A REVIEW ON MODELLING AND ANALYSIS OF PULSATOR OF A WASHING MACHINE

M.Raghu[1],M.Praveen[2], M.Sai teja[3],MD.Ilyas[4]

Department of Mechanical engineering Gurunanak institute of technology,Telengana,India.

Abstract: Pulsator (impeller) in the top loaded washing machine gives poor performance while cleaning the dirt as compared with agitator. Optimization of it, considering all the parameters regarding its contribution towards increasing the turbulent flow inside the drum will impact on its performance. The design of the pulsator is made as per accurate dimensions using the CATIA V5 software. A step file copy of washing machine drum is saved as export file to ANSYS. CFD in ANSYS workbench which is being used widely for solving many fluid flow problems,t is used here to set out the results for optimized pulsator. The main important factor to improve is turbulence inside the washing machine drum which is directly proportional to fluid velocity at points. The most influencing parameters were changed in levels as per analysis on the design which is being made in CATIA V5.

KEYWORDS: Pulsator(impeller), Computational fluid dynamics (CFD), CATIA V5, ANSYS.

1. LITERATURE SURVEY

Cristiano Spelta et al,[1] in his work explained about the analysis and design of a control system for the reduction of the mechanical vibration and the perceived acoustic noise in a washing machine.

Ms. NehaVirkhare and Prof. R.W. Jasutkar [2] described about the washing machine system consists of the neuro - fuzzy and fuzzy techniques that will help the system to take its own decisions like release of water and washing powder as per need of cloth.

FengTyan et al,[3] in his work explained about the multibody dynamic model is developed for a front loading type washing machine in details.

Sunil Patel and S.A. Kulkarni [4] explained about the optimization of crosspiece of washing machine.

SeiichirouSuzuk [5] in his work described the vibration simulation result of the washing machine.

A.K.Ghorbani-Tanha et al, [6] describes about the Operation of home appliances like washing machines can produce undesirable vibrations and noise and their purpose of this study is to analyze and develop a control system for vibration reduction of washing machines employing smart materials.

MorioMitsuishi and Yutaka Nagao [7] describes how a Finite Element Analysis model of washing machine dehydration dynamics were developed and validated with operating test measurement results.

Sichani et al,[8] in his work explained about the structures which are excited during their normal operation can be studied with operational modal analysis (OMA) methods.

Janaki, and Shanthi, [9] (2013) in their study entitled, “Marketing Stimuli in Purchase of Home Appliances From Customer Perspectives”, explains that marketing strategy is the game plan which the firms must adhere to, in order to outdo the competitor or the plans to achieve the desired objective. The people consume things of daily use, and buy these products according to their needs, preferences and buying power. The objectives of the study are to study the purchase decision behaviour relating to home appliances and to analyze customer response to the marketing stimuli of home appliances. The study was carried out with the sample size of 200 respondents selected based on proportionate random sampling with in Coimbatore city. The data were collected with interview schedule and were analyzed using

percentage weighted average score analysis of variances. The findings of the study included that education and income of the respondents are the two socioeconomic variables which have significant association in all the stages which the buyers undergo while purchasing home appliances.

Shahram Jenabi, Seyed Yahya Seyed Danesh and Minoo Yousef [10] (2013) made a study titled, "Examining the effect of Brand dimension (trademark) on home appliances consumers' behavior Case study: LG brand in Rasht city", tells that one of the most important and valuable assets of a company is its trademark. The more valuable is a trademark for consumers more profit the company achieves. The present paper aims to identify the effect of brand dimension on home appliances consumers' behavior. To achieve this goal the relationship between reputation, identity, image, meaning, age and brand advertisement with consumer behavior was tested based on the conceptual research model. Required data were collected using questionnaire, randomly, from the population of LG brand consumers from agents of this company in Rasht city. Since the population is wide and infinite, simple random sampling and sample size formula were used to estimate the sample size (it was calculated to be 202 individuals). Pearson correlation test, using SPSS software, and multiple regression analysis were used to analyze collected data. Results showed that aspects of brand's dimensions have a positive effect on consumers' behavior and there is significant relationship between these two components. Thus, it is suggested to LG brand to use its competitive advantage, particularly its reputation, identity and brand management, and other aspects of brand (mentioned in this research) to lead its consumers' behavior to a positive direction.

Qianyu Dong and Tohru Futawatari [11] (2013) made a study entitled, "The Study of Low-Carbon Policy Influence on Consumers' Energy Efficiency Household Appliance Purchase Behavior", explains that sequences of low carbon policies are aimed at reducing greenhouse gases and increasing energy efficiency also in the household sector in China. However, not all the policies are useful to guide consumers' purchase behavior. Consumer's environmental friendly purchase behavior is affected not only by personal influence but also by external environmental forces. While information provision policies may be effective in encouraging certain consumers to understand the energy efficiency household appliance, but not promote purchases; fiscal incentive may be more attractive during pre-purchase period (information collection); regulation instrument regards as the most effectively instrument to influence consumers' energy efficiency household appliance purchase behavior, but useless to advance citizen's environmental awareness. Analysis of a survey dataset of Chinese households observes considerable heterogeneity in terms of influence of three policy instruments, in line with our conjectures.

