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CERTIFICATE

Certified that the project titled “DEVELOPMENT OF EXPERIMENTAL SET UP USING HYDRAULIC SYSTEM TO INVESTIGATE VARIOUS VARIABLES OF IMPROVED BAMBOO PROCESSING MACHINE” is a bonafide work done under our guidance and is submitted to **Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur** for the partial fulfillment of the requirement for the award of Post Graduation degree, **Master of Technology (M.Tech.)** in **Mechanical Engineering Design (MED)**


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ABSTRACT

The present work shows the development of experimental set up of improved hydraulic bamboo processing machine with a capability of doing two operations in a single unit. The details of different components, construction and working are explained in this research. The force required to split the bamboo in 8 pieces is also included in this paper. This research also includes the traditional process of processing the bamboo.

This research investigates the different variables of bamboo processing machine, such as cutting done by using different cutters, development of different types of dies for splitting and slicing purpose, development of special combined die for splitting and slicing, cutting done by using different cutter material, force estimation on each split bamboo piece, construction and working of improved hydraulic bamboo processing, study of different components of processing machine, and experimentation done on different dies is also incorporated in this research.

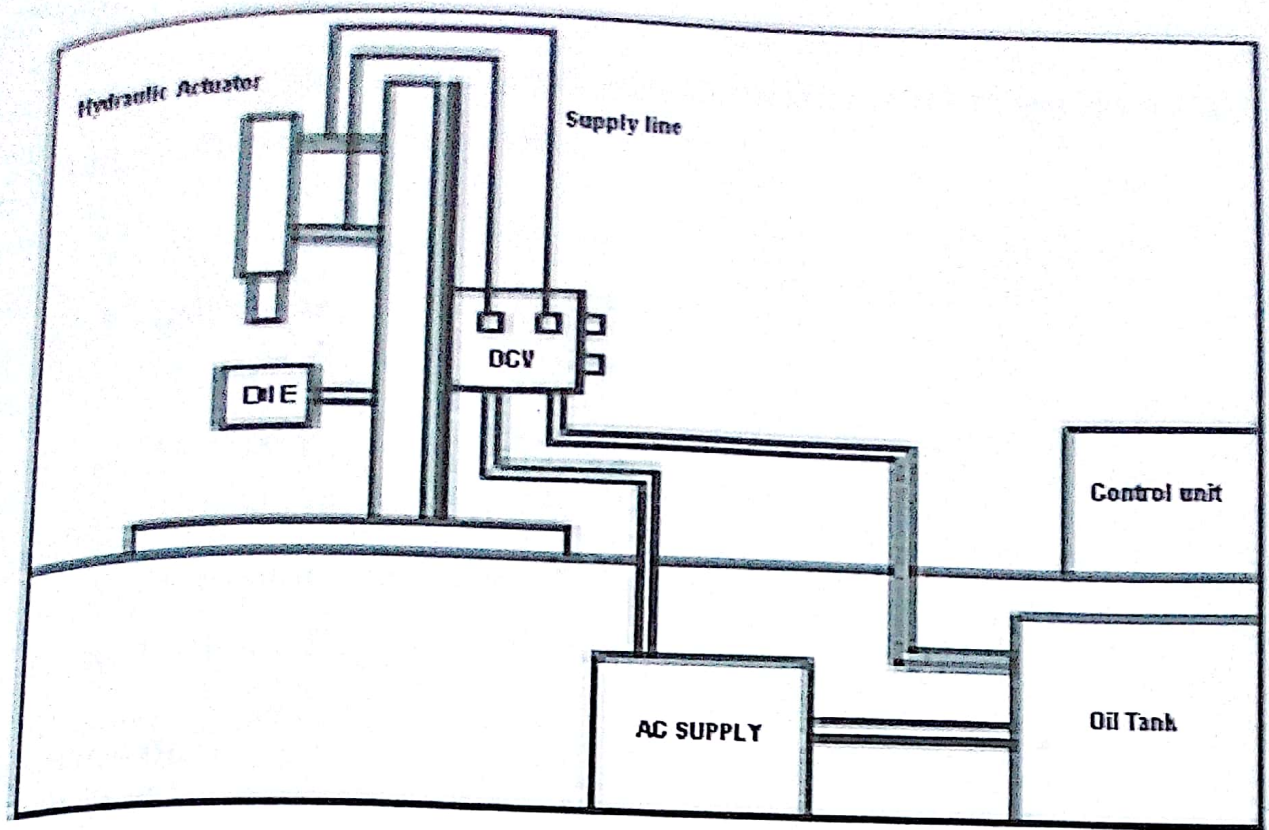


Figure 5.1 Sketch of proposed bamboo processing machine.



Figure 5.2 Actual Machine

Result discussion and conclusion

In this chapter, the results of experimentation on different dies, conclusion of the research work and future scope has been discussed.

The table below shows the comparison between the three dies being experimented in this project.

