

Design and Fabrication of Auto Loader and Auto Catcher for Press Automation

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Abstract—The Press Machine is a project that is designing a new way to improve the previous press machines in industries which has a few weaknesses in safety while operating processes. The new press machine is a project to improve previous press machine which have weakness in safety while operating it. This matter creates a lot of problem and at the same time the operators and technician have the higher risk to have an accident in industries. The solution for this problem is a development of a new program of machine which running same operation but the machine is more safety and easy to setup when machine pressing the radio panel using external timer. This machine controlled by the Programmable Logic Controller (PLC). It consists of 6 pneumatic cylinders which each cylinder have their own function. This project contains in 2 parts first one is autoloader and another one is auto catcher. The autoloader will place the hot billet into the lower die of press and the auto catcher will catch the finished product and place it onto the conveyor.

Keywords—Programmable logic controller, Pneumatic cylinders

I. INTRODUCTION

New Press Machine is a project that is designing a new way to improve the previous press machines in industries which has a few weaknesses in safety while operating it. This matter creates a lot of problem to the operators which have the higher risk to have an accident. This project is study about the design and fabricates of Auto-loader and Auto-catcher which shows capability to design more than one concept and fabricate the machine using a variety of machine Other than that, it is important to studies on pneumatic and forging presses which are the main topic for this project. So, at the end of this project, student will practicing on how to build and steps to follow to complete the requirement for this project.

Present day industry is increasingly turning towards computer-based automation mainly due to the need for increased productivity and delivery of end products with uniform quality. The inflexibility and generally high cost of manual system, the society is moving forward towards the automation. Automation is leading to greater safety and increased production of an organization.

Auto-loader and Auto catcher is a plc based system that detects the object, picks that object from source location and places at desired location. For detection of object, different sensors are used like physical touch sensor . Using pneumatic systems is economical and environmentally friendly, as air is inexpensive, plentiful and easily compressed and stored in tanks

II. METHODOLOGY

System Overview

The Figure shows the entire project.



