



## **Designing and development of disposal technique of sanitary pad by installing crushers in the toilet pot**

By-Aadarsh A. Rathi ,Student at P. R. POTE PATIL International school ,Amravati

### Introduction :-

In a country like India which has such humongous population, the magnitude of problem is also huge. The problem of disposal of used sanitary pads is one of them. The youth of today is quite vigilant, but the age group of 30 to 40 is still in efforts to cope up with the new ideology of “Swachh Bharat” ,an initiative which the youth is aware about but implementation as always is a problem in India. Disposal of sanitary pads has always been a problem not only physically but hygienically too. The statistics says currently an estimate of 35% of around 350 Million women uses sanitary pads in India. The pro is that atleast they are using something medically acclaimed rather than cotton, cloth or leaves as in some rural cases, but this is also leveraging another problem of disposing these sanitary pads which the Authorities must address as soon as possible. The total Generation of sanitary pads in India is approximately 12.3 billion. Looking at such huge number of generation of sanitary pads ,a compact area wise solution is not viable, infact the problem is in every bathroom so the solution also need to be there is every bathroom only. Before dwelling into this let us first understand what all problems needs to be understood.

The hazards of current methods of sanitary pad disposal are as follows :

- The first and the foremost is waste management problem with such huge number of sanitary pad generation, it is imperative that we come up with waste management strategies to deal with it
- The user disposes it in local dustbins which further goes in bigger Trash , which is further sorted with bare hands of the “Rag pickers”.
- If not thrown in dustbin it is flushed in toilets which clogs it and cause drainage blockage problem which needs a manual Cleanup .That again is totally unhygienic.
- When thrown in open sewage on the corners of roads it is eaten up many a times by animals,if the water is not flowing in this open sewage. Sanitary napkins contain polyethylene which is hazardous if intaken by animals. Not only it is hazardous for Human and Animal life but also totally unhygienic.
- Even if the water is flowing it still not biodegradable and hence can float in the bigger water bodies. Sanitary napkins contain polyethylene which is hazardous if intaken by animals.
- In public washrooms, often due to poor infrastructure, sanitary napkins are flushed or are left in corners or other open areas. Very few women use newspaper to wrap it in



- public bathrooms. The lavatory pots get clogged which again becomes drainage blockage issue.
- Sanitary Napkins can neither be reused nor recycled.
- Acres and hectares of dumping land all filled with this was



If direct burial of Sanitary pad is done, it takes quite a long time to decompose as it contains polyethylene (PP), which is non-biodegradable in nature, hence usable fertile land is reduced.

- The Rag pickers and Sanitary Workers are unknowingly exposed to harmful bacteria and microorganisms which can cause adverse effects on their health.

The current ground level compliance taken to deal with this problem are :

Incinerators are installed in Public Places where the used sanitary pad can be burned one by one. Adopting Incinerators at Community level can Collectively Control Sanitary Waste in a channelized way. The Rural tribe also has come with "Matka" Incinerators as an alternate way to disposal of pads in India, in which you can burn the pads and throw away the ashes. Burning pads can cause emission of harmful gases in the air. Discarding Sanitary pads in the most hygienic way can be by deep burial that too the pad should not be intact because it contains 38 % plastic which is not bio-degradable, but if it can be crushed into tiny, micro particles and then sediment into either soil or mixed with human feces, that will be the least hazardous method to discard sanitary pads other than incinerators.

This can be possible by fitting a crusher right either beneath the lavatory seat or adjacent to it encompassed with a suction flap opening in the lavatory seat or on the side wall of the lavatory seat. This flap opens when the connected button is pressed and that connected pipe is further connected to the crusher blades which turn the intact sanitary pad into minute particles and paste which further can be connected to bigger pipes that carry human waste. This lavatory seat crusher can be a game changer if implemented and will make the life of all the women much more easier with such an easy discarding process, hence this idea of breaking down the pads into micro particles right in the bathroom can support women hygiene as well as reduce the awkward moment of carrying it outside the bathroom and then disposing it off. It also solves the problem of every woman who changes Sanitary pads in bathroom. When the idea clicked, the first step was to churn the sanitary pad in the household mini portable chopper after cutting it into big pieces, when this experiment came out affirmative, then a chopper prototype was developed through which water and sanitary pad were crushed converting it into thick paste which could flow towards the main pipe attached.

Understanding the working Procedure for sanitary pad shredder :

As in food waste disposer units, no types of blades are used to crush the waste. Rather, impellers are mounted on a spinning plate that uses centrifugal power that forces food waste particles to break down against a grind ring. That churn of a ring breaks down the food waste into very fine particles literally liquidating them.

Tap running water then flushes the micro particles through the mince ring from the disposer



and into main wastewater pipe which from there flows to the wastewater treatment plant and then to the septic tank .



