

ERODE SENGUNTHAR

ENGINEERING COLLEGE (An Autonomous Institution)

Approved by AICTE, New Delhi, Permanently Affiliated to Anna University- Chennai, Accredited by National Board of Accreditation (NBA), New Delhi & National Assessment and Accreditation Council (NAAC), Bangalore with 'A' Grade

PERUNDURAI -638 057, TAMILNADU, INDIA.





DEPARTMENT OF MECHANICAL ENGINEERING

Two Days National Conference on Advances in Mechanical Engineering for Sustainable Development (**AMESD 2022**)







About ESEC

Erode Sengurthar Engineering College is a well -developed institution offering a variety of programs in UG and PG degree courses. Erode Sengunthar Educational Trust started the College in the year 1996 with a vision to provide world class technical education for the upliftment of urban and rural youth. The Management of Erode Sensuritian Educational Trust has been associated with various Educational Institutions like Matric & Higher Secondary Schools, etc.

It is an Autonomous institution accredited by NMAC with 'A' Grade and institute of Engineers (India). Eligible UG Programmes are accredited by National Board of Accreditation (NBA), approved by AICTE and permanently affiliated by Anna University, A Nanufacturing Unit (HARLI LAB SYSTEMS) established at a Cort of 2 Grares in 10,000 Sq.ft to fabricate and commissions fume hoods required for charmaceutical industries. A Narufacturing Unit (CNC Machining centre; established with the cost of around 1.5 crores to manufacture gears, cams, camshafts, valve bodies, spindies, bolts and nots. A fully operated Sanitary Napion Manufacturing unit set, under NRDWS project with a production capacity of 10,000 units was commissioned in the year 2016.

About the Department

The Department of Mechanical Engineering was established in the year 1996. It has the state of art laboratory factities equipped with high caliber equipment and machinery. The department is Pi collaborated with M/s Roots industry Colmbatore, W/s TV5 Training and O Services Chernel, Nacional Skill Training Institute Bangalore and O Advanced Training Institute Chennal to offer training to staff and \$4 students to improve their practical knowledge and skills. The department is an Approved Research Center by the Anna University M Chennal to carry out the collaborative research.

UG programme of BE Mechanical Engineering is accredited by the National Board of Accreditation (NBA), New Delhi since 2009 and is reaccredited in the year 2020 for a period of three years as well as BE Nechanical Engineering(Tarril Medium) is accredited by AICTE in the year 2020. Students are exposed to latest developments in the field of Mechanical Engineering by means of organizing symposial seminars, workshops to enrich their knowledge. Apart from that, the students are trained in language taboratory to enhance their communication skills and in software packages to design and simulate and analyses the mechanical components

About the AMESD-2022: 😿

The Conference aims at bringing together Researchers, industry Experts and Students for knowledge sharing session. The Conference consists of keynote ackness and paper presentations.

Call for Paperst

The organizing committee of AMESD-2022 condially invites the contributors to submit articles for the conference of Sustainable Development in Mechanical Engineering. Paper Submission Format: 🌔

Full text papers with IEEE format in word document (.doc). Email to Ame

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750/-
1000/-
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Important Dates Submission of Paper (Dead	20.10.2022
Intimation of Acceptance after review	27,10.2022
Last Date for Registration	29.10 2022
Conference Date	01.11 2022 8 02.11 2022

From the Editor's desk

Warm greeting!

In order to enhance professional skills of the budding engineers and hone their expensive with technical inputs in various spheres, through state of the art techno-centric interactions with contemporary learners from all over the country, Mechanical Engineering departments of Erode Sengunthar Engineering (Autonomous) is conducting a Two days National Conference on Advances in Mechanical Engineering for Sustainable Development "AMESD 2022" on 01 & 02 November 2022.

Mind-blowing arrangements by our students, ebullient participation of our delegates, praiseworthy performances and fruitful outcomes are the hall marks of "AMESD 2022", every year.

This year – AMESD conference 2022 is all set to surpass set limits. The meticulously screened and short-listed papers for the final presentation are sure to create technology revolution by means of which the young engineers find success in their research in the coming days.

We are eagerly looking forward for more such knowledge sharing interactions with the technocrats all around the country in the future...!

ACKNOWLEDGEMENT

Right from contriving a schematic plan to organizing the multifarious activities, AMESD involves lot of untiring effort and thorough commitment.

Our founder correspondent Udyog Rattan, **Thiru.J.Sudhanadhen** always blesses us in our endeavors. We dedicate this **AMESD 2022** to his great soul.

We acknowledge the keen interest shown and motivation provided byourpresidentThiru.V.Annadurai,CorrespondentThiru.G.Kamalamurugan,SecretaryThiru.S.N.Thangarajuandthedignified trust members of Erode Sengunthar Educational trust.

We do thank the sincere efforts taken and apt guidelines given by our respected principal **Dr.V.Venkatachalam**, for the successful conduct of this symposium.

We record our heartfelt thanks to **Dr.N.Saravanan**, Head of the Department/MECH, **Mr.S.Karthikeyan & Mr.S.Manikandan**, Organizing Secretaries, **Mr.B.Srimaan**, **Mr.S.Pragadeshwaran & Mr.J.Sethubathi**, Student Coordinators for their fullest cooperation and appropriate coordination in every aspect of AMESD 2022.

We thank all the teaching and non-teaching staff members of the Mechanical Engineering for their effusive effort and praiseworthy support.

Seeking the blessing and wishes of all, in our futures endeavors too...!

ABOUT THE COLLEGE

Erode Sengunthar Engineering College (Autonomous), permanently affiliated to Anna University, Chennai, was established in the year 1996 for the upliftment of urban and rural youth by the philanthropic visionaries of Erode Sengunthar Educational Trust. The college offers fifteen UG programmes and nine PG programmes in Engineering, Technology, Computer Application and Management. All the UG programmes offered in our college are certified by National Board of Accreditation (NBA), New Delhi. The college has full-fledged infrastructure furnished in all aspects. The college has been awarded ISO 9001:2008 Certification for excellence in quality education by British Standards Institution.

ABOUT THE DEPARTMENT

The Department of Mechanical Engineering was started in the year 1996. It has good infrastructural facilities with well-experienced and dedicated team of faculty members. The Department has been accredited by NBA New Delhi. In addition to B.E. Mechanical Engineering, B.E. Mechanical Engineering (Tamil Medium), B.E. Robotics & Automation, the department offers M.E., – Manufacturing Engineering and M.E. Industrial Safety Engineering Degree programmes. The college has signed active Memorandum of Understanding (MoU) with Asian Pacific University of Information and Technology, Malaysia and the Department of Mechanical Engineering is coordinating the same. The Department has signed MoU's with Companies like Kriatec Services Pvt. Ltd., Chennai, Latha Non-ferrous Castings, Coimbatore, Sivan Industries, Erode, CADD Centre, Erode,

COINDIA, Coimbatore, Movement for Green Revolution, Chennai and has collaboration in Research and Development / Student project / Consultancy works. Every year the department is organizing National Conference (AMESD). The department had received funds from CSIR, AICTE, Ministry of New and Renewable Energy, Govt. of India, New Delhi, Indian Society for Technical Education, New Delhi, etc., for organizing professional events. The students of Mechanical Engineering have excelled in the Anna University Examinations. In the University Examinations held in April / May 2014 our students Babin Sam. G.J. secured 13th rank, Manikandan. R secured 32nd rank, Ilaiyaraja. D secured 37th rank and Gowthaman. M secured 40th rank. Indian Institute of Production Engineers, Bangalore has honored our Department with "Most Active Student Chapter Award" for the academic year 2013-2014. Our student project titled "Physico Pump" was awarded Second prize under Energy & Sustainability Category in National Project Contest, jointly organized by All India Manufacturing Organisation and Anna University, Chennai during 21st and 22nd February, 2014.



Thiru. V.ANNADURAI, President, Erode Sengunthar Educational Trust

"Any man worth his salt will stick up for what he believes right, but it takes a slightly better man to acknowledge instantly and without reservation that he is in error."

Andrew Jackson

It is a matter of pride to pen down the message for AMESD conference the knowledge of ESEC which paves the platform for Engineering students, School students to enhance the Academic excellence along with co-curricular activities for the process of education and it gives me great satisfaction that ESEC is progressing in all its endeavors towards the overall development and personality of our college students but also for all students 'community. Conference is a platform for the students to express their creative pursuit which develops in them originality of thought and perception which build our youth for the future.

I wish success to ESEC in all its endeavors.

(Thiru. V.ANNADURAI)



Thiru. G.KAMALAMURUGAN, Correspondent, Erode Sengunthar Engineering College

"We cannot always build the future for our youth, but we can build our youth for the future."

Franklin D. Roosevelt

It is a matter of pride to pen down the message for Padhmaviyuha the annual festival of ESEC which paves the platform for Engineering students, Polytechnic students, Arts & Science students, School students to enhance the Academic excellence along with co-curricular and extracurricular activities for the process of education and it gives me great satisfaction that ESEC is progressing in all its endeavors towards the overall development and personality of our college students but also for all students 'community. Padhmaviyuha is a platform for the students to express their creative pursuit which develops in them originality of thought and perception which build our youth for the future.

I wish success to ESEC in all its endeavors.

(Thiru. G. KAMALAMURUGAN)

Thiru. S.N.THANGARAJU, Secretary, Erode Sengunthar Educational Trust



Keeping in mind that today life is an epitome of competition, ESEC takes care to inculcate professionalism among the students while shaping and sharpening their mindsets. We foster due emphasis on exposing our students to real-life situations of the corporate world and enriching them with life turning experiences to become self-reliant.

Every year, we celebrate AMESD conference to exhibit the academic innovation in co-curricular activities and extracurricular activities of entire student community of the Region in specific and talented students from entire country in general.

I wish AMESD conference to tap the knowledge of this country.

(Thiru. S.N.THANGARAJU)



Dr. V.VENKATACHALAM,B.E., M.S., M.E., Ph.D., Principal, Erode Sengunthar Engineering College

"Education is the passport to the future, tomorrow belongs to those who prepare for it today"

We at ESEC focus on Engineering education to keep pace with mighty changes and challenges occurring today in this technological era. The management is too keen on providing high quality technical education.

Apart from academics, we encourage and ensure the development of our students in extracurricular and co-curricular activities to shape them as complete personalities. Every year, we organize AMESD conference to kindle students' innovative technical skills. Also, we motivate and facilitate our students for attaining leadership qualities.

I wish all the participants of this grand event.

(Dr.V.VENKATACHALAM)



Dr.N.SARAVANAN, M.E., Ph.D., Prof. & Head/ Mechanical Engineering, Erode Sengunthar Engineering College

I am very happy to note that the Department of Mechanical Engineering is organizing various events such as Paper Presentation/ Journal Presentation in view of Two days National Conference on "AMESD 2022" during 01 & 02 Nov 2022. This is an opportunity for the stake holders to exhibit their talents in all activities.

It is learned that our conference received very good response from the participants throughout the country.

I congratulate all the students who took many initiatives to make the event a memorable One.

I convey my best wishes for the successful conduct of "AMESD 2022".

(Dr.N.SARAVANAN)

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DESIGN AND FABRICATION OF HYBRID MATRIX COMPOSITE USING PET BOTTLE AND METAL POWDER

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ABSTRACT

The development of biodegradable plastics has caught up with non-biodegradable plastics, but there is still no correct answer. Because of the toxic plastic we've been using for days. The most important The motivation for this study is to eliminate single-use PET disposal. Bottle. Non-biodegradable plastics are discarded without reuse Landfill. Treating generated waste plastic with crushing technology Eliminate the possibility of contaminants caused by heating plastic. Useless, Putting plastic into a crusher and processing it into a PET bottle into granules or powder. These powders are then combined with reinforcement materials, namely metal powder and epoxy resin and hardener.

Keyword: - Hybrid composites; PET bottles; Pulverization; Mechanical properties, Microstructure

1. INTRODUCTION

Polyethylene terephthalate (PET) is a semi-crystalline polymer. Composites are used in packaging, construction, automotive, household, electrical, textile industry. Great efforts have been made improve various physical, mechanical and barrier properties of PET Mix with nano grades to produce layered clay PET composites. Or In this case, the recovery efficiency of polymeric materials is greatly improved. After crushing, crush finely. Polymer nanocomposites are a class of nano scale materials. Particles such as layered clay and spherical inorganic minerals are dispersed within the polymer matrix. Polymer compared to pure polymer Nano composites are said to have significantly improved properties such as: Modulus, strength, stiffness, flame resistance, dimensional stability, electricity conductivity, barrie performance, solvent resistance, heat resistance, wettability, Stainability depending on the type and content of nano particles used. Composites are mixtures of the following substances:

1.1 Polymer Matrix Composite

Polymer matrix composites (PMCs) are present on nearly every side. Modern life - from gadget parts to a wide range of automobiles accessories. Derived from the name meaning that many repeating units are polymeric Often composed of chemically bonded carbon and hydrogen branches make a chain Polymers commonly used as composites are thermoplastic Polymers, thermoset polymers or elastomers. You are the source of a wide range A variety of inexpensive raw materials that offer many advantages such as:

- Low specific weight
- High material stability against corrosion
- Good electrical and thermal insulation
- Ease of shaping and economic mass production

• Attractive optical properties

1.2 Properties of PMCs

The components of PMC that affect its overall characteristics are:

- Matrix This is the polymer that is the continuous phase. Classified as a weak link in the PMC structure.
- Reinforcement This is the discontinuous stage and the main structural element. It can be either glass, quartz, basalt, or carbon fiber.
- Intermediate stage intermediate stage between reinforcement and matrix the phase in which load transfer takes place.

2. PRODUCTION OF POLYMER MATRIX COMPOSITES

Polymer is reinforced with 150 micron metal powder It is collected at the workshop and treated as waste. Metal powder 150 μ m of 150 μ m are collected by sieve analysis. These metal powders are injection, extrusion. It is pressed or stamped and then cured to produce the final composite. During the manufacture and molding of polymer matrix composites there are many finished products that incorporate the molding of the material itself manufacturing process.



2.3 Stress Strain Diagram

Designing the extraordinary elements of machinery, it is important to be aware of how the fabric will perform in use. To do this, you need to understand certain material properties or houses. Primary tensile testing is commonly used to evaluate mechanical housing in mechanical engineering research. In these experiments, we increase the number of loads on a regular fabric sample and record the resulting load and elongation values before the sample breaks. Use the test unit to measure the weight. "Pressure is calculated by dividing the weight value by the running stitch. Sample floor elongation is calculated by calculating the time it takes to move a positive distance. We can see the hypothetical C age under 2 house factors. The measurement period is the gap between the reference factors. High temperature, Dividing the elongation value by the measurement time, this gives listed below.



Chart -1: Stress strain diagram

3. TYPES OF MECHANICAL TESTING

3.1 Tensile Test

A tensile test is a physical laboratory test that is performed. Substances to determine suitability for precision engineering and production program for making a certain quality.



Fig -2: Tensile test machine

3.2 Flexural Test

Bend sorting out in composites is used to determine flexural energy and stiffness of a strong laminate or sandwich construction. The specimen is loaded in a horizontal feature in a three-thing or four-thing loading configuration in 10 a flexural check. The check fixture has a assist thing near every edge of the beam and a loading nose with one (third-thing loading) or two (four-thing loading) configurations. The distance amongst supports, and the loading elements within the four-thing configuration, can be effortlessly modified to complete the fixture too big specimen geometries and thickness-period ratios. The ASTM well known we accompanied in our paintings turned into D790.

3.3 Compression Test

Compression checking out is frequently performed to damage (rupture) or to a restriction. When the take a look at is completed to damage, damage detection may be described relying at the kind of cloth being tested. The ASTM standard that we have used in our work is D3410 (150x25x6).

3.4 Impact Test

Engineers take a look at the cap potential of a cloth to stand as much as impact to be looking forward to its behavior beneath actual conditions. Many materials fail unexpectedly beneath impact, at flaws/cracks or notches. The most common location impact tests use a swinging pendulum to strike a notched bar; heights in advance than and after impact are used to compute the energy required to fracture the bar. In the Charpy take a look at, the take a

look at piece is held horizontally amongst vertical bars. In the Izod take a look at, the specimen stands erect, like a fence post.

3.5 Micro-hardness Test

Hardness take a look at techniques use an indenter probe that is displaced proper right into a ground beneath a selected load. The indentation commonly has a described live time. In traditional mechanical sorting out, the scale or intensity of indentation is measured to determine hardness. Hardness sorting out is cut up into ranges: macro-hardness and micro-hardness. It covers sorting out with a carried-out load over 1 kg or about 10 Newton (N). Micro-hardness sorting out, with performed hundreds beneath 10 N, is commonly used for smaller samples, thin specimens, plated surfaces or skinny films. The most not unusual place micro-hardness techniques are Vickers and knoop hardness tests.

3.6 Vickers Hardness Test

The Vickers hardness take a look at uses a Vickers indenter (below) pressed proper right into a ground to an actual strain. The strain is normally held for 10 seconds. After the indentation is finished, the following indent is analyzed optically to diploma the lengths of the diagonals to determine the size of the impression.

4. CONCLUSIONS

The polymer matrix composite changed into bolstered with Metal powder and single-use waste plastic. We utilized waste plastics in powdered form via way of means of using a plastic pulverizing machine, so there'll no want of heating or melting the plastic and there may be no opportunity of poisonous gases escaping into the surroundings that reasons air pollutants and that is achieved via way of means of pulverization approach that converts plastic flakes into powder or granules which does now no longer pollute the environment. As a result, it aids in the reuse of plastics at the same time as additionally lowering pollutants. We created kind of compositions here. In assessment to the primary kind composition, the second kind composition has produced a higher result. Since those plastics are combined with resin it turns into corrosion resistant and warmth resistant and affords extended lifestyles to the product. The use of metallic powder adds electricity and stiffness to the composite. Since metallic are used as a dispersed segment of reinforcement, it consequences in generating mild weight components without sacrificing the electricity

5. ACKNOWLEDGEMENT

We humbly submit all the glory and thanks to our almighty for showering the blessing upon us and give us the necessary wisdom for accomplishing this project.

First and foremost, we would like to submit our sincere and heartfelt thanks for our Founder Udyog Rattan Deiva Thiru.J. SUDHANANDHEN, for his blessings to us for complete this project.

We express our gratefulness to our respectable president **Thiru.V.ANNADURAI**, Correspondent **Thiru.S.KAMALAMURUGAN**, and our honorable Secretary **Thiru.S.N.THANGARAJ**, for having offered us the golden opportunity to do the project work in this prestigious institution.

We like to express thanks to our Principal **Dr.V.VENKATACHALAM,M.E.,Ph.D.**, for forwarding us to do our project and offering adequate duration in completing our project.

We are grateful to **Dr.N.SARAVANAN,M.E.,Ph.D.**, Head of the Department of Mechanical Engineering for his anchoring support and constant innovative advices in doing this project.

We express our sincere thanks to our Project Guide **Mr.N.S.MOHAN,M.E.**,(**Ph.D**)., Assistant Professor, Department of Mechanical Engineering, for his constant guidance, constructive criticism and encouragement throughout our project work.

We express our thanks to our Project Coordinator Dr.S.NAVANEETHAKRISHNAN, M.E., Ph.D.,

Associate Professor, Department of Mechanical Engineering, who were always with us to carry out this project successfully.

We would like to enunciate special thanks to our friends, teaching and non- teaching staffs who have directly and indirectly contributed to the success of this project.

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DESIGN AND FABRICATION OF MINI WOODEN LATHE MACHINE

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ABSTRACT

The purpose of a project is to construct a portable wood lathe machine that is effective and useful. We'll evaluate and combine the various potential design concepts and solutions. We will analyse each machine component part in order to find the best size for the given loads and stresses. We'll use locally accessible supplies and equipment from a workshop, as well as some machine tools from the college workshop. To assess the overall cost of a prototype, the costs of materials, labour and overhead will be calculated. The machine basically consists of a wooden frame, a headstock that is fixed in place, a tailstock that travels along the machine's bed, and a tool rest positioned on a cross slide that can be moved across the bed both longitudinally and transversely. Between the support and the support, it has been resolved. The capital cost of machining can be decreased by using the micro lathe machine, which also lowers labour costs. Due to its portability and mobility, the machine would be simple to handle and maintain. It will use less power than traditional lathes and be simpler at the same time because of its portability and small size.

Keyword: - Fabrication, portable wood, lathe machine, tools

1. INTRODUCTION

In recent, when it comes to the choice of various designs and models demand for interior decoration and furniture has been increased. This has led to the design of a good number of machines that can be used by the craftsmen to create different wood designs amongst which are the wood lathe machine.

1.1 Objectives

To model and fabrication of portable wood lathe machine is justifying a simple way of cutting off wood at its best quantity at minimum cost of labour.



Fig -1: Machining process

www.ijariie.com



Fig -2: Frame

1.2 Literature review

This project is about portable wood lathe. We find that during machining, vibration is a common problem, affecting machining efficiency and especially surface finish and tool life. Heavy vibration occurs in machining environment due to movement between the cutting tool and the workpiece. In all cutting operations such as turning, boring and milling, vibration is caused by deformation of the workpiece, machine structure and cutting tool. A new approach is also taken where the system uses O as a method to minimize the testing work required and gives a good assessment of the designed monitoring system. The average dependencies of the proposed systems are compared with the pattern recognition ability of the back-propagation neural network and the logical.

1.3 Statement of problem

The constant quest to solve human problems and growing needs has led to the establishment of factories and other industries, requiring intermediate technology. In addition, the formerly easy-to-use manual equipment is no longer properly used today for mass production. Similarly, the importation of wood lathes, to replace these tools, also cannot meet the instatiable human needs due to our unstable economy.

Then demand drew attention to a more powerful woodworking machine, created in the area. Study Subject The design and construction of the wood planer aims, together with other factors, to demonstrate a simple way to scrape and split the highest quality wood with minimal labor, so that the financial burden of the individual is reduced. The simplicity of design and manufacture of this machine makes it possible, reliable and easy to carry out maintenance services at the lowest cost.

2. SCOPE OF STUDY

Basically, the machine consists of a wooden frame, with the head in position, the chuck moving along the machine base and the tool holder mounted on a horizontal slider that can be moved both vertically and horizontally on bench. It is placed between support and thus support. In operations, the machine is limited to turning and cutting any wood style. Unable to performs drilling operation on the machine.

2.1 Dimension and specification

Below are the scale and specification as regards the fabrication of the wood shaping machine.

- **1.** Total length of the machine35inches
- 2. Total height of the machine 8 inches
- **3.** Width of the machine 11 inches
- **4.** The electric motor BLACK + DECKER
 - Rpm2900 rpm
 - Drill Capacity 13 mm
 - Power500 watts
 - Voltage 5 volt
 - Current 8 amps
- 5. The space between the bed rails
 - Maximum13inches
 - Minimum7inches

- **6.** Diameter of the headstock pulley 0.47 inches / 12mm
- 7. Diameter of electric motor's pulley 0.39 inches / 10mm
- 8. Width of tailstock 9 inches
- 9. Maximum length of work piece 10.62 inches / 27cm
- **10.** Minimum length of work piece 8.6 inches / 22cm

2.2 Material selection

We use wood to make prototypes. In any lathe, gray cast iron is used, but gray cast iron is not available everywhere, and the cost is also high and the weight is large compared to the wooden. In case we use gray cast iron, the cost of processing and labor increases by more than compared to the cost of wood processing. Only we introduce a new way of wood lathe which is movable head and fixed head to compare with other lathes. For this project, wood is the perfect material for prototypes if we use gray cast iron, CNC machining and machining costs and lead times are high. As we choose wood to make prototype wood lathe.

2.3 Analysis



Fig -4: Frame analysis

3. PRINCIPAL

3.1 Maximum Principal Elastic Strain Minimum Principal Elastic Strain Assembly Procedure

Stage -1 (base/bed)

- 1. First we are going to take wooden blocks according to the above Dimensions and specifications.
- 2. Then after make a base by using respected tools length-35inchs, width-11inchs, height- 8inchs)

Stage -2 (head stock)

- 1. Now we are going to make a base like a block (length-10inches, width-8inches, height-5inches) and to kept on the bed at a side and it is stable.
- 2. On this base we are going to place a hand drilling machine and it is fixed by the wooden clam which is made by hand and fixed tritely

Stage -3 (tail stock)

- 1. The tail stock part is made (length-15 inches, width-8inches, height-7inches) by wood and it is fix at opposite side of the head stock.
- 2. This tail stock is moving in the horizontal to the lathe machine and not exceed from the bed.
- 3. The tail stock have a hole at the top and it carries a bolt and it is use to hold the work piece tritely



Fig -5: Outcome product

3.2 Safety guide

When the wood lathe is in operation, it is important to wear certain Personal Protective Equipment (PPE). Do not wear loose consumables, remove all jewelry, and tie long hair. excellence created during filming will have to be forcibly removed infrequently. Eye protection may be required during wood shaping. There are many PPEs available for eye protection such as safety specifications, goggles and face shields, some equipped with internal respirators. while all these squared measurements are sufficient, for the best level of protection a face shield should be worn that protects the entire head from mud and debris

Ear protection - Compared to other power tools, a lathe is a quiet machine. Ear protection should be used if noise is excessive; this may be due to motor (fan) noise from a shop dust collector, or the combination of wood and tool being used.

Hand/skin protection - Gloves should not be used with rotating equipment, since there's always a risk of getting tangled in the machine. Nevertheless, some woods provide splinters that not only puncture skin, but also cause festering sores and/or skin irritation. Polishes and finishes used in woodturning can also be harmful or irritati to skin, often containing organic solvents such as methanol, turpentine and toluene. This subject continues to be debated in the community.

Protective footwear, often leather steel-toe boots, is required for any type of shop activity. A good way to check the safety before starting the lathe is 'SAFER':

• S - Speed - check the rpm speed, slower for big, heavy things, faster for smaller lighter things. Most authors recommend always starting at slow speeds and re-setting speed to low at end of session.

• A - Aside - make sure you are standing to the side of the blank's 'firing line' (not in front of the wood).

• F - Fixings - check that the wood, tool-rest, tail-stock etc. are correctly attached.

• E - Eye protection - make sure you're wearing sufficient eye protection

• R - Revolve - Check that the wood can turn around without encountering any obstructions, such as the tool rest, by rotating it by hand.

Safe usage of a lathe also depends on the operator's choice of proper techniques for the lathe, tools, and wood.

3.3 Cost report

SL NO	MATERIAL	QUANTITY	COST
1	Wood	5 feet	400
2	Bolts& Nuts	5 pairs	25
3	Drilling Machine	1 piece	2000
4	Tools	6 Pieces	300
5	Nails	100 grams	50

Table -1: Material cost

4. CONCLUSIONS

In this project a study has been done on mini lathe machine to know about its portability, reliability and cost reduction. The fabricated model of the design will be portable, cost efficient and can be assembled and dismantle according to the use which will increase the mobility of the machine and can be easily carried. The ordinary workers who can't afford the conventional lathe machine can buy this portable mini lathe machine and can perform their machining operation effectively. The mini lathe machine can reduce the capital cost of machining reducing the labor cost. The machine would be easy to handle because of its mobility and portability and can easily be maintained. Because of its portability and small in size it will consume less power than conventional lathes and at the same time will be simple.

5. ACKNOWLEDGEMENT

We humbly submit all the glory and thanks to our almighty for showering the blessing upon us and give us the necessary wisdom for accomplishing this project.

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DESIGN AND FABRICATION OF REGENERATIVE BRAKING SYSTEM

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ABSTRACT

Most brakes generally use friction among surfaces pressed collectively to transform the kinetic strength of the shifting item into heat, eleven though different strategies of strength conversion can be hired as all of the strength right here is being dispensed within side the shape of heat. Regenerative braking converts lots of the strength to electric strength, which can be saved for later use. Driving a vehicle includes many braking events, because of which better strength losses takes place, with extra ability savings. With buses, taxis, transport trucks and so forth there may be even extra ability for economy. As we understand that the regenerative braking, the performance is stepped forward because it effects in a growth in strength output for a given strength enter to an automobile. The quantity of labor achieved through the engine of the automobile is reduced, in flip decreasing the quantity of strength required to force the automobile. The goal of our assignment is to look at this new form of braking device which can bear in mind lots of the car's kinetic strength and convert it into electric strength or mechanical strength. We also are going to make a running version of regenerative braking to demonstrate the manner of conversion of strength from one shape to another. Regenerative braking converts a fragment quantity of overall kinetic strength into mechanical or electric strength however with in addition look at and studies in close to destiny it may play a crucial function in saving the non-renewable reasserts of strength...

Keyword: - Regenerative brakes, Electric Strength, Electric Motor, and Kinetic energy recovery system

1. INTRODUCTION

1.1 Design and fabrication of regenerative braking system

A brake is a mechanical tool that inhibits movement by means of soaking up electricity from a shifting machine. It is used for slowing or preventing a shifting car, wheel, axle, or to save you its movement, most customarily done by way of friction. The term 'Braking' in a shifting car way the utility of the brakes to lessen its pace or forestall its movement, typically by means of miserable a pedal. The braking distance is the space among the time the brakes are carried out and the time the car involves a whole forestall. In braking structures on traditional vehicles, friction is used to counteract the ahead momentum of a shifting car. As the brake pads rub towards the wheels or a disc this is linked to the axles, immoderate warmness electricity is created.

Most of it genuinely receives launched with inside the shape of warmth and turns into useless. That electricity, that can had been used to do work, is basically wasted. The answer for this form of this hassle is Regenerative Braking System. This is a brand new sort of braking machine which could remember lots of the car & kinetic electricity and convert it into electric electricity or mechanical electricity. The electricity so produced can then be saved as mechanical electricity in flywheels, or as, electric electricity conversion in RBSs such as spring, flywheel, electromagnetic and hydraulic. More recently, an electromagnetic-flywheel hybrid RBS has emerged as well. Each sort of RBS makes use of a specific electricity conversion or garage method, giving various performance and programs for every type. The impact of regenerative brakes is much less at decrease speeds compared to that at

better speeds of car. So the friction brakes are wanted in a state of affairs of regenerative brake failure, to forestall the car completely.

1.2 Need for regenerative braking system

The regenerative braking device can provide some of sizeable benefits over a vehicle that simplest has friction brakes. In low-speed, stop- and-move visitors in which little deceleration is required; the regenerative braking device can offer the bulk of the entire braking force. This hugely improves gas economic system with a vehicle, and similarly complements the beauty of cars the usage of regenerative braking for metropolis driving. At better speeds, too, regenerative braking has been proven to make a contribution to stepped forward gas economic system – with the aid of using as a good deal as 20%

1.3 Brakes as an electrical generator

The regenerative brake is a form of generator, originally discovered in 1832 by Hippolyte Pixii. The generator rotor slows down as kinetic energy is converted into electrical energy by electromagnetic induction. Generators can be used as a generator or brake by converting motion into electricity, or reversed to convert electrical energy into motion. The use of a generator as a regenerative brake was found to coincide with modern electric motors. In 1873, Znobe Gramme tied the wires of two generators together. When one rotor of the generator is turned into a regenerative brake, the other becomes an electric motor.

2. AIM OF RESEARCH

To lay foundation for building totally upgraded regenerative slowing mechanism for Recipe Crossover racecar. To plan and test a reasonable models utilize computational recreation devices. To track down an ideal harmony between the points of plan to plan the framework, however not think twice about wellbeing. To reproduces the entire framework in ADAMS for virtual testing.



In this undertaking two regenerative slowing down ideas must be concentrated on to track down an ideal method for consolidating a regenerative slowing down with a customary frictional stopping mechanism to accomplish maximal energy recovery. For the most part, the regenerative slowing down force can't be made adequately enormous to give all the required slowing down force of the vehicle to guarantee vehicle steadiness. Moreover, the regenerative stopping mechanism may not be utilized under many circumstances, for example, with high condition of charge Territory of Charge (SOC) or high temperature of the battery.



Fig -2: Regenerative braking system

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2.1 Idea of regenerative braking system

Idea of this regenerative brake is better perceived from bike fitted with Dynamo. In the event that our bike has a dynamo (a little power generator) on it for controlling the lights, we'll know it's harder to hawk when the dynamo is locked in than when it's turned off. That is on the g rounds that a portion of our hawking energy is being "taken" by the dynamo and transformed into electrical energy in the lights.

Parameter	Frequency, %	Avg Power without RBS, kW	Avg Power with RBS, kW
Acceleration	15.8	21.8	19.5
Deceleration	0.0	25.2	0.0
Stationary	0.0	8.0	0.0
Constant Speed	10.0	45.0	2.9
Increase in efficiency	51.7	$\mathbf{y}_{\mathbf{z}}$	

Table -1: RBS on rural model

2.2 The motor as a generator

Vehicles driven by electric engines utilize the engine as a generator while utilizing regenerative slowing down, it is worked as a generator during slowing down and its result is provided to an electrical burden; the exchange of energy to the heap gives the slowing down effect. Regenerative slowing down is utilized on mixture gas/electric cars to recover a portion of the energy lost during halting. This energy is saved in a capacity battery and utilized later to drive the engine at whatever point the vehicle is in electric mode.

3. WORKING PRINCIPLE

Regenerative slowing down and regenerative brakes are components that can be tracked down in totally electric and gas-electric creamer vehicles. Automobiles like the creamer Toyota Prius, Portage Combination Cross breed and Honda understanding and the totally electric Tesla Roadster incorporate regenerative easing back instruments. Regenerative easing back systems benefit from the resemblances being developed of electric motors and electric power generators. An electric motor's inside is involved copper windings. It uses an electromagnetic imperativeness field to convey force through its essential shaft, when power is associated with it. A generator or dynamo is similarly elaborate copper windings and makes use of an electromagnetic field; applying an oblige to turn its rotor licenses it to deliver electric power. Regenerative slowing down relies upon the rule of material science that communicates that vitality can't be squashed; it should be changed beginning with one shape then onto the next. In a regenerative halting instrument, the objective is to recuperate the imperativeness secondary effect that outcomes when the brakes are associated. In electric or creamer vehicles, the electric motor that drives the auto's wheels as critical impact in the midst of slowing down. Right when the brake pedals pressed, the regenerative slowing down circuit switches the motor with the goal that it presently works in reverse to counter the course of the wheels. This reversal truly causes it to perform like a power generator or dynamo that produces electrical imperativeness. The power made is guided towards the auto's stockpiling batteries to resuscitate them. The viability of regenerative halting systems being utilized today has enhanced basically. A few current systems can catch and store however much 70% of the vitality that would somehow have been lost. At higher speeds, regenerative brakes still.

3.1 Regenerative braking efficiency

The energy effectiveness of a regular vehicle is something like 20%, with the excess 80% of its energy being changed over completely to warm through grinding. Themiraculous thing about regenerative slowing down is that it may have the option to catch however much 50% of that squandered energy and set it back to work. This

could reduce fuel utilization by 10 to 25 percent. Hydraulic regenerative stopping mechanisms could give even more amazing additions, possibly diminishing fuel use by 25 to 45 percent. In a century that might see the end of the tremendous petroleum derivative holds that have given us with energy to auto and different innovations forms any years, and in which fears about carbon emissions are coming to a pinnacle, this additional efficiency is turning out to be progressively important. The added proficiency of regenerative slowing down also mean less torment at the siphon, since cross breeds with electric engines and regenerative brakes can travels considerably farther on a gallon of gas, some achieving in excess of 50 miles for every gallon at this point. And that is something that most drivers can really appreciate.



4. CONCLUSIONS

The regenerative slowing mechanism utilized in the vehicles fulfills the motivation behind saving a piece of the energy lost during slowing down. Likewise it very well may be worked at high temperature range and are proficient when contrasted with traditional stopping mechanism. The outcomes from some of the test led show that around 30% of the energy conveyed can be recuperated by the framework. Regenerative stopping mechanism has a wide degree for further turn of events and the energy investment funds. The utilization of additional proficient frameworks could prompt colossal reserve funds in the economy of any country.

5. ACKNOWLEDGEMENT

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DESIGN AND FABRICATION OF HYDRAULIC ASSISTED PICK AND PLACE ROBOTIC ARM

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ABSTRACT

Weight Are you wonder about how jacks in functions shop lift vehicles? Great, the response is pressure driven frameworks. Pressure driven power, that arrangements with the age, control and transmission of power utilizing compressed fluids. They convert a little info exertion into the bigger power to finish the work, similar to the support switch idea. The guideline behind the water powered framework is called Pascal regulation. The ongoing work shows the creation and Position control of 3 DOF mechanical arm produced using Cardboard

Keyword: - Fluid Power, Liquid power, Pneumatic power, and Pascal'S Law etc...

1. INTRODUCTION

In particular liquid framework is ordered into two sorts called as liquid vehicle framework & liquid power framework. Liquid vehicle framework is to ship/Convey liquids from one spot to somewhere else to accomplish some valuable reason like vehicle of water from water supply to houses. Liquid power is the innovation that arrangements with the Age, Control, and Transmission of force utilizing compressed liquids as is oil utilized in different development and earth-moving hardware to achieve the wanted developments and consequently to perform planned work. Liquid power framework further delegated two sorts called Pressure driven power framework & Pneumatic power framework. Water driven power is sent by the strain and stream of fluids. The most well-known fluids utilized are petrol oils. Pneumatic power is sent by the strain and stream of packed gases. The most generally utilized gas is air.

1.1 Materials used for hydraulic arm

Development parts take into account more prominent other option and imaginative plans. They are not needed, yet are proposed to bring seriously designing and advancement to the action. A couple of development parts are typically expected to make elective plans, so your inventory of advancement parts can be utilized for some water powered arms and different exercises. Here are the parts that are utilized in this project.

1.2 Experimental setup

Liquid power is a term which was made to incorporate the age, control, and use of smooth, compelling force of siphoned or packed liquids (either fluids or gases) when this power is utilized to give force and movement to instruments. This power and movement perhaps through pushing, pulling, turning, managing, or driving. Liquid power incorporates hydrodynamics, which includes fluids, and pneumatics, which includes gases. Fluids and gases

are comparative in many regards. The distinctions are called attention to in the proper region of this manual. This manual presents a considerable lot of the major ideas in the fields of power through pressure and pneumatics. It is planned as a essential reference for all faculty of the Naval force whose obligations and obligations expect them to have an information on the essentials of liquid power.

2. ADVANTAGES OF FLUID POWER

The broad utilization of hydrodynamics and pneumatics to send power is expected to the reality that appropriately developed liquid power frameworks have various positive qualities. They dispose of the requirement for muddled frameworks of pinion wheels, cams, and switches. Movement can be trans-mitted without the leeway innate in the utilization of strong machine parts. The liquids utilized are not expose to breakage as are mechanical parts, and the systems are not exposed to perfect wear. The various pieces of a liquid power framework can be strategically placed at generally isolated places, since the powers produced are quickly communicated over significant distances with little misfortune. These powers can be conveyed up furthermore, down or around corners with little misfortune in proficiency and without confounded systems. Extremely huge powers can be constrained by a lot more modest ones and Liquid Power Gas Fluid Pneumatics Power through pressure can be sent through relatively little lines and openings. Assuming that the framework is all around adjusted to the work it is expected to perform, and on the off chance that it isn't abused, it can give smooth, adaptable, uniform activity without vibration, and is unaffected by variety of burden. If there should be an occurrence of an over-burden, a programmed discharge of tension can be ensured, so the framework is safeguarded against breakdown or strain. Liquid power frameworks can give generally factor movements in both rotational and straight-line transmission of force. The requirement for control by hand can be limited. Likewise, liquid power frameworks are practical to work.

The inquiry might emerge regarding the reason why hydrodynamics is utilized in some applications and pneumatics in others. Many variables are viewed as by the client as well as the maker while figuring out which sort of framework to use in a explicit application. There are no immovable guidelines to keep; in any case, previous experience has given a few sound thoughts that are typically thought of at the point when such choices are made. In the event that the application requires speed, a medium measure of tension, and just genuinely exact control, a pneumatic framework may be utilized. In the event that the application requires just a medium



Fig -1: Robotic arm configuration

2.1 Pneumatics

The word pneumatics is a derivative of the Greek word pneumatic, which means air, wind, or breath. It can be defined as that branch of engineering science that pertains to gaseous pressure and flow. As used in this manual, pneumatics is the portion of fluid power in which compressed air, or other gas, is used to transmit and control power to actuating mechanisms. This chapter discusses the origin of pneumatics. It discusses the characteristics of gases and compares them with those of liquids. It also explains factors which affect the properties of gases, identifies and explains the gas laws, and identifies gases commonly used in pneumatics and their pressure ranges. It also discusses hazards of pneumatic gases, methods of controlling contamination, and safety precautions associated with compressed gases.

2.2 Use of Hydraulics

The water driven press, imagined by Brit John Brahmah, was one of the primary work-capable bits of apparatus fostered that pre-owned water power in its activity. It comprised of an unclogger siphon funneled to an enormous chamber and a slam. This press found wide use in Britain since it gave a more powerful And economical method for applying huge powers in modern purposes. Today, water driven power is utilized to work various apparatuses and components. In agarage, a technician raises the finish of an auto-versatile with a pressure driven jack. Dental specialists and bar bersuse pressure driven power, through a couple of strokes of a control switch, to lift and position their seats to a helpful working level. Pressure driven entryway stops keep weighty entryways from hammering. Pressure driven brakes have been standard hardware on auto-mobiles since the 1930s.

Most cars are outfitted with programmed transmissions that are powerfully worked. Power controlling is another use of water driven power. Development laborers rely on water driven power for the activity of different parts of their gear. For instance, the cutting edge of a tractor is regularly worked by water driven power. During the period going before The Second Great War ,the Naval force started to widely apply power through pressure to maritime instruments.



2.3 Forces in liquids

The investigation of fluids is separated into two fundamental parts: fluids very still (hydrostatics) and fluids moving (hydraulics). The impacts of fluids at rest can often be communicated by basic recipes. The impacts of fluids in movement are more challenging to communicate due to frictional and other factors whose activities can't be communicated by straightforward science. Fluids have an unmistakable volume yet take the state of their containing vessel. There are two extra qualities we should investigate earlier to continuing. Fluids are practically in compressible. For instance, if a pressure of 100 pounds for each square inch (psi) is applied to a given volume of water that is at environmental tension, the volume will diminish by just 0.03 percent. It would take a power of roughly 32 tons to lessen its volume by 10%; be that as it may, when this power is taken out, the water promptly gets back to its unique volume. Different fluids act in about the same way as water. One more quality of a fluid is the inclination to keep its free superficial. On the off chance that the surface isn't level, fluids will stream the heading which will generally make the surface level.

2.4 Pascal's law

The groundwork of current water power was laid out when that's what pascal found strain in a liquid demonstration similarly this way and that. This strain acts at right points to the containing surfaces. In the event that some sort of strain check, with an uncovered face, is set underneath the outer layer of a fluid at a particular profundity and pointed this way and that, the tension will peruse something similar. Consequently, we can say that pressure in a fluid is free of heading. Strain because of the heaviness of a fluid, at any level, relies upon the profundity of the liquid from the surface. If the uncovered faces of the tension measures are drawn nearer to the outer layer of the fluid, the demonstrated tension will be less. At the point when the profundity is multiplied, the shown pressure is multiplied. Consequently the strain in a fluid is straightforwardly relative to the profundity .Consider a holder with vertical sides that is 1 foot long and 1 foot wide. Allow it to be loaded up with water 1 foot down, giving 1 cubic foot of water. We learned before in this section that 1 cubic foot of water weighs 62.4 pounds. Utilizing this data and condition, P = F/A, we can ascertain the strain on the lower part of the holder.

2.5 Transmission of forces through liquids

At the point when the finish of a strong bar is struck, the primary power of the blow is helped straight through the bar to the opposite end This happens in light of the fact that the bar s unbending. The course of the blow nearly entire decides the heading of the sent power.

2.6 Hydraulic cylinder

A Water powered chamber (likewise called a straight pressure driven engine) is a mechanical actuator that is utilized to give a unidirectional power through a unidirectional stroke. It has numerous applications, eminently in designing vehicles.

3. OPERATION

Water driven chambers get their power from compressed water driven liquid, which is ordinarily oil. The water powered chamber comprises of a chamber barrel, in which a cylinder associated with a cylinder pole moves this way and that. The barrel is shut on each end by the chamber base (likewise called the cap end) and by the chamber head where the cylinder pole emerges from the chamber. The cylinder has sliding rings and seals. The cylinder separates within the chamber in two chambers, the base chamber (cap end) and the cylinder pole side chamber (bar end). The water driven pressure follows up on the cylinder to accomplish straight work and movement. Ribs, trunnions, or potentially clevisses are mounted to the chamber body. The cylinder bar likewise has mounting connections to interface the chamber to the article or machine part that it is pushing.



4. CONCLUSIONS

Our plan utilizes very basic thoughts and systems to accomplish a complex set of activities and is expected to copy the activities of the operators. However, these water driven arms are costly for limited scope businesses. If the serious issue of high starting expense is tended to, a mechanical pressure driven arm can be presented in any industry to get automation. The mechanical connections and parts that have been manufactured are incredibly basic.

5. ACKNOWLEDGEMENT

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FRICTION STIR WELDING OF THIN SHEETS OF MAGNESIUM ALLOYS (AZ31B)

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ABSTRACT

A preliminary investigation has been carried out into the application of friction stir welding for joining a magnesium alloy to an Aluminium alloy. The work has shown that liquation during the welding process can lead to the formation of a brittle inter-metallic at the joint interface. This inter-metallic has a microstructure composed of a divorced lamellar eutectic containing $Al_{12}Mg_{17}$ and magnesium. The formation of this microstructure and its influence on mechanical properties are discussed in terms of solidification theory.

Keyword: - FSW welding, magnesium alloys AZ31B, thin sheet, joining of metal sheet

1. INTRODUCTION

Recently, in many industrial fields much attention has been focused on Magnesium alloys because of various unique properties. Magnesium and its alloys are becoming widely recognized as playing an increasingly important role in automotive, aircraft, and aerospace industries. As the desire to further utilize lightweight magnesium alloys in various industrial applications grows, different aspects of magnesium research must be intensified in order to improve properties of magnesium alloys and enhance their chances of being selected by the product designers. The present paper will give a general review of the recent main research of magnesium alloys. Friction Stir Welding (FSW) is an innovative solid state welding technique which was first invented by The Welding Institute (TWI), UK in 1991. This technique was developed aiming Aluminium alloys but later it had foundprofound application in welding of Mg alloys [2]. The heat generated during the process is about 80-90% of the melting temperature. With FSW traditional components current and voltage are not present as the heat input is purely mechanical replaced by force, friction etc. The quality of an FSW joint is always better than other fusion welding processes. In friction stir welding a rotating pin emerging from a cylindrical shoulder is plunged between two edges of sheets to be joined and moved forward along the joint line. The material is heated by friction between the rotating shoulder and the work piece surface and simultaneously stirred by the profiled pin leaving a solid phase bond between the two pieces to be joined.

2. MAGNESIUM AND ITS ALLOY

Magnesium alloys are broadly divided into

- Mg-Al-base alloys
- Zr-containing alloys
- Cast Mg alloys
- Die casting

Mordike and Ebert [5] have disussed the advantages and disadvantages of Magnesium and its alloys which include:

- High specific strength (related to low density);
- Good castability (particularly for high pressuredie casting);
- Can be turned/milled at high speed;
- Good weldability;
- Better mechanical properties;
- Resistant to againg;
- Better electrical and thermal conductivity;
- Recyclable

Magnesium and its alloys are not without their disadvantages [5] includes

- Low elastic modulus
- Limited cold workability and toughness;
- Limited strength and creep resistance at elevatedtemperature;
- High chemical reactivity with associated poorcorrosion resistance;
- Inadequate wear resistance.

