International Journal of Advance Research in Science and Engineering
Vol. No.10, Issue No. 04, April 2021
www.ijarse.com
IJARSE
ISSN 2319 - 8354

DESIGN AND FABRICATION OF MEDICAL WASTE DISPOSAL MACHINE

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ABSTRACT:

Medical treatment are conducted generate wastes that are highly hazardous and put people under risk of fatal diseases. So we have designed medical waste disposal crusher. This machine is manually operated and we have attached Motor, Rotary cutting blades, Shaft, Collector, Frame, Basin, Conveyor belt. In this machine we are about crush the waste material such as plastic bottles, glass bottles, etc. the working principle and the other descriptions are explained below detail.

Keywords: Bio-Medical Waste, Hospital Infection, Medical Waste Act, Medical Waste Management.

INTRODUCTION:

Disposal of medical wastes is a growing global environmental concern. The problem is rising with an ever-increasing number of hospitals, clinics, and healthcare laboratories universally (Hassan et al.,2008). Medical waste is been generated from health-care establishments, medical institutions, diagnostic laboratories, veterinary clinics, hospitals and research institutes; it includes absorbents, sharp and needles, glass gauze, paper, plastics andhuman anatomical remains and animal carcasses (Longe and Williams 2006). It is a waste capable of producing infectious disease. According to Manyele, 2004; Medical waste is extremely infectious and hazardous. Medical waste threatens the environmental health. Therefore it must be treated before its final disposal. Until now, the management of medical wastes has been so unpopular despite its potential environmental hazards and public health risks. Moreover, medical waste constitutes a minor quota of the entire municipal solid waste. However, the potential environmental and health hazards could be dangerous if not properly handled, the worst scenario being in developing countries (Salki 2004). In modern times, the disposal of medical waste has posed more difficulties with the appearance of disposable needles, syringes, and other similar items (Askarian et al., 2006). Wastes generated in a hospital are too hazardous to be treated and carefully managed as these wastes carry infections and contaminate the environment prevailing in a hospital (Habiburet al., 1999). However, fromthe late 80s, the spreading trend of Hepatitis B Virus (HBV),Human Immunodeficiency Virus (HIV), and other agents associated with blood-borne diseases has raised the awareness level of the public regarding the dis-

posal of medical waste. Consequent on this, medical waste is required to be treated specially and not to be combined with municipal waste (George et al., 2011). The medical waste contains highly toxic materials, pathogenic viruses and bacteria which could lead to pathological dysfunction of the human body.

According to World Health Organization (WHO, 2011), 20% of the medical waste is hazardous and should be taken with utmost caution while the remaining 80% is regarded as normal municipal waste. Infectious and anatomic wastes together make up about 15% of the total healthcare waste. Sharps are a major source of disease transmission and is just is about 1% of the total waste. About 3% are Chemicals and pharmaceuticals while genotoxic waste, radioactive matter, and heavy metal content are about 1% of the total health-care waste. Developed countries generate about to 0.5 kg of hazardous waste per hospital bed per day; while developing countries generate on average 0.2 kg of hazardous waste per hospital bed per day. Health-care waste is in less developed countries are often not separated into hazardous or non-hazardous .Good Health Care Waste Management (HCWM) has led to an improved hygiene and operational efficiency in health facilities; it also leads to reduction in the environmental pollution that arises from poor waste segregation and destruction practices. The numerous advantages associated with incineration and its long history as an effective method of waste management, have led to its worldwide use as the preferred means of treating and disposing of infectious waste. The process converts combustible waste into residual ash and gases, the latter being ex pelled to the atmosphere.

2. Literature survey:

Particularly important to develop a management strategy for basic health-care waste are chapters on “Health care waste management planning”, “Handling, storage and transportation of health-care waste”, “Application of treatment and disposal methods to health-care waste categories” and “Minimal program for health-care waste management”.

The section “Health care waste management planning” relates facility level planning with international recommendations and national plans indicating their respective importance. It covers both development and implementation of the plan. It lays down the basic principles for managing health care waste from scattered small sources [1].

Aimed at providing guidance for selection of the most appropriate options for safe health care waste management at Primary Health Care Centres (PHCs) in developing countries this guide caters detailed information on the following:

1. Basic risks associated with poor management of heath care waste.
2. Basic elements for safe health-care waste management (HCWM).
3. Parameters to assess before selecting HCWM options
4. Technical annexes describing HCWM options
5. Estimation of costs of the various options
6. Decision-trees, assisting the selection of HCWM options [2].

This guidance note is an internal World Bank working document that attempts to synthesize the available knowledge and information in the field of healthcare waste management. It has been developed on the basis of WHO guidelines for healthcare facilities and waste management projects contained in “Safe Management of Wastes from Health-care Activities, WHO, 1999” [3].

