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Design & Fabrication of Metal Scrap Bailing Press

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Abstract: Industries are facing a lot of problems in storing and handling the scrap. A lot of room is required to store the piece. To defeat these issues the pieces can be packed and put away in a cubic shape. Today, all the cutting edge fabricating businesses are endeavouring to grow best advanced lessened weight and savvy items that meet the planned outline practically and dependably. In this situation, auxiliary enhancement apparatuses like topology and shape improvement with assembling re-enactments are getting to be appealing in item configuration forms. These instruments likewise help in lessening item improvement times. In most recent couple of years, shape improvement has risen as the profitable device to grow new plan recommendations particularly in steel ventures. Auxiliary enhancement devices have increased foremost significance in modern applications. In this task, topology streamlining has been connected on different segments of pressure driven piece metal baling press

Keywords*: *Topology, Scrap, Pascal's principle, Optimization, Ergonomics

I. INTRODUCTION

A baling machine is a gadget used to pack materials into a bunch for capacity, transport, or taking care of. A few sorts of machines exist for this reason, as some are outlined particularly for one material, while others might have the capacity to deal with different materials. Pressure driven piece baling presses are hardware that discover use to pack distinctive kinds of scraps into parcel shapes utilizing pressure driven power. These presses are utilized as a part of various approaches to pack light, thin and additionally delicate materials. With a few sorts of balers accessible for various materials/applications, these Balers are additionally utilized as a part of material reusing offices. There is additionally an arrangement of tying parcels physically with help of gave grooves, in this manner helping in sparing much cost of transportation.

Pressure driven scrap bailing presses are designed for:

1) Metal scrap
2) Paper scrap
3) Plastic scrap
4) Cotton waste

All these can be framed into cuboids bunches. Further, as the thickness of bundles is high, these are likewise advantageous to store, transport and utilized as a part of metallurgy. Highlighting complex electrical- hydraulic control have two working modes viz. Auto and Inching, these accompany weight customizable office that make these Hydraulic piece baling squeezes best in execution and in addition simple in working and high in profitability. Since high level of compaction is accomplished, it helps in sparing costly storage room and in addition permits making transport and dealing with more less demanding. These balers are made of steel with water driven Ram for compacting the material stacked. Some balers offered are straightforward and work escalated, yet appropriate for littler volumes.

II. LITERATURE REVIEW

A. "BALING PRESS", Orion Thomas Quinn, Sr., Los Angeles, Calif., assignor, by mesne assignments, to Apex Steel Corporation, Ltd., Los Angeles , Calif., a Corporation off Nevada.

This invention pertains to a baling press adapted to compress Waste paper, cotton waste, rags, cork chips, metal cuttings, scrap metal and various other materials into consolidated or compressed bales which are then strapped or bound in the usual manner. The invention is specifically directed to improvements in baling presses, among such improvements being simple and efficient means for opening and closing the upper portion of the charging box so as to permit the charging box to be readily filled and the pressed material readily removed from the press.

B. "Improvement In Waste Handling System", Varun Chandratre, Pratik Rathod

Large Square of baling is currently recognized in industry of wasted paper in a proper form so as during transportation the waste material is decreased and quantity of transportation will increase. Baling machine is used to bale collecting and storing at an industry (Jash Packaging Co.) Factors to be affect of this method are large square of bale production and handling logistics were quantified. Performance material capacities of machines used in this system to be determined based on field measurements. It means to increase system efficiency or reduce transportation cost and waste paper material were discussed.

III. GAPS IN THE REVIEW

A. After our initial survey, we found that most of the industries are using the traditional way to store the scraps.
B. Due to that traditional way steel gets corrosive
C. Due to the excess of steel waste it requires lot of time for filling the waste in the transporting vehicle and it more tedious work .
D. These Metal scrap baling machines, hydraulic operated machines are costlier which is not affordable for some small scale industries.

IV. OBJECTIVE

Strength optimization tools have gained the paramount importance in professional applications therefore of ground breaking designs, reduced weight and cost effective products. Especially, in steel, airplane and automobile industries, topology optimization has become an integral part of the product design process. In this project, topology search engine optimization has been applied to various components of discarded baling press and hydraulic press.

V. WORKING

A. Working Principle

The Pressure driven scrap bailing presses works on the principle of Pascal's law which state that: The pressure throughout the system remains constant. The pressure exerted onto the confined fluid is transmitted equally in all directions at the same time and acts at 90 degrees to the containing surfaces.

