

## **MODELING AND ANALYSIS OF GRAIN BAGGING THROUGH VACUUM MACHINE**

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**ABSTRACT:** In the present scenario developing countries like India have oldest technologies in the handling of the food grains in agriculture sector. India is the 2<sup>nd</sup> largest country in the cultivation of rice, wheat, millets pulses, etc. But in India there is no new technologies in crop handling and storing of food grains. The million tons of food grains are wasted due to lack of grain handling systems. However in this study we can overcome this barrier of grain handling with portable grain bagging machine based on vacuum principle. We did a modelling and analysis on a centrifugal flow type blower and made a prototype model of axial flow type blower. From this modelling and analysis of centrifugal axial blower we found that the axial flow blower can lift different density grains at different dynamic pressures. Finally from this study we concluded that this system

can overcome the human effort from the grain handling and increase the effectiveness of the bagging and storing capabilities of the food storage houses.

### **INTRODUCTION**

India has one of the world's largest Agricultural Research System viz., National Agricultural Research System (NARS) including ICAR institutes and State Agricultural Universities (SAUs). The NARS has contributed immensely to make India self-sufficient in food production and serves the agricultural technology and information needs of the country. NARS has a research network of 102 ICAR Research Institutes, 11 Agricultural Technology Application Research Institutes (ATARIs) and 73 Agricultural Universities (including 3 Central Agricultural Universities and 5 Universities with Agriculture Faculty) spread across the

country. For popularization of ICAR technologies, 725 Krishi Vigyan Kendras are operating throughout the country for different extension activities.

According to the Food Corporation of India (FCI), More than 60,000 Tons of Food grains have been wasted each year in which 84% was rice and 14% was wheat. Mainly due to Storage and Transfer system available in India. Grain wasted heavily during rainfall when it was stored in Open Grounds instead of Warehouse and Other Main factor is the Lack of labour workforce who can transfer these grains to the godown manually. So, the Basic Idea was generated from this Scenario in our country.



## LITERATURE REVIEW

**1.Design and Analysis of Impeller for Centrifugal Blower using Solid Works: Kay Thi Myaing,tay Htay: 2014:** He stated the backward-curved impeller was simulated and compared with theoretical result by using SolidWorks Software.

Flow Analysis is also based on the



computational fluid dynamic and can obtain the results for the estimation of the outlet flow velocity components, pressure distribution and temperature distribution for impeller.

1. SolidWorks is used to build 3D geometry for analysis using SolidWorks Flow Simulation. The impeller design calculation consists of shaft diameter, hub diameter, vane inlet diameter, and inlet width, inlet vane angle, outside diameter and outlet width.

**2. Vacuum Grain Collector Bagging and Weighing Machine: Madhuri S. Dale , Tejaswi P.Hodgar**

**2021:** He Concluded that the flexibility and adaptability of grain bagging technique give potential to increase productivity and generate a positive economic impact.

## MODELLING OF BLOWER

In this course, you will learn core modelling skills and quickly become proficient with CREO Parametric 5.0. Topics include sketching, part modelling, assemblies, drawings, and basic model management techniques. The course also includes a comprehensive design project that enables you to practice your new skills by creating realistic

parts, assemblies, and drawings. After completing the course, you will be well prepared to work effectively on product design projects using CREO Parametric 5.0. At the end of each module, you will complete a set of review questions to reinforce critical topics from that module. At the end of the course, you will complete a course assessment in PTC University Proficiency intended to evaluate your understanding of the course as a whole.

### Sketcher

- Line
- Circle
- Arc

### In Part

- Pattern
- Extrude

### Assemble

- Coincidence
- Distance
- Section

**Sketcher:** -Sketcher provides you with a customizable library of predefined shapes that you can readily import into an active sketch. These shapes are presented in a palette. You can resize, translate, and rotate the shape when using it in an active sketch.

## RESULTS AND DISCUSSIONS

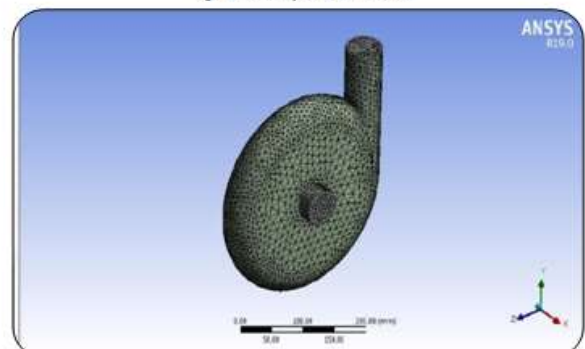
### MODELLING OF BLOWER



Fig 3.1:- Casing Part Drawing.



Fig 4.1:- Geometry of the Model Product



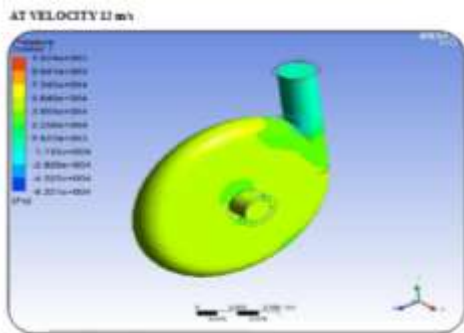


Fig 4.17 - Vacuum Collector

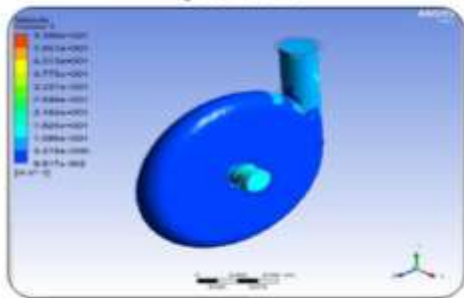
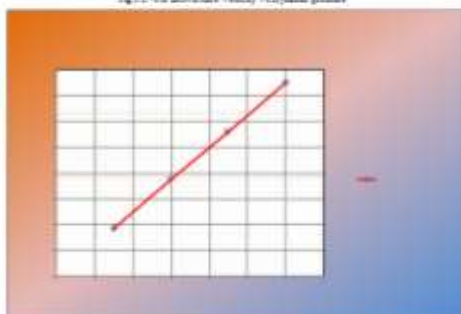


Fig 2.1 - The Dynamic Pressure Vs Dynamic pressure



### CONCLUSION

Our work can contribute to solve the need to find the sustainable solution to the labour workforce. With the aid of

mathematical calculations to increase productivity and to facilitate heavy work in agricultural activities such as bagging the grains by the vacuum and delivering transporting in shared environment. By this system to bagging the multi grains by regulating the vacuum pressure it is also affects the flow rate of the system. In terms of health and safety in agriculture, most accidents are caused by collisions and human errors. In this context, our system can be used to mitigate the accident causes. In agricultural environment, several approaches already been implemented. However, In particular, the flexibility and adaptability of this technique give potential to increase productivity and generate a positive economic impact in the near future. There is no such a device currently present in the market at such a cost which can handle three things at a time like suction, packing of food grains, so launching of such a project and device will surely create a market boom. This project is totally dedicated to solve the problem on grain handling (bagging transporting and delivery) in emergency conditions in India. By using this technology one day there will be no issues in India's agriculture for grain handling.

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