

FLEXIBLE SPRING CONVEYOR

Akshay shah¹, Abhishek Sonawane², Jay Surve³, Aakash Shukla⁴

¹ Student, Mechanical, Vadodara institute of Engineering, Gujarat, India

² Student, Mechanical, Vadodara institute of Engineering, Gujarat, India

³ Student, Mechanical, Vadodara institute of Engineering, Gujarat, India

⁴ Asst.Prof., Mechanical, Vadodara institute of Engineering, Gujarat, India

ABSTRACT

Flexible spring conveyor is one type of atomization used to material transfer from one place to another place. We can use it in different field in industry or agriculture. We are doing modification in available screw conveyor machine and increase the production. We added the flexible spring and modify the design for reduce the cost. We can call it flexible spring conveyor. After the modification we got high efficiency of machine and low cost.

Keyword: Spring conveyor, Flexible conveyor, prototype model

1. INTRODUCTION:

- (1.1) Various industries handling powders or granular materials like pharmaceutical, chemical, food, plastic industries.
- (1.2) Have been approached / surveyed to exactly understand exactly the need of proper conveyor system to bulk material handling industry. Also some relevant data regarding the material need to be conveyed have been collected, to understand the exact properties of material.
- (1.3) Material properties like flow ability, lump size and shape etc. significantly influence performance of the conveyor system. A few industries were selected for the study. It was found that among the selected industries, many are currently employing manual handling which results in inaccuracy in powder proportions at end use, delay in operation due to manual errors and other parameters.
- (1.4) Conveyors are essential to productivity, from light-duty package-handling roller conveyors in distribution centers to overhead and towline chain conveyors carrying automobiles through assembly to massive ore-handling belt conveyors. To avert production stoppages due to conveyor failure, progressive companies use predictive condition monitoring technologies to monitor those assets.

The objective is to detect impending failures before they occur, and take corrective action during scheduled production shutdowns. One of those technologies is thermograph, or IR Imaging. Thermal imagers capture two dimensional images representing the apparent surface temperatures of conveyor components, and are excellent tools for monitoring conveyors. Conveyors are able to safely transport materials from one level to another, which when done by human labor would be strenuous and expensive. They can be installed almost anywhere, and are much safer than using a forklift or other machine to move materials. They can move loads of all shapes, sizes and weights. Also, many have advanced safety features that help prevent accidents. There are a variety of options available for running conveying systems including the hydraulic, mechanical and fully automated systems, which are equipped to fit individual needs.

Conveyor systems are commonly used in many industries, including the automotive, agricultural, computer, electronic, food processing, aerospace, pharmaceutical, chemical, bottling and canning, print finishing and packaging. Although a wide variety of materials can be conveyed, some of the most common include food items such as beans and nuts, bottles and cans, automotive components, scrap metal, pills and powders, wood and furniture and grain and animal feed

1.1 Archimedes' screw law

Archimedes' screw consists of an inside a hollow pipe. The screw is turned usually by a windmill or by manual labor. As the shaft turns, the bottom end scoops up a volume of water. This water will slide up in the spiral tube, until it finally pours out from the top of the tube and feeds the irrigation systems. The screw was used mostly for draining water out of mines or other areas of low lying water.

The contact surface between the screw and the pipe does not need to be perfectly watertight, as long as the amount of water being scooped at each turn is large compared to the amount of water leaking out of each section of the screw per turn. Water leaking from one section leaks into the next lower one, so that a sort of mechanical equilibrium is achieved in use.

