**Australian Journal of Basic and Applied Sciences**, 9(10) Special 2015, Pages: 290-294

ISSN:1991-8178

**Australian Journal of Basic and Applied Sciences**

Journal home page: www.ajbasweb.com

# Reinforced Bar Bending Machine

[1]S.Thillairaja, [2]K.VarunYadav, [3]G.VelMurugan, [4]S.P.Venkatesan, [5]R.Thanish Kumar, [6]K.Manoj Prabhakar

*[1,2,5,6] UG Student, Mechanical engineering, Excel College of Engineering And Technology, Namakkal*
*[3] Assistant professor, Mechanical Engineering, Excel College of Engineering And Technology, Namakkal [4]Associate professor, Mechanical Engineering, Excel College of Engineering And Technology, Namakkal*

**ARTICLE INFO**

***Article history:***
*Received 28 January 2015*
*Accepted 25 February 2015*
*Available online 26 May 2015*

***Keywords:***

**ABSTRACT**

Reinforced bars are the one which are widely used in the construction field, such as pillars, concrete, etc.., especially, it is used for pillars. The reinforced bars plays vital role in construction of building. It may be used as straight or otherwise in bend .since bending of this bar, done by traditional technique, which requires fully manual work. Somewhere like construction of apartments needs much more manual work for this bending, minimum it need at-least two persons for bending the bars. This bar bending machine replacement for manpower and it is a semi-automatic one by using electrical motor, gear box etc.., it simplify the manual work as well also economic wise (approximately it saves rs:500 per day minimum) by reducing the labors. Number of operations can do easily with this machine. Our project's video link: https://youtu.be/BiVIkAv86M4

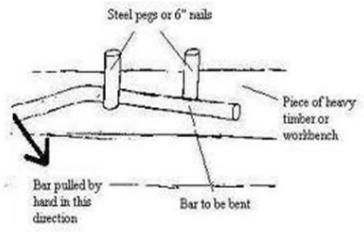


**To Cite This Article:** S. Thillairaja, K. VarunYadav, G. VelMurugan, S.P.Venkatesan, R.Thanish Kumar, K. Manoj Prabhakar., Reinforced Bar Bending Machine. ***Aust. J. Basic & Appl. Sci.,*** *9(10): 290-294, 2015*

## INTRODUCTION

It is the one among the semi-automatic machine, where the labor need for feeding the bars and operating the switches only. It is the portable machine, so it can be carried anywhere. It is compact in size; it does not occupy larger space, so it can be placed wherever. This is fully motor-gear based system, and it is does not make any noise or vibration during the bending.

### *Manual Bending Technique:*




### *Manual bending:*

In manual bar bending, dies are there. In between those dies bars are placed, so one side of the bar is supported by the die, and another side of the bar is pulled by human hand. This same concept is used in this project; here instead of hand pulling, revolution of machine shaft is used for bending the bars.

### *Parts Of Bar Bendig Machine:*

It is a fully mechanical based machine; it has the mechanical components those are listed below:

### *Induction Motor:*

Gear box and gears
Iron table
Wooden plate
Belt with coupling

### *Induction Motor:*

In this project, induction motor is used as a source. It gives high torque compare than others, because of its slow speed

**Corresponding Author:** S.Thillairaja, UG Student, Mechanical engineering, Excel College of Engineering And Technology, Namakkal

Australian Journal of Basic and Applied Sciences, 9(10) Special 2015, Pages: 290-294

Slow speed induction motor.

***Specification Of The Motor:***
POWER: 180 W
CLASS: E
R.P.M: 1400
AMPS: 2.0
PHASE: SINGLE PHASE
FRAME: B56

***Gear Box:***

In this project, gear box-(BEVEL GEAR) plays the vital role, it reduces the speed as (3:1) ratio, and so enormous amount of speed is reduced in easy manner. Apart from this, different size of couplings is also used for the speed reduction. That's how "1400 RPM" which is reduced as "110

***RPM:***

G.B with shaft & gear.

***Iron Table:***

Iron table is carrying weight of all the elements such as wooden table, gear box, motor, and the gears all are mounted over it. As it consist of six columns.

Table side view.

***Wooden Table:***
**Size= ( 46 * 16) CM**

Australian Journal of Basic and Applied Sciences, 9(10) Special 2015, Pages: 290-294

It carries the motor and gear box over it. Wood is cheap and best, and it does not

**Gear box without pulley**

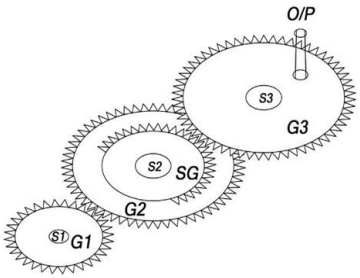
make noise while running, rest of this like steel ,iron are make the vibration

***Speed Reduction By Coupling:***

***Coupling view:***

Where;
G.B= Gear Box
Motor pulley (1")which rotates In 1400 rpm
Which transfers energy to the gear box pulley(7")
So 1400 rpm reduced as 330 RPM
Gear box reduces the speed as (3:1) ratio
So the final out will be 110 rpm

***Main mechanism of the machine:***




| COMPONENT | SPEED |
|---|---|
| MOTOR | 1400 |
| G.B PULLEY | 330 |
| G.B OUTPUT | 110 |

Where;
G1, G2, G3- are the gears
S1, S2, S3- are the shafts
SG- semi teeth gear
O/P- groove (output)

***Construction:***

G1 gear (20 TEETH) is connected to the gear box output by help of a shaft S1.
G1 (20 TEETH) gear is merged with the compound gears (G2, SG).
Compound gear consists of a gear G2 (127 TEETH), SG (90 TEETH) by help of a shaft S2.
SG (90 TEETH) of a compound gear is merged with the gear G3 (127 TEETH) with shaft S3.
The output groove is welded on gear G3 (127 TEETH).
The gear arrangements are fully invisible (covered by the top table surface). Only the grove output is visible in top surface of the machine.

