International Journal of Advanced Technology in Engineering and Science
Vol. No.4, Issue No. 12, December 2016
www.ijates.com
ijates
ISSN 2348 - 7550

VIBRATION AND NOISE ANALYSIS OF FLOUR MILL FOUNDATION

Ajinkya A. Mohite[1], Prof. Dr. S. H. Sawant[2]

[1,2]Department of Mechanical Engineering, Dr. J.J. Magdum College of Engineering, Jaysingpur , M.S., (India)

ABSTRACT

The Vibration and Noise developed in Flour Mill is a Social relevant problem. It is necessary to minimize the Vibration and Noise level in Flour Mill. Noise and Vibration is the study and modification of the noise and vibration characteristics of vehicles, machines etc. Motivated from the problem arises in the working of the Flour Mill. The vibration causes the effect on the operator of machineries. Continuous Noise is hazardous for human being. In the case lightly damped structures can produce high levels of vibration from low level sources if frequency components in the disturbance are close to one of the system's natural frequencies. This means that well designed and manufactured sub-systems, which produce low level disturbing forces, can still create problems when assembled on a machineries. In order to avoid these problems, at the design stage it is necessary to model the system accurately and analyze its response to anticipated disturbances, in this research work a mathematical model of the system and formulate the equations of motion, analyze the vibration characteristics (natural frequencies and modes) the forced vibration response to prescribed disturbances. This research work is proposed to carry out for the vibration analysis of the Flour Mill and also it is proposed to work for the noise and harshness creates in the Flour Mill. The research aim is for minimizing uneven Vibration & noise level in the Flour Mill.

Keywards- Flour Mill Foundation, Vibration Analysis, Noise Analysis, Harshness.

I. INTRODUCTION

Mechanical vibrations occur in all factories as long as there are operating machines. The machines and floor vibrate and may harmonize once their frequency approaches each other or the natural frequency of one of the machines. Unwanted vibrations may be induced by large impulsive forces in machines such as hammers and presses; unbalanced reciprocating components such as engines, motors, compressors etc. These dynamic forces produced by machinery are often very large. However, the force transmitted to the foundation or supporting structure can be reduced by using flexible mountings with the correct properties [1].

Fast development of technology over the last decades has contributed to the adverse effects that may affect human health (both physical and mental). Such negative effects may include noise and vibration. These phenomena are accompanied by most of the technological processes. Need for more efficient and productive

processes is causing to rising trend in intensifying of these phenomena. It is unavoidable to increase efficiency without increasing the operating speed of machinery and equipment. The obtained data, results and observations show that certain problems were encountered they are as follows:

1. Vibration in the Foundation of Flour Mill : a) The improper foundation of Flour Mill leads to vibration, b) Failure of foundation.

2. Noise and Harshness : a) The vibration leads to noise and harshness, b) Leads to adverse impact on human operator, c) Leads to minimized quality of the work and product. d) Permanent failure of hearing organs.

This research work is proposed to carry out for the vibration analysis of the Flour Mill and also it is proposed to work for the noise and harshness creates in the Flour Mill. The research aim is for minimizing uneven Vibrations & Noise level in the Flour Mill.

By considering all above facts, this paper tries to cover literature which deals with design and development vibration and noise reduction techniques to reduce vibration & noise in flour mill foundation.

II. LITERATURE REVIEW

Ohijeagbon, et al.[1], studied Analysis of Vibration Effect on Factory Foundation in a Flour Mill. They studied on the problems of vibration occurred in the factory foundation in a Flour Mill. In this work the vibration of roller machines in operation at a Flour Mill, all on one floor were analyzed for spectra transmission and propagation using a vibration analyzer. The study concluded that Cork and Composite pad were found to be adequate for the isolation of the machines. Their study shows that vibration effects could be successfully monitored on factory floors through the vibration analyzer application, thus minimizing hazardous effects on factory workers and facilities.

