



# ID2802-OELP Project Report

**Title:** Valorization of Scrap(Vibrating tumbler).

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Page 1 : Introduction and Design of vibrating tumbler..

Page 2 : Materials used and model.

Page 3 : Role of eccentric mass and sectional view of vibrating tumbler.

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## **Introduction:**

*In this report the focus is on valorization of scrap. This report gives a brief glimpse of design and working of Vibrating tumbler which is used to remove the rust on the rusted things with the help of vibration. As the name of vibrating tumbler is evident by name its name it is mainly a tumbler and it is vibrated accordingly to generate vibrations and this vibrations are used to rub the test material and remove the rust to great extent.*

### **Why do we need vibrating tumblers?**

- ☐ *Instead of removing rust by hand rubbing which needs lot of human effort.*
- ☐ *Vibratory finishing is now the most popular type of mass finishing and, next to hand deburring, the most common surface conditioning method used by industry.*
- ☐ *This versatile process is used for cleaning, deburring, deflashing, descaling, edge and corner radiusing, surface finishing, and stress relieving.*

### **In which places vibrating tumblers can be used?**

- ☐ *The vibrating tumblers are widely used in industry scale to remove rust and give coating to the test material.*
- ☐ *But the vibrating tumbler done in this project can be used at any place until and unless electricity supply is available. So this makes a lot of difference. The vibrating tumbler designed here can be used for home appliances comfortable at any place(provide 30 V voltage is available)*

## **Design:**

*A vibrating tumbler is built by placing the tumbler on a wooden piece which is vibrated by placing computer fan under it. The vibrations are created on the base by using springs and computer fan. Computer fan provides upward push and also toggling effect because of eccentric mass. A vibrating tumbler is build using the materials mentioned in the next page.*

*This vibrating tumbler is tested against different arrangements and different set ups.*

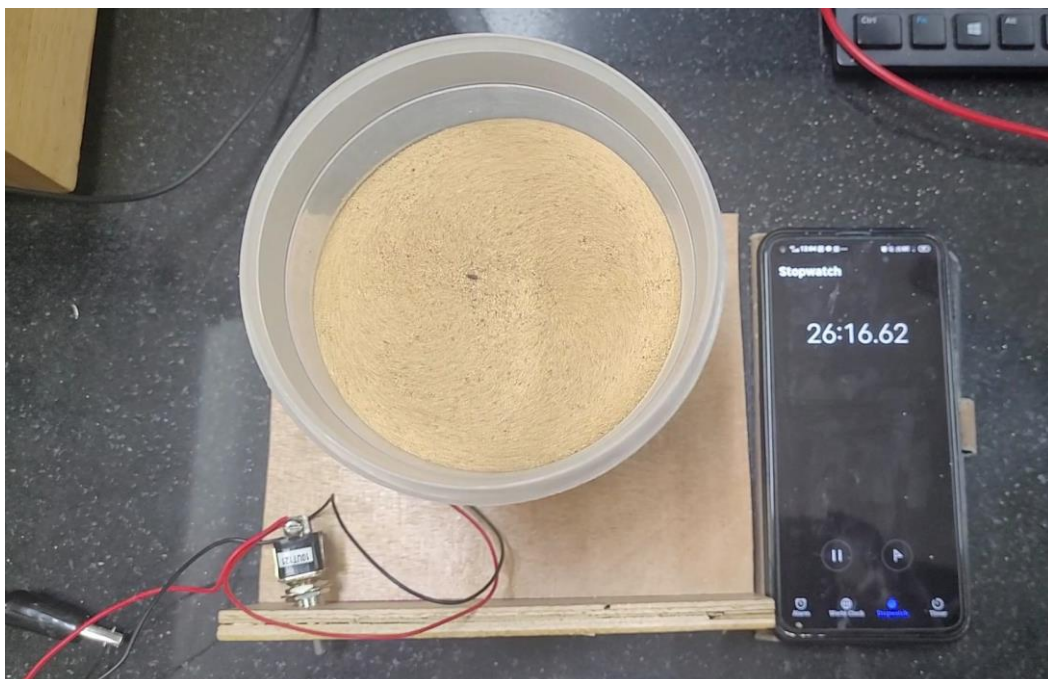
*The fluctuations which are done here for the model after building are changing the media, changing the eccentric mass. Test samples are tested against these different set ups to observe the importance of each fluctuation.*

