Research Paper Engineering

Research Paper of Manually Operated Pipe Bending Machine

N. N. JADEJA	Assistant Professor, Government Engineering College, Bhavnagar-364002
M.C.Baraiya	Students, Government Engineering College, Bhavnagar-364002
A.B.Jasoliya	Students, Government Engineering College, Bhavnagar-364002
R.U.Jagad	Students, Government Engineering College, Bhavnagar-364002
V.R.Makwana	Students, Government Engineering College, Bhavnagar-364002

ABSTRACT

The paper deals with manufacturing of fixed die and lever operated manually tube bending machine. Especiallydiscussions are made on bending project analysis of manually operated pipe bending machine with the bend of 19mm outer and 17mm inner diameter pipe at the angle of 90° to 180° without any wrinkles or defect. Also, considering a market survey of that machine prize and pipe defects on these manually operated pipe bending process.

KEYWORDS Wrinkle effect, Productivity, Market analysis of machine, accuracy of output product

1 INTRODUCTION

The development of nation depends on the achievement in science & technology. So, innovate a machine which is easy to use and that can not tolerate with their accuracy. Without affecting the prize of the machine. All over the world the resources of energy is reduced for that we can find new sources of energy. For that machine is both manually and power operated. In India, there is many industries which are engaged in production of manually pipe bending machine. Presently, the pipe bending machine is power and manually both operated. But, the manually operated pipe bending machine has less accuracy at high prize. Therefore, our objective is to increase accuracy at low prize without affecting the pipe bending productivity.

1.1 MANUALLY OPRATED PIPE BENDING MACHINE

Take a pipe of correct size of 19 mm outer diameter and 17 mm inner diameter Mild Steel.Hold this pipe between the grooved pulley and rail with the help of fixing element. Apply a considering force at the end of lever.In this machine when the force is applied by the lever, roller transmits this force to the rail. The rail can slide over the face of pulley. So, rail tends to bend the pipe in the groove.

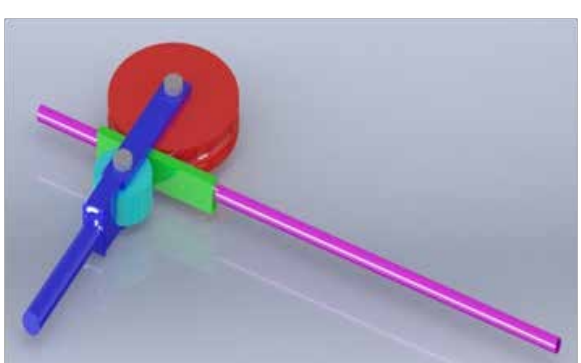

FIG. OF PIPE BENDING MACHINE ASSEMBLY

2 FIGURE OF STRESS PRODUCED IN PIPE BENNDING MACHINE

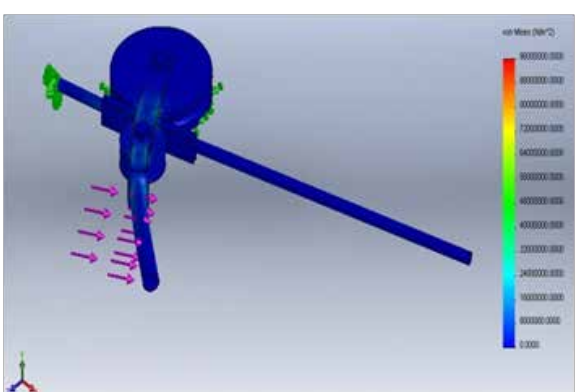

FIG. STRESS APPLY ON PIPE BENDING MACHINE

Here, compressive stress is generated at the inner side surface of pipe and tensile stress is generated at the outer surface of pipe. Due to these stresses, the pipe will bend without failure.

3 MANUFACTURING COST, EQUATION OF STRESS AND APPLY FORCE

Manufacturing cost of Machine:

Machine Specification	Cost
Machine Raw material	2219
Machining of parts	850
Total Prize	3069

Equation of apply forces:

$Z = I/Y$

$\sigma = M/Z$

$M = F*L$

Where I = moment of inertia of pipe, mm^4

$= \pi(D_o^4 - D_i^4)/64$

Z = section modulus, mm^3

σ= allowable bending stress, N/mm^2

M= Bending moment, N-mm

L=length of lever end from pipe center, mm

Equation of stresses:
Here, pin is the weakest part in the machine. It is subjected to double shear failure.

$\tau = 2* F * \pi d^2/4$

d = diameter of pin, mm

4 CASE STUDY OF PIPE BENDING MACHINE MARKET ANALYSIS AND ACCURACY

MARKET ANALYSIS OF MACHINE

Pipe Bending Machine	Prize
Horn CNC50TBRE Specification	150000
Section Bending Machine	32000

In the market wrinkled pipe is pipe being produced by chair manufacturer. In this bend pipe, no wrinkle is produced inside the bend pipe of 19mm outer and 17mm inner diameter. With help of this machine, we can produced 90◦ to 180◦ bend pipe easily.so that over produced a manually pipe bending machine within only of Rs.3069/- which is affordable to all small industries.

5 CONCLUSION

The conclusion is for small pipe bending machine user industries. For bending a 19mm outer and 17mm inner diameter pipe can bend with the accuracy without any wrinkle inside the pipe and failure with the help of this machine.

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