Vinay V. Nesaragiet, et al.[2], published paper on Design and Noise, Vibration, Harshness Analysis of Engine Bonnet of the Car. They carried out the work on the noise, vibration, harshness analysis of engine bonnet of the car. They also studied the vibration analysis that is caused due to engine operation and suggested the new design of the vibration. This paper concentrates on Analysis and strategies utilized for NVH of bonnet. The vibration in the engine bonnet computational carried out in ANSYS software. In this paper Modal analysis is used to obtained for natural frequency for bonnet component result extracted for different modes with different condition. The modal analysis is done for calculating the harmonic frequency from the bonnet.

Rahul R. Joshi, et al.[3], studied Vibration Analysis of Critical Components of Plain Weaving Machine. In this research they carried out the work on the vibration analysis of the weaving machine. In this paper the observed mechanism is shaft and cam picking mechanism which gives meshing details, force analysis, FFT analyser result. The Modal testing and structural dynamics testing is carried out on weaving machineries parts. With help of the Teflon coating they reduced vibration and noise in the machine. Finally they concluded that performance

of chemical coating for vibration and noise reduction will depends on different layers of Teflon coating. It is evaluated by FFT analyser and they found that there was reduction in noise and vibration after coating.

F. Al-Badour, et al.[4], published paper on Vibration Analysis of Rotating Machinery Using Time-Frequency Analysis and Wavelet Techniques, article is in press. In their work they focussed on the vibration analysis of rotating machinery using time-frequency analysis and wavelet techniques. In this research work they used the Time-frequency analysis as advance tool for carried out the said work. The research work used two powerful wavelet techniques, namely the continuous wavelet and wavelet packet transforms for the analysis of the monitored vibration signals. With this study they conclude that the effective use of the traditional FFT approach in yielding good results in fault detection under stationary operations.

Gabriel-Petru Anton, et al.[5], studied NVH Test-Calculation Correlation of an Engine in the Automotive Industry. They investigated the NVH test-calculation correlation, the finite element (FE) model updating of an engine and the vibration level (low and medium frequency range) on the engine/body interface points. Their main objective for this approach was to obtain the absolutes values of the vibration level (low and medium frequency range) on the interface points using an updated FE model. Experimental and theoretical analysis used for this work, have allowed us to understand the real vibratory behaviour and to obtain a new FE model more closed by reality.

Yogendra S. Rajput, et al.[6], presented paper on A Vibration Analysis of Vehicle Frame. They worked on the vibration analysis of vehicle frame. In this research work they carried out vibration analysis of the vehicle frame by using ANSYS and also carried out dynamic analysis by using FEM simulation thereby predicted failure modes of the vehicle frame under vibration analysis. With results of the study they concluded that the natural frequency of the model was maximum and design is safe in the all aspects of study. The results developed states that the frame's dynamic behaviour caused by change in usage with finite element method using ANSYS.

Piyush K. Bhandari, et al.[7], presented paper on Dynamic Analysis of Machine Foundation. In this study the analysis and design of machine foundation requires more attention since it involves not only the static loads but also the dynamic loads caused by the working of the machine. The limiting amplitude and operating frequency of a machine were the most important parameters to be considered in analysis of machine foundation. They used the Elastic half space analogy method with embedment coefficients for coupled modes of vibration to get the natural frequencies and amplitudes of foundation vibrations. With effect to depth of embedment there has been increase in natural frequency but considerable decrease in amplitude of foundation vibrations.

III. OBJECTIVES

- To minimize Vibration in Flour mill foundation.
- To minimize the noise level in Flour millworking area.
- To develope efficient process of the Flour mill.
- To reduce maintenance cost

IV. METHODOLOGY

The working principle and operating of the Flour Mill is studied well for proposed research work. Then on the basis of data obtained from researches the experimental setup is designed to measure the vibration and noise from the Flour Mill. Based on that the input data obtained from the given conditions is analyzed for output experimental results. The experimental results are studied for the analytical calculation. The vibration from the experimental results are computational verify using the ANSYS and finally the validation of the existing research work is proposed carried out on the basis of the obtained results. The results of the study finally concluded with remedies to minimize the sources of vibration and noise.