Main commercial magnesium alloys include the AZ series (Mg-Al-Zl), AM series (Mg-Al-Mn), AE series (Mg-Al-RE), EZ series (Mg-RE-Zn), ZK series (Mg-Zn—Zr), and WE series (Mg-RE-Zr). Table 1&2 showssome of the magnesium alloys mechanical properties and Physical properties

 Table - 1: Mechanical Properties of Magnesium Alloys at Room Temperature

Property	Unit	AZ91	AM60	AM50	AM20	AS41	AS21	AE42
Ultimate Tensile Strength	Mpa	240	225	210	190	215	175	230
Yield Strength	Mpa	160	130	125	90	140	110	145
Elongation	%	3	8	10	12	6	9	10
Elastic Modulus	Gpa	45	45	45	45	45	45	45
Brinell Hardness		70	65	60	45	60	55	60
Impact Strength	J	6	17	18	18	4	5	5

Property	Unit	Temp(F)	AZ91	AM60	AM50	AM20	AS41	AS21	AE42
Density	g/cu cm	68	1.81	1.8	1.77	1.75	1.77	1.76	1.79
Linear Thermal Expansion Co- efficient	µm/m	68-212	26	26	26	26	26.1	26.1	26.1
Specific Heat	Kj/kg k	68	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Thermal			10	Sec.					
Conductivity	W/km	68	51	61	65	94	68	84	84
Electrical Conductivity	MS/m	68	6.6	nm	9.1	13.1	nm	10.8	11.7

Table.2: Physical Properties of Magnesium Alloys

2.1 Welding Parameters

The welding parameters are key players during every welding technique and FSW is no exception. Proper selection of welding parameters influences the final weld quality and resulting microstructure. In FSW the parameters chosen are Tool rotational speed: An increase in the tool rotational speed and decrease in tool travel speed will cause a hotter weld.

2.2 Welding speed

The grain arrangement will change abruptly with increasing welding speed. Tilting angle: Tilting angle may be kept constant or variable Pin Profiles: Pin profiles play important role in FSW Axial down force: The down force will ensure the generation of frictional heat to soften the material.

2.3 Welding tool

Welding tool design is critical in FSW processes; tool material should possess high hardness at elevated temperatures and should maintain that hardness till the end of the process. Weld quality and tool wear are two important considerations in the selection of tool material, the properties of which may affect the weld quality by influencing heat generation and dissipation.H13 tool steel is usually used for FSW. The various types of pin profiles used are tapered, cylindrical, cylindrical threaded, conical etc. The shape of pin profile greatly influences the final weld microstructure, grain refinement etc. This review mainly focuses on FSW of Mg alloys. The period of review was from 2010-2016. The influence of various objectives on final weld quality.



Fig - 2: Machine to used how to its work

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2.4 Tensile testing of FSW joints

Obtained FSW joint were the basis to make specimens fortensile tests and metallographic examinations. The mechanical properties of the joints were measured during tensile testing, aswell as micro hardness testing. Tensile specimens dimension was shown on Fig. 6. Dumbell specimen preparation was performed using wire EDM machining.



Fig - 3: Uni-axial tensile testing geometry (dimension are in mm)

Static tensile test was performed in accordance with PN- EN ISO 6892-1:2009The tensile tests were carried out on a Zwick/Roell Z 100 universal testing machine, at room temperature. An extensometer with a gauge length of 50 mm was used for strain data acquisition. The results, given by the nominal stress vs. nominal strain curves, were evaluated in terms of the ultimate tensile strength (UTS), yield strength (YS) and ultimate elongation (UE) in percentage. In the purpose of verifying the repeatability of the results each tested samples was repeated at least three times. From each joined metallic plate was cut three samples from the beginning, middle and end of a weld and then the measured values were averaged. Mechanical properties of FSW joints were grouped. Overall, it was observed that the base material exhibit higher mechanical properties than the FSW samples. The tensile properties of the joints are slightly affected by the rotational and welding speeds. The maximum force to elongation data for all coupons is plotted. It is seen that the after welding both the strength and elongation reduced. The Ultimate Tensile Strength (UTS) of BM (base material) was obtained to be 286 MPa. Joint efficiency of the FSW joints varied varied approximately from 65% to 90%.

3. FORCE MEASUREMENTS DURING FSW PROCESS

The vertical (Z axis) and horizontal (X,Y axis) forces occur- ring during linear FSW process was measured by high sensitive piezoelectric dynamometer developed by Kistler. It consist of four piezoelectric force sensor calibrated in range from 0 to 60kN. Sensors are fitted between two rigid plates (400 mm long, 400 mm width and 50 mm in thickness each). Typical microstructures of a FSW joint made at different rotational speed and welding speed.

- a) Microscopic structure of FSW welded AZ31B of 0,5 mm in thickness. View of base material BM
- b) Microscopic structure of FSW welded AZ31B of 0,5 mm in thickness. View of HAZ and TMAZ zone from the retreating side
- c) Microscopic structure of FSW welded AZ31B of 0,5 mm in thickness. View of stir zone SZ and TMAZ of advancing side



Fig - 4: Typical graph of the axial and translational forces

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First stage tool plunges into the work-piece with an increase in the deformed volume [11]. Both vertical and horizontal forces rise quickly owning to the strength of the deforming material to the pin penetration that prevails on the softening due to the heat generated by the stirring action of the rotating pin. The local softening of the welded material promptly becomes the predominant effect and produces a decrease both vertical and horizontal forces [11]. Stage (II) is performed to assure an adequate heating of the blank material before welding. During the experiment dwelling time was constant and was 20s. Following with the literature increasing the dwell time does not affect on the quality of the FSW process [11]. For this reason, dwelling time not subjects to be modified. At the stage (III) the vertical and horizontal forces suddenly increase the curve reaches almost steady state that is kept during the entire welding process. The influence of rotational speed and welding speed especially on the vertical force was analyzed. Average Z axis forces values during welding stage were in range from 1300 to 2200 N. Increasing rotational speed at constant welding speed of the tool causes decreasing the axial forces. When the rotational speed of the tool was constant in- creasing the welding speed caused also increasing the axial force. Determining the values of force during FSW process is also very helpful when selecting the right machine.

Objective	Work piece Material	Tool material	Year/Author	Remarks
Effect of process parameters on weld Quality	ZM21 Mg alloy25mm thickness	H13	2010/K.L.Harikrishn aEt al	GS increased at the HAZ and NZwith respect to thickness
To calculate influence of welding speed on Tensile properties	AZ61 Mg alloy 300x300x6m m	Hig carbon h steel	2011/a.Razal Rose et al	WS has maximum influence on micro structure and Tensile properties
Microstructures and properties testing on joints	AZ31B-H24 Mg Alloy of 2mm thickness	Tool steel	2012/S.H Chowdhury et al	Texture weakeneddue to TRS and decreasing of WS
To study the process parameters on weld quality	AZ61A Mg alloy 300x150x6mm	Hig h carbon steel	2013/S.Rajkumar et al	Max tensile strength obtained
Effect on welding parameters o nwelded joints		High carbon high chromium steel	2014/ Inderjeetsingh et al	Proper reinforcement grain
Mechanica lproperties throug optimized h parameters proces s	AZ31B Mg alloy 150x50x5mm	Hig h speed steel	2014/Jaiganesh et al	Defect free are joints obtained
Characterization of microstructure & mechanical properties	AZ31B-H24 Mg alloy 1200x500x2m m	H13 tool steel	2014/B.S Naik et al	Grain coarsening was seen in SZ,TMAZ,HAZ
Microstructure &mechanical properties testing	AZ31 Mg alloy 300x100x2m m	H13 tool steel	2014/Yong Zhao et al	Uniform distributions of grains

 Table - 3: References

4. CONCLUSIONS

The results of this study demonstrated the micro structural and anisotropic modification induced by FSW in a thin sheet of magnesium alloys AZ31B in 0.5 mm in thickness. The results of this study reveal that FSW induces the generation of several distinct zones with different micro structural, anisotropic and mechanical properties. The following conclusion is drawn from this research.

1. But joints with smooth surface, without voids and flash can be obtained by cylindrical flat shoulder and pin tool made from tungsten carbide of the dimensions given in Table 1.

2. Tensile tests revealed a durability increase up to 90% compared to BM which is thought to be mainly attributed to the preferred basal orientation and the activation of the extension twins.

3. The SZ and TMAZ experienced full dynamic re-crystallization and thus consisted predominantly of equal grains. The grain size in SZ increased with increasing heat input.

4. During the FSW, the process must be carried out at the temperature preferably higher than the recrystallization temperature of the base material BM to be joined for the dynamic re-crystallization to take place in the SZ.

5. With increasing tool rotational speed or decreasing welding speed supplied more heat energy and generated a higher temperature in stir zone SZ. This led to a weaker or more random texture stemming from the occurrence of more complete dynamic re-crystallization.

6. After the FSW of AZ31B alloy of 0.5 mm in thickness, the lowest hardness occurred at the center of SZ through the HAZ and TMAZ of the welded joints however, the differences are minor.

7. The welding speed and rotational speed had a strong effect on the UTS.

8. When choosing the technological parameters for the process, tool feed rate played an important role in compared to a tool rotation speed.

9. The plastic flow in the welded regions is also observed with uniform grain orientation.

5. ACKNOWLEDGEMENT

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DESIGN AND FABRICATION OF ULTRASONIC SMART EYE GLASS

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ABSTRACT

This gadget incorporates a couple of glasses and a deterrent identification module fitted in it in the middle, a handling unit, a result gadget for example a blaring part, and a power supply. The Deterrent identification module and the result gadget is associated with the handling unit. The power supply is utilized to supply capacity to the focal handling unit. The hindrance identification module essentially comprises of an ultrasonic sensor, handling unit comprise of a control module and the result unit comprises of a bell. The control unit controls the ultrasonic sensors and gets the data of the hindrance present before the man and cycles the data and sends the result through the ringer likewise. These Ultrasonic Shrewd Glasses for Blind individuals is a convenient gadget, simple to utilize, light weight, easy to understand and modest in cost. These glasses could without much of a stretch aide the visually impaired individuals and assist them with staying away from deterrents.

Keyword: - Smart Glass, Ultrasonic Sensor, Blind People Introduction

1. INTRODUCTION

In this convention when track down object however distance more prominent than 3 miter then it not sense, in the event that distance fewer than 300 cm, it sense and make sound. A similar methodology is likewise utilized in numerous applications. One is Gives visually impaired individuals the incredible availability to their current circumstance is the goal of the brilliant glass system. The vital capability of another framework is to empower the client in seeing social signs during a characteristic dyadic conversation. The third framework is a plan, manufacture, gathering, and portrayal of a completely coordinated single-chip glass BGA bundle at 40/80 μ m off-chip I/O pitch with multifaceted wiring and through-bundle vias (TPVs) at 160 μ m pitch. The ClimaWin undertaking's principal objectives are to further develop both indoor air quality and the energy effectiveness of new and restored structures, using novel green savvy windows.

Another one is an indoor route wearable framework in light of visual markers acknowledgment and ultrasonic obstructions discernment utilized as a sound help for blind people. There was an answer for the visually impaired individuals to walk securely by distinguishing hindrance and producing comparing ready sign as per the distance of the obstacle.

The Microsoft Kinect camera empowers a versatile robot to do fundamental undertakings like confinement and route .There is a plan of a little compact electronic stick using Polaroid's Ultrasonic Going Unit expected to enhance or supplant the customary long stick is introduced. An insightful help blind glass framework, involving a remote transmission module, a top quality camera, an infrared sensor, an eyeglass outline, mounting the cartridge

The next one is an epitome of the current innovation is a technique for imparting route data on an actual climate to a client .An creation included .An electronic talking stick for the visually impaired and all the more especially to a stick which converses with teach a visually impaired man to walk.

2. PROPOSED MODEL

Visually impaired as an unique gathered in the public eye, the necessities of society to offer them more consideration and consideration, with the goal that they are better ready to freely live. In any case, how safe strolling blind life is the most serious issue. Conventional route gadget for the most part blind stick, blind by tapping the ground or strolling around the item to decide the course, the construction is basic, single capability, simple to utilize, yet the optional impact isn't impossible to miss, as a matter of fact, will experience numerous issues while utilizing the visually impaired, for example, unfortunate street conditions, lopsided, draping before deterrents, common stick can't be demonstrated exact, a particularly serious effect on the wellbeing of visually impaired explorers.

2.1 Framework Particulars

- 11. Equipment Necessities
 - Arduino Uno
 - Ultrasonic Sensor
 - Vibration Engine
 - Switch.
 - Gsm
 - Power Supply
- **12.** Programming Necessities
 - Arduino Ide.
 - Embedded

3. WORKING

The ultrasonic sensor is used to perceive the obstacle before an individual using the soundwaves for a particular distance. The Ultrasonic sensor here used as a handset. The ultrasonic waves are emanated by the transmitter when the things are perceived. Both the transmitter and gatherer re loathe inside the ultrasonic sensor. We register the time stretch between the conveyed and gotten signal. The distance between the article and sensor is resolved using this.



Chart -1: Navigation System for Blind

We have utilized a redone Arduino uno board which is the controlling unit of this game plan. The Arduino help in distinguishing and controlling the things in the real-time conditions and climate. The Arduino Uno is revamped utilizing the Arduino Programming (IDE), our Arranged Progress Climate normal to all of our sheets and running both on the web and withdrew. On the off chance that the ultrasonic sensor perceives the articles utilizing the sound waves the Arduino get information which will quickly pre-arranged the individual with a vibration. For this interaction the vibration engine is been utilized. In the event that if the individual couldn't talk, we have embedded a change switch with a speaker to ask the encompassing people for help. The voice will be rehashed till the switch is moved to off position. We have utilized GSM module for good measure of a crisis to send a caution message to the boss of the individual. So this contraption will be going most likely as a help to the apparently attempted people.



Fig - 1: Ultrasonic smart glass

3.1 Field of invention

There has forever been a requirement for the individual with handicap to carry on with a typical life and get an open door to succeed on the planet. There have been numerous creations such a long ways to welcome such people groups on similar grounds like others. Some have bombed yet some have made it well. The science and innovation in this day and age has consistently attempted to serve the humankind in the wellbeing and security field and same is the witticism of this venture.

	Table -1: Component	
Component	Specification	Quantity
ATMEL Microcontroller	Nano	1
Ultrasonic Sensor	HC-SR04	1
Buzzer	5 Volt	1
Switch	DPDT	1
Battery	9Volt	1

3.2 Obstacle Avoidance

There exist a tremendous writing on obstruction identification and evasion. As per the sensor type, the impediment aversion technique can be ordered as: ultrasonic sensor based strategy, laser scanner based strategy, and camera based technique. Ultrasonic sensor based strategy can quantify the distance of hindrance and contrast it and the given distance limit for choosing whether to go on, however it can't decide the specific course of proceeding, and may experience the ill effects of obstruction issues with the actual sensors if ultrasonic radar (ultrasonic sensor cluster) is utilized, or different signs in indoor Distance L = $1/2 \times T \times C$ L: The distance T: Time between the outflow and gathering C: Sonic speed *The worth is duplicated by 1/2 since T is the ideal opportunity for the proceed to bring distance back.

3.3 Embedded C

Glancing around, we view ourselves as encircled by different kinds of inserted frameworks. Be it a computerized camera or a cell phone or a clothes washer, every one of them has some sort of processor working inside it. Related with every processor is the inserted programming. In the event that equipment shapes the body of an implanted framework, implanted processor goes about as the cerebrum, and installed programming structures its spirit. It is the implanted programming which essentially oversees the working of installed frameworks.

During early stages long stretches of chip based frameworks, programs were created utilizing constructing agents and combined into the EPROMs. There used to be no system to find what the program was doing. LEDs, switches, and so on were utilized to actually take a look at right execution of the program. Some 'extremely lucky' designers had In-circuit Test systems (Frosts), yet they were excessively expensive and were not exactly solid .

At first C was created by Kernighan and Ritchie to squeeze into the space of 8K and to compose (versatile) working frameworks. Initially it was executed on UNIX working frameworks. As it was expected for working situation advancement, it can control memory addresses. Additionally, it permitted software engineers to compose exceptionally conservative codes. This has given it the standing as the language of decision for programmers as well.



3.4 Feature of smart glass

The utilization of savvy glasses empowers ongoing admittance to different data and information, this makes it conceivable to amplify commitment and increment labor force effectiveness. The sans hands include likewise gives more noteworthy adaptability to laborers while they are playing out their errands

The clients of the provisioned upkeep administrations with Savvy Glasses likewise had a positive insight about the innovation. All evaluated clients had a superior insight about the mechanical level of the organization. 80% of the clients accept that the organization is locked in to constant improvement and accept there was an improvement in the upkeep administrations they got. Ultimately, 60% of the clients saw a better correspondence with the experts.



4. CONCLUSIONS

In this paper, the planned framework utilizes the reconciliation of sensors and engines to help the outwardly impeded explore through impediment while navigating. This framework is molded to play out the activity of 64 Plan and Development of an Impediment Distinguishing Glasses for the Outwardly Hindered deterrent location and furthermore caution of the vicinity to identified snag. To finish up, obviously not all clients will actually want to get a handle on this sort of innovation, as a large portion of the versatility actually depends principally on their sensation of their current circumstance and through normal impulses. In any case, the task and exploration can really open up the conduits to new arrangements of headway in human improvement as it plans to bring debilitated individuals back into the general public, as most they have turned into a separated segment of the current local area.

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EXPERIMENTAL INVESTIGATION ON THE MECHANICAL & MICROSTRUCTURAL PROPERTIES OF SINGLE USE PROVIDED PLASTICS AND ITS REINFORCING EFFECTS

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ABSTRACT

The development of biodegradable plastics has caught up with non-biodegradable plastics, but there is still no correct answer. Because of the toxic plastic we've been using for days. the most important The motivation for this study is to eliminate single-use PET disposal. Bottle, Non-biodegradable plastics are discarded without reuse. Land-fill, treating generated waste plastic with crushing technology, Eliminates the possibility of contaminants caused by heating plastic. Useless Putting plastic into a crusher and processing it into PET bottle into granules or powder. These powders are then combined with reinforcement Materials: metal powder and epoxy resin and hardener. Or the combination is poured straight into the space where the desired one comes out Products are available in the required dimensions. Various pattern accessories ASTM requirements and their mechanical properties (tensile strength, impact strength, flexural strength, hardness) and micro-structural investigations are carried out.

Keyword: - Hybrid composites; PET bottles; Pulverization; Mechanical properties, Microstructure

1. INTRODUCTION

1.1 Experimental investigation on the mechanical & micro-structural properties of single use provided

plastics and its reinforcing effects

Although the use of non-biodegradable plastics has decreased as a result of the development of biodegradable plastics, there is currently no suitable alternative to the hazardous plastics that we have been utilizing for so long. The goal of this project is to stop people from throwing away plastic bags. Plastics that aren't biodegradable are thrown away without being used again, and they end up in landfills. This concept provides a suitable alternative to letting discarded plastic materials end up in a landfill, where they could pose a threat to our ecosystem, by utilizing a pulverization technology.

Utilizing pulverization technology to handle waste plastics eliminates the risk of pollution brought on by the heating of the material. The pulverize machine grinds the discarded plastic into granules or powder. After that, epoxy glue, a hardener, and these powders are combined to make a fluid that can be injected into the necessary cavities to give the polymers the shape they want. Large quantities of non-biodegradable polymers can be transformed using this method into useful household and workplace appliances.

1.2 Polymer matrix composite

Polymer matrix composites (PMCs) are present on nearly every side. Modern life - from gadget parts to a wide range of automobiles accessories. Derived from the name meaning that many repeating units are polymeric Often composed of chemically bonded carbon and hydrogen branches make a chain Polymers commonly used as composites are thermoplastic Polymers, thermo-set polymers or elastomers. You are the source of a wide range a variety of inexpensive raw materials that offer many advantages such as:

- Low specific weight
- ✤ High material stability against corrosion
- ✤ Good electrical and thermal insulation
- ✤ Ease of shaping and economic mass production
- Attractive optical properties

2. Production of polymer matrix composites

Polymer is reinforced with 150 micron metal powder It is collected at the workshop and treated as waste. Metal powder 150 μ m of 150 μ m are collected by sieve analysis. These metal powders are injection, extrusion. It is pressed or stamped and then cured to produce the final composite. During the manufacture and molding of polymer matrix composites there are many finished products that incorporate the molding of the material itself manufacturing process.



2.3 Stress Strain Diagram

Designing the extraordinary elements of machinery, it is important to be aware of how the fabric will perform in use. To do this, you need to understand certain material properties or houses. Primary tensile testing is commonly used to evaluate mechanical housing in mechanical engineering research. In these experiments, we increase the number of loads on a regular fabric sample and record the resulting load and elongation values before the sample breaks. Use the test unit to measure the weight. "Pressure is calculated by dividing the weight value by the running stitch. Sample floor elongation is calculated by calculating the time it takes to move a positive distance. We can see the hypothetical C age under 2 house factors. The measurement period is the gap between the reference factors. High temperature, Dividing the elongation value by the measurement time, this gives listed below.



Chart -1: Stress strain diagram

3. TYPES OF MECHANICAL TESTING

3.1 Tensile Test

A tensile test is a physical laboratory test that is performed. Substances to determine suitability for precision engineering and production program for making a certain quality.

3.2 Flexural Test

Bend sorting out in composites is used to determine flexural energy and stiffness of a strong laminate or sandwich construction. The specimen is loaded in a horizontal feature in a three-thing or four-thing loading configuration in 10 a flexural check. The check fixture has a assist thing near every edge of the beam and a loading nose with one (third-thing loading) or two (four-thing loading) configurations. The distance amongst supports, and the loading elements within the four-thing configuration, can be effortlessly modified to complete the fixture too big specimen geometries and thickness-period ratios. The ASTM well known we accompanied in our paintings turned into D790.

3.3 Compression Test

Compression checking out is frequently performed to damage (rupture) or to a restriction. When the take a look at is completed to damage, damage detection may be described relying at the kind of cloth being tested. The ASTM standard that we have used in our work is D3410 (150x25x6).

3.4 Impact Test

Engineers take a look at the cap potential of a cloth to stand as much as impact to be looking forward to its behavior beneath actual conditions. Many materials fail unexpectedly beneath impact, at flaws/cracks or notches. The most common location impact tests use a swinging pendulum to strike a notched bar; heights in advance than and after impact are used to compute the energy required to fracture the bar. In the Charpy take a look at, the take a look at piece is held horizontally amongst vertical bars. In the Izod take a look at, the specimen stands erect, like a fence post.

3.5 Micro-hardness Test

Hardness take a look at techniques use an indenter probe that is displaced proper right into a ground beneath a selected load. The indentation commonly has a described live time. In traditional mechanical sorting out, the scale or intensity of indentation is measured to determine hardness. Hardness sorting out is cut up into ranges: macro-hardness and micro-hardness. It covers sorting out with a carried-out load over 1 kg or about 10 Newton (N). Micro-hardness sorting out, with performed hundreds beneath 10 N, is commonly used for smaller samples, thin specimens, plated surfaces or skinny films. The most not unusual place micro-hardness techniques are Vickers and knoop hardness tests.

3.6 Vickers Hardness Test

The Vickers hardness take a look at uses a Vickers indenter (below) pressed proper right into a ground to an actual strain. The strain is normally held for 10 seconds. After the indentation is finished, the following indent is analyzed optically to diploma the lengths of the diagonals to determine the size of the impression.

4. CONCLUSIONS

The polymer matrix composite changed into bolstered with Metal powder and single-use waste plastic. We utilized waste plastics in powdered form via way of means of using a plastic pulverizing machine, so there'll no want of heating or melting the plastic and there may be no opportunity of poisonous gases escaping into the surroundings that reasons air pollutants and that is achieved via way of means of pulverization approach that converts plastic flakes into powder or granules which does now no longer pollute the environment. As a result, it aids in the reuse of plastics at the same time as additionally lowering pollutants. We created kind of compositions here. In assessment to the primary kind composition, the second kind composition has produced a higher result. Since those plastics are combined with resin it turns into corrosion resistant and warmth resistant and affords extended lifestyles to the product. The use of metallic powder adds electricity and stiffness to the composite. Since metallic are used as a dispersed segment of reinforcement, it consequences in generating mild weight components without sacrificing the electricity.

5. ACKNOWLEDGEMENT

We humbly submit all the glory and thanks to our almighty for showering the blessing upon us and give us the necessary wisdom for accomplishing this project.

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DESIGN OF AERO LEAVES IN WIND TREE

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ABSTRACT

The project focuses on Design, Fabrication and Testing of a VAWT (vertical Axis Wind Turbine) with external wind. The project is an international ongoing research project and the phase we carried out was concerned in shifting the design from Darrieus type to Savonius type, which created the necessity of freshly designing all the parts, increasing the torque and rpm of the VAWT by implementing lightweight blades, make the whole structure portable meanwhile maintaining the project within a very low-cost range. The said objectives can be achieved by manipulating the knowledge of Design of Machine element, fluid dynamics, and Energy Technology. A major concern was fashioning the design to enable the VAWT to operate with a maximum efficiency. Several parameters were analyzed with respect to wind speed to determine the best value for each parameter which would give the highest efficiency, thus ensuring the maximum ultimate performance of the VAWT. The parameters that were considered for analyzing are the number of blades the rotor should have, positioning of the blade (i.e. the distance from the shaft to blade and the angle the blade creates with the shaft), the shape of the deflector, and the angle of the deflector so as to generate the highest efficiency. The fabrication of the VAWT was carried out under few stages, namely the fabrication of rotor blades, fabrication of main shaft with bearings and rotor blade support frames, fabrication of support structure, fabrication of wind vane unit, painting and assembling the structure. As the final step, the VAWT was tested for its performance practically with digital voltmeter and buck boost rectifier circuit, and the results were recorded and then analyzed. The comparison between the two displayed a significant increase in the energy extraction ability of the VAWT from the wind.

Keyword: - VAWT, Savonius, Darrieus, green energy blades, the rotor, nacelle, a gearbox and coupling

1. INTRODUCTION

A wind turbine converts the kinetic energy in wind into mechanical energy, which will be reflected on its axis. To convert this mechanical energy into electrical energy, the turbine has to be coupled to an electrical generator, becoming a wind turbine. To perform this task, several types of turbines are used, differentiated into two types by the position of its axis of rotation with respect to the surface on which it is fixed, and can be then Horizontal Axis Wind Turbines (HAWT). the most common turbines, used mostly in wind farms for high-energy production, and Vertical Axis Wind Turbines (VAWT), latter less common and currently are the subject of numerous studies and developments of new models. Within the VAWT's, there are two types, differentiated by the morphology of their blades. Savonius type or S turbine, created in 1922, is composed of two circular cross-sections blades, one placed concavely and one convexly towards the wind position and vertically arranged along an axis of rotation with the particular feature that the blades are overlapping in the vicinity of the rotation axis, making the effect of support by exchanging the flow between both blades, thus achieving assistance for the starting factor that receive both blades to be positive in the wind direction and thereby getting movement.

1.1 Function

They rely on the yaw system to orientate the rotor in order to capture wind. Due to this difference in operation mechanism, vertical axis wind turbines can be used to generate power even in unstable weather conditions such as turbulent, gusty wind. They also function well in mountain and coastal areas.

2. PROJECT SCOPE

We cannot take care of our self while in running while being less conscious. If we equip all vehicles with automated security system that provides high security to driver with alms, we can provide more security. All vehicles should be equipped with eye blink sensor in future to avoid these types of accidents.

2.1 Testing

There is a three-blade H-type Darrieus, with a diameter of 2.5 m and a height of 3 m. The blades have a NACA0015 profile with a chord of 0.4 m. The test was designed such that the operational envelope of the turbine would be slowly expanded. The tests were sequenced to start at the lowest wind speed and RPM, and continued until the most challenging conditions were reached at the end of the testing program. The generator and control system based on the electrical power produced and load applied were still under development during these tests. Consequently, to test the turbine, control and instrumentation systems had to be added to the VAWT test specimen. The following instruments and components were added: Turbine speed measurement: A proximity sensor was used to measure the passing frequency of 6 equally spaced bolts, providing a resolution of 6 lines per revolution. Mechanical load/torque measurement: In order to determine the aerodynamic performance of the turbine independently from the generator performance, a servo-controlled mechanical variable load was devised. A disc brake calliper was installed on a floating mount supported by a load cell, and driven by an electro-hydraulic servoactuator. The load cell measures the torque produced by the turbine and transmitted through the brake. Closed-loop speed control system: Because of the feedback interaction between the rotor dynamics and the aerodynamics of the system, the system is not self-regulating when operating on the front side of the torque vs. turbine speed curve (before reaching maximum torque). This means that a constant or slow-varying load will cause the turbine to either stop rotating, or it will lead to the "runaway" condition, in which the turbine speeds up to the stable back side of the torque curve. An active closed-loop speed control system was devised, which made use of the turbine speed measurement and the servo-controlled variable load system to accurately regulate the rotary speed of the turbine, using a high gain proportional control law. The proportional gain is made larger than the largest positive slope of the torque curve in order to guarantee the stability of the control system. Due to time delays inherent to the system and hardware, as well as a dead band in the brake servo-actuator, the resulting control torque is in general pulsating.

3. PLAN METHODOLOGY

Vertical-axis wind turbine (VAWT) is a type of wind turbine where the main rotor shaft is set transverse to the wind while the main components are located at the base of the turbine. This arrangement allows the generator and gearbox to be located close to the ground, facilitating service and repair.

3.1 Features

You may have seen this photo online recently of EDF's floating offshore vertical-axis wind turbine (VAWT) called "Vertiwind." It has a nameplate capacity of two megawatts. The Vertiwind will be part of EDF-EN's offshore wind farm project called Inflow, which the European Commission is helping fund. The strange design piqued my curiosity about VAWTs. Why would a developer opt for a VAWT over a horizontal-axis wind turbine (HAWT)? And, are there good reasons for more developers to consider VAWT models? Let's look at how a VAWT works and how it stacks up against the horizontal-axis wind turbine. There are three basic advantages of a VAWT over HAWT and just as many drawbacks. For instance: Fewer components – Obviously, the main rotor shaft of a VAWT is oriented vertically rather than horizontally. The advantage here comes as a reduction in parts. A conventional HAWT must first be generally oriented into the wind before the blades can rotate. In contrast, the blades of a VAWT catch wind in any direction without directional orientation. This makes it ideal for gusty conditions. What's more, there is no need for components to control yaw and pitch. Safety – Keeping workers from climbing tall turbine towers also makes VAWTs a safer alternative. Maintenance costs are further reduced because gearboxes, generators, and most electrical and mechanical components are at or near ground level, avoiding the need for climbing gear, lifts, and danger-pay compensation. Scaling down – the design has potential to scale down and remain fairly efficient in dense urban areas or on rooftops where other renewable technologies might not be feasible.

The residential possibilities of the VAWT model seem promising in reducing energy consumption from hydrocarbon sources. Despite the plusses, there are good reasons that many are sceptical of VAWTs' potential to ever be adopted on a wind farm.

3.2 System configuration

Double the height and power output of the popular WS 030-series turbines, the WS-060 allows integration of a higher-output generator to boost output at all wind speeds. Their size & power output allow for many integration scenarios: measure and control systems, small DC electronic equipment in buoys, sea marks/lights, lighthouses, boats, park and street lights, and building integrated/mounted. Cut-in speed varies depending on generator configuration. Refer to power curves. Cut-out speed is not applicable to these turbines. It is not necessary to stop rotation at high wind speeds. Turbines will continue to reliably generate power up to their max structural wind endurance rating. Basic System consists of wind turbine & generator unit, safety cut-off switch, rectifier/charge controller, free tube of bearing grease, and shipping crate. vertical-axis wind turbine (VAWT) is a type of wind turbine where the main rotor shaft is set transverse to the wind while the main components are located at the base of the turbine. This arrangement allows the generator and gearbox to be located close to the ground, facilitating service and repair.

4. CONCLUSIONS

The VAWT is designed and fabricated in such a way that the it can able to capture wind from all the direction, power developed from the project is 28W for a speed of 6.1m/s, the efficiency of VAWT can be increase by changing the size and shape of the blade, the theoretical and experimental result is varying because in theoretical calculation we consider the wind is hitting all the eight turbine blades, practically it is not. Our work and the results obtained are very encouraged that vertical axis wind energy conversion are plausible and potentially very contribute to the production of the clean renewable electricity from the wind even under low ideal sitting conditions. With the idea on highway, it will power up street lights. In most cities, highways are a faster route for daily commute and in need of constant light makes this a very efficient way to produce natural energy.

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DESIGN AND FABRICATION OF AUTOMATIC BRAKING SYSTEM

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ABSTRACT

I.C Engines had been superior loads such that its velocity is turning into a primary catastrophe. Advanced automated braking machine improves braking strategies in vehicles. It adjustments entire braking structures in an automobile and offers with the idea of Automatic Braking System giving the solution. This mission is designed with ultrasonic transmitter, ultrasonic receiver, Arduino UNO R3 board with PIC microcontroller, DC tools motor, Servomotor and mechanical braking arrangement. The Ultrasonic Sensor generates (0.020-20)kHz frequency sign. It is transmitted via ultrasonic transmitter. The ultrasonic receiver is used to get hold of the contemplated wave found in the front of the vehicle, then the contemplated waves is given to the ultrasonic wave generator unit wherein the incoming wave is amplified and in comparison in regards alerts to hold a steady ratio and this sign is given to microcontroller and via which the operating of DC tools motor and Servomotor might also additionally takes place, which ends up in software of brakes. The prototype has been organized depicting the generation and examined as consistent with the simulated conditions. In destiny the real version can be evolved relying on its feasibility.

Keyword: - Braking, Motor, Aruduino, and Ultrasonic etc...

1. INTRODUCTION

1.1 Design and fabrication of automatic braking system

Driving is a typical movement for the greater part of individuals. The quantity of vehicles is expanding step by step. Present a days, the innovation has immense changes which leads speed up. The speed assumes an imperative part to keep time for longer separations. Yet, this speed likewise gets a significant issue for purposes of street mishaps. The normal slowing down isn't adequate for evasion of mishaps when driver isn't dynamic. Further improve needs to done in stopping mechanism to slow down a vehicle when driver can't slow down i.e., it might needs programmed stopping mechanism. This programmed slowing mechanism permits the vehicle to slow down without help of the driver.

The principal focus of the ultrasonic stopping mechanism is that, vehicles ought to naturally slow down when the sensors sense the obstruction. This is an innovation for cars to detect an unavoidable forward crash with another vehicle or a snag, and to slow down the vehicle likewise, which is finished by the slowing down circuit. This framework incorporates two ultrasonic sensors viz. ultrasonic wave producer and ultrasonic wave recipient. The ultrasonic wave producer gave in front part of a programmed stopping mechanism vehicle, delivering and radiating ultrasonic waves in a foreordained distance before the vehicle. Ultrasonic wave collector is additionally given in front part of the vehicle, getting the reflected ultrasonic wave signal from the impediment. The reflected wave (discovery beat) is estimated to get the distance among vehicle and the snag. The DC gear engine is associated with the wheels of vehicle and power input is given to it from Arduino board.



Fig - 1: Automatic braking system

2. SCOPE OF PROJECT

The extent of this undertaking is to foster ultrasonic sensor to distinguish the snag and to handle the result from the ultrasonic sensor to drive the servomotor as an actuator. Vehicles can naturally slow down because of hindrances when the sensor detects the snags. The focal point of this venture is planning a naturally slowing mechanism that can assist us with controlling the slowing mechanism of a vehicle. The naturally stopping mechanism likewise needs to work with a ultrasonic sensor, which produce sound heartbeat by a bell. The ultrasonic wave is produced from a transmitter and ships off a collector.

2.1 Transducer

A transducer is an energy change gadget which changes over one type of energy into another. In the ultrasonic sensors they are utilized to change over electrical energy into ultrasonic energy as well as the other way around. In this framework piezoelectric transducers are utilized, which make ultrasonic vibration through utilization of piezoelectric materials like specific types of precious stones or fired polymers. Their working depends on the piezoelectric impact. This impact alludes to the voltage created between surfaces of a strong. (non-leading substance) when a mechanical pressure is applied to it. On the other hand when an voltage is applied across surfaces of a strong that shows piezoelectric impact, the strong goes through mechanical bending.

2.2 Sensor

A sensor is an electrical gadget that maps an ecological property to a quantitative estimation. Every sensor depends on transduction rule which is transformation of energy starting with one structure then onto the next structure. There are two significant terms connected with any sensor. Target Point - This term alludes to the slant reaction restrictions of a given sensor. Since the ultrasonic waves bounce off the objective item, target points show satisfactory measures of slant for a given sensor. Pillar Spread - This term alludes to the greatest rakish spread of the ultrasonic waves as they leave the transducer.

2.3 Ultrasonic Sensor

Ultrasonic running and recognizing gadgets utilize high recurrence sound waves called ultrasonic waves to distinguish presence of an article and its reach. Ordinary recurrence scope of human ear is generally 20Hz to 20,000Hz. Ultrasonic sound waves are sound waves that are over the scope of human ear, and subsequently have recurrence above 20,000Hz. A ultrasonic sensor essentially comprises of a transducer for change of one type of energy to another, a lodging encasing the ultrasonic transducer and an electrical association.



2.4 Ultrasonic Receiver

In the event that the ultrasonic wave recognizes the deterrent, it will deliver a reflected wave. A ultrasonic collector is utilized for getting the ultrasonic waves reflected from the street surface to create a gathering signal. There is ultrasonic transducer that will change back the sound wave to electrical energy. This sign enhanced by an intensifier. The enhanced sign is contrasted with reference signal with recognize parts in the enhanced sign because of snags out and about surface. The greatness of the reference signal or the enhancement element of the speaker is controlled to keep a consistent proportion between the normal of the reference signal and the normal of the intensified sign.

2.5 Ultrasonic Transmitter

Prior to sending the ultrasonic wave, there is a section which is ultrasonic wave generator that capabilities to produce ultrasonic wave. In that part, there is timing guidance implies for producing a guidance signal for discontinuously giving ultrasonic waves. This sign will ship off a ultrasonic wave generator for creating ultrasonic waves in light of the guidance signal from said timing guidance implies (change electrical energy into sound wave). After ultrasonic wave was created, ultrasonic transmitter sends the ultrasonic waves toward a street surface to figure out the hindrance. The reach that deterrent distinguished is relies upon the scope of ultrasonic sensors that utilized.

3. SENSING AND CONTROLLING UNIT

The Detecting and Controlling unit, is that piece of this framework which detects the article or deterrent before the vehicle, gauges the distance and the coming speed and afterward conveys vital messages to the servo engine and consequently to the Programmed Slowing down Unit. Its parts comprise of Arduino as a microcontroller, Servo engine, Ultrasonic Transducer and a power source to keep the framework running. The Arduino is coded by a product called Arduino 1.6, a language advanced by the organization of a similar name, which goes about as a free source coding, very much like Android.

3.1 Arduino UNO R3

The Uno is a microcontroller board in light of the ATmega328P. It has 14 computerized input/yield pins (of which 6 can be utilized as PWM yields), 6 Simple sources of info, a 16 MHz quartz precious stone, a USB association, a power jack, an ICSP header and a reset button. It contains everything expected to help the microcontroller, essentially interface it to a PC with a USB link or power it with an air conditioner to-DC connector or battery to begin. You can dabble with your UNO without stressing a lot over accomplishing something off-base, most dire outcome imaginable you can swap the chip for a couple of dollars and begin once more.

"Uno" signifies one in Italian and was decided to stamp the arrival of Arduino Programming (IDE) 1.0. The Uno board and rendition 1.0 of Arduino Programming (IDE) were the reference forms of Arduino, presently developed to fresher deliveries. The Uno board is the main in a progression of USB Arduino sheets, and the reference model for the Arduino stage.

The design of Arduino is its burden also. During building an undertaking you need to make its size as little as could be expected. However, with the large designs of Arduino we need to stay with enormous estimated PCB's.

On the off chance that you are dealing with a little miniature regulator like ATmega8 you can undoubtedly make your PCB as little as could really be expected.

4. CONCLUSIONS

Our plan utilizes very basic thoughts and systems to accomplish a complex set of activities and is expected to copy the activities of the operators. However, these water driven arms are costly for limited scope businesses. If the serious issue of high starting expense is tended to, a mechanical pressure driven arm can be presented in any industry to get automation. The mechanical connections and parts that have been manufactured are incredibly basic.

5. ACKNOWLEDGEMENT

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First and foremost, we would like to submit our sincere and heartfelt thanks for our Founder Udyog Rattan Deiva Thiru.J. SUDHANANDHEN, for his blessings to us for complete this project.

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DESIGN AND FABRICATION OF AUTOMATIC GEAR TRANSMISSION SYSTEM

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ABSTRACT

Motorcycles are widely used around the world particularly in INDIA. The gear shifting system of the motor-cycle is conventionally manual. This report covers development of an indigenous gear shifting /changing system for the standard motorcycle. By this system the manual mechanical gear shifting will remain unchanged because an additional electromechanical system is placed on the top of the lever to shift the gear and automatically control the clutch. So the system has both the option manual as well as automatic. The system uses low cost microcontrollers to make the accurate decision for shifting the gear up and down by observing the speed, and it controls the clutch transmission where necessary. The complete hardware and software has been tested and the functioning of the automatic gear shifting system is verified. System is flexible and can be used with any motorcycle ranging from 50 to 200 cc.

Keyword: - Linear Actuator, Arduino, Hall effect sensor, Atmega328, Servo motor, Gear shift lever.

1. INTRODUCTION

There are already some inventions done of gear box for motorcycle for transmitting the torque from engine crankshaft to the rear wheel of the motorcycle. The gear box is used to vary the torque as per the different driving conditions. The gearbox increases the required torque for start the ride and put the motorcycle in to motion. After the start or the running of the motorcycle there is no need of high torque, so now gear box will transmit the optimum torque to the rear wheel at high speed. For the operation of gearbox and shifting the gear there is need of some effort of driver of motorcycle. A foot lever is used to shift the gears in a motorcycle. Also, a clutch is placed between the engine and the transmission in order to engage and disengage the flywheel with the transmission. So for smooth driving of motorcycle there is need to time these two operations perfectly. This gear shifting becomes a tiresome process for most new drivers. This can also help in reducing accidents. Therefore we propose the development of an automated system which can change the gears automatically with the help of speed. This automated system which we propose will also be beneficial in terms of fuel economy and production costs. In our developed system, both the gear and the clutch are controlled electro- mechanically by a micro controlled based computer system. This system does not require any modification to the engine. The equipment is mounted externally on the body of the motorcycle. This system shifts the gear up and down electro-mechanically like the human rider by sensing the speed of the vehicle, but the system shifts the gear at exactly the correct speed, which produces the smooth gear changing sequence. The engine runs smoothly without any knocking, which increases the engine life. This proposal is different from the one used in cars as it uses electromechanical actuators.

1.1 Project objectives

- To design the system for automatic transmission.
- To calculate the dimensions of the magnet to be used and gear ratios being use.
- To code the required Arduino program for the servo motor and the linear punching actuator.
- Analysis of designed mechanism.
- Fabrication and testing of designed mechanism.

2. PROJECT BACKGROUND

Field of the Invention: The present invention relates to an automatic gear change device for controlling the operation of a gear transmission and a clutch in an automotive vehicle. Description of the Prior Art: One example of automatic gear change devices of the type described is disclosed in Japanese patent laid-open publication No. 61-192954 in which two actuators for manipulating a clutch and a gear transmission are controlled based on the control signals issued from a single control unit. The control unit is mainly composed of a microprocessor operable to determine the control signals based on input signals representing various travelling condition data including the vehicle speed. The disclosed device is disadvantageous, however, in that the control unit and the actuators have a low compatibility with the corresponding components in an automobile of a different type. With this difficulty in view, a somewhat successful device has been proposed in Japanese patent application No. 61-154339 filed by the present assignee. The proposed device includes an actuator operation control unit which takes over a portion of the function of the conventional main control unit, and a main control unit for controlling the actuator operation control unit, the actuator operation control unit being disposed adjacent to each actuator for controlling the operation of the latter. The foregoing device is still unsatisfactory, however, in that since the actuator operation control units are connected to the main control unit by exclusive connecting lines, they are likely to run away when the exclusive connecting lines are damaged or broken away.

2.1 Past work

- Changing gears manually is a gruesome task which has also been very disturbing for the riders.
- However, switching to automatic transmission can help us overcome all such situations.
- Abrupt stopping of the engine in traffic due to poor handling of clutches can be avoided.

2.2 Literature review

2.2.1 Automated Transmission System

Automated Transmission is a clutch-less (without clutch pedal) manual transmission system which uses electronic sensors, processors and actuators (hydraulic or electro mechanical) to do clutch actuation and gear shifts as per command of the driver. Automated Transmission system uses a conventional manual transmission, actuators and control unit to automate the whole process. The system consists of three sections of sensors, processors and Actuators.

2.2.2 Gear Selecting Mechanism

Conventional way of Gear selection was been using a gear speeder to detect nicks on transmission gear teeth. However, measurement over balls, run out and tooth-to-tooth composite error could not be measured by the gear speeder and skilled workers were always needed to operate the gear speeder. Efficiency of these highly mechanized processes appreciably depends on the reliability of work of tooth gearings of machine drives. Impulsive responses in geared systems with multiple clearances are studied when the mean torque excitation and system load change abruptly, with application to a vehicle driveline with an automatic transmission.

3. PLAN METHODOLOGY

The study of following research papers are done:

- Modeling of an automated manual transmission system,
- Development of a new Automatic Gear Selecting Machine for Automobile,
- Tooth wear modeling and prognostication parameters of engagement of spur gear power transmissions.

• Impulsive response of an automatic transmission system with multiple clearances: Formulation, simulation and experiment.

3.1 Calculations

Speed range of gearing and vehicle Now here we calculate the range of speed of gear box output power and range of all minimum and maximum rpm of the gear box shaft in every gear mashing condition...

If we consider the speed for first gear is 0km/h to 20km/h for second 20km/h to 30km/h for third 30km/h to 45km/h and for greater than 45km/h take for the gear mashing

Here, we have the range in term of speed in km/h now converting the vehicle speed in rpm for that use the equation , as given below.

N=V*60/3.14 D;

Where, N=speed in rpm V=speed in m/s, D=tire diameter in m, Take, D=0.80 meter tire diameter.

Thus by using this equation we can find the our speedometer speed km/h can convert in revolution per minute (rpm). We have output gear reduction as 9.889 (calculated by using the output shaft dia. And teeth on rear to front sprockets).



Fig -1: Prototype

4. CONCLUSIONS

This system is flexible and can be implemented on a motorcycle available in the Indian market without any modification. The motorcycle manufacturing can also use the system in their vehicles because it can be easily fitted to the motorcycle and there is no need of internal modification of the gear system. By install this low cost system in their motorcycle. Companies may also be able to increase their sale due to availability of these new features. This will also help in improving fuel economy in addition to improving the parts lifetime.

5. ACKNOWLEDGEMENT

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MECHANICAL AND TRIBOLOGICAL PROPERTIES OF TICN MONOLAYER COATING ON TUNGSTEN CARBIDE CUTTING TOOL INSERTS

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ABSTRACT

When it comes to machining materials that are challenging to machine, metallic nano coatings on cutting tools are an efficient method for enhancing tool performance. Hard coatings have been developed for cutting tools as a result of the metal machining industry's demand for high productivity and accuracy. In the past, hard tool materials have not been able to simultaneously and at the highest level achieve all of the properties of high hardness, low wear rate, long tool life, and good surface finish. A thin, hard film coating is applied to the cutting tool in order to extend its lifespan. Inserts were coated using the magnetron sputter technique with a single layer of metallic nanoparticles (TiCN). According to evaluations of high-rise models, TiCN coating has demonstrated lower resistance to tungsten carbide (WC) and less material damage than generated stiffness (24.51 GPa).

Keyword: - Nano Coating, TiCN, Magnetron sputter method, Tungsten Carbide.