Table 7.1: Result and Comparison of different dies

Die	Position of Tools	Size of slice in mm.	Performance	Result
Die no 1	Combined	2	Failure	Failed because of non availability of space for slices to flow out
Die n 2	Straight (HSS)	1.8	Not acceptable	Quality of slices are not acceptable
Die no 3	Inverted	2.2	Not acceptable	Quality of slices are not acceptable
Die no 4	Straight(O2)	1.5	Acceptable	Smooth in working

The above table shows comparison of different dies along with their results, we can see that the die with straight O2 tools gives us the best result, and the same die will be used for further operations

7.1: CONCLUSION AND DISCUSSION

The above discussed work gives a brief description regarding how a single machine is capable of doing two operations with a single unit. If compared with the traditional procedure of doing the above mentioned two operations, this machine can save a lot of time and cost as well. The next step in this project could be replacing the

two individual die with a new improved single die which will be capable of doing the two operations at a same time.

After conducting a number of experiments on different dies for producing slices from bamboo splits, we estimated the power required to produce slices from different dies, the quality of slices and time required to produce slices out of each split.

This project focus the relationship between the manufacturing cost of two different machines and the cost of two dies which will be used on same machine to perform two different operations, it also focus the comparison between two dies being used for same purpose.

The figure below shows the slices produced by different dies and, from the above table, we can conclude that die no 2 is ideal for working and for further experimentation, we can use die no 2.

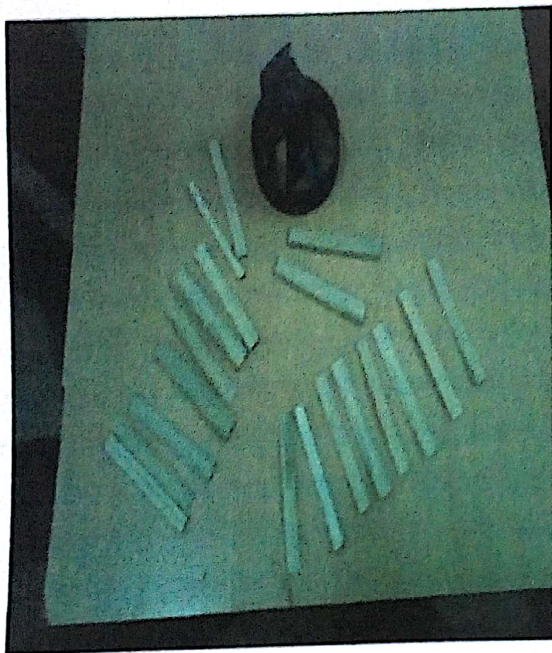


Fig 7.1 : Bamboo Slices of die no.1

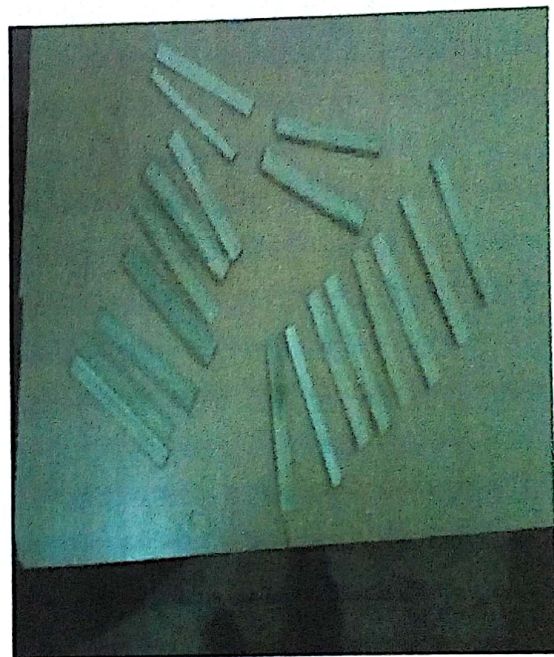


Fig 7.2 : Bamboo Slices of die no 2

from the above figures we can see that slices obtained from die no 1 are much better than die no 2, so we can recommend die no 1 for further processing.

In the present work all the details of proposed machine are found considering all the design parameters. The fabricated machine is robust in construction, it can be

operated by unskilled operator and also has sufficient space for operating. It can split bamboo of minimum 15 mm to 60 mm diameter.

This machine is very useful in rural areas because bamboo articles have very high demand in market. So, any one can start his own business of making bamboo articles by using slices obtained from this machine, since two operations can be performed on a single machine, there is no need of purchasing separate machine for every operation.

7.1: FUTURE SCOPE

The present research has been done for making a compact die which can perform two operations at a same time and to reduce the time and effort for producing processed bamboo, as we all know at least four to five operations are required for producing incense sticks out of it, in this research efforts have been made to combine two operations namely splitting and slicing in a single die. A die can also be made for performing all the five operations on a single machine, and automation can also be done on this machine.