

A Review on Design and Manufacturing of Portable Sanitary Napkins Disposal Incinerator

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Abstract: The problem of improper disposal of menstrual waste is a major road block create a clean India. This waste is problematic for many reasons. Heaps of napkins using lots of disease causing germs pose danger. The proposed system uses safe scientific process of disposal of sanitary napkins is to incinerate them to ash, in comparatively low temperatures. Systems bleach napkin utilizing fire, without letting the procedure generated in, by the smoke established burner. This measure has to be taken to fix the issues that, usage of napkins triggers to the health and also to the environment. Also the proposed system focuses on making the fumes coming out of chimney less hazardous to the environment by using wet scrubber for its filtration.

Keywords: Wet scrubber, incinerator, chimney, smoke established burner.

1. Introduction

According to World Health Organization, a person aged 10–19 years is considered as an adolescent. The transition period between the childhood and adulthood is called adolescence which is marked with the growth and development of the child. During this period, physical, psychological and biological development of the child occurs. It is recognized as a special period in a girl's life cycle which requires special attention. Menarche is an important biological milestone in a woman's life as it marks the onset of their productive phase of her life. The average age at menarche is mostly consistent across the population that is between 12 and 13 years of age. Unfortunately, due to lack of knowledge on menstruation preparedness and management or due to shyness and embarrassment the situation becomes worse for girls. Women and men have specific sanitation needs, preferences, access requirements, and utilization patterns and experiences. Women also use toilet facilities to manage their menstruation. Good menstrual hygiene practices means that women and adolescent girls are using a clean menstrual management material to absorb or collect menstrual blood, that can be changed in privacy as often as necessary for the duration of a menstrual period, using soap and water for washing the body as required, and having access to safe and convenient facilities to dispose of used menstrual management materials. Poor menstrual hygiene

management (MHM) can negatively impact the health and psycho-social well-being of women and girls.

2. Objective of the study

- To educate and develop awareness on utilization of Sanitary Napkins and supply accessibility by installment, straight to Sanitary Napkins Vending Machines using application in Schools and Faculties that, Girls/Women get habituated to apply this Sanitary Napkins for their health care.
- To install incinerators that will decrease spread of disease due to disposal of sanitary napkins, and to take care of the issue of sanitary napkin disposal and decrease pollution due to reduced clogging of drainage system in public.
- To make the system more environmental friendly by using wet scrubber in the system for making the fumes less hazardous to the environment. To educate and develop awareness on utilization of Sanitary Napkins and supply accessibility by installment, straight to Sanitary Napkins Vending Machines using application in Schools and Faculties that, Girls/Women get habituated to apply this Sanitary Napkins for their health care.
- To install incinerators that will decrease spread of disease due to disposal of sanitary napkins, and to take care of the issue of sanitary napkin disposal and decrease pollution due to reduced clogging of drainage system in public.
- To make the system more environmental friendly by using wet scrubber in the system for making the fumes less hazardous to the environment.

3. Methodology

- Literature Survey
- Study of Materials
- Design and Modeling of Incinerator
- Manufacturing Process
- Results and Discussion

- Conclusion

4. Literature Review

A. Details of Literature Review

A. Chourasia Sandhya Bhagawat, Dr. Tambolishabanam, Mali Satish (2019): This project gives a solution for destroying napkin waste in a very hygienic way. This is portable system to destroy napkin waste, using Incinerator. These systems also help to achieve the “Swachha Bharat” mission and avoid the large amount of diseases. Napkin disposer too can be fabricated and integrated with the vending machine, so that dispensing and disposing can be achieved in a single unit. [1]

B. Madheshwar Subhramaniyan; Anandha Moorthy Appusamy; Prakash Eswaran (2019): The present research deals with an effective solution to dump and dispose the menstrual waste with the help of an incinerator. The system involves an incinerator which uses electricity to heat the heating coil which in turn will lit up the sanitary napkins when dumped into the incinerator. As a responsible citizen of our country is to maintain the environment neatly, taking it in mind the model has been designed and also ensures the performance of it. [2]

