INTERNATIONAL JOURNAL OF RESEARCH IN AERONAUTICAL AND MECHANICAL ENGINEERING
WWW.IJRAME.COM
ISSN (ONLINE): 2321-3051

Vol.5 Issue.4,
April 2017
Pg: 69-74

IMPROVING THE PRODUCTIVITY OF SPARE WHEEL CARRIER BY AUTOMATION

Mahesh.S.Kalokhe[1], Tushar.R. Patil[2], Rajesh.K.Patil[3],Akshay.P.Kotawadekar[4], Chetan.A.Chaudhari[5,]

B.E. Mechanical Engineering, PVPIT, Bavdhan, Pune.[123]4
Asst.Professor, PVPIT, Bavdhan, Pune.[5]

Abstract :

Many organizations are maintain their competitive advantage they must continually look at ways to keep their manufacturing efficient by eliminating deficiencies, monitoring productivity and improve operational performance with the continued pressures of output, quality and deadlines to be met. To compete successfully in today's manufacturing environment, every part of the business needs to run at maximum efficiency and needs to increase productivity. Productivity can be articulated as the proportion of production to inputs cast-off in the fabrication method, i.e. output each unit of input. After entirely outputs and inputs are involved in the productivity quantity it is termed as complete productivity. Outputs and inputs are well-defined in the complete productivity portion as their commercial principles. The cost of outputs minus the cost of inputs is a measure of the income produced in a creation process. It is a amount of total productivity of a construction process and as such the neutral to be exploited in production process. It can be improved with the support of automation [5].

Keywords: Automation, Productivity, Production

INTRODUCTION

In today s scenario production cost is growing rapidly. The raw measurable cost, power cost, etc. are not in our mechanism. For establishments to continue their inexpensive advantage they essential frequently aspect at behaviors to retain their industrialized resourceful by excluding absences, checking productivity and improve functioning performance. With the continuous densities of output, quality and boards to be met, businesses must involve in 'preemptive maintenance' and enlargement at a company level. To strive successfully in today's industrial environment, each part of the commercial requirements to run at thoroughgoing efficiency. Automation is predominantly associated due to the practiced simplicity, repetitiveness, and massive volume of exertion involved with streets. Of course, any investment in automation must consider sound economic analysis of the wished-for applications and the financial capitals of independents (Skibniewski 1988a). In addition to any rigorously financial benefits, an expected advantage of automatic spare wheel construction equipment is improvement in work safety and health [2].
Manufacturing engineering techniques can be used to expose operating abilities and to provide a substance for continuous production levels.

Therefore to increase the productivity and condense the manufacture cost we can only have controls on: todays.

- Manpower cost —by reducing manpower.
- Utility cost —by power saving.
- Quality improvement —Through good control.
- High production —Through state of art machine.
- Keeping proper record —Through systems.

These can be possible only by implementing 'Automation [6].

1. SPARE WHEEL CARRIER

Spare wheel carrier is a carrier which usages to embrace spare wheel. It's informal to procedure and speedy to suitable spare wheel. If spare wheel is straddling limited the packing space of the vehicle such as cars, pickup trucks, buses anywhere the universe is prime factor, extra wheel essential large space therefore to operate this space spare wheel carrier is used to grip the space wheel freestanding of the vehicle. It can be built-in by anchoring it to the vehicle chassis or straight joined on frames of the vehicle [3].

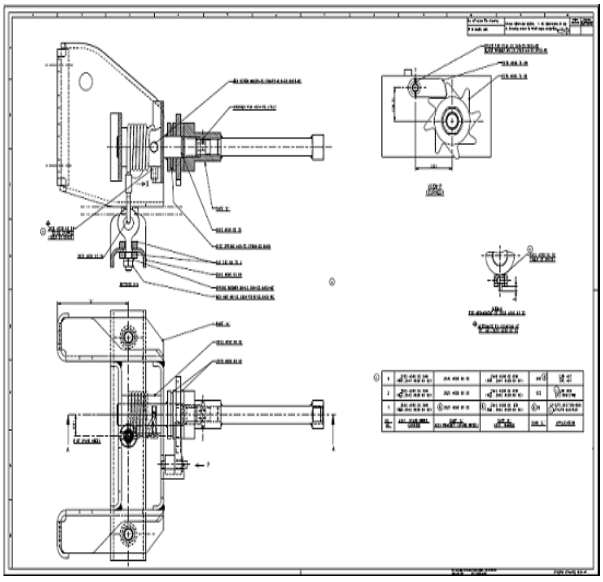

Fig.1. Design of Spare Wheel Carrier

2. AUTOMATION USED (CONVEYOR BELT)

A conveyor system is a common portion of mechanical supervision apparatus that transfers resources from one location to another. Conveyors are especially useful in applications connecting the transference of weighty massive materials. Conveyor systems are used prevalent crosswise a range of productions due to the frequent assistances they provide. Conveyors are able to safely transference materials from one level to extra, which when done by human employment would be determined and exclusive. They can be installed almost anywhere, and are much harmless than consuming a forklift or other mechanism to move resources. They can move masses of all outlines, latitudes and weights. Also, many have progressive safety features that help prevent coincidences. There are a variety of opportunities available for successively conveying systems, including the hydraulic, mechanical and fully automated systems, which are prepared to suitable individual needs. Conveyor systems are generally emphasized in numerous industries, encompassing the locomotive, agronomic, computer,

