iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** V **Month of publication:** May 2020

DOI: http://doi.org/10.22214/ijraset.2020.5180

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue V May 2020- Available at www.ijraset.com

Kota Stone Waste: A Threat to Environment

Ritu Mathur
Deptt of Chemistry, Govt. R.R. College, Alwar, Rajasthan, India

Abstract: ***The uncontrolled and non-sustainable use of resources on this earth has created the problem of production of large amount of solid, liquid & gaseous waste. Stones are one of the causes of this problem. In recent years, large amount of stone waste has been generated by the industries processing stones with significant environmental impacts. Indian calcareous stone industry currently produces around 17.8 M. T. of solid calcareous waste : 12.2 million tonnes as rejects at the mine sites, 5.2 million tonnes in the form of cuttings / trimmings or undersize materials and 0.4 million tonnes calcareous slurry as processing and polishing units The solid waste generated in the calcareous stone industry is directly related with the production and processing of various types of calcareous stones that has drastically increased over the years. Improper waste disposal has caused land degradation, ponding and flooding of water, visual impact, pollution, health and safety hazards. Agriculture productivity is also severely affected. The aim of this study is to focus on the hazards caused by the waste generated in Kota stone industry. The waste is a serious environmental hazard. The Waste is generated in different forms like solid waste and slurry waste. Excavation and disposal of such large quantity of waste in Kota stone industry cost about 25% - 35% of total cost of production. It adversely affects the fertility of the soil, contaminates the water resources and increases the drainage problem, besides causing serious air pollution The proper waste management is an essential need of stone industries to tackle the problems arisen by the waste generated by stone industries. The proper management of stone waste is essential to enhance the economic growth and to reduce the environmental degradation & health hazards.***

Keywords: Stone industry , Kota stone, Waste, Hazards and Waste management.

I. INTRODUCTION

India is amongst the largest producer of raw stone material and the sector is quite developed and vibrant in the South as well as in Rajasthan and Gujarat with a dedicated resource of entrepreneurs..Present day stone industry is recognized as one of the fastest growing sector in the Indian economy. Kota stone industry is one of the well known industries. Kota stone is a fine grained variety of lime stone, quarried at Kota district, Rajasthan, India. Chemically Kota stones are siliceous Calcium Carbonate rocks. It is preferred for flooring and wall cladding, paving and facades of buildings. They are tough, non water- absorbent, non slip, non porous and have excellent stain removability.

The Indian stone industry has evolved into the production and manufacturing of blocks, flooring slabs, structural slabs, calibrated - ready to fix tiles, monuments, tomb stones, sculptures, artifacts, cobbles cubes, pebbles and landscape garden stones. While being the third largest exporter of stones in the world, India is also amongst the largest consumers of stones and stone products. Stone industry is an important factor in worldwide economy. Despite this, a large amount of residues is produced in ornamental stone industry with different dimensions and particle sizes.

The increasing rate at which raw materials are continuously transformed into industrial products results in waste generation. Dumping of stone waste has many negative implications on the environment. It leads to air, water and land pollution [1]. Consequently recycling of industrial wastes and by products is becoming a crucial demand by the environmental laws in agreement with the concept of sustainable development. The proper management of industrial waste is a must to enhance the economic growth and to reduce the environmental degradation and health hazards.

II. GENERATION OF WASTE

Stone cutting industry is a classical example of unscientific mixing and improper waste disposal regardless of aesthetic senses and proper land use practices. Kota stone industry is one of the stone industries generating a waste on large scale. During mechanical processing of Kota stone about 30% - 40% part is left as a waste in the form of powder or slurry. Nearly 50% of the precious mineral resource is wasted due to non-upgradation of technology in mining, processing and polishing with gang saws contributing to more than 50% of the waste generation [2]. Every year some 23 million tonnes of solid waste is added to the old ones in Kota stone industry. Lack of rightful quarrying technology lead to huge generation of waste and poor mineral recovery. Over 5 decades Kota stone industry enjoyed luxury of solid waste in abundance. Additional waste is generated from fractured blocks, the sawing and polishing processes and the rejection of broken or damaged slabs.

©IJRASET: All Rights are Reserved

A study has revealed that waste dump accumulated over 50 years are estimated to be over 100 million tonnes and stretched over a length of about 35 km. all around Modak–Ramganj Mandi. Waste is generated during mining and processing of the calcareous stone.

Presently large amounts of stone wastes are generated in natural stone processing plants with an important impact on the environment due to its disposal. There are two types of natural stone processing waste; solid and semi liquid or slurry [3].