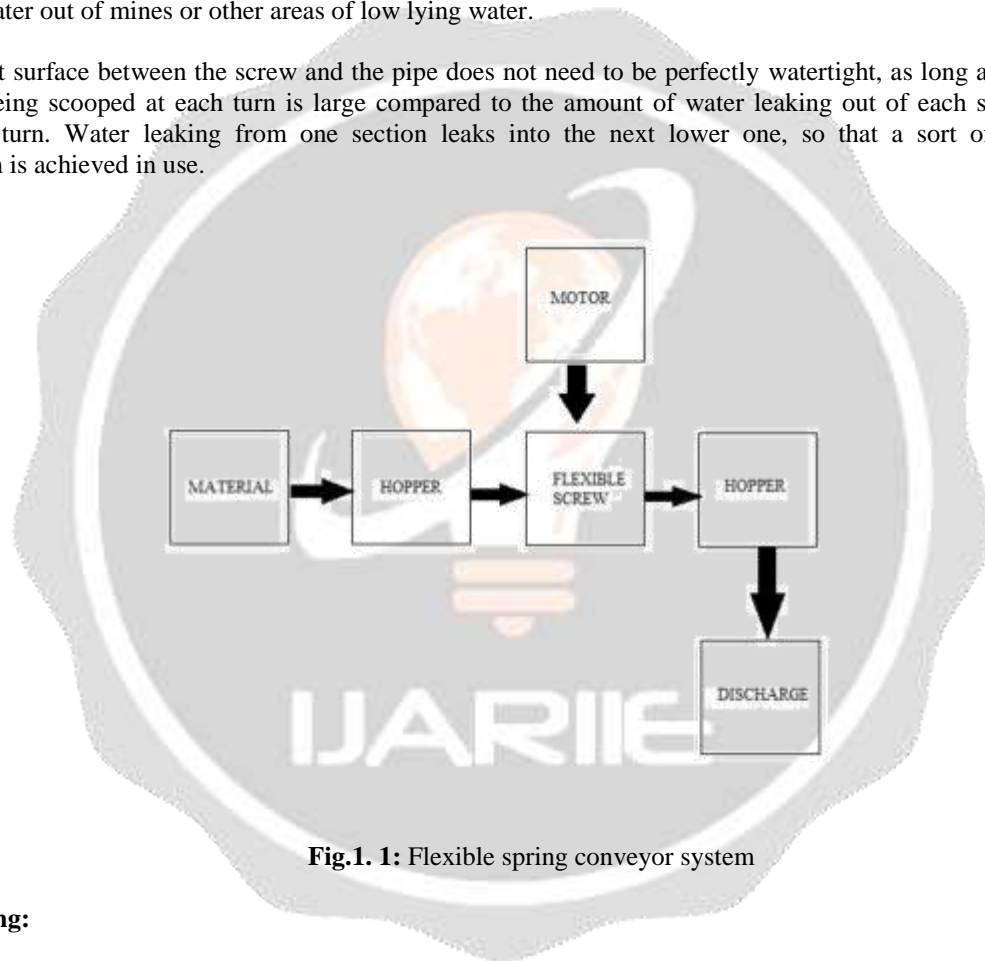


Fig.1. 1: Flexible spring conveyor system

1.2 Working:

The flexible spring conveyor consists of minimum components as compared to other conventional conveyors systems, namely a spring made up of steel which is enclosed in a tubular casing or a flexible pipe of plastic. The helical spring is connected with the small shaft which having internal diameter and this shaft is connected with the electric motor which have the 150r.p.m.

The motor is hanged on the two angle plates with the help of the U-clamps. The spring is connected to a motor and the spring is covered with the rubber pipe. One end of pipe is connected with storage hopper and second end is connected with discharge hopper. Materials like powder, ceramics, etc. are stored in hopper. When the motor rotates, it guides flexible spring or screw. When spring rotates with the motor shaft flexible spring or screw conveys the material from hopper to discharge hopper in upward direction with the help of angle between pitch and centrifugal force.

2. ADVANTAGES:

2.1 . *Space requirements*

Due to its wide flexibility, Flexible Spring Conveyor will be very useful in workplaces having space constraints. The flexible tube and spring can be easily carried and taken away to any position or place as and when required. Unlike other conveyor systems which are rigid in structure, this particular advantage of this proposed system can give great flexibility to the industries facing limitations to material handling due to their space constraints. [6].

2.2 . *Accuracy and precision in discharge*

The output in this conveyor system being controlled by rotational speed of the spring, just by varying rpm of the drive we can achieve great control over the flow of material. In other systems metering has to be done at feeder end, controls are ineffective sometimes at the discharge end. Various new programming techniques can be employed to control the output at discharge end for spring conveyor system. Variations in geometry or design of spring can influence discharge effectively.

2.3 . *Costs*

This conveyor is cost effective as having minimum number of parts. This also in turn reduces initial setup costs in large scale. The complete absence of bearings and less relatively moving parts leading in high friction are avoided; the maintenance cost is also considerably reduced. When it comes to economy, from technologically suitable conveyors flexible spring conveyor can outperform by offering lower capital and operating costs. [7]

2.4. *Power consumption*

is seen that this conveyor system requires less power as there are no bearings and minimum friction between the parts is achieved. The only friction is between the material to be carried away and tube walls and spring. The throughput, torque & power are significantly influenced by vortex motion of bulk solid being conveyed. [8]

2.5. *Dust control*

Dust control is the most common and challenging task in industries like food, chemical, agricultural etc. as dust threatens safety of the human being directly exposed in the plant or indirectly involved end users of the product. In conventional conveyors dust control is not only economical but also is a skilled task which needs expensive and precise components to control. As the enclosed tube and spring is used, flexible spring conveyor can have good dust control in much less cost. [9]

3. CONCLUSIONS

The final conclusion is that by changing internal diameter of pipe and motor speed we can get the discharge of material more and constantly in short time And also it decreases cost of production. Flexible Spring Conveyor system can be a good substitute to manual material handling in small scale industries.

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