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EXPERIMENTAL ANALYSIS OF MULTIPURPOSE MECHANICAL MACHINE

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Abstract:

In an industry a considerable portion of investment is being made for the installation of machinery. So in this project we have proposed a machine that can perform operations such as drilling, grinding, cutting some turning operations with different processes centre individually implying that industrial do not pay for the machine that performs tasks above individually to operate simultaneously. This file shows the idea of a multi-function operating machine mostly made for generation-based companies. We have built a calculated model of a car for which it would be equipped. Perform some activities at the same time and also be financially efficient. In this machine we are truly offering solidarity to the primary well to which the key tool is specifically associated.

Keywords- – **Multifunction Machine. Ex. Drilling, Grinding, Cutting**

I. INTRODUCTION

In the market there is not a machine that facilitates cutting, grinding and drilling operations at the same time. So we I tried to do the same with all these operations. This team describes the implementation of redesign. Our project is the special purpose equipment, specially designed to have the ability to work the material using an abrasion process machine using the design application for production and methodology of the Assembly.
The industries are basically destined for the production of goods and services useful at low production costs, machine costs and low inventory costs. Today in this world, every business has become increasingly fast due to technological progress, but this progress also requires huge investments and expenses, all industries want to achieve a high rate of productivity while maintaining the quality and standard of the product at a cost low in a sector, a considerable part of the investment in the installation of machinery is taking place. So in this mechanism we have a proposed machine that can perform operations such as drilling, grinding, cutting.

OBJECTIVE

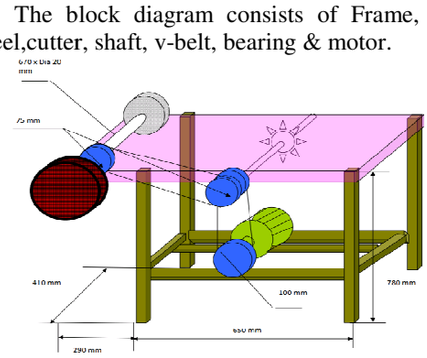
- You can perform a tedious task to get rid of empty spaces.
- You can perform the operation of striking to complete the work piece, refine the equipment and so on.
- It is an exceptionally consumable machine and can perform tasks based on its own decisions.
- It is light, of great vitality and, moreover, profitable.
- A hacksaw is a fine-toothed saw with a sharp edge under pressure on one side, used to cut materials, e.g. Metal

SCOPE OF THE PROJECT

This equipment performs multiple operations at same time with required speed & this machine is automatic which control or operated by motor. From the study, the total number of parts, cost of existing design is reduced. As we know that the machine cannot be kept idle. So accordingly, we have modified the given mechanism into multi operating equipment system. Due to which we can perform different operation in single machine. Eventually, the improvement of redesign and integration of grinding and drillingoperations with metal cutting finally will be able to meet user requirements and satisfactions.

II. BLOCK DIAGRAM

The block diagram consists of Frame, pulley, grinding wheel,cutter, shaft, v-belt, bearing & motor.



PART NAME	MATERIAL	QUANTITY	DIMENSION
L SECTION ANGLE	MS	1	25x25x3mm
PEDESTAL BEARING	CI	4	P-204
SHAFT	MS	2	20mm
BIGGER PULLEY	MS	1	9 inch
SMALLER PULLEY	MS	2	4,2 inch
MEDIUM PULLEY	MS	1	8 inch
MOTOR	STD	1	1HP,1440 rpm
V-BELT	LEATHER	2	A-44, A-67
OLDHAM COUPLING	MS	1	No. 75
CUTTER	MS	1	4 inch

III. EXPERIMENTAL SET UP

Setup comprises of casing, metal shaper, granulating wheel, boring wheel, shafts, heading, v-belts, pulleys and engine as appeared in fig.1.Initially frame is fabricated with help of M.S. angles keeping in mind the location of different parts to be mounted. According to design specifications and availability in market metal cutter, grinding wheel, and drilling tool are brought and mounted on two different shafts. At that point heading and pulleys of wanted details mounted on shaft. V-belts used to transmit the power frame engine to pulley and one pulley to another. Toward the end electric A.C. engine is mounted on base of the edge. All get together is finished and tried in working condition giving wanted load lastly the outcomes are broke down.

The standard angle available of 25 x 25 x 3 mm and we selected the same which can bear the impact loading. The components and their Specifications are shown in the extensive design.

IV. MECHANISM USED

Crank Lever Mechanism:

It is principally used to change over rotating movement into responding development or the other way around. The accompanying is a sliding wrench system and the parameters used to characterize the points and lengths of the associations are given. As in the four-bar system, the lengthened and twisted deadlock positions happen when the wrench and the coupler are collinear (the coupling of the coupler is regularly alluded to as the associating bar in the sliding wrench instruments). The entire wrench turn is conceivable if the capriciousness, c, is not as much as the contrast between the interfacing pole and the lengths of the crankshaft.

V. CONCLUSION

In this paper multipurpose machine having metal cutting, grinding and drilling on single base is described. The practical measurement results have shown that the performance of this machine is better than the existing one. It requires less power for its operation. It is also convenient to move from one place to another, due to its compact size and being installed on the single frame. It is simple for the support with low upkeep cost and requires less expertise for its activity. This machine causes the expansion of generation limit.Thus this machine is better choice than machines performing those operations individually.

VI. DESIGN CALCUTION

FOR SHAFT:

Step1:

τper=0.3xSyt =0.3x183=54.9MPa

OR

τ per=0.18xSyt =527x0.18=94.86 MPa

Pulley are keyed to shaft reducing smaller value by 25%

τper=0.75x54.9 =41.175MPa

Step 02:

$P=\frac{2\pi NT}{60}$

$T=\frac{P\times 60}{2\pi N}$

$T=\frac{746\times 60}{2\pi\times 1440}$

$T=4.94\times 10^3$ N-mm

Torque transmit by bolt drive

$T=(T_1-T_2)\,\gamma$

$4.94\times 10^3=(T_1-T_2)\times 112.5$

$T_1-T_2=43.9$

$T_1/T_2=2.5$

$T_1=2.5T_2$

$T_2=29.27$ N

$T_1=73.17$ N

Step 3:

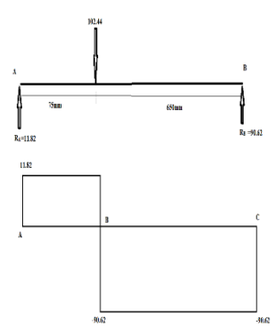


Fig.2 SFD

$R_A+R_B=102.44$
$\sum M_A=0$
$102.44x75-R_Bx650=0$
$R_B=11.82$ N
$R_A=90.62$ N

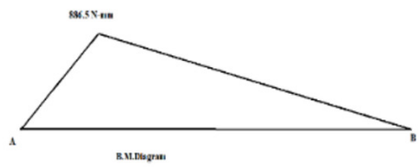


Fig.3: BMD

B.M at A & B=0
B.M at C =11.82 x 75= 886.5N-mm
M_{max}=886.5N-mm
$\sqrt{(K_t xT)^2+(KbxM)^2} = \pi/16d^3 x\tau_{per}$
$\sqrt{(1.25x4.94x10^3)^2+(1.5x886.5)^2} = \pi/16d^2 x41.175$
d=8.75mm =10mm (Standard)
The design is safe.

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