Design And Development of Bike Operated Crane

Prof. B.P. Kolhe[1], Mr. Mustafa Sayyad[2], Mr. Harshad Shelke[3], Mr. Shubham Navale[4], Mr. Rushikesh Borhade[5]
[1] Professor, Dept of Mechanical Engineering
[2, 3, 4, 5]Dept of Mechanical Engineering
[1, 2, 3, 4, 5] Samarth College of Engineering, Belhe, Pune, Maharashtra, India

Abstract- *Engineers are always trying for human effort reduction and cost reduction in machines which are already exist. In that we have selected machine is crane which we using for lifting the weight at construction site. There is manual method of lifting material at desired location of construction which suffering from several disadvantages such as more time required, more effort is required, injury can take place during material handling and unavailability of worker. In order to solve above problem engineers discovered Diesel engine crane to minimize above problem. But such arcane is not economical at small construction site and also availability is less. In order to solve above problem we have made such a crane which powered from bike engine. This project is help full for Industry where use of material handling at high level, At construction site for handling material, For operating the roller on the ground for leveling purpose etc.*

There is manual method of lifting material at desired location of construction which suffering from several disadvantages such as more time required, more effort is required, injury can take place during material handling and unavailability of worker. In order to solve above problem we have made such a crane which powered from bike engine. Engineers are always trying for human effort reduction and cost reduction in machines which are already exist. In that we have selected machine is crane which we using for lifting the weight at construction site. In order to solve above problem engineers discovered Diesel engine crane to minimize above problem. But such arcane is not economical at small construction site and also availability is less.

Keywords- Diesel engine, Lifting, Bike engine, Crane.

I. INTRODUCTION

Crane may be a sort of machine, generally equipped with a hoist rope, wire ropes or chains, and sheaves, which will be used both to lift and lower materials and to move them horizontally. It is mainly used for lifting heavy things and transporting them to other places. The device uses one or more simple machines to make ratio and thus move loads beyond the traditional capability of a person's . Cranes are commonly employed within the transport industry for the loading and unloading of freight, within the housing industry for the movement of materials, and within the manufacturing industry for the assembling of heavy equipment. The first known construction cranes were invented by the traditional Greeks and were powered by men or beasts of burden, like donkeys. These cranes were used for the development of tall buildings. Larger cranes were later developed, employing the utilization of human tread wheels, permitting the lifting of heavier weights. In the High Middle Ages, harbor cranes were introduced to load and unload ships and assist with their construction – some were built into stone towers for extra strength and stability. The earliest cranes were constructed from wood, but forged iron , iron and steel took over with the approaching of the economic Revolution. The first known construction cranes were invented by the traditional Greeks and were powered by men or beasts of burden, like donkeys. These cranes were used for the development of tall buildings. Larger cranes were later developed, employing the utilization of human tread wheels, permitting the lifting of heavier weights. In the High Middle Ages, harbor cranes were introduced to load and unload ships and assist with their construction – some were built into stone towers for extra strength and stability. The earliest cranes were constructed from wood, but forged iron , iron and steel took over with the approaching of the economic Revolution. For many centuries, power was supplied by the workout of men or animals, although hoists in watermills and windmills might be driven by the harnessed natural power. The first 'mechanical' power was provided by steam engines, the earliest steam crane being introduced within the 18th or 19th century, with many remaining in use well into the late 20th century. Modern cranes usually use combustion engines or electric motors and hydraulic systems to supply a way greater lifting capability than was previously possible, although manual cranes are still utilized where the supply of power would beuneconomic.

Cranes exist in a huge sort of forms – each tailored to a selected use. Sizes range from the littlest jib cranes, used inside workshops, to the tallest tower cranes, used for constructing high buildings. Mini-cranes also are used for constructing high buildings, so as to facilitate constructions by reaching tight spaces. Finally, we will find larger floating

cranes, generally wont to build oil rigs and salvage sunken ships.

