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HIGH PERFORMANCE DESIGN OF THE MANUAL SMALL PRESS MACHINE

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Abstract (10pt)

In an attempt to improve the accuracy and efficiency according to the requirement. No work is done in proper designing of special manual machine press machine, these days, rather rule of thumb prevails. To keep pace with company demands improvement in the design of the manual press is needed. So I worked to improve the designing of the machine for getting the best results by designing the balls of cast iron that provides appropriate pressure to stop fluctuation in size of components.

The specific dimensions of the press machine are as Improvement in design of the manual small press machine for sheet metal job under 900mm2 areas X 1mm thickness in stainless steel grade 304. Though in extreme case it can work even on 2.0 mm thick stainless steel of specified area, without any problem.

Keywords:

Press machine;
Balls;
Cast iron;
ManualPress.

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1. Introduction (10pt)

There is an increase in technological methods in all daily activities in the industries. This is done to improve the quality, efficiency and cost deduction of a particular product. Many manufacturer companies try to be up-to-date in their products' improvement with thinking the effects on their customers. Although it is good for customers side to have the latest version of particular products but if the interest of their valued current customers is to be put into

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consideration there should be a stand-by solution to their existing products improvement to suit the latest version to some extent if not one hundred percent. This has been one of the major problems of companies nowadays because their equipment and customers to buy the new products anytime they are released. This was the reason to examine equipment modification machines are very expensive and high maintenance and the manufacturers should not expect the.

Fly Press

The basic picture of the fly press machine used till now is shown. This type of fly press machine is used for the different purposes in the industries like joint of the door. This press machine is widely used in the small scale industries where the demand of special item for the product is changed time to time with the main product. If the new machine is purchased for each odd item than the regular demand, the cost of that odd item is so high that the profit level of industry is down. So, after study the whole working of the industries I suggest an idea to solve the problem up to some extend by improve the design of that fly press machine.

Problems Facing the Company in Using Existing Press Machine

Due to technological and industrial advan- cement, some of the old manual and hydraulic press attachments (e.g. made for odd design product) are not suitable for the new big machines this causes a big problem for the company because it means that they have to buy new attachments again for the newly bought machine.

Another problem that the worker has to face while using the hydraulic press machine is that he must needed to trained with that hydraulic machine and also know the whole working process with the all working conditions of electricity fluctuation, temperature etc. all this make the worker so much costlier that the rate of that specific product is also so much high that the working with that is not suitable for the owner.

A common problem that we are going to face with the working with fly press is that the weight of the flywheel is fixed no change can be done with that weight. Because the whole fly press is made up of by casting .So the rigidity of the machine is comes in a form of a big problem regular product by the customer.

Suggested Solutions

1. Buying a new attachment for the different product to be assembled. (High cost)
2. Managing the old one with help of some supports (Low efficiency and cost)
3. Redesigning of the coupling area/parts for easy fittings (High efficiency, low cost and less Time)
4. Redesigning of the coupling area/parts for easy fittings with use of different type of press machines of lower working with lower cost and power (high efficiency, low cost, less power and less time).

By carefully checking the all above, it will be seen that the target area can be found in the fourth point which makes it the most suitable option to choose.

2. Research Method

LITERATURE REVIEW

The press machine Gutenberg (Johan Gensfleisch) a German invented in 1400 was modified one from a wooden screw type press machine for squeezing olive oil and grapes. This was exactly the root of the screw presses and all press (punching, stamping) machines, stamping inked print boards onto sheet with the screw. This is the type of machine to apply static pressure.

Until 1700 AD fly press were not in engineering application. Earlier open Die or Hammer were used to produce small components .Then gradually by 1767 AD; small fly presses particularly for Gold smith work in ornamental work were evolved and used effectively.