1) *Solid Waste*: Quarries producing Natural stone, Kota stone, Marble, Slate stone etc. generate large quantity of solid waste. This waste is in the form of overlying burden, inter bedded burden, production, waste generation during cutting, sizing, splitting at quarry floor[4].
2) *Slurry Waste*: Stone slurry is a semi liquid substance consisting of particles originated from the sawing and polishing processes and water used to cool and lubricate the sawing and polishing machines [5]. Conventionally Kota stone slabs and tiles have been polished by rubbing one layer of stone with the other. Mechanically using coarse sand as media and water for flushing out the worked out material in the form of slurry. Good quantity of slurry waste flows out and accumulates.

III. HAZARDS OF WASTE

A. *Environmental Impacts*

1) When dumped on land, it adversely affects the productivity of land due to decreased porosity, water absorption water percolation etc [6].
2) When dried, the fine particles (size less than 363 micron) become air borne and causes severe pollution [6].
3) Fine particles result in poor fertility of the soil due to increase in alkalinity [6].
4) During rainy season, the slurry is carried away to rivers, drains, roads and water bodies affecting the quality of water, reducing storage capacities and damaging aquatic life.
5) Due to long term deposition on land the finer particles block flow regime of aquifers thus seriously affecting underground water availability [7].
6) The disposal of such large quantity of solid waste causes serious environmental problems of degradation of land, loss of green pasture and loss of regional aesthetic values [7].
7) Waste from quarry and fabrication operations can be unsafe and environmentally detrimental [7].
8) When stone slurry is disposed in land fills, its water content is drastically reduced and the stone dust resulting from this presents several environmental impacts. Runoff from the scrap mounds can cause erosion problems and fines introduced into natural water waste can suffocate local ecosystems.

B. *Economic Impacts*

1) Excavation and disposal of large quantity of waste in Kota stone industry cost about 25% - 35% of total cost of production [8].
2) Apart from occupational health problems, it also affects machinery and instruments installed in industrial areas. Slurry dumped areas cannot support any vegetation and remain degraded.
3) The heaps of slurry remain scattered all round the industrial estate are an eye sore and spoil aesthetics of entire region. Subsequently tourism and industrial potential of the state is adversely affected [9].
4) From another prospective due to the huge amount of stone waste generated in the industries and plants. Vast amount of money is spent on its transportation to landfills. Besides, the accumulation of waste in landfills it is also a pressing problem for many businesses from economic prospective. Further, if waste is disposed offsite, land fill fees can create additional costs for quarry and fabrication operators.

C. *Health Hazards*

1) Scrap stone can create an undesirable visual impact as well as dangerous working conditions if it is not well organized or if piles are allowed to be stacked carelessly.
2) Airborne dust from uncovered stock piles or poorly functioning filtration equipment can cause respiratory, ocular and dermal irritation for employees and be a visual or even respiratory burden on local communities
3) The high cost of water and the environmental problems associated with slurry disposal has motivated the studies and researches to reduce economic losses as well as environmental impact [10].