V. FIGURE

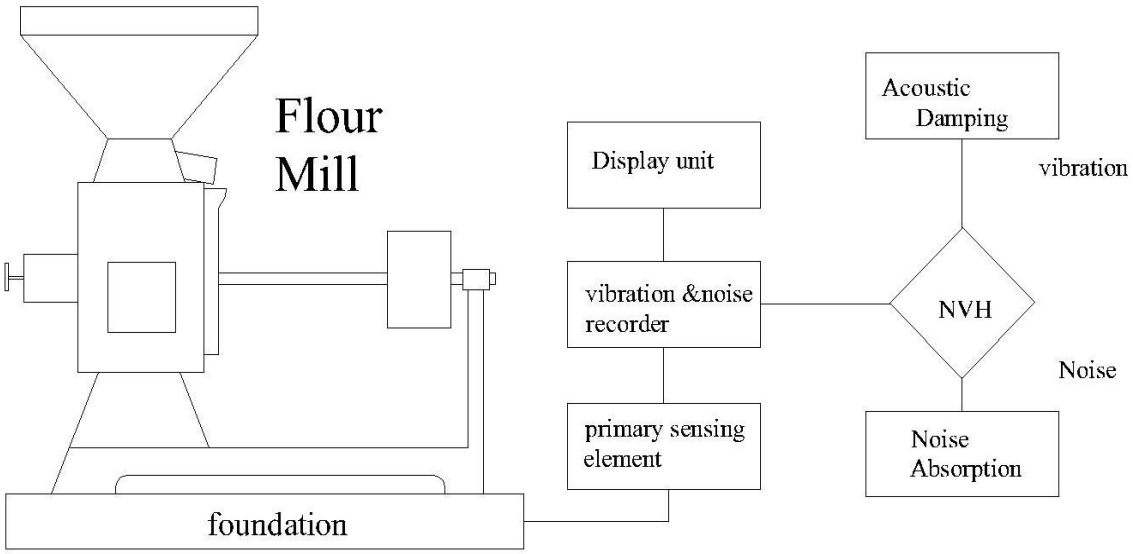

Fig. Proposed Experimental work

VI. CONCLUSION

From the literature survey it can be seen that machine components having vibration or noise are dangerous for working condition. The vibration and harshness in the machine components is hazardous for the operator. Vibration leads to develop failure in machine parts, foundation etc. As per above research literature study, aim is that by using different techniques (Spectra transmission, FFT analyser, frequency domain etc.) the vibration and noise can be minimized.

REFERENCES

[1] Ohijeagbon, I. O Olusegun, H. D., Adekunle, A. S., Oladosu, O. A., Bodunde, A., ―Analysis of Vibration Effect on Factory Foundation in a Flour Mill‖, LAUTECH Journal of Engineering and Technology 7(1) 2012:44-5.

[2] Vinay V. Nesaragi, Maruthi B.H., Chandru B.T., Dileep Kumar, ‖Design and Noise, Vibration, Harshness Analysis of Engine Bonnet of the Car‖, International Journal of Engineering Research and Applications, ISSN : 2248-9622, Vol. 4, Issue 7(Version 2), July 2014, pp.05-11.

[3] Rahul R. Joshi, Prof. Dr. V. R. Naik, ―Vibration Analysis of Critical Components of Plain Weaving Machine‖, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 2, Issue 6, June 2013, ISSN: 2319-8753.

[4] F. Al-Badour, M. Sunar, L. Cheded, ―Vibration Analysis of Rotating Machinery Using Time-Frequency Analysis and Wavelet Techniques, article is in press‖, Mechanical Systems and Signal, doi:10.1016/j.ymssp.2011.01.01 7.

[5] Gabriel-Petru ANTON et al., ―NVH Test-Calculation Correlation Of An Engine In The Automotive Industry‖, Renault TechnologieRoumanie – DIM /DAPEM NVH, BarbaCenterSos. Pipera- Tunari, Nr. 1/VI, Voluntari, Jud.Ilfov, 077190, Romania.

[6] Yogendra S. Rajput, ―A Vibration Analysis of Vehicle Frame‖, IJERA, ISSN: 2248- 9622, Vol. 3, Issue 2, March -April 2013, pp.348-350.

[7] Piyush K. Bhandari, ―Dynamic Analysis Of Machine Foundation‖, International Journal of Innovative Research in Science, Engineering and Technology, National Conference-VISHWATECH 2014.