1. INTRODUCTION

Coating a cutting tool is a good way to improve the tool's performance while making hard-to-machine materials. Hard coatings on wounding tools have resulted from the need for high productivity and precision in amalgam fabrication. In addition to their developed mechanical, tribological, natural, and physical properties, hard coatings have a wide range of scientific applications. Wearable flexible high-hard coverings are now available in both single-film and multifilm system applications, both of which have a devilish crack through amalgamation wounding assiduity .The hard/easy covering has a medium microhardness, lower inner stress TiCN rigid film and less disunion .The damage and gash performance as well as the continuance of a tool delivered through a face film or carbide tool through the excessive stylish admixture of the covering or substrate things. Conducted experimental working desiccated revolving of austenitic pristine brands cemented carbide material covered through TiAlN/ Idiosyncrasy/ Al2O3 and Idiosyncrasy/ TiAlN/ Drum multifilm coverings, also initiate that the Consideration is given to the mechanical and tribological properties of a nanostructured Drum/TiBN multifilm coating for the purpose of bi--film consistence equipped by responding unstable magnetron sputtering in an N2-Ar gas combination at temperature.

The fact that the highest skill-off resolution are exorbitantly delicate to the norms rehearsed can be attributed to the fact that the binary regression computations achieved aimed at face smoothness and material removal rate (MRR) through regard to fabricate through an uncovered tools and through carpeted tools are enhanced in every through as they are similar to colorful purposes. This process has colorful COF records, wear accessories visualizations, and applications for PVD-TiCN carpeted inserts .The wounding performance of SiAlN slipup

wounding inserts was improved by putting TiAlN coatings on the nickel-innovated compound supplements that were rotating in wet conditions. Additionally, the position of frictional wear on coated inserts is lower than that on uncoated inserts .The face excellence of the crafted pieces was calculated through a series of turning trials as a result of the wounding speed pacing a device continuance and the wear ministry (9).Energy, face roughness, and tool wear are all increased by the proliferation of feed quantum rate improve as wounding haste increases and energy decreases.

1.1 Materials used

A chemical compound known as tungsten carbide (WC) has equal amounts of carbon and tungsten atoms, making it carbide in particular. Through sintering, tungsten carbide can be pressed and molded into shapes for use in industrial machines, cutting tools, chisels, abrasives, armor-piercing shells, and jewelry. In its most basic form, tungsten carbide is a fine grey powder. Waxed carbide has a Young's modulus of approximately 530–700 GPa, making it roughly twice as rigid as steel and having a density somewhere in the middle of that of lead and gold. It can only be polished and finished with high-hardness abrasives like cubic boron nitride, diamond powder, wheels, and compounds because it has a hardness that is comparable to that of corundum (Al2O3). Wiper inserts with an 80° rhombic angle on both sides for a perfect surface finish at high feed turning speeds (0.3 to 0.6 mm/rev). At the same feeds, the surface finish is three to five times better than that of plain turning inserts. For medium and semi-roughing on steel, forged iron, and chrome steel, this kind of cutting insert is effective.



Most of the time, TiAlN is coated on high-speed CNC cutting tools for machining tougher materials under extreme cutting conditions. Drill bits, hard metal milling cutters, cutting inserts, and shaping knives can all use it.It is used for machining that is dry or close to being dry.

Properties	Value
Hardness	32GPa
Thickness	1-4 micrometers
Coefficient of friction	0.49
Thermal stability	600°C

	A	PERSONAL CONTRACT	8 . D.	
Table 1:	Properties	of Titanium	chromo	nitride

2. METHODOLGY



The magnetron sputtering technique is a high-rate vacuum coating method that makes it possible to deposit on a wide variety of materials, including composites and metals, onto a large number of substrate materials by applying a magnetic field that has been specifically formed to a diode of the sputtering target.

The magnetron sputtering deposition technique makes use of magnets on the side of the negative cathode to prevent electrons from striking the substrate and capture them over the negatively energized target material, allowing for faster deposition rates.



Fig -3: Magnetron sputters method

2.1 Coating Deposition Parameters

Supstarate temperature	673-973 K
Distance between Target and supstarate	6.5cm
Bass Pressure	1.2*10^3 pa
N2 Flow rate	2-30 sccm
Ar Flow rate	10-38 sccm
Total Flow rate	40 sccm
Working pressure	0.77 pa
Target Voltage	300-350 V
Plasma Current	200 mA
Deposition Time	60 min
Target	TiCN

Table -1: Coating deposition parameters

We machined the work-piece with a work-piece tool made of stainless steel 304, both coated and uncoated, for 30 minutes at a feed of 0.15 mm, a depth cut of 1 mm, and a cutting speed of 1500 rpm.



Fig -4: TiCN Coated CNMG 120408-M4 TK150 insert

3. RESULT AND DISCUSSION

The scope of micro-structural analysis spans from the straightforward measurement of specific parameters like coating thickness or grain size through pore structure and porosity to the comprehensive characterization of multi- component systems and the investigation of degradation or failure mechanisms. With sub-micron resolution, a variety of methods are utilized to provide both physical and chemical information.

SL.NO	Cutting tool with coating	Cutting tool without coating
1	1641.5	1632.9
2	1611.9	1576.9
3	1734.8	1604.7
Average	1662.7	1604.7

	Table	-2:	Vickers	hardness	test
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The surface roughness test for the coated and uncoated carbide tool it seems the hardness of the TiAlN coated carbide tool has better hardness than uncoated carbide tool as been shown in the below figure.



Fig -5: Surface roughness

4. CONCLUSIONS

The tungsten carbide wounding device insertion is followed by a positive dump of TiCN monolayer coverings using the magnetron sputter method. For single-film (TiCN) covers, higher rigidity (24.51 GPa) was found. The TiCN covering exposed well development in apparel amount (52 percent) associated with the uncovered device, as one stood similarly observed. The exterior similarity increased as the number of films in the multi-film covering increased, and as a result, a worthy exterior quality (0.219 m) was achieved.

In the following phase, properties like wear rate, coefficient of resistance, and scratch resistance must be determined. To determine whether coated nano-materials are present, coated tools must be compared to their uncoated counterparts' microscopic structures. After that, their performance must be measured and real-time machining must be performed.

5. ACKNOWLEDGEMENT

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FABRICATION OF NATURAL FIBRE (COCONUT COIR) REINFORCED POLYMER COMPOSITE

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ABSTRACT

Coir fiber was selected for this study because it is non-toxic, low cost, high lignin content, rarity, low enduringness, low tensile modulus and high range of elongation compared to other fibers. Composites were prepared using Coir fiber within the rough (raw) stage, after washing with tap water, and also subjected to numerous other treatments. After which their mechanical, chemical composition, morphological properties were determined within the laboratory and therefore the results are discussed. There was an honest improvement in their properties thanks to chemical composition modification and surface modification (fiber / matrix adhesion). Characterization study was done by XRD, SEM, INSTRON and FTIR facility.

Keyword: - Coir fiber, non-toxic, morphological properties, and chemical composition etc...

1. INTRODUCTION

Over a beyond couple of many years composites, plastics, earthenware production have been the predominant designing materials. The areas of utilizations of composite materials have developed quickly and have even tracked down new business sectors. Current day composite materials comprise of numerous materials in everyday use and furthermore being utilized in complex applications while composites have proactively demonstrated their value as weight saving materials the current challenge is to make them strong in extreme circumstances to supplant different materials and furthermore to make them cost effective. This has brought about improvement of numerous new methods as of now being utilized in the business. The composite industry has started to perceive the different applications in industry essentially in the transportation area. New polymer gum network materials and superior execution filaments of glass, carbon and aramid which have been presented as of late have brought about consistent development in utilizations and volume of composites. This increment has brought about clear decrease of cost. Superior execution FRP are additionally tracked down in numerous assorted applications for example, composite armouring plan to oppose the effect of blasts, wind factory edges, modern shafts, furthermore, fuel chambers for gaseous petrol vehicles paper making rollers and even help light emissions. Existing structures that must be retrofitted to make them seismic safe or to fix harm brought about by seismic movement are additionally finished with assistance of composite materials.

1.1 Materials and methods

These days, plant strands are tracking down improved and expanded applications in many fields, for example, autos, sports, products assembling and laser hardware. The antagonistic impact on the climate by the use of engineered filaments can be supplanted by regular strands. Subsequently, the coconut blossom cover, which is utilized for the development of cottages in country towns of India, was utilized as a regular fiber in the ongoing
examinations. The utilization of such inexhaustible source as filler is thought of to be another endeavor towards the arrangement of composites for modern applications. General purpose polyester tar that has great temperature properties, great malleable extension and incredibly high resistivity was utilized as a base network. It is broadly utilized in marine applications, fire retardants, etc. The pressure shaping cycle was embraced for the manufacture of the composite. Right off the bat, the filaments were separated from coconut bloom covers which promptly accessible. These strands are known for their high-explicit strength and solidness, low thickness and minimal expense, plentiful accessibility and inexhaustible nature. They are additionally a natural amicable other option when contrasted with glass fiber- supported composites.

1.2 Composite fabrication

For fabricate exceptional PP sheet, granules of PP (around 5 g) was situated into two steel plates and situated into the electrically warmed water powered press (Kao Tieh Go Tech Pressure Machine). The press was worked at 180 C. Steel plates were squeezed at 7 MPa strain for 3 min. The plates were then, at that point, cooled for 3 min in a different press under 7 MPa tension at room temperature. The subsequent PP sheet was cut into the ideal size (150 120 0.25 mm3) for composite assembling. The strands were then, at that point, situated unidirectional between two PP sheets, with no obvious end goal in mind in a form having aspect 150 120 0.25 mm3. Composites were organized at different fiber stacking (say, 10 40 wt%) by embedding four layers of filaments between five layers of pre-weighted PP sheets. Composites were ready by squeezing this sandwich at 190 C for 5 min under a strain of 10 MPa. Completely pressure shaped sheets were then, at that point, cold squeezed for 5 min.

2. CLASSIFICATION OF NATURAL FIBER

Natural fiber, any hair-like unrefined substance straightforwardly realistic from a creature, vegetable, or mineral source and convertible into nonwoven textures like felt or paper or, in the wake of turning into yarns, into woven material. A characteristic fiber might be additionally characterized as an agglomeration of cells in which the measurement is irrelevant in examination with the length. In spite of the fact that nature has large amounts of sinewy materials, particularly cellulosic types like cotton, wood, grains, and straw, just a modest number can be utilized for material items or other modern purposes. Aside from financial contemplations, the value of a fiber for business not set in stone by such properties as length, strength, malleability, flexibility, scraped spot opposition, sponginess, and different surface properties. Most material strands are slim, adaptable, and generally solid. They are flexible in that they stretch when put under strain and afterward to some degree or totally return to their unique length when the pressure is taken out.



Fig -1: Classification of Natural Fiber

2.1 History of natural fiber

The utilization of normal strands for material materials started before written history. The most established sign of fiber use is likely the revelation of flax and fleece textures at uncovering locales of the Swiss lake inhabitants (seventh and sixth hundreds of years BCE). A few vegetable strands were likewise utilized by ancient people groups. Hemp, apparently the most established developed fiber plant, began in Southeast Asia, then spread to China, where reports of development date to 4500 BCE. The craft of winding around and turning cloth was at that point well developed in Egypt by 3400 BCE, showing that flax was developed at some point before that date. Reports of the turning of cotton in India date back to 3000 BCE.

The assembling of silk and silk items started in the exceptionally evolved Chinese culture; the creation and advancement of sericulture (development of silkworms for crude silk creation) and of strategies to turn silk date from 2640 BCE. With further developed transportation and correspondence, profoundly confined abilities and expressions associated with material production spread to different nations and were adjusted to nearby requirements and capacities. In the eighteenth and nineteenth hundreds of years, the Modern Upheaval supported the further creation of machines for use in handling different normal strands, bringing about a colossal upsurge in fiber creation.

The presentation of recovered cellulosic strands (filaments framed of cellulose material that has been disintegrated, decontaminated, and expelled), like rayon, trailed by the creation of totally manufactured filaments, like nylon, tested the imposing business model of normal filaments for material and modern use. Different manufactured strands having explicit helpful properties started to enter and overwhelm advertises recently hoarded by normal filaments. Acknowledgment of the serious danger from engineered filaments brought about concentrated research coordinated toward the reproducing of new and better types of regular fiber sources with more significant returns, further developed creation and handling strategies, and alteration of fiber yarn or texture properties. The significant enhancements accomplished have allowed expanded all out creation, albeit normal filaments' genuine portion of the market has diminished with the flood of the less expensive, engineered strands requiring less worker hours for creation.

2.2 Objective

As expressed above Coir Fiber Composites Find huge applications in the field of developments like material tiles and epoxy flooring Nowadays composites are utilized in the arrangement of wellbeing head protector shell readiness In this trial and error a little exertion is made to create a material by utilizing Coir fiber and Concrete filler Epoxy composite furthermore, figuring out its properties and checking out whether it is a reasonable material for creation of a security cap shell. The Properties like Hardness and Influence Strength of manufactured material is contrasted with that of customary cap shell material.

3. TESTING OF MECHANICAL PROPERTIES

3.1 Tensile test

Tensile test examples were cut in canine bone state of aspects (140mmX15mmX10mm) with a measure length of 5mm according to ASTM standard. Pliable strength of the pre-arranged examples was tried utilizing the 3382 Story Model All inclusive Testing Machine, INSRON (10 ton) with a strain pace of 1mm/min. Youthful's modulus or on the other hand the versatile modulus was gotten as a proportion of the solidness of the composite.

3.2 Flexural test

Flexural test examples were cut looking like rectangular bar of aspects (120mmX10mmX10mm) according to ASTM standard. Flexural strength of the examples arranged was tried utilizing the 3382 Story Model Widespread Testing Machine, INSRON (10 ton) with a strain pace of 2mm/min over a range length of 70mm. Flexural modulus or twisting modulus was figured as a proportion of inclination of the material.

3.3 Impact strength

Impact test examples were cut according to ASTM standard Charpy influence test in aspects of (7.5mmX10mmX10mm) with a score of 2mm cut at the focal point of example at 600 . The effect analyzer with an exactness of $\pm 0.022J$ was utilized according to ASTM standard D256



Chart -1: IR spectra of raw and de-waxed coir fiber

3.4 Feature results and discussion

Regular filaments are made of cellulose, hemi-cellulose and lignin. Arrangement of polymer-cellulose composites are thwarted by the profoundly hydrophilic nature of these strands while the polymers utilized for grid readiness are generally hydrophobic making similarity issues bringing about loss of mechanical properties after dampness take-up [18]-[20]. Because of the unfortunate similarity, surface of strands should be altered so as to make it less hydrophilic and further develop the connection point cooperation between the fiber what's more, the lattice. Syed H. Imam et al [21] concentrated on the impact of various medicines (washing with water, treatment with soluble base otherwise called mercerization and dying) on pliable what's more, warm properties of coir composites with starch/ethylene vinyl liquor copolymers (EVOH). SEM portrayal of fiber surface morphology showed that mercerization delivered the best outcome with expanded sticking between fibers furthermore, grid and 53% increment in rigidity contrasted with composites with crude filaments. It likewise further improves fiber-lattice grip for better pressure appropriation among lattice and the filaments.

3.4 Mechanical Strength

The mechanical properties of composites with coir fortifications have recently been concentrated on by a few scientists. A. Bensely et al [30] created coir composites and concentrated on their mechanical properties. Examining electron micrographs of broken surfaces were utilized for subjective assessment of the interfacial properties of coir/epoxy and were contrasted and glass/epoxy composites. These outcomes demonstrate that coir can be utilized as a potential supporting material for low burden bearing thermoplastic composites. A.zuradia et al [31] concentrated on the impact of fiber length on mechanical properties of coir fibber built up concrete collection composites. It was reasoned that rising the fiber length expands the flexural strength yet fuse of long fiber into the concrete decreased its usefulness as voids were presented which brought about low thickness, expansion in water retention and water content. Rahul A.khan et al [32] concentrated on the mechanical properties of coir fiber ethylene glycol dimethacrylate base composites. The outer layer of the coir filaments was altered with monomer EGDMA under UV radiation. Pre-therapy with UV radiation on the coir fiber actually worked on its mechanical properties. The outer layer of the fiber was likewise mercerized (soluble base treatment) utilizing fluid NaOH arrangements (5half) at fluctuated time and temperature. It was found that TS of the mercerized composites expanded with the expansion in NaOH arrangements (up to 10%) and afterward diminished. The composites made utilizing mercerized strands treated with ethylene glycol dimethacrylate (EGDMA) showed further expansion in TS. Pre-treatment with mercerization + UV treatment of coir fiber showed critical improvement in the mechanical properties of the coir fiber-based composites.

4. CONCLUSIONS

Composites with mercerized coir fortifications in epoxy framework were ready by hand rest up procedure and their mechanical properties like elasticity, flexural strength and effect still up in the air. The impact of mercerization on the filaments was likewise investigated by FTIR and SEM examination of the treated and untreated strands.

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MECHANICAL WASHING MACHINE

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ABSTRACT

Despite being one of life's necessities, washing clothes is frowned upon due to the labor, expense, and time it requires. There are many different washing machines on the market today, and competition among the makers is fierce. A washing machine can cost anywhere from Rs. 8,000 to Rs. 45,000, depending on its features and capabilities. Very expensive washing machines come with the option of dry cleaning as well. Every washing machine on the market is powered by electricity, and the fundamental idea behind how they work is to create a turbulent flow of detergent around the unclean laundry. Wet clothing is rotated at a fast rate of speed to remove water droplets from it, which helps the clothing dry. In our nation, where around 70% of the population has a very low socioeconomic position; those individuals cannot own a washing machine owing to financial restrictions and a lack of power for any reason. The current study is an effort to create a design for a cloth washing mechanism that can satisfy the needs of the nation's 70% most populous group. Working principle of this concept is no more different from available similar type of machine with a difference driving mechanism of the machine. The objective of bringing down the initial cost and operating cost of washing machine is almost achieved in present work within the limitation of work as mentioned.

Keyword: - CWT, CEA

1. INTRODUCTION

A washing machine, also known as a laundry machine, clothes washer, or washer, is a piece of equipment used to wash clothes, towels, and other linens. In contrast to dry cleaning (which employs other cleaning fluids and is carried out by specialized firms) or ultrasonic cleaners, the phrase is often solely used to describe machines that use water as their primary cleaning solution. In order to wash anything, it must be submerged, dipped, rubbed, or scrubbed in water or another liquid, typically with the help of soap, detergent, or bleach. If washing by hand, beat out and rub the dirty fabric. Laundry Washing Technology (CWT) is designed to reduce manual labor by providing an open basin or closed bin with paddles or fingers to automatically move clothes. Early machines were manually made of wood, but later metal machines kept a fire burning under the washbasin to keep the water warm all day (the whole process often took a full day of hard labor and drying). The earliest special cleaning device was the scrubbing brush, invented in 1797. Electricity didn't become widespread until at least the 1930s, so some early washing machines were powered by single-cylinder, low-speed, hit-or-miss gasoline engines.

2. COMPONENTS USED

We are used the readily available components for making this mechanical washing machine. Ice-cream freezer box, HDPE mesh net, bearing ratchet, Journal bearing, ball bearing with hub and PVC pipes are the components used for this project.

2.1 Ice-cream Freezer

Ice-cream freezer is used as outer body of the washing machine. The size of the box is depends upon the load act so we choose this ice-cream freezer box as outer body of the washing machine. Also it can able to with stand the load up-to 100N without any failure.



Fig -1: Ice-cream freezer (Washing machine outer body)

2.2 HDPE Mesh Net

HDPE (High density Polyethylene) Mesh Net is used as casing purpose on the drum. It is one of the hardest materials also it is UV resistance material. It does not absorb water also it is corrosion resistance. The weight of net is very less when compared to other material. It can carry the load up-to 10kg after loading the clothes. The durability of this material is high so we preferred HDPE Mesh Net as casing purpose.



Fig -2: HDPE Mesh Net (Casing on the drum)

2.3 Bearing Ratchet

It is a device used for allow linear or rotary motion in uni-direction on the other direction there is no changes occurred due to that motion. Here we used this component for converting the motion from one form to another form. The conversion of motion is mention on the mechanism chapter.



Fig -3: Bearing Ratchet

2.4 Journal Bearing

Journal Bearing is a beam or journal revolving in a bearing. The bearing setup is separated into two parts. It is designed for reduce load friction also resistance to shock and overload. It is used mostly used in industrial

machines but we used for withstand the load in other words it resist the load where applied. It is long lasting material when the proper maintenance.



Fig -4: Journal Bearing

2.5 Ball bearing with hub

Ball bearing is a rolling element here we used this for carries the radial and axial loads. It consists of n number of balls for reduces the rotational friction. The number of balls present in the system depends upon the size of the bearing.



2.6 PVC Pipes

Polyvinyl Chloride (PVC) pipes are one of the essential household materials during the construction period. Most of the builders use PVC pipes for both electrical and plumbing purposes. Because of the cost of the pipes is less also less weight material. Here we used PVC pipes as treadle or foot pedal. We used reinforced PVC pipes and fitting materials like elbow and T-joints.



Fig -6: PVC Pipes with fittings

3. MECHANISM USED

The mechanical washing machine is based on the conversion of reciprocating motion to rotary motion. The motion conversion is done by the help of components above mentioned. On this mechanism we provide the force as reciprocating motion convert into rotary motion by the help of bearings and the connecting chain.

3.1 Reciprocating Motion

Reciprocating motion is also called as reciprocation. The up and down linear motion is said to be reciprocating motion. The length of the top dead centre and bottom dead centre is known as stroke or stroke length. Here we produce the reciprocating motion by applying force on the treadle or foot pedal.

3.2 Rotary Motion

Rotary motion is also called as rotational motion. An object rotates with an fixed axis or path is known as rotary motion. For an example the Earth rotates with its axis, Fan is also a best example for rotary motion. Here we get the rotary motion by the help of bearing setup.

3.3 Conversion of Motion

We make this entire setup to convert reciprocating motion into rotary motion for washing the clothes without interaction of electricity. The conversion is been done by the help of bearing setups and PVC Pipes.

3.4 Methodology Used

Here we used simple methodology for this mechanical washing machine. The machine is rotates continuously, using less amount of water and detergent. The drum is rotated frequently, which rubs clothes against each other. This process is works to clean the clothes.

4. CONCLUSIONS

From the experiment we have successfully make the Mechanical washing machine. Also it runs by applying force on the foot pedal (treadle) without any interaction of electric current. In our observation this machine can wash the clothes up-to 3kg within 20minutes. Therefore our mechanical washing machine has been successfully runs without electricity.

5. ACKNOWLEDGEMENT

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We would like to enunciate special thanks to our friends, teaching and non- teaching staffs who have directly and indirectly contributed to the success of this project.

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APPLICATION OF GENEVA MECHANISM

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ABSTRACT

Geneva mechanism is a method which is used to exchange nonstop circular movement into predetermined step circular movement in other words produces discontinuous rotary motion. It is consists of driving wheel and driven wheel. It is a reasonably priced also trouble-free mechanism. It is mostly used in automotive industries and transporting of unprocessed substance in processing of manufacturing. Several types of rotators are there such as peripheral Geneva rotator, domestic Geneva rotator and sphere-shaped Geneva rotator. The rotators were selected depends upon the machine mechanism.

Keyword: - Geneva Mechanism, conveyor belt, etc....

1. INTRODUCTION

The Conveyor Belts be worn in Industries to bring weighty things or substance from one position to another position. They are profoundly worn in all fields. But the conveyor belts require a lot of power to work. Geneva drive is a gear mechanism that converts a nonstop revolving into an discontinuous rotatory movement. The rotating drive wheel has a small rod that reaches into a slot of wheel advancing it by one step or round. The drive wheel also has a raised circular disk used for blocking that is it locks the wheel in position between the steps. Currently the conveyor prepared using Geneva mechanism holds a very significant place in factories as the Geneva mechanism has many advantages. It is the simplest and most inexpensive method in all intermittent motion mechanisms and thus is of great advantage in current time. They have various sizes and are used in automobile industry, electronic industry, building sites, film projectors, etc. The majority important advantage in the conveyor belt using Geneva mechanism is that we can control the speed and direction of the belt by just adjusting the length of the rod attached to the servo motor being used.

2. COMPONENTS USED

We are used the readily available components for making this Geneva mechanism. Frame, Geneva drive, DC motor, Conveyor belt, transformer and Rectifier are the components used for this project.

2.1 Frame

Frame is a construction method by means of an "outline frame" of perpendicular steel columns and parallel I-beams, constructed in a rectangular framework to hold up the floors, covering and walls of a construction which are all attached to the frame. The enlargement of this method prepared the production of the skyscraper achievable. The rolled steel "outline" or cross section of steel columns takes the shape of the letter "I". The two spacious flanges of a column are thicker and wider than the flanges on a beam, to superior hold out compressive pressure in the arrangement. Square and round tubular sections of steel can also be used, often overflowing with tangible.



Fig -1: Frame

2.2 Geneva Drive

The Geneva drive or Maltese cross is a gear mechanism to facilitate translates a nonstop revolution movement into discontinuous rotating movement. It consists of two wheels such that driving wheel and Driven wheel. The rotating drive wheel (driving wheel) is typically prepared by a pin that reaches into a slot positioned in the other wheel (driven wheel) that advances it by one step at a time. The drive wheel also has an high-minded circular jamming disc that "locks" the rotating driven wheel in position between steps.



2.3 DC Motor

DC motor converts the electric current into mechanical work. Mostly all of DC motors are producing force by help of magnetic fields.



Fig -3: DC Motor

2.4 Conveyor Belt

A conveyor belt is the transport standard of a belt conveyor system. A belt conveyor method is one of many types of conveyor systems. A belt conveyor method consists of two or additional pulleys with a stopped loop of hauling standard the conveyor belt that rotates with reference to them. One or both of the pulleys are power-driven, moving the belt and the material on the belt promote. The powered pulley is called the drive pulley while the unpowered pulley is called the idler pulley.



Fig -4: Conveyor Belt

2.5 Transformer

Transformer is a device used for transfer the electric current between two or more circuits from side to side electromagnetic induction. Also used for increase or decrease the voltages of alternating current (AC).



2.6 Rectifier

Rectifier is a device used to convert alternating current (AC) to direct current (DC). It also used for obtain the high-voltage direct current (DC). Here we used the rectifier as power or energy distributing system for this Geneva mechanism project.



Fig -6: Rectifier

3. WORKING PRINCIPLE

The Geneva mechanism is a method which is used to exchange nonstop circular movement into predetermined step circular movement in other words produces discontinuous rotary motion. It is consists of driving wheel and driven wheel. It is a reasonably priced also trouble-free mechanism. It is mostly used in automotive industries and transporting of unprocessed substance in processing of manufacturing. Several types of rotators are there such as peripheral Geneva rotator, domestic Geneva rotator and sphere-shaped Geneva rotator. The rotators

were selected depends upon the machine mechanism. The driving wheel is kept next to the driven wheel in such a method that when the driving wheel is rotated, the extruded rod fits in the interior slot. As it reaches the base point of the slot, the rod exerts a force on the driven wheel. As the driven wheel is pivoted from the centre, there will be a generation of a moment. This causes the generation of a torque which rotates the driven wheel. Hence there is a fixed step circular motion. The mechanism used for conveyer belt is an external Geneva mechanism.

4. CONCLUSIONS

Geneva mechanism is the simplest and low cost of all discontinuous movement mechanisms. They have a massive multiplicity of sizes, with a range of applications. They have a better movement curve personality compared to ratchets. They are very helpful in manufacture, automobile and electronic industries for accumulation creation. Thus, the use of Geneva mechanism in conveyor belt helps in reduction of excess energy and control the speed of conveyor belt and building the creation and managing contented.

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ADAPTIVE HEADLIGHT SYSTEM FOR ACCIDENT PREVENTION

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ABSTRACT

In this paper we paying attention on the plan and carrying out of a microcontroller based Adaptive Headlight System (AHS) for automobiles. The major motivation of this method is to present a cost valuable method to elucidate blind spots despite the fact that driving in the night and at some stage in the times when the visibility is concentrated considerably so as to make the things able to be seen in those pitch-black locations and in this manner prevent accidents. The system is planned to receive input from the indicator switch wherein a full turn is achieved by the headlight mirror when the indicator input is given. Also, the adaptive headlights are involuntarily switched on when the amount of light measured by a photo diode falls below a verge, thereby eliminating the need for the driver to toggle on the headlights.

Keyword: - Accident mitigation in vehicles, embedded systems, Microcontroller, Blind spot elimination, etc

1. INTRODUCTION

During the night time more accidents are occurred due to lack of vision or direct focus of head-light to our eyes. The temporary blindness is occurred due to head-light directly focused to the eye. To overcome this situation, we designed an adaptive head light system to reduce the accident level. We used microcontroller for sensing the speed and produce the angle of light emission. The light emission is depends upon the speed of the vehicle. We achieved this project by the help of micro-controller.

2. COMPONENTS USED

We are used the readily available components for making this adaptive head-light system. Microcontroller, battery (9V), transformer (12V/1A), segment display, stepper or servo motor, connecting card/wires are the components used for this project.

2.1 Microcontroller

Microcontroller is a device used as a mini computer. It is a very large scale integrated circuit (VSLC) the memory of the microcontroller is very less. We used 1ATMEL 89S52 microcontroller for sense speed and control the emission of light.



Fig -1: 1ATMEL 89S52 microcontroller

2.2 Segment display

Now-a-days segment displays are used widely. Digital clocks, electronic meter and basic calculator are some of the examples. Here we used segment display as display unit. It shows the speed range also the angle of light emission.



2.3 Transformer

It is a device used transfer alternative electric current from one circuit to another circuit. It can be used for either increase or decrease the voltage. Here we used transformer for regulate the power supply.



Fig -3: Transformer

2.4 Motor

Motors are an electro-mechanical device used to transmit the power. Here we used stepper motor for this project. Stepper motor is runs in the basis of pulse signal. Also we can able to set the speed of motor by the help of micro-controller.



Fig -4: Stepper motor

2.5 Connecting cords/ wires

Connecting cords are used to inter-connect sensor and other components to the micro-controller. Connecting cords is nothing but the connecting cables is used for circuits and components.



3. MECHANISM USED

The adaptive head-light mechanism is worked based on the program where present in the microcontroller. Here we connect the transformer, speedometer and light emitting cord to the microcontroller. Also we provide an operational based program to the microcontroller then it performs based on the instruction

4. CONCLUSIONS

Thus the adaptive headlight system is a most favorable and expenditure efficient resolution to prevent recurrent accidents in the nights. The deliberate system provides step wise turns of the headlamps on either side based on the restricted input given to the stepper motor emotionally involved to the light on either side. The maximum degree of turn achieved on the downward head-light is -30 degrees and on the upward is 0 degrees. The stepper motor transducers this voltage rate into resultant revolving angles and provides enough turn at the bends. Hence this system is trustworthy and ensures resourceful and safe driving. It also costs less and can be included in low end cars also.

5. ACKNOWLEDGEMENT

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ANALYSIS AND TESTING THE SMALL WIND TREE

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ABSTRACT

The design, manufacture, and testing of a VAWT (vertical Axis Wind Turbine) with external wind are the main objectives of the project. The project is an ongoing international research endeavour, and the phase we worked on involved switching the design from the Darrieus type to the Savonius type, which necessitated completely redesigning all the parts, boosting the torque and rpm of the VAWT by incorporating lightweight blades, and making the entire structure portable while keeping the project within a very low-cost range. The aforementioned goals can be accomplished by utilising understanding of fluid dynamics, energy technology, and machine element design. Creating a design that would allow the VAWT to run as efficiently as possible was a top priority. Numerous factors related to wind were examined. In order to ensure the maximum possible performance of the VAWT, a number of parameters were examined in relation to wind speed in order to establish the ideal value for each parameter that would yield the highest efficiency. The factors that were taken into consideration for the analysis included the rotor's recommended number of blades, the blade's positioning (i.e., the distance between the shaft and the blade and the angle the blade creates with the shaft), the deflector's shape, and the deflector's angle to produce the maximum efficiency. The VAWT was constructed in several stages, including the construction of the rotor blades, the main shaft with bearings and rotor blade support frames, the support structure, the wind vane unit, and painting and putting the building together. The VAWT was practically tested for performance as the last step using a digital voltmeter and buck boost rectifier circuit; the results were then documented and analysed. The two were compared, and the results showed a considerable improvement in the VAWT's capacity to extract energy from the wind.

Keyword: - Green energy blades, the rotor, nacelle, a gearbox and connection, an aero turbine, etc.

1. INTRODUCTION

Wind turbines work by converting wind's kinetic energy into mechanical energy, which is then reflected off their axes. The turbine must be connected to an electrical generator, transforming it into a wind turbine, in order to transform this mechanical energy into electrical energy. The location of the turbine's axis of rotation in relation to the surface it is fixed to distinguishes two types of turbines that can be employed for this task: horizontal axis wind turbines (HAWT). the most prevalent turbines, which are primarily employed in wind farms for the generation of high-energy, and Vertical Axis Wind Turbines (VAWT), which are currently the focus of several studies and the creation of new models. There are two varieties of VAWTs, distinguished by their blades' morphology. The Savonius type or S turbine, developed in 1922, consists of two circular cross-section blades that are vertically arranged along an axis of rotation with the specific feature that the blades are overlapping near the rotation axis, creating the effect of support by exchanging the flow between both blades, achieving assistance for the starting factor that receive both blades to be positive it.

1.1 Funtion

To position the rotor and capture wind, they rely on the yaw mechanism. Vertical axis wind turbines can generate power even under unsteady weather situations like turbulent, gusty wind because of this distinct difference in operation mechanism. They work well in mountainous and coastal settings as well.

2. PROJECT SCOPE

While running and being less aware, we cannot take care of ourselves. We can offer more security if we outfit every car with an automated security system that offers excellent security to the driver in exchange for charity. In the future, all vehicles should be fitted with eye blink sensors to prevent accidents of this nature.

2.1 Testing

These are three-bladed H-type Darrieus with a 2.5 m diameter and a 3 m height. The blades feature a 0.4 m chord and a NACA0015 profile. The test was set up such that the turbine's operational envelope would gradually grow. The tests were conducted in a specific order, beginning with the lowest wind speed and RPM and continuing until the testing program's conclusion under the most difficult conditions. During these tests, the generator and control system that used the electrical power generated and the load applied were still being developed. Control and instrumentation systems had to be installed to the VAWT test specimen in order to test the turbine. The following equipment and parts were included: Measurement of turbine speed:

A With a resolution of six lines per rotation, the passing frequency of six evenly spaced bolts was measured using a proximity sensor. Mechanical load/torque measurement: A servo-controlled mechanical variable load was developed in order to assess the aerodynamic performance of the turbine independently of the generator performance. A load cell-supported floating mount with a disc brake calliper mounted on it was powered by an electro-hydraulic servo-actuator. The torque generated by the turbine and transferred through the brake is measured by the load cell. Closed-loop speed control system: When operating on the front side of the torque vs. turbine speed curve, the system is not self-regulating due to the feedback interaction between the rotor dynamics and the aerodynamics of the system (before reaching maximum torque). This indicates that a load that is constant or slowly fluctuating will either stop the turbine from rotating or cause it to enter the "runaway" situation, where it accelerates to the stable rear side of the torque curve.

The rotating speed of the turbine was precisely regulated by an active closed-loop speed control system that used a high gain proportional control law, the turbine speed measurement, and the servo-controlled variable load system. To ensure the stability of the control system, the proportional gain is made larger than the torque curve's greatest positive slope. The resulting control torque is limited because of system and hardware time delays, a dead band in the braking servo-actuator, and these factors is pulsing all everywhere.

3. PLAN METHODOLOGY

The main rotor shaft of a vertical-axis wind turbine (VAWT) is oriented transverse to the wind, and the main parts are situated at the base of the turbine. With this configuration, service and repair are made easier because the generator and gearbox are situated near to the ground.

3.1 Features

This image of the floating offshore vertical-axis wind turbine (VAWT) known as "Vertiwind" from EDF may have recently surfaced online. It has a two megawatt nameplate capacity. The Vertiwind will be a component of the Inflow offshore wind farm project by EDF-EN, which is being co-financed by the European Commission. My interest in VAWTs was aroused by the peculiar design. As opposed to a horizontal-axis wind turbine (HAWT), why would a developer choose a VAWT? And do more developers have strong reasons to think about VAWT models? Let's examine a VAWT's operation and how it compares to a horizontal-axis wind turbine. A VAWT has three primary benefits over a HAWT, as well as numerous disadvantages. For illustration: less components Naturally, a VAWT's principal rotor shaft is positioned vertically as opposed to horizontally. Here, the benefit manifests as a part-reduction. The blades of a traditional HAWT cannot rotate until it is generally orientated into the wind. The blades of a VAWT, in contrast, can capture wind without regard to direction. It is therefore perfect for windy circumstances. Additionally, components for yaw and pitch control are not required. Safety - VAWTs are a safer

choice because they prevent employees from scaling large turbine towers. Gearboxes, generators, and the majority of electrical and mechanical components are located at or close to ground level, eliminating the need for climbing apparatus, lifts, and danger-pay compensation.

This lowers maintenance costs even more. Scaling down - The design has the potential to do so and yet be somewhat effective in dense metropolitan areas. regions or rooftops where it might not be practical to use other renewable technology. The VAWT model's home applications appear to hold promise for lowering energy consumption from hydrocarbon sources. Despite the benefits, there are valid reasons why many people doubt that VAWTs would ever be used on a wind farm./

3.2 System architecture

The popular WS 030-series turbines' height and power output are doubled by the WS-060, which also enables the integration of a higher-output generator to increase output at all wind speeds. Numerous integration scenarios are possible due to their size & power output, including integrated/mounted measurement and control systems, compact DC electronic equipment in buoys, sea marks/lights, lighthouses, boats, park and street lights, and building applications. Depending on the generator arrangement, cut-in speed varies. Think about power curves. These turbines do not operate at cut-out speed. High wind speeds do not need stopping spinning. Up to their maximum structural wind endurance rating, turbines will continue to reliably produce power. A complimentary tube of bearing grease, a shipping crate, a safety cut-off switch, a rectifier/charge controller, and a wind turbine and generator unit make up the Basic System. wind from the vertical A wind turbine known as a vertical axis wind turbine (VAWT) has its main rotor shaft-oriented transverse to the wind and its primary parts at the base of the turbine. With this configuration, service and repair are made easier because the generator and gearbox are situated near to the ground.



4. CONCLUSIONS

The VAWT is constructed and designed to be able to capture wind from all directions. The project's power output is 28W at 6.1 m/s, and the efficiency of the device can be increased by altering the size and shape of the blade. However, the theoretical and experimental results differ because, while in the theoretical calculations, we assume that the wind is hitting all eight turbine blades, this is not actually the case. Our research and the results show that, even in low-ideal sitting conditions, vertical axis wind energy conversion is feasible and has the potential to significantly contribute to the generation of clean, renewable electricity from the wind. The concept on the roadway will activate the street lights. Highways in most cities provide a quicker route for daily commuting, and since they require continual light, this is a particularly effective technique to generate natural energy.

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CNC WRITING MACHINE

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ABSTRACT

The article offers a method for creating fluid, user-friendly CNC machines that can execute writing jobs. The suggested writing device's design includes both hardware and software. The idea of transforming textual content into G-code is applied in this project. The program Inkscape is used to convert text to G-code. The user must use a universal G-code transmitter to convert a text file into G-code before feeding it to the machine. This project uses an Arduino Nano with an Atmega328 microprocessor as its control system. The CNC plotter's motor driver receives a set of machine language instructions that are translated from the G-code by the microcontroller. The rapid advancement of high technology and industry has greatly influenced human progress. We were able to develop this idea thanks to industry requirements like good and high precision quality, all of which may be attained using computer-controlled equipment like computer numerical control machines (CNC). This project includes an X-Y plotter that creates or records two-dimensional data on a rectangular coordinate system. It also includes materials ranked by cost and a variety of applications, including servo motors and stepper motors, which can be distinguished for system improvement based on their peak torque capability, cost, and speed range. There are two servo motors and two stepper motors for movement in the X-Y direction.

Keyword: - CNC, pointer, drawing tool

1. INTRODUCTION

General description we has the technologies like automatic writing machine, TTS, printers, scanners, etc. But the basic problem is it only writes only those fonts which the computer already has. That is Roman, Calibri, Arial, Impact, Georgia, etc. We want a machine which can write the full matter on a page by the ink of pen in our own personal hand writing. By using the concepts like CNC machines, wooden CNCs which make the design on wood by giving accurate feed to the driller. Similarly, we can use this Technology to make a machine for writing purpose also

2. LITERATURE SURVEY

Basically, some physically challenged people who are able to think but unable to write due their inability. In order to over-come this difficulty the auto writing machine is designed to sense their thinking using a brain sensor and there by converted to voice by signal using the transducer. This voice signal will be set as input to auto writing machine which has the ability to access the voice and process it. GAKKEN a Japanese company which was started in the year 1946, developed the large mechanical hand. The GAKKEN auto writing machine consist of a hand when you stick a pen to its holder will write the characters. A research is to use an autopen for writing in easiest way. The auto writer works by having a hard disk for storing a large amount of data and three plates that rotate and caught by two sliders that then pull the spring loaded hand to draw the desire shape. This is main advantage.

2.1 Existing system

In the present scenario education system is handled through blackboard presentation or by power point presentation Blackboard presentation is the process held from the ancient days which is defined as boring by the children. In order to improve power point presentation is used which is more interesting and easy to understand than black board teaching. The major drawback of this paper is same process of teaching leads to boring environment for neither teacher nor student. This system leads to reduce the interest of a student's observing capacity. We know there are many areas in human life which require t write the matter by ink on a paper in their own handwriting having clerks for writing the matter manually. For eliminating this heavy work we are going to introduce an automatic writing machine. CNC Machines are Computerized Numerical Control Machines which are used to draw anything or design any mechanical part according to the design program fed into their controller unit. Controller unit can be either computer or microcontroller. CNC machines have stepper and servo motors to draw the design as per the fed program. After researching on CNC machines, I decided to build my own CNC machine using locally available materials. There are so a many CNC machines in the world, some of which are much technical and complex to make or even operate them properly.



2.2 Modules description

G-code Generator: Programming is a fundamental skill for all types of CNC machining, even as automation and new technology seem to be replacing programming tasks. Every machinist still needs to understand how their programs and tools work. Whether you're new to CNC programming and its most common language, g-code, or you've been writing code by scratch for years, CNC codes can still feel like a foreign language. And to make things worse, every machine speaks a different dialect you have to understand. Do you understand what they're saying? Here are the gcode basics you need to know to efficiently understand and write programs that produce high quality products.

3. ALGORITHM

- Installation of arduino software in system
- The programming code will be uploaded in the arduino uno board once the devices is fixed
- The sensors used recognizes the user and fetch user input with stored documents and returns result and start writing on paper.
- The sensor is more efficient than speech in dependent system. Speaker-independent speech recognition has been proven to be very difficult ,because pattern matching would fail to handle ,include accents and varying speed of delivery, pitch, volume and inflection

- One more use of this invention if the user wants a fresh document which doesn't exist in the hard disk or plates then automatic pen allows this by sensing our mind signals and then write
- It stores the new document in the hard disk for later use. Hence in this way the automatic pen writer with sensor works to automate writing system for physically challenged people unable to write. Hence it makes a new and better way of communication for them.

3.1 CNC System & Mechanism



4. CONCLUSIONS

It has been a great pleasure for me to work on this exciting and challenging project. This project proved good for me as it provided practical knowledge of not onlyprogramming in java to some extent Web Application and firebase Server, but also about all handling procedure related with "AUTOMATIC WRITING AND DRAWING MACHINE". It also provides knowledge about the latest technology used International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 Published by ETEDM - 2019 Conference Proceedings in developing web enabled application technology that will be great demand in future. This will provide better opportunities and guidance in future in developing projects independently. The project is fully fledged and user friendly, End users will be lightened in using this software because it is easy to have bills and reports and mostly all contents to be entered are to selected from combo box. It can be used for the student of engineering and school student to make their science fair project. Any Artist can draw an outline diagram for their work. The principal can use as a sign the certificate. Write anything in Smartphone case cover. A student can draw their outline of a sketch. also, they fill up a colour in it. The student does their homework with this machine at home

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DESIGN AND FABRICATION OF SOLENOID ENGINE

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ABSTRACT

Electric vehicles are becoming increasingly appealing alternatives to traditional cars with combustion engines, taking into account environmental and economic reasons such as the gradual increase in the price of fluid fossil fuels, maintenance, and others. These automobiles are well renowned for having zero emissions and running on renewable energy. The project's goal is to replace the current electric motor with an alternate electric vehicle prime mover. Generally speaking, electric vehicles (EVs) are propelled and controlled by the fusion of electrical, electronic, and mechanical components, although their principal propulsion system is its electric motor. By transforming electrical energy into kinetic energy, an electric motor operates according to the electromagnetic induction theory. The primary goal is this energy conversion.

Keyword: - Linear Solenoid Engines, Rotary Solenoid Engines, etc...

1. INTRODUCTION

1.1 Project Definition

A magnet can be a type of magnet if the goal is to create a controlled magnetic field. Solenoids are often classified as inductors rather than electromagnets if their purpose is to prevent changes in current instead. In engineering, the term can also crosstalk with various electrical devices that convert energy into linear motion. This term often refers to solenoid valves. H. Integrations involving mechanical solenoid valves that internally use mechanical solenoids to control electrical switches to actuate either gas or hydraulic valves, or magnetic switches, which may be some form of relays device. Linear electro-magnets is a for example electromagnets for car starters or electromechanical electromagnets. A magnetic bolt, a type of electromechanical protection mechanism, coexists. Magnet is a generic term for coils of wire used as electromagnets. It also refers to devices that use solenoids to convert electrical energy into energy. The device creates magnetic fields from electrical phenomena and uses force fields to create linear motion. A common use for solenoid consists of a coil and a moving metal rod (also called an armature or plunger). Solenoids are considered electromechanical actuators because their operation is based on the conversion of electrical energy into mechanical energy. Coils are typically copper wire wound with a small pitch and placed in a metal case (an iron-based material), also called a C-frame. The C-frame is a support structure that also contributes to the magnetic field produced by the coil.

1.2 Project Objectives

The foremost objective of this engine is that the electromagnetic motors help provide additional power and capacity without releasing toxic pollutants into the atmosphere, unlike regular car engines. A solenoid, similar to a bar magnet, consists of a large coil of wire wound many times, which produces a constant magnetic field when an electric current is passed through it. Solenoids are used in a variety of solenoid motors because the coil can be

strengthened by adding an iron core. A solenoid and an electromagnet are not the same. A solenoid is a coil of wire that becomes an electromagnet when an electric current is passed through it. This is the most useful use of coils of wire. Electromagnets are very useful because, unlike traditional magnets, they can be turned on and off and their strength can be increased by increasing the current flowing through them.

1.3 Project Specifications

An electromagnetic motor can be used as an alternative motor. It runs entirely on battery power, so it greatly controls pollution. The magnetic force of the coil is used to attract the piston and the spark distributor is used to activate the electromagnet depending on the position of the piston within the cylinder, which is the location of the sensor and microcontroller. In this way, reciprocating motion can be converted into rotary motion and used for various applications.

2. PROJECT BACKGROUND

Once the prototype solenoid is built, it needs to be tested. An electrical circuit has been developed to test the solenoid. The circuit is designed so that the electrical parameters can be easily changed. The first thing you need is a power supply. The source varies from 0 to 300V. The source charges a capacitor with a capacity of 4.7 mF. A resistor is placed between the capacitor and the source. When the capacitor is full, the switch can be closed and all the energy in the capacitor is released through the coil of the electromagnet. The coil has an inductance of 15.8 mH and a resistance of 2.5 Ω . Additional diodes is placed across the coil. This allows the coil to release energy when the switch is open.

To compare test and simulation, we need to determine the motor constants. For this purpose the forces are measured with special load cells. Engine constants are different for each position of the piston. Several 8 mm plates are arranged for good viewing. In this way, we can find the motor constants at 8mm intervals.



