



## Design of Modified Storage Mechanism for Daily Wastage

Nilesh C. Kanojiya<sup>1\*</sup>, Achal S. Shahare<sup>1</sup>, Ritesh K. Sambare<sup>2</sup>

<sup>1</sup> Mechanical Engineering Department, G H Raison Academy of Engineering & Technology, Nagpur, Maharashtra 440028, India

<sup>2</sup> Mechanical Engineering Department, Shri Ramdeobaba College of Engineering and Management Nagpur, Maharashtra 440013, India

Corresponding Author Email: [nckanojiya6@gmail.com](mailto:nckanojiya6@gmail.com)

<https://doi.org/10.18280/eesrj.070104>

### ABSTRACT

**Received:** 22 December 2019

**Accepted:** 4 March 2020

#### **Keywords:**

*households waste, slider mechanism, heat transfer, environment, dustbin*

The main purpose of this project is to modify the existing dustbin into the modern dustbin. As we know that, People lobbing the waste inside the dustbin but not in a proper manner because old dustbin will overflow before its actual capacity. Main task of designing of any component is to follow the design procedure calculations; this will lead to the safe dimensions of the component. This machine consists of a container which is divided into four parts i.e. two for mechanism and two for waste storage. Mechanism consist of crank, connecting rod, hammer, mechanism works same as with-worth quick return mechanism for crushing. Another mechanism contains of blower which pushes the plastic into the hot chamber, it is work same as single slider Mechanism When the crank is rotate then the connecting rod which is connected to hammer and crank moves left to right and crushes the can. Another mechanism consists of blower which pushes the plastic into the hot chamber. A switch is connected to the hopper as the hopper is open then the blower starts due to pressure & plastic moves into the hot chamber which contain heating coils in equilibrium condition.

## 1. INTRODUCTION

The inspiration behind this design came from the festivals, wastage in malls, canteens of big company often the winter holidays involve large parties where people gather and consume a lot of canned beverages. In this manner, it just bodes well that there ought to be a simple method to discard jars appropriately during these enormous get-togethers. Along these lines this can smasher was made, with a convenient and physically worked component. Can smashers be essentially used to spare space and reusing. Crushers be able to make it conceivable to make little stackable heaps that spare space. There are numerous structures that would crushers be able to come in.

A portion of the structures are pneumatic, water powered, aluminum, and wood. Jesse M. Wright was the man who created the aluminum can smasher in 1937, yet he didn't get it licensed until August 30, 1938. Recycling is brilliant approach to enable the earth, to regardless of whether you think in any case when you're pulling enormous, massive sacks packed with void jars to the check. One gadget that will make our life simpler, and our reusing pull much more compact, is the cane crushing machine. The main purpose of the project is to modify the existing dustbin into the modern dustbin as we all know that People throwing the waste into the dustbin but not in proper manner because old dustbin got overflow before its actual capacity. Main task of designing of any component is to follow the design procedure calculations; this will lead to the safe dimensions of the component. Next step is to manufacture the components into the workshop. As per the study of many research articles, it has been cleared

that there is need of change in the existing dustbin used in India for new modified engineering mechanism dustbins which will solve the storage mechanism inside the dustbins. Hence for new design as per engineering and waste management's required the study of different research articles which overcome the gap of our new design mechanism of waste management dustbin.

## 2. LITERATURE STUDY

For taking into consideration of many researchers study or reviews on waste management and its technology of implementation, we satisfied our research article will implemented for the management of daily households wastage. As per the research article on municipal waste management system for the use of domestic purpose they suggested their work was to identified, best available waste disposal system for daily use on the basis of climatically changes [1]. The case study was concluded that the problem facing in Turkey related to waste management, like disposal, industrial origin, household origin, household Wastes, construction was the major collection in the country [2]. This was the case study on Brazilian waste management and how to link the study with other country for to manage the waste in Brazil [3].

