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Analysis of waste plastics in Chandigarh and its Economical Use in Concrete Technology

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ABSTRACT

The generation of waste plastic is tremendously increasing year by year as use of new plastic waste items comes into existence with each passingday. Plastic being a non –biodegradable material takes thousand years to degrade in the ecosystem , and this non- biodegradable nature of plastic inturn leads to degradation of our ecosystem by means of decreasing the fertility of soil, generation of toxic gases like dioxins, furans on burning, Threatening of aquatic life etc. Also plastic adds 2% to global warming which is a big threat nowadays, hence safe disposal mechanism of waste plastic is need of an hour!

Keywords: Chandigarh, Waste plastic, concrete, safe disposal, Dumping yards, Carbon credit

INTRODUCTION

Plastic is a versatile, lightweight, flexible, moisture resistant, strong and relatively inexpensive material. Those are the attractive qualities that lead to over-consumption of plastic goods, however, durable and very slow to degrade, plastic materials that are used in the production of so many products, ultimately becomes waste. Our tremendous attraction to plastic, coupled with an undeniable behavioral propensity of increasingly over-consuming, discarding, littering and thus polluting, has become a lethal combination. The disposal of plastic is one of the least recognized and most highly problematic areas of plastic's ecological impact. Ironically, one of the plastic's most desirable traits: its durability and resistance to decomposition is also the source of one of its greatest liabilities when it comes to the disposal of plastics.
Present study aims at the analysis and safe disposal mechanism of waste plastic in Chandigarh. It also aims for the economical use of waste plastic in concrete technology.

Fig 1 Waste plastic Dumping site of Chandigarh

STUDY AERA

Chandigarh UT is located in the foothills of the shivalik range of the Himalayas in the North West India with an an area of 114sq.km. It had a population of 9, 00,914 in the last census. Chandigarh is unique, because it is the capital of two

state governments, Punjab and Haryana. The elevation of Chandigarh from the mean sea level is 321 m. Chandīgarh is known as one of the best experiments in urban planning and modern architecture in the twentieth century in India. The UT is fully dense by the beautiful trees and the modern roads with Intelligent Transportation Systems. The UT comprises of 56sectors. The sectors are numbered from 1 to 56 and they are spread out in a grid like pattern with each sector covering an area of approximately 1 square mile. Sectors beyond 56 are in Mohali area of Punjab. The Industrial area of Chandigarh are divided as phase 01 and phase 02 Industrial area with surrounding's by the Chandigarh's famous IT park known as Rajiv Gandhi IT park Chandigarh.