Fig -1: Graphical representation

The system consists of an iron-boron permanent magnet bonded to the top surface of the piston. The cosmopolitans magnet next to the piston during reciprocal movement. The magnets were mounted in the simplest way so that the pole placements were in the same direction. For example, when the south pole of each magnet was attached to the surface of the piston, the north pole was exposed to the atmosphere.

A magnet is an associated magnet that, having passed through it, creates a dipole at the two end faces, resulting in the formation of north and south poles. It was powered using a regular 24V lithium particle battery. When the current is attempted and becomes a real magnet, it attracts the plunger.

A magnet was placed on top of the non-magnetic cylinder. It was durable with the help of a rigid frame constructed in various arrangements.

2.1 Past work

Conventional work solenoids are not as electrically efficient as motors when they are ideally matched to perform the same work task.

The simple reason is that the piston mass of the solenoid itself has to accelerate to drive the load, but at the end of the stroke it stops abruptly, throwing away that kinetic energy. Also, the coil must be turned off and the stored inductive energy is thrown away by a spark across the coil suppressor or switch.

These two energy losses can easily exceed 30% of the electrical energy supplied. This cycle continues until the task is completed. In contrast, a motor store its kinetic energy and keeps rotating, and a solid-state driver can store induced energy while rotating.

A typical electric car replacement cost is around Rs 40,000-50,000. However, solenoid-actuated motors require about 1.5 to 2 racks, depending on the vehicle. This saves him 60% of the normal EV installation cost.

2.2 Way to improve engine efficiency

Holding current can be reduced by placing a resistor in series with the coil after tripping or by pulsing with a higher voltage during the stroke. The holding current can be reduced to zero using a permanent magnet, so that the bolt will "stick" to the pole face when actuated.

During the stroke, the electromagnet forms a magnetic field, the energy of which is converted into mechanical force, but the energy is wasted by the resistance of the coil. Reducing this waste requires a higher ratio of inductance to resistance, which requires a smaller air gap, which is not compatible with long strokes. However, if the slug and pole faces are tapered, the air gap will be much smaller.

The load may only need to be "bumped" by the solenoid. After that, the load only needs to be pulsed for a short time, so efficiency is less important.

3. PLAN METHODOLOGY

The solenoid changes the air gap and magnetic force as it moves. Depending on the desired arousal and force profile, it is common to apply more energy for the majority of the stroke to achieve the desired force or velocity profile.

It would be very efficient if the application could be tailored to the characteristics of the solenoid. This means you can store energy in an accelerating bat to impact things like pinball machines. The motor he isn't 100 speed (brushed or brushless) and neither is the gearbox he is 100 speed, but in most cases you can find something better suited to what you need than using an electromagnet. increase. In some cases, even if a magnet is suitable for the task, the maximum efficiency of the motor and gear may not match. Solenoids have the advantage of relatively small cost and size, and in some cases very large amounts of power can be packed into small and inexpensive devices.

3.1 Common details

Demand for fossil fuels continues to grow, and the time will come when the world will rely on electricity as its only source of fuel. Electric motors are heavier, require more power, but are less efficient than internal combustion engines. Magnet motors are a promising alternative to internal combustion engines due to the following factors:

- 1. Electromagnetic motors do not cause air pollution, so there is no danger to the environment.
- 2. Serve as a viable alternative to fossil fuel
- 3. Increased efficiency for operations that require less torque
- 4. Less maintenance required
- 5. Much lighter than an internal combustion engine

4. CONCLUSIONS

When the piston 1 reaches bottom dead centre, the magnet is charged in the simplest way and lands on the opposite pole of magnet 1, creating the appropriate force on the piston. A continuous method is achieved by a piston (up and down) by turning the knobs together, with the help of relays and IR sensors. The switching of current direction in the magnet was controlled by the dominant circuit. The control circuit consists of a series of Infrared

Electrode Detector (IRED) sets that sequentially detect the position of both cranks. MRP has many advantages over internal combustion engines. The most important advantage is environmental friendliness. No fossil fuels, no natural resource consumption, no pollution and no heat generated in the system.

The electromagnet generates heat during continuous operation, but the temperature is lower than that of an internal combustion engine. No cooling system, no fuel system, no valves, etc. The operating sound level is quite low. Proper development of this engine with materials such as aluminium greatly reduces stress and improves performance. Of critical importance is that its development reduces reliance on resource depletion, which can be a key requirement today. Additional analysis and development will position it as a boon in the automotive sector.

5. ACKNOWLEDGEMENT

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VEHICLE GAS LEAKAGE DETECTOR

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ABSTRACT

This paper presents the design of a Carbon-Monoxide (CO) gas leakage detector in vehicles. The number of sudden death incidents due to excessive CO inhalation has recently increased. Many cases are due to driver habits and awareness, for instance, air conditioning switches remain on while they are sleeping in the car. This habit is not a good practice because if there were gas leakage into the cabin, especially CO, the situation could result in sudden death. Basically the driver feels sleepy when excessive CO concentrations occur in the cabin. Based on that, a vehicle gas leakage detector system has been developed using a gas sensor and logic detector circuit. Subsequently, the signal from the sensor is fed the an 8-bit PIC16F84 microcontroller on-board system via appropriate interfacing devices, which will run on pre-programmed instructions.

Keyword: - Gas leakage detector, carbon monoxide, CO, gas sensor circuit, logic detector circuit

1. INTRODUCTION

The main driver behind this research relates to real cases which occurred in recent years in Malaysia. The first case was reported in Johor Bahru, Malaysia, where a young couple died due to Carbon Monoxide (CO) inhalation. This case occurred after lethal doses of the gas speeded into the car's inner chamber through its extractor exhaust system, which was found to have been modified. An examination of the bodies showed that there is no sign of trauma.

In a second case involving the hazardous CO gas occurred in Kulai, Johor. This accident involved a family with three children. As reported in the news paper account the leakage of CO managed to flow through the ventilation system when the engine of the car was left in the runningconditionforabout3hours.

CO leakage normally happens due to one of two events. First, the original exhaust system has been altered for a certain reason. Usually, a standard car has a long exhaust system but modified exhaust systems are usually a bits horter. Due to this, it is believed that the CO manages to seep into the car's inner chamber through its extract or exhaust system more easily compared to a standard exhaust. Second, the air conditioning system in a car operates by filtering air from the outside before it is used. However, it is recommended not to turn on the air condition system while the engine idles or while the car is stall. Car air conditioners may gather CO gas while the engine idles.

2. COMPONENTS USED

The vehicles gas leakage detector system can be divided into the hardware and software system development. The hardware system development can be divided four parts, which are

- The gas sensor circuit
- Micro-controller on board system
- Logic detector circuit
- Alarm system

The sensor circuit is used to detect the gas leakage in the car. Output from the gas sensor circuit will then interrupt the micro controller to send a signal to logic detector circuit. The logic detector circuit is used to check whether the presence of the gas leakage in the car and lastly send to alarm system.

The first part of this system is the schematic of the gas sensor circuit. In this system, the NEMOTO semiconductor type of gas sensor NAP-11A is used as the gas sensor in this circuit. This type of sensor (NAP-11A) is able to detect a very low concentration range of CO generated by stoves or other stoking equipment in rooms. NAP-11A is widely used as a detector because of itssuperb stability against noise gases and ambient temperature and humidity. The other important feature in the choice of the NAP-11A sensor is the sensor's highly sensitive to a low concentration of CO gas. After the gas sensor circuit has been successfully implemented, the output signal has been fed to microcontroller

3. PHYTHON CODE USED

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
// Set the LCD address to 0x27 for a 16 chars and 2 line display
LiquidCrystal_I2C lcd(0x3f, 16, 2);
int ThermistorPin = A2;
int Vo;
float R1 = 1000;
float logR2, R2, T;
float c1 = 1.009249522e-03, c2 = 2.378405444e-04, c3 = 2.019202697e-07;
int sensor = A0;
int thermister = A2;
int buzzer = 13;
void setup()
    {
lcd.init();
lcd.backlight();// initialize the lcd
Serial.begin(9600);
pinMode(sensor, INPUT);
pinMode(buzzer, OUTPUT); // Digital pin 10 set as output Pin
digitalWrite(buzzer, LOW);
lcd.setCursor(0, 0);
lcd.print(" EXHAUST GAS & ");
lcd.setCursor(0, 1);
lcd.print("ENGINE HEAT MNTG");
 delay(2000);
lcd.clear();
lcd.setCursor(0, 0);
lcd.print("E GAS :");
```

```
lcd.setCursor(0, 1);
lcd.print("E TMP :");
}
void loop()
{
 Vo = analogRead(ThermistorPin);
R2 = R1 * (1023.0 / (float)Vo - 1.0);
//Serial.println(R2);
\log R2 = \log(R2);
 T = (2.0 / (c1 + c2 * logR2 + c3 * logR2 * logR2 * logR2));
T = map(T, 800, 0, 0, 800);
//T = T - 273.15;
//T = (T * 9.0) / 5.0 + 32;
T = (T - 32) * 5 / 9;
int gas = analogRead(sensor);
int g = (gas/5);
lcd.setCursor(7, 0);
lcd.print(g);
lcd.setCursor(7, 1);
lcd.print(T);
if (g > 50 \parallel T > 50)
  {
digitalWrite(buzzer, HIGH);
     delay(100);
  }
  else
  {
digitalWrite(buzzer, LOW);
  }
}
```

4. CONCLUSIONS

The first part of this system is the schematic of the gas sensor circuit. In this system, the NEMOTO semiconductor type of gas sensor NAP-11A is used as the gas sensor in this circuit. This type of sensor (NAP-11A) is able to detect a very low concentration range of CO generated by stoves or other stoking equipment in rooms. NAP-11A is widely used as a detector because of itssuperb stability against noise gases and ambient temperature and humidity. The other important feature in the choice of the NAP-11A sensor is the sensor's highly sensitive to a low concentration of CO gas. After the gas sensor circuit has been successfully implemented, the output signal has been fed to microcontroller.

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FABRICATION OF MOTORISED OPERATED CHECKPOST TYRE KILLER

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ABSTRACT

A road spike (also known as traffic spikes, tyre shredders, stop sticks and tyre killer) is a device used to impede or stop the movement of wheeled vehicles by puncturing their tyres. Generally, the strip is composed of a collection of long metal. The barbs are designed to puncture and flatten tyres when a vehicle is driven over them. The barbs may be hollow or solid. Hollow barbs are designed to become embedded in the tyres and allow air to escape at a steady pace in an attempt to reduce the risk of the driver crashing into oncoming traffic or the surroundings.

Keyword: - Battery, Block Diagram etc

1. INTRODUCTION

Tyre Killer is an electro mechanically operated heavy duty spike barrier which rises above the ground level on giving a valid input signal and thus prevents unauthorized intrusions at entry/exit points of high security premises. When the tyre killer is in a lowered position the vehicles can pass through, thereby providing a good enhanced security blockage system.

The housing and the blocking element of the Tyre Killer are designed in full core steel profile construction with TESCON 4S Coating, ensuring maximum safety against corrosion. The impact faces of the Tyre Killer is impact resisting thick, sharp steel spikes to puncture the tyre and in fact are strong enough to break the axle of the vehicle. It transfers mechanical forces to reinforced concern. The Tyre-Killer is bolted into a reinforced concrete foundation and is designed to withstand 50 tons of axle loads when closed.



Fig -1: Prototype

2. COMPONENTS USED

We are used the readily available components for making this project. Battery, filter, relay, keypad, spike (tyre killer) are the components used for this project.

2.1 Battery

An electric battery is a collection of one or more electrochemical cells in which stored chemical energy is converted into electrical energy. The principles of operation haven't changed much since the time of Volta. Each cell consists of two half cells connected in series through an electrolytic solution. One half cell houses the Anode to which the positive ions migrate from the Electrolyte and the other houses the Cathode to which the negative ones drift. The two cells are may be connected via a semi permeable membranous structure allowing ions to flow but not the mixing of electrolytes as in the case of most primary cells or in the same solution as in secondary cells.



2.2 Filter

The output after being processed by full wave rectifier is not a pure DC. The output is a pulsating DC. The output contains large fluctuations in voltages. This is quite apparent from the block of full wave rectifier shown above. The power supply that we intend to design must not have any variation in output voltage. The voltage that we get from full wave rectifier fluctuates between 0 V and V_{peak} , and hence it contains AC components.



2.3 Relay

Relays are simple switches which are operated both electrically and mechanically. Relays consist of a n electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. But they differ according to their applications. Most of the devices have the application of relays.



Fig -4: Relay

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2.4 Keypad

Keypad is a widely used input device with lots of application in our everyday life. From a simple telephone to keyboard of a computer, ATM, electronic lock, etc., keypad is used to take input from the user for further processing.





2.5 Spike (Tyre killer)

The Avon Tyre Killer Barrier is designed for use in high security high traffic applications. The tyre killer barrier is a simple to install highly secure vehicle control barrier, ideally suited for approach entrances to banks, military installations, airports, docks, cash collection depots government offices etc.

The tyre killer teeth retract below ground level when a signal is received from the push button or integrated access control unit providing safe access or authorised vehicles. When the vehicle has passed, the teeth return to the active position, ensuring total protection from unauthorised vehicle intrusion.



Fig -6: Spike (Tyre Killer)

3. WORKING PRINCIPLE

The main components used in this project are bevel gear, bearing and supporting frame. These components are arranged in the manner as shown in the figure given below. The gate model is fitted over the spike arrangement. If the gate model is closed the spikes are comes up with help of the bevel gear setup. If any vehicle tries to cross the signal at the time of gates closed the tyre will get puncture. When we open the gate operate, the spike arrangement will automatically goes under the ground by the help of bevel gear arrangement. After the vehicle has passed over the gate, the gate can be closed which will brings the spikes over the road automatically

Splitting teeth utilized in tire killer is manufactured from 25mm steel. Teeth bar on which the teeth are welded is attached to the frame by means of stainless steel and hardened steel hinges, provided with bronze bearings to reduce friction and noises. The hydraulic cylinder support brackets are alloy-bronze casting. Therefore both smooth operation and durability against high axle loads is achieved. In case of power failure, it is possible to disarm the Tyre-Killer manually. Parts forming the drive unit, namely, keypad, bevel gear, wiper motor, spikes, relay circuits etc. are very precisely manufactured so that they can stand harsh environmental conditions. It will generally be installed outdoors.



4. CONCLUSIONS

In this system will be applied for safety driving and toll gate and check post we will be use this application. and it's after in this process will be using at the defense military working condition system, this system has to be can be easily theft attempt easy to catch them, and then speed driving will be indicating in this condition to the working system and this system will be easily takeover to theft to identify then it will be suddenly operated them.

5. ACKNOWLEDGEMENT

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STIRLING ENGINE

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ABSTRACT

A Stirling engine is a heat engine operating by cyclic compression and expansion of air or other gas, the working fluid, at different temperature levels such that there is a net conversion of heat energy to mechanical work. Or more specifically, a closed-cycle regenerative heat engine with a permanently gaseous working fluid, where closed-cycle is defined as a thermodynamic system which the working fluid is permanently contained within the system and regenerative describe the use of a specific type of internal heat exchanger and thermal store, known as the regenerator. It is the inclusion of a regenerator that differentiates the Stirling engine from other closed cycle engines. Originally conceived in 1816 as an industrial prime mover to rival the steam engine, its practical use was largely confined to low-power domestic applications for over a century. The Stirling engine is noted for its high efficiency compared to steam engines, quiet operation, and the ease with which it can use almost any heat source. This compatibility with alternative and renewable energy sources has become increasingly significant as the price of conventional fuels rises, and also in light of concerns such as peak oiland climate change. This engine is currently exciting interest as the core component of micro combined heat and power(CHP) units, in which it is more efficient and safer than a comparable .As a part of our mini-project , we are visualizing the use of Stirling engine in various fields where waste energy.

Keyword: - heat exchanger, regenerator, thermodynamic system

1. INTRODUCTION

Cleaning of drains/gutters has always been a problem. Labours cleaning gutters & drain seems unethical and also leads to a high risk of them catching infections or poisoning due to large amounts of waste/chemicals in them. Also throwing of bottles/plastics and other such objects into the gutters lead to narrowing and eventually blockage in gutter flow. This leads to overflow in many cases. So here we provide a fully automated drain gutter cleaning mechanism to tackle these modern day gutter jamming issues. Our system uses an automated gutter/drain cleaning system that lets fluids flow through it but catches large solid waste like bottles & amp; plastic and accumulates it. So gutter cleaners need to just clean these gutter cleaning systems installed at points instead of cleaning entire gutter floors.

Our system consists of metal teeth based jaws that wait at the bottom of the mechanism This project automatically cleans the water in the drainage system randomly and removes waste and this form an efficient and easy way of cleaning the drainage system and preventing the blockage. It also reduces labour and improves the quality of water that is cleaned. If the garbage are allowed to flow they will end up flowing down to recreational beaches used for tourism purposes making a scene not pleasurable to the eyes else these garbage flow to residential sites where they are burnt in a way of getting rid of them, thereby causing climate change. Here we provide a fully automated drain gutter cleaning mechanism to tackle these modern day gutter jamming issues.

This proposed system uses an automated gutter (or) drain cleaning system that lets fluids flow through it but catches large solid waste like bottles, plastic and accumulates it. So, gutter cleaners need to just clean these gutter cleaning systems installed at points instead of cleaning entire gutter floors. The problem such as Environmental pollution and spreading of viral diseases are avoidable. Automation of Drainage Cleaning System would reduce the risk of various diseases spread due to accumulation of waste. The devices are place across drain so that only water flow through lower grids, waste like bottle, etc. Floating in drain is lifted by a tooth which is connected to chain. This chain is attached by sprockets driven by motor. When motor runs the chain starts to circulate making teeth to lift up. The waste materials are lifted by teeth and are stored in waste storage tank.

2. COMPONENTS USED

2.1 Engine cylinder

There are 1 or 2 cylinders used in stirling engine depending on its type i.e. alpha stirling engine or the beta stirling engine.

In alpha stirling engine 2 cylinders are used that are -

- A cold wall cylinder- It is the cylinder that provides cooling of the gas by some external means like cooling system, in order to reuse the gas for another cycle.
- A hot wall cylinder- It is the cylinder through which the external heat source is connected that provides heat to the gas inside this cylinder in order to expand the gas.
- In beta SE engine single cylinder is used which is heated through a heating source at one end and cooled through a cooling device at another end.
- Both the cylinders are linked with a passage through which the gas flows from hot cylinder to the cold cylinder for re-use.



2.2 Piston

It is the rigid cylindrical piston which is used inside the cylinder and is responsible for the final power output of the engine .Depending upon the type of stirling engine i.e. alpha or beta, 1 or 2 pistons are used, (for alpha stirling engine 2 piston and for beta stirling engine single piston is used).



Fig - 2: Piston

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2.3 Regenerator

In Stirling engines, the regenerator is the indispensable heat exchanger. Its existence is the key factor that enables the Stirling cycle to reach the highest thermal efficiency. The regenerator of a Stirling engine is placed between the heater and the cooler and is composed of the matrix and the housing.



2.3 External Heat Source

A external heat source (renewable or non renewable) is used for heating the wall of the hot cylinder (Alpha S E) or the hot end of the cylinder (Beta S E) which in turn expands the gas i.e. increases potential energy of the molecules of the gas, in order to cause movement in the piston.



2.4 Cooling system

A effective cooling system that can be water cooled or air cooled is used to cool the wall of the cold cylinder (Alpha SE) or the cold end (Beta cylinder) which in turn cools the gas inside the cylinder for re-use.



Fig -5: Cooling system

3. WORKING PRINCIPLE

In an ideal Stirling process, there are 4 consecutive processes that occur:

- The air expands isothermally (also at constant temperature).
- It becomes isochoric after the expansion (meaning at a constant volume) and cooled by the regenerator.
- After this, it becomes isothermally compressed.
- The air again becomes isochoric, while heated in the regenerator back to the original temperature.
- These four consecutive steps describe the Stirling process.

4. CONCLUSIONS

Stirling engines can run directly on any available heat source, not just one produced by combustion. They can be used as CHP (combined heat and power) in the winter and as coolers in summer. The engine mechanisms are in some ways simpler than other reciprocating engine types. No valves are needed, and the burner system can be relatively simple. Crude Stirling engines can be made using common household materials. Applications of the Stirling engine range from heating and cooling to underwater power systems. A Stirling engine can function in reverse as a heat pump for heating or cooling. Other uses include combined heat and power, solar power generation, Stirling dry coolers, heat pump, marine engines, low power model aircraft engines, and low temperature difference engines.

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ALCOHOL SENSING ALERT WITH ENGINE LOCKING PROJECT

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ABSTRACT

The number of accidents in the world is increasing day by day and among these accidents. ALCOHOL SENSING ALERT WITH ENGINE LOCKING PROJECT more than 60% are caused due to menace of driving under the influence of "unreasonable" alcohol consumption. Therefore, since the death due to drunken-driving lus assumed proporticrn larger than one can imagine, it requires immediate attention. This paper attempts to explore the possibility of using the technology that would detect the level of alcohol in the blood and prevent "Tery-scafi" of the motor vehicle. The model device aims at preventing the user from driving when drunk and reduces the number of accidents occurring due to drunken driving. The model is created using fuduino Uno and Alcohol detecting sensor. The alcohol detecting sensor ($lv{Q-3}$) when commented to an fuduino UNO R3 detects the level of alcohol content in blood by analyzing driver's breath.

Keyword: - Geneva Mechanism, conveyor belt, etc....

1. INTRODUCTION

Driving a vehicle requires complete concentration, reflexive action and quick decision abilities for the drivers to avoid any untoward incidences. The consumption of alcohol beyond limits can obstruct functioning of the brain and impact "presence-of-mind" capability of the resulting in accidents that can prove fatal not only for the driver but also for the fellow-passenger. Firm, it can result in endless trauma to the members of the family back-home. The technology-enabled if fitted in the car will test the multiple-conditions that will trigger the alarm indicating that the state of mind of the driver is not apt to behind the wheels.

2. COMPONENTS USED

We are used the easily available components for making this project. The components are following below.

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2.1 Alcohol Sensing Detector

AT89S52 Microcontrollers are "embedded" inside some other device. They can control the features or actions of the product. Another name for a microcontroller is "embedded controller". Microcontrollers are dedicated to one task and run one specific program. The program is stored in ROM (read-only memory) and generally does not change. Microcontrollers are often low-power devices. A microcontroller has a dedicated input device and has a small LED or LCD display for output. A microcontroller also takes input from the device it is controlling and controls the device by sending signals to different components in the device.

3. WORKING PRINCIPLE

3.1 Working

Sensor is basic sensing element used for alcohol detection. When alcohol is detected it gives logic high(1) as per the program and remaining circuit run simultaneously. When MQ3 sensor goes to logic 1, it sends an high signal to micro controller 89S52. The micro controller sends this signal to engine circuit driving through LM293D driver IC. As per the program and our aim is that when alcohol is detected then the engine speed starts decreasing ultimately and engine stops through this process i.e., engine is locked. Along with this operation 16X2 LCD connected to micro controller, it displays the engine status as well as sensor status w.r.t above operation when alcohol detected the buzzer starts ringing at the same time.



