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Design, Analysis of Mechanism of Amber Charkha

KEYWORDS: Exhaust Muffler, Reynolds number, Computational Fluid Dynamics

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ABSTRACT *The Charkha is a small device which can be used to spin fiber, such as cotton, into yarn. Fabric from this yarn can be used to make all sorts of clothing. Increasing demands of the cotton fabrics, now a day has made it necessary to increase the production of cotton fabrics. To increase the production it is necessary to study the factors affecting the performance of the women workers working on Amber charkha. Most of the Amber charkha in rural areas are hand operated (i.e. they run with the help of human energy input). The various factors that are affecting the productivity are top arm is unable to give variable pressure to different pulley. Gandhiji was having desire that every Indian should spin one's own cotton thread and to weave Khadi, he embedded twin-purpose; one that the people should get engaged in a focused activity and create one's own gainful employment thereby contributing to the country's economic wealth. This paper reveals the factors affecting the productivity of amber charkha*

1.0 INTRODUCTION

Today era is marching towards the rapid growth of industrialization higher the rate of production higher is the profit is today's thinking. Textile sector is also emerging sector. Synthetic and blended material, like polyester became available at very low price compared to Khadi. The low capacity and high cost rendered handmade fabrics most incompatible, which made weavers and artisans drift away from the loom. The common man shuns the handmade fabric, because of the rough texture, stale colours and unattractive designs. He likes the machine-made fabrics because of the competitive disadvantages the handmade fabric suffers from. MGIRI decided to focus on the techniques to make Khadi textile acceptable with a popular appeal. It decided to conduct R&D on product diversification with new designs and fashion appeals for Khadi. MGIRI chose to play the role of a technology adviser to nurture the locally available and technically qualified human-resources in the

Wardha-Nagpur region in designing of new products from Khadi. To begin with, it was decided to design handbags first. A flash market survey was conducted to assess the needs and requirements of different customer segments of the society, and accordingly a series of new designs of Khadi handbags were prepared at MGIRI. Simultaneously, a training and production programme was undertaken for the beneficiary artisan groups. The MGIRI has twin objective behind this endeavour; one, to finalise the pathway for creation of more and more employment for the general masses and, second to give new dimensions to fashion accessories with the help of Khadi. MGIRI's nurturant technology advisors were engaged by District Rural Development Agency (DRDA) Wardha, to organise training-cum-production and quality control during production at artisan's colony. The experiment aims at bringing about a plausible change in the rural mindset. The idea is to enhance the present earnings and produce worthwhile supplementary fashion accessories through khadi.

1.1 MGIRI's Vision for the Village Empowerment

The techno-group at MGIRI works at two levels; mobilize the artisans, craftsmen, tailors and willing learners on one hand, gather the inputs on the contemporary market trends and fashions pertaining to those crafts, and then innovate designs for their working and finally market offering. Disposable income polarity in the country is mired in absurdity, yet the poor man's items of use can be transformed into fashion statements many times. Jewelry, leather, terracotta and cotton fabrics in khadi have big potential for such positioning. Indian fashion market is vibrantly expanding and looks for curios and objects with an ethnic touch but with modern orientation. Many high profile fashion designers from metros are routinely seen giving the traditional handcrafted fabrics a luxury label. People with rising incomes that forms the upper crust of the society from organized, intermediary and business segments, is now looking beyond the standard-of-living; they look for life style, brands and objects of life style statements. Weavers and craftsmen in and around places like Benares, Jaipur, Kota, Cuttock, Maheshwar and Pochampalli etc. have already been contracted by some leading fashion designers to create the quality products for them. They offer design inputs and innovative techniques in return for quality salable in high end market. Ms.Pranavi Kapur from Delhi has already established herself as an exponent of modern khadi garments. She has kept it alive in remote villages of northern India and trendy in urban areas. There is a big need in India for an effective intermediation between the market and the craftsmen. Some businessmen and fashion entrepreneurs are doing it with a commercial motive though; the craftsmen are also gaining the spillover benefit from them. MGIRI's effort is to facilitate and empower the craftsmen in becoming entrepreneurs by themselves. There are extraordinary opportunities for Indian craftsmen to penetrate the emerging fashion market where the brand conscious shoppers can indulge in some extra shopping for handicrafts from cottage segment of industry and especially the hand-made khadi.

2.0 METHODOLOGY USED

2.1 CAD modeling:

Part modeling is the process of creating abstract or conceptual model and the use of objects in the creation of a predictive statement, also to make a miniature model of a technical artifact. CAD technology is very important while designing any new concept or to test it using FEA applications.

Pro/ENGINEER is a parametric, feature based, solid modeling System. It is the only menu driven higher end software. Pro/ENGINEER provides mechanical engineers with an approach to mechanical design automation based on solid modeling technology and the following features.

2.2 3-D Modeling

The essential difference between Pro/ENGINEER and traditional CAD systems is that models created in Pro/ENGINEER exist as three-dimensional solids. Other 3-D modelers represent only the surface boundaries of the model. Pro/ENGINEER models the complete solid. This not only facilitates the creation of realistic geometry, but also allows for accurate model calculations, such as those for mass properties.