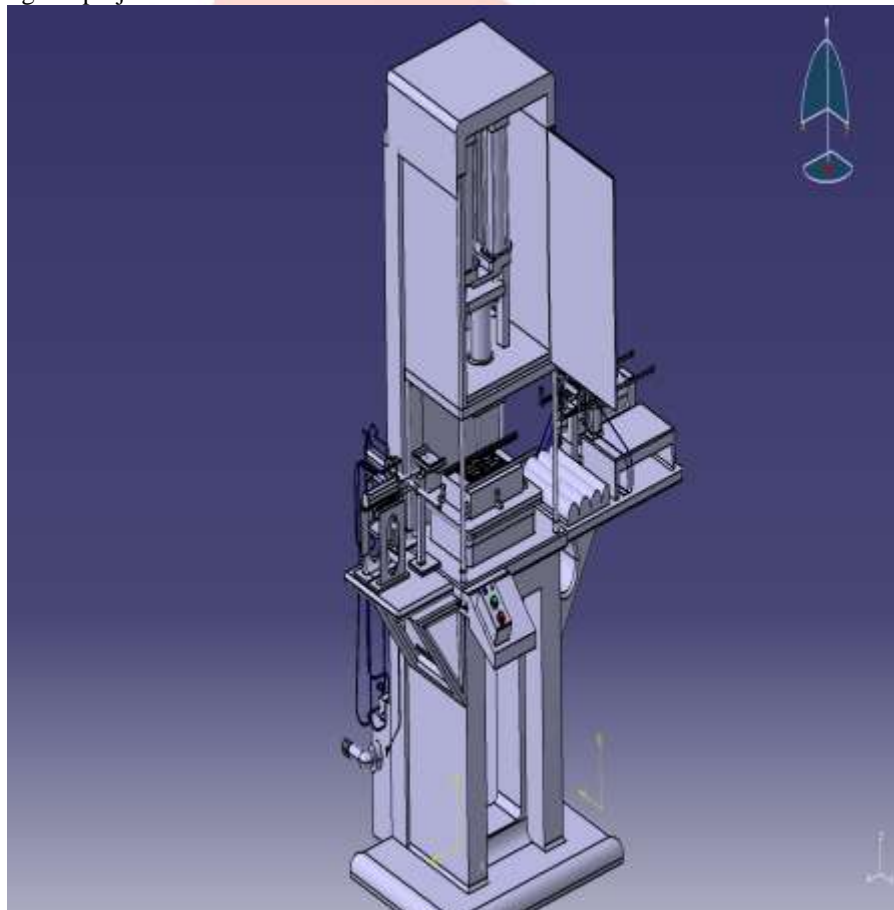
Loading Side



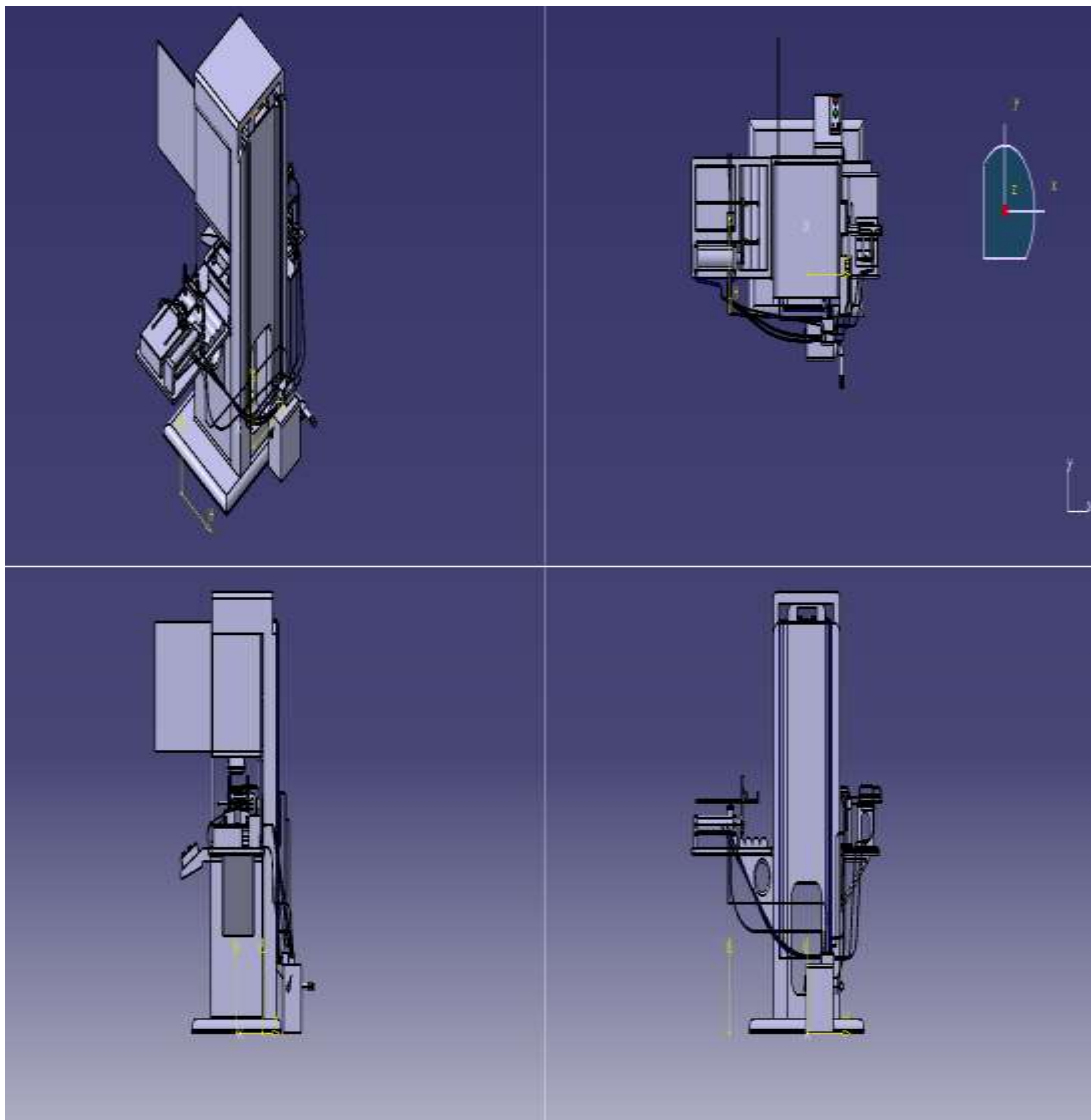
Unloading Side

Design

Following are the design of project



CATIA designs of auto loader and auto catcher



Working

Working of Autoloader- The autoloader consist of 4 pneumatic cylinders. The arrangement of the cylinders is shown in photo. At first vertical cylinder will actuate so that it will move the assembly in downward direction after that horizontal cylinder will help to grasp the hot metal after grasping the metal vertical cylinder will move upward then remaining two cylinders will actuate such that one cylinder will give horizontal motion to assembly and other will give angular motion to arm and the gripper will drop the hot metal into the lower die. And the press will operate and the forging process will be completed.

Working of Auto catcher- After completion of forging process the auto catcher will start working it will catch the finished product into tray and place it on the conveyor. It is very simple in construction only 2 cylinders are used. One will push the other cylinder horizontally. The arm with tray is connected to second cylinder. This cylinder gives the angular movement to arm to catch the product. The physical touch sensor is used to give feedback so that the next cycle is processed.

Results/ Findings and Discussion

At the end of the project, this press machine completed and functioned as the desired result. Press machine was able to push the object to the place which will be press by the pneumatic. Then it will push to a gripper machine that will grip the object and place it to nearest place. Following are the observation made before and after automation.

Observations	Before	After
1. Production time	90 sec	40 sec
2. Production Rate	710	1500
3. Men needed	3	1

Conclusions

From the research , findings and testing made in this project, it showed that this press machine is able to press the component, Auto loader is able to pick and place the metal in lower die as well as the auto catcher is catching product satisfactorily. The sensors fitted are working fine. The cycle time is reduced to 40 sec from 90 secs and the manpower needed is also reduced as only one person is required to supervise the working.

III. ACKNOWLEDGMENT

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