```
delay(2000);
 lcd.clear();
 lcd.setCursor(0, 0);
lcd.print("SENSOR:");
 lcd.setCursor(0, 1);
lcd.print("ENGINE");
}
void loop()
 int achl = digitalRead(sensor);
 if(achl == 0) //seed on
     lcd.setCursor(8, 0);
     lcd.print("YES");
     lcd.setCursor(8, 1);
     lcd.print(" OFF ");
     digitalWrite(relay, HIGH);
}
  else
{
    lcd.setCursor(8, 0);
     lcd.print(" NO ");
     lcd.setCursor(8, 1);
     lcd.print(" ON ");
     digitalWrite(relay, LOW);
}
3.3 Application
```

- Alcohol Detector project" can be used in the various vehicles for detecting whether the driver has consumed alcohol or not.
- This project can also be used in various companies or organization to detect alcohol consumption of employees.
- "Alcohol Detection System in Cars" provides an automatic safety system for cars and other vehicles as well.

4. CONCLUSIONS

In this project we have developed a real time model that can automatically lock the engine when a drunken driver tries to drive a car. Now-a-days car accidents are mostly seen. By fitting this alcohol sensor into the car, we can save guard the life of the driver and also the remaining passengers. It is very simple application. The life time of the project is high. It has low or zero maintenance cost and of course low power consumption.

This is a developed design to efficiently check drunken driving. By implementing this design a safe car journey is possible decreasing the accident rate due to drinking. By implementing this design, drunken drivers can be controlled so are the accidents due to drunken driving. Government must enfor/ce laws to install such circuit in every car and must regulate all car companies to preinstall such mechanisms while manufacturing the car itself. If this is achieved the deaths due to drunken drivers can be brought to minimum level. In this type of system, future scope can be safely landing of car aside without disturbing other vehicles.

5. ACKNOWLEDGEMENT

We humbly submit all the glory and thanks to our almighty for showering the blessing upon us and give us the necessary wisdom for accomplishing this project.

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CONVERSION OF RECIPROCATING MOTION INTO ROTARY MOTION IN CONVENTIONAL HAND PUMP

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ABSTRACT

A human power pumped designed to lift the water from a depth of 50 m or less. The pump was designed to serve to village water needs. This type of hand pump is difficult to repair to village level and mechanism involves for more effort for pumping. In present scenarios Indian society are in need of water supply and use of hand pump is most effective way for supply of water. We are seeing hand pumps which uses crank type of pumping, which need a greater effort for pumping. In this paper we go for a rotary type of motion in handling the pump. This conversion is mainly focused on senior citizen who find difficult to pump using a conventional pump. The effort made by them is really minimized.

Keyword: - Human Power, Hand Pump, Rotary motion, Effort, etc

1. INTRODUCTION

1.1 Pump

A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. Pumps can be classified into three major groups according to the method they use to move the fluid: direct lift, displacement, and gravity pumps.

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Pumps operate by some mechanism (typically reciprocating or rotary), and consume energy to perform mechanical work by moving the fluid. Pumps operate via many energy sources, including manual operation, electricity, engines, or wind power, come in many sizes, from microscopic for use in medical applications to large industrial pumps.

Mechanical pumps serve in a wide range of applications such as pumping water from wells, aquarium filtering, pond filtering and aeration, in the car industry for water-cooling and fuel injection, in the energy industry for pumping oil and natural gas or for operating cooling towers.

In the medical industry, pumps are used for biochemical processes in developing and manufacturing medicine, and as artificial replacements for body parts, in particular the artificial heart and penile prosthesis.

In biology, many different types of chemical and bio-mechanical pumps have evolved, and bio-mimicry is sometimes used in developing new types of mechanical pumps.

1.2 Calcification of pump

- 1. Positive displacement pump
- 2. Impulse Pumps
- 3. Velocity pumps

- 4. Gravity pumps
- 5. Steam pumps
- 6. Valve-less pumps

1.3 Positive displacement pump

A positive displacement pump makes a fluid move by trapping a fixed amount and forcing (displacing) that trapped volume into the discharge pipe. Some positive displacement pumps use an expanding cavity on the suction side and a decreasing cavity on the discharge side.

Liquid flows into the pump as the cavity on the suction side expands and the liquid flows out of the discharge as the cavity collapses. The volume is constant through each cycle of operation

1.3.1 Positive displacement types

- 1. Rotary-type positive displacement: internal gear, screw, shuttle block, flexible vane or sliding vane, circumferential piston, flexible impeller, helical twisted roots (e.g. the Wendelkolben pump) or liquid ring vacuum pumps
- 2. Reciprocating-type positive displacement: piston or diaphragm pumps
- 3. Linear-type positive displacement: rope pumps and chain pumps

1.4 Hand-pump

Hand pumps are manually operated pumps; they use human power and mechanical advantage to move fluids or air from one place to another. They are widely used in every country in the world for a variety of industrial, marine, irrigation and leisure activities.

There are many different types of hand pump available, mainly operating on a piston, diaphragm or rotary vane principle with a check valve on the entry and exit ports to the chamber operating in opposing directions. Most hand pumps have plungers or reciprocating pistons, and are positive displacement.

1.5 Calcification of hand pump

- 1. Suction and lift hand pumps
- 2. Siphons
- 3. Direct action
- 4. Deep wells
- 5. Diaphragm
- 6. Progressive cavity
- 7. Range of lift

1.5.1 Suction and lift hand pumps

Suction and lift are important considerations when pumping fluids. Suction is the vertical distance between the fluid to be pumped and the centre of the pump, while lift is the vertical distance between the pump and the delivery point. The depth from which a hand pump will suck is limited by atmospheric pressure to an operating depth of less than 7 meters.

The height to which a hand pump will lift is governed by the ability of the pump and the operator to lift the weight in the delivery pipe. Thus the same pump and operator will be able to achieve a greater lift with a smaller diameter pipe than they could with a larger diameter pipe.

1.5.2 Siphons

Water will always try to find its lowest level. Using this principle, very simple pumps with plastic or rubber bulb with flap valve at each end are used for emptying fuel or water cans into tanks. Once the bulb is full the fluid will flow without further effort from the higher to the lower container.

Many hand pumps will allow the passage of fluid through them in the direction of flow and diaphragm pumps are particularly good at this. Thus where the levels are correct large volumes of liquid such as swimming pools can be emptied with very little effort and no expensive energy use.

1.5.3 Direct action

Direct action hand pumps have a pumping rod that is moved up and down, directly by the user, discharging water. Direct action hand pumps are easy to install and maintain but are limited to the maximum column of water a person can physically lift of up to 15 m.

1.5.4 Deep wells

Deep well hand pumps are used for high lifts of more than 15 m. The weight of the column of water is too great to be lifted directly and some form of mechanical advantage system such as a lever or flywheel is used. High lift pumps need to be stronger and sturdier to cope with the extra stresses. The installation, maintenance and repair of deep well hand pumps is more complicated than with other hand pumps. A deep well hand pump theoretically has no limit to which it can extract water.

1.5.5 Diaphragm

Diaphragm pumps have the advantage that they pump relatively lightly due to the lack of pulling rods and are corrosion resistant. Their disadvantage is that they need a specific length of tubing and high quality rubber diaphragms, which are costly and are relatively inefficient due to the extra work needed to deform the diaphragm. Rubber diaphragms will eventually leak and need to be replaced. Because this is usually complicated and costly, diaphragm pumps operating in poor rural areas are often abandoned once the diaphragm wears out.

1.5.6 Progressive cavity

Progressive cavity pumps consist of a single helix rotor inserted into a double helix stator. As the rotor is turned, the voids in the stator are screwed upwards along the axis of rotation. Progressive cavity pumps can have complicated gearing mechanisms and are difficult for local pump technicians to maintain and repair. A rope and washer pump is a type of progressive cavity hand pump.

2. CONSTRUCTION

- Frame is a construction method by means of an "outline frame" of perpendicular steel columns and parallel I-beams, constructed in a rectangular framework to hold up the floors, covering and walls of a construction which are all attached to the frame.
- The enlargement of this method prepared the production of the skyscraper achievable.
- The rolled steel "outline" or cross section of steel columns takes the shape of the letter "I".
- The two spacious flanges of a column are thicker and wider than the flanges on a beam, to superior hold out compressive pressure in the arrangement.
- Square and round tubular sections of steel can also be used, often overflowing with tangible.



Fig -1: Frame

3. WORKING PRINCIPLE

3.1 Working

While rotating the handle the disc starts rotating the disc has an eccentric hole. The eccentric hole is connected to the piston rod so that rotary motion is converted into reciprocating motion with the help of that reciprocating motion the piston while create some pressure in the pump that pressure is used to suck the water from the sump.

3.2 Advantages

The advantages can be specified by anyone, due the vast project scope specialties. Therefore we listed out below

- Discharge is high
- Operating depth is high
- Reduced cost
- Easy installation
- Less maintains

4. CONCLUSIONS

This project may be developed with the full utilization of man, machines, method and materials. Also we have followed throughout the study of time motion and made our project economical and efficient with available existing resources. This system was designed, fabricated successfully and also tested. It works fully satisfactorily. We hope that this will be done among the most versatile and interchangeable in future modifications. Thus we worked out our Conversion of Reciprocating Motion in to Rotary Motion in Conventional Hand Pump.

5. ACKNOWLEDGEMENT

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- [5]. Norwin C Derby-[1992] Vacuum Fill System Patent No(5109813)



DESIGN AND FABRICATION OF MINI CONVEYOR USING GENEVA MECHANISM

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ABSTRACT

The Geneva Mechanism is a method for transforming continuous cycles Movement in a circular motion with intermittent/fixed pitch, d. H a circular motion are generated at equal time intervals and result in the same lag. This is the name "Genève" comes from Geneva, Switzerland, where in its early days. Device was used in mechanical watch making. The Geneva stroll is also nicknamed the Maltese Cross Mechanism due to their visual resemblance. a sponsor The belt is basically a linear belt, usually made of rubber or plastic compounds (high strength) combined with one or more layers of fabric such as nylon, polyester, neoprene or nitrile. It has a basic material transport function from one point to another. A simple Geneva mechanism consists of a drive wheel (connected to the motor) and a drive wheel (connected to the pulleys). The the drive wheel is a disc with a pin or shaft close to the circumference, the guided the wheel consists of several housings. The drive wheel is held close to the drive wheel so that when you turn the drive wheel, the pin or shaft fits into the drive wheel slot. When it reaches the innermost point of the crack, the pen exercises a force on the driving wheel. Since the driving wheel is pivoted from the center, a moment is produced which causes the generation of a couple, which leads to the rotation of the drive wheel and the pulley connected to it. That's why there is a intermittent circular movement inside it with consequent movement of the belt. Over there are different types of Geneva rotator, such as external, internal Geneva rotator Geneva rotator and spherical Geneva rotator. The mechanism that I will be the use for the conveyor is of an external Geneva rotator in which the the rotating drive wheel interacts externally with the drive wheel. This mechanism: causes instant 4 movements at regular intervals and holds higher mechanical stresses. The mechanism has many applications in many industries, especially the automotive industry. It is one o the easiest and inexpensive mechanisms.

Keyword: - Geneva Mechanism, Maltese Cross Mechanism, Several housings, etc...

1. INTRODUCTION

The Geneva instrument is one of the earliest of all discontinuous movement components and when info is as consistent pivot, it is presumably still the most regularly utilized. Geneva is accessible in assortment of sizes. They are less expensive than cams or star haggles sufficient to great execution attributes, contingent upon load factors and other plan prerequisites. Figure shows the commonplace four space outside Geneva.

A transport line is the conveying mode of a belt transport framework. A belt transport framework is one of many sorts of transport frameworks. A belt transport framework comprises of at least two pulleys, with an interminable circle of conveying medium the transport line that turns about them. Either of the pulleys are controlled, moving the belt and the material on the belt forward. The controlled pulley is known as the drive pulley while the unpowered pulley is known as the idler pulley. There are two principal modern classes of belt transports.

Those overall material taking care of like those moving boxes along inside a processing plant and mass material dealing with like those used to move huge volumes of assets and farming materials, like grain, salt, coal, mineral, sand, overburden and the sky is the limit from there. Belt transports are generally utilized in modern settings and in bundling and gathering units. They can help in transportation of normal and sporadically formed things starting with one point then onto the next no matter what their weight. The things can go in a flat, declined or slanted way, contingent upon the kind of belt transport utilized. They are put on the outer layer of the transport also, shipped from one highlight the other through persistent, constant development. The belt transport includes a belt that lays on top of a smooth metal bed or rollers. At the point when the distance is long, belt transports to be straight. They likewise can become corners with an extraordinary connection. In such a case, the state of the belt for the corners will be concentric, to work with smooth development around the corners.

1.1 Design and fabrication of mini conveyor using geneva mechanism

The Geneva mechanism is a gear mechanism that provides a continuous turning with an intermittent rotary motion. The rotating drive wheel has a pin which enters a slot in the drive wheel and slides it forward one step. The race the wheel also has a raised circular locking disc which locks the drive wheel position between the steps. The Geneva mechanism has many applications such as watches, projectors, etc. But we used the Geneva mechanism to convert the rotary motion to a intermittent movement in the production line. The Geneva mechanism can be used in material handling in one sector. The proposed concept will help in production line where many workers are employed for material handling, but also: reduce the cost and time of threshing required by more workers; be eliminated completely, as only two workers can complete the whole operation. In general, a conveyor consists of a motor to drive the rollers and in our design is a handle attached to the drive wheel. We work by hand conveyor belt.

2. GEENEVA MECHANISM

Geneva component, likewise called Geneva Stop, one of the most ordinarily involved gadgets for delivering irregular rotational movement, portrayed by substitute times of movement and rest with no inversion in course. It is likewise utilized for ordering (i.e., pivoting a shaft through an endorsed point).

In the Figure the driver A conveys a pin or roller R that fits in the four spiral openings in the supporter B. Between the openings there are four curved surfaces that fit the surface S on the driver and effectively hold the adherent back from pivoting when they are completely locked in. In the position shown, the pin is entering one of the openings, and, on additional pivot of the driver, it will move into the space and turn the devotee through 90° . After the pin leaves the opening, the driver will pivot through 270° while the supporter abides — i.e., stops. The most reduced viable number of openings in a Geneva system is 3; more than 18 are only from time to time utilized. Assuming one of the space positions is whole, the quantity of turns that the driver can make is restricted. It is said that the Geneva component was created by a Swiss watchmaker to forestall the overwinding of watch springs. Thus it is at times called a Geneva stop.

Early movie projectors utilized Geneva components to give the film a fast development while the screen was shut, trailed by a stay period with the shade open.



Fig -1: Geneva mechanism

www.ijariie.com

2.1 Driving wheel

It is otherwise called Geneva drive. The driving wheel is one of the significant parts in the Geneva component. It is a roundabout circle and comprises a pin on its surface. This pin places an urgent job while in working. The turning drive wheel is typically outfitted with a pin that ventures into a space molded groove situated in the other wheel 14 (driven wheel) that progresses it by one stage at a time. It is displayed in figure beneath. While the driving wheel is worked, the pin will embed on the space which is available on the determined wheel. The revolution of the determined wheel is finished by the pin.

2.2 Driven wheel

It is otherwise called Geneva driven. It is the determined piece of a Geneva system and it is displayed in figure underneath. It comprises of openings on its surface. The driving wheel has a pin. While in revolution the pin embeds in the space and propels it by slowly and carefully. The openings width is more than the pin distance across for example leeway is accommodated smooth running. The figure shows the Geneva driven wheel.

2.3 Conveyor belt

Most usually utilize in transportation of mass materials. Belt transport frameworks comprise of at least two pulleys. A perpetual circle of conveying medium transport line pivots about them. To move the belt and the material, one or both pulleys are controlled. The controlled pulley is called drive pulley and the unpowered pulley is known as idler pulley. In view of the proposed use, transport lines are produced utilizing either PVC or elastic. The belt comprises of at least one layers of material. Most belts in everyday material dealing with comprise of two layers. Cadaver is the name of the under layer that gives straight strength and shape, while cover is the name of the over layer. Polyester, nylon furthermore, cotton are utilized most frequently to make the body, while an assortment of elastic or plastic mixtures indicated by utilization of the belt are utilized to make the cover. Belts with customary separated parcels are known as lift belts. They are utilized to transport free materials up steep grades. Belts transports are likewise utilized in self un loading mass vessels and in live base trucks.

3. DESIGN OF GENEVA MECHANISM

One of the serious issue associated with our task is that the plan of Geneva instrument. This instrument incorporates a specific math. In view of this calculation, recipes and prerequisites the Geneva wheel is planned. The most compelling thing in our task is that appropriate working of the system. This requires more fixation and creation of Geneva instrument is likewise a one of the serious issue. The quantity of openings expected for the Geneva driven is additionally a significant boundary. The plan of Geneva system incorporates the Geneva drive and driven. The middle distance, drive span, driven range, driving pin measurement, driven space length and width are the significant boundary which are expected for the plan if Geneva system. Without legitimate plan it is difficult to work of the instrument. Because of this the plan of the Geneva instrument considered as the principal issue.

COMPONENETS	MATERIALS USED
GENEVA WHEEL	MILD STEEL
GENEVA DRIVE	MILD STEEL
STAND	MILD STEEL
ROLLER	MILD STEEL

Table -1: Components

3.1 Time interval

The time span is the stay time of the Geneva driven. We as of now realized that the Geneva system is a component that changes over the persistent rotating movement into irregular rotational movement. By the drive pin and the determined opening the instrument is created. For the one upset of the driver, the determined will move rely on the quantity of openings present in the determined wheel. The time between the two movements of the determined is known as time span. The time span should be viewed as before the plan of Geneva. One thing should be thought about that once the time stretch is chosen it couldn't be variable. The time spans are different for different applications. At the point when specific time is taken that couldn't be changed and it is material for that specific

application. There is an alternate method for computing the time stretch, by utilizing the formulae. The time stretch is rely on the speed of the driver and this is changed rely on the engine speed. However, our task is physically worked so the time span depends on the administrator. This time stretch impacts the material moved time.

3.2 Jerking motion

The snapping movement is delivered because of the discontinuous movement. This yanking movement is expected in the Geneva worked paper cutting machine. Yet our task is belt transport, with the goal that the snapping movements will impacts the material. Because of this movement the material might be sneaks away from the belt. The jolting movement is additionally affected by the speed. At the point when the speed of the driver is less, the delivered snapping movement is likewise less and it shouldn't impacts the material, instrument and machine. While in high rates the yanking movement created will be high and because of this the material which is to be moved by utilizing this belt transport will be affected. So the fundamental issues engaged with our task is principally founded on the speed

4. CONCLUSIONS

We have effectively determined the precise speed and speed increase of the Geneva wheel. For the planned Genera haggle roller transport the time expected by the material to cross the whole belt is determined precisely. The whole displaying of the task is finished with the assistance of CATIA V5. In expansion to this task work has given us a great open door and experience, to utilize our restricted information. We acquired a ton of down to earth information with respect to, arranging, buying, collecting and machining while accomplishing this task work. We feel that the task work is great answers for span the doors among organizations and businesses. The fact that we have makes us satisfied finished the work with restricted time effectively. "The Geneva Worked Belt Transport" is working with agreeable condition. We have done to our capacity also, expertise making work, let us add. The proposed idea wills a couple of additional lines about our impression project work. Assist underway with covering where numerous specialists are utilized for the material taking care of direction it likewise decrease the expense and sifting time necessity of more number of laborer will be totally wiped out as just two laborers can did the total effort. The venture objective initially is to convey the material taking care of at standard time period.

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IRRIGATION FACILITY WITHOUT CENTRIFUGAL PUMP

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ABSTRACT

Irrigation is the farming procedure of applying proscribed amounts of water to land to assist in the making of crops, as well as to grow landscape plants and lawns, where it may be known as watering. Agriculture that does not use irrigation but instead relies only on direct rainfall is referred to as rain-fed. Irrigation has been a central feature of agriculture for over 5,000 years and has been developed independently by many cultures across the globe.

Keyword: - Agriculture, Rotary motion, etc....

1. INTRODUCTION

Irrigation is underway by pump-enabled extraction directly from the Gumti, seen in the background, in Comilla, Bangladesh. Irrigation water can come from groundwater, from surface water or from non-conventional sources like treated wastewater, desalinated water, drainage water, or fog collection. A special form of irrigation using surface water is spate irrigation, also called floodwater harvesting. In case of a flood, water is diverted to normally dry river beds using a network of dams, gates and channels and spread over large areas. The moisture stored in the soil will be used thereafter to grow crops. Spate irrigation areas are in particular located in semi-arid or arid, mountainous regions. While floodwater harvesting belongs to the accepted irrigation methods, rainwater harvesting is usually not considered as a form of irrigation. Rainwater harvesting is the collection of runoff water from roofs or unused land and the concentration of this.

2. COMPONENTS USED

We are used the readily available components for making this project. Foot valve, L Bend, T Joint, Reducer, Shoe bend are the components used for this project.

2.1 Foot Valve

A foot valve is found at the end of a pipe line in a suction lift application. They function as a check valve, but they also have a strainer affixed to their open end. The check valve is spring assisted. When the pump turns on, the pressure inside the pump column changes and the valve responds by opening.



Fig -1: Foot Valve

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2.2 L Bend

Pipe bending allows systems to minimize pressure changes while still routing materials through complex piping systems. As most bent pipes do not alter the ends of the piping, pipe bends are often easy to implement within a processing system using standard welding processes, flanges, or other connection methods. You can bend PVC pipes by applying heat to the part where you want the bend to go. PVC is what scientists call an amorphous polymer, which means the particles that make up its structure are not arranged in fixed arrays. Applying heat to the PVC, therefore, softens it up and makes it easier to bend.



2.3 T Joint

A "T" joint refers to the welded point of two metallic materials that are joined in the same plane at a 180° combined angle with a 90° angle on either side, forming the letter "T". In plumbing applications, the T-shaped connector into which tubes or pipes are inserted to form a tee joint is also itself known as a tee joint. This connector may be used to direct the flow of fluid in one direction or the other, to divide it in two directions, or to combine flow from two streams into a single stream.



2.4 Reducer

A concentric reducer is used to join pipe sections or tube sections on the same axis. The concentric reducer is cone-shaped, and is used when there is a shift in diameter between pipes. For example, when a 1" pipe transitions into a 3/4" pipe and the top or bottom of the pipe doesn't need to remain level.



Fig -4: Reducer

2.5 SHOE BEND

A pipe shoe is a pipe holding device that is used to raise a pipe above its support structure and is made to withstand the compression stresses that a pipe puts on them. Pipe shoes are round and have a diameter very similar to the pipe that they are holding.



Fig -5: Shoe Bend

3. MECHANISM USED

In agricultural sectors, the flow rate of water must be high and regulated over a wide range when large amounts of water must be moved from one site to another. In these cases, a centrifugal Mono-block pump is an excellent solution.

These pumps are employed in agricultural, industrial, wastewater treatment facilities, mining, power production plants, and other applications for productive usage. Centrifugal mono-block pumps possess an ample voltage band that establishes them distinctly from their mono-set configuration. This mono-set system and high-quality automated insulation avoid water leakage, pressure containment, and contamination.

Irrigation is essential in agriculture because it aids in the growth of crops, the preservation of landscapes, and the revegetation of disturbed soils in arid regions. A consistent water supply in agricultural fields is maintained by installing powerful and productive agriculture water pumps in the fields. It is essential to undertake thorough research and seek professional guidance before purchasing constructive submersible pumps for agriculture.

4. CONCLUSIONS

From the experiment we have successfully make the project – Irrigation Facility without centrifugal pump. Also it runs by less amount electric current and produce more efficiency than centrifugal pump. This mono-set system and high-quality automated insulation avoid water leakage, pressure containment, and contamination. Therefore our irrigation facility has been successfully runs without centrifugal pump.

5. ACKNOWLEDGEMENT

We humbly submit all the glory and thanks to our almighty for showering the blessing upon us and give us the necessary wisdom for accomplishing this project.

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FABRICATION OF ELECTRICITY GENERETOR USING SPEED BREAKER

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ABSTRACT

Every living thing in the universe needs energy to survive. Everything that takes place in the surrounding area is a manifestation of the energy flow in one form or another. However, in this fast-paced world, both the population and conventional energy sources are decreasing. Over the past few years, excessive energy use has led to an energy crisis. As a result, in order to solve this issue, we must employ energy-saving strategies that make the most of conventional sources. How to make use of the energy lost when a vehicle passes over a speed breaker is part of this project. When a vehicle passes over it, a lot of energy is produced. Using the speed breaker as a power generating unit, we can use the generated energy to generate electricity. Through the rack and pinion mechanism, the kinetic energy of moving vehicles can be converted into mechanical energy of the shaft. After that, a generator will be used to convert this mechanical energy into electrical energy, which will be saved thanks to a battery. We can use the energy we save during daylight to light street lights at night. As a result, we can save a lot of energy through this arrangement, which can be used to meet future demands. This project makes use of electronic devices and gear arrangement to extract energy from a speed breaker. It is possible to generate a lot of electricity and save a lot of one, and if put into action, it will be very good for the government. The vehicle generates a variety of forms of energy when it is moving, such as heat energy produced when a vehicle traveling at a high speed hits the wind and causes friction between the wheel and the road, also known as rough surface heat. Conversion of potential energy into electrical energy is the underlying principle. By converting the potential energy produced by a vehicle ascending a speed breaker into kinetic energy, a method exists to generate power. In a standard rumble strip, potential energy is wasted because of the vehicle's increased height as it moves over the inclined plates. They crank a lever attached to an angular motion converter, a ratchet-wheel-type mechanism, which rotates a geared shaft loaded with recoil springs when the breaker comes down. This shaft's output is connected to a dynamo to produce electricity from kinetic energy.

Keyword: - Conventional energy sources, electricity, heat, Conversion, and breaker etc.

1. INTRODUCTION

The need to find non-conventional energy sources grows as energy demand rises. In my paper, I'll talk about how speed breaker power is generated and the possible mechanism needed for it. Any significant bottleneck (or rise in price) in the supply of energy resources to an economy is considered to be an energy crisis. It usually means that there isn't enough oil, electricity, or other natural resources. An energy crisis can also be referred to as an oil crisis, a crisis, a lack of energy, or an absence of electricity. Rising energy costs started the political riots that took place during the anti-government protests in Burma in 2007 but did not escalate into a full crisis. Similarly, the gas dispute between Russia and Ukraine and the energy dispute between Belarus and Russia were largely resolved prior to reaching a prolonged crisis stage. When markets are manipulated by monopolies, market failure is possible. Industrial actions like union-organized strikes and government embargoes can lead to a crisis. Age-related overconsumption, infrastructure, and occasionally bottlenecks at oil refineries and port facilities may be to blame.

During winters that are unusually cold, an emergency may arise. Short-term crises that are currently in existence include. The main sources of power generation will be regular, conventional fossil fuels, but it is feared that they will eventually run out in a few decades. As a result, we need to look into some approximate, new sources of power generation that won't run out in a few years. Pollution is another major issue that is becoming the hottest topic of the day. It suffers from all kinds of living things on land, in water, and in the air. The main sources of pollution are power plants and automobiles.

As a result, we need to look into other kinds of renewable sources that don't use harmful products or commercial fossil fuels to generate electricity. TEC (ocean thermal energy conversions), solar wind, and other renewable energy power generation systems are already in place. The most recent technology, known as "POWER HUMP," is used to generate electricity from renewable sources.

1.1 Construction details

The various machine elements used in the construction of power hump are:

- Rack
- Spur Gear
- Fly Wheel
- Bearings
- Shaft
- Springs
- Electric Dynamo

Four springs support a dome, and a clamped rack is in the bottom. On both faces, the rack has contact teeth. To only rotate the gear wheels in one direction, it is connected to two gear wheels. In each gear, we have added a free wheel. The gear assembly and the free wheel are mounted in the middle. Additionally, the flywheel is positioned on the same shaft, which is simply supported at both ends by ball bearings. Each shaft is now connected to a dynamo via belt drive. An electrical storing device is connected to the dynamo's output terminal. The whole thing is set up in a concrete pit.

2. WORKING

The vehicles have some kinetic energy that is being wasted while they are moving. Using a special arrangement known as POWER HUMP, this kinetic energy can be used to generate power. This unit is electromechanical. For power generation and storage, it makes use of both mechanical and electrical technologies. Power Humps are dome-shaped devices that are likely to slow down vehicles. The springs that are attached to the dome are compressed whenever the vehicle passes over the dome, and the rack that is attached to the bottom of the dome moves downward in a reciprocating motion. Because the rack has teeth that are connected to gears, the rack's reciprocating motion is converted into the gears' rotary motion, but the two gears rotate in opposite directions. On the shaft, there is a flywheel that keeps the energy uniform and regulates the energy's fluctuation. A belt drive connects the shafts to the dynamos, which convert mechanical energy into electrical energy, so that the shafts can rotate at a certain RPM. Traffic density will have an effect on the conversion. An electro motive force (EMF) is induced in an armature as it rotates between the south and north magnetic fields. Therefore, the E.M.F. armature coil must rotate in order to induce, and this armature is connected to a long shaft for rotation. The kinetic energy of moving vehicles is used to induce the same e.m.f. by rotating. The power comes from both directions; A special component known as a Zener diode for continuous supply is utilized to convert this power into a single mode. Like the speed breaker, also known as HUMP, all of these mechanisms can be housed inside the dome. These POWER HUMPS can be arranged in series to increase the electrical output. Various electrical devices can be used to increase and store this generated power.



Fig -1: Working Model

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The system consists of an iron-boron permanent magnet bonded to the top surface of the piston. The cosmopolitans magnet next to the piston during reciprocal movement. The magnets were mounted in the simplest way so that the pole placements were in the same direction. For example, when the south pole of each magnet was attached to the surface of the piston, the north-pole was exposed to the atmosphere.

A magnet is an associated magnet that, having passed through it, creates a dipole at the two end faces, resulting in the formation of north and south poles. It was powered using a regular 24V lithium particle battery. When the current is attempted and becomes a real magnet, it attracts the plunger.

A magnet was placed on top of the non-magnetic cylinder. It was durable with the help of a rigid frame constructed in various arrangements.

3. WORKING PRINCIPLE

The power generation from speed breaker (PGFSB) is a system designed to capture kinetic energy and waste from all vehicles. The kinetic energy of the vehicles is converted into electric energy by this device. This is accomplished by installing a moving plate on the road. This plate records very little movement from the road surfaces and transfers it to rack-and-pinion arrangements.

The rack and pinion arrangement is used here to convert the speed-breaker's reciprocating motion into rotary motion. A gear arrangement is connected to the pinion's axis. There are two gears here, each with a different diameter. The pinion's axis is connected by means of a gear wheel with a larger dimension. As a result, the larger gear wheel receives the speed that was increased at the smaller sprocket wheel.

The larger gear and the smaller gear are linked. As a result, the smaller gear that follows the larger gear still multiplies the speed to a greater intensity as the larger gear rotates at the multiplied speed of the pinion. Therefore, even though the pinion's rotary motion results in a slower speed, as power is transferred to gears, the speed eventually increases to a higher speed. The rotor of a generator receives this speed, which is sufficient to rotate the rotor. The electric motive force (emf) is produced when the rotor in a static magnetic stator cut through the surrounding magnetic flux. After that, the generated emf is sent to an inverter, where it is controlled. Now that the regulated emf has been sent to the storage battery, it is stored there during the day. After that, this current is used for lighting purposes on both sides of the road for a considerable distance at night.



Fig – 1: Schematic Dia. Of Mechanism

3.1 Crank shaft mechanism

As is common knowledge, the crank shaft is used to convert linear motion into circular or rotary motion. This method is good for making power, but the system will produce a lot of heat and vibrations because it has so many moving parts. As a result, selecting such systems necessitates careful system design. The piston and crank shaft mechanism can produce circular motions because the specialized speed breaker can support linear motion. These cyclical motions can be transferred to the generator through an effective transmission system because our primary goal is to generate electrical energy.

In automobile engineering, pistons are used to convert thermal energy into mechanical linear motion. The crank shaft mechanism transforms that mechanical linear motion into circular or rotary motions. That the power transmission system transmits the rotary motions generated by the crank shaft to the differential. The crank shaft mechanism used to generate power here uses kinetic energy rather than thermal energy to push the piston down or generate the linear motion. As a result, the kinetic energy applied to the speed breaker causes it to push the piston down whenever a vehicle passes over it.As a result, the piston completes half a revolution on the crank shaft. Because of its inertia-based design, the crank itself performs the remaining half of its revolution to raise the piston. As a result, moving the speed breaker back to its original position returns the piston to its original position. The crank shaft mechanism is able to produce the circular motion in this manner. The transmission system is used to transfer circular motions to the generator.

3.2 Hydraulic speed breaker

When compared to the crank shaft mechanism, the hydraulic speed breaker mechanism produced superior results. The pistons used in this process compress the oil. so that the system can receive power. There may be more expensive equipment here. Also in this case, the speed breaker is a spring supported at both ends to produce linear motion. Additionally, the speed breaker is equipped with pistons that are pushed down by the speed breaker whenever a vehicle passes over it. So the under-the-piston oil can be compressed by the piston. The compressed oil reaches the accumulator via a route. The motor that generates torque is connected to the accumulator as well. The electrical energy is generated by applying that torque.

3.3 Advantages

Such speed breakers can be easily mounted and can also be designed for heavy vehicles, thus increasing input torque and hence output of generator. These prototypes can be readily manufactured and put to use at all public toll-plazas to bring about an efficient system wherein the electricity generated can be used to lighten up the premises of the same place where it is generated thus making a self-sufficient model. These can be mainly used at toll booths, approaching traffic signals, parking plots of malls and complexes etc.,

4. CONCLUSIONS

To maintain a nation's industrial growth and standard of living, energy conservation and reuse are essential. Reusing energy is important for sustainable development because it can significantly reduce per capita consumption. Now that vehicle traffic is a big problem in most big cities, we can use this to our advantage by installing these speed breakers on roads with a lot of traffic and toll booths. We can use the proposed mechanism to generate electricity almost continuously with little work and upkeep.

5. ACKNOWLEDGEMENT

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PEDEL POWER GENERATION

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ABSTRACT

For many Indian villages, bicycles serve as their primary source of mobility. The majority of these settlements lack of electricity. Pedal power can be transformed from mechanical to electrical generating electrical energy with a dynamo or an alternator. Small using a dynamo, powered lighting devices can be charged, and be used by students to study late at night. Using this rule can be increased to power computers, iPods, mobile devices, etc. energy can be produced as a result of the alternator's wheels rotating. Vehicles, such as bikes and cars, where there is a producing more power Uses for the generated power include the same vehicle or kept in a battery for use as electricity various other gadgets. Bicycling promotes healthy lifestyle maintenance physics.

Keyword: - Alternator, dynamo, bicycle, and rechargeable batteries are the keywords, etc....

1. INTRODUCTION

The universe is a vast energy reserve. We all understand that while energy cannot be generated or destroyed, it can change its form. However, we waste energy-producing resources as if there were no end to their availability. Energy scarcity is currently the biggest concern to the world, so if we can recycle and replenish the energy we waste, it will help in some manner. When pedalling a bicycle, a person may produce about 150W of power. However, this power is wasted because it is never used. Many electronic items could be powered if we could harness this energy. The energy produced by a cyclist while cycling can be captured by a dynamo or an alternator.

1.1 Electrified India

According to the research [6], Number of Towns and Villages Electrified in India by IIFL, 17.7% of India is still without electricity after 65 years of freedom. Late at night, All 5161 of India's towns have electricity, i.e.In the case of towns, 100 %. How-ever, villages in India are more than just towns, and it is the only way that India can flourish through the growth of those villages. 593732 villages total. Only 105293 out of 488439 villages in India have electricity. The settlements lack electricity. Andhra Pradesh, Kerala, Goa, among the few, Punjab, Tamilnadu, Haryana, and Delhi are states with a complete electric grid. Uttar Pradesh, The states are Bihar, Jharkhand, Orissa, Meghalaya, and Tripura.

1.2 Turning sweat into watts

IEEE Spectrum's July 2011 [7] issue contains a thorough study and analysis of the production of pedal power energy, it use, presented are economics and viability. Power is generated a tiny switch can be used to convert the exercise bikes used in gyms generator. This article discusses a case in which it examines the overall viability of integrating bicycle power technologies into popular culture. Being accepted by society entails this Technology needs to generate a lot of energy. Additionally, it lists several home appliances, along with the time spent pedalling Activate each device for an hour. CFL need 18 people cycle for minutes. The process takes 30 minutes for laptops, for a fan One hour is needed.

2. PEDAL POWER GENERATION USING BICYCLE

Solar, wind, and other renewable energy sources are only a few, hydropower, wind, etc. Additionally, individuals consume non-renewable fossil fuels. These materials are highly pricey. Consequently, an inexpensive, renewable energy source is required. As long as we are pedal and everything is operating as it should, we can get power anytime necessary. Generating electricity with the bicycle is both economical and sustainable. Nevertheless, people have been used pedal power for a variety of daily tasks, Up until recently, pedal-powered electricity generation was not popular, many years ago. Currently, bicycles with dynamos are common. Which, at night, run the incandescent head-light, the rotational energy produced by the tire's rotation due to the usage of force on the pedals, they can be used in both ways.

2.1 Dynamo

Bicycle Dynamos are permanent magnet alternators.ac current is produced by magnets. There are two different types of dynamos. Both the hub and bottle dynamos are offered. An integrated dynamo powers a bicycle wheel's hub. Here the rotation of the generator is used to produce power, bicycle tyre Like a hub dynamo, a bottle dynamo is a portable electric generator. Usually, it is situated next to the vehicle's back wheel. Similar to a miniature alternator, a bottle dynamo operates.

2.2 Alternator

The dynamo produces very little energy. This power is only capable of charging three 1.2V NiMH batteries, which can be used for low power devices such tiny led lights. These batteries take a long time to charge as well. It is certain that the dynamo output will not be enough for high power applications and the need for an alternative. An alternator can take the role of a dynamo since it is able to generate more electricity in a shorter amount of time. the alternator dynamo has both benefits and drawbacks, while an alternator creates more power, with less time and effort than a dynamo. The size of an alternator is more than that of a dynamo, and it would take up more room. One method of coupling an alternator with the bicycle should be positioned

2.3 Application of all alternators in bikes and cars

Bicycles can generate power that can be used to run some electronic devices with low power ratings, such tail lights. Bike and car headlights for charging mobile devices such as phones similarly, bicycles may generate power. An alternator can be kept for backup or other uses. In automobiles, dynamos can be installed on multiple tyres to generating more electricity with less work. This can then be utilized, to run several electronic components in autos.





2.4 Energy Losses

Energy loss occurs at every level, from production to storage, and cannot be completely prevented. There is energy loss in the battery, in the converter (which converts ac) in the alternator/dynamo in the voltage regulator, from DC to AC. This indicates that the overall A pedal-powered generator will lose 50–70% of its energy. Losses can be reduced by lowering the amount of employ mechanical connections in addition to electrical connections whenever it is feasible. Take into account the cost component, elements of Use as much efficiency as possible. Similar to NiMH batteries be utilized because they are the most effective rechargeable batteries.

3. ANALYSIS

The many aspects of producing pedal power with a dynamo and an alternator. A dynamo only generates about 3W of electricity as opposed to an alternator, which may generate between 50 and 100W of power depending on the pedalling pace. Additionally, utilize dynamo to charge a battery results in low power efficiency because of power loss in the battery, connecting wires, and bridge rectifier circuits (which is being charged). Only low power consumption gadgets, such LED lamps, mobile charging, and LED headlights and taillights mounted to the bicycle, can be powered by dynamos due to their low power efficiency. In rural areas where individuals cannot afford alternators, dynamos are the most cost-effective solution

Characteristics			
Characteristics	Alternator	Dynamo	
XX7 · 1		Comparatively	
weight	Comparatively more(>0.5kg)	1	
AN A		less(>270gms	
	10000 20000 1 1	Normal: 3W (6V,	
Output power	100W – 300W can be generated	500 (11)	
~		500mAh)	
Current	60 amps and more at max RPM	22amps at max RPM	
Efficiency	55%-70%	≈40%	
Size	Comparatively big	Small	
A CONTRACTOR	As heat, friction, noise,		
	vibration		
	Copper loss: series		
N. A. W. S.	field & shunt field Iron loss:	10.3	
Loss	Hysteresis	As heat, friction, noise	
No. No.	loss and eddy current loss		
1 A.	Other losses: Armature	ST 115	
	loss and mechanical loss		
	As heat, friction, noise		
Comparative drag	More	Less	
and the second	With a separate stand/ In the place of	- Constant State	
Mounted on	the	Mounted on seat stays	
	carrier	10	
Applications		Low power devices such as mobile	
	High power and low power devices	phones, LED lamps, CFL etc	
	including portable TV, DVD players,	Dynamo is preferred, only for	
	iPod etc Alternator is preferred, if more	powering small power devices, like	
	power with less effort is needed	lighting nurpose	
	1	ingining purpose	
rpm	High(1000rpm)	130rpm – 170rpm	
Output (dc/ac)	AC	AC	
Battery used	Rechargeable batteries such as NiMH,	Dechargeshie hetteries such as NiMI	
	NiCd, Li-ion	Nicd Lister	
	NiMH is preferred since it does not	NICU, LI-1011	
-	possess memory effect	INIVITI IS preferred since it does not	
	and non toxic.	possess memory effect and non toxic.	
At low rpm	Can't self-excite	Can self excite	
cost	US \$30 – US \$500	US \$0.5-US \$3.0 / Set	

4. CONCLUSIONS

One must consider alternative renewable energy sources at a time when an energy crisis is looming large over the globe. One such alternative method of electricity production is this paper is presented. The tyre rotational energy in the pedalling a bicycle can be used to power tiny appliances, powered equipment Alternators and dynamos can both be utilised, and many scenarios and possibilities where a dynamo or alternator is used are offered and can be utilised. The numerous contexts in which thisIn this study, it is also explained how power might be employed. Villagers The people who ride bicycles will gain the most from this.

5. ACKNOWLEDGEMENT

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MODERN MOTORIZED RAIN GUTTER CLEANER

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ABSTRACT

Our project is the gutters to remain on the side of the house and do their job effectively; they must remain clean and free of debris. Debris inside gutters weigh them down which can over time pull them away from the house. With a motorized device that is capable of doing all the hard work for the home owner, the threat of falling off a ladder or roof while cleaning the gutters by hand is eliminated. The device was designed to target specific customer needs and especially reduce the risk factor. The device was designed to be hands free and easy to use to where even a pre-teen could control and it.

Keyword: - Cleaning, gutter, etc....

1. INTRODUCTION

Cleaning of drains/gutters has always been a problem. Labours cleaning gutters & drain seems unethical and also leads to a high risk of them catching infections or poisoning due to large amounts of waste/chemicals in them. Also throwing of bottles/plastics and other such objects into the gutters lead to narrowing and eventually blockage in gutter flow. This leads to overflow in many cases. So here we provide a fully automated drain gutter cleaning mechanism to tackle these modern day gutter jamming issues. Our system uses an automated gutter/drain cleaning system that lets fluids flow through it but catches large solid waste like bottles & amp; plastic and accumulates it. So gutter cleaners need to just clean these gutter cleaning systems installed at points instead of cleaning entire gutter floors.

Our system consists of metal teeth based jaws that wait at the bottom of the mechanism This project automatically cleans the water in the drainage system randomly and removes waste and this form an efficient and easy way of cleaning the drainage system and preventing the blockage. It also reduces labour and improves the quality of water that is cleaned. If the garbage are allowed to flow they will end up flowing down to recreational beaches used for tourism purposes making a scene not pleasurable to the eyes else these garbage flow to residential sites where they are burnt in a way of getting rid of them, thereby causing climate change. Here we provide a fully automated drain gutter cleaning mechanism to tackle these modern day gutter jamming issues.

This proposed system uses an automated gutter (or) drain cleaning system that lets fluids flow through it but catches large solid waste like bottles, plastic and accumulates it. So, gutter cleaners need to just clean these gutter cleaning systems installed at points instead of cleaning entire gutter floors. The problem such as Environmental pollution and spreading of viral diseases are avoidable. Automation of Drainage Cleaning System would reduce the risk of various diseases spread due to accumulation of waste. The devices are place across drain so that only water flow through lower grids, waste like bottle, etc. Floating in drain is lifted by a tooth which is connected to chain. This chain is attached by sprockets driven by motor. When motor runs the chain starts to circulate making teeth to lift up. The waste materials are lifted by teeth and are stored in waste storage tank.
2. COMPONENTS USED

We are used the readily available components for making this project. The components are following below.

2.1 Wiper Motor

Wiper Motor, the power source of the wiper blade, is the core of the whole wiper system. Therefore, the quality of the wiper motor must be guaranteed to ensure its performance. The wiper motor is a permanent-magnet direct current (DC) one. It is equipped on the front windscreen glass with the mechanical parts of the worm gear. The worm gear functions to slow down and increase torque. Its output shafts spur four-bar linkage, by which the movement is changed from rotary to swinging.



2.2 Transformer

It is a device used transfer alternative electric current from one circuit to another circuit. It can be used for either increase or decrease the voltage. Here we used transformer for regulate the power supply.



Fig -2: Transformer

2.3 Filter

The output after being processed by full wave rectifier is not a pure DC. The output is a pulsating DC. The output contains large fluctuations in voltages. This is quite apparent from the block of full wave rectifier shown above. The power supply that we intend to design must not have any variation in output voltage. The voltage that we get from full wave rectifier fluctuates between 0 V and V_{peak} , and hence it contains AC components.



Fig -3: Filter Block diagram

2.4 Relay

Relays are simple switches which are operated both electrically and mechanically. Relays consist of a n electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. But they differ according to their applications. Most of the devices have the application of relays.



3. WORKING PRINCIPLE

A motorized device that could clean gutters without putting people in harm's way of climbing a ladder onto the roof of a house would an ideal solution. That is why an automated gutter cleaner would be a great tool for everyone who owns a home to own.

Here motor is connected with the rain gutter. In summer or unwanted times the rotates the rain gutter by down ward position to avoid the dust accumulation in gutter. In needy time the motor moves the rain gutter by upper ward position to carry the water to desired place.



Fig 1: Line diagram

4. CONCLUSIONS

In order for the gutters to remain on the side of the house and do their job effectively, they must remain clean and free of debris. Debris inside gutters weigh them down which can over time pull them away from the

houses. Along with snow and ice during the winter months, they can eventually fall off. And if they are not free of debris, such as leaves, twigs, acorns, etc., it can stop the flow of water out to the street and eventually it will find its way back to the foundation of the house. Depending on the amount of trees around a house, the average homeowner may need to clean them two or more times a year and this are usually done manually.

This device that could clean gutters without putting people in harm's way of climbing a ladder onto the roof of a house would an ideal solution. That is why an automated gutter cleaner would be a great tool for everyone who owns a home to own.

5. ACKNOWLEDGEMENT

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AUTOMATIC VEHICLE SPEED CONTROL SYSTEM IN A RESTRICTED ZONE

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ABSTRACT

This project has an aim to control the speed of any vehicles automatically in cities and also in restricted areas such schools, parks, hospitals and in speed limited areas etc. Nowadays in a fast moving world all the peoples are not have self-control. Such peoples are driving vehicles in a high speed. so the police are not able to monitor all those things. This paper provides a way for how to control the speed without harming others. Driver does not control anything during such places; controls are taken automatically by the use of electronic system. In this project we using RF for indicating the speed limit areas it is placed front and back of the restricted zones. RF receiver is placed inside the vehicle. Speed is acquired by the help of speedometer in the vehicle. The controller compares the speed. if it exceeds the limited speed the controller alerts the driver and controls taken automatically. If they does not respond that message an information along with the vehicle number is transmitted to the nearest police station by the use of GSM and penalty amount is collected in the nearest toll gate.

Automatic Vehicle Speed Control System is designed to control the speed of the vehicle in specific zones to avoid the accidents in the low speed areas. In this system the low speed zone is considered to be the 100 meter earlier to the traffic signal. The case study and implementation is based on the light vehicle speed control, when the vehicle is running with full speed and gets entered into the low speed zone the speed of it will be automatically reduced to the allowed speed in low speed zone. The microcontroller will interface with the sensors to detect the speed of vehicle and based on this input the controller will take appropriate action and generate a control signal for the vehicle control system which then will activate the mechanism of the Speed control in the vehicle and the speed of the vehicle is reduced to the required speed in that zone.

Keyword:- Speed, RF receiver, etc

1. INTRODUCTION

The Indian Law Commission has an advisory to limit the speed at critical zones, to reduce the road accidents and to make a peaceful environment for the people. The existing methodologies can't able to reduce the accidents still now, Because of the rash driving of some drivers. Hence speed control is in need to be implemented in all the vehicles. Here is the new idea of ours to install an automated speed control system in the vehicles mainly in the restricted areas. Here setup device as a transmitter where the multiple devices are combined to monitor the speed of the vehicle when the vehicle enters above the prescribed speed and controls it by placing a receiver at the vehicles, based on the signals transmitted the speed of the vehicle get reduced by interfacing a microcontroller. The current speed of the vehicle is sensed by the dc motor and the output of it was given to the microcontroller where it compares the speed with the prescribed limit and the speed is controlled automatically. The technology used in this

system to communicate between transmitter and receiver is Zigbee technology, which covers up to 10-100m within its range. This is comparatively cheaper than others. Therefore this system controls and monitors the overall vehicles in its covered area. By implementing this system the accidents are reduced in this fast-moving world. In the developed and developing countries, people finds inconvenience with the road accidents, jamming of vehicles because of the drivers who dislike to obey the laws at the restricted zone, where the speed has to be limited as prescribed in that zone by using an automated speed control system to limit the speed automatically using Zigbee technology.

2. COMPONENTS USED

2.1 Microcontroller

Microcontroller is the heart of the System. It compares the speed of vehicle by sensor at low speed zone or signal zone maximum allowable speed and automatically regulates the speed of vehicle by activating the speed limiting mechanism. The speed of vehicle is reduced to the required in that zone.

The microcontroller which has been used in our system is the "AT89S52" which is typically 8051 microcontroller manufactured by Atmel.

2.2 IR Sensor

In this system we have used IR sensor as IR Transmitter unit and IR Receiver. The Transmitter unit which is be placed at 100 meter earlier to the traffic signal.

The IR Receiver module is been implemented inside the car mechanism.



2.3 Motor

An electric motor is an electrical machine that converts electrical energy into mechanical energy. In this system we are using dc motor when the motor is interfaced with microcontroller, we can control the speed of vehicle by controlling the direction of rotating of flow valve automatically.

The motor has been implemented with an speed limiting mechanism in the vehicle. This mechanism is automatically activated in the low speed zone which access the vehicle and with respect to that the vehicle gradually decreases the flow of petrol. This is done by a throttle valve which has a spring action it allows to decreases the flow and simultaneously the vehicle decreases speed as per the detection of the sensors.

2.4 Motor Driver

L293D is a dual H-bridge motor driver integrated circuit(IC). Motor driver's acts as current amplifiers since they take a low current control signal and provide a higher current signal. This higher current signal is used to drive the motors. In one IC we can interface two DC motors which can be controlled in both clockwise and counter clockwise direction and if you have motor with fix direction of motion. There are four I/Os to connect up to four DC motor. L293D had output current of 600mA and peak output current of 1.2A per channel. Moreover for

protection of circuit from back emf output diodes are included within the IC. The output supply (VCC2) has a wide range from 4.536V, which has made L293d a best choice for dc motor driver.

3. WORKING PRINCIPLE

In car assembly carburetor work on petrol engine, a carburetor basically consists of an open pipe through which load p asses towards throttle valve of carburetor. The pipe is in the form of venture: it narrows in section and then widens again. Causing air flow to increased in speed in the narrowest part. Below the venture is a butterfly valve called as throttle valve.

The throttle valve is connected to the accelerator of engine (pedal). When pedal pressed the valve works, if maximum force applied on accelerator then the valve fully opens and large amount of mixture of fuel and air is passed through the throttle valve and simultaneously the speed of car increases. If less force applied on pedal then the valve close partially depending on the force applied on the pedal and accordingly the amount of mixture of air and fuel will be supplied towards the engine.



4. CONCLUSIONS

This system proves to be highly effective in minimizing the over speeding and unwanted accidents in restricted zones. In current systems, there is no autonomous speed restriction in the vehicle to avoid accidents. Hence further research and optimizations of the automatic vehicle speed control system will allow us to implement in vehicles for improved safety for roadside pedestrians, passengers, and other road users.

5. ACKNOWLEDGEMENT

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PNEUMATIC POWERED PICK AND PLACE ARM

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ABSTRACT

In an effort to find replacements for it-self to carry out his orders and also to work in a hostile environment, humanity has always sought to give its artifacts lifelike qualities. The popular conception of a robot is one that resembles a human being in appearance and operation. In order to provide uniform quality and increase productivity, the industry is transitioning from its current state of automation to robotization. Despite all efforts to incorporate increasingly anthropomorphic and human-like characteristics and superhuman capabilities into industrial robots of today, they may not even remotely resemble humans. A robotic manipulator, also known as a robotic arm, is one type of robot that is frequently utilized in industry. It is a rigid link chain with movable joints that can be open or closed. Links can be thought of as resembling human anatomy in some configurations, with joints at the shoulder and elbow, upper arm, and forearm, a end effectors, which may be a tool and its fixture, a gripper, or any other device for working, is connected at the end of the arm by a wrist joint.

Keyword: - Robotization, super human anotomy, kinematic links and grippers, etc

1. INTRODUCTION

The Robotics Law: The robots were created as humanoids by Isaac Asimov and used in a number of stories. His robots had human-programmed brains and were well-designed, fail-safe machines. He proposed rules for the ethical behavior of such a device because he anticipated the dangers and chaos it could cause. The "Three laws of robotics," which required robots to operate in accordance with three principles, are applicable to both real robots and Asimov's robots and are

- A robot should not injure a human being or, through inaction, allow a human to be harmed.
- A robot must obey orders given by humans except when that conflicts with the First Law.
- A robot must protect its own existence unless that conflicts with the First or Second law

These are very broad rules that also apply to other appliances and machines. They are always taken care of in the design of any robot.

1.1 Pneumatics in Material Handling

Pneumatic systems typically operate at a much lower pressure than hydraulic systems, and the advantages of pneumatics make it better suited for many applications. Components can be made of thinner and lighter materials, like aluminum and engineered plastics, because pneumatic pressures are lower. By contrast, hydraulic parts are typically made of steel and ductile or cast iron. Pneumatic systems typically provide some cushioning, or "give," whereas hydraulic systems are frequently regarded as rigid. Hydraulic fluid typically returns to a fluid reservoir, whereas pneumatic systems can exhaust air to the atmosphere. This makes pneumatic systems typically simpler. In comparison to electromechanical power transmission methods, pneumatics also has advantages. Heat generation frequently limits electric motors. Pneumatic motors typically do not have a problem with heat generation because the compressed air that flows through them removes heat. In addition, because pneumatic components do not require

electricity, they do not require the expensive, bulky, and heavy explosion-proof enclosures that electric motors do. In fact, electric motors are significantly heavier and larger than pneumatic motors of the same power rating even without special enclosures. In addition, pneumatic motors will simply stall and consume no power if they are overloaded. However, when overloaded, electric motors can overheat and fail.In addition, simple pressure- or flow-control valves, as opposed to more expensive and intricate electrical drive controls, are frequently required for pneumatic torque, force, and speed control. Pneumatic actuators, like hydraulics, can immediately reverse direction, whereas electromechanical parts frequently rotate with a lot of momentum, which can delay changes in direction.

1.2 Objective and methodology

Analyze the current pneumatic arms: In this step, we looked at the market's existing material handling system. We observed how the material was held, lifted, and positioned on the plane. For instance, the operation we observed required a large number of expensive motors and three to four pneumatic cylinders. We concluded that adopting a helical slot on the shaft, which will transform the lifting cylinder's linear motion into the arm's rotational motion, was the best option after observing how the existing material handling machines move the metal or material. Making a plan for the project, At this point, we got started on the design and concept of the machine. We carefully considered and decided how our Arm would look. The initial conceptual plan is as shown, and a number of modifications were made to make it more cost-effective and perform better. Choosing the right materials, In order to construct an effective system that was accountable for both performance and cost, it is necessary to select the appropriate material. The materials were chosen so that they could withstand varying loads and vibrations. The system's belt was made of nylon-coated cotton and almost mild steel. Calculations and modeling in three dimensions: For the design of the shaft, arm, gripping cylinder, and lifting cylinder, calculations were performed. As a result, modeling Software CREO 2.0 was used to create a three-dimensional model of the components. The pneumatic arm that was going to be made was depicted in three dimensions in both the Assembly model and the three-dimensional component model. The machine's fabrication and assembly: Arc welding, drilling, boring, step turning, threading, grinding, sheet metal cutting, and bearing mounting were performed following the preparation of the machine's 3D model with CREO 2.0.Both permanent fastenings like welding and temporary fastenings like bolts and nuts were used to assemble the entire arm. The pneumatic arm is made up of a number of different parts, which are listed below.

2. PNEUMATIC CYLINDER

In any pneumatic system, the double-acting cylinder is considered to be the primary actuator. Although double- acting cylinders are superior to single-acting cylinders in every important way, their price tag is higher than that of single-acting cylinders. Cylinders with double action are more powerful and faster. Single-acting cylinders are also utilized whenever possible in industrial applications; however, when speed and force are crucial, double-acting cylinders are utilized. Doors can be opened and close, items can be taken off and put on conveyor belts can be taken off, and so on.



Fig -1: Double acting cylinder

We produce heavy-duty air cylinders that can withstand temperatures up to 180 degrees Celsius and a pressure capacity of 12 kg/cm2. This heavy-duty cylinder has a 2500 mm stroke and a wide range of bore sizes, so it can meet all of your needs. Additionally, there are space-saving, high-performance, and compact air cylinders available to address issues of low performance.



Fig -2: Sectional view of double acting cylinder

2.1 Design procedure

In the process of building the robot, the design is the most crucial component. In this section, we come up with fresh concepts for the robot's construction and present them in the form of plans and drawings. The steps involved in designing a robot arm are:

- Material selection
- Design of mechanism
- Preliminary design
- Revision of design
- Final drawings

3. FLOW CONTROL VALVES

3.1 Maximum Principal Elastic Strain Minimum Principal Elastic Strain Assembly Procedure

In a pneumatic system, the energy that the system will use and transmit is stored as potential energy in an air receiver tank as compressed air. After a receiver tank, a pressure regulator is used to distribute this stored energy to each leg of the circuit. A normally open valve is a pressure regulator. Air from the receiver tank can expand through a valve to a point downstream when a regulator is positioned after the tank. An internal pilot passage that connects to the underside of the piston is where pressure is detected as it rises after the regulator. Because it has a large surface area exposed to downstream pressure, this piston is very sensitive to changes in downstream pressure.



Fig -3: Flow control valve

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3.1 Future result and description

- > The pneumatic arm's performance is depicted in the table above.
- > To verify the pneumatic arm's capabilities, three operations are required.
- > Additionally, as can be seen above, various weights or loads were lifted during operation.
- > In the first three operations, lifting a load of 5 kilograms takes about 1.5 to 1.9 seconds.
- ▶ Lowering the load takes between 1.3 and 1.6 seconds.
- In the subsequent three operations, lifting a load of 10 kilograms takes approximately 1.9 to 2.2 seconds.
- > The load is reduced for approximately 1.5 to 1.7 seconds.
- > The subsequent three operations take approximately 6.5 to 6.9 seconds to lift 15 kilograms.
- The load is reduced for approximately 1.3 to 1.4 seconds.

4. CONCLUSIONS

The pneumatic arm for pick and place is designed and manufactured with efficiency and cost in mind. The flow control and direction control valves are operated manually. Using a helical slot mechanism, a pneumatic cylinder moves and rotates the pneumatic arm. Additionally, the solenoid valve is an object-holding pneumatic actuator. It is anticipated that the model will lift 30 kilograms of weight. The multi-handling Pick and Place Pneumatic Arm has been successfully designed and implemented. The necessary corrective steps have been taken after extensive testing of the various arm linkages and their components. As a result, the goal of developing a low-cost pick-and-place robot was achieved with success and affordability. It has been demonstrated that the pneumatic arm also has very low operating costs. With a low initial investment, this will assist in lowering labor costs and increasing profits. An example from the real world serves as an illustration of the proposed model. This project can be used in the industry if the aforementioned benefits and other benefits are taken into consideration. In conclusion, I would like to state that this project has the potential to have an impact on assisting poor and unemployed paralyzed or handicapped individuals.

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DESIGN AND DEVELOPMENT OF SMART SPEED BREAKER

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ABSTRACT

The traffic related accidents can have dire consequences. Traffic safety solutions of today forces heady vehicles to slow down more than necessary, Smart Speed Breaker is a traffic safety system where speeding vehicles activate the speed breaker and rises the speed bumps above the road surface and giving the physical remainder to driver to slow down the vehicle. If the speed of the ongoing vehicles is within the permissible limit then the speed bumps stay flat on road surface and vehicles passes over it comfortably. It's modern way to keep control on speeding vehicles only and un-affect the legal speed vehicles. Further modification can be also done for emergency vehicles accessibility.

Keyword: - Battery, Block Diagram etc

1. INTRODUCTION

India is developing country with the second largest road network in the world. Out of total stretch of 5.4 million km of road network, almost 97,991 km is covered by national highways. It's already a huge challenge for the Indian government to provide world-class road, due to sheer magnitude. On an average, a person spends anywhere between 30 minutes to two hours of their day driving, which means in a year, it almost 360 hours. Imagine the kind of stress and unnecessary burden the person is putting on their body. In-spite of all that the biggest mode of transport in India is-Roads. Almost 90% of the passenger and industrial transport is carried out through roads. The rapidly increasing population increases the traffic and good control on traffic is very necessary for safety and also reduces travelling time. Traffic solution which is available now a day and popularly using is good solution but not the best one. It slows down all the vehicles without considering their speed of vehicles. In short it's collective punishment to all vehicles and bad accessibility or dangerous traffic situation and an unsafe road. After slowdown of heavy vehicles and small vehicles also more time are require to regain their previous speed by vehicles in tern it increases traffic. The vehicles with slow speed also get shocks and vibration which the does not deserve.

2. COMPONENTS USED

We are used the readily available components for making this project. Components are following below.

2.1 Scissor Jack:

Screw jack along with electric motor can be used to load lifting easier. Screw jack is linked mechanically and also electronically and with advance in motion control.



Fig -1: Scissor Jack

2.2 Arduino Microcontroller

The Arduino Uno is a micro-controller board based on the ATmega328(data-sheet). It has 14 digital input/output pins(of which 6 can be used as PWM output), 6 analog input, a 16 MHz ceramic resonator, a USB connection, an ICSP header and a reset button. It contain everything needed to support the micro-controller; simply connects it to computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differ from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2(Atmega8U2 up to version R2) programmed as a USB-to-serial conv.



2.3 Relay

Relays are simple switches which are operated both electrically and mechanically. Relays consist of a n electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. But they differ according to their applications. Most of the devices have the application of relays.



Fig -3: Relay

2.4 Infrared sensors

Infrared sensors uses special sensors to modulate IR signals emitted from to IR transmitter and detect the modulated IR signal reflected back from near objects this sensor has built in IR LED driver to modulate the IR signal at 38KV to match built in detector. The modulated IR signal immunes the sensors from the interferences cause by the normal light of the sun light. The module will output a high if no object is detected and low if an object is detected.



2.5 Wiper Motor

Wiper motors are devices in the wiper system that functions on a power supply in order to move the upper platform of speed breaker in a smooth motion. Like other motors, the wiper motor rotates continuously in one direction which is converted into a back and forth motion. Its composition entails a lot of mechanical linkages each playing a role in initiating the movement. The gear head motor is the type of wiper motor known for its abundance in torque

3. WORKING PRINCIPLE

The IR sensors are installed before the Smart Speed Breaker at appropriate distance. As vehicle passes, it detected by first IR sensor and then by second. The distance between two IR sensors are known and from that we can calculate the speed of vehicle. A predetermine speed limit set into programme of Arduino microcontroller. If vehicle speed is exceeding the predetermine speed then Arduino microcontroller give input to Relay Circuit. Relay Circuit operate the wiper motor and rises the Smart Speed Breaker, thus giving physical remainder to driver for slow down. If speed of on-going vehicle is within the permissible limit then, the Smart Speed Breaker stays flat on road.

4. CONCLUSIONS

Smart Speed Breaker would prove to be a pivotal innovation in pedestrian safety, especially in school zones and roads with heavy pedestrian or vehicular traffic. The implicit speed enforcement and the savings in public spending thereby shall offset part of the costs associated with the installation of a new Smart Speed Breaker. The Smart Speed Breaker acts as a deterrent to speeding vehicles, which serves the purpose of its design. Perhaps more important, its effectiveness as a traffic calming device is independent of driver obedience. The selective deterrence ensures that law abiding drivers are not punished and thus keep from antagonizing them. The systems installation would thus be met with no or lesser public resistance compared to conventional bumps. The pre-emption system eliminates concerns related to bumps affecting emergency response times. The bump would cause fewer vehicles to brake and accelerate thereby reducing the pollution any other traffic calming device may create.

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DESIGN AND FABRICATION OF SELF RE-ENERGIZE E-VEHICLE PROTOTYPE ARRANGEMENT

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ABSTRACT

In this project we have done this to make self-re-energize E- vehicle through waste kinetic energy, Air is compressed with the help of vehicle Suspension system. When vehicle travel through bumpy road conditions, road dents including speed breakers at the time the damping moment utilized with the help of pneumatic suspension. The moment of pneumatic Suspension, compresses the air and the compressed air is sent through non return valve to pneumatic cylinder. In the process is continuously working to store air in cylinder. After the compressed air is taken from the pneumatic cylinder through regulator it allows the required pressure air is sent pneumatic driver. The pneumatic driver converts pneumatic energy into mechanical energy. The pneumatic driver is connected to generator throughout shafts. The generator produces electricity and the produced electricity is used to recharge the vehicle battery. This work is utilizing the best source of the energy which we get in our day-to-day life.

Keyword: - Regeneration, Electric current, Electric Motor, and Kinetic energy recovery system

1. INTRODUCTION

Fossil fuels are being consumed with very fast rate. Also, the cost of fuel is increasing with a very fast rate. Every need of a human being is indirectly related with the cost of fossil fuels like petrol, diesel and other hydrocarbons. So, we try to save the Fossil fuel consumption in our project work by increasing the electric vehicle efficiency.

Why do we use electric vehicles? In the future, electric vehicles will be the most used only electric vehicles and although electric vehicles do not use non-conventional fuel like petrol and diesel, they are indirectly dependent on them. Example: Over half of the country's Parentage electricity is generated by operating a coal power plant. Also, if electric vehicles are overused, the demand for electricity may the efficiency of electric vehicles through the Conventional method.

So, we develop electric vehicle efficiency in this project work. We have come up with an innovative solution to self-recharge the vehicle electric vehicles while it is still running or rest condition with the help of utilizing the pneumatic suspension motion



Fig -1: Line diagram

2. MATERIAL SELECTION

2.1 Spring

Steel alloys are the most commonly used spring materials. The most popular alloys include high-carbon (such as the music wire used for guitar strings), oil- tempered low-carbon, chrome silicon, chrome vanadium, and stainless steel.

Other metals that are sometimes used to make springs are beryllium copper alloy, phosphor bronze, and titanium. Rubber or urethane may be used for cylindrical, non- coil springs. Ceramic material has been developed for coiled springs in very high- temperature environments. One-directional glass fiber composite materials are being tested for possible use in springs.

2.2 Pneumatic air hose

Polyurethane (PU) tubing is a most common type of tubing used for pneumatic applications. The PU material makes it durables, gives it good resistance to kinks and abrasions, and it is readily available.

2.3 Non-return valve

Stainless Steel Nrv Valve is a non – return type valve that allows fluid flow in only one direction. Suraj Metal Corporationis a leading manufacturer and supplier of these in different Non Return Valve Material types. There are bronze and stainless steel materials used to make these valves.

2.4 Pneumatic driver

The materials used for making marine propellers are an alloy of aluminium and stainless steel. Other popular materials used are alloys of nickel, aluminium and bronze which are $10\sim15$ % lighter than other materials and have higher strength.

2.5 Generator

Electric generators are basically made of a rotor and a stator and materials used include magnetic steels and copper for wirings in electromagnet generators or steels, copper, boron, neodymium and dysprosium in permanent magnet generators.

3. WORKING

3.1 Fabrication process

The frame structure for the total units fabricated using square frames and L frames. These frames are made of mild steel. They are held to proper dimensions are attached to form a unit with the help of welding. The suspension is attached to the frame like vehicle chassis with the help of fascinators and the compressed air storage tank is attached to the front of the frame with the help of cylinder bed, and also the pneumatic valve, hoses and pressure gauge is connected with the help of connecters and clamps.

A special sect arrangement is made up of plywood. A 12v DC generator with pneumatic drivers placed within the seat and is held firm using bolts and nuts. The output wires are connected to the terminals of the DC generator and its other ends are connected to a Lead-Acid battery. In between the generator and battery, the diode is provides, it prevents the current flow in reverse direction.

3.2 Working principle

When vehicles travel through irregular road condition, road dents including speed breakers at the time the damping moment is utilized with the help of pneumatic suspension. The moment of pneumatic Suspension, compresses the air and the compressed air is sent through non return valve to pneumatic cylinder. The non-return valve which allows air at one direction it cannot allow the compressed air in reversed direction from pneumatic cylinder. And one pressure gauge is fitted in the storage tank it shows the compressed air pressure in the process is continuously working to store air in cylinder. After the compressed air is taken from the pneumatic cylinder through regulator, is allows the required pressure air is sent pneumatic driver. The pneumatic driver converts pneumatic energy into mechanical energy. The pneumatic driver is connected to generator throughout shafts. The generator produces electricity and the produced electricity is used to recharge the vehicle battery. This work is utilizing the best source of the energy which we get in our day-to-day life.



Fig -1: Design and fabrication of self re-energize e-vehicle protype

3.3 Advantages

- Minimize the fuel usage.
- Decrease the pollution of environment.
- Utilize waste kinetic energy.
- Reduce the vehicle running cost.
- Increase the vehicle efficiency.
- > This also acts as battery backup system.
- It confirms to save conventional energy source.

3.4 Application

- Small changes in construction and design of this set up can help to make the following future applications.
- > This project work to reduce electricity usage rural area.
- ➤ To promote the non-conventional energy source.
- ➤ To save conventional energy sources.
- To recharge the vehicle battery while vehicle running condition. It is very useful to save electric power .it reduces the operating cost of e-vehicles.
- > To produce electricity at cheapest cost.

3.5 Future Scope of the work

Nowadays electricity has become a necessity along with the other basic needs for the existence of life on earth. The population on our planet is increasing day by day. Due to this electricity is the most widely used and

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common resource of energy. There are few people who are still illiterate in rural areas and might find the usage of machines difficult and the energy produced might not be completely harnessed hence our system is fully automated and needs no men power. The natural resources likes water, wind etc., can be used to generate the electricity. But these resources developments require big plants and high maintenance cost. So, we need non- conventional energy like this system. Some developing countries and newly industrialized countries have several hours of daily power cuts in almost all cities and villages. People in these countries may use a power inverter or a diesel (or) petrol run electric generator at their homes during power cut. The use of standby generators is common in industrial and IT companies. In this project work is to generate electrical power through suspension system as a source of renewable energy that we can obtained while operating the e-vehicles certain arrangement.

4. CONCLUSIONS

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries. We are proud that we have completed the work with the limited time successfully. The DESIGN AND FABRICATION OF SELF RE-ENERGIZE E-VEHICLE PROTOTYPE ARRANGEMENT is working with satisfactory conditions. We can understand the difficulties in maintaining the tolerances and quality. We have done to our ability and skill making maximum use of available facilities. In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus, we have developed the project which helps to know how to achieve low-cost automation. The application of pneumatics produces smooth operation. By using more techniques, they can be modified and developed according to the applications.

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COMPARISON OF DIFFERENT CONVENTIONAL AND NON-CONVENTIONAL ENERGY SOURCES

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ABSTRACT

This paper presents a Comparison of Different Conventional and Non-Conventional Energy Sources Conventional energy sources and non-conventional ones are vital resources for domestic and commercial consumption. The high growth of the population and the wastage of resources are depleted by conventional sources. For this reason, non-conventional sources of energy are being developed and researched. Conventional sources are generally obtained from the earth's crest. Non-conventional energy sources are present in the environment such as sun, wind, water, biomass, etc. Most conventional energy sources pollute the environment and cause global warming.

Keyword: - wind power, solar power, tidal power

1. INTRODUCTION

Energy is the ability of a physical system to perform work. We use energy in our daily lives from various for doing work. We use muscular energy for carrying out physical work, electrical energy for running multiple appliances, and chemical energy for energy in its usable form.[1] This article will familiarize you with two important sources of energy.

Energy, in general, is defined as the source of power required by an object to perform a specific task. In the case of basic day-to-day activities, an energy source is essential for the basic functioning of modern society. [2] Depending on the type of source it is derived from, energy can be defined into two types conventional energy and non-conventional energy. Sun is the primary source of energy. Sunlight is a clean, renewable source of energy. It is a sustainable resource, meaning it doesn't run out, but can be maintained because the sun shines almost every day. Coal or gas are not sustainable or renewable: once they are gone, there is none left. More and more people are wanting to use clean, renewable energy such as solar, wind, geothermal steam and others. It is called 'Green Power. It lights our houses by day, dries our clothes and agricultural produce, and keeps us warm and lots more. Its potential is however much larger.

The wind is the natural movement of air across the land or sea. The wind when used to turn the blades of a windmill turns the shaft to which they are attached. This movement of the shaft through a pump or generator produces electricity.[3] The Potential for wind power generation for grid interaction has been estimated at 3,02,251 MW (MW taking sites having wind power density greater than 200 W/sq. m at 80 m hub-height with 2% land availability in potential areas for setting up wind farms @ 9 MW/sq. km. India now has the 4th largest wind power

installed capacity in the world which has reached 39990.10 MW (as of Oct 2021). Private agencies own 95 % of the wind farms in India.

The plants fix solar energy through the process of photosynthesis to produce biomass. This biomass passes through various cycles producing different forms of energy sources.[4] For example, fodder for animals that in turn produce dung, agricultural waste for cooking, etc. The current availability of biomass in India is estimated at 500 million MT per annum, with an estimated surplus biomass availability of about 120 - 150 million metric tons per annum covering agricultural and forestry residues. This corresponds to a potential of about 18,000 MW. An additional 9200.50 MWp of power was generated through bagasse-based cogeneration in the country's Sugar mills.

Bio-fuels are predominantly produced from biomass feedstocks or as a by-product from the industrial processing of agricultural or food products, or from the recovery and reprocessing of products such as cooking and vegetable oil. Bio-fuel contains no petroleum, but it can be blended at any level with petroleum fuel to create a biofuel blend. It can be used in conventional healing equipment or diesel engine with no major modification. Biofuel is simple to use, biodegradable, non-toxic and essentially free of Sulphur and aroma.

Water and geothermal the flowing water and the tides in the sea are sources of energy. India is endowed with a large hydropower potential of 1,45,320 MW. Heavy investments are made in large projects. In recent years, hydel energy (through mini and small hydel power plants) is also used to reach power to remote villages which are un-electrified. [5]The estimated potential of Small Hydro Power is about 15,000 MW in the country. As on Oct. 2021, the installed capacity of Small hydro projects (up to 3MW) amounts to 4821.81 MW.

Oceans cover 70 percent of the earth's surface and represent an enormous amount of energy. Although currently under-utilized, Ocean energy is mostly exploited by just a few technologies: Wave, Tidal, Current Energy and Ocean Thermal Energy.

Tidal Energy: The tidal cycle occurs every 12 hours due to the gravitational force of the moon. The difference in water height between low tide and high tide is potential energy.[6] Similar to traditional hydropower generated from dams, tidal water can be captured in a barrage across an estuary during high tide and forced through a hydro-turbine during low tide. The capital cost for tidal energy power plants is very high due to high civil construction and high power purchase tariff. To capture sufficient power from the tidal energy potential, the height of a high tide must be at least five meters (16 feet) greater than the low tide. The total identified potential of Tidal Energy is about 12455 MW, with potential locations identified at Khambat & Kutch regions, and large backwaters, where barrage technology could be used.

Wave Energy: Wave energy is generated by the movement of a device either floating on the surface of the ocean or moored to the ocean floor. Many different techniques for converting wave energy to electric power have been studied. Wave conversion devices that float on the surface have joints hinged together that bend with the waves. This kinetic energy pumps fluid through turbines and creates electric power. Stationary wave energy conversion devices use pressure fluctuations produced in long tubes from the waves swelling up and down. [8]-[10]This bobbing motion drives a turbine when critical pressure is reached. Other stationary platforms capture water from waves on their platforms. This water is allowed to run off through narrow pipes that flow through a typical hydraulic turbine. The total theoretical potential of wave energy in India along the country's coast is estimated to be about 40,000 MW – these are preliminary estimates. This energy is however less intensive than what is available in more northern and southern latitudes.

Current Energy: Marine current is ocean water moving in one direction. This ocean current is known as the Gulf Stream. Tides also create currents that flow in two directions. Kinetic energy can be captured from the Gulf Stream and other tidal currents with submerged turbines that are very similar in appearance to miniature wind turbines. Similar to wind turbines, the movement of the marine current moves the rotor blades to generate electric power.

2. SOURCE OF ENERGY

2.1 Conventional sources of energy

Conventional sources of energy are those energies that have been predominantly in use for the better part of civilization. They are non-renewable meaning that once a sample of a conventional energy source is used up, it cannot be used again. The most extensive kind of conventional energy source is fossil fuels. As the name suggests, fossil fuels are formed from the buried bodies of organisms by the natural phenomenon of anaerobic decomposition over thousands of years. Commonly used energy sources likes, petroleum, coal, natural gas and their derivatives such as kerosene, propane etc., are all examples of fossil fuels. Fossil fuels contain high percentages of carbon

