Impact of Covid-19 Pandemic on Waste Management: A Case Study of Dhaka City in Bangladesh

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INTRODUCTION

- As of the second week of November 2021, there are over 250 million global confirmed cases of Covid-19 and roughly 5.06 million deaths across the globe.
- According to the World Health Organization (WHO), between January 2020 and November 2021, there have been 1,571,228 confirmed cases of Covid-19 with 27,901 deaths in Bangladesh.
- Worldwide healthcare professionals have been recommended to use personal protective equipment (PPE) masks, and gloves.
- This recent surge, have caused increase in the requirement and production of single use Plastic (SUP), which in turn increased the waste generation.
- Due to poor waste collection system and lack of proper recycling facilities, SUP is disposed of on land and surface waterbodies, and eventually the waste ends up in in the Bay of Bengal (ESDO, 2020).
- Local hospitals lack inhouse facilities of disinfection and incineration capacities.

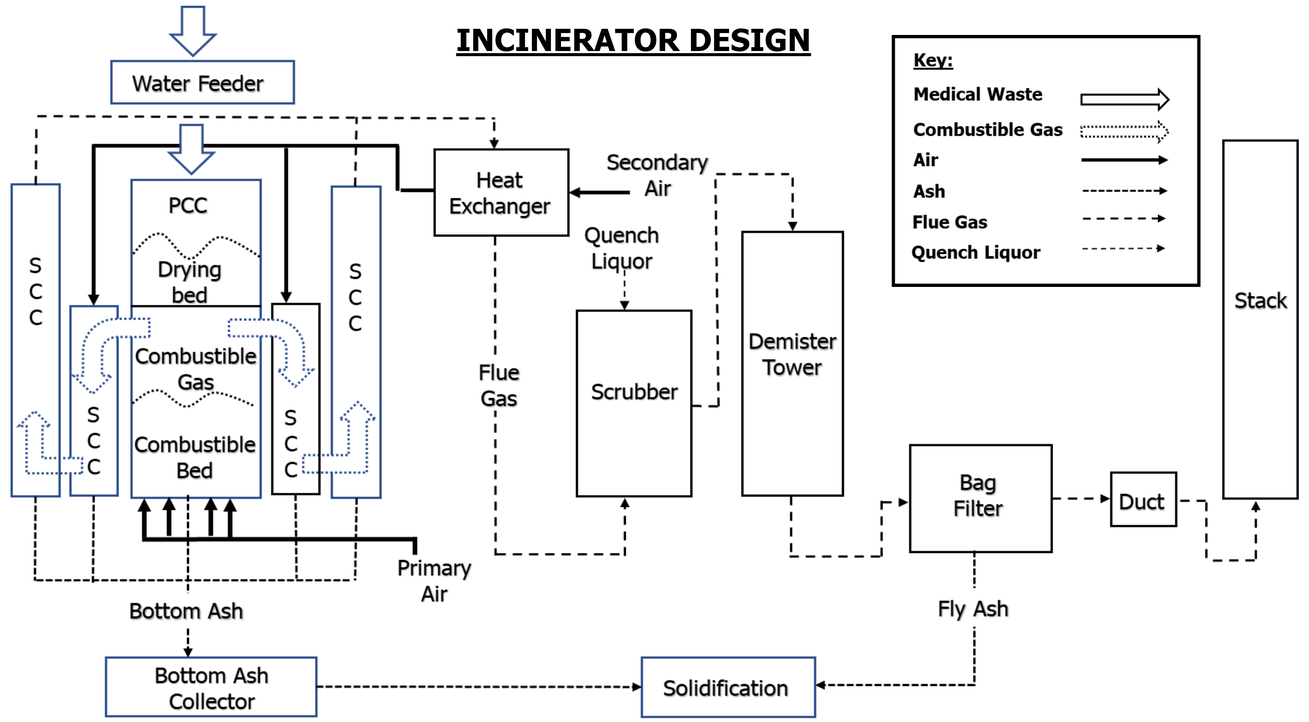
OBJECTIVES

- To evaluate the plastic waste management situation during the pandemic in Dhaka, the capital and the largest city of Bangladesh.
  - To design an incinerator for plastic waste specifically generated by hospitals and health care facilities within Dhaka city.

DESIGN METHODOLOGY

- The total quantities of biomedical waste generated in Dhaka city on a daily and monthly basis was quantified to obtain a sample size of waste for designing purposes.
- The design was carried out considering the cost effectiveness and environmental factors in the context of an emerging country such as Bangladesh.
- The proposed design is based on previously published work by USEPA (1990), Ontario Ministry of the Environment (1986), Xie et al. (2010), John et al. (2011), John et al. (2016), Ganguly et al. (2017), Olanrewaju et al. (2019) and Wajs et al. (2019).

INCINERATOR DESIGN



Although there are instructions to cover waste containers, many lie open at hospitals.

Used PPEs from various hospitals dumped.

Cleaners, without any PPE on, separate plastic materials from a mixture of infectious and non-infectious waste materials of hospitals.

Medical waste is being kept in a room next to a public hospital, which houses a mixture of toxic and non-toxic waste.

Medical waste is mingled with the general waste of public hospitals.

Photo source: BDNews24.com

RESULTS & DISCUSSION

- The designed incinerator will treat the biomedical waste generated in Dhaka city with a capacity of 200 kg/hr.
- Additional heat requirements will be met using auxiliary fuel. Necessary heat to sustain the process temperature is 1100 °C.
- The volume of the primary collection chambers (PCC) and secondary collection chambers (SCC) for the designed incinerator is 10 m^3 and 4.35 m^3.
- The design is expected to reduce the COVID-19 waste quantity by approximately 95%.

CONCLUSION

- The wastes from hospitals and health care facilities need to be handled separately, whereas regular waste can be handled by a regular waste management system.
- In this study, the incineration process has been designed in an eco-friendly and sustainable way.
- In spite of designing a bio-friendly incinerator proper management of COVID-19 related waste is not possible if the Government other public and private organizations come forward with their support, initiative and ideas.

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