C. Rutujakulkarni, Rajnandini Lohar, Neha Wani (2018): The problem of improper waste is major road block to our achieving ‘Swachha Bharat’ missions goal to create a clean India. This waste is problematic for several reasons. This project gives a solution for destroy napkins waste in a very hygienic way. This is portable system for destroy napkins waste using Incinerator. This system also helps to achieving the ‘Swachha Bharat’ mission and avoid the large amount of diseases. Insufficient information is available to women on the environmental impacts of menstrual waste and on alternative behaviors which reduce the impact. With no knowledge of how to dispose napkin’s, most women just throw them in the garbage bin which usually gets mixed up with dry, wet and hazardous waste. [3]

D.K. Samba Siva Rao, K. Harish, M. Kavin Kumar, D. Vishnu Harish (2018): The system works on the automatic napkin dispenser in toilets and places that keep track of available napkins and inform the person concern when fewer napkins are available. Napkin Disposer too can be fabricated and integrated with vending mahine, so that dispenser and disposing can be achieved in a single unit. [4]

E. Pooja G. Nidoni (2017): municipal waste is one of the major problems in modern societies even though the significant efforts to prevent, reduce, reuse and recycle. At present municipal solid waste incineration in waste-to-energy plants is one of the main management options in most of the developed countries. The attempt is made to utilize these byproducts effectively for the welfare of living beings. [5]

F. Rotary Club of kalyan (2017): Study investigated how girls manage waste from the light of future degradation, in the uterus. Interviews were conducted to find out the methods of waste disposal which are employed in state. Discretion and hygiene would be factors of concern in managing menstruation for girls, and too little information about menstrual disposal

practices at the exterior was happened. Disposal of menstrual use through sewage systems may result in blockages of these approaches, and because countless vinyl strips to be thrown to the sea, in which they stay indefinitely, causing observable pollution. Menstrual goods are disposed of with the vast majority of users at the simplest and most convenient manner. Percent of consumers flushed napkin in the work and home down the bathroom. The use of sanitary napkin to handle menses has led girls to eliminate the products, at the manner for them would be to spoil them. The plastic used in napkins is not damage for health, but has consequences. [6]

G. Vishakha Goyal (2016): Marketing opportunities for menstrual products in India: i. Increasing the consumer Base: if the product is manufactured by micro enterprises there will be huge increase in the availability of the product, hence consumer base will be enhanced to increase the market size in India. ii. Cost reduction: Wealth Index Quintiles reflect that 47% of female uses sanitary napkin while only 5% among poor income household. Hence this should be considered as normal commodity so we can assume that there is high correlation price and quantity demanded. With the above case of production there is scope of high reduction in prices that will surely boost up the quantity demanded of the product, which will provide high positive externalities on women menstrual health. iii. Lack of standardization: on the basis of the District Level Household and Facility Survey (DLHS-3) 2007-08, there is huge variation in the usage of locally prepared Napkins. The northern states like Chandigarh, Uttar Pradesh and Himachal Pradesh show high usages. While the states which has more developed market like, Haryana and Chhattisgarh locally prepared Napkins are not very popular. [7]

H. Akshey B Tower to Bhangava (2016): Wet scrubbers are compactible and effective air pollution control devices to arrest particulate matters and polluting gases coming out of industrial processes as air pollution emissions there are various types of wet scrubbers but the present papers deals with the spray towers for a 100 TPD cement plants based on the vertical shaft technology (VSK) after monitoring the air emissions in regard to designed parameters under variable conditions on a time scale. [8]

I. Avinash A. Patil; (2014): All sorts of waste materials are generated in the Indian cities as in other countries. It is common practice of adding the road sweepings to the dustbins. However, with the growing problems of waste management’s in the urban areas and the increasing awareness about the ill effects of the existing waste management systems on the public health’s, the urgent need for improving the overall waste management system adaptation is imperative. [9]

J. Shyam Swaroop Nigam (2014): In this study, incineration and its types is discussed in detail. The focus on low cost incinerator is made by highlighting on its advantages economically. The effective utilization of the byproducts obtained during the process of incineration is the contribution made to the paper. [10]

K.Linda scott, paul Montgomery, laurel stinfielt, Catherine dolan (2013): dops on have presented that frequently hear a public concern about providing sanitary napkins to women and adolescent girls in developing countries. We think that the effect of disposal should be weighed to aid women delay by maintaining privacy childbearing. Disposal napkins can be an issue when the community does burnt in the leaving gobs of items for children or dogs to select out. [11]