because they are derived from carbon-based organisms. The extensive consumption of fossil fuels is problematic for two reasons: The amount of pollution caused by fossil fuels is very hazardous to the health of the environment, and because fossil fuels are not consumed at a sustainable rate so they cannot be replaced as fast as they are getting used up.

2.1.1 Coal

Coal is an ignitable sedimentary rock formed from the dead decays of vegetation. Coal is primarily composed of carbon with traces of other elements such as hydrogen, sulfur, oxygen, and nitrogen. The extensive usage of coal started with the arrival of the industrial revolution in the 18th century.



2.1.2 Petroleum

Otherwise known as crude oil, petroleum is a naturally occurring fuel source that is refined into different types of petroleum-based fuels after extraction. The method of fractional distillation is used to separate the different components of petroleum. Formed as a result of high pressure and strong temperatures on the dead and decaying matter of organisms like zooplankton and algae and extracted from under layers of sedimentary rock, petroleum is also an extensively used fossil fuel. Petrol, propane, kerosene, tar etc., are all derived from petroleum.

2.1.3 Natural gas

Natural gas is a hydrocarbon gas that contains methane and small traces of carbon dioxide, nitrogen, hydrogen sulfide, and helium. Natural gas in itself is a greenhouse gas that severely affects the environment once released into it. The end products obtained after burning natural gas like carbon monoxide, and sulfur dioxide are even more hazardous.



Fig – 2: Nuclear power plant

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2.2 Non-Conventional sources of energy

Non-conventional sources of energy are the up-and-coming energy sources that are much more sustainable than conventional sources of energy as their impact on the environment is significantly less hazardous. They are renewable sources of energy because, unlike non-renewable sources, they do not get depleted when used. With more awareness spreading worldwide about the adverse effects fossil fuels have on the planet, non-conventional sources of energy are being adopted at a fast rate.

2.2.1 Hydropower

The natural or artificial flow of water, even at a small rate, can be used to generate electricity. Though there are many types of hydropower, the most popular type and developed is hydroelectric dams and reservoirs. Hydroelectric dams are built atop rivers that have a decent flow of water. The natural flow of the river is then used to drive turbines that are connected to generators. When the turbines are rotated, electricity is produced by the generator, which is stored and then later transported for consumption.

2.2.2 Wind power

Windmills, also known as wind turbines, are placed in locations where there is a strong and constant flow of wind. The locations where many wind turbines are placed for the generation of electricity are called wind farms. The wind turbines have large blades connected to a generator. When there is a fast flow of wind, these blades are rotated, which is then converted to electricity. The electricity that the wind turbine can produce is directly proportional to the cube of the wind speed.



2.2.3 Solar power

Solar energy is one of the cleanest sources of energy, which is it has the most scope among other renewable energy sources. Solar panels that are made of semi-conductive materials known as photovoltaic cells are capable of converting light to electricity. Several panels are placed in the most optimum position so that sunlight falls on them constantly during the day. Solar panels are now being used in some households as a primary source of electricity and commercially in solar farms, which contain hundreds and thousands of solar panels.



Fig – 4: Solar power plant

2.2.4 Wave power

Wave power also called ocean wave energy, electrical energy generated by harnessing the up-and-down motion of ocean waves. Wave power is typically produced by floating turbine platforms or buoys that rise and fall with the swells. However, wave power can be generated by exploiting the changes in air pressure occurring in wave capture chambers that face the sea or changes in wave pressure on the ocean floor.

2.2.5 Tidal power

One type of tidal energy system uses a structure similar to a dam called a barrage. The barrage is installed across an inlet of an ocean bay or lagoon that forms a tidal basin. Sluice gates on the barrage control water levels and flow rates to allow the tidal basin to fill on the incoming high tides and to empty through an electricity turbine system on the outgoing ebb tide. A two-way tidal power system generates electricity from both the incoming and outgoing tides. A potential disadvantage of tidal power is the effect a tidal station can have on plants and animals in estuaries of the tidal basin. Tidal barrages can change the tidal level in the basin and increase turbidity (the amount of matter in suspension in the water). They can also affect navigation and recreation. Several tidal power barrages operate around the world. The Sihwa Lake Tidal Power Station in South Korea has the largest electricity generation capacity at 254 megawatts (MW). The oldest and second-largest operating tidal power plant is in La Rance, France, with 240 MW of electricity generation capacity. The next largest tidal power plant is in Annapolis Royal in Nova Scotia, Canada, with 20 MW of electricity generation capacity. China, Russia, and South Korea all have smaller tidal power plants.



Fig – 5: Tidal power plant

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3. COMPARISON

CONVENTIONAL SOURCES OF ENERGY	NON-CONVENTIONAL SOURCES OF ENERGY		
These sources of energy are also known as non- renewable sources of energy.	These sources of energy are also known as renewable sources of energy.		
They find both commercial and industrial purposes.	They are mainly used for household purposes.		
These can be considered to be one of the reasons for the cause of pollution.	These are not responsible for the cause of pollution.		
Conventional energy sources of energy available in limited quantities in nature.	These are available in abundance in nature.		
These sources take a longer period to form.	These sources can be formed in a short period.		
These sources shall exhaust one day.	Since they are renewable they will not exhaust.		
Energy density is high.	Energy density is less.		
They were obtained from the earth's crest.	They can be obtained from the environment such as sun, wind, water, etc.,		
Coal and fossil fuels are two examples	Wind, solar energy, and Biomass are two examples		

4. CONCLUSIONS

This paper is Compared Different Conventional and Non-Conventional Energy Sources. Conventional energy sources and non-conventional ones are vital resources for domestic and commercial consumption. Although, the high growth of the population is the wastage of resources have depleted conventional sources. For this reason, non-conventional sources of energy are being developed and researched.

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EXPERIMENTAL ANALYSIS ON MECHANICAL PROPERTIES OF NATURAL SISAL/JUTE FIBERS REINFORCED COMPOSITES

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ABSTRACT

Nowadays, scientist and engineers working in the field of materials are too concerned with sustainability issues and environmental protection. Therefore, environment friendly, natural, recycled, or biodegradable materials are attracting lot of interest. Due to environment friendly, biodegradability and sustainability, natural fiber composites are preferred as compared to conventional synthetic fiber based composites. They are used in diversified domains like building materials, structural purpose, aerospace industry, automotive industry and many other applications. Natural fibers are in considerable demand in recent years and play a key role in the emerging "green" economy. They are abundantly available, less costly, biodegradable, and easily recyclable and have low environmental impact. Lingo-cellulosic fibers have low density and sometimes process stiffness equivalent to glass fibers. Therefore, fiber reinforcement in polymeric composites is growing day by day.

Keyword: - Natural Fibers, Polyethene, Vegetable fibers, and heat deflection temperature.etc....

1. INTRODUCTION

In recent years the interest in composite materials is increasing due to its advantages as compared to synthetic fiber. Composite materials can be defined as engineered materials which exist as a combination of two or more materials that result in better properties than when the individual components are used alone. Composites consist of a discontinuous phase known as reinforcement and a continuous phase known as matrix. In practice, most composites consist of a bulk material the matrix, and a reinforcement of some kind, added primarily to increase the strength and stiffness of the matrix. NFCs are found to be new emerging material. An increasing amount of interest has developed over the past few years in NFCs, especially due to weight saving, low cost, and attractive look. Especially, Natural fibers such as Bamboo, Sisal, Jute, Hemp, jute, flax are showing good compatibility in automotive applications.

One of the reasons for this growing interest in natural fibers, as it has higher specific strength than glass fiber and a similar specific modulus. The energy consumption to produce natural fiber is far less than synthetic fiber. Example, for 1kg of jute fiber 9-12MJ/kg energy needed while for the same glass fiber, consume about 54.7MJ/kg energy. The main advantage of using natural fiber is they are biodegradable and recyclable, while synthetic fiber shows poor recyclable characteristics. Hybridization of sisal woven and jute fiber chosen considering its attractive look and low weight. So, an attempt has been made to study the mechanical properties of the sisal fiber, jute fiber and hybrid sisal fabric/jute fiber reinforced composites.

Aruna Santhi.K. et al.,[1] discussed the effectiveness of composite manufacturing has been a wide area of research and it is the preferred choice due to its superior properties like low density, stiffness, light weight and possesses better mechanical properties. This has found its wide applications in aerospace, automotive, marine and sporting industries. There has been continuous lookout for synthesizing composites without compromising on the mechanical and physical properties. In this research, fiber reinforced composites were prepared with jute fibers of fiber length 5–6 mm. The resins used in this study are polyester and epoxy.

Dhinesh Kumar.M. et al.,[2] made the work, the mechanical characteristics and free vibration behavior of Jute, Sisal and hybrid Sisal/Jute epoxy composites were investigated. A free Vibration test was conducted using the Impulse Frequency response test under a free-free boundary condition. Plain weave Jute and Sisal fabric were used in the ratio of 60:40. The hand fabrication method was used for fabrication, followed up with compression under the method. Alkaline treatment was carried out before fabrication to improve the interfacial strength between the matrix and fibers.

Kamalakannan.R. et al.,[3] investigated Ecological pollution is the most essential thing in the fast-growing world. Many scientists were concentrated to develop environmental pollution-free composite materials and products according to environmentally sustainable principles. So those synthetic fibers were replaced by natural fibers due to less expensive, easy availability, minimal waste removal difficulties, comparable strength, non-toxicity, and ecologically friendly environment

Kumar .A. et al.,[4] studied Preparation and Mechanical Properties of Jute Fiber Reinforced Epoxy Composites. There are considerable suggestions for the natural fibers that can be implemented in order to enhance their mechanical properties. Once the base structures are made strong, the polymers can be easily strengthened and improved.

Muhammad Yasir Khaild.et al.,[5] investigated Polymer-based composites have an exceptional perspective to replace traditional structural materials like steel and aluminum, owing to their low weight, high strength, and outstanding performance at elevated temperatures. However, the utilization of natural reinforcements for functional polymer composites is still in infancy. In this study, the tensile properties of natural and synthetic fibers-reinforced hybrid composites are reported. Glass-jute hybrid composites, prepared through hand layup technique, were used with different glass and jute fibers stacking sequences.

The reference number should be shown in square bracket [1]. However the authors name can be used along with the reference number in the running text. The order of reference in the running text should match with the list of references at the end of the paper.

Palani Kumar.K.et al.,[6] studied sisal fiber and jute fiber reinforced composites. Composites made from natural fibers possess favorable properties like low cost, light weight, high strength and eco-friendly nature compared to synthetic fibers. Structural applications such as aerospace and automobile industries moving towards the use of these natural composites. In this research work two lightweight composite materials were developed, one with a linear pattern and other with chopped pattern of sugarcane jute and sisal fiber reinforcements.

Ramesh Babu et al.,[7] discussed Sisal fibers composites became attractive due to their high specific strength, lightweight and biodegradability. The aim of this work is to examine characteristics of sisal fibers as composite material for light body vehicles on experimental basis. Composite materials prepared using biodegradable natural fibers are found to be most promising materials which can be used in vehicle body which results in reduction of overall weight of the vehicle. In this work sisal fibers was used. Sisal fibers was extracted using knife from the sisal plant leaves collected from Ethiopian highland.

1.1 Objectives

Assessment of mechanical behavior of sisal and jute fiber with epoxy resin and reinforced matrix composite materials. Effect of changing the mechanical properties for the reinforcement composites material like Tensile, Impact, Thermal Coefficient of Expansion and water absorption test has been performed on a specimen according to ASTM standard. Then compare with both of the result to increase strength given testing sample.

1.2 Problem Identification

Plastic pollution is the accumulation of plastic objects (e.g.: plastic bottles and much more) in the Earth's environment that adversely affects wildlife, wildlife habitat and humans. Plastics that act as pollutants are categorized into micro-, meso or macro debris, based on size. Plastics are inexpensive and durable, and as a result levels of plastic production by humans are high. Moreover, the chemical structure of most plastics renders them resistant to many natural processes of degradation and as a result they are slow to degrade. Together, these two

factors have led to a high prominence of plastic pollution in the environment. Shape design are not possible to design for manufacturing. Shape design are not strong and not strength.

1.3 Problem Solution

The Co-axial tensile property and other mechanical properties of these composite. There are many scopes to characterize of Tran- axial properties of Jute/ sisal fibre rein-forced composites. So it is decided to carry out research the topic of Co axial and Tran axial Tensile Properties of composite material and analyses the mechanical properties of flexural behavior, impact behavior, and compression behavior.

2. MATERIAL SELECTION

Natural fiber can be used in FRPs as continuous, randomly oriented or as a woven textile for reinforcement. Woven textiles are found to be more attractive as they provide excellent integrity and conformability for advanced structural applications. SISAL fibres Textile is available in various types such as plain woven, twill woven, satin etc. In present work, the plain-woven SISAL textile is used for reinforcement. SISAL fibre is a natural fibre with high strength, which can be blended easily with cotton fibres to produce blended fibre and textiles. SISAL fibre also finds use in high quality security/currency paper, packing cloth for agriculture produce, ships towing ropes, wet drilling cables etc. SISAL fiber is multiple celled structures.

2.1 Preparation of sisal and Jute fibers

The SISAL fiber treated with permanganate treatment, peroxide treatment, and alkali treatment and then kept in distilled water for 8h to wash out impurities on it. Then kept it for drying at ambient temperature for 48hours. They are widely used for different applications as Automotive Industry, Aerospace Industry, Building Industry, Furniture Industry, Bio medical Industry etc.

The need for lightweight, dimensionally stable materials for automotive and aerospace applications opened new frontiers of advanced materials.

Natural fiber composites are being used for manufacturing many components in the automotive sector. Typical market specification natural fiber composites include elongation and ultimate breaking force, flexural properties, impact strength, acoustic absorption, suitability for processing and crash behavior.

Plant fibers are mainly used in the part of car interior and truck cabins. The use of plant fiber based automotive parts such as various panels, shelves, trim parts and brake shoes are attractive for automotive industries worldwide because of its reduction in weight about 10%, energy production of 80% and cost reduction of 5%

2.2 Fiber Reinforced Composites (FRC)

The fibres as the discontinuous or dispersed phase. The matrix as the continuous phase and the fine inter phase region, also known as the interface.

FRC is high-performance fibre composite achieved and made possible by cross-linking cellulosic fibre molecules with resins in the FRC material matrix through a proprietary molecular re-engineering process, yielding a product of exceptional structural properties. Through this feat of molecular reengineering selected physical and structural properties of wood are successfully cloned and vested in the FRC product, in addition to other critical attributes to yield performance properties superior to contemporary wood.

This material, unlike other composites, can be recycled up to 20 times, allowing scrap FRC to be reused again and again. The failure mechanisms in FRC materials include delamination, intraluminal matrix cracking, longitudinal matrix splitting, fibre/matrix debonding, fibre pull-out, and fibre fracture.

2.3 Materials and Method

Primarily pulverized or crushed a coconut shell powder get mixed in Maida (additive) with the gluten to attain the properties of composite materials. Composite material such as (coconut shell powder and maida flour).

3. METHOD OF PRODUCTION

3.1 Compression Moulding Machine

In Compression moulding the composite material preheated, is first placed in an open cavity. The mould is closed with a top force or plug member, pressure is applied to force the composite material into contact with all mould areas, while are maintained until the moulding material has cured.

Sample with SISAL 10% + JUTE 20% + 70% E POXY RESIN

For fabrication of jute fiber reinforced composite jute fibers are chopped four layers, and mat is prepared in random oriented direction. Similarly, same procedure as well as sisal fabrication can be made. For hybrid samples, the plain-woven sisal fabric was placed at top and bottom. There are three different combination sample can be prepared.

a) Sample - 1 = SISAL 10% + JUTE 20% + 70% E POXY RESIN

- b) Sample 2 = SISAL 20% + JUTE 10% + 70% E POXY RESIN
- c) Sample 3 = SISAL 25% + JUTE 25% + 50% E POXY RESIN

3.2 Tensile Test

The sample was taken as per the ASTM 628 standard and tensile test was conducted in a universal testing machine. It is defined as the amount of tensile stress a material can withstand before breaking and denoted by s. The formula is: $\sigma = F/A$. Where, σ is the tensile stress. F is the force acting.



Fig – 1: Tensile test machine and specimens



Fig – 2: Tensile test specimen size & dimensions

It is calculated as the moisture content, which is equal to: (weight of the container with wet soil minus the weight of the container with dry soil) divided by (weight of the container with dry soil minus the weight of the container), then multiplied by 100 to express it as a percentage.

Sample No.	CS Area [mm²]	Peak Load [N]	%Elongation	UTS [N/mm²]
000001	150.000	2169.688	3.410	14.470
000002	150.000	2034.104	3.010	13.557
000003	150.000	1642.302	3.150	10.948
000004	150.000	2046.219	3.240	13.646

Table -1: Tensile Test Sample Load Values

4. CONCLUSIONS

The Mechanical properties of Jute/Sisal Fiber reinforced hybrid composites were studied, and the following conclusions are drawn. The jute, sisal fibers was successfully used to fabricate natural hybrid composites with 35% fiber and 65% resin; these fibers are biodegradable and highly crystalline with well-aligned structure. The co axial tensile strength of jute/epoxy and sisal fiber epoxy composite having compared to sisal epoxy the result was increased 32%. Hybrid composite the tensile strength is decreased. Compare to Tran axial loading and coaxial loading is a better result. The flexural strength of jute/epoxy composite improves by increasing fiber loading up to 35 wt%. Addition of sisal fiber decreases the tensile, flexural, compression and increases the Impact properties of composites. The tensile, flexural, and compression strength of jute fiber/epoxy composite are better than the jute fiber epoxy composites.

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HYBRID ELECTRIC VEHICLES AND BATTERY ELECTRIC VEHICLES

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Abstract: HEVs are vehicles propelled by more than one power source such as an engine and electric motor. They are classified by type and level. Advantages of HEVs are improved fuel economy, efficiency, and reduced emissions. The disadvantage of HEVs is cost. The cost aspect may be offset in years to come due to higher gas prices and improved HEV technologies. BEVs run only on electric power stored in the batteries and do not have an engine. They emit zero emissions from the vehicle and are more energy efficient than HEVs. However, BEVs must be charged from a plug, have a shorter driving range, and expensive batteries. Although some B Vs, such as the Tesla Model S, have a range as high as 265 miles on a full charge, most are limited to around 100 miles per charge. Despite this low range, in a study by the U.S. Department of Transportation Federal Highway Administration, "100 miles is sufficient for more than 90% of all household vehicle trips in the United States". Examples of BEVs on the market today are the Ford Focus EV, Nissan Leaf, Mitsubishi MiEV, and the Tesla Model S.

Keywords: Hybrid Vehicles, Battery Vehicles, Electrical Vehicle

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I INT ODUCTION

An electric vehicle is one that operates on an electric motor, instead of an internal c mbustion engine that generates power by burning a mix of fuel and gases.

A hybrid electric vehicle (HEV) augments an electric vehicle (EV) with a seco d source of power referred to as the alternative power unit (APU). A hybrid can achieve the cruising range and perfor ance advantages of conventional vehicles with the low-noise, low-exhaust emissions, and energy independence benefits of electric vehicles.

Accordingly, the hybrid concept, where the Accordingly, the hybrid concept, where the Alternative power unit is used as a second source of energy, is gaining acceptance and is overcoming some of the problems of Hybrid power systems were conceived as a way to compensate for shortfall in battery technology. Because batteries could supply only enough energy for short trips, an onboard generator, powered by an internal combustion engine, could he installed and used for longer trips.

be installed and used for longer trips.

II HYBRID ELECTRIC VEHICLES

Today's hybrid electric vehicles (HEVs) are powered by an internal combustion engine in combination with one or

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more electric motors that use energy stored in batteries. HEVs combine the benefits of high fuel economy and low tailpipe emissions with the power and range of conventional vehicles. The most common form of HEV is the hybrid electric car, although hybrid electric trucks (pickups and tractors), buses, boats and aircrafts also exist.

Parts of HEV

- Engine
- Electric motor
- Generator
- Battery
- Charger
- Radiator
- Fuel Storage

WORKING PRINCIPLE

Initially the vehicle is propelled by the help of electric motor instead of IC engine to avoid IDELING. When vehicle run and to overcome IDELING condition then the engine is start. During more acceleration the motor run combines with IC engines. The generator of the vehicle comes into action during coasting (do nfall of vehicle), cruising and breaking.



Fig.1 Electric CAR [1]

The power split device plays an important role in HYBRID ELECTRIC VEHICLE, because contain transaxle means (an integral driving axle and differential gear in a motor vehicle).

It divides energy into

- Driving Shaft.
- Generator.
- Motor.

Hybrid Electric Vehicle (HEV)



Fig.2 hybrid electric vehicle [2]

According to power train onfiguration Hybrid vehicle are two types

- 1. Parallel Hybrids.
- 2. Series Hybrids.

A. PA ALLEL HYBRIDS

A parallel Hybri has both an internal combustion engine and an electric motor is parallel connected for more propulsion.

- Here clutch is use because IC takes part for propulsion of vehicle.
- Electric motor is operating around the city, as well as in reverse gear, during reverse gear the speed is limited.
- For more acceleration the electric motor starts working in parallel with the IC engine to achieve more power.
- The battery can be recharged during regenerative breaking, coasting (during downfall) and during cruising (when the ICE power is higher than the required power for propulsion).





B. SERIES HYBRIDS

- The fuel goes to the engine, but the engine turns a generator.
- Electric motor is the only means of providing power to the wheels.
- Then the generator supply power to electric motor for propulsion of vehicle and some amount of energy store in battery by inverter.
- The IC engine does not directly power the car.
- When large amounts of power are required motor consume electricity from both the batteries and the generator.

III BATTERY ELECTRIC VEHICLE

A battery electric vehicle (BEV), pur electric vehicle, only-electric vehicle, fully electric vehicle or all-electric vehicle is a type of Electric vehicles (EV) that exclusively uses Chemical energy stored in rechargeable battery packs, with no secondary source of propulsion (e.g. hydrogen fuel cell, internal combustion engine, etc.). Their driving ranges on a full charge vary widely from about 80 to more than 300 miles, with considerably higher ranged electric cars coming soon.



Fig .4 Battery Electric vehicles [4]

- Electric motor
- Power inverter
- Power Converter
- Battery
- Battery Charger
- Charger Port

WORKING PRINCIPLE

Electric cars function by plugging into a charge point and taking electricity from the grid. They store the electricity in rechargeable batteries that power an electric motor, which turns the wheels. Electric cars accelerate faster than vehicles with traditional fuel engines – so they feel lighter to drive.

MAIN COMPONENTS OF ELECTRIC VEHICLES



Fig.5 Electric vehicle [5]

You can charge an electric vehicle by plugging it into a public charging station or into a home charger. There are plenty of charging stations around the UK to stay fully charged while you're out and about. But to get the best deal for home charging, it's important to get the right EV
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electricity tariff, so you can spend less money charging and save more on your bill.

ADVANTAGES

- Savings
- Low emissions
- Reduced noise pollution
- Low maintenance
- Safe to drive
- Electric vehicles are easy to driv and quite
- Convenience of charging at home
- Renewable electricity tariffs
- Better driving experience
- Spacious cabin
- More storage
- More convenient
- Popularity
- Battery life & cost

DISADVANTAGES

- Hybrids are more expensive than Non-hybrids.
- Hybrids (in regards to a car accident) have a much higher risk of exploding because it has a combination of gasoline and ethanol.
- Sometimes they can be pretty ugly.
- Parts can be very expensive to repair.
- Slower than petrol powered cars.
- Their batteries need rare metals
- There aren't enough charging points
- You can't drive as far in an electric car
- Making electric cars creates more emissions
- Longer recharge time
- Not suitable for cities, facing shortage of power
- Lower amount of choices
- Reduction in government grants

IV CONCLUSION

A Cooler, Cleaner and More Secure Future The technology exists to build a future with a significantly lower dependence on oil and a cleaner, cooler environment. With sufficient political will and automaker participation, this future can arrive in time to address these significant and growing problems. Hybrids can play an important role in realizing this future, filling the gap between immediate improvements through conventional technology and the longterm promise of hydrogen fuel cells and alternative fuels. Hybrids can help drive passenger vehicle oil consumption and global warming emissions from cars and trucks. The progress that the electric vehicle industry has seen in recent years is not only extremely welcomed, but

highly necessary in light of the increasing global greenhouse gas levels. As demonstrated within the economic, social, and environmental analysis sections of this webpage, the benefits of electric vehicles far surpass the costs. The biggest obstacle to the widespread adoption of electric-powered transportation is cost related, as gasoline and the vehicles that run on it are readily available, convenient, and less costly. As is demonstrated in our timeline, we hope that over the course of the next decade technological advanceme ts and policy changes will help ease the transition from traditional fuel powered vehicles. Additionally, the realization and success of this industry relies heavily on the global population, and it is our hope that through mass marketing and environmental education programs people will feel incentivized and empowered to drive an electric-powered vehicle. Each person can make a difference, so go electric and help make a difference!

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A REVIEW ON DIFFERENT POWER TRANSFORMERS

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Abstract: This paper presents a Review on Different Power Transformers. A transformer is a widely used device in the electrical and electronics domain. It is an electromagnetic device which follows the basic principle of electromagnetism discovered by Michael Faraday. We have covered about Transformers construction and operation in detail in previous tutorial. Here we will cover different types of transformers used in different types of applications. However, all types of transformers follow the same principles but they have different constru tion method. And with little bit of effort you can also build your own transformer, but while building the transformer one should always follow transformer protection techniques.

Keywords: Current Transformer, Current Transformer, Potential Transformer.

I INTRODUCTION

Power transformers are generally constructed to use the core part for maximum and will perform very much near to the apex of the B-H curve (Magnetic Hysteresis Loop). This takes down the mass of the core exceedingly. Typically, power transformers have the corresponding copper and iron wastes at a larger load. A transformer is a device used in power transmission to transfer electrical energy from one electrical circuit to another, or in multiple circuits at a time. In other words,[1]-[3] it is a voltage control device that is

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widely used in the distribution and transmission of AC power. These are made to increase or decrease the AC voltage between the circuits while controlling the frequency of the current by creating a conductive connection between the two circuits. This is done through the application of Faraday's law of induction which states that "the magnitude of the induced voltage in a coil is proportional to the rate of change of the magnetic flux which cuts across the coil". Transformer Types: Transformers are used in various fields like power generation grid, distribution sector, transmission and electric energy consumption. There are various types of transformers which are classified based on the following factors. Working voltage range, the medium used in the core, Winding arrangement, Installation location.

II POWER TRANSFORMER

A power transformer is a static machine used for transforming power from one circuit to another without changing the frequency. As there are no rotating or moving parts, a transformer is classified as a static device. Transformer operates on an AC supply. Transformers operate based on the princ ple of mutual induction.

The Power transformer is one type of transformer that is used to transmit electrical energy in any component of the electronic or electrical circuit between[4]-[6] the distribution primary circuits and the generator. These transformers are utilized in distribution networks to

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interface step down and step up voltages. The usual form of power transformer is fluid immersed, and the life cycle of these instruments is approximately 30 years. Power transformers can be divided into three types according to the ranges. They are large power

Transformers are medium power transformers, and small power transformers.



Fig.1 132KV Power Transformer

Use of Power Transformers:

Generation of electrical power in low voltage level is very much cost effective. Theoretically, this low voltage level power can be transmitted to the receiving end. This low voltage power if transmitted results in greater line current which indeed [7]-[9] causes more line losses. But if the voltage level of a power is increased, the current of the power is reduced which causes reduction in ohmic or I²R losses in the system, reduction in cross-sectional area of the conductor i.e. reduction in capital cost of the system and it also improves the voltage regulation of the system. Because of these, low level power must be stepp d up for efficient electrical power transmission. This is done by step up transformer at the sending side of t e power system network. As this high voltage power may not be distributed to the consumers directly, this must be stepped down to the desired level at the receiving end with the help of step down transformer. Electrical power transformer thus plays a vital role in power transmission.

Two winding transformers are generally used where ratio of high voltage and low voltage is greater than 2. It is cost effective to use auto transformer where the ratio between high voltage and low voltage is less thar 2. Again a single unit three phase transformer is more cost effective than a bank of three single phase transformers u rit in a three phase system. But a single three phase transformer unit is a bit

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difficult to transport and have to be removed from service entirely if one of the phase winding breaks down.

Power Transformer Design he structure of the power transformer is modelled with metal that is covered by sheets. It is fixed into either a shell type or core type. The structures of the transformer are wound and attached, employing conductors to produce three 1-phase or one 3phase transformer. Three 1-phase transformers need each bank isolated from the extra parts and thus provides continuity of service once one bank flops. A single 3-phase transformers, whether the core or shell type, will not perform even with one bank out of service. The 3-phase transformer is cost-effective to produce, and it has a lower footprint and operates comparatively with higher efficiency. Power Loss in Transmission Lines: There are several reasons for employing a power transformer in electrical power networks. But one of the most essential reasons for using this device is to decrease power losses during electric transmission applications. Now let's explore how power wastes are considerably reduced by employing a power transformer:

First, the equation of Pow r waste is $P = (1) \land (2) P P = 72P$

$\mathbf{P} = \{\mathbf{I}\}^{\mathcal{A}}\{\mathbf{2}\} \ \mathbf{R}P = I\mathbf{2}R$

Here I is the current across the conductor, and R is the resistance of the part.So, power waste is directly related to the square of the current moving across the Conductor or transmission line. So, the lower the magnitude of current flowing within the conductor, the lesser the power wastes. How we will take advantage of this phenomenon is discussed below:

Take initial voltage is 100V, load draw is 5A, and power delivered is 500watt. Then transmission systems here should carry a current of magnitude 5A from the supply to load. But if we step up the voltage at the first section to 1000V, then transmission systems only should carry 0.5A to deliver the identical p wer of 500Watt. Xanax without prescription .So, we will step up the voltage at the

primary stage of the tra smission system using a power transformer and employ another power transformer to step down the output at the end of the transmission network. With this configuration, the magnitude of current moving across the +100Kilometer transmission system is decreased considerably, thereby dr, pping the power waste during transmission.

Difference between Power Transformer and Distribution Transformer

The power transformer is commonly performed in full load since it is modeled to have high efficiency at 100% load. Otherwise, the distribution transformer has high efficiency once the load stays

The power transformer is usually operated in full load because it is designed to have high efficiency at 100% load. On the other hand, the Γ istribution transformer has high efficiency when the load stays between50% and 70%. So,

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distribution transformers are not desirable to operate at 100% load constantly. Because power transformers lead to large voltages during step-down and step-up, the windings have great insulation when compared with distribution types or instrument transformers. Since they apply high-level insulation, they are very massive in size and are also too heavy. Since power transformers are usually not connected to homes directly, they experience less load fluctuations, while on the other have distribution transformers experience heavy load fluctuations. These are loaded fully for 24 hrs a day, so copper and iron losses take place throughout the day and they stay very much the same the entire time. The flux density in the Power Transformer is higher than the Distribution Transformer.



Fig.2 Power Transformer

Low maintenance, high performance, digital and environmental-friendly designs

DIGITIZED POWER TRANSFORMERS

- · Continuous & intelligent bushing monitoring
- Online gas analysis of up to / fault gases plus oxygen & moisture
- Constant temperature monitoring for winding hot spots
- Fast tripping with unrestrained differential element DESIGNED FOR RELIABILITY
 - Design verified with sophistic ted validation & analysis software
 - High short circuit withstandWide range of options for HV/MV bushings

HIGH PERFORMANCE

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- High efficiency cooling system with speed controllable fans
- Minimizing losses & noise level
- Leakage flux control reduce stray losses & hot spots

ADVANCED DESIGN & TESTING

- Extensive testing capabilities with in-house developed design rules & software
- Strong contribution to industry & standardization organizations (i.e: CIGRE & IEEE)

State-of-the-art s ftware & design analysis tools

Applications of Power T ansfer

The power transformer is mainly used in electric power generation and at distrib tion stations. It is also used in Isolation transformers, earthing transformers, six pulse and twelve Pulse rectifier transformers, solar PV farm transformers, wind farm transformers and in Korndörfe., autotransformer starter.

- 1. It is used for red cing power losses during electric power transmission .
- 2. It is used for high voltage step-up and high voltage step-down.
- It is preferred during long-distance consumer cases.And preferred in cases where load runs at full capacity 24x

Rated Power	3 M A up to 200 MVA	
Primary Voltages typically	11, 22, 33, 66, 90, 132, 220 kV	
Secondary Voltages typically	3.3, 6.6, 11, 33, 66, 132 kV or custom specification	
Phases	Single or three-phase transformers	
Rated frequency	50 or 60 Hz	
Tapping	On-load or off-load tap changers	
Temperature rise	60/65Corcustom specification	
	ONAN (oil natural air natural) or	
Cooling type	other types of cooling such as KNAN (max 33kV) on request	
Radiators	Tank-mounted cooling radiator panels	
Vector groups	Dyn11 or any other vector group as per IEC 60076	
Voltage	Via on-load tap changer (with AVR	
regulation	relay as standard)	
HV & LV terminals	Air cable box type (33kV max) or open bushings	
Installations	Indoor or Outdoor	
Sound level	As per ENATS 35 or NEMA TR1	

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Difference Between Current Transformer (CT) & Potential Transformer (PT)

The electrical instruments are not directly connected to the meters or control apparatus of high voltage for safety purpose. The instrument transformers like voltage transformer and current transformer are used for connecting the electrical instruments to the measuring instruments. These transformers reduce the voltage and current from high value to the low value which can be measured by conventional instruments.

The construction of the current and potential transformer is similar as both have the magnetic circuit in their primary and secondary winding. But they are different in the method of working. There are several types of differences between the voltage and the current transformer. One of the major differences between them is that the c rrent transformer converts the high value of current into low value whereas the potential or voltage transformer conv rts the high value of voltages into low voltage. Some between the current and the potential explained below in the comparison chart.

III CURRENT VS POTENTIAL TRANSFORMER

Basis for	Current	Potential	
Comparison	Transformer	Transformer	
	Transform the	Transform the	
	current from high	voltage from high	
Definition	value to the low	value to the low	
	value.	value.	
Circuit Symbol	Ip I Is C. T C. T C. C. T		
Core	Usually built up with lamination of silicon steel.	It is made up of with high quality steel operating at low flux densities	
Drimary	It carries the	It arries the voltage	
Winding	current which is to	which is to be	
winding	be measured	measured.	
	It is connected to		
Secondary	the current	It is connected to the	
Winding	winding of the	meter or instrument.	
	instrument.		
	Connected in	Connected in parallel	
Connection	series with the	with the instrument	
	instrument		
Primary	Has a small	Has a large number	

Circuit	Circuit number of turns of turns	
Secondary Circuit	Has a large number of turns and cannot be open circuit.	Has a small number of turns and can be open circuit.
Range	5A or 1A	110v
Transformatio n Ratio	High	Low
Burden	Does not depends on secondary burden	Depends on the secondary burden
Input	Constant current	Constant Voltage
Full line current	The primary winding consists the full line current.	The primary winding consists the full line voltage.
Types	Two types (Wou d and Closed Core)	Two types (Electromagnetic and Capacitor voltage)
Impedance	L w	High
Applications	Measuri g current and power, monitoring the power grid operation, for operating protective relay,	Measurement, power source, operating protective relay,

The current transformer transforms the high value of current into the low value so that it can conveniently measure by the instrument whereas the potential transformer converts the high value of voltage into low value.

- The primary winding of the current transformer is connected in series with the transmission line whose current is to be measured whereas the potential transformer is connected in parallel with the line.
- The core of the current transformer is built up with the laminations of the stainless steel. The core of the potential transformer is made up with high operating core operating at low flux densities.
- The primary wir ding of the current transformer carries the current which is to be measured whereas the prim ary of the potential transformer carries the voltage.
- The primary winding of the current transformers has a small number of turns, whereas in potential transformer the primary winding has a large number of turns.

- The secondary of the current transformer has a large number of turns, and it cannot be open circuited when it is under the services. The secondary winding of the potential transformer has a small number of turns, and it can be open circuit during the services.
- The normal range of the current transformer for measuring the current is 5A or 1A whereas the standard voltage at the secondary winding of the potential transformer is up to 110V.
- The transformation ratio of the current transformer is always remained high, whereas for the potential transformer its remains low.
- The input of the current transformer is the constant current, whereas the input of the potential transformer is the constant volta e.
- The primary winding of the c rrent transformer does not depend on the burden of the secondary winding of the transformer; it depends on the current flows in the primary windings whereas the primary of the potential transf rmer depends on the burden of the secondary winding.
- The primary winding of the current transformer is directly connected to the full line current whose current is to be measured whereas in potential transformer the full line voltage is directly connected to the primary terminal.
- The impedance of the primar transformer is very low as secondary winding whereas transformer, the impedance of the primary winding is high.
- The current transformer is measuring such magnitude of meter or instrument cannot measured whereas the potential transformer is used for measuring the high voltage o the current.

IV CONCLUSIO

Transformers meet wide varieties of needs. Some transformers are huge and typically are found at a generating station, whereas some are small enough to be used with charging cradles. Whatever shape or size it may have, the purpose of a transformer remains the same i.e. transferring the electrical power from one to another type.

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LIVE AUGMENTED REALITY ACROSS THE CAMPUS

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ABSTRACT

Campus tours are among the opportunities for college and universities to show their environment facilities and achievement to the visitors or prospective students. The technology of augmented reality(AR) enhances the real world environment with virtual information by embedding virtual objects in the real world to enhance the user's requirements. The purpose of this project is to build a mobile AR application in order to get navigation of the campus. Many universities are utilizing this technology as a mobile campus touring application to make the visitors become familiar with the campus through the self-guided devices. This project application helps the users to find the location and route to the place in virtual tour.

Keyword: - Android application, Android phone, Augmented Reality, Location, Navig tion etc

1. INTRODUCTION

University or college usually has umerous buildings to accommodate the getting to know activities for heaps of students from various faculties and departments. The big location of campus some instances make visitors quite effortlessly get lost amid all of the homes [1]. To resolve this problem, the college events typically held a campus excursion activity to reveal their surroundings, centers and success to the site visitors or new who first time come to the campus. Traditionally, a campus tour requires someone who is aware of properl approximately campus to manual and tells the records to the traffic while strolling around the campus. However, it's no longer usually possible for visitors to consider all of the information and emerge as acquainted with the campus throughout the only-day tour. Fortunately, the development of technology have brought a brand new manner for campus excursion via utilizing the augmented reality technology and permit the visitors familiarize th mselves with the campus through self-guided devices [1]. Augmented Reality (AR) is a discipline of pc studies that goals to supplementing reality by way of blending computer generated information and real global environments [2]. AR combines the virtual gadgets or the data to the real surroundings through the computer images generat on which makes the digital

gadgets seem to originate from the existing surroundings [3]. In the cutting-edge, A can be used with mobile devices, in conjunction with big use and emergence of telephone and pill from a decade earlier. Through the prototyping and visualization of products, many universities are offering AR as a camp s traveling systems, and in this manner permitting site visitors, new students, or maybe the possible college students to become acquainted with the campus surroundings. This paper presents a survey of numerous cell campus tour software based totally augmented truth, the implementation, and the functions of each utility.

Problem Statement

There are some issues that cause students and teachers to miss or delay classes. These issues are also faced by non academic staff members. Issues include having difficulty getting some information about the college buildings and different rooms. Lecturers need to know whether a classroom is available or occupied by another staff. Lecturers lose their time if the laboratories have contacting staff or academic members, and some students do not know how to contact staff, so they must return to the staff offices again and again. Finally, people who are new to the college

campus have trouble locating their labs or classes as well as finding academic members' names and office locations, and admin sections.

Problem Solution

To solve the identified problems, a proposal of creating a mobile application to provide a new innovative way to acquire information about the College. The doors of classes and laboratories will have certain QR codes on them which the user can scan with the help of the camera option in this application which will show him all the information that he/she wishes to see. All the additional information such as email, phone numbers, or office hours of a specific staff member will be shown on the application. This application is helpful to both students and staff members and will also save their time as all the necessary information will be available in seconds. Also besides, making use of new and advanced technology can save ink and paper products.

2. AUGMENTED REALITY FOR CAMPUS TOUR

The implementation of AR technology for campus tour purposes was initiated by at Columbia University. This first outdoor AR system uses a head-mounted display (HMD) with GPS and orientation tracking to presents 3D graphical tour guide information to campus visitors, registered with the buildings and artifacts the visitor sees. It is required a backpack to holding a computer, various sensors, and an early tablet computer for inp t. However, the heavy AR technologies such as HMD and co puter are not easy to handle, and that AR technologies should be developed to be smaller, lighter, more portable, nd fast enough to display graphics. Further develop ent of AR for campus tour purposes leads to mobile application along with the increasingly sophisticated capabilities of mobile devices. Smartphone and tablet have creat d new possibilities to optimize content that engages campus visitors in more innovative ways. There are many mobile AR applications developed for the campus tour purposes at various universities and some of them are ritten in journal articles. The following is a table of relevant past literature about the use of mobile AR as a campus tour application that taken from several databases such as IEEE, Scopus and Science Direct.

Features in Mobile Augmente Reality Campus Tour

Content and media is the key when creating meaningful campus tour application. The effective and user-centered campus tour application is not only provide users with the environmental informati n, but also allow users to quickly access useful features and increase environmental awareness. Based on the table of previous literature above, there are several useful features that can be applied to mobile AR campus tour ap lication, and in this section we will discuss each of these features.

Navigation within Campus Area

Navigation feature is another important point for a campus tour application to help the users find their destination, since the cam pus normally has a large area and consists of various buildings. Most of applications that have this feature and still rely on third-party map application which means that the navigation provided is not overlaid into the existing reality. However, there are some applications that provide different navigation experience. Sun map provides 3D navigation indicators that can be viewed real time on the smart phone camera. Another application provides radar to scan various POI t campus within 100 meters radius.

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3. METHODOLOGY, DESIGN & TOOLS

To develop a system, choosing a appropriate methodology is important. The methodology provides the basic guidelines that will guide the developer to accomplish the project task. This section, which is the best methodology need to be applied to this project are discussed. This project involves heavy user interaction thus is more suitable to use the prototyping approach. A prototype will be developed based on the known requirements of the system so that with the prototype the client has a basic idea of how the completed product will look like. The interactions with the client can have a better understanding of the requirements of the desired system. Normally, the prototype is not a complete system and there are some of the features that are not built in the prototype. The objective of the prototype is to deliver a system that can provide basic functionality.



ANDROID STUDIO

Android studio provides a unified environment where you can build apps for android phones, tablets, android wear, android TV and android auto. A flexible Gradle-Based build system and a fast and feature-rich emulator. The unified environment where you can develop for all Android devices. Apply changes to push code and resource changes to your running app without restarting your app. Code templates and GitHub i tegration to help you build common app features and import sample code. Extensive testing tools and frameworks. Lint tools to catch performance, usability, version co patibility, and other problems.



Fig -2 Android Studio Code

HARDWARE

Operating System	Updated new android version in mobile
	& windows 10 64-bit in Computer

CPU	Intel Core i3-7020U @2.30 GHz
GPU	NVIVIA GeForce GT 650M
RAM	4GB

Table -1: HARDWARE COMPONENTS

4. CONCLUSIONS

This paper presents a survey of various mobile AR campus tour applications along with the features of each application. The main purpose of mobile AR campus tour is to provide the infor ation about campus with innovative approach and allowing the user to become familiar with the campus envi onment. There are several commercial navigation applications - such as Google Maps, Yahoo Maps and MapQuest that provide users with directions from one place to another. However, these applications must search along existing roads; they will not able to provide routes that are as precise as an on-campus path would require. Real-ti e mapping can effortlessly make the visitors reach any location inside the facility within a stipulated time. Also, this feature affects the productivity of the facility in the long run, having real-time information on our Smartpho e screen.

5. ACKNOWLEDGEMENT

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DESIGN AND FABRICATION OF EYE BLINK BASED ACCIDENT AVOIDING SYSTEM

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ABSTRACT

Accidents due to drowsiness can be controlled and prevented with the help of eye blink sensor using IR rays. It consists of IR transmitter and an IR receiver. The transmitter transmits IR rays into the eye. If the eye is shut, then the output is high. If the eye is open, then the output is low. This output is interfaced with an alarm inside and outside the vehicle. This module can be connected to the braking system of the vehicle and can be used to reduce the speed of the vehicle. The alarm inside the vehicle will go on for a period of time until the driver is back to his senses. If the driver is unable to take control of the vehicle after that stipulated amount of time, then the alarm outside the vehicle will go on to warn and tell others to help the driver. Accident due to cause of drowsy is controlled the vehicle. The term used here for the realization that the drivers drowsy is by using eye blink sensor of the driver. In recent times drowsiness is one of the major problem of highway accidents. These types of accidents occurred caused by drowsy and driver can't able to control the vehicle, when the driver wakes. The drowsiness is indented by the eye blink closure and blinking frequency through infrared sensor worn by driver by means of spectacles frame or IRS. If the driver is drowsy, then the system will give buzzer and the speed of the vehicle is reduced in 3 to 5 sec

Keyword - Eye blink sensor, Drowsiness, IR sensor, Microcontroller Based Implementation, Software Implementation, Design Procedure.

1. INTRODUCTION:

This project involves measure and controls the eye blink & alcohol content using IR sensor & alcohol detector. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye is closing or opening position. Alcohol detector detects the content of alcohol in the breath and thus it attempts to clamp down alcoholics. This system uses microcontroller, LCD display, alcohol detector, GSM and buzzer. The output of the sensor is directly proportional to the content of alcohol consumed. This output is given to logic circuit to indicate the alarm. This project involves controlling accident due to unconscious through Eye blink & alcohol detector. Here one eye blink sensor and alcohol detector is fixed in vehicle where if anybody loses conscious and indicate through alarm, LCD and GSM. The circuit has an alcohol sensor. This sensor measures the content of alcohol from the breath of drunken people. Output of the sensor is directly proportional to the sensor is directly proportional to the alcohol sensor. When the alcohol molecules in the air meet the electrode that is between alumina and tin

dioxide in the sensor, ethanol burns into acetic acid then more current is produced. So the more alcohol molecules more will be the current produced. Output of the sensor is then fed to the microcontroller for comparison. The output of the sensors are in the analog nature which should be converted into digital format. This is done by the analog to digital converter of the microcontroller unit. The microcontroller controls the entire circuit. The LCD displays the message, GSM sends message and buzzer produces alarm. The working conditions and various constraints were properly studied before carrying out further step.

FUNCTION:

The project involves preventing accidents due to drowsiness in vehicles by using eye blink sensor. The IR transmitter transmits infrared rays into the eyes. The ray reflected from the eye is picked up by the receiver which is in a straight line to the transmitter. Depending on the output of receiver, we get to know whether the eye is in an open or closed position. Another extra feature is the alarm system. There are two alarms. One inside the vehicle to alert the driver and another outside to alert the people in the vicinity of the vehicle. If the eye is in a closed position, then the output is high. This output activates the corresponding pin in the microcontroller and sets off an alarm. The alarm continues to ring until the driver takes necessary steps to take control of the vehicle. If after a stipulated amount of time, the driver is unable to take control of the vehicle, then the microcontroller which is linked to the braking system, slows down the vehicle. An external alarm goes off indicating people to help the driver in the vehicle.

COMPONENTS:

The block diagram mainly consists of parts.

- Eye Blink Sensor (IR).
 - To sense the duration and frequency of eye blinks.
- LM358 Comparator
- LCD display
- 8051 Microcontroller
- Buzzer (Piezo)

2. PROJECT SCOPE:

We cannot take care of our self while in running while being less conscious. If we equip all vehicles with automated security system that provides high security to driver with alms, we can provide more security. All vehicles should be equipped with eye blink sensor in future to avoid these types of accidents.

TESTING:

For unit testing the following contents are suggestive testing strategy in the system:

- > The design description characteristics and source code for each module to be trialed are first reviewed.
- > An evaluation committee is responsible for validation of the Unit Test Plan.
- > A trial "stub" is created to allocate input to or fetch output from the trial module.
- > The code is then compiled in the trial environment to check for any anomalies.
- > The trials are executed and data received out of the verified software are compared with the expected, as recorded in the Unit Test Plan.
- > The code is retested and results are recorded, when an updated version is available.
- > Final report form archived from that unit is said to have cleared all trials.
- > Every possible tweaks/ related to software requirements and draft documents are provided.
- > The owner's phone receives an audio warning message.
- > The owner can retrieve the location of the driver by choosing the -location option.
- > The owner can also get a list of driver's nearby police stations. With this, the photograph of the driver can be sent to owner's email address as specified in the clamped phone.
- > The wheel/motor is stopped as soon as an accident occurs, the vibrator in the eye blink sensor frame vibrates and displays a message on the LCD.
- > When the driver falls asleep, the vibrator vibrates and the LCD displays the message. Along with this, the vehicle speed is automatically reduced.

- > When the accelerometer is tilted randomly, that acts as the steering, a message is displayed on the LCD the speed of the vehicle is reduced.
- > With all of the above mentioned, the android applications send and receives details simultaneously.

3. PLAN METHODOLOGY:

The concept of drowsy driver detection system focuses on the functioning of all sensor modules used in the project. This helps explain the inputs received by modules and the outputs they produce.

FEATURES:

- > 4K Bytes of In-System Reprogrammable Flash Memory (Endurance: 1,000 Write/Erase Cycles)
- Fully Static Operation: 0 Hz to 24 MHz
- > Three-Level Program Memory Lock
- > 128 x 8-Bit Internal RAM
- > 32 Programmable I/O Lines
- > Two 16-Bit Timer/Counters
- Six Interrupt Sources
- Programmable Serial Channel
- Low Power Idle and Power Down Modes

SYSTEM ARCHITECTURE:

Drowsy driver detection system is divided into subsystems and these sub systems gives some interconnected services.



FIG-1

4. CONCLUSION:

Nowadays, people have become more prone to accident. So, we as an engineer need to take some action against this and provide the desired solution. For the safety of the human being some automation is made. The purpose of such a model is to advance a system to detect fatigue symptoms in drivers and control the speed of vehicle to avoid accidents. Advanced technology offers some hope avoid these up to some extent. This project involves measure and controls eye blink using IR sensor. By observing the working of EBM system, it is found that while driving when the driver wears the goggle with IR sensor. 1. The normal blinking rate of eye is not affected. 2. When the driver is awake, the system will be in standby mode. 3. When the driver tends to sleep, the system sounds an alarm, causing the driver to wake up & concentrate on driving.

5. ACKNOWLEDGEMENT:

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EFFECT OF BLENDING RATIO ON THE BENDING PROPERTY OF COTTON AND BAMBOO MIXED FABRIC

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ABSTRACT

For similarly utilizing the traits of bamboo fibers and growing quality fabric fabric, we've got designed and advanced 15 types of combined fabric with specific specs via way of means of the use of 5 types of mixing ratio of bamboo/cotton warp and filling. The drape, inflexible flexibility, and crease resistance have been tested. The consequences confirmed that the cotton and bamboo/cotton combined material has higher drape, inflexible flexibility and crease resistance than the natural cotton material. With boom of bamboo fiber content material with inside the filling, the static and dynamic drape coefficient of the combined material decreased, even as the drapability and shape improved. The bending pressure and bending modulus of elasticity decreased, and the softness improved. Elastic restoration perspective increased, and crease and distort density have been the same, the drape and inflexible bendy decreased, and each the short and gradual elastic restoration exhibited a downward fashion with boom of weft density. When the mixing ratio of bamboo/cotton combo filling becomes 55/45, the symmetry of the material shape become badly and care need to be taken while selecting this ratio.

Keywords: Blending ratio, Draping, Rigid flexibility, Bending performance, Cotton, Bamboo

1. INTRODUCTION:

Blending is completed to provide a material, which is cost-effective with the aid of using combining the classy consolation houses of the herbal fibers with the smooth care and energy houses of artificial fibers. Blending also enables to provide a mild weight material with all desirable traits with the aid of using enhancing spinning, weaving and completing efficiency, and the uniformity of product1-6. Human frame is cooled with the aid of using evaporation of liquid sweat from the pores and skin floor lowering frame temperature. There are exclusive mechanisms hired in liquid and vapor switch in textiles. Moisture transmission via fabric substances has been identified as an crucial aspect in lots of applications, which includes sportswear, shielding wear, fabric processing and cleaning, composite manufacturing - resin

switch via the plays in mould filling and in lots of other areas. Fabric liquid moisture shipping houses in multi-dimensions have an effect on the human notion of moisture sensations and luxury significantly.

Moisture control is one of the key overall performance standards in today's garb industry, which comes to a decision the consolation degree of that material. Moisture control may be described as the managed motion of water vapor and liquid water (perspiration) from the floor of the pores and skin to the surroundings via the material. This motion prevents perspiration from final subsequent to the pores and skin. 10 pronounced an experimental examine at the impact of fiber pass sectional form and fiber diameter on moisture transmission houses of the material. They discovered that the fiber diameter performs an crucial position in moisture transmission via fabric. It is likewise crucial to reduce the degradation of thermal insulation prompted by moisture build-up.. The gift examines goals to research the liquid moisture control houses of bamboo/ cotton knitted fabric in relation with unique blend ratios.

2. MATERIALS AND METHODS:

Regenerated bamboo fibers, used within side the production of the yarn and cloth samples, have been received from a spinning mill. The fiber homes have been: suggest duration 36 mm, fiber fineness 1.52 dtex, linear density 0.155 tex, moisture regain 11.42%, tenacity 22.eighty four g/tex and elongation 21.2%. The Sankar-6 cotton fiber, having the characteristics including fiber duration 27.27 mm, fiber duration uniformity ratio 49.58%, fiber fineness 4.fifty two micrograms/in, fiber adulthood 82.fifty three% and trash content material 0.19%, changed into used. Besides getting ready 100 bamboo and 100% cotton yarns, combined yarn (50:50 bamboo: cotton) changed into also organized for the study (Table 1). It have to be emphasized that the bamboo fibers are the cellulose fibers product of bamboo pulp. It changed into ensured that everyone the yarns produced had the identical suggest linear density of 29.fifty three tex (unmarried), 14.seventy six tex (plated) and 2/14.seventy six tex (double). The above yarns have been used to provide unmarried jersey fabric on Knitmac unmarried jersey knitting system of the subsequent details: version 2006, gauge 24 G, diameter sixteen inch, pace 27 rpm, feeders 21 and variety of needles 1200. The ambient knitting-room environment had a humidity of 65% and a temperature of $30 \pm 2^{\circ}$ C. All samples have been produced with three mm loop duration. The knitting technique changed into finished with regular system settings and the samples have been kept below in general environment for forty eight h to permit relaxation and conditioning. The samples have been scoured at 40 °C for 30 min the usage of artificial detergent, accompanied by rinsing for the identical time period. After the washing technique finished, the samples have been dried.

3. TESTING:

For dimensional homes, the variety of wales and publications in keeping with inch has been measured. The suggest values of variety of wales and publications in keeping with inch have been decided through taking 10 measurements from different regions of every fabric. Fabric thickness changed into measured on SDL virtual thickness gauge in step with ISO 5084 standard. The porosity of the samples changed into calculated through the approach utilized by Majumdar ET al.14. The bodily homes of the fabric, such as thickness (mm) and weight in keeping with unit area (g/m2). The moisture management homes of the bamboo/cotton mixed yarn knitted fabric have been evaluated the usage of moisture management tester (MMT) from Atlas, which contained top and decrease concentric moisture sensors, enclosing the knitted sample7, 8. Based at the signal, a hard and fast of indexes changed into calculated, the descriptions of

which might be summarized through Hu et al. 9. According to AATCC Test Method 195-2009, the indices have been graded and converted from cost to grade primarily based totally on a 5 grade scale.

4. RESULT AND DISCUSSION:

Analysis of variance (ANOVA) for impact of numerous decided on parameters on output variables is summarized. The suggest values of moisture control consequences of the bamboo/cotton single jersey knit systems are cited in One manner evaluation of variance (ANOVA) turned into achieved in order to decide the statistical importance of the impact of combination ratio on moisture control properties. A P-fee of much less than 0.05 suggests that the combination ratio and yarn linear density has statistically great impact on moisture control property.

FABRIC PHYSICAL PROPERTIES:

It can be found from the information in Table 2 that the material thickness and material weight display a lowering fashion with growth in bamboo fibre content material for single, double and plated yarn knitted fabric. These observations also are substantiated by the findings of researchers1-6, who determined that for bamboo/cotton mixed yarns with the equal linear density, the yarn diameter decreases because the proportion of bamboo fibre will increase. This has been attributed to the bamboo mixed yarns having decrease bending rigidity, because the knitted loops may be compressed without difficulty which reduces the fabric thickness. However, the thickness of the fabric reduces and hence the ratio of mass in step with rectangular meter and thickness will increase and consequently porosity will increase

MOISTURE MANAGEMENT PROPERTIES:

The effects of moisture control houses of bamboo/cotton material samples are summarized.

EFFECT OF BLEND RATIO ON WETTING TIME:

The wetting time values of the pinnacle and bottom surfaces of the bamboo/cotton fabric are given in Table 4. Top material floor refers to that aspect of the material which comes immediately in touch with the skin, wherefrom the perspiration is meant to be wicked out to the opposite aspect. The wetting time changes in line with the mixture ratio at the pinnacle and bottom surfaces. The effects suggest that typically wetting time of the lowest surfaces is better than the pinnacle surfaces for all of the fabric as expected. In the scope of this explanation, it is able to be said that the wetting time price is associated with the water absorbency of the bamboo/cotton combined fabric. When the effects of the skinny and thick fabric from the equal kind of fabric are compared, it is able to be visible that thinner fabric display faster wetting time than thicker fabric, whilst identical quantity of water is used.

EFFECT OF BLEND RATIO ON WATER SPREADING SPEED:

The water spreading velocity take a look at outcomes are given in Table 4. It may be truly visible that the better the bamboo fibre ratio, the better is the spreading velocity. When the fabric are thinner, the wetting time decreases as referred to in advance and therefore the spreading velocity for wetting of the thicker material is better in comparison to the thinner material. This is likely because of the low porosity cost of bamboo combined fabric. Work Introduction related your research work Introduction related your research work.

5. CONCLUSION:

It is located that because the bamboo content material increases in fabric the wetting time decreases. The fabric with 100 bamboo content material supplies the very best absorption rate. In the most wetted radius test, it's far visible that the better the cotton content material, the better is the wetting radius. The better bamboo content material impacts faster water spreading speed. In the AOTI test, it's far found that the cotton fabric display better AOTI values in comparison to different fabric. According to the effects, it may be said that, because the bamboo content material increases, normal moisture control functionality of the fabric decreases. It is concluded that the increase in bamboo content material effects in lower with inside the fabric areal density. This shows that with the increase in combination ratio, it takes much less time to moist a bamboo combination knitted fabric. These effects imply that the bamboo fabric have true moisture control assets and short water switch cap potential in comparison to different fabric.

6. ACKNOWLEDGEMENT:

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ROBOTIC GRIPPER ARM CONTROLLED BY HAND MOTION

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ABSTRACT

In the robotics community, the robotic arm is used the most. It is widely used for welding, material handling, thermal spraying, and many other industrial tasks. In this project, a robotic arm is made that simply moves in response to the movements of the hands. This robotic arm can be used in industries where both humans and machines are needed. We can save time and effort while simultaneously completing a variety of tasks because hundreds of robotic arms can follow our handwork. This robotic system is made up of mounts and parts that hold motors in place so they can move in the way you want. This servo motor's components are moved by a servo motor, which can rotate around 190 degrees. The flex sensor is attached to the gloves that users wear.

Keyword : - robotics, motors, sensors etc....

1. Introduction

Automation plays a significant role in modern life. A robot arm, also known as a robot manipulator, can perform as many tasks as a human arm. A robot's robotic arm, also known as a robot manipulator, is a crucial component of many industries, and its precise control depends on the application. Robot manipulators can be used for welding and trimming in any industry or application; choosing, etc. The advantage of this kind of robotic arm is that it can operate in hazardous areas that humans cannot access. The requirements are the basis for the design of numerous robot parameters.

Transmitter side

Fig- 1: Transmitter module for input sensors

Arduino Nano

The brain of the project is this component. An Arduino is contained in this section. An ATmega328P microcontroller is housed in a nanochip. This chip is the smallest of its kind and responds to a given program [3]. This chip is given instructions on how to control the entire system based on the input it receives from the program. It has input and output pins that connect the components of the input and output, as well as a power cable that supplies power [4].

Block Diagram



2. Mems

Small integrated devices or systems known as microelectromechanical systems (MEMS) combine mechanical and electrical components [6]. They can be anywhere from a few to millions in a given system, and their sizes range from the submicrometer (or submicron) to the millimeter. Mechanical components like gears, diaphragms, beams, and comes to devices are made possible by MEMS, which extend the microcircuit industry's fabrication methods.

Applications of MEMS

i. Pressure Sensors Typically, MEMS pressure microsensors have a flexible diaphragm that deforms when there is a difference in pressure [7]. At the sensor output, the deformation is transformed into an electrical signal. In order to calculate the amount of fuel required for each engine cylinder, a pressure sensor typically senses the entire atmospheric pressure within the engine's manifold. In this illustration, the sides of a neighborhood where a silicon diaphragm will be micromachined are lined with piezoresistors. The diaphragm is made by etching the substrate. After that, a glass substrate and the sensor die are bonded together, forming a sealed vacuum cavity beneath the diaphragm. The diaphragm's topside is exposed to the environment because the die is mounted on a package.

ii. Accelerometers Accelerometers are sensors that measure acceleration. Acceleration forces act on a mass suspended by springs, causing the mass to deviate from its initial position. At the sensor output, this deflection is converted into an electrical signal. It's possible that MEMS technology has only recently been implemented in accelerometers.

iii. One of the most common commercial products that make use of surface micromachining are inertial sensors, which are a type of accelerometer [8]. They are utilized in automobiles as airbag deployment sensors as well as tilt or shock sensors.Due to the need to manually align and assemble them into three-axis systems, their alignment tolerances, lack of in-chip analog-to-digital conversion circuitry, and lower sensitivity limit, these accelerometers cannot be used in inertial measurement units (IMUs).

iv. Microengines A three-stage polysilicon micromachining process has made it possible to make devices that are more complicated [9]. There are three movable levels of polysilicon and a stationary level, each separated by an oxide sacrifice layer. It has been demonstrated that the small gears can operate at rotational speeds greater than 300,000 rpm. Microcombination locks frequently have their wheels driven by microengines. They can even be used to pull a pop-up mirror out of a plane with a microtransmission. Known as a micromirror, this device

v. Unlike the computer, the future MEMS technology has the potential to significantly alter our daily lives. However, the MEMS industry's fabric requirements are still in their infancy. A comprehensive com rehension of the properties of existing MEMS materials is just as crucial as the creation of the most recent MEMS materials.

FLEX SENSOR

There are typically two sizes of flex sensors. One measures 2.2 inches and the other 4.5 inches [11]. Even though the sizes are different, they all serve the same fundamental purpose. Additionally, they are divided and supported resistance. There are three levels of resistance: low, medium, and high. Depending on the requirement, select the suitable type.

Fig-3: Flex Sensor

3. Zigbee Technology

Zigbee is a data communications standard for business and consumer devices that is part of IEEE 802.15.4 [12].Its low power consumption allows batteries to last practically indefinitely.Network, security, and application support services are provided by the Zigbee standard, which is built on top of the IEEE 802.15.4 Medium Access Control (MAC) and Physical Layer (PHY) wireless standards.It makes use of a collection of technologies to make scalable, self-organizing, self-healing networks that can handle various patterns of data traffic.

The following is a current list of ap lication profiles that have either been published or are in the works:

- Personal Home
- Home Automation
- Zigbee Smart Energy
- Telecommunication Applications

Zigbee is one of the global communication protocols developed by the relevant task force of the IEEE 802.15 working party. The most recent model, WPAN Low Rate/Zigbee, is the fourth in the series. It specifies specifications for devices with low data rates, low power consumption, and long battery life.



Fig- 4: Zigbee module

DC Motors

Electrical energy is efficiently converted into mechanical energy with the help of electric motors. Their principles of operation are based on magnetism. In order to create these amazing machines, they make use of electromagnets, permanent magnets, and the magnetic properties of materials. Two leads make up the DC Motor. If we apply +ve to one lead and ground to another, the motor will rotate in one direction; however, if we reverse the connection, the motor will rotate in the opposite direction. If we keep both leads open or ground them, it will not rotate (though there will be some inertia). If we apply +ve voltage to both leads, braking will take place.



DC motors are fairly straightforward to comprehend. Additionally, they are simple to construct and operate only with a battery or DC supply.

Liquid Crystal Display

Liquid Crystal Display is an acronym for LCD.Due to the following factors, LCD is increasingly replacing LEDs (seven segment LEDs or other multi segment LEDs):

1. The falling cost of LCDs.

2. The capacity to display graphics, numbers, and characters.LEDs, on the other hand, can only display a few characters and numbers.

3. Incorporating a controller for refreshing the LCD, thereby delegating the task of refreshing the LCD to the CPU.In contrast, for the data to continue being displayed, the CPU must refresh the LED.

4. Ease of character and graphic programming.

Because they are "specialized" for use with microcontrollers, these parts cannot be activated by conventional IC circuits. They can be used to write various messages on a small LCD.



Fig-5: LCD display

This model is most commonly used in practice due to its low cost and numerous possibilities. It is able to display messages in two lines of 16 characters each and is based on the Hitachi HD44780 microcontroller. It shows the Greek letters, punctuation marks, mathematical symbols, and other alphabets. Additionally, the user can create their own symbols to be displayed.

The display's automatic message shifting (shifting left or right), the pointer's appearance, the backlight, and other features are thought to be useful features

FEATURE RESULTS AND DISCUSSION

Because the robot's movement can be precisely controlled, the robotic hand has been developed successfully. It is anticipated that this robotic hand control method will either enhance our capabilities to perform such tasks or solve problems like quickly and easily placing or picking objects that are away from the user.

4. CONCLUSIONS

The co-design of a robotic arm controller with DC motors and the microcontroller Arduino was the topic of this project. The robotic hand has been constructed to fulfill all of the project's initial requirements. The fingers are allowing full hand movement. The project is observed to produce the required finger movement. The majority of applications for this kind of hand-controlled robotic arm are in the industrial, medical, and military sectors. This kind of hand gesture technology can be used in places where humans can't survive in hard or harsh environments. This may lessen the risk to lives and some of the labor used in industry.

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ABSTRACT

Notice Board is an application which will automate a lot of activities in a school or college or office etc depending upon the usage that is expected by different organizations. They can display info of all teachers in various departments, display timetable for students, display results of students. They can display info related to any holidays or info related to any fees collection scenarios or any common regulatories that are announced by management .Notice board is primary thing in any institution or organization or public utility places like bus stops, railway stations or parks. But sending various notices day to day is a tedious process. This paper deals with advanced notice board. It presents an SMS based notice board incorporating the widely used GSM to facilitate the communication of displaying message on notice board via user's mobile phone. Its operation is based on microcontroller ATMEGA32 programmed in assembly language. A SIM300 GSM modem with a SIM card is interfaced to the ports of the microcontroller with the help of AT commands

Keywords: ATMEGA32, Regulatories, gsm, modem, facilitate communication, microcontroller

INTRODUCTION:

Nowadays conveying messages at large using notice boards are widely used ones ranging from schools to organizations. We know the significance of notice boards in public areas like bus stands, railway stations, airports, and banks, etc. But day to day changing these boards is a very difficult task and a waste of time. At present, all electronic boards are designed with a wired system. The major drawback of designing these boards is; not flexible and cannot be located anywhere due to messy wire. To overcome this problem, a wireless board is designed to display the latest information. This article gives you an overview of how to design a wireless electronic notice board using GSM technology. This notice board displays the information on LCD display whatever you sent from the mobile

COMPONENTS USED:

- □ SIM 900A GSM MODEM (GSM Module)
- □ SIM CARD (For inserting in GSM modem)
- □ A mobile phone with a SIM card already inserted
- \Box 16 x 2 LCD Display
- \Box 10k potentiometer
- \Box Connecting wires
- \Box Power supply

GSM TECHNOLOGY:

The term GSM is the short form of the <u>global system for mobile communication</u>. GSM technology was developed in the year 1970. GSM technology is used to transmit the data services and mobile voice and operates at different frequency bands like 850MHz, 900MHz,1800 MHz & 1900MHz. GSM technology was developed as a digital system using a TDMA technique (time division multiple access) for the purpose of communication. A GSM device reduces the data and digitizes, then sends it down through a channel with two different streams of consumer data, which has a specific time slot. The data rates carrying ability of a digital system range id from 64 kbps- 120 Mbps. In a GSM system, there are different types of cell sizes such as micro, macro, umbrella and Pico cells. Each and every cell change according to domain implementation.

CIRCUIT DIAGRAM:



CIRCUIT ALGORITHM:

- 1. Initialize the LCD and UART protocol
- 2. Check for the command +CMTI: "SM",3 (Location number) to know whether the new message is received or not.
- 3. If you receive the command, then store message location number.
- 4. Now read that particular location and extract the body of the message.
- 5. Display the message on LCD.

PROJECT DESCRIPTION:

Notice Board is the most important thing in any institution, organizations and public places like bus stands, airports, railway stations & parks. But changing different notice day by day is

a difficult process and consumes more time. To overcome this problem, here is a project which deals with an innovative wireless notice board.

The main concept of this project is to design a wireless notice board that displays various notices sent from the mobile phone. When a mobile user sends information from his mobile, it is received by a SIM slot, which is integrated into a GSM modem at the receiver end.

The GSM modem is properly interfaced through level shifter IC for connecting the RS232 communication protocol to the 8051 microcontrollers. So the message received is thus sent to the 8051 microcontrollers. Furthermore, that displays it on a wireless notice board which is inbuilt with an LCD display. Here LCD display is interfaced with an 8051 microcontroller which is duly powered by an RPS (regulated power supply) from a 230V AC mains supply. Furthermore, designing of this wireless notice board project can be enhanced by providing a message storage facility by EEPROM (non-volatile memory). This EEPROM is attached to the 8051 microcontrollers for the recovery of old messages if needed.

ADVANTAGES:

- No need of any complex wires to display the message on LCD as it is wireless.
- Consumes less power and easy to operate.
- The circuit is portable.

APPLICATIONS:

- The applications of wireless notice board mainly include public places like bus stands, railway stations, airports, shopping malls, and parks to display the information wirelessly.
- This project is also used in organizations, schools, and colleges.

CONCLUSION:

Thus, this is all about designing a GSM-based wireless notice board project, which includes what is GSM technology, project description, operation, advantages, and applications. We hope that you have got a better understanding of this concept.

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DROWSINESS DETECTION SENSOR

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ABSTRACT

This driver drowsiness detection project is created to prevent accidents. Drowsiness means sleepiness, so it prevents accidents that are caused by drivers who are feeling drowsy or we can say who fell asleep while driving. So we are creating a Drowsiness detection system that will detect that the person's eyes are closed or open. And if a person's eyes are closed for a few seconds, the system will alert the person by ringing an alert sound. Our approach to Create Drowsiness detection system: In this project, for collecting images from webcam we will be using OpenCV and feed these images to our Deep learning model which will classify that the person's eyes is 'Open' or 'Closed'. So we will follow these steps: We will take image input from the camera. Detect face and eyes in the image. Create a Region of Interest(ROI), for both detected face and eyes. Feed this to our classifier(model), which will categorize whether eyes are open or closed. At last, we will calculate the time to check if the person is drowsy or not.

1. INTRODUCTION

The development of technologies for preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems.

Preventing drowsiness during driving requires a method for accurately detecting a decline in driver alertness and a method for alerting and refreshing the driver. In this paper we are presenting a method towards automobile safety and security as well as peoples safety in this we propose a Drowsiness Detection System. This paper combines Image Processing, Computer Vision, pattern recognisation, Matlab Based programming.

Nowadays Driver fatigue is a major factor in a large number of vehicle accidents. Recent statistics estimate that annually 1,200 deaths and 76,000 injuries can be attributed to fatigue related crashes. The development of technologies for detecting and avoiding drowsiness at the wheel is a major challenge in the field of accident avoidance systems. Because of the hazard that drowsiness presents on the road, methods need to be developed for counteracting its affects.

The aim of this project is to develop a prototype drowsiness detection system. The focus is on designing a system that will accurately monitor the open or closed state of the drivers eyes in real-time. By monitoring the eyes, it is believed that the symptoms of driver fatigue can be detected early enough to avoid a car accident. Detection of drowsy involves a pattern of images of a face, and the observation of eye movements and blink rate. The analysis of face images is a popular research area with applications such as face recognition, virtual tools, and human identification security systems. This

project is used the localization of the eyes, which involves looking at the image of the face, and determining the position of the eyes by developing matlab program. Once the position of the eyes is located, the system is designed to determine whether the eyes are opened or closed, and detect drowsiness. The purpose of this study is to detect drowsiness in drivers to prevent accidents and to improve safety on the highways. A method for detecting drowsiness in drivers is developed by using a camera that point directlytowards the drivers face and capture for the real time video. Once the video is captured, monitoring the face region and eyes in order to detect drowsy. The system able to monitoring eyes and

determines whether the eyes are in an open position or closed state. In such a case when drowsiness is detected, a warning signal is issued to alert the driver. It can determine a time interval of eye closure as theproportion of a time interval that the eye is in the closed position. If the drivers eyes are closed cumulatively more than a standard value, the system draws the conclusion that the driver is falling asleep, and then it will activate an alarm sound to alert the driver.

2.SALIENT FEATURES

- Simple application of Image processing
- Easy to install and used
- Micro controller based interface using PIC16F72 RISC MCU
- USB Web camera Interfacing
- Automatic Vehicle Speed Control
- Image processing based drowsy detection
- Real time video capturing and image processing
- Working Voltage 12V AC/DC
- Operating Current 500ma Approx
- Relay Contact Rating 230V AC / 500W
- Buzzer for alarm indication
- Diode protection for reverse polarity connection of DC supply to the PCB

3. The Model Architecture

The model we used is built with Keras using **Convolutional Neural Networks (CNN)**. A convolutional neural network is a special type of deep neural network which performs extremely well for image classification purposes. A CNN basically consists of an input layer, an output layer and a hidden layer which can have multiple layers. A convolution operation isperformed on these layers using a filter that performs 2D matrix multiplication on the layer and filter.

The CNN model architecture consists of the following layers:

- Convolutional layer; 32 nodes, kernel size 3
- Convolutional layer; 32 nodes, kernel size 3
- Convolutional layer; 64 nodes, kernel size 3
- Fully connected layer; 128 nodes

The final layer is also a fully connected layer with 2 nodes. A Relu activation function is used in all the layers except the output layer in which we used Softmax.

4. Project Prerequisites

The requirement for this Python project is a webcam through which we will capture images. You need to have Python (3.6 version recommended) installed on your system, then using pip, you can install the necessary packages.

- 1. **OpenCV** pip install opencv-python (face and eye detection).
- 2. TensorFlow pip install tensorflow (keras uses TensorFlow as backend).
- 3. Keras pip install keras (to build our classification model).
- 4. **Pygame** pip install pygame (to play alarm sound).

Steps for Performing Driver Drowsiness Detection

Step 1 – Take Image as Input from a Camera

With a webcam, we will take images as input. So to access the webcam, we made an infinite loop that will capture each frame. We use the method provided by

OpenCV, cv2.VideoCapture(0) to access the camera and set the capture object

(cap). **cap.read()** will read each frame and we store the image in a frame variable.

Step 2 – Detect Face in the Image and Create a Region of Interest (ROI)

To detect the face in the image, we need to first convert the image into grayscale as the OpenCV algorithm for object detection takes gray images in the input. We don't need color information to detect the objects. We will be using haar cascade classifier to detect faces. This line is used to set our classifier face = cv2.CascadeClassifier(` path to our haar cascade xml file`). Then we perform the detection using faces =

face.detectMultiScale(gray). It returns an array of detections with x,y coordinates, and height, the width of the boundary box of the object. Now we can iterate over the faces and draw boundary boxes for each face.

Step 3 – Detect the eyes from ROI and feed it to the classifier

The same procedure to detect faces is used to detect eyes. First, we set the cascade classifier for eyes in **leye** and **reye** respectively then detect the eyes using **left_eye** =

leye.detectMultiScale(gray). Now we need to extract only the eyes data from the full image. This can be achieved by extracting the boundary box of the eye and then we can pull out the eye image from the frame with this code.

l_eye only contains the image data of the eye. This will be fed into our CNN classifier which will predict if eyes are open or closed. Similarly, we will be extracting the right eye into **r_eye**.

Step 4 – Classifier will Categorize whether Eyes are Open or Closed

We are using <u>CNN</u> classifier for predicting the eye status. To feed our image into the model, we need to perform certain operations because the model needs the correct dimensions to start with. First, we convert the color image into grayscale using $\mathbf{r}_e\mathbf{ye} =$

cv2.cvtColor(**r_eye, cv2.COLOR_BGR2GRAY**). Then, we resize the image to 24*24 pixels as our model was trained on 24*24 pixel images **cv2.resize**(**r_eye, (24,24**)). We normalize

our data for better convergence **r_eye** = **r_eye**/255 (All values will be between 0-1). Expand the dimensions to feed into our classifier. We loaded our model using **model** = **load_model('models/cnnCat2.h5')**. Now we predict each eye with our model **lpred** = **model.predict_classes(l_eye)**. If the value of lpred[0] = 1, it states that eyes are open, if value of lpred[0] = 0 then, it states that eyes are closed.

Step 5 – Calculate Score to Check whether Person is Drowsy

The score is basically a value we will use to determine how long the person has closed his eyes. So if both eyes are closed, we will keep on increasing score and when eyes are open, we decrease the score. We are drawing the result on the screen using cv2.putText() function which will display real time status of the person.

cv2.putText(frame, "Open", (10, height-20), font, 1, (255,255,255), 1, cv2.LINE_AA)

A threshold is defined for example if score becomes greater than 15 that means the person's eyes are closed for a long period of time. This is when we beep the alarm using **sound.play() 5. The Source Code of our main**

