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Spring testing machine

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Abstract - Mechanical Engineering without production and manufacturing is meaningless and inseparable. Production and manufacturing process deals with conversion of raw materials inputs to finished products as per required dimensions specifications and efficiently using recent technology. In our project spring load testing machine is used to find out the stiffness, modulus of rigidity, bulk modules. In spring working industry a wide range inspection machines are used. As the industry is a large and growing industry different type of machines are used for different operations. Our project the spring rolling machine is very simple in operation by using microcontroller with digital display. This machine is used to testing the various types of spring load test in different diameters and length of the spring. This machine can be used in various fields. This machine is simple in construction and working principle.

Key Words: Spring, Ride height, Spring coil, Stiffness, Spring testing machine, Load, Deflection.

1. INTRODUCTION

Spring rolling industry is a large and growing industry. There are many special purposes machines used in this industry to-day. The proper selection of the machines depends upon the type of the work under-taken by the particular industry. There are many examples of spring, which can be seen in our everyday lives. The metals generally used for spring rolling work include iron, copper, tin, aluminium, stainless and brass. Our project the "SPRING TESTING MACHINE" finds huge application in all spring manufacturing industry.

A spring is an elastic body used to store mechanical energy. When a spring is compressed or stretched from its mean position, it exerts an opposing force approximately proportional to its change in length. Spring is used in hydraulic valves, ball point pens, in a round hole or anywhere a pushing or compressing force needs to be applied. It is also used in brakes, clutches, spring balance, shock absorber, toys and watches etc. The most common application of spring is in vehicle suspension.

2. PROBLEM STATEMENT

Many companies manufacture spring machine and they required the springs for installing in their products. Design and develop the spring testing machine by using electronic circuit . and Also fabricate the model of the same which will show the working desired by design and develop of spring stiffness testing machine.

3. LITERTURE REVIEW

G. S. JAGUSHTE, S. S. JOSHI [1]:

Springs isolate the driver from road imperfections by allowing the tyre to move over a bump without drastically disturbing the chassis. If the chassis remains fairly steady then the tyres are better able to follow road contours automatically. While springs do an excellent job of smoothing over bumps, they will keep bouncing once started. In other words, the chassis continues swaying and the tyres keep hopping long after the vehicle strikes a bump. Left uncontrolled, springs give an uncomfortable ride with very poor tyre to road contact.

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Mechanical springs used in any machine hold its own stiffness value. This stiffness/ spring rate changes according to different springs and its application. Stiffness of any spring is an important factor as far as its application is considered. Hence in industries many methods are used to test and calibrate springs. Many methods are been used to test springs such as hydraulic actuators or by applying external load etc. In search of the most advanced machinery to test springs, basic mechanisms are under looked. This leads to inefficient growth of machines. Considering this factor spring testing machine is developed.

4. SYSTEM DESCRIPTION

4.1 WORKING DIAGRAM

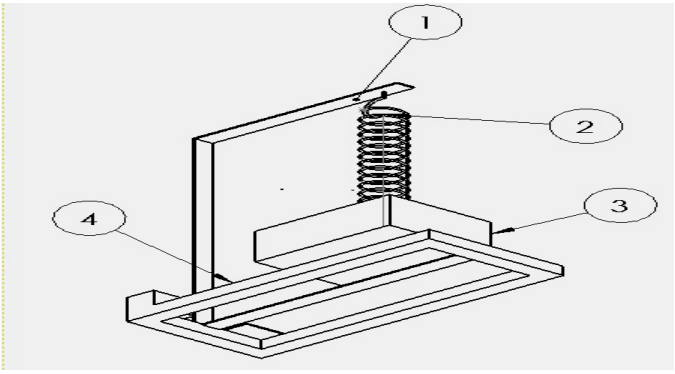

Fig.1 Spring testing machine

1. Frame
2. Spring
3. Weighting box
4. LCD

4.2 WORKING OPERATION

The microcontroller receives the signals from power supply unit; the transistor T1, T2, T3 and T4 is used to ON the each letter one by one with respect to the load applying to the spring. The circuit drew the power from the rectified 12 volt supply. This 12 volt is regulated by the 5 volt with the help of microcontroller. The 12 MHz crystal oscillator is used in this circuit. This oscillator is used to decide the operating speed of the microcontroller.

4.3 COMPONENTS DESCRIPTION

1. Ultrasonic sensor

ultrasonic sensors are devices that use electrical–mechanical energy transformation to measure distance from the sensor to the target object. Ultrasonic waves are longitudinal mechanical waves which travel as a sequence of compressions and rarefactions along the direction of wave propagation through the medium.

Fig.2 HC-SR04 Front view

- **VCC** – 5V Power supply.
- **TRIG** – Trigger Pin connect to the P1.1 of AT89S52.
- **ECHO** – Echo Pin connect to the P1.0 of AT89S52.
- **GND** – -0V Ground

2. Spring

A spring is an elastic object that stores mechanical energy. Springs are typically made of spring steel. There are many spring designs. In everyday use, the term often refers to coil springs. When a conventional spring, without stiffness variability features, is compressed or stretched from its resting position, it exerts an opposing force approximately proportional to its change in length (this approximation breaks down for larger deflections).

Fig.3 spring

3. Arduino

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

"Uno" means "One" in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

5.ADVANTGES,DISADVATAGES AND APPLICATION

ADVANTGES

1) Its operation and maintenance is very simple.

2) It is compact and portable.

3) It is simple and rigid in construction.

4) Manufacturing cost is lesser than other testing machine.

5) It provides better clamping force on the job.

DISADVANTAGES

1) Electronic components life is limited.

2) Additional cost is required

APPLICATION

• This device is mainly used in manufacturing – oriented industries and spring manufactures.

• This device is suitable for holding open coiled spring.

• It is used to find the torsional rigidity of spring of engineering colleges and polytechnics.

CONCLUSION

Design and implementation of spring stiffness testing machine is successfully completed. The main purpose of this project for student to analysis different types of spring stiffness and application of different types of sprigs uses. Manufacturing cost is also less. Less time required to find stiffness. Easy for student to analyze different types of springs. It has high accuracy in spring testing and precision work

REFERENCES

1. S. M. Metev and V. P. Veiko, Laser Assisted Microtechnology, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.

2. J. Breckling, Ed., The Analysis of Directional Time Series: Applications to Wind Speed and Direction, ser. Lecture Notes in Statistics. Berlin, Germany: Springer, 1989, vol. 61.

3. S. Zhang, C. Zhu, J. K. O. Sin, and P. K. T. Mok, "A novel ultrathin elevated channel low temperature poly-Si TFT," IEEE Electron Device Lett., vol. 20, pp. 569–571, Nov. 1999.

4. M. Wegmuller, J. P. von der Weid, P. Oberson, and N. Gisin, "High resolution fiber distributed measurements with coherent OFDR," in Proc. ECOC'00, 2000, paper 11.3.4, p. 109.

5. R. E. Sorace, V. S. Reinhardt, and S. A. Vaughn, "High-speed digital-to-RF converter," U.S. Patent 5 668 842, Sept. 16, 1997.