2.3 Parametric Design

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Dimensions such as angle, distance, and diameter control Pro/ENGINEER model geometry. You can create relationships that allow parameters to be automatically calculated based on the value of other parameters. When you modify the dimensions, the entire model geometry can update according to the relations you created.

2.4 Feature-Based Modeling
You create models in Pro/ENGINEER by building features. These features have intelligence, in that they contain knowledge of their environment and adapt predictably to change. Each features asks the user for specific information based on the feature type. For example, a hole has a diameter, depth, and placement, while a round has a radius and edges to round.

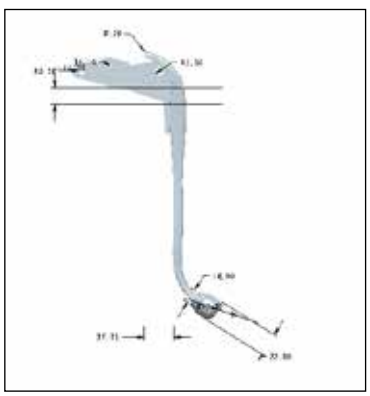

Figure Top arm of charkha

2.5 Associativity
Pro/ENGINEER is a fully associative system. This means that a change in the design model anytime in the development process is propagated throughout the design, automatically updating all engineering deliverables, including assemblies, drawings, and manufacturing data. Associativity makes concurrent engineering possible by encouraging change, without penalty, at any point in the development cycle. This enables downstream functions to contribute their knowledge and expertise early in the development cycle.

2.5.1 Capturing Design Intent
The strength of parametric modeling is in its ability to satisfy critical design parameters throughout the evolution of a solid model.

The concept of capturing design intent is based on incorporating engineering knowledge into a model. This intent is achieved by establishing feature and part relationships and by the feature-dimensioning scheme. An example of design intent is the proportional relationship between the wall thickness of a pressure vessel and its surface area, which should remain valid even as the size of the vessel changes.

2.5.2 Combining Features into Parts
The various types of Pro/ENGINEER features serve as building blocks in the progressive creation of solid parts. Certain features, by necessity, precede others in the design process. The features that follow rely on the previously defined features for dimensional and geometric references. The progressive design of features can create relationships between features already in the design and subsequent features in the design that reference them. The following figure illustrates the progressive design of features.

2.6 Parent-Child Relationships
definition of a feature frequently relies on dimensional and geometric cues taken from another feature. This kind of relationship is termed a parent-child relationship. The parent-child relationship is one of the most powerful aspects of Pro/ENGINEER. When a parent feature is modified, its children are automatically recreated to reflect the changes in the geometry of the parent feature. It is therefore essential to reference feature dimensions and geometry so design modifications are correctly propagated throughout the model. Because children reference parents, features can exist without children, but children cannot exist without their parents.

2.7 Assembly
Just as you can combine features into parts, you can also combine parts into assemblies. Assembly mode in Pro/ENGINEER enables you to place component parts and subassemblies together to form assemblies, as well as to design parts based on how they should fit together. You can then modify, analyze, or reorient the resulting assemblies.

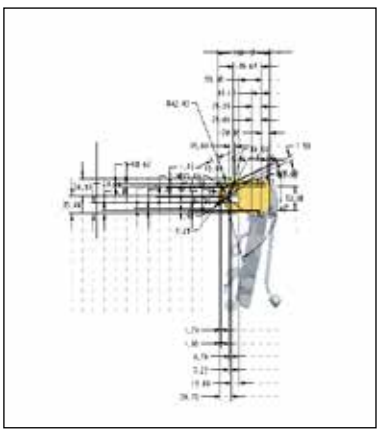

Figure Total assembly of charkha arm

2.7.1 Overview
create a subassembly or an assembly, you must place a base component or feature, and then attach additional components to the base and to each other. You cannot attach components to an exploded assembly.

We can add components to an assembly in the following ways:

- Attach a component parametrically by specifying its position relative to the base component or other components in the assembly.
- Attach a component nonparametric ally using the Package command in the COMPONENT menu. Use packaging as a temporary means to include the component in the assembly; then finalize its location with assembly instructions.

Create a part or subassembly directly in Assembly mode. This option is available only if you have a Pro/ASSEMBLY license.

3.0 IMPROVEMENT IN THE EXISTING CHARKHA MODEL
To apply variable pressure on the top arm for the generation of uniform thread as we are applying uniform pressure on top arm the diameter of thread is not uniform and thread is break. Due to variable motion of articulate plate the thread is not getting weaved due to this problem filling is not uniform throughout the spindle.

4.0 CONCLUSION
Considering all the parameters we have To apply variable pressure on the top arm for the generation of uniform thread as we are applying uniform pressure on top arm the diameter of thread is not uniform and thread is break.

The project will focus on the new improved design of top arm and its finite element analysis

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