L. Jereme, Chamhuri Siwar, Md. Anowar Hossain Bhuiyan (2013): This study examines the current global situations of incineration as a waste management method. The objectives are to reiterate that incineration is not a sustainable waste management system in this 21st century in Malaysia. Though, the proponents of incineration are trying to convince us to accept it is the best solution to reduce the large quantities of waste generated in Malaysia. However, studies around the world has shown strong oppositions of incineration even though it is being touted as another source of energy generation. This is because its environmental externalities overwhelm its advantages as there is no economic sense in building a waste management system that has a limited time of existence in this age of sustainable development. Recycling and composting of waste has proven that of all waste management methods to be generally accepted as only options which we could use to turn waste into wealth. The argument that incineration is waste to energy does not hold water as the end justifies the means. It is being myopic and not making a right decision in this contemporary world sustainable development has become a buzz word. [12]

M. Adika, V.O, Yabga, J, Apiyanteide, F.A (2011): The Knowledge of perception and behaviour on the use of sanitary pads during menstruation among adolescents of school age is a vital aspect of health education. The study was carried out among 140 school girls, it investigated perception as well as behaviour on the use of sanitary pads during menstruation. Specific objectives were tailored to determine adolescent girls' perception on the use of sanitary pads during menstruation and also to assess their behaviour on using sanitary pads for menstrual hygiene. Girls were selected by cross-sectional population survey of educational institutions, 56 from primary school and 84 from junior secondary school within the age group of 10-20 years were given questionnaires to gather data for analysis. 46.4% of the adolescent girls used 2 pads per day, 30.0% used three pads, with 12.9% using one pad while only 10.7% used more than three pads daily. 39.3% had their sources of information from their mothers while 27.9% from a teacher or a health worker and 20.7% from the other parameters combined. Table 2 shows that 64.3% of the respondent adolescent girls used sanitary pads during menstruation while 22.1% used toilet tissue/paper during menstruation, with less than 15.0% using clothes, tampons and multiple materials for their sanitary hygiene during menstruation. [13]

N.Fan Bai, Xiaochang Wang (2011): state that as utilized in systems that are bio-toilet, said composting is a technique for

sanitary napkins disposal of human stool. It would be fine, if the illness might be controlled for holding nitrogen so far as possible, since the products may be proper as fertilizer. It attracts attention, particularly from regions and areas where supply of water for toilet flushing is difficult because of water deficit, it is therefore essential to biodegradation of their feces, where fecal nitrogen and organics are decomposed or changed under the action of germs. [14]

O.Yichun Yeh, Harutoshi OGAI, Ryouta YUI, Hiroshi Morita, Yukinori Takabayashi (2006): Have provided a method that disposes a germs, cryptomeria chips and ALGA, for waste reduction that a fresh disposal technique continues to be present which dispose diapers. Microorganisms alive using the cryptomeria processors have influence on the decomposition of these disposable diapers, an ecofriendly disposal method which uses microorganisms in the forests to eliminate the used diapers is suggested to decrease waste. Microorganisms including cryptomeria chips have the influence upon the decomposition of the pulp. Roughly, 85.46 percent of those pulps per sheet is decomposed by bacteria. [15]

P. Sabariah Baharun, (2005): A study to investigate factors affecting the combustion efficiency of a clinical waste incineration process revealed that waste, primary combustion temperature (T1) and secondary combustion temperature (T3) play an important role to this effect. A regression model explained the combustion efficiency related to the variables. However, the existence of multicollinearity between T1 and T3 indicates that improvement to enhance the representation of the relationship could further be investigated. Nevertheless, the study provides a better understanding of the variables affecting the combustion efficiency vis-à-vis the performance of the incinerator. [16]

Q. Daniel Mussati Paul Hemmer E.H. Pechan and Associates, Inc; (2002): A wet scrubber is an air pollution control device that removes PM and acid gases from waste gas streams of stationary point sources. The pollutants are removed primarily through the impaction, diffusion, interception and/or absorption of the pollutants onto droplets of the liquid. [17]

R. Innovative Technology Group at De Montfort University, (2000): The medical waste incinerator is a simple two-chamber natural-draught incinerator designed to be operated at temperatures of 800 °C and higher. The performance of the incinerator will vary depending on the moisture content of the medical waste but a throughput of up to 15kg/hour can be achieved. The incinerator has been designed so that it can be built on site, using standard building bricks or blocks and lined with refractory bricks. All the steel components, such as the loading door, the ash removal door and air inlet apertures can be made using basic workshop equipment. [18]