©IJRASET: All Rights are Reserved

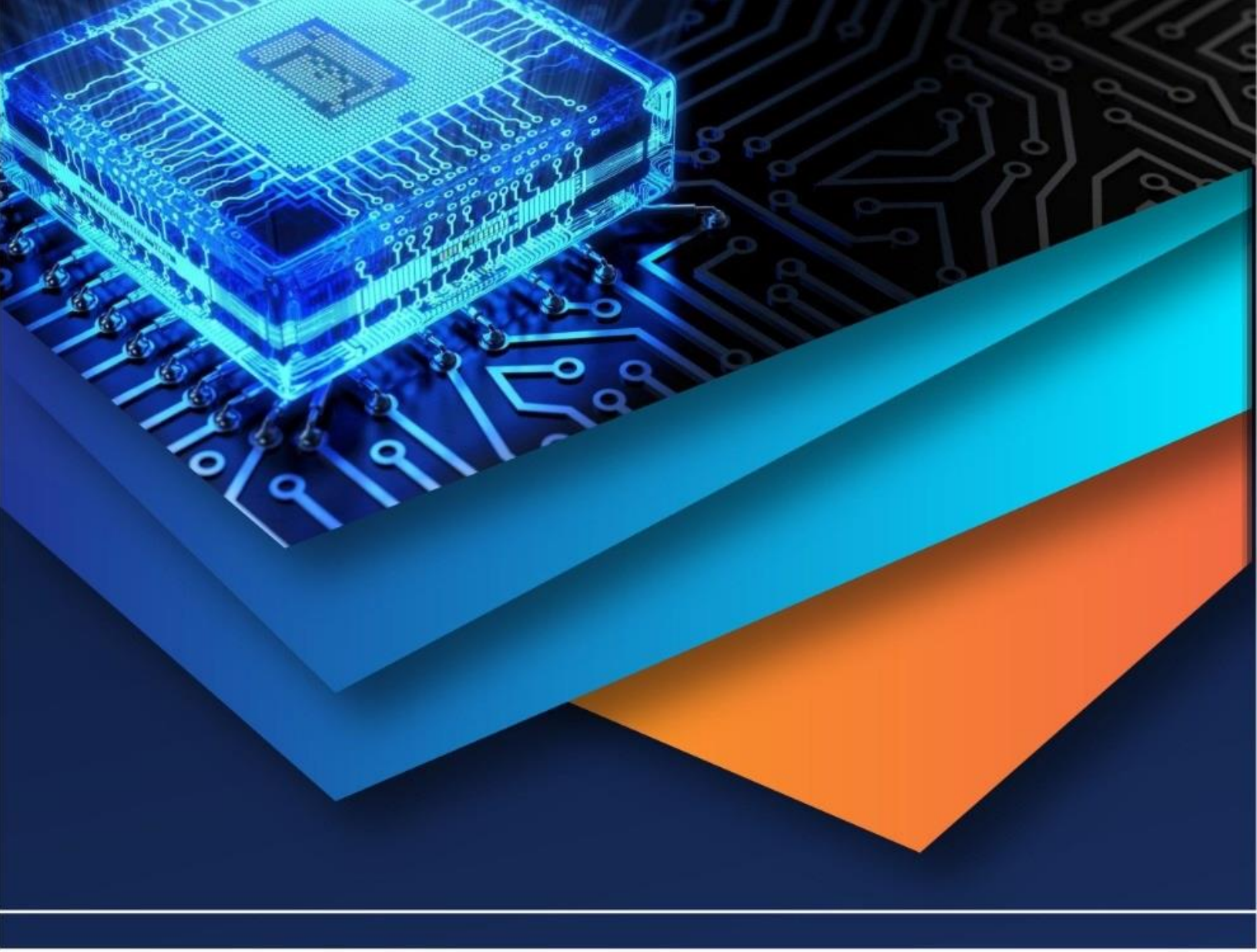
IV. RESULTS AND DISCUSSION

Waste is a valuable raw material which can be converted into useful products by the application of appropriate processing technology . It can also be considered as a potential resource. The dumping of solid wastes on the land decreases the soil fertility which in turn affects the agricultural productivity. There is a need of conversion of these wastes generated on a large scale by various industries into useful products through judicious handling and technological processing. The most important part is that a powerful resource material is deprived of its use for various purposes like producing energy, electricity, manure etc. A waste of one industry may be a useful product for other industry. Waste management is a fundamental component to any manufacturing or production enterprise. The proper management of industrial waste is must to enhance the economic growth and to reduce the environmental degradation & health hazards. The development of suitable and sustainable technologies for the effective management of different kinds of wastes within the framework of environmental protection is an immediate need.

REFERENCES

[1] A.Pappu,M.Saxena and S.R.Asolekar,"Solid waste generation in india and their recycling potential in building materials",Build.Environ.J.,Vol.42(6),pp.2311-2320,2007
[2] B.K.Sharma,Environmental Chemistry,11th ed.,Krishna Prakashan,Meerut,U.P,2007
[3] S.Jain, R.Mathur, "Enrichment of Bio-waste Compost by Kota Stone Industrial Waste", National Conferencce on Emerging Areas in Chemical Education and Research and National Convention of Chemistry Teachers, Department of Chemistry, IIS University, Jaipur, Rajasthan, pp 129, 2014.
[4] S.Jain, R.Mathur, "Value Addition of Kota Stone Slurry as Bio-fertilizer", National Conference on Current Research in Emerging Trends of Management, Arts, Science and Technology, Department of Research, Sunrise University, Alwar, Rajasthan, pp 12, 2014.
[5] R.lakhani,R.Kumar and P.Tomar"Utilization Of Stone Waste In The Development Of Value Added Products:A State Of The Art Review",IJISET,Vol.1,Issue 7,Sep.2014.
[6] S.Jain, R.Mathur, M.P.S. Chandrawat, P.Sudan, "Utilization of Marble Slurry to Enhance Soil Fertility and to Protect Environment", J.Int.Pharm.Bio.Sci., Vol.6(2), pp 81-84, 2015.
[7] P.Sudan,, "Relative Investigations on Value Added Biofertilizers from Industrial and Biowastes" Chem.Thesis,University of Rajasthan,Alwar,Rajasthan,India,2015
[8] S. Kothari, "Effective Utilization Of Crusher Dust In Sustainable Concrete", IJERA, Vol.6, pp.20-30, Feb.2016.
[9] S.Jain, R.Mathur, M.P.S. Chandrawat, P.Sudan, "Use of Kota Stone Waste to Ameliorate and to Alleviate Environmental Hazards", Palegia Research Library, Adv.Appl.Sci. Res., Vol 7(1), pp 81-84, 2016.
[10] S.Jain, R.Mathur, MPS Chandravat, "Effect of Value Added Bio Fertilizer Obtained From Kota Stone Waste on Growth of Okra (Abelmoschus esculentus)", IJRASET, Vol 5 (10), pp 413-416, 2017.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)