B. Calculations

Assume: One person can lift, pull or push weight of 50 to 60 kg. ……. (By using Ergonomics).

Therefore, F =60*9.81
= 588 N.
=600 N.

To compress steel = Force/Area
= 600/150*150
= 0.026 N/mm^2

1) Design of Screw

O_D =18 mm
I_D=15 mm
Torque= F*D_m /2 tan*(α+φ)
Where, α- Helix angle
φ- Angle of friction at screw
α= Tan-1(1/∏*D_m)
= Tan-1(1/∏*17)
=1.07 Degree
μ=0.10-0.16……(from design data book P.N.-94 T.N. IV-2)
μ=0.12
φ=Tan-1(0.12/sin 1)
φ= 6.84 Degree
T= 300*17/2 *tan*(1.07+6.84)
T= 358.59 N-M

2) Lever Design

T=F*L

L=358.59/600

=0.54 M

Bewel Gear **:** No. of teeth =25.....(on both gear)

Cone distance:

$L=0.5*(D_g^2 +D_p^2)^{1/2}$

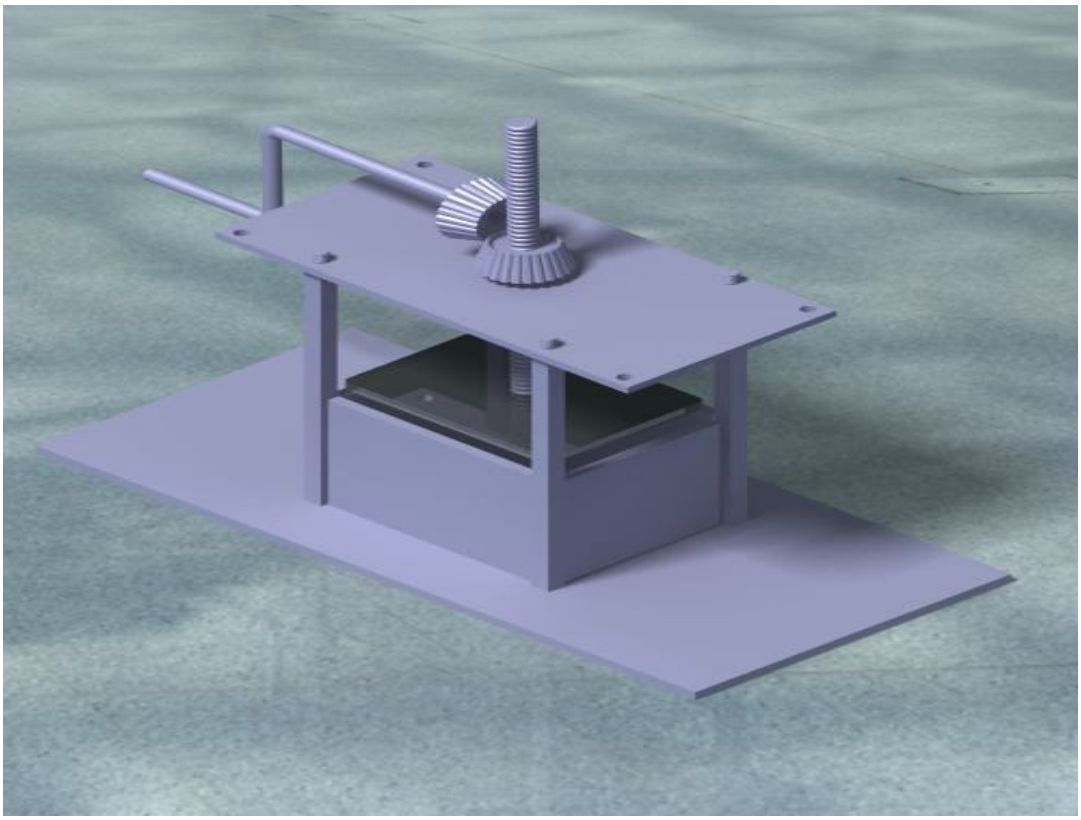
D_g = Diameter of gear drive

D_p = Diameter of pinion

$L=0.5*(65^2 +65^2)^{½}$

L=45.96 mm

C. Design



VI. CONCLUSIONS

A. The bales formed by this machine helps in easy handling, storage and transportation.

B. The maneuverability of the device is quite good and the handling is quite simple.

C. Optimization design is compared to the actual part design that is being manufactured for the scrap baling press and hydraulic press.