The paper was about to overcome the solid wastage in India and how the policies are failed to reduced that to manage the solid waste from the country [4]. As from the reviewed from the articles the analysis was did by the authors regarding how to develop the smart city by managing

households' wastages in India [5]. In the textbook of mechanics of machines shows that how the different machines and mechanism of mechanical engineering will be utilised in any systems of mechanisms like, mechanical linkages, different operations performed by machines by using proper mechanisms arrangements as per their applications [6]. We have discussed few papers which directly help us to determine the lagging of waste management by using such mechanism will to recycle the daily home's wastages using the mechanical concept of engineering [7]. The researcher was focus on how to implement the smart dustbin as in network process for the smart city and its development [8]. In the machinery handbook published by industrial press used as small parts like, fasteners, screw etc. Are very much important when any machines or mechanism are assembled [9]. The researcher concluded that, if we used heat transfer mechanism so it is very important to enhance the heat transfer rate accurately so for that researcher used the nanofulids & inserts, from that we concluded that if we using the heat transfer mechanism inside the mechanism, we must have to improve the heat transfer rate of the casing [10]. The conference was titled product design, hence their aim was to find out the new concept of design from the used of different researchers thoughts, and hence we conclude that if we design the new product of mechanism, we need some similar papers to read which helps us to determine the conclusion points of our new design [11]. In this paper they are concluded that for the smart cities developments their is a need of smart bin which help to improve the waste managements systems [12]. The researcher was found the smart dustbin with wi-fi device which help the municipal corporations, if dustbins are overflow or any damages, hence for our project we also used such types of systems for new dustbins [13]. In this, researchers used the monitoring system for dust bin, which help indirectly to peoples those who used such types of bins, from this we are also using the same techniques in our project [14]. The researcher studied how to manage the solid waste at Abakaliki Metropolis, Ebonyi State, Nigeria and suggested to convert waste into energy [15]. In such type of conference under waste management's helps the society to overcome the problems of how to manage the wastages by using the researcher's new ideas over it [16]. The researcher studied the problem face by the Kerala state of India regarding conversion of solid waste into useful form and major challenges faced during the solid waste management system [17]. As per the research article by Europe scientific journal, they are concluded that if peoples will take the responsibility than an only India will overcome from the problems arising from waste management's, hence from this we are concluded for our project, the urgent need of new mechanism for the dustbins [18]. In this management of disposal under solid waste management was very much important which directly solve the problems of waste management of municipal mechanism of wastage dumping sides [19]. In this review article they were identified the challenges of wastage in India and also shows the current status of municipal solid waste management mechanism need to be modified [20]. As per their Kerala region study they were concluded that there must be an assessment technology will be used for the solid waste management system, which directly helps the dumping of wastages [21]. In this chapter author main focus on how the municipal solid waste will convert into the useful form and how wastage can be used as

resourceful [22]. The study was very much useful for new researchers those who are working in the area of waste management technology, in this researchers focus was how the waste will be harmful for the environment of country specially in the region of middle and lower income countries, hence to overcome it there is a need to motivate the peoples and used some new design of dustbins [23]. This paper case study will be helpful for finding the new solutions for the managements of wastages for any countries; in this they defined the waste management modules which overcome their problems [24]. This report shows the accurate figures of municipal solid waste management which indirectly represents the public health in terms of waste management system in India [25]. The researcher was focus on how this domestic food waste will be utilized or recyclable for the betterment of society [26]. Hence from this literature, we identified the gap between waste management cycles and their mechanism should be change as per the need of society and its populations, the population is the main problem of waste management and the thinking ability of human being. For that we decided to change the old waste management systems with new engineering waste management mechanism.

### 3. OBJECTIVE OF WORK

The main objective of our work is to provide such kind of modified dustbin to the society of Indian populations which change the thinking of every people leaving in the world. Following are some point discuss about the work objectives as,

- The main intention of this project is to provide our Indian daily wastage into proper recycle process which is the need of today's Indian generation.
- Designed such Mechanism which stores the waste in easy way.
- The total effort and time needed in the process should require very less time.
- The device should simple in design, easy to use and easily portable.
- The can crusher requires low pressure to crush the cane and crush a can on short time. The can crusher should store and locate the can after crush.
- Mechanism consist of crank, connecting rod, hammer, mechanism works same as Single-slider mechanism for crushing the cold drink canes.
- Another mechanism consists of blower which pushes the plastic into the hot chamber for the recycle processes.