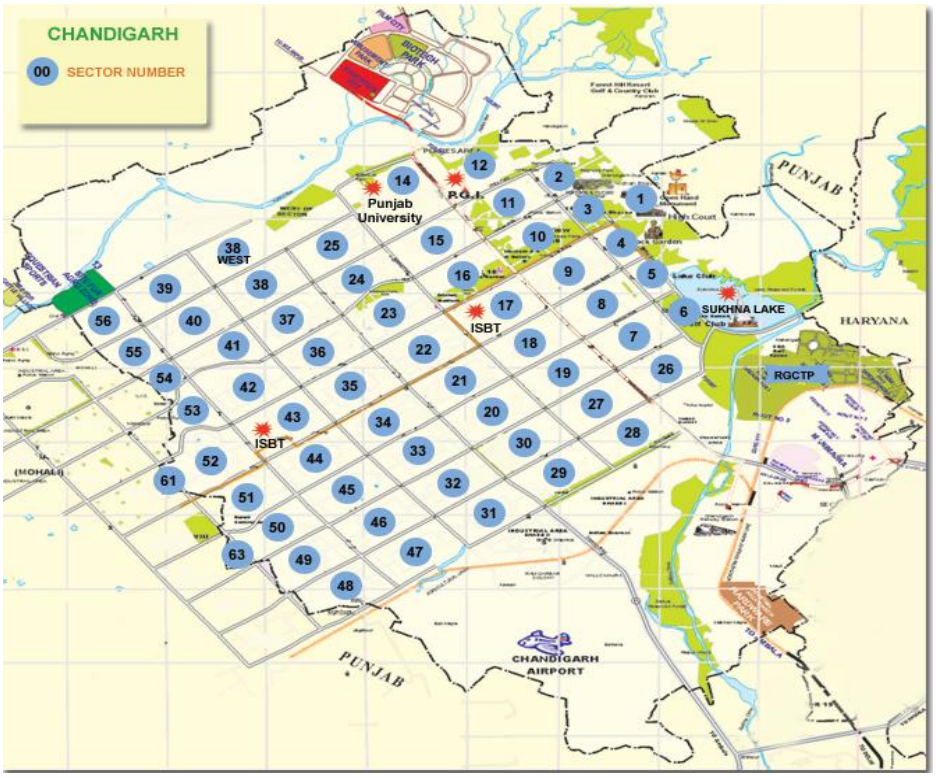

Fig 2. Map of Chandigarh UT

According to census 2011, the Chandigarh has a population of about 10, 54,686residents. The plastic waste generation in Chandigarh is about 21,516 Tons per year, increasing from 6,746 TPA in 2019 to 21, 516TPA in 2021.The value keeps on increasing because of the utilization of more plastic products in our modern life style. Due to the presence of inadequate disposal techniques , the waste is mostly dumped near water bodies or along road side. The dumping of wastes in such inappropriate way leads hazards to an environment.

In this study analysis of waste plastic generation was done across the sectors of Chandigarh.The Study area taken was Dadu Majra dumping site. Dadu Majra is located in the west of Chandigarh where whole waste of UT Chandigarh is stored on a mountain heap. After whole analysis, the effects the wastes on surrounding ecosystem were summerised and the some measures were summarized how we can save this part of beautiful city '' The Chandigarh'' from the plastic pollution.

DATA COLLECTION AND ANALYSIS

Dadu Majra is the largest dumping site in Chandigarh, where waste is being stored on a heap of mountain. The whole area has lost its beauty and charm because of this dumping site.Due to lack of proper disposal mechanism of Waste plastic almost every household dump the rubbish on this heap of plastic Waste Mountain. Majority of the plastic waste like polythene, PET water bottles, foodwrappers, grocery bags, drink lids, straws and stirrers generated from various sectors of the Beautiful UT Chandigarh was found to be dumped on this dumping site of Dadu Majra. The plastic waste generated was analyzed for seven days and after seven days the report was made.

RESULTS AND DISCUSSION

Analysis of waste plastic from different sectors of Chandigarh dumped at Dadu Majra dumping site was analyzed for 05 days and analysis is as:

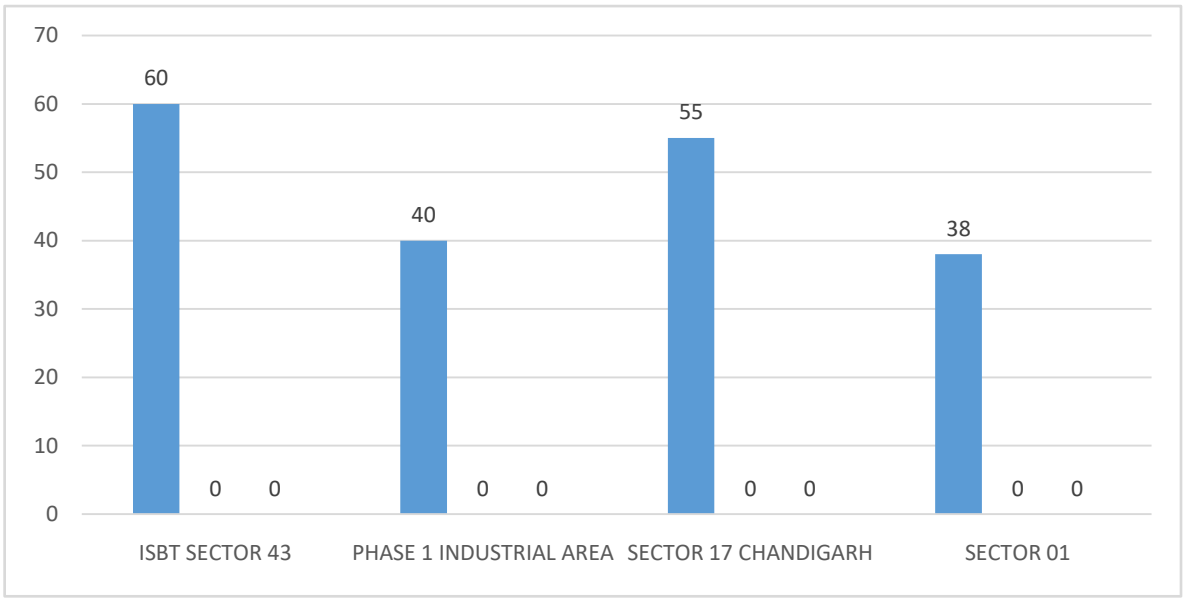

Fig 3 waste plastic production (kg/5days) from different locations of Chandigarh.