***Working Of Gear Mechanism:***

Side view of the gear arrangement.

Australian Journal of Basic and Applied Sciences, 9(10) Special 2015, Pages: 290-294

***Working of mechanism:***

Gear G1 is rotated by the shaft S1 mounted on the gear box output.

Gear G1 which rotates the compound gear of G2 gear By the shaft S2 of a compound gear, SG gets rotates as a speed of gear G2.

SG rotates the gear G3 mounted on the table by help of a shaft S3.

The groove mounted on the gear G3 get rotate as the speed of a gear G3.

***Specilization Of A Semi-Gear:***

***Semi-toothed Gear:***

The SG (SEMI TEETH GEAR) is a specially designed gear as it rotates completely. But the gear dose not consist of a full teeth, as it contain only limited teeth, as it rotate the gear G3 only for 90 degree.

The gear SG and G3 are works like the CAM AND FOLLOWER. The gear G3 get rotates only when the teeth of a SG get merged and the gear G3 gets ideal when the teeth of a gear SG demerged (where SG works like CAM and gear G3 works like a FOLLOWER).

Merging

De-Merging

***Top View Of The Machine:***

The inside motor and gear box systems are covered with the wooden plate, which is known as surface of the machine. On this, three fixed dies and one movable die is there in between these dies bars are hold for bending

Mechanism view

Bar bending with dies

After placing these gear systems 110 RPM is reduced as 28 RPM and semi-gear is also placed

there it works like the CAM. When the gear is merged output groove is worked, otherwise it is in ideal condition. This interval time is used for feeding the bars.

***Working Of The Machine:***

The groove at the surface of the table were rotates only for the 90 DEGREE by the specialization of a SG gear.

The top table consists of a two fixed grooves, which helps to hold the bar firm while bending the bar by help of moving groove.

The bar is feed between the fixed grooves and the moving groove rotation of 90 DEGREE bend the bar to an "**L**" shape as 90 DEGREE.

As the gear G3 gets ideal the bending of a bar is completed.

While this ideal condition, G3 has come back to its original position caused by the spring.

Again the process is get repeated by the specialization of a gear SG.

While the movement of a groove to the forward position the bar gets bend.

While the movement of a groove to backward position the bended bar is taken out and the new rod is feed for bending.

***Working video is available on youtube:***

**https://youtu.be/BiVIkAv86M4**

***Advantages:***

It does not makes any noise, while running

It is portable, so we can move wherever we want;

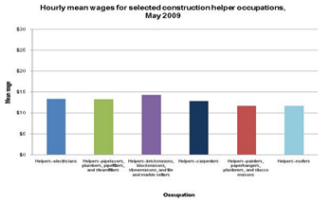
Machine Cost is less

Less maintenances

Economic wise it gives better results.

***Conclusion:***

The bar bending process in building construction of manual work, time taken and economical wise were studied




Here BLUE Bar indicates The occupation of Carpenters and helper.

By replacing this Machine, We can reduce that bar As half

The project was designed to do the work fast by semi-automatic process with less time taken, high output and economical wise also less Through Reducing The Man power

## REFERENCES

Rong-kai, Y.U., L.I.U. Fei, W.E.I. Ke-kang, Y.O.U. Xiao-jie, 2008. Design of Motor Drive System for Series Hybrid Electrical Vehicle Based on CAN Bus. Electric Machines & Control Application, 35(4): 27-30-63.

Guo Wei, Zhang Cheng-ning, 2009. Iron losses and transient temperature analysis of the permanent magnet synchronous motor for electric vehicles. Electric Machines and Control, 13(1): 83-87-92.

Liu, R., P. Zheng, D. Xie, L. Wang, 2007. Research on the High Power Density Electromagnetic Propeller. IEEE Transactions on Magnetics, 43(1): 355-358.

Wei Yongtian, Meng Dawei, Wen Jiabin, 1998. Heat exchange in the motor. China machine press, 105-109.

Ruan Lin, Gu Guobiao, Tian Xindong, Yuan Jiayi, 2007. The comparison of cooling effect between evaporative cooling method and inner water cooling method for the large hydro generator Electrical Machines and Systems. International Conference on ICEMS, 8-11: 989-992.

Kuosa Maunu, Sallinen Petri, Larjola Jaakko, 2004. Numerical and experimental modelling of gas flow and heat transfer in the air gap of an electric machine.Journal of Thermal Science, 13(3): 264-278.

Zhou Feng, Xiong Bin, Li Wei-li, Cheng Shu-kang, 2005. Numerical Calculation of 3D Stator Fluid Field for Large Electric Machine as Well as Influences on Thermal Field Distribution. Proceedings of the Csee, 25(24): 128-132.

Aldo, D., C. Andre, L. Maria, 2003. A simplified thermal model for variable-speed self-cooled industrial induction motor. IEEE Transactions on Industry Applications, 39(4): 945-95.

Electric Motors, 1928. By Wilberton Gould, Member N. A. of P. T., New York City.