Doc Smith & Mates in 1999 work on hydraulic press machine & give conclusion that the press work on the Hydraulic version of the press machine Oseni K Owolarafe, Michael O Faborode 25 May 2000 work on press machine & give conclusion that The comparative evaluation of the DSP system which is being developed and the conventional hydraulic press system undertaken in this study revealed that the DSP system has many comparatively favorable attributes and is to be preferred to the hydraulic system. Isaac Bamgboye and Morakinyo T.A An improved oil screw press has been designed and constructed having 98.6 % efficiency and a capacity of 0.86 tons/ day. Abrasion rate of screw-shafts has been reduced from 63.3% to 12.6% by using high carbon steel material instead of low-carbon steel. Peter Beerens in 2007 gives an idea about press machine and the result is extended due to improvement in the plate form in the design of the machine.

METHADOLOGY

The steps in the design process proposed as follows:

1. Problem identification
2. Preliminary ideas
3. Problemrefinement
4. Analysis
5. Decision, and
6. Implementation

Problem Identification

It need to gather data of several types : fixed data, opinion surveys, experimental data,personal observations

Preliminary Ideas

It is the generation of as many ideas as possible . these ideas should be sufficiently broad to evolutionize existing methods. All thoughts should be recorded in written form with diagrams. A technical approach should be used to gather preliminary ideas for the design problem. The following sequence of the step is suggested:

i. Hold brainstorming session
ii. Prepare sketches and notes,
iii. Researches existing designs, and
iv. Conduct surveys.

Deign Refinement

Several of the preliminary ideas are selected for further refinement to determine their true merits. Consideration is given to spatial relationships, angles between planes lengths of structural members, intersections of the surfaces and planes.

Analysis

In involves the evolution of the best design to determine the required merits of each part of the machine with respect to price, cost, strength function and market appeal. The analysis is done in all respect, that is, Functional analysis, human engineering, market and product and model analysis.

Decision

Decision of any design is taken after the different type of the analysis done with the design and its matching with the requirement in the industries. It is the final stage of the administration group before implementation of any design in the factory. So, it is the crucial stage of the administration how and up to which extant the design is to be implementing for the improvement.

Implementation

It is the presentation of the final design concept in a workable form, primaryly as working drawings and specifications that are used as the actual for fabrication of a product. Implomentation phase of the design process is shown in figure below.

DESIGN CALCULATION FOR MANUAL PRESS MACHINE

Rankine - Gorden Formula Crippling load:

Rankine - Gorden Formula Crippling load:

Wcr= Ac σy [1-(σy / (4cπ2 E) (L/k)] (all dimensions are in mm & N)

= 332400(1-0.430852)

=189184.61 Newton

Or =189.18 kN

Here, **W**cr = Crippling load

Ac= Cross Sectional Area Of the screw

σy = Yield Stress C = End-Fixity Co-efficient E = Modulus of Elasticity l =Length of Screw k = Least Radius of Gyration.

Since, 189.18kN is greater than our maxi- mum required of load 140 KN (including factor of safety as 2)

Hence, the Design is very safe.

Design of the Ball Attached

Mass of ball

Radius of ball (r) =68 mm 4/3 2 = mass of a ball 4/3 (0.068) 7300 = **10kg**

Here = mass density of the material of the ball i.e., cast iron

RESULTS AND DISCUSSION

Designed machine is capable to do work with some shear force so we can made some modification to improve the shear force of the press machine for that some of the load in accordance with the design of the existing press machine is attached. This improvement

W = A [1(/ (4c2E) (L/k)]

is helpful for the working of the machine with (all dimensions are in mm & N)

= (1662 x 200)[1-(200/ (4(0.25 2E)(l/k)]

= (1662 x 200) [1-(200/(4 (0.25 * 200000)(750/(46/4))]

the odd products too without any difficulties and solve all objectives mention in this paper. The press machine is helpful in many ways, i.e. accuracy, lower cost of machining and improve the efficiency of the machine.

CONCLUSION AND FUTURE SCOPE

By putting (diametrically opposite) variable additional weights on the flywheel we can obtained that desired energy levels to suit the maximum load required for manufacturing different types of engineering parts. Of course it is understood that only limited variation in capacity is possible. If at all some bigger or odd components to be manufactured one can choose the next higher range of the flypress.It is very clear that for given press reasonable flexibility is possible as far as energy is total load is concerned.

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