electronic, food processing, pharmaceutical, chemical, bottling and canning, print finishing and packaging. While a extensive diversity of ingredients can be transported, some of the most mutual contain food objects such as beans and nuts, bottles and cans, automotive components, scrap metal, pills and powders, wood and furniture and grain and animal feed. Numerous features are important in the precise collection of a conveyor system. It is important to know how the conveyor system will be used previously. Certain different extents that are accommodating to consider are the requisite conveyor operations, such as transportation, accumulation and sorting, the material sizes, weights and shapes and where the loading and pickup points need to be Care and maintenance of conveyor systems [3].

LITERATURE REVIEW

The maturity levels of the mangoes were predicted by using the video signals of the CCD (Charge Coupled device) camera which was placed on top of the conveyer belt. The use of CCD cameras in the above method consumed lot of power, dissipated more heat and required additional ICs for operation. This also had a drawback that the maturity levels of mangoes with scratches and black spots on their skin could not be detected with the signals obtained from the CCD camera Robots were developed to sort the objects in bulk which required more mathematics and kinematics for their operation and made the system complex and also less economical. Robotic arms should be designed as to match to the size of the objects to be sorted which made it object specific design and hence less flexible. Most of the Robots use Mat lab software for Image Processing that has less processing speed and they are controlled by Microcontrollers which is application specific. Hence we tried to establish a system that overcomes some of the above mentioned drawbacks by using Raspberry pi 3[7].
Fred Winslow Taylor, a foundry manager from Philadelphia, laid the foundation for mass production (Dennis, 2002). He was the first to systematically apply scientific principles to manufacturing. His many innovations included: Standardized work identifying the best and easiest way to do the job; Reduced cycle time the time it takes for a given process; Time and motion study - a tool for developing standardized work; Measurement and analysis to continually improve the process. The key to mass production was not the assembly line (Dennis, 2002). Rather, it was the thorough interchangeability of parts and ease of assembly. These innovations, in turn, made the assembly line possible. Hemy Fords' conveyor system at the Ford plant, allowed for mass production (Tapping, 2007). The moving assembly line brought the car past the stationary worker. (Dennis, 2002) The assembly line reduced walk time, and most importantly, linked sequential processes. Thus, slower workers sped up and faster workers slowed down. No other company had this technology and could not compete with the Ford plant (Tapping, 2007). Ford's system catapulted the company to industry leadership (Dennis, 2002). The Toyota Production System, or lean production, was the solution to Toyota's problems (Dennis, 2007). Over the next thirty years, Taiichi Ohno solved these problems one by one and pushed his system through Toyota. Today, the Toyota Production System (TPS) is used synonymously with "lean manufacturing" throughout the world (Tapping, 2007). But today we face the same daunting problems that Toyota faced a half century ago, Ohno's system is more relevant than ever (Dennis, 2007)[4].

PROBLEM DEFINITION

It is found that in Sharada industries which is situated in Bhosari MIDC, Pune produces spare wheel carrier in which assembly is carried out manually, workers produces near about approximately 300 products daily, manual assembly leads to human fatigue and due to this the rate of production is slow here we have introduce some automation like conveyer belt or suitable fixture so that the rate of production is increased.

SUGGESTED SOLUTION

- Introducing automation in process of assembly of spare wheel carrier.
- Automation such as to introducing material handling unit in it such as conveyor belt.
- So that required time for assembly is reduced.
- Therefore it helps to improve productivity of organization.

ANALYTICAL SOLUTION

- To find out time required for manual assembly.
- To find out time required for assembly by using conveyor belt.
- To find out total time saving per job.

PROPOSED METHODOLOGY

In this we have studied conventional assembly process of spare wheel and calculate the time required of each and every processes of spare wheel carrier assembly then designed new fixture and conveyor model in CATIA V5.

