DESIGN AND FABRICATION OF WALL PLASTERING MACHINE

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***ABSTRACT*: Plastering is the plasterwork which is known as ornamentation done by plasterers on walls by manually in most parts of the world. The plasterwork needs more effort of humans and also consumes more time in manual process. This is an intention to implement an innovative process with a development of "Wall Plastering Machine". Automation is one of the significant and evolving disciplines among all technologies. Our aim of this innovative idea is to render the plasters on walls automatically. This idea aims in reducing the work of plasterer. It is feasible, light weight, inexpensive and simple structure comparing to the existing machine. This innovative process keeps up with the ever changing world of building automation.**

I. INTRODUCTION:-

Building and construction is one of the major industries around the world. In this fast moving life construction industry is also growing rapidly. But the labors in the construction industry are not sufficient. This insufficient labors in the construction industry is because of the difficulty in the work. In construction industry, during the work in tall buildings or in the sites where there is more risky situation like interior area in the city. There are some other reasons for the insufficient labor which may be because of the improvement the education level which cause the people to think that these types of work is not as prestigious as the other jobs.

The construction industry is labor-intensive and conducted in dangerous situations; therefore the importance of construction robotics has been realized and is grown rapidly. Applications and activities of robotics and automation in this construction industry started in the early 90"s aiming to optimize equipment operations, improve safety, enhance perception of workspace and furthermore, ensure quality environment for building occupant. After this, the advances in the robotics and automation in the construction industry has grown rapidly

The expansion of any country depends on the development trade therefore it's of prime economic significance to several industrial sectors. Intense competition, shortages of arch labor and technological advances is forcing fast amendment within the industry, so encouraging its automation during this trade The development of buildings, apartment, complex, shops, homes are basic necessities of creature. During this construction space coating is important for decorating the wall. Coating works refers to construction or ornamentation through with plaster, plaster ornamental moldings on ceilings or walls. This can be conjointly referred to as coating.

II. OBJECTIVE

To design and develop a machine for the purpose to reduce the human work especially works of plasterers. It is simple in structure, light weight and easy to operate.

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III. PROPOSED FABRICATION EQUIPMEN

- **WIPER MOTOR-**
  A wiper motor is used to move the wiper in the windshield to remove the rain drops, snow and other dust particles from the windshield.
  We have used a wiper motor having torque of 70 N-m that is used to lift the setup that is used for plastering of the wall.

Fig 1 Wiper Motor

- **CONVEYOR SYSTEM-**
  A conveyor system is a mechanical handling instrument that is used to move materials from one place to another. It is especially used to transfer bulky or heavy materials. We have used the conveyor system to transfer the cement from the storage to the plasterer for plastering of the wall.

- **GEARS –**
  Gears are used for transmission of torque. It consists of teeth that meshes up with the other toothed part for transmission. Here gears are used for transmission of torque from the wiper shaft to the shaft that is attached to the movable setup.

Fig 2 Gear Arrangement

- **BEARINGS -**
  A bearing is a machine element that constrains relative motion to desired motion and it also reduces friction between the moving parts. We have used the bearings to reduce the friction when the shaft is rotating.

- **SHAFT –**A shaft is an element which is used to transmit power from one part to the other. Here we used the shaft to transmit power from the wiper motor to the movable setup to the plastering work.

DESCRIPTION

- General description of the project is given as the "wall plastering by using the trowel technique of plastering with the help of awiper motor.
- Firstly the cement mixture is poured on a storage tank.
- The cement mixture passes through a conveyor belt to the metal plate which forcefully sticks the cement to the wall.
- The cement will be punched by using the rollers and the stuck cement will be smudged by the metal plate.
- For making this process automatically we have used a wiper motor to move the header unit through the rail guides.
- Here we can give horizontal movement to the setup through the rail guides.
- This technique of plastering is called trowel technique of plastering.

PLASTERING TECHNIQUE –

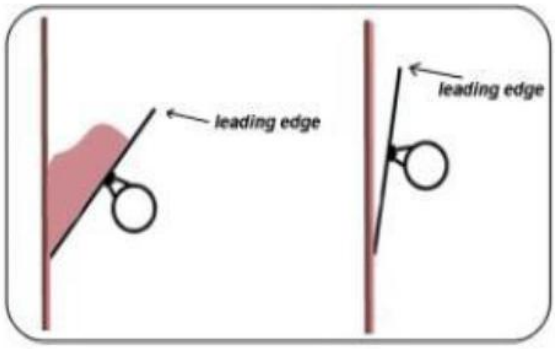

Fig.3 shows the trowel operation technique in ancient covering technique. The right covering technique is crucial with solely the trowel getting used to use and end the skim coat. Achieving a decent end is that the combination of firm pressure combined with the right angle of trowel (how so much the forefront is from the wall).
Covering technique for applying plaster is initiated by trowel loaded with plaster, so forefront of the trowel are an extended approach from the wall. The forefront got to be planate step by step into the wall.
With consequent stroke the trowel are used for flattening out the plaster as simply applied. There'll be no plaster on trowel and it'll be fairly flat the forefronts are more or less ten fifteen metric linear unit removed from the wall.

WORKING -

Initially, the machine must be placed close to the wall that is to be plastered. The machine needs to be placed in horizontal position. Then the cement mixture that consists of cement and sand within the magnitude relation of roughly around 1:4 is poured into the storage chamber.

The cement then passes through a conveyor to the metal plate (inclined) by which the plastering is done.

The lifting force is given by a rope and machine mechanism. The linear movement to the assembly is given through a guide manner. Once the inclined plate moves up with the assistance of guide way's and by keeping clearance between inclined plate and wall the mortar gets continue the wall and also the roller mechanism is assembled below the inclined plate that then finishes the plaster done on the wall.

ADVANTAGE:-

- Ease of use –All the most of the essential plastering tools are fairly basic and already intuitive and easy to use innovation have been made to further simplify their use.
- This enables the plasterer to maneuver easily in hard to reach areas,as well eliminating the use of ladders when measuring distances by using such equipment as laser measuring devices.
- Faster work time-With equipment so easy to use, the time to finish the specific job is often cut down dramatically, allowing worker to do more in a smaller amount of time.
- This is beneficial to both workers and employers as speed and quality of work can be both maximize for an increase in overall efficiency.
- Better output quality-With state of the art equipment, the risk of human errors and miscalculation will be significantly diminished there by leaving a very elegant finish with top quality workmanship.
- Cheaper overall cost- Taken in to consideration the overall cost of the material that are used to finished an entire project with less error and less wastage material, due to precision mixing and measuring one can easily see the increasing savings.

SCOPE FOR A FUTURE WORK:-

- The present model is semi-automatic and it does not have an automatic loading of mortar. The automation of loading mortar has needed to be carried out.
- The machine is developed to do plastering work for straight wall, hence it is suitable only for commercial buildings like apartment which has large in size and not for the construction of a curved wall as it does not have to make curved blade. Hence upgrading is required by making some changes to use the machine for any size and for the corners and joining of two wal**ls.**

CONCLUSION –From this study it is concluded that implementation of mechanical work in construction field is of a great need which can reduce the labor cost, working time, plastering cost, less human efforts. This can also be used to solve the problem of shortage of skilled labors.

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