The study documents successful sharp management systems in urban areas and evaluates non-burn treatment and disposal technologies. In view of the nationwide introduction of Auto Disable (AD) syringes for immunisation programme the study analyses the implications linked to their use and the possibilities of material recovery of these syringes. Thirteen case studies have been conducted on bio-medical waste management and disposal covering health care and waste treatment facilities in different parts of the country. Areas under focus are: waste management within the health care facility, sharps collection and transportation, treatment of sharps waste, evaluation of waste treatment technologies including costs and options for final disposal [4].

This is a very useful handbook by SRISHTI, who are the pioneering NGO in bio-medical waste management in India, for managing waste in a health care unit. It addresses the following areas:

1. Planning the programme
2. Getting to know the waste (classification, survey)
3. Dealing with the waste (segregation, handling and treating)
4. Focusing on specific locations (in patient locations, OT, OPD, Laboratory)
5. Involving Personnel(training modules, awareness)
6. Sustaining the scheme
7. Disposal technology efficacies

9.Case Studies [5]

3. MATERIALS:

DESCRIPTION	QUANTITY
Motor	1
Rotary cutting blades	1
Shaft	1
Collector	1
Frame	1
Hopper	1
Conveyor Belt	1

This stage the conceptualization of the equipment as part of medical waste management. The different part of the equipment is carefully designed to function with an acceptable level of safety.

4. MACHINE SPECIFICATION:

Motor Specification

- Type - Gear Motor
- Phase - Three Phase
- Voltage - 440V
- Speed - 10-300rpm

- Power - 0.25-15.0W

Shaft Specification

- Number of Shaft - 2
- Shaft - Mild steel
- Length of shaft - 450mm

Belt Specification

- Length of belt - 1000mm
- Type of material - Hard leather

5. PRECAUTIONS TAKEN DURING FABRICATION AND THE EXPERIMENT:

1. The inlet of the machine must be high enough to prevent particles from flying out during the experiment.
2. Proper personal protective equipment (PPE) such as hand gloves, goggles, safety shoes etc. must be worn during the experiment to prevent injury.
3. The test environment must be kept clean so as to make any particles visible.
4. Avoid staying by the belt side during the experiment
5. All connections to electricity must be properly protected.
6. The outlet was designed to prevent particles from flying out of the equipment and enhance easy entry into the receiving container.

4. Machine Design:

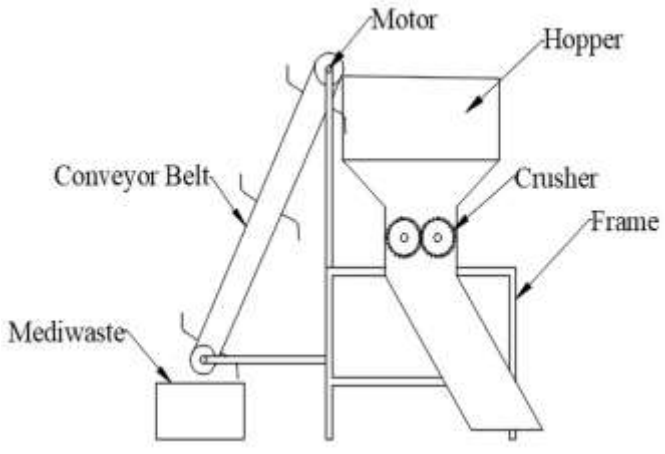
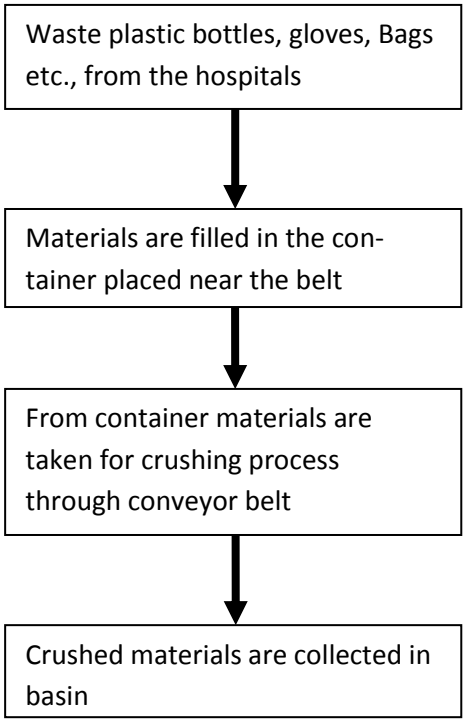


Fig4.1. 2D Design of Machine

Fig4.2. Design of Fabricated machine

6. METHODOLOGY:

The methodology of the project is explained in the flow manner below.



7. CONCLUSION:

The main motive of the medical waste disposal machine is to reduce harmful effects spreading through the waste from the hospital, and also to reduce investment in getting new medical products. The fabricated machine is very useful for the medical centre.

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