Some lifting machines don't strictly fit the above definition of a crane, but are generally referred to as cranes, like stacker cranes and loader cranes. Within terminal differing types of fabric handling equipment are wont to transship containers from ships to barges, trucks and trains and the other way around . The facilities utilized in the container terminal are transfer cranes, gantry cranes, trailers, and yard tractors. Over the past decades, ships have strongly increased in size, up to 8000 TEU. In order to use these big ships efficiently, the docking time at the port must be as small as possible. This means that enormous amounts of containers need to be loaded, unloaded and transshipped during a short time span, with a minimum use of pricy equipment.

To ensure a quick transshipment process, at large terminals, control for efficiency and a high degree of coordination is important . These terminals are often obtained by using, among other things, information technology and automatic control technology. Containers also can be stored during a cargo area for a certain period, before they're transferred to a different mode. First of all, the layout and the choice of equipment have to be determined. This is a necessary condition to get an efficient terminal. Furthermore, planning and control concepts for the various sorts of material handling equipment need to be developed. These concepts should end in a sufficient performance.

We can distinguish between three planning and control levels in making decisions to get an efficient terminal, namely the strategic level, the tactical level and therefore the operational level. At the strategic level it's , for instance , decided which layout, material handling equipment and ways of operation are used. The time horizon of selections at this level covers one to many years. These decisions cause the definition of a group of constraints under which the choices at the tactical and operational level need to be made.

II. LITERATURE REVIEW

A Case Study on Motorcycle Driven Ploughing Machine by Gujarat Grassroots Innovations Augmentation Network (GIAN) With introduction of summer groundnut crop within the region increased the demand of draft power which forced the farmers to look for economical alternatives. Also increasing frequency of drought, decreased supply of fodder, restrictive usage of bullocks, high maintenance cost of draft animals added thereto . Whereas tractors were found uneconomical for later stage (when the soil has considerably softened) for ploughing and inter- culturing, weeding thanks to high weight and fuel consumption, triggered the innovator. It is an easy multipurpose toolbar which attaches to vehicles like Enfield Bullet Motorcycle by replacing the rear wheel. It is an innovation by Shri Mansukhbhai Ambabhai Jagani, Amreli. The innovation was scouted by Mr. Mahesh Parmar, SRISTI For farming operations, tractor isn't a reasonable option for farmers having small land holdings. Increase within the cost of fodder for bullocks, regular occurrence of drought and lack of farm labor forced the farmers of Saurashtra area of Gujarat to seem for an alternative to Bullock. Inspired by an area mode of transport, the three-wheel taxi “chhakdo” (common transport within the Saurashtra region), innovator has developed an innovative multipurpose farming machine which may do all the operations which may be administered by a pair of bullock. Using the self fabricated chassis, drive and power of an Enfield Bullet motorcycle ahead the innovator has retrofitted an attachment with two wheels at the rear with a tool bar to fit various farm implements. The rear wheel of the motorcycle has been removed and an innovative assembled unit has been attached. It can also be designed and attached to bullock driven plough and cannot afford the tractors various needs such as ploughing, weeding and sowing or power tillers.

III. METHODOLOGY

Step 1:- Identification of problem: Crane used for small construction site having very high prize. So our attempt is to make such a device which save this high cost.

Step 2:- Literature Survey: Various research papers are studied to find the solution of problem. The study from research paper tells about what thing is affect the performance of system so we have to eliminate that thing.

Step 3:- Design of layout & mechanical part.: This phase involves the design of various elements such as shaft, stand etc. This design consist of calculation by considering some theory of failure of that part and Design is followed by CAD drawing for the purpose of Production.

Step 4:- Brought our material.

The following things we have to buy for making our small power plant.