Generally, these findings point out that the use of garbage/sink grinders leverages useful benefits. In fact, in the sustainable development the reduction of wastes production (and disposal) is the fundamental issue and the retrieval of resources contains within the concept of sustainable development. In urban areas these targets could be achieved by the integration of the wastes treatment cycles (waters and solid organics). The integration of the treatment cycles could be achieved considering the sewers as collecting systems. According to Henze, organic wastes could be treated through garbage grinders and sent to wastewater treatment plants by means of sewers, saving in terms of separate collection and truck transport ("aquamobile" concept)<sup>(1)</sup>. The same was proposed in Italy in the 1980s, since this method allows the collection at source of some one third of municipal solid wastes<sup>(2)</sup>.

The use of pad grinders is almost as same as Garbage grinders installed in homes. Sometimes, garbage grinders are accused of producing problems in sewers and wastewater treatment plants but this being the prototype model developed here, there could be chances of errors and up gradation. In this paper, A prototype of this pad Grinder can be seen based on this technology. In particular, it is shown that garbage grinders enable the disposal of household organic wastes with advantages for the wastewater treatment processes because of an increase in the carbon/nutrients ratio in the wastewater. This is particularly important for biological nutrients removal processes.<sup>(3)</sup>

The method of starting disposal of pad would be a pipe mounted on the side of lavatory pot on the adjacent wall flap in the pipe with a solonite switch besides flush push button.

Once the used pad is dropped in the pipe, user can press the solonite switch which is connected to the flap in the pipe it opens and sucks in the pad which further falls in the crusher.

The design of the crusher machine is quite replicating to the sink crusher.

Rated at 650-750(1 hp) an high torque insulated motor suitable for a domestic bathroom fit, with a turntable suitable for spins in circular motion can be mounted horizontally above it.

The size and weight of induction motors depends on the available installation space and construction of the Bathroom area.

The Induction motors rotate at 1,400–2,800 rotation per minute and have a range of starting torques, depending on the method of starting used. Here, the starting method used is the push button based on electric ignition.

Series-wound motors, rotate at higher speeds, have high starting torque, and are usually lighter, but are noisier than induction motors, partially due to the higher speeds and partially because the commutator brushes rub on the slotted commutator.<sup>(4)</sup>

Inside the grinding chamber there is a rotating metal turntable onto which the used sanitary pad waste can be dropped. Two swiveling and sometimes also two fixed metal impellers and mounted on top of the plate near the edge then fling the pad against the grind ring repeatedly. Sharp cutting edges in the grind ring break down the waste until it is small enough to pass through openings in the ring, and sometimes it goes through a third stage where an Under



cutter disk further can chop the sanitary pad up, whereupon it can be flushed down the drain<sup>(5)</sup>.

Usually, there is a partial rubber closure, known as a splashguard, on the top of the disposal unit to prevent sanitary waste from flying back up out of the grinding chamber<sup>(6)</sup>.



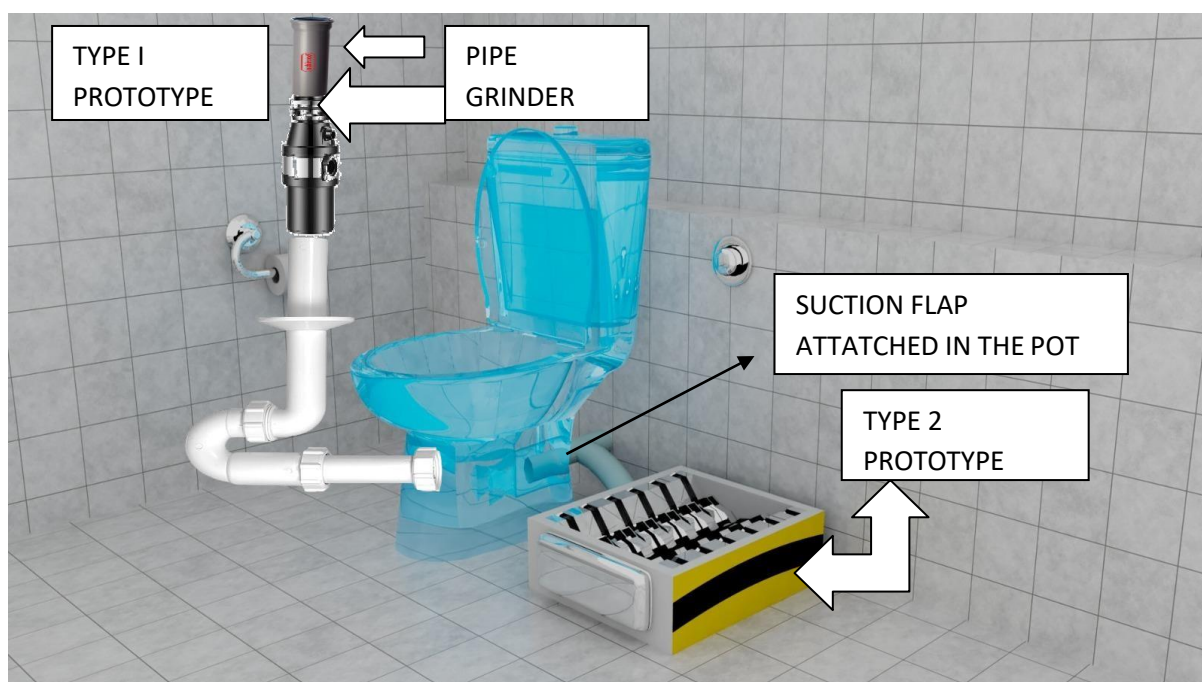
It may also be used to lower noise from the grinder for quieter maneuver.