Seyed Fathollah Amiri Aghdaie[12] (2012) has written a paper on, "An Analysis of Impact of Brand Credibility and Perceived Quality on Consumers' Evaluations of Brand Alliance", the purpose of this study was to analyse the effects of brand credibility and perceived quality on consumers' evaluation of brand alliance. This goal had been followed by examining the impact of constituent brands credibility on co-brand overall credibility, effect of perceived quality of the constituent brands on co-branded product perceived quality and constituent brands credibility and perceived quality on perceived price and purchase intention of co-branded product as the hypotheses of the study. This study could be considered as an applied research from purpose perspective and descriptive-survey with regards to the nature and method (type of correlation). Respondents to the questionnaire were randomly selected shoppers

at one of the branches of Refah chain stores in Isfahan city. The study identified that credibility of constituent brands (i.e., brand A and brand B the allied brands) positively affect co-brand credibility, co-branded product perceived price and purchase intention. Results also show that perceived quality of constituent brands affect co-branded product perceived quality and perceived price. Furthermore, only perceived quality of one of constituent brands (brand B) has positive influence on cobranded product purchase intention whereas the perceived quality of the other brand (brand B) has no effect.

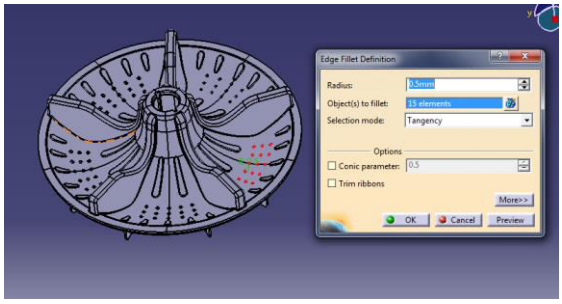
2. INTRODUCTION

Pulsator: A Pulsator is a plastic panel that is designed to rotate clockwise and anti-clockwise. As a result there is a gentle kneading action that slowly removes dirt from the clothes without damaging the fabric. The rapid rotation creates a strong water flow that agitates clothes and breaks away dirt and grime.

CATIA: is the leading solution for product success. It addresses all manufacturing organizations. CATIA can be applied to a wide variety of industries- from aerospace- automotive- and industrial machinery- to electronics- shipbuilding- plant design- and consumer goods. Today- CATIA is used to design anything from an airplane to jewelry and clothing. With the power and functional range to address the complete product development process- CATIA supports product engineering- from initial specification to product-in-service- in a fully-integrated manner. It facilitates reuse of product design knowledge and shortens development cycles- helping enterprises to accelerate their response to market needs.

CatiaV5R20 is an interactive Computer-Aided Design and Computer Aided Manufacturing system. The CAD functions automate the normal engineering- design and drafting capabilities found in today's manufacturing companies. The CAM functions provide NC programming for modern machine tools using the CatiaV5 R16 design model to describe the finished part. CatiaV5R20 functions are divided into "applications" of common capabilities. These applications are supported by a prerequisite application called "CatiaV5R20 Gateway".

CatiaV5R20 is fully three dimensional- double precision system that allows to accurately describing almost any geometric shape. By combining these shapes- one can design- analyze- and create drawings of products.



ANALYSIS

Meshing of the model is generated to approximate the geometry and reduces the degree of freedom from infinite to finite. This meshing process is vital in the finite element analysis as the quality of the results generated directly depends on the quality of the mesh. At the same time the computation time will be affected depending on the number of elements (number of nodes).

Project Objective:

- In this project, we will be able to define total
- Deformation and stress, etc
- Create the static structural analysis system

- Apply a different type of constraints
- Apply different loads
- Generate project reports

Applying of boundary conditions
rectional Deformation, Equivalent Stress, Maximum Principal Stress, and Minimum Principal Stress. The Static Structural analysis is one of the important analyses in ANSYS Workbench. It is available as Static Structural analysis system under the Analysis System toolbox in the Toolbox window, this system analyses the structural components for displacements (deformation), stresses, strains, and forces under different loading conditions.
The loads in this analysis system are assumed not to have damping characteristics (time dependent). Steady loading and damping conditions are assumed in this type of analysis system. To start a new Static Structural analysis system, double-click on Static Structural in the Analysis Systems toolbox in the Toolbox window; the Static Structural analysis system will be added to the Project Schematic window. To start an analysis, first you need to specify the geometry on which the analysis is to be done. To do so, you can import the geometry from an external CAD package, or you can create the geometry in the ANSYS's Design Modeler software. After the model is specified for an analysis, you need to double-click on the Model cell of the Static Structural analysis system to open the Mechanical window. In this window, you can specify the parameters and run the analysis.

3. REFERENCES

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