In Chandigarh city someextent of waste plastic was found to be dumped along road side & in open areas, the analysis of which is shown as;

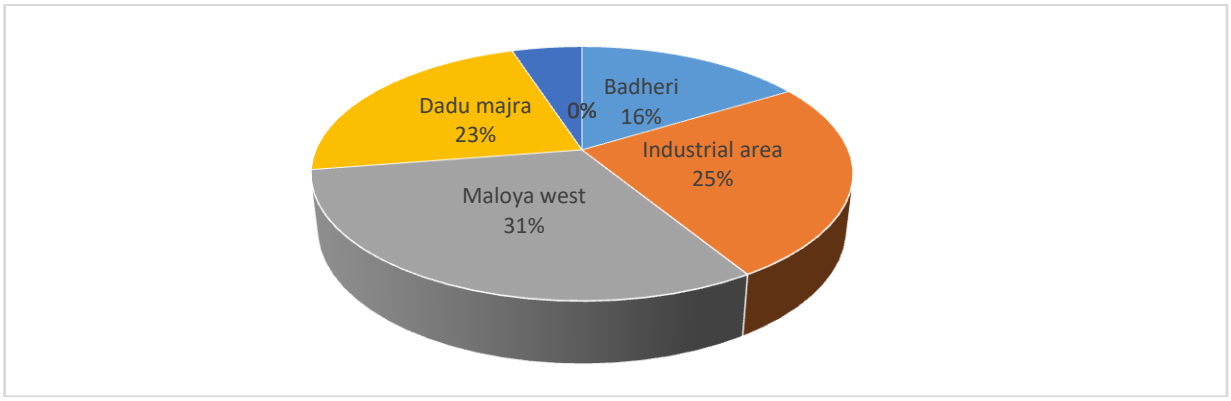

Fig 4 waste plastic in open area

CONCLUSION

After the analysis it was concluded that the waste plastic dumped at these dumping sites put an adverse effect on the surrounding and as well as on the human life present near these dumping yards. It also has lead a way towards both soil as well as water pollution. The dumped wastes near these beautiful sites has degraded the quality of the nature as well. Hence dumping of the wastes in these areas should be stopped as soon as possible in order to save them from further degradation and pollution. Dumping of plastic wastes in these dumping yards is not the safe disposal mechanism as such, hence searching for safe disposal mechanism of these wastes in need of an hour. Use of plastic wastes in construction line proves as one of the economical disposal systems. Apart from using Plastic waste in Pavements, plastic waste can be used in concrete technology too.

RECOMMENDATIONS

1. Use of waste plastic in concrete technology proves to be a safe disposal mechanism of wasteplastic. Neither it creates any kind of pollution nor its hazardous in any way . so this mechanism should be adopted as early as possible. This method of disposal is eco-friendly in each and every way besides the other methods of disposal like landfilling, disposing in water bodies etc.

2. The plastic waste can be used as filler material in concrete. Use of plastic waste in concrete improves the mechanical properties of concrete.

3. Use of plastic waste as partial replacement of aggregates in the concrete significantly boosts the efficiency of thermal and sound light weight concrete insulation.

4. Reusing plastics as concrete additives could also redirect old water and soda bottles, the bulk of which would otherwise end up in the landfill.

5. Concrete is the second most widely material used on the planet. The manufacturing of concrete involves emission of carbon dioxide hence increasing the carbon credit. Replacing even a small portion of concrete with irradiated plastic can reduce the extent of global carbon credit.

6. Addition of plastic waste also contributes to the higher shrinkage, water absorption of concrete.

7. Use of plastic waste as replacement for fine aggregate can enhance the workability and bulk density of concrete.

8. Use of waste plastic in concrete technology does not require any cost as the waste plastic is readily available for free of cost.

9. Use of waste plastics in concrete technology can prove as the Economical , as by this measure we cannot only enhance the properties of concrete but can also reduce cost of manufacturing of concrete.

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