### 4. DESCRIPTION OF COMPONENTS

The Mechanism consist of crank, connecting rod, hammer, mechanism works same as Single-slider mechanism for crushing the cold drink canes. When the crank is rotate then the connecting rod which is connected to hammer and crank moves left to right and crushes the can. Another mechanism consists of blower which pushes the plastic into the hot chamber. A switch is connected to the hopper as the hopper is open then the blower starts due to pressure plastic moves into the hot chamber which contain heating coils in equilibrium condition. A can smasher is a gadget utilized for

squashing aluminum soft drink jars for simpler capacity in reusing receptacles. While most recyclers don't expect you to pound jars, on the off chance that you do reuse a great deal, your typical canister may top off rapidly. The smasher gives you additional room by levelling either single or different jars. The first can smasher was obviously the human foot. Individuals frequently trampled jars to smooth them down either for reusing or for more noteworthy space in the trash can. This could some of the time hurt if the foot didn't descend appropriately on the can, so business people enthusiastically looked for an assortment of choices that could be utilized with the hand.

The main purpose of the project is to modify the existing dustbin into the modern dustbin as we all know that People throwing the waste into the dustbin but not in proper manner because old dustbin got overflow before its actual capacity. Main task of designing of any component is to follow the design procedure calculations.

#### 4.1 Single slider mechanism

Slider crank chain reversal emerges when the associating bar of a slider-wrench linkage turns into the ground interface, so the slider is associated legitimately to the crank. This transformed slider crank is the type of a slider crank linkage that is frequently used to activate a pivoted joint in development gear like a crane or excavators, just as to open and close a swinging entryway or entryway. A slider crank is a four bar linkage that has a crank that pivots coupled to a slider that the moves along a straight line. This system is made out of three significant parts: The wrench or crank which is the pivoting plate, the slider which slides inside the cylinder and the interfacing pole which consolidates the parts. As the slider moves to the privilege the interfacing bar pushes the wheel round for the initial 180 degrees of wheel pivot. At the point when the slider starts to move once more into the cylinder, the interfacing bar pulls the wheel round to finish the turn as shown in Figure 1.

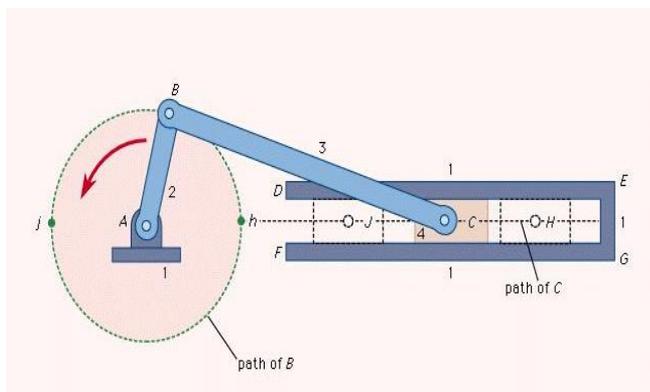


Figure 1. Single slider mechanism [7]

#### 4.2 Crank

A crank is an arm joined at right edges to a turning shaft by which responding movement is bestowed to or got from the pole. It is utilized to change over round movement into responding movement, or the other way around. The arm might be a twisted bit of the pole, or a different arm or plate appended to it. Appended as far as possible of the crank by a turn is a pole, as a rule called an interfacing pole. The finish of the pole joined to the wrench moves in a round movement

while the opposite end is typically compelled to move in a straight sliding movement as shown in Figure 2.



Figure 2. Crank [7]

#### 4.3 Connecting rod

In a reciprocating piston engine, the interfacing bar or condor associates the cylinder to the wrench or crankshaft. Together with the wrench, they structure a straightforward system that changes over responding movement into pivoting movement. Interfacing poles may likewise change over pivoting movement into reciprocating motion. Truly, before the improvement of motors, they were first utilized right now. Figure 3 shows the connecting rod.