S. C. Block, J. Van Caneghem, A. Van Brecht, G. Wauters, C. Vandecasteele, (2000): The first objective of any waste policy should be to minimize the negative effects of the generation and Re-use and recycling of waste, although of high priority in the waste hierarchy, is not necessarily always the best

treatment method. In the case of hazardous waste containing toxic components, thermal treatment with energy recovery constitutes a cost effective treatment option, complying with the pillars of “Sustainability” and the requirements of “Resource Efficient and rotary kiln for the incineration of hazardous waste, are far below the European emission limit values. Furthermore, recent studies on health effects of modern, state-of-the art waste incinerators show that any potential damage to the health of those living close-by or working in a hazardous waste incineration plant, is likely to be very small and to be detected. [19]

T. E. R. Kaiser; (1964): The design of industrial and municipal incinerators is based on combustion and heat considerations The procedures are given for calculating the quantities of air, flue gas, water and heat, as well as the gas temperatures. To assist the reader, a municipal incinerator is used as an example. The relation between refuse analysis and flue gas analysis is explained. Sections on dry and wet dust collection are included. [20]

B. Literature Reveals

Despite the fact that this study was limited to adolescent girls of school age in primary and junior secondary schools, who have started experiencing menstruation, it is observed that problems may arise if positive perception and behaviour on the use of sanitary pads during menstruation is not achieved and provisions of sanitary supplies are not made especially during early menarche (Quint, 2008), since health education and promotion are an integral part of learning.

The study highlights the need for further implementation of educational programs, counseling and training on the use of sanitary pads during adolescent girl’s menstruation. In this study, 55.7% of adolescent pupils had training on use of sanitary pads during menstruation. This is in line with other studies from Nigeria (Adinma and Adinma, 2008, Aniebue et al, 2009), and from Western background (Dickson and Wood, 1995). However, the view of Cooper and Koch (2007) reveals few sources of information as well as limited menstrual learning/training from schools, their mothers and other women. Results from this study revealed that mothers were cited as the primary source of information (39.3%) on use of sanitary pads, even though Cooper and Koch (2007) wrote that most mothers lacked the necessary skills to comfortably discuss such topics. It is the authors believe that source of information whether it is from mothers’ or others may influence their perception and behaviour on use of sanitary pads, as most teachings from mothers’ are fundamentally laid down cultural beliefs from ancestors even with regard to sanitary hygiene. Furthermore, the study showed that the source of information on use of sanitary pads were acquired also from mothers with 46.4% using two or more sanitary pads per day, and over 80% of the adolescent girls complaining of the cost of buying sanitary pads. Previous findings reveal that sanitary pads are not usually affordable for many adolescent girls of schooling age, and as such they use other materials and methods such as washing or

staying away from school completely. According to Shukla (2005), most girls are left to cope as best as they can with rags or other insufficient protection. The Forum of Africa Women Educationalist, Uganda (FAWEU, 2004) states that buying sanitary protection (pads) means a monthly spending equivalent of four radio batteries or enough paraffin to last a family one month; or sanitary protection may cost around a tenth of a family monthly income (Kayinke, Akankwasa and Karungi, 2004). Furthermore, there is the indication that using sanitary pads help confers protection from infectious diseases as well as complications that may arise from lack of use of sanitary products (Farage, 2006) during this sensitive period of adolescent girls life even though expensive. Thus, there is urgent need for counselling and education enlightenment program for this vulnerable group of girl child.

5. Conclusion

The purpose of our job is to keep environment clean by means sanitary napkin disposal method, we also should provide solution to dispose sanitary napkin and steer clear of present ways of disposal such as sanitary napkins are blended with regular trash, and it isn't easy to distinguish them and remove off them. Incinerating that this napkin is the sole method of eliminating these problems, therefore installation of the system is manufactured. Scientific, sterile, a safe and quick way of disposal of sanitary napkin is disposing them in temperature to ash that is low. The system will also clean the hazardous fumes before they are released to atmosphere through chimney. This system will use wet scrubber for that purpose. Also the material used for insulation will make the system more compact.

The improper disposal of menstrual waste in open environmental condition will affect the health of the surrounding population in a great manner. With the intention that, this proposed setup is to overcome the tremendous hazard of disposal of these wastes.

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