### **Materials required:**

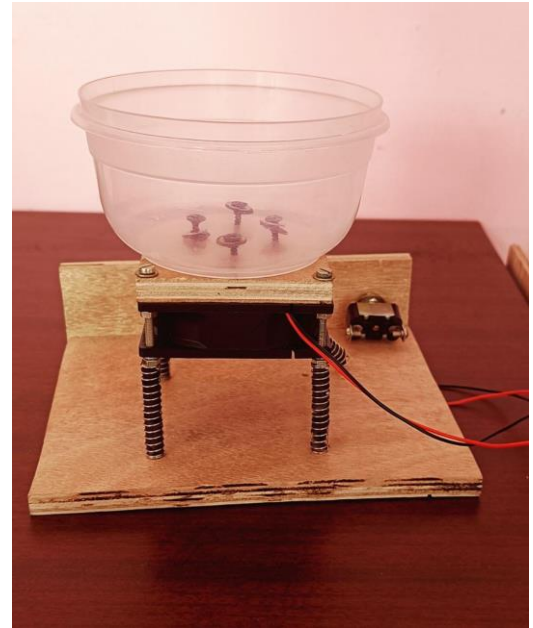
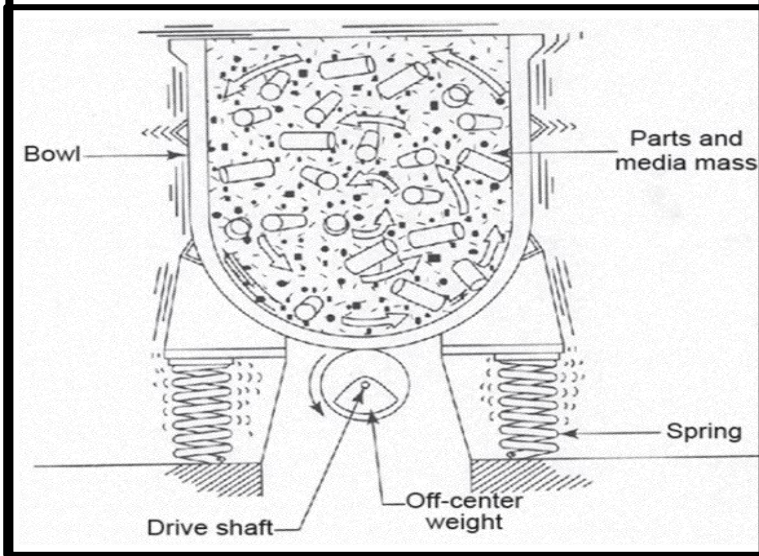
*The following are materials needed to build a single vibrating tumbler.*

- 1) Small plastic tumbler. (1)*
- 2) Springs (4)*
- 3) Computer Fan (24V)*
- 4) Shield of computer fan*
- 5) Toggle switch*
- 6) Voltage DC supply.*
- 7) Washers bolts and nuts.*
- 8) Wooden pieces*
- 9) Connecting wires.*
- 10) Different media*
  - *Wall nut shell powder*
  - *Wall nut shell powder mixed with  $Al_2O_3$ .*
  - *Corn Cob material*
  - *Sand*
  - *SiC (silicon carbide abrasives)*

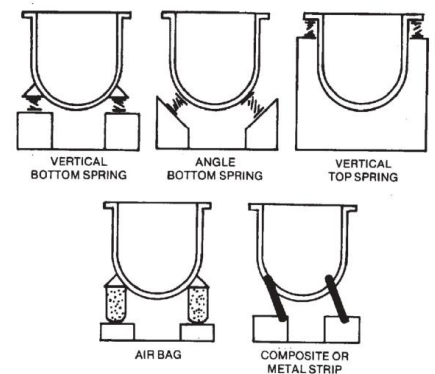
### **Model:**



## Sectional View Vibratory Finishing.

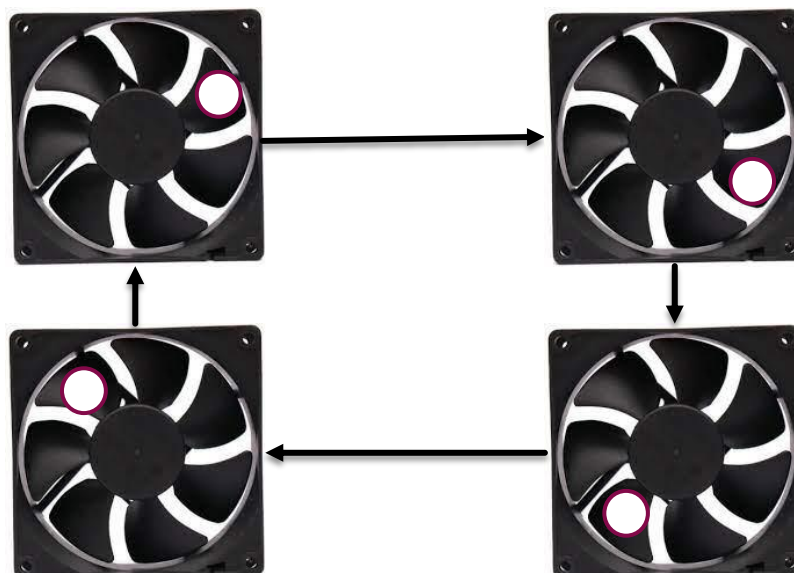


*There are many suspension methods to suspend the tumbler. And in this picture we can see those. And among those Vertical Bottom Spring is used here in this model to suspend the tumbler.*



## Role of eccentric mass:

*From the below picture we can note the effect of eccentric mass, a toggling effect is created to the vibrating tumbler. The location of the eccentric will create load on the corresponding spring. More is the eccentric mass more are the vibrations.*



## **Experiments done:**

*The following are experiments done:*

- 1) Vibrating tumbler with media wall nut shell powder ([link](#))
- 2) Vibrating tumbler with media wall nut shell powder + Al<sub>2</sub>O<sub>3</sub> ([link](#))
- 3) Vibrating tumbler with media sand ([link](#))
- 4) Vibrating tumbler with corn cob media
- 5) Vibrating tumbler with SiC abrasives

*The following are the frequency calculations done to measure the vibrations generated in vibrating tumbler:*

- 1) When there is not material the frequency is : (200Hz) [link](#)
- 2) When the material is wall nut powder the frequency is: (34 Hz) [link](#)
- 3) When the material is corn cob, the frequency is: (73 Hz) [link](#)

## **Observations:**

*By observing the above results the results were good for wall nut shell powder with Al<sub>2</sub>O<sub>3</sub> and SiC. These materials are showing good results compared to other media. I have observed the following:*

*(freq)no-material > (freq)corn-cob > (freq)wall-nut shell powder.*

## **Conclusion & Future scope:**

*More media can be used to test the model and come to a conclusion which media is better over another. The depth of rust removed can be compared from different media.*

## **Refernce:**

*Reference link: [link](#)*