```
import cv2
import os
from keras.models import load_model
import numpy as np
from pygame import mixer
import time
```

```
mixer.init()
sound = mixer.Sound('alarm.wav')
```

face = cv2.CascadeClassifier('haar cascade files\haarcascade_frontalface_alt.xml')
leye = cv2.CascadeClassifier('haar cascade files\haarcascade_lefteye_2splits.xml')
reye = cv2.CascadeClassifier('haar cascade files\haarcascade_righteye_2splits.xml')

```
lbl=['Close','Open']
```

```
model = load_model('models/cnncat2.h5')
path = os.getcwd()
cap = cv2.VideoCapture(0)
font = cv2.FONT_HERSHEY_COMPLEX_SMALL
count=0
score=0
thicc=2
rpred=[99]
lpred=[99]
```

```
while(True):
    ret, frame = cap.read()
height,width = frame.shape[:2]
```

gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)

faces = face.detectMultiScale(gray,minNeighbors=5,scaleFactor=1.1,minSize=(25,25))

```
left eye = leye.detectMultiScale(gray)
right_eye = reye.detectMultiScale(gray)
  cv2.rectangle(frame, (0,height-50), (200,height), (0,0,0), thickness=cv2.FILLED)
  for (x,y,w,h) in faces:
cv2.rectangle(frame, (x,y), (x+w,y+h), (100,100,100), 1)
  for (x,y,w,h) in right_eye:
r_eye=frame[y:y+h,x:x+w]
    count=count+1
r_eye = cv2.cvtColor(r_eye,cv2.COLOR_BGR2GRAY)
r_eye = cv2.resize(r_eye,(24,24))
r_eye = r_eye/255
r_eye= r_eye.reshape(24,24,-1)
r_eye = np.expand_dims(r_eye,axis=0)
rpred = model.predict_classes(r_eye)
    if(rpred[0]==1):
lbl='Open'
    if(rpred[0]==0):
lbl='Closed'
   break
 for (x,y,w,h) in left_eye:
l_eye=frame[y:y+h,x:x+w]
    count=count+1
l_eye = cv2.cvtColor(l_eye,cv2.COLOR_BGR2GRAY)
l_eve = cv2.resize(l_eve,(24,24))
l_eve = l_eve/255
l_eye=l_eye.reshape(24,24,-1)
l_eye = np.expand_dims(l_eye,axis=0)
lpred = model.predict_classes(l_eye)
    if(lpred[0]==1):
lbl='Open'
    if(lpred[0]==0):
lbl='Closed'
   break
 if (rpred[0] = 0 and lpred[0] = 0):
    score=score+1
    cv2.putText(frame,"Closed",(10,height-20), font, 1,(255,255,255),1,cv2.LINE_AA)
  # if(rpred[0]==1 or lpred[0]==1):
  else:
    score=score-1
    cv2.putText(frame,"Open",(10,height-20), font, 1,(255,255,255),1,cv2.LINE_AA)
 if(score<0):
    score=0
```

