

STRUCTURE ANALYSIS OF LAUNDRY WASHING MACHINE

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Abstract: *In this paper a Laundry Washing Machine drum and a shaft is built and analyzed in ANSYS. The aim is to help the machine designer to design a machine for conducting similar analysis for future manufacturing of high capacity drums and high load carrying shafts by reducing experimentation. The analysis is mainly concerned with an evenly distributed load on the drum and the stresses developed on the drum and also the stresses induced in the shaft. The load is applied with the help of lead plates instead of clothes. The three dimensional model of the drum and shaft is created using CATIA software. The model is imported to ANSYS Workbench 14.5, where the boundary conditions, loads and constraints are given and analysis is made.*

Keywords: *Stress Analysis, CATIA V5 software, ANSYS Workbench 14.5.*

INTRODUCTION

Washing machines are commonly used in almost every laundry worldwide. These appliances make it easy to clean clothing. Laundry uses soap, soda and detergents in removing grease, dirt and starch from soiled clothing. The technology of washing includes white- work washing, bleaching, bluing, and starching processes under normal circumstances. Specialized processes are used for woolen, silk and such other fabrics. Depending upon the type of the stain, various chemicals are used for removal of the stains. The performance of these machines is based on the rotation of the cloths inside a drum while they are mixed with water and some kind of cleaning powder or soaps.

The cost of the commercial washing machine is high which is not affordable by common washer men. Then we work on that project. In this project we mainly focus on to reduce overall cost of commercial washing machine. And for this first we do the 3D modeling of a Commercial Washing Machine then this drawing will be import in Ansys software and by changing dimensions as well as martial we reduce the cost.

It is not hard to imagine that the load of these cloths, when they are soaked in water can

create big reaction forces in the cylinder when they are rotating. This situation makes it very important to calculate stresses on inner drum and shaft of laundry washing machine.

2. LITERATURE REVIEW

In India, normally commercial washing machines are used by laundry industry. We done survey in Solapur only, we find a biggest problem which is mainly related to the laundry washing machine.

In Solapur there is one traditional work that is washing clothes in large quantity, called as dhobi. But the cost of Commercial Washing Machine is around 2 lakh which is not affordable by a common washer man so we plan to reduce the cost of commercial washing machine which is affordable to all washer man.

After doing the survey we come to know about the problems faced by the washer men while washing the clothes using the laundry washing machine. There are still more problems related to the washing drum of the machine like material and the stresses induced in the drum. That is we mainly focus on reduce the dimensions of commercial washing machine as well as we change the material which directly affect on the cost.

We also came to know about the failures due to which the drum and the shaft fail. So after analyzing the problem we started working on it.

First of all we have done 3D modeling of the drum and the shaft by using CATIA V5 software.

3. WORKING

- 3D Modeling steps
- 1. In sketcher mode we have drawn circle of diameter_ by using pad command we have extended the object to length_.
- 2. Using shell command we have made the drum in the hollow drum of thickness 5mm. Then by using hole command we have made a hole of diameter 2.5mm.
- 3. Then by using circle and rectangle pattern we got number of holes on periphery of drum.
- 4. In sketcher mode we have drawn the cross-section of the object and padded it to a length of 90mm.

4. CONSTRUCTION

1. Drum
2. Shaft

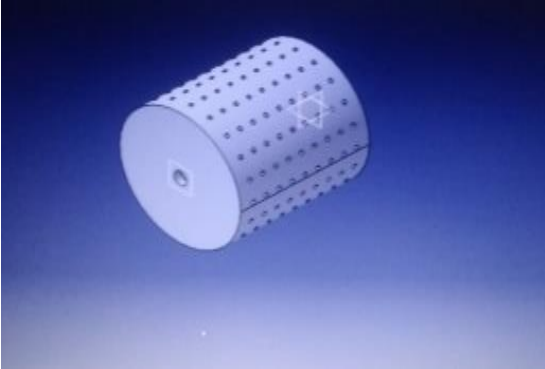


Fig.4.1 3D Modeling of Drum

5. PROPOSED WORK

We have done the 3D modeling of drum and shaft by using CATIA and ANSYS Workbench.

6. REFERENCES

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