D. It is inferred that under the same loading conditions, constraints and intended design purposes, shape optimization results in better and more reliable design.

E. The cost of the machine is low compared to market product; there is 50% reduction in the cost.

VII. ACKNOWLEDGMENT

A. Accomplishment of any work involves many people. We take this opportunity to express our appreciation and thanks to all the people who have contributed directly or indirectly to make this project a success.

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[1] BALING PRESS, Orion Thomas Quinn, Sr., Los Angeles, Calif., assignor, by mesne assignments, to Apex Steel Corporation, Ltd., Los Angeles , Calif., a Corporation off Nevada.
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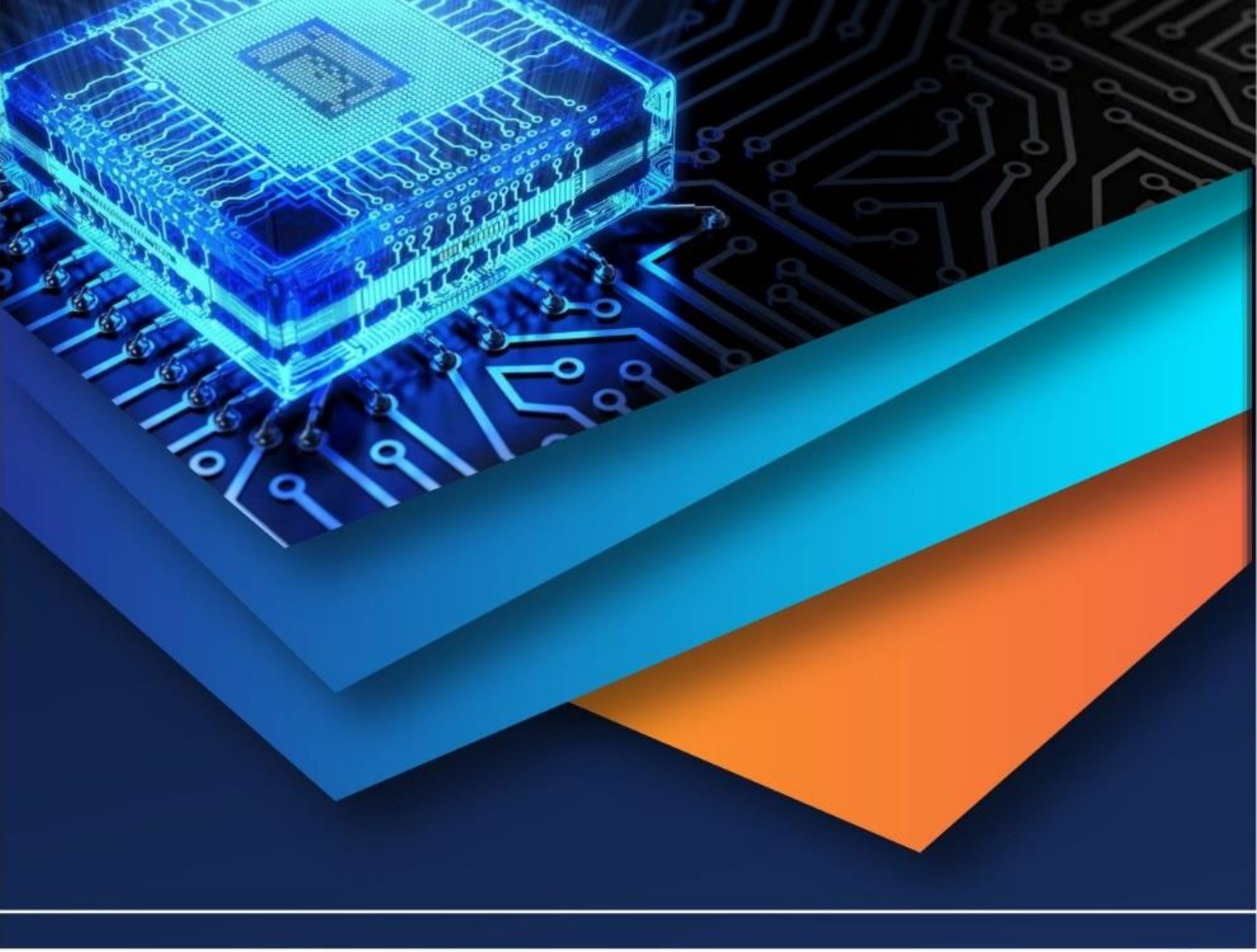

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