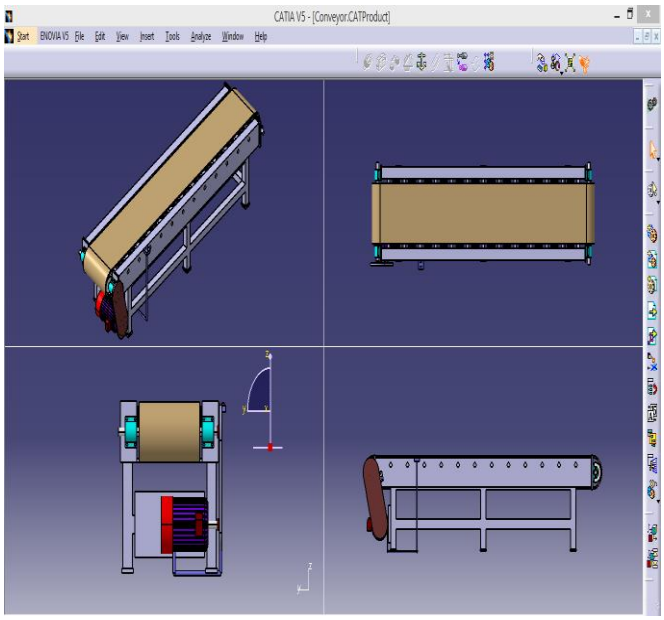

Fig.2. Conveyor Model in CATIA V5

EXPERIMENTAL RESULT

- Total Time Required For Manual Assembly Of Job =
  50 + 28 + 14 + 20 + 24 + 43
  = 179 seconds
  Time Required (T) = 2.59= 3 min.
- Total Time Required For Assembly With Automation =
  10 + 12 + 10 + 6 + 2 + 4 + 8 + 12 + 15 + 15 + 30

= 124 seconds
Time required = 2.06 min

- Time Saving =
(Time required for manual assembly of job) – (Time required with automation)
= 3 – 2.06
= 54 sec=1 min Approx.

ACKNOWLEDGEMENT

I would like to thank the almighty god to shower his blessings on us.Also I would like to thank our honorable head of department Dr. K. B. Waghulde sir,my special thank to my project guide,asst prof C.A.Chaudhari sir & sincere thanks to all the respected teaching faculties of department of mechanical engineering of Padmbhushan Vasantdada Patil and technology Bavdhan.My special thanks to all the writers of reference papers that are preferred by us

CONCLUSION

- By introducing automation in the manual process of assembly of spare wheel carrier we can reduce the production cost so that the productivity will definitely increase.
- The biggest benefit of automation is that it saves labor; however, it is also used to save energy and materials and to improve quality, accuracy and precision.
- So that by introducing automation we can save approximately 1 minute per job.

REFERENCES

1) Ghazi Abu Taher1, Yousuf Howlader2, Md. Asheke Rabbi3, Fahim Ahmed Touqir4 “Automation Of Material Handling With Bucket Elevator And Belt Conveyor ” International Journal Of Scientific And Research Publications, Volume 4, Issue 3, March 2014 1 Issn 2250-3153.
2) Miroslaw Skibniewski And Chris Hendrickson” Automation And Robotics For Road Construction And Maintenance” Journal Of Transportation Engineering, Vol. 116, No. 3, May/June, 1990.
3) Kaboli, Shahriyar “Reliability In Power Electronics And Electrical Machines: Industrial Applications And Performance Models” Industrial Applications And Performance Models IGI Global, 08-Mar-2016 - Technology & Engineering.
4) Rodney S. Rogstad “Implementing Lean Manufacturing Principles In A Manufacturing Environment ” The Graduate School University Of Wisconsin-Stout December, 2010.
5) Cs.Ananas.Chaoxing.Com/Download/029d699f6b80553c19fdc12f6d39f57b.
6) Harish Chatterjee A Textbook Of Increasing Productivity By Automation.
7) Sheela. S 1, Shivaram. K. R 2, Meghashree. S 3, Monica. L4, Prathima. A5, Shriya.M.Kumar6 “Low Cost Automation For Sorting Of Objects On Conveyor Belt ” International Journal Of Innovative Research In Science, Engineering And Technology (An Iso 3297: 2007 Certified Organization) Vol. 5, Special Issue 10, May 2016.
8) Ashwini Bhiungade ”PLC And SCADA based monitoring and control “Multidisciplinary Journal of Research in Engineering and Technology Volume 1, Issue (April 2015).

9) Rodney S. Rogstad ”Study of total lean manufacturing, design Analysis of an automotive Composite Drive Shaft” International Journal of Engineering and Technology Vol.2(2), 2010, 45-48.
10) Mr. Kaustubh Shete. (July 2015)”Simplistic random vibration analysis of a vehicle moving on an infinitely long periodic track 2010” International Journal of Scientific & Engineering Research, Volume 6, Issue 7, July-2015 832 ISSN 2229-5518.
11) R.S.Khurmi, J.K.Gupta ”A textbook of Machine Design, 4Ed” S.Chand publication 2009.
12) Md. Imran Khan, Saad Bin Siddique, Nazmul Hassan, Md.Towhid Chowdhury “Automated Luggage Carrying System” American Journal of Engineering Research (AJER) e-ISSN : 2320-0847 p-ISSN : 2320-0936 Volume-02, Issue-11, pp-61-70.
13) Ajit Chavda, Prof. M.Y.Patil” Increased Productivity of Tyre Manufacturing Process using Lean Methodology” INSTITUTE OF TECHNOLOGY, NIRMA UNIVERSITY, AHMEDABAD – 382 481, 08-10 DECEMBER, 2011
14) Ross Levine, Chen Lin and Wensi Xie “Stock Markets, Banking Crises, and Economic Recoveries” Research Grants Council of Hong Kong (Project No. 448412 and T31/717/12R).
15) Hon Robert Fisher” SPARE WHEEL ARBITRATORS” Paper for AMINZ Conference, Wellington, 7 August 2009.