

SCRAP COLLECTING VEHICLE

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ABSTRACT

A scrap collecting vehicle, has a bucket drive mechanism. The vehicle has a scrap container that has a bin and a movable bucket for receiving scrap. The movable bucket is driven upwardly in friction contact with a side of the bin by the given mechanism. This mechanism further causes the bucket to rotate about a point for delivering scrap from the bucket into the bin. A rotatable paddle may be given for sweeping the scrap from the bucket and thus for dumping the scrap inside the bin. Such mechanism may include inclined actuators which are connected to chain rollers that run over track to raise the bucket until the chain collars reach a disposed rocker shaft that acts as a joint for pivoting the bucket

Keyword: - Belt Drive Attachment, Scrap Bin, Gripper.

1. INTRODUCTION

1.1 Problem statement

We will replace the tool post by worm and worm wheel for radius turning. On the worm wheel it has a slot for clamping of single point cutting tool. Worm is rotate by the motor which is fixed at the end of shaft for auto feed purpose. So we can achieve highly precise products.

1.2 Problem identification

The problem of loading and unloading by manually is solved and the faster transportation of the scrap is been possible by using this vehicle.

For the solution of problems, we are trying to make the scrap collecting vehicle which can be handled by a single operator of the vehicle and mechanism. And for the maximum work output the men work is reduced and time problem is solved.

The last problem of the scrap collecting vehicle is about the mechanism used in that , it can be able to lift the load and unload.

1.3 Aims and objectives

Our aim is to reduce the men work and fully automation in that particular manner. for that the automatically operated gripper arm is attached to the vehicle for more accuracy in the work. And for the management of the more space inside the container for the maximum storage. So that can be increase the overall efficiency of the vehicle.

The main objective is to improve the model, as per the requirement of the companies. And then we are looking forward, to apply the changes in the model. Develop it with the help of industries and then making it more user-friendly

2. DESIGN & MECHANISM

This 3D model had been made in AUTODESK INVENTOR PROFESSIONAL 2014 by actual dimension of the mechanism.

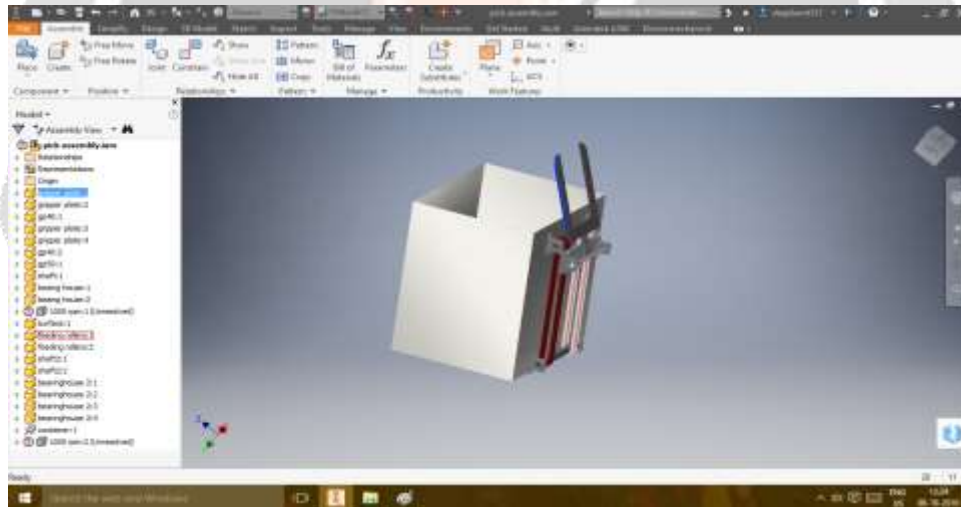


Fig -1 : 3D Model

2.1 Mechanism

Scrap collecting vehicle is to collect the different types of the scrap from the industries and as similar to the refuse collector for the garbage collector or the collection of scrap. The scrap bins are the principal object for the simple operation, efficient in operation, economic to environment and easy to operate.

scrap or garbage of the industries include the plastics, metals and other kinds of the wooden or rubber material. So, the mechanism is capable of collect and separate these all kind of plastic, metal, wooden and rubber scrap. as described the mechanism is mounted on the side of the vehicle. That is responsive in the movement to the usual scrap bins feeding movement of the scrap. The provision of the side attachment of the vehicle which fully responsive to all of the movement of the usual scrap collection from the bins. It doesn't depend on the type of the scrap but, it will depend upon the weight of the scrap and the whole lot. The loading of the scrap from industries or door to door garbage and scrap collection with the provision of side attachment. So, the single operator can able to

drive the vehicle as well as the mechanism manually without comes out from the drivers cabin. The provision of this attachment is quickly operated by any non-skilled person.

2.2 Belt drive

Belt drives are used when power has to be transmit in close centers . It is common for belt drives to have efficiency of 95% to 98%, and even up they are very cheap.