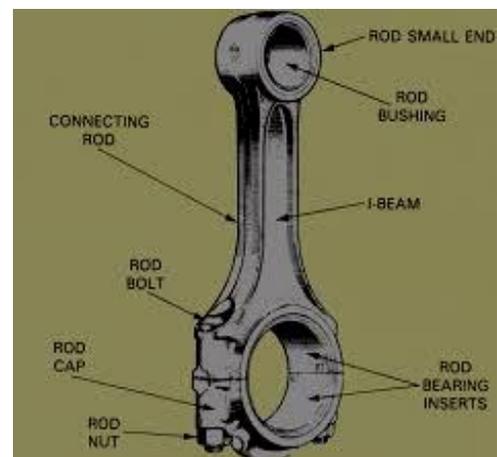


Figure 3. Connecting rod [7]

#### 4.4 Blower

The centrifugal or radial blowers as shown in Figure 4 are used in heating applications in this project for compressing the plastic in particular temperature. A radial blower admissions air through its inside and guides it through an opposite opening in the lodging.

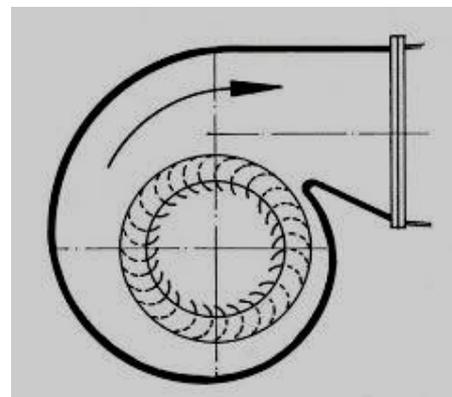


Figure 4. Blower [7]

#### 4.5 Hopper

The container or hopper as shown in Figure 5 is an enormous, pyramidal formed holder utilized right now gathers and hold particulate issue. Containers are normally introduced to take into account a more prominent assortment amount, such as dust collectors, plastics, wet wastage of household, cans, etc. and it is made of steel.



Figure 5. Hopper [7]

### 5. EXISTING AND NEW IDEA

#### 5.1 Existing methodology

As we know that in India the daily wastage percentage is around millions of tons and the procedure of storage of daily wastage is too old which are shown in Figure 6, the wastage did by Indian are including plastics, wet wastage etc. are increases very high, due to that we required to modify the old dustbin storage system into the new modified storage i.e. dustbin using mechanical mechanism.



Figure 6. Existing procedure for wastage management [8]

#### 5.2 New design of methodology

The main Aim to make the machine is to reduce the volume of waste to store the maximum waste in small space. This advance dustbin gives waste already into compressed form so further processes for waste management are slightly reduced. As we can see the volume of waste (ex:- plastic soda cans etc.) is increases much faster than it recycle so there is a need to store these type of waste but we have limited space for it if we store the waste in compressed form so we can store maximum waste in same space. The design of modified dustbin is basically involving the heat treatment like melting of plastic at desire temperature and will like the elastic rubber made of waste rubber inside the dustbin. It will not affect the system inside very badly and result of low

corrosion accrues inside of it simultaneously. Figure 7 shows the Modified Dustbin with Mechanism designed in CAD software.