```
cv2.putText(frame,'Score:'+str(score),(100,height-20), font,
1,(255,255,255),1,cv2.LINE_AA)
 if(score>15):
    #person is feeling sleepy so we beep the alarm
    cv2.imwrite(os.path.join(path,'image.jpg'),frame)
    trv:
sound.play()
    except: # isplaying = False
      pass
    if(thicc<16):
thicc=thicc+2
    else:
thicc=thicc-2
      if(thicc<2):
thicc=2
    cv2.rectangle(frame,(0,0),(width,height),(0,0,255),thicc)
  cv2.imshow('frame',frame)
 if cv2.waitKey(1) & 0xFF == ord('q'):
    break
cap.release()
cv2.destroyAllWindows()
```

6. Driver Drowsiness Detection Execution

Let's execute drive drowsiness detection system and see the working of our ml project. To start the project, you need to open a command prompt, go to the directory where our main file "drowsiness detection.py" exists. Run the script with this command.

python "drowsiness detection.py"

It may take a few seconds to open the webcam and start detection

In this Python project, we have built a drowsy driver alert system that you can implement in numerous ways. We used OpenCV to detect faces and eyes using a haar cascade classifier and then we used a CNN model to predict the status.

7. CONCLUSION

A non-invasive system to localize the eyes and monitor fatigue was developed. Information about the eyes position is obtained through self-developed image processing algorithm. During the monitoring, the system is able to decide if the eyes are opened or closed. When the eyes have been closed for too long, a warning signal is issued. In addition, during monitoring, the system is able to automatically detect any eye localizing error that might have occurred. In case of this type of error, the system is able to recover and properly localize the eyes.

The following conclusions were made:

- Image processing achieves highly accurate and reliable detection of drowsiness.
- Image processing offers a non-invasive approach to detecting drowsiness without the annoyance and interference.
- A drowsiness detection system developed around the principle of image processing judges the drivers alertness level on the basis of continuous eye closures.

With 80% accuracy, it is obvious that there are limitations to the system

8. FUTURE SCOPE:

This technology is still in the early research stage of development. Based on the work completed thus far, following modifications can be implemented:

- Capture individual drivers steering activity while drowsy
- Conduct additional simulator experiments to validate the algorithm, test additional road

conditions, and test a more diversified group of drivers,

• Test and refine the algorithm based on the road test data, and conduct research on warning systems integrated with the detection system.

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System Analysis For Thermal Energy Storage Using Various Phase Change Materials.

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Abstract - This review paper comprises the use of phasechangematerials(PCMs)invarioustypesofheating/coolin g systems as an effective means of blockingenergy and maintaining temperatures within the well-beingzone. PCMs have been widely used in a variety of systems forheat pumps, solar engineering, and thermal control. Duringthelastdecade,researchershavelookedattheusageofPC Msinheatingandcoolingapplications.PCMsareabundantandme Itandsolidifyatawiderangeoftemperatures, makingthemusefuli navarietyofapplications. This study also discusses the investigation

and analysis of Phase Changematerial sutilised invarious heating/ cooling systems and their applications.

Key Words: PCMs, ANSYS, Meshing, Thermal EnergyStorageAnalysis,housecooling

1. INTRODUCTION

Due to rising global energy consumption associated withthe growth of civilization and the concomitant depletion

of conventional energy sources, several countries are impleme nting technological solutions minimise to energyconsumptionindifferentareas, including construction .Scientificresearchiscurrentlybeingconductedinanumber of research institutes across the world in order todevelop material and technology solutions that will allowrooms to maintain adequate thermal comfort throughoutperiodsofloworhighoutsideairtemperatures.Si multaneously, solutions related to the possibilities of employi ngenergyfromrenewable sources, including in the case of building partitions, thermal energy from solarenergyconversion, are being researched. To increase the rmal comfort in building rooms, phase change materialis employed, increasingly being which lowers

temperaturechanges on the interior surface of the partition due to itsheat storage capabilities. This material is used to reduce the amount of energy required to cool or heat rooms in abuilding by incorporating it into passive or active systems. In passive systems, phase changematerial (PCM) is usedinmanyconstructioncomponents. The goal of this approac istocollectthermal energyfrom h avarietyofsourcesandthendirectthatenergytowardLowertem peratures.Wallpartitionsarecommonlyutilized regardlessofthebuilding'sstructuralarchitecture,althoughthe ycanalsobefoundinfloorsandroofelements. The application pr ocedureforphasechangematerialsisdeterminedbythetypeofP CManditslocation. It's most commonly used in microcapsule form

inconcreteelements.PCMisaddedtotheconcretemix,which isthen usedto make concretewall elements. andthesampleswereutilisedtodeterminethethermalproperti es of composites. Varied computational methodswere used characterise the heat flow to through the testedmaterialswithvariousconcentrationsofPCMinthesampl eandheatcapacity.

Phase change material is used in a variety ofbuildingitems, including ceramic components. Filling existi nggapsinfinishedmasonryusingphasechangematerial is one of the options for modifying these features.AseparatePCMlayerontheinsideoroutsideofthecer amicpartition, or between the partition layers, is another option. Modification of phase change material foritemsusedasindoorinteriorcladdingisalsobeingresearch ed. The goal of this alteration is to absorb excess thermal energy inside the space, which can come from avarietyofsources, includingsolarradiation coming throught hebuilding'smajorglazedsurfacesortheoperationofelectron icsinsidetheroom.Researchconfirms the beneficial effect of phase change material on he stabilisation of temperatures on the internal surface of the partition, regardless of the location of the PCM and thepartition structure in which it used. during was periods ofsignificanttemperaturefluctuationsandroomoverheating.

There is an issue with the basic thermal parameters forthesecompositeswhendevelopingcustomisedpartsormulti laver construction partitions. We frequently receivefundamentalphysicalandmechanicalattributesforpref abricatedpiecespreparedbythemanufacturer(parameters).0 btainingthermalparametersneedstheuse of available research methods, such as experimental, computational, or computer simulations, despite the factthattheelementorpartitionismadeupofnumerousmaterial s.Inmanyresearchfacilities, studies are conducted using a single methodoracombinationofmethodologies, with the results com pared.Experimentson a single building component or a modified

multilayerbuildingpartitioncanbecarriedoutusingtheexperi mentalapproach.
These studies are conducted in a laboratory setting or in(outside) field settings under natural climate conditions. The authors of the research conduct edtest sinal aboratory chamber on a PCM modified wall to investigate the effect of temperatures on the effective thermalconductivity of this partition. These experiments we reconduct ed in a constant state, demonstrating a good linkbetween thermal conductivity and growing temperature. Thermal characteristics building components of were alsostudiedinthenextpapers. Available statistical programm escanalsobeusedtoanalysetheresultsoflaboratory tests. More information regarding the physicaland mechanical properties of newly built composites orredesigned building partitions can be gathered as a resultofsuchstudy.

2. MATERIALSANDMETHODS

PhaseChangeMaterials(PCMs)

Aphasechangematerial(PCM)isasubstancethatreleases/abs orbsenoughenergytogenerateusefulheat/coolingatphasetr ansition.Inmostcases,thetransitionwillbebetweenoneofthe firsttwofundamental states of matter, solid and liquid. The phasetransition may also occur between non-classical states ofmatter, such as crystal conformance, in which the materialtransitionsfromonecrystallinestructuretoanother, whichmayhave ahigher orlower energystate.

Materials

Fortheanalysis,amodelwithabasedimensionof7.31m*7.31 m*0.005 m and a surface area of 53.43m²wasused. On this foundation, a room model with four walls,one roof, two glass windows, and one door was built. Theroom's dimensions were 5.18m*4.87m*5.18m, resulting ina volume of 31.856m³. The model was then examined aftervarious PCMs were applied to the inside surfaces of thewalls.

FivevariantsofthePCMmodelswereusedforthepurposeofth e research.

- Variant1(V1)-noPCM
- Variant 2(V2)-PCMusedis Sodium MetasilicatePentahydrate.
- Variant3(V3)-PCMusedisn-Hexadecane.
- Variant4(V4)-PCMusedis saveOM65.

• Variant5(V5)-PCM usedis A70PlusICE.

Because of the ongoing research using a modified masonryelementincollectorandaccumulationwalls,theafor ementionedPCMlayersystemwaspostulated.Thephase change material's position on the inside will blocksolar radiation from entering the living space, preventingenergy frombeingusedincooling.

SelectionCriteria

The phase change material should possess the followingthermodynamicproperties:

• Meltingtemperatureinthedesiredoperatingtemper aturerange

Highlatentheatoffusionperunitvolume

• Highspecificheat, high density, and high thermal conductivity

- Chemicalproperties
- Chemicalstability
- Completereversiblefreeze/meltcycle
- No degradation after a large number offreeze/melt cycle
- Non-corrosiveness,non-toxic,non-

flammableandnon-explosivematerials

- Economicproperties
- Lowcost
- Availability
- 3.

PHASE CHANGE MATERIAL (PCM)INTEGRATEDINWALLS

Encapsulation

SincePCMstransformbetweensolid– liquidinthermalcycling,encapsulationnaturallybecametheo bviousstorage choice. Following are some of the encapsulationtechniquethatareused fortheencapsulationofPCMs-

- Macro-encapsulation
- Micro-encapsulation
- Molecular-encapsulation

In this technique, PCM has to be encapsulated before beingusedintoconstructionelements.Here,themicroencaps ulation is summarised. The process that PCMparticles are contained in a thin and stable shell (rangingfrom1•mto1000•m)isknownasmicroencapsulatio n. Due to these advantages of preventing the leakage of PCMand high heat-conduction ability. Therefore, its chances ofbeing incorporated into various construction materials are increased greatly.

TheProjectiscompleted with the encapsulation of different phase change materials placed in the walls. These tupismade with fewer joints to decrease the wastage.

ProductDevelopment

Many decisions need to be made in order to produce themost desirable and affordable product to make the highestprofit and most unique devices. There are three distinctphases:Theconceptphase,thestudyphase,andthepr oduction phase. During the concept phase, we defined the problem of storing thermal energy for a long duration.We then conceptualised in different ways by cascading ofPCMsindifferentlayers by usingdifferenttypesofPCMs.

Through research and customer surveys, we entered thestudyphaseknowingconsumerpreferences.

Afterreviewingourresults,wehypothesisedhowwewould enter the production phase. Because this productwould be produced in bulk, we took into account the priceofmachinery,storage,labour, etc.

After all of those costs were accounted for, we analysedpotentialifthetaskcouldbeachieved practically.

4. STEADYSTATETHERMALANALYSISBYANSYS

Steady-

statethermalanalysisisevaluatingthethermalequilibrium of a system in which the temperature remainsconstant over otherwords, time. In steady-state thermalanalysisinvolvesassessingtheequilibriumstateofas to constant heat loads subject and vstem environmental conditions. The simplest form of steadystate analysis islinearsteadystateanalysisinwhichinputparameters, such as material properties, are prescribed independent/variables.

The following figures hows the steady state thermal analysisse tup. We have created 2 models which are-

NonPCM basedmodel

• PCMbasedmodelconsistingofdifferentPCMmateria lanalysis

Specificationsofthemodel

Followingphysicalspecificationswereconsidered for the purp ose of the analysis-

• LengthOfRoom=5m

- BreadthOfRoom=5m
- HeightOfRoom =5m
- Area OfPlot=7.31m*7.31m=53.43m²

MaterialsUsed

The following materials we reconsidered during analysis-

- Concrete
- OakWood
- Glass
- Wood
- Sodium Metasilicate Pentahydrate (ThermalConductivity- 0.1W/m.ºC)

• N-hexadecane(ThermalConductivity-0.154W/m.°C)

• SaveOm65(ThermalConductivity-0.19W/m .°C)

• A70PlusICE(ThermalConductivity–0.23W/m .°C)

Meshing

Ameshisarepresentationofalargergeometricdomainby smaller discrete cells. Meshes are commonly used tocomputesolutionsofpartialdifferentialequationsandrend ercomputergraphics, and to analyse geographical and cartogr aphicdata.Ameshpartitionsspaceintoelements (or cells or zones) over which the equations canbe solved, which then approximates the solution over the larger domain. Element boundaries may be constrained tolieoninternalorexternalboundarieswithinamodel.Higherquality(better-shaped)elementshavebetternumerical properties, where what constitutes a "better" element depends on the general governing equations and the particular solution to the model instance. A mesh isconsideredtohavehigherqualityifamoreaccuratesolutioni scalculatedmorequickly.

MeshingSpecificationsoftheModel

Table 4.3.1 Meshing details of the model

Properties	Values
ElementSize	0.33m
ElementOrder	Linear
NumberofNodes	5266
NumberofElements	13835
Smoothing	Medium



Fig.4.3.1MeshingOfthemodel

5. RESULT

TheProjectiscompleted with the encapsulation of different phase change materials placed in the walls. These tup is made with fewer joints to decrease the wastage. Four types of PCMs are placed in the walls. The temper a ture of the room from inside increases as the thermal conductivity of the PCM is increased.

Temperature increases sharply until it reaches the meltingzone of respective PCMs.

Wallwithout PCM

Temperatures from the analysis shows following result-

- MaximumTemperature-39.991°C
- MinimumTemperature-37.132°C
- AverageTemperature-38.531°C



 $\label{eq:Fig5.1Variation} Fig5.1Variation of Temperature in the Room without Use of PC $$M$$

WallwithPCMusedisSodiumMetasilicatePenta hydrate

Temperatures from the analysis shows following result-

• MaximumTemperature- 41.234°C

- MinimumTemperature-34.649°C
- AverageTemperature-38.566°C



Fig5.2VariationofTemperatureintheRoomwithuseofSodi um MetasilicatePentahydrate

WallwithPCMusedisn-Hexadecane

Temperatures from the analysis shows following result-

- MaximumTemperature-40.755°C
 - MinimumTemperature-35.359°C
 - AverageTemperature-38.692°C



Fig5.3VariationofTemperatureintheRoomwithuseofnhexadecane

WallwithPCM usedissavEOM65

Temperatures from the analysis shows following result-

- MaximumTemperature-40.582°C
- MinimumTemperature-35.657°C
- AverageTemperature-38.736°C



Fig5.4VariationofTemperatureintheRoomwithuseofsavE OM65

WallwithPCMusedisA70PlusICE

Temperatures from the analysis shows following result-

- MaximumTemperature-40.437°C
- MinimumTemperature-35.902°C
- AverageTemperature-38.77°C



Fig5.5VariationofTemperatureintheRoomwithuseofA70 PlusICE

6. CONCLUSIONS

Table5.5ComparisonofVariousResults

PCM Used	No PCM	Sodium Metasili catePen tahydra te	n- hexadec ane	savE OM65	A70 PlusICE
ThermalC onductivi ty (InW/m.ºC)	Nil	0.1	0.154	0.19	0.23

Maximum Temperat ure(Outsi dewall)	39.9 9∘C	41.234 ₀C	40.755 ₀C	40.58 2∘C	40.43 ₀C
Minimum Temperat ure(Insid eWall)	37.1 3∘C	34.649 ∘C	35.359 ∘C	35.65 7∘C	35.90 ∘C

With the conclusion of the analysis, the project comesto a close. The etest results are listed in the tables above.

• The test was conducted to confirm that PCM maybe usedin our construction process to lower the amountof energyrequired to cool/warm the room to a humancomfortable temperature.

• Using the various PCMs, it can be seen that as the ThermalConductivity of PCMs increases, so does the tempe rature inside the room.

• Asaresult,aPCMwithpoorheatconductivityshouldn otbeemployedtogetthemostoutofthisapproach.

• If we use a Sodium Metasilicate Pentahydrate (Therm al Conductivity – 0.1 W/m.°C) the minimum temperature dropped from 37.132 °C to 34.649 °C which is a 8% drop in temperature.

• Ifweusean-Hexadecane(ThermalConductivity– 0.154W/m.°C)theminimumtemperaturedroppedfrom 37.132°Cto35.359°Cwhichisa5% dropintemperature.

• If we use a SavEOM65 (Thermal Conductivity-0.19W/m.°C) the minimum temperature dropped from 37.132°C to 35.657°C which is a 4.1% drop in temperature.

• If we use an A70 Plus ICE (Thermal Conductivity – 0.23 W/m.°C) the minimum temperature dropped from 37.132°C to 35.902°C which is a 3.4% drop in temperature.

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Heat Transfer Enhancement Using Turbulence Flow on a Modified Heat Exchanger with Phase Change Material in a Finned Tube Numerical Analysis

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Abstract

As a potential solution to reduce the energy supply-demand gap, thermal energy solutions is a viable option. Heat accumulates on phase change materials (PCM) for a specified period of time, which has been established. Because of the minimal thermal conductivity of PCM, it must be used in conjunction with other materials that have high thermal conductivity to absorb and release energy. The numerical analysis of a modified triplex bypass flow heat exchanger is presented in this study, and the heat transfer enhancement achieved is discussed. By analyzing changes in temperature gradients, liquid fractions, and velocities of phase change materials. The outcome of the investigation is consistent with the abundant evidence found in the specialized literature. PCM melts completely in roughly 98 min at a rate of transfer of kg/s and a temperature of 90^oC. The flow of heat transfer fluid (HTF) into the triplex tube heat exchanger with bypass flow (BFTTHE). The design of a double-flow heat exchanger creates turbulence in the fluid surrounding the outer tube, which aids in heat transmission. During the melting process, 1306 kJ of energy was stored as latent heat and 830 kJ as sensible heat.

Keywords: Heat transfer enhancement, triplex-tube, Turbulence Flow,

1. Introduction

Waste heat recovery in industrial processes has become a feasible alternative via the use of various techniques and cutting-edge technology. According to experts, the kind of process should always be investigated and evaluated prior to assigning a waste heat recovery method in order to get the greatest system efficiency feasible with the least effort.[1].Thermal sensitivity differed significantly between vertical and horizontal configurations. Longitudinal and no-fin systems outperformed spiral and circular fin systems in the horizontal position. In general, the heat recovery system designed for vertical use has the quickest PCM melting and solidification processes[2].A modified type heat exchanger with a PCM layer may be used to heat an evaporator in a high-temperature heat pump capable of generating steam. The heat exchanger equipped with a thermal storage plate balances the heat observation.[3].

A triplex heat exchanger, which incorporates gravity and natural convection into the melting process, reduces the melting time of the PCM. The positioning of the fins has a significant effect on the material's phase transition process[4]. The performance of a heat

exchanger unit with nanoparticle-infused fins was evaluated during PCM discharge and the subsequent utilisation of the liberated energy. PCM solidification was investigated experimentally by chilling both surfaces. In this research, the discharge rate was reduced from 90° C to 270°C. However, the overall energy stored in PCM requires more time to convert to the most often used thermal energy.[5].

A horizontal tank holding PCM slurry was designed to combat the phase transition process. Temperature-dependent characteristics were also included in the assessment. They forecast the quantity of heat energy stored during phase transition for each experimental module and compare their predictions to those obtained using CFD[6]. The orientation of the heat exchanger's design in relation to the direction of fluid flow is critical to the heat transfer mechanism. The system's conclusion explains the longitudinal fins' uniform heat distribution. By orienting the fins vertically, the melting time is shortened[7].

The findings of this study are based on the stated fin and steel fibre kinds, specifications, and dimensions. However, solar performance may be enhanced even more by further altering and analysing the fins. Additionally, the desalination system's effect on water collection, PCM materials, and sustainability principles, as well as the surrounding environment, should be considered.[8]. A technique for storing heat energy in capsules that is improved. Capsules were developed to absorb and store solar energy in a solar stove system. It took 20 minutes for the capsule and meal temperatures to approach equilibrium, and then gradually drop. The researchers discovered that using phase transition material as a storage substrate is economical[9]. The system is configured with two tubes aligned vertically to enable the melting and solidification of PCM in the outer tube. Comparing several wavelengths to determine performance. When compared to using a constant wavelength, wavelength variation results in a 33 percent reduction in melting time.[10].

Water, paraffin wax, and thermal energy storage materials were used to test the FPSWH. It was able to attain a daily efficiency of 43% and a maximum temperature rise of 24°C using this system. The greatest daily efficiency was 65 percent when the system was linked with both the PCM and the water storage tank. This setup was capable of delivering hot water at temperatures ranging from 50 to 60°C 24 hours a day, 7 days a week[11]. For big structures such as hotels, hospitals, and barracks, the research offers a new solar water heater with PCM heat storage. The system is capable of producing hot water up to 850 degrees Celsius during the day and 63-38 degrees Celsius at night. At midday, the highest usable heat generated by water in a 100 m2 unit is 72.6 kW. Economic and environmental impacts of the suggested system will be studied and reported in future studies.[12].

A research looked at the viability of a polycrystalline silicon thermal energy storage device for usage in small air conditioners. Using the corrugated channel during the melting and solidification process saves about 8% of the time. Also, the shorter channel speeds the melting and solidification of PCM owing to its lower mass[13]. Researchers investigated the ion (PCM) melting time in a cylindrical cavity using four heating sources. The purpose of this study is to enhance thermal energy storage by using a new geometric shape that shortens the melting time of gallium and optimizes the efficiency of the heating source. Two designs were examined for their potential to reduce the melting time[14]. The study on 3-D transient CFD model for a flat plate collector coupled to an LHTES system. Each component solves complete energy and momentum equations with continuous boundary conditions in the ambient environment. Four PCMs were evaluated throughout the course of two summer and winter days. The temperature and velocity

distributions that arise are utilized to calculate both case-specific and overall performance.[15]. By changing the sequence of PCMs, the porosity of each layer, and the height of each layer, one may obtain a more advantageous thermal performance for the desired purpose. The researchers aim to build on this work in the future by creating a three-dimensional simulation of this topic that incorporates more comprehensive physical modeling.[16].

A thin layer of melted liquid develops between the inner wall and the solid PCM during natural convection, filling the top half of the sphere and causing it to heat up[17]. The researchers used numerical techniques based on computational fluid dynamics (CFD) to model the conduction dominant phase change. Additionally, they discovered that the experimental DSC curve of capsules manufactured in-house validates the numerical results of the experiment[18]. Designers simulated and studied the melting of aluminium PCM in the air. When the Reynolds number of air is raised, the rate of heat transmission rises as well, resulting in PCM melting considerably more quickly than anticipated.[19]. A three-dimensional (3D) model of the phase transition material was used to investigate its thermal performance in a heat exchanger. Because air with a higher Reynolds number conducts quickly heat more rapidly, PCM melts more than anticipated.[20]. The performance of a triplex tube heat exchanger is optimal when three hot tube fins and one cool tube fin are used. Fins are needed on the bottom half of the inner heated tube because buoyancy forces cause the melted PCM to rise.[21].

Butterfly tube inserts were shown to improve heat transfer from microencapsulated phase change material slurry to the tube in a laboratory study. It is possible to increase the heat transfer coefficient by a factor of up to two by mixing slurry with the base fluidAs a consequence of the research, a two-dimensional mathematical model of enthalpy in a shell and tube heat exchanger was developed that uses PCM to compute the enthalpy. Charge rate is critical, since the temperature difference between the HTF intake and the PCM melting point rises with increased charging rate[23]. According to the study of a cascaded latent heat energy storage system, when many PCM modules are arranged in sequential order, the pre-heater and super heater are more efficient[24]. Extensive surfaces, such as longitudinal and triangular fins, substantially contributed to the quantity of heat transferred to PCM, resulting in a high TTHX level. In comparison to designs with longitudinal fins, solidification periods were reduced by 14%, 16%, and 18%, respectively[25]. The melting time decreases initially as the thickness and volume increase, but increases as the fin count increases. A study team from the University of Bristol examined an annulus of concentric pipes fitted with fins to enhance heat transfer. They discovered that increasing the volume decreased the melting time but increased the thickness. [26]. Numerous new empirical turbulence models have been created to illustrate a variety of phenomena. They use pre-existing models of eddy viscosity into their design. The SST model optimises all flows, independent of their pressure gradient. It circumvents the original and-co model's free stream sensitivity[27]. The study was performed to establish if the PCM should be placed horizontally, as is the case with the horizontal pipe system for thermal energy storage (LHS). Both cases demonstrated conductive activity prior to the melting process commencing. As the liquid level increased, natural convection took over. In the case of example A (the PCM in the annulus), convection leads in a higher temperature change, which results in a faster melting rate.[28].

When the fin arrangement is optimized, the overall surface area and/or volume of the fins remain constant. When two of the criteria mentioned above are fulfilled, the mixture will harden

in the same length of time regardless of the configuration or size.[29]. Numerical analysis showed that RT82 had solidified as PCM in TTHX. Numerous simulations were conducted to get a better knowledge of a number of design factors, including fin length, fin count, fin thickness, and the PCM unit's shape. Case G (which included identical 1 mm thick fins) seems to have solidified at a quicker pace (35%) than the other cases[30]. Fins have a substantial influence on both melting and solidification, although their effect varies according on the process. Fins are most effective during the middle phase of the melting process and have the largest impact at the beginning of the solidification heat release process. The instances labelled B, which utilises internal fins, and D, which employs internal-external mixed fins, both enhance particle processing.[31].

2. Problem description

Industrial waste heat has grown globally during the past several decades. Generally, any company uses water and air to dissipate heat. Due to its greater thermal conductivity than air, water is the optimal heat recovery medium. A heat recovery system is one that can recover heat that has been discarded into the environment. As a result, the amount of fuel needed to heat the boiler system is decreased. By capturing and reusing waste heat, you may improve the boiler's thermal efficiency while reducing its carbon emissions.

3. Methodology

Phase transition materials may store and release large quantities of energy as heat through latent and sensible heat. Thermal energy is required to melt and solidify the PCM. Because wax has a low thermal conductivity, it is an effective heat exchanger. A heat exchanger is made up of two components: a tube used to circulate hot fluid and a PCM container. Turbulence flow is more efficient than laminar flow in transferring heat. To run a heat exchanger with turbulent flow, the Reynolds number of the flow must be increased. According to the Reynolds number definition, velocity rises as the cross-section of the fluid flow decreases. By supplying by-pass flow around the circumferences of the external tubes and increasing the number of heat exchanger fins, the turbulence rate is enhanced.

4. Geometric model

The proposed system is to examine the fusion mechanism of PCM (RT82), which exchanges heat from water through TTHX made of copper material. The inner and outer tubes contain fins 1mm thick and 42 mm long over the surface that were in contact with PCM. Figure 1 shows the components such as the water domain, PCM domain, internal tube, outer tube, and outer case. water as a source term with a known temperature Ti and mass flow rate into a copper tube. The inlet tube is divided into 2 by-pass ways to access better turbulence over the outer surface of the tube.To simplify the simulation, neglect the thickness of eternal tube. The presented geometry was performed in ANSYSDesign Modeler® software (Periyar University, Tamil Nadu, India). The surface area and volume of PCM domain was 0.308932 m² and 0.00713 m³. Considering the density of PCM, total mass of 6.08 kg of was calculated.

5. Boundary conditions

The parameters at the intake are defined as follows: a parallel mass flow rate of 5 percent, a turbulence intensity of 5 percent, and a turbulent viscosity ratio of 10 percent. The numerical reaction takes into account the whole change in pressure. We used a volumetric flow rate of 0.12 kg/s to inject HTF at 90^oC. While the starting circumstances for flow are considered as constant, once convergence occurs, the flow is referred to as transient, and the initial conditions for flow are treated as constant.

6. Fluid properties

Table 3 contains the material parameters required for the PCM simulation. Consider the initial set of conditions throughout the heat exchanger and fluid domain, which comprised a 90° C HTF and a 27° C PCM and pipelines, among other elements. An incremental time step of 0.5 seconds was utilized for the transient simulation to get the results.

7. Modeling option selections

The conservation laws describing BFTTHX's action are presented in Equations (1) - (5). The research must involve the fluid dynamics and thermal and phase change processes that occur concurrently during PCM loading. The simulation of model requires the following equation.

Mass conservation Equation:

$$\frac{\partial(\rho)}{\partial t} + \frac{\partial}{\partial X_{i}}(\rho u_{i}) = 0, \qquad (1)$$

Where ρ is the fluid density, t is the time variable, X is the location vector, u is the velocity vector, and sub-indications I and j describe the components (x, y and z) of the coordinate axes such that i or j = 1 is the x-direction, i or j = 2 is the y-direction, and i or j = 3 is the z-direction.

Momentum conservation Equation:

$$\frac{6(\rho u_{i})}{6t} + \frac{6}{6K_{i}} \frac{(\rho u u)}{i i} = -\frac{6P}{6K_{i}} + \frac{6}{6K_{j}} \left[\mu \left(\frac{6u_{i}}{6K_{j}} + \frac{6u_{j}}{6K_{i}} - \frac{2}{3}\delta_{ij}\frac{6u_{i}}{6K_{j}}\right)\right] + \frac{6}{6K_{j}} \frac{(-\rho u'u')}{i j}$$
(2)

Where μ is the dynamic viscosity, P is the pressure and the term $\frac{u'u'}{i_j}$ and represents the Reynolds stresses, which were derived from the turbulent flow.

Turbulence model

Model stress transport (shear-load transport) The k shear stress transport (SST) implemented in the Ansys FLUENT® programme has been created by to balance the robustness and precision of the near-wall findings using the regular k model with the accuracy and simplicity of the k model for wall-far regions[32]. To this end, coupling functions are used in cells close and far from the walls of the computational domain,

respectively, to enable the models k. The vector k reflects the turbulent kinetic energy and represents the dissipation rate of that energy. Equations (3) and (4) explain their transport.

$$\frac{\partial(\rho k)}{\partial t} + \frac{\partial}{\partial X_{i}}(\rho k u_{i}) = \frac{\partial}{\partial x}(\Gamma_{k}\frac{\partial k}{\partial X_{j}}) + G_{k} - Y_{k}W_{k}, \qquad (3)$$

$$\frac{\partial(\rho\omega)}{\partial t} + \frac{\partial}{\partial X_{i}}(\rho\omega u_{i}) = \frac{\partial}{\partial x}(\Gamma_{\omega}\frac{\partial\omega}{\partial X_{j}}) + G_{\omega} - Y_{\omega} + Y_{\omega}$$
(4)

Energy conservation equation:

$$\frac{\partial}{\partial t}(\rho E) + \frac{\partial}{\partial X_{i}}(u_{i}(\rho E + P)) = \frac{\partial}{\partial X_{j}}[(\gamma_{eff}\frac{\partial T}{\partial X_{j}}) + u_{i}(\tau_{ij})_{eff}] + W_{h}$$
(5)

Where T is the temperature, is the energy source term, E is the total energy term. All coefficients can be regarded as positive, making the implicit arrangement absolutely stable for every time step. Because the precision of the scheme is just the first order, minor steps are required to assure the correctness of the results

Phase Change Model:

The sensible enthalpy equation can now be discretized in any way as long as the source term S is properly represented. The control-volume finite-difference approach is a popular and widely used methodology[33].

8. Grid design

The three-dimensional finite volume discretization method was used in this research. The complex geometries of the system are considered as tetrahedral elements within the walls due to the hydrodynamic and thermal boundary layers formed in these regions built with Ansys Meshing® software. Figure 3 shows the meshes used in physical problems.

9. Numerical algorithm

By using a pressure-based solver, it is possible to handle a wide range of flow regimes, from low-speed incompressible flow to high-speed compressible flow, while consuming less memory and allowing for more solution process flexibility. The First-Order upwind method is used for discretization because it allows rapid convergence while retaining accuracy. Transitions between solution variables are required for a number of reasons, including the assessment of diffusive fluxes, velocity derivatives, and schemes of higher order discretization. In terms of accuracy and characteristics, the Least-Squares Cell-Based – Default approach is comparable to the Node-based Gradients method, but needs less computation time. The semi-implicit technique is used to achieve pressure-velocity coupling. The Implicit Method for Pressure-Linked Equations (SIMPLE) is a method for solving pressure-linked equations that is especially useful when dealing with unsteady flow or meshes that include cells with a higher skewness than the average. Standard Initialization

was chosen as the simulation's beginning point. The solver is an iterative process. As a result, the system must have a value for each quantity in each grid cell prior to executing the first iteration..

10. Iterative convergence criteria

The process is initialized with double precision and a parallel (local Machine 4) solver is used for steady and transient states of the process. The model is a pressure-based solver with absolute velocity formation. When the process reaches convergence, the steady-state is converted into transient energy and the phase change process is enabled in the simulation with table 2. The convergence conditions used in the simulations for velocities in the x and y directions were 2×10^{-4} respectively, and 10^{-4} for velocities in the z-direction, mass conservation, balance of turbulent generation energy, and balance of turbulent energy, and 10^{-5} for energy conservation[34].

11. Result interpretation and reporting

Velocity vector plots

Figure 4shows streamlines describing HTF's path. The circumferential location of tubes concerning the external annular facilitated a swirling flow from the inlet to the system outlet, which should be remembered. The HTF pumped into the lower annular region and the fluid outlet in the upper region caused it to move from the length toward the exit, and the described vector directions were displaced in a reverse and forward direction. The PCM temperature and liquid fraction differences are detected in the analysis of heat transfer, which generates asymmetric fluid variations.

11.2. Temperature Distribution

The liquid fraction of phase change material attains 0.8. The temperature distribution of heating fluid, pipes, and PCM over the entire system is illustrated in Figure 5 as the temperature contour. The temperature of the fluid enters the inlet and outlet systems at 90°C and 80°C respectively. The inner surface and outer surface of the outer and inner copper tubes are so close to the heat transfer fluid. When the volume of PCM melted 100%, the water that left the outlet had temperatures close to 88°C and 90°C.

11.3 Liquid Fractions Fields

Figures 6. show the spread of the liquid fractions during the melting process, with 10%, 50%, 70% and 90% of the volume of the PCM being melted, respectively. The heat transfer on phase change material is done by sensible heat and latent heat for a time period of 98min.

12. Average Melting Temperature

Figure 7. shows the measurements of the average temperature of the water during the melting period. At first, the pipes were cooled rapidly at 88°C. Then, for the first ten minutes of heating, it started to increase its temperature to 88 °C, which was the time needed to achieve its fluid temperature at normal PCM temperatures. The HTF was quickly heated to 88.9°C between 10 and 20 minutes, and then its temperature increased nearly steadily until its end and reached nearly 89.75°C. The temperature flux between PCM and HTF decreased in the melting phase.

b) Average Heat Flux

Figure 8 shows the findings for the average heat flexes determined on the inner and outer surface of the intermediate tube during the melting phase. This shows the energy proportion connected to the heat transmission to PCM by HTF. Due to the thermal shock between PCF and HTF temperatures, the interpretation of this figure showed that a heat flux peak occurred during the PCM loading phase on both referring surfaces. The peak stream of internal and external tubes is around12 kW/m2 and 16 kW/m2 respectively.

c) Average Liquid Fraction

Figure 9.represents the average liquid fractions measured during the PCM loading process. It was noted that, after the substance reached the transfer area, it took 8 minutes for the distant segment to achieve non-zero fluid fractions.

d) Energy in the PCM

Figure 10. shows the energy accumulation levels during the melting phase of 6.89 kg PCM. The latent heat of 677 kJ was absorbed for 46 min of the responsive thermal curve during melting; then, owing to the phase changeover, the latent thermal curve rose to 1306 kJ and, due to an increase in temperature above the fluid material melting point (82.17 °C), the sensible heat curve was at 830 kJ. At the end of 98 minutes, the sample had been completely melted and there had been a net thermal energy accumulation of 2220 kJ.

Conclusions

By collecting heat as sensible and latent heat, the proposed numerical model predicted the PCM's transient activity during the melting phase.

1. The triplex heat exchanger design improves heat transfer rate by raising PCM temperatures; the resulting reduction in density causes buoyant forces to develop within the material as it travels away from the lighter fracture. Due to the HTF cooling that occurred when the phase change material heated up across the heat exchanger's length, the PCM heating process was sped up in the middle and power was lost throughout the BFTTHX length. The increase in PCM temperature and the resulting reduction in density caused the material to exhibit buoyant forces as it travelled away from the lighter fracture.

2. Bypassing the heat exchanger results in an increase in the turbulence of the HTF flow across it. This lowers the time required to merge PCM to a total of 98 minutes. The fan and heat exchanger were constructed in such a manner that any lighter PCM fractions stayed at the bottom of the annulus throughout the melting process. Heat fluxes anticipated via the inner surface of the inner tube were about three times those calculated through the intermediate tube's outer surface, due to the inner tube's velocities being approximately ten times those of the outer annular tube. During the melting phase, the latent heat energy and sensible energy absorption were calculated numerically to be 1306 kJ and 830 kJ, respectively.

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Flexible Bladeless Windmill

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Abstract—Disc Wind Turbine is a development of a new design of a wind turbine which does not use traditional air foil sectioned blades. The research involves developing a turbine that uses three discs mounted along the periphery of the central hub in specific geometry and convert the kinetic energy of the wind, much more efficiently into rotational mechanical energy which could further be converted intoelectrical power. The working principle of this technology along with the experimental findings obtained by directly comparing our designwith traditional wind turbine is further elaborated. Finally, various pitfalls of a traditional turbine designs are being discussed which are effectively lessened or eradicated in the Disc Turbine design. The design was developed realizing the fact that there is immense windenergypotential and the existing technology is onlyable to harness apartofit into ausable form.

Key words — DiscTurbine, Drag, Adaptation, Wind, Electricity, Reaction force, Windspeedsensor, Low RPM.

1 INTRODUCTION

ind power is one of the perennial sources of energyalong with being available during day time as well as atnighttimealmostthroughouttheyearwhichcouldbe harnessed from most of the parts of the planet. Butmoderndaywindturbinescouldconvertonlyuptoaround45percentof the total energy content in the wind. Along with this thespace constraints are a major concern in any developing ordeveloped country and thisshould be considered asone ofthemajorfactorwhenenergygenerationthroughwindpoweris at stake since wind energy generation requires a considera-ble amount of free space. Considering all these factors, DiscTurbine design is a new form of wind turbine, requiring lessamount of space along with being able to convert most of thewind power into usable energy and minimize various difficultiesassociated with conventional wind turbined esign related to on-field application. This design uses three disc shapedrotors along the central hub with adaptability depending onwind conditions by a servo mechanism. This is one of a kindunique design of a wind turbine which uses radically different concepts for wind power trapping and apt for increasing futureenergydemands.

2 DESCRIPTION

Wind energy is being used since a long time for generatingusefulworklikecruisingashipthroughoceantogrindinggrains in mills powered by wind to modern electrical energygenerationbyharnessingthisimmense windpower.

A conventional turbine uses an aerodynamic lift and reactionforce generated while wind moves past each blade. Theseturbines generally havethreeblades withrelatively smallerwidth compared to the length equally spaced from each otherand have a large amount of unoccupied space between theseblades.Thisisexplainablesincetheseconventionalturbines generate power by the means of flow concept, which meansthat greater the velocity of wind flowing over these blades thegreater will be the power generated, and hence if three blades, with relatively small width are designed then it would createless overall drag force and the wind could easily move withsame speed over the blades. If the number of blades is in-creased to around six or ten then there would be a large dragforce offered to the flowing wind and the velocity of the windflowing past each blade would decrease and hence would be a large dragforce offered to the flowing wind and the

veloplesspoweralongwithincreaseincostofadditionalbladesandweight constraint.

Due to this a traditional turbine has small width of blades, inorder to prohibit the decrease in the wind speed due to drageffect and letting most of the upcoming stream of wind to bepassedoverthebladesand developthe motivepower.

Disc Turbine utilizes the drag force which caused a problem in the traditional turbine design as the main source for generating the motive power. Along with this, our design is capable of utilizing the reactive force generated by the wind while leaving the turbine blades, similar to the force generated by a jet of waterleaving a nozzle.

3 LIMITIATIONSOFCURRENTDESIGN

The traditional design of the wind turbine is less efficient, consuming great amount of space and providing low output elec-trical energy. The cost of the entire wind farm project is veryhigh and this could be the main reason for reluctance to mostofthe wind energyprojects.

The manufacturing facilities required for construction of mas-sive blades of turbine are not cost effective to build. The trans-portation cost involved in carrying huge and heavy machineryis high. Along with this the set up measures required to as-semble the traditional wind turbine on site are quite cumber-someand involvesa highamountofrisk.

The blades of the turbine are made sharp to minimize the windresistance, but these sharp edges take lives of thousands of migratory birds and bats allover the world [1].

The allied cost involved with the traditional technologies like the cost involved in rawmaterials, manufacturing, labour, transportati on and on site assembly are substantially high and this makes it less practical for implementation for any govern-mentalornon-governmental organisation and are naturally gravitated towards the fossil fuel based energy source which are cheap but pernicious to our environment.

Limitationsofthetraditionalwindturbinesarelowtorqueforthe given wind flow. These turbines are effective only whenwind speeds are quite high, they are inefficient in low windconditions. Some of the available designs harnessing low windspeedsareonlycapableofinterceptingsurfacewindandhence are unable to capture full potential of the wind like theInveloxSystem [2].

4 HISTORY

In 2004 Shawn Frayne invented a bladeless wind energy har-vesting technique which is based on the aeroelastic flutter of apolymer film held against the wind. The electrical energy isgenerated as the magnets attached at the ends of the polymerstrip exibit a to and fro motion and electric current is induced inthecopper coilheld nearby [3].

In2013astartupVortexBladelessS.Lpresentedaturbinewith no blades which used a phenomenon called vortex shed-ding. This technology uses a fiber glass based column whichsways in wind due to the vortices of air caused on either sidedue to its specific design and converts the linear motion intoelectricalenergy [4].

A Tunisian startup Saphon Energy has developed a similarbladeless single disc designed turbine which converts windenergy into mechanical energy and then into hydraulic energyby pistons inside the hub. The hydraulic energy could be con-verted into usable electrical energy by a hydraulic motor. Asthe design uses single disc, it has a tendence to wobble andthestructure startsshakingin highwinds[5].

5 Design

Our design is inspired from the canopy of the umbrella and thesails of the ship. We realized that immense drag force is pro-duced when the gust of the wind is obstructed by a specificgeometry such as the canopy of an open umbrella. An umbrellaheldinthewrongdirectionagainstthewindcouldgeneratea huge amount of drag force enough to overturn the entirefragile umbrella structure. The sails of the wind work in a simi-lar manner by trapping large portion of the wind flow and con-verting into drag force which inturn propels the ship further. Byaltering the angle of attack of the wind with respect to the sail, a component of the drag force could be utilized for changingthe direction of ship. We combined the two concepts of um-brella canopy producing immense drag force and changing theangle of attack could make the drag component work in therequired direction. If this force component is made to work in atangential direction with respect to a shaft attached to the centralhub, then atorquecould beproduced. The turning moment depends upon the diameter of each disc and the length of the shaft. The speed of the turbine will depend on the velocity of windflow.



Our bladeless design of the turbine consists of three circulardiscs which are slightly concave or funnel shaped towards thewind facing direction. These three discs are fixed to a centralhub by means of a connecting rod. All the three discs aremounted equally on the hub with 120 degrees angle betweentwo consecutive discs. These three discs are given a certainangle so as to produce a tangential thrust effect required togenerate rotary motion of the turbine. The preliminary proto-type shown below is constructed with above specification as aproof of concept of our innovative turbine. The actual turbinewould have an electrical servo motor attachment in the centralhub to equally change the angle with which each turbine isattached. Another servo motor will be mounted on the wholegenerator turbine assembly in order to smartly adjust the frontside of the turbine towards the wind direction or upstream direction. These servo motors would be using a small amount ofelectrical energy generated by turbine itself and smartly con-trolled by a microcontroller depending on the real time windcondition and the flow direction or directly through a base con-troller.

6 WORKING

Our design is inspired from one of the oldest source of windenergy harvesting technique which is the sail of a ship alongwith the shape of an umbrella. Sail ships are propelled by thehuge drag force experienced by the massive sails which arekept at a certain angle with respect to direction of wind flow inorder to steer the ship in the direction desired in the downstreamofawindcurrent.Ourturbineworksinasimilarwaybut allows the sails to rotate in order to obtain power, we arereferring this technique wind capture, and this will he disas cussedshortly. The another technology that we are using is the reactive force thrust generation, in which the wind whenmoves past the blades which are moving in relatively lesserspeed than that of the wind impart some tangential reactionforce while leaving the disc edge thus providing an extra mo-ment towards the center. Yet another technology, which in factis a controlling technology that we are using, is the adaptableblade technology in which the angle of these blades relative tothecentralshaftwillbeautomaticallychangeddependingupon the wind conditions. All these three key techniques are fur-therbriefed below.

WindCaptureTechnique

As mentioned earlier our design is largely inspired from sail oftheship.Asailoftheshipisusedtoprovideamotivepowerfor the ship to move. When the sail is tilted along the direction of wind one side of the sail faces the wind directly on its frontalarea than the other sides of the sail, due to this high pressure created on the windward side than other sail sides and thesail gets a pushing force from high pressure side. In a sail shipdue to the angle of the sail, some wind power is utilized inmoving the ship forward and some power in moving the shipsidewise since the high pressure side generates almost a per-pendicular force to the wind velocity, but a ship utilizes a stabi-lizers and long fins submerged under water which minimizes this lateral movement and only allows forward thrust. Our discwill perform in almost a similar manner with the change being,our design would utilize the lateral force generated when windisimparted on the discs.

Due to the disc design, wind will impose a huge drag force inthe direction of the wind; again as these discs are angled rela-tive to the shaft, force central this drag now could be resolvedintotwocomponentsonetangentialcomponentandothersimple tangential pushing force. This component acting at theendoftheconnectingrodwherethediscwillbemountedisthe most important factor as it would provide a turning momentnecessary to the turbine and hence the generator rotate connectedtothecentralshaftandproduceelectricalenergy.

ReactiveForceTechnique

When the wind blows over the disc most of the kinetic energy of the wind is used to create the drag force when it is imparted on the discs, but still it contains enough energy to flow past thediscs. These discs are angled, due to which one side of the disc is higher than the other side. The wind flows past these discs from the side which is slightly lower than the other side. Here the wind speed is still slightly higher than the tip velocity of the rotating disc and hence while leaving the disc it impartssome reactive force on the tip of the disc in the direction of the disc tip. This force contributes to the total torquegenerated at the center and this torque can be calculated as the force times the distance between connecting rod disc at-tachmentsto the center of the shaft.

AdaptableDiscTechnoloygy-

This is the technique which we have developed and it givesturbine the name adaptable bladeless disc wind turbine. Anideal turbine should provide almost constant power output invariable wind speeds and also offer a control over the turbinespeed in case of emergency or high wind conditions. This con-trol over the speed could be effectively achieved by changingthe blade angle with respect to central shaft. When the windflow is having a lower velocity the angle of all the blades couldbe increased due to which greater tangential forces would de-velop; when the wind speeds are very high, this angle will bereduced due to which lesser tangential force would be gener-

ated and hence the speed of the turbine could be maintained

inthegivenrangeof windspeeds.

This change of the disc angle could be either made by a servomechanismorbyamechanicalmeanssuchasatorsionspring. Here we are initially using a tension spring which willmake the entire system less bulky than a servo and a control-ler unit. The tension spring will be mounted between the con-necting rod and the central hub inside the hub itself. Someinitial tension would be maintained in the spring and when ex-cess stress would develop due to high wind conditions thetorsion spring would slightly twist thus twisting the connectingrod and eventually the disc angle and controlling the turbinespeed in most of the variable wind conditions, acting like amechanicalgovernor system.

7 PROOFOFCONCEPT

In order to realize the concept in the form of workable model asmall scale model of Bladeless Disc Turbine was built and along with this a model of traditional three bladed wind turbine of similar dimensions was tested.

Experiment

An experiment was designed to compare the electrical outputpower produced from a traditional and the advanced design. Two turbines having the similar centre to tip distance wereconstructed and were exposed to the wind draft generated by a horizontal fan, the distance between the fan and the turbine was fixed for both the turbines under test to 7 meters. The fan was set to constant speed to generate approximately same wind speed as experienced by both the turbines.



Same Center to Tip Distance

OutcomeandConclusion





The experiment carried out under similar wind conditions dis-played the higher efficiency of Bladeless Disk Turbine over aTraditionalWindTurbine.Ourdesignwascapableofproducinga peak voltage of 19.8 volt DC as against the oneproducingpeakofonly7.1voltDC.Theaveragevoltagegenertraditional atedbyourdesignwasaround16voltsDCandthatfortheoth-er was around 5.5 volts. Disc Turbine is capable to producevoltage more than twice that for a traditionally made turbine. The area swept by both the turbines is same indicating thatsame power could be generated bv the advanced design with consuming only half the space as occupied by a regularone.

8 APPLICATIONS

Adaptable Bladeless Disc Wind Turbine is essentially a designforgeneratingenergybyharvestingthewindenergybyconsusumingminimumspaceandproducingmuchhigherpow er outputand capability towork inlow windconditions.Due to this there is an immense scope in various fields which require energy to function.

The scaled version of such a turbine can be used for offshorewind-farm projects which work away from the coast and cangenerate adequate power to meet the demands of a small city. It could be effectively used for off grid power requirements where such turbine could suffice the need of small power requirement.

These kinds of turbines suited outpost are well for military andcitiesofdevelopinganddevelopedcountriesasitoccupiesless space and does not produce noise when it is disc operating.Along with this the huge could capture the even lightestbreezewhichenablesittoproduceelectricalpowerinlowwindconditionsin cities.

9 CONCLUSION

Wind turbines are today primarily used for the purpose of gen-erating electrical power without depending upon the depletingsources of fossil fuel. Wind Power has tremendous environ-mental benefits over any fossil fuel burning power station, butdue to the massive size of these structures, their noise pollu-tion in the locality, requirement of immense free space, con-stant high windy conditions, difficulty in transport of each frag-ile blade over long distance and a large amount of capital re-quirement has restricted the wide scale applications of all tra-ditional wind turbines.

This research of Adaptable Blade Less Disc Wind Turbinesaims at curbing various issues which cause the hindrance tothe implementation of these power generators. This designrequires much less space and can even produce power in verylowwind speed conditions.

The material used for their construction would comprise ofglass fiber central skeleton covered with a synthetic polymerfiber similar to the construction of an umbrella with a sophisti-cated design. Due to this the material cost of the turbine ismuch reduced. This kind of design can be constructed in mod-ular fashion which facilitates the ease of transportation overlong distances. Utilizing such kind of design would allow us to to the energy production from the renewables our can deventually lessen the dependence overfossilfuel.

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HEAT PIPES

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ABSTRACT

It has been demonstrated that heat pipe heat exchangers are extremely effective at recovering wasted heat. In order to accomplish this, the design of a thermosyphon heat exchanger's heat pipe is the goal of this project. The project usually demonstrates the applications and benefits of using thermosyphon heat exchangers as cooling and heat recovery devices on a small or large scale, especially in industrial areas. Heat pipe heat exchangers with high thermal conductivity perform exceptionally well. Heat pipes simply function with a working fluid in the heat pipe. Heat is absorbed in the evaporator region and transferred to the condenser, where the vaporized liquid is condensed, discharging the heat to the cooling area. Heat pipes do not require any other energy source, such as electricity. The heat pipe heat exchanger has a wide range of applications and has gained widespread acceptance because it is a cost-effective, efficient, and effective method of recovering wasted heat.

Keyword: - thermosiphon,, heat exchanger areas. Heat pipe, and Heat pipes etc

1. INTRODUCTION

Although there has been a lot of study and research done on the recovery or storage of wasted energy, there is still a need for the proper application and execution of the research that has been done. Heat waste is the most underrated form of energy waste. Heat exchangers are utilized for this purpose to recover and repurpose wasted energy wherever it is desired. Saudi Arabia's industrial development has advanced significantly. According to the Ministry of Energy, Industry, and Mineral Resources, 7,630 factories were established in Saudi Arabia by the end of the first quarter of 2018, demonstrating the country's widespread industrialization. From the preceding, it is clear that these factories and other sources have merely wasted and released incalculable amounts of heat energy.

The heat pipe heat exchanger HPHE is an excellent tool for recovering wasted energy and overcoming this heat depletion problem. In addition to being an efficient means of storing wasted thermal energy, HPHE also helps to prevent global warming. Heat pipes are inert, extremely stable, and offer high heat transfer rates with little heat loss. Since the beginning of research and application into heat pipe heat exchangers, various types of heat pipe heat exchangers have been developed. Over time, these heat pipe heat exchangers have evolved to make it more effective and efficient to store latent heat energy.

PROJECT OBJECTIVES:

The following is a list of the project's primary goals for heat pipe heat exchangers:

To achieve a compact heat pipe heat exchanger that can cool a fluid over a large surface area of heat transfer while occupying comparatively less space in order to improve its capacity to recover heat without wasting any thermal energy.

to guarantee that heat moves over a long distance at a constant low temperature.

As a heat exchanger, heat pipes should be flexible enough to control temperatures effectively.

The design of a heat pipe exchanger ought to be cost-effective as well as effective and efficient. Because it requires no external power to function, it saves electricity and other fossil fuels to ensure both energy savings and environmental protection.

PROJECT SPECIFICATIONS

The heat pipe heat exchanger that is going to build on the principle of thermosyphon heat pipes. The following are the specifications based on estimations and approximations:.

Value
1.65 mm
3.18 mm
45.72 cm
60.96 cm
2.18 cm
1.00 cm
37.78 °C

2. DESIGN CONSTRAINTS AND DESIGN METHODOLOGY

While using a thermosyphon cooling system in a variety of applications has numerous benefits and sound logic, there are some geometrical constraints to keep in mind when designing the project. Since gravity plays a significant role in the thermosyphons principle, it is necessary to model an almost vertical setup. This may make it difficult to use it in any application involving horizontal geometrics. Device convection flow necessitates a sufficient distance between the thermosyphon's top and bottom, which is yet another geometric constraint. During the design process, we also made it a point to avoid creating any pockets that might entrap the returning warm vapour, thereby preventing convective flow. When using any application, which may be limited due to its passive nature, we may encounter adjustability issues.



Fig-1: Alaska pipeline with permafrost ground

Project Background

In the world we live in right now, conserving heat energy is essential because many energy sources are running out and will soon all be gone. Increasing energy efficiency is also a constant challenge for industry. Therefore, the choice we make regarding the source of heat energy is crucial to maintaining equilibrium. Therefore, a heat exchanger that works in conjunction with the heat pipe and is based on the working liquid principle will be utilized in order to effectively and efficiently recover wasted heat energy.

Comparative Study

The heat pipe heat exchanger has been the subject of extensive research in the past, and that research is still ongoing to improve its efficiency and effectiveness as well as investigate its applications. Heat pipe heat exchangers were first introduced in 1963, but they have not been utilized appropriately. There is extensive research conducted, but there is also a lack of practical implementation. The heat pipe heat exchanger will be constructed in such a compact manner that it will increase its capacity to recover heat energy and transfer it without losing heat or dropping temperature.

3. Steps in Heat Pipe Design

1) Examine and ascertain the operational parameters listed below:

- a. The heat source's geometry and load.
- b. The potential location of the heat sink, as well as its distance and orientation from the heat source.

c. The temperature profile of the heat source, heat sink, and ambient d. The state of the environment (such as whether a corrosive gas is present)

- 2) Choose the working fluid, wick structure, and material of the pipe.
- a. Choose the right working fluid for your application;
- b. Choose a pipe material that is compatible with the working fluid;
- c. Choose a wick structure for the operating orientation; and
- d. Choose the protective coating.
- 3) Determine the heat pipe's length, size, and form.



Fig-2 : Heat pipe in a Notebook

Characteristics of a Wick Structure

Pore sizes Pore counts per unit volume Passageway continuity is crucial. The wick's liquid motion is determined by the dynamic balance between internal resistance to flow and the effects of capillary pressure. Because the capillary pressure is inversely proportional to the mesh's effective capillary radius, a small pore size increases capillary action. However, as the pore size decreases, so does the friction force. Different fluids and heat pipe orientations will have varying effects on the ideal pore size. The heat pipe will eventually fail as a result of an inadequate liquid supply and a poorly designed wick.

The net capillary pressure difference between the wet and dry points must be greater than the sum of all the pressure losses for a heat pipe to work properly. Several pressure losses include: In the evaporator, a pressure gradient crosses the phase transition. Pressure gradient in the Condenser across the phase transition. normal decrease in hydrostatic pressure Drop in axial hydrostatic pressure.

4. CONCLUSIONS

In conclusion, the topic of our project is heat pipe heat exchangers. It has been demonstrated that heat pipe heat exchangers are extremely effective at recovering wasted heat. In order to accomplish this, the design of a thermosyphon heat exchanger's heat pipe is the goal of this project. The project usually demonstrates the applications and benefits of using thermosyphon heat exchangers as cooling and heat recovery devices on a small or large scale, especially in industrial areas. Heat pipe heat exchangers with high thermal conductivity perform exceptionally well. Heat pipes simply function with a working fluid in the heat pipe. Heat is absorbed in the evaporator region and transferred to the condenser, where the vaporized liquid is condensed, discharging the heat to the cooling area. Heat pipes do not require any other energy source, such as electricity. Our project has taught us a lot over the past three months. In order to accomplish our objectives, we learned how to use our engineering knowledge effectively and how to put it to use in our project.

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