1. Old scooter
2. Propeller shaft
3. Pipe
4. Hollow shaft

5. Disc
6. Pedestal Bearing
7. 1'' angle
8. Small pulley
9. Rope

Step 5:- Manufacturing processes. For manufacturing of our project we have to done following manufacturing processes localy available Chhakdo rickshaw or assembled vehicle having minimum 6.5 HP engine. This meets seeds and spraying. It can improve productivity and reduce operating costs for farmers, who currently use

1. Sheet metal process
2. Drilling
3. Cutting
4. Arc Welding

Step 6:- Running of project. For running purpose we have taken some test load and that load lifting time for particular height is recorded.

A qualitative approach is utilised to realize a stronger understanding of the underlying principles of crane incidents and accidents and therefore the role of coaching in their prevention. The discussion and conclusions drawn are supported a literature review alongside consideration of the present practices in training and assessing crane operator competence internationally. Noted best practice is printed within a selected context, where training and assessment is said to crane operation, particularly with a view to stop commonly occurring crane incidents and accidents. The discussion firstly establishes the kinds of accidents and incidents that occur, with international examples, to derive common causes which then spotlight areas of focus for training programs. These are then framed up as a model competency specification which may be used as a baseline or standard for the event of crane operation training programs during a range of contexts, such as those leading to licencing, enterprise based programs and vocational education and training programs.
OSHA & American Society of Mechanical Engineers (ASME) crane standards

• Causes & results of crane accidents
• Types of mobile cranes, components & terminology
• Interpreting load charts correctly
• Pre-operational inspection
• Crane setup and recognizing site hazards
• Safe operating practices & procedures
• Operator responsibilities
• Pick & carry operations
• Safety procedures for boom and jib assembly/disassembly
• Safety procedures for working cranes near power lines
• Hand & voice signals
• Hoisting personnel
• Basic rigging procedures.

The article presents stability assessment of the mobile crane handling system supported the developed method with the utilization of the mathematical model built and therefore the model inbuilt the integrated CAD/CAE environment. The model proposed consists of the most crane assemblies coupled together: the truck with outrigger system and therefore the base, the slewing column, the inner and outer arms, the six-member telescopic boom, the hook with lifting sling and therefore the transported load. Analyses were conducted of the displacements of the mass centre of Grus system, reactions of the outrigger system, stabilizing and overturning torques that act on Grus as well because the safety indicator values for the given movement trajectories of Grus working elements.

IV. CONCLUSION

In that way we have selected machine is crane which we using for lifting the weight at construction site. There is manual method of lifting material at desired location of construction which suffering from several disadvantages such as more time required, more effort is required, injury can take place during material handling and unavailability of worker. In order to solve above problem engineers discovered Diesel engine crane to minimize above problem. But such crane is not economical at small construction site and also availability is less. In order to solve above problem we have made such a crane which powered from bike engine. This project is help full for Industry where use of material handling at high level, At construction site for handling material, For operating the roller on the ground for leveling purpose etc. By considering the disadvantages of manual and diesel engine crane we have made successfully this bike operated crane which consist of following benefits.

As Compared to diesel engine crane are Low weight, Low cost and Operating is easy and no need skilled operator for its working. And as compared to mannual material handling is Unavailability of worker, Injury during material handling, More timerequired and More effort with physical health problem arises.

We can also make change in our system that we use boring tool attachment on the shaft so that we can dig small small hole during the construction. So our attachment of boring tool is very help full at construction site. Where we can

use bike power for digging the hole as well as lifting and lowering the material.

REFERENCES

[1] ACEA. (2016). ACEA Key Figures. Retrieved November14,2017,from http://www.acea.be/statistics/article/key-figures
[2] Yang, C.-J. (2010). Launching strategy for electric vehicles: Lessons from China and Taiwan
[3] Fu, J. (2013). The Role of Electric Two- Wheelers in Sustainable Urban Transport in China: Market analysis, trends, issues, policy options. Sustainable Development, United Nations, 1–17. [4] Machine-pdf-rs-khurmi-book-download
[4] Weinert, J. X., Ogden, J., Sperling D., & Burke, A. (2008). The future of electric two-wheelers and electric vehicles in China.