Belt drives are simple, inexpensive, and do not require axially aligned shafts. They help protect machinery from overload and jam, and damp and isolate noise and vibration. Load fluctuations are shock-absorbed (cushioned). They need no lubrication and minimal maintenance. Clutch action is activated by releasing belt tension. Different speeds can be obtained by stepped or tapered pulleys.



Fig -2: Belt drive

This class of mechanisms uses leather belts to transmit motion from one wheeled axis or pulley to another. Reuleaux called belts, tension organs, in a class with rope, wire and chain drives. To help keep the belts on the pulley, the surface of the outer rim would be designed to take the shape of a cylindrical, conical or toroidal surface. Such belt mechanisms were called "self guiding". Willis (1841, 1870) called them "wrapping connectors". The use of belting for the transmission of power was universal in the factories of the 19th century when the source of power was centralized as in a steam engine. The development of small motors in the late 19th century meant that each machine could have its own power source and obviated the need for belting. However some machine shops in the middle 20th century could still be found with extensive belting with the power source a large electric motor replacing the steam engine. Belt drives are still used in modern vehicle engines to drive water and fuel pumps, and the alternator.

3. OPERATION OF FIXTURE

3.1 Transportation of scrap

Scrap collection operation can be perform by many attachment on vehicle like side attachment, front loading attachment, with the use compacting mechanism etc.

Below attachments are good for transportation and precise scrap collection like collection of the scrap from the all kind of mixed scrap.



Fig -3: Radius turning

As shown in figure this side attachment is operate by vehicle driver so, it is manually operated. Also it hasn't any heavy foundation so it can be very much useful for transportation. It is costly in price but so good for accuracy.

3.2 Loading and unloading

There are different types of the scrap collectors for loading and unloading.

Side attachment type scrap collecting vehicle means, It has the gripper arm attachment on the side of the vehicle as shown in the figure. it can also known as the refuse truck with side attachment like, robotic arm.



Fig -4: Concave & convex

The front loading and unloading attachment type scrap collecting vehicle which is having the same mechanism as shown in the figure but, in the front side.

Scrap collecting vehicle is having the both front and rear attachment so we will design the vehicle to loading of scrap only in side of vehicle. This is limitation of our vehicle. But the scrap collector is main aim to take scrap from the side for now we will redesign the vehicle to overcome this limitation of time consumption of manual operation. Then we can easily remove the scrap from the industry in less time so that the space can be useful for another lot.

3.3 Single operator

In industry collection of scrap shown in figure is perform on manual with the labors so, for higher accuracy and less time consumption to perform on this vehicle. with the use of this vehicle the single operator can able to operate vehicle as well as the mechanism.



Fig -5: bearing radius

We can collect the scrap from industries as well as home-side with the use of this vehicle in the less time. So, it will be very useful for the cleanliness also.

4. OBJECTIVE

Main purpose of this vehicle is to increase the efficiency. Scrap collecting vehicle with side attachment. Operator driving the vehicle and also give the direction to the mechanism for loading and unloading. Made ease of a work by attached of side attachment which is made for the loading and unloading of the scrap.

5. ADVANTAGES

Side loaders trucks are loaded from the side, either manually, or with the assistance of a joystick-controlled robotic arm with a claw, used to automatically lift and tip wheeled bins into the truck's hopper. An Automated Side Loader truck only needs one operator, where a traditional rear load garbage truck may require two or three people. Advantage of reduction on the job injuries due to repetitive heavy lifting.

6. DISADVANTAGES

The setup of scrap collecting vehicle is having more work area. So, Scrap loading and unloading is not possible in the small industries. For operating mechanism more fuel is required. Electric motor with high torque is required for lifting the scrap bin.

7. APPLICATIONS

It can be used in large scale industries for removal of scrap from the industry. It can also be used as the door to door scrap collecting vehicle or any special zone at where only industries available like, industrial estates.

8. SCOPE OF FUTURE WORK

We can redesign these scrap collecting vehicle for the different kinds of attachment. Like separate compartment for the different scrap for example plastic, metal, aluminum. We can also use the hydraulic mechanism for the compacting of scrap inside the bin. We can use the heavy duty hydraulic system for the reduction of the fuel consumption in operation of mechanism.

9. CONCLUSIONS

The different mechanism of scrap collection are semi-automated controlled as above with side attachment would result in increasing the work efficiency and this would lead to automation for the time saving. More amount of operation can be done in short time with a single operator for vehicle as well as the mechanism. Now due to these automation will be comparatively more percentage of less time consumption from the same quantity of scrap collection as compared to manually controlled vehicles.

So the arrangement of this design with a core features such as the belt drive and guide post with the collecting arms would provide us high quantity of the torque from the electric motor as compared to other mechanism. Thus, adopting the above design would be beneficial in all terms instead of manually controlled vehicles.

6. REFERENCES

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