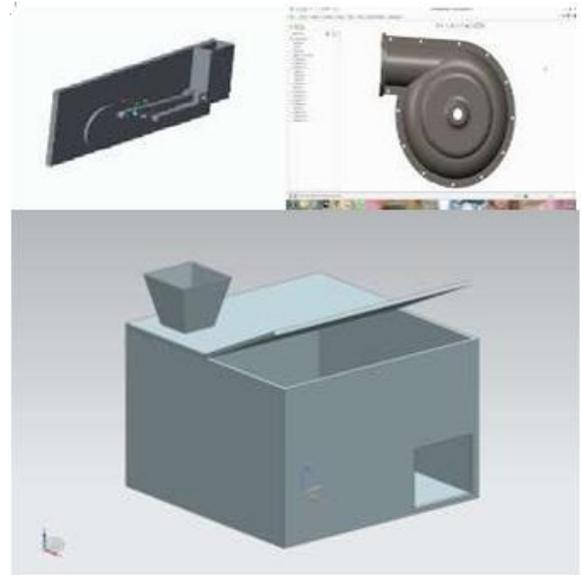


Figure 7. Modyfied dustbin with mechanism designed in CAD software

### 6. LITERATURE GAP

As per the review of many research papers on waste management and its technology, most of the researcher studied the various aspects of wastage like plastics, can crusher, wet waste, etc. but only few researchers are thinking to design the waste management systems for the society or in India in daily household's wastages. In our project we are designing, developing and fabricating such type of dustbin which solve the daily recycling of wastages, we modified only inside daily used dustbin in India by using the concept of mechanical engineering & its mechanisms

### 7. OBSERVATIONS FOR SELECTING THE DESIGN (GRAPHICAL CALCULATIONS)

#### 7.1 Waste generation in India (million metric Tonnes per annum) as shown in Figure 8

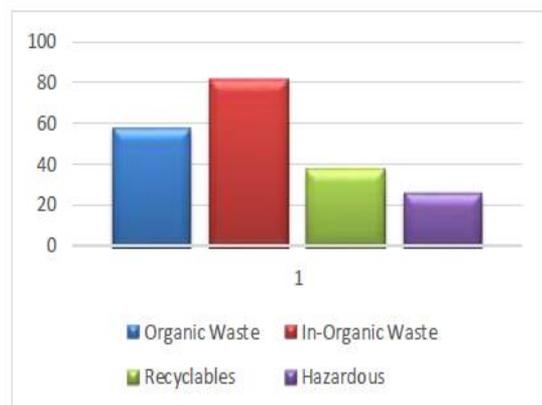
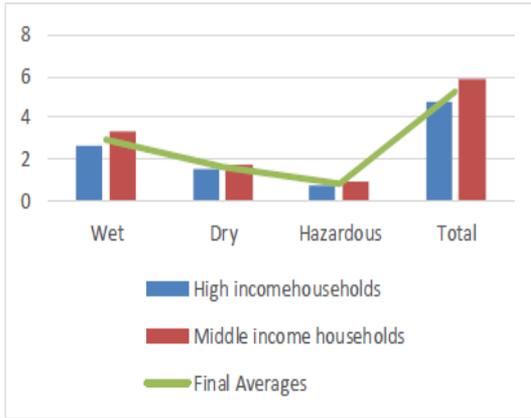


Figure 8. Waste composition of India, in million metric tonnes per annum (2018) [27]

**7.2 Methodology of waste audit in urban India (in kgs) as shown in Figure 9**



**Figure 9.** Average waste generated per day per household (in kgs) [27]

**8. APPLICATION AND CONCLUSIONS**

**8.1 Application**

It has number of uses

- Daily storage of waste like in corporations’ dustbin.
- It can be used as road side dustbin.
- It can be used in college campus also.
- Any other

**8.2 Conclusion (Theoretical)**

As per the Graphical representation or result and the modified dustbin design following points are to be taken under considerations

- The invention reduces the time consumed to crush the can.
- In conventional method, certain torque has to be applied to crush the can.
- Designed such Mechanism which stores the waste in easy way.
- The can crusher requires low pressure to crush the cane and crush a can on short time. The can crusher should store and locate the can after crush.
- The device is simple in design, easy to use and easily portable in these inventions, the torque applied for Crushing
- Easy recycle process of plastic into the rubber form, other like wet waste/vegetables etc. will separated and recycle as composed for the use of agriculture.

**ACKNOWLEDGMENT**

We are acknowledging that the work is original and not copied from any other person or peoples. And we don’t have any funding agencies support for this project, if anyone having suggestion contact me at my email address nilesh.kanojiya@raisoni.net.

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