As the pad crusher is mainly inspired by sink crusher and mechanism of garbage disposers two main types of garbage disposers—continuous feed and batch feed are found to exist. Continuous feed models are used by feeding in waste after being started and are more common. Batch feed units are used by placing waste inside the unit before being started. These types of units are started by placing a specially designed cover over the opening. Here in this sanitary pad disposer unit batch feed machinery is used. Some covers manipulate a mechanical switch while others allow magnets in the cover to align with magnets in the unit. Small slits in the cover allow water to flow through. Batch feed models are considered safer, since the top of the disposal is covered during operation, preventing foreign objects from falling in<sup>(7)</sup>.

Waste disposal units may jam, but can usually be cleared either by forcing the turntable round from above or by turning the motor using a hex-key wrench inserted into the motor shaft from below. Especially hard objects accidentally or deliberately introduced, such as menstrual cups or plastic waste can damage the waste disposal unit and become damaged themselves, although recent advances, such as swivel impellers, have been made to minimize such damage<sup>(8)</sup>.

This disposal unit can be powered by water Pressure, rather than Electricity for the flow of crushed sanitary pad waste, which can be attached to P bend pipe after the bend and with flush of water can be flushed. Because of horizontal cutting action, they can handle fibre waste.

The conventional disposal technique of land-fills can see a drastic change as this method may prove to be an environmentally responsible alternative by executing a deep burial through pipe lines. Reduction in greenhouse gas emissions, can also be counted as property to this.





An digital image created to show two different types of working of pad crusher ,where one prototype(I) unit is seen mounted on wall, through which pad can be inserted ,which falls on





the grinder ,gets crushed and with the water pressure gets carried in the septic tank or deep burial land fill via sewage waste .In prototype (2),a suction flap is itself attached in the lavatory pot ,which has a T-Bend Connector pipe connected to crusher ,where the pad gets crushed and through outlet pipe attached after the P-Bend Pipe (carrying human feces) is yet again attached via another T bend ,which further mixes and flows in the septic tank or sewage waste .

#### Spreading Awareness :

Educating the public about the perils of non systematic disposal of sanitary pads can be a pavement to bring about the real change which is required and is the need of the day. Equipping the feminine lot for a safer cleaner and better tomorrow so that it does not violate the health of even the rag pickers and Community Cleaners. All this means that these disposers are an environmentally responsible alternative to conventional disposal methods such as landfill. Not only does this help reduce greenhouse gas emissions, but it means that food waste can be processed and used for renewable energy.

This paper considers several aspects of the use of garbage grinders technology in the prototype I used for sanitary pad grinder option, in order to clarify the possibilities of the application of this device.

#### CONCLUSIONS

The use of the sanitary grinder enables the fluctuation of the organic/non organic wastes to be diverted from the collecting manually to disposal /treatment system headed for the wastewater treatment plants or deep burial . This is feasible both from a technical and an economical point of view. Both the prototypes can be taken into consideration for the working of the same which will solve n number of problems of hygiene and health of not only the feminine lot but also all the community workers working manually.



REFERENCE:

- 1} <https://www.dbt.univr.it/documenti/ArticoloRivista/allegato/allegato867512.pdf>
- 2} <https://pubmed.ncbi.nlm.nih.gov/25512234/>
- 3} [https://www.researchgate.net/publication/10796921\\_The\\_under\\_sink\\_garbage\\_grinder\\_A\\_friendly\\_technology\\_for\\_the\\_environment](https://www.researchgate.net/publication/10796921_The_under_sink_garbage_grinder_A_friendly_technology_for_the_environment)
- 4} <https://testbook.com/question-answer/which-motor-is-used-where-high-starting-torque-and--5c8fa8defdb8bb4e6d5acfb8>
- 5} [https://en.wikipedia.org/wiki/Garbage\\_disposal\\_unit](https://en.wikipedia.org/wiki/Garbage_disposal_unit)
- 6} <https://www.reicheltplumbing.com/plumbing-blog/replace-a-garbage-disposal-splash-guard>
- 7} <https://www.consumerreports.org/garbage-disposals/batch-feed-garbage-disposals-pros-and-cons-a5596533938/>
- 8} [https://www.chemeurope.com/en/encyclopedia/Garbage\\_disposal.html](https://www.chemeurope.com/en/encyclopedia/Garbage_disposal.html)