USE OF INDUSTRIAL WASTE IN THE FIELD OF CONSTRUCTION

Ar. Kalyani Nilesh Junankar
M. Arch. (Construction Management)
Assistant Professor,
SKN College of Architecture, Ambegoan, Pune. 41.
Email.: kalyanilesh2911@gmail.com

***Abstract*—** *The basic elements of our environment are air, water, trees, buildings, vehicles, people, animals, birds & the most important WASTE…….*
The waste play an important role in our daily lives as it is spread anywhere & everywhere without considering its uselessness in our activities. So to give the justice to this waste, it should be reused in every possible ways.
The study focuses on the types, ingredients and various sources of the waste. The main types are residential, commercial, food, bio medical, educational, hospitality, construction, maintenance, & industrial; further divided into biodegradable & non-biodegradable, so ingredients change accordingly.
There are some of the treatments & processes which make this waste reusable in various other forms. The most harmful and dangerous are the Industrial waste.
The achievable aim & objective of this study would be to understand, in what ways the industrial wastes can be reutilized in construction. The study would focus on the literature to understand the importance of waste management, causes of industrial waste, and effects of industrial pollution, theory & reasons behind the issue. From the survey & research one of the industry i.e. Packaging Industry is been finalized to work out for development of new material for construction field.
Book & live Case studies help to identify the major problems in current scenario, and current materials that are used in packaging. Enlisted materials which are prominently used in the packaging industry are paper, glass, metal, cartons, plastic, bubble sheet, thermacol.
After the studies & research the achievable task is to develop a material or a technique which can easily be utilized in the field of construction with low initial investment.

Key words: industrial waste, packaging material, treatments & processes

Introduction

Waste is any substance which is discarded after primary use, or it is worthless, defective and of no use.
Examples include municipal solid waste (household trash/refuse), hazardous waste, wastewater (such as sewage, which contains bodily wastes (feces and urine) and surface runoff), radioactive waste, and others.
Industrial waste is the waste produced by industrial activity which includes any material that is rendered useless during a manufacturing process such as that of factories, industries, mills, and mining operations.
It has existed since the start of the Industrial Revolution.
We have millions of factories, mills, industries, mining plants, etc. around the world. These industries use raw materials to produce finished goods for consumers.
But in the manufacturing process, there are materials which are rendered useless. They constitute the industrial waste.

Some examples of industrial wastes are metals, paints, sand paper, slag, ash, radioactive wastes, etc.
Industrial waste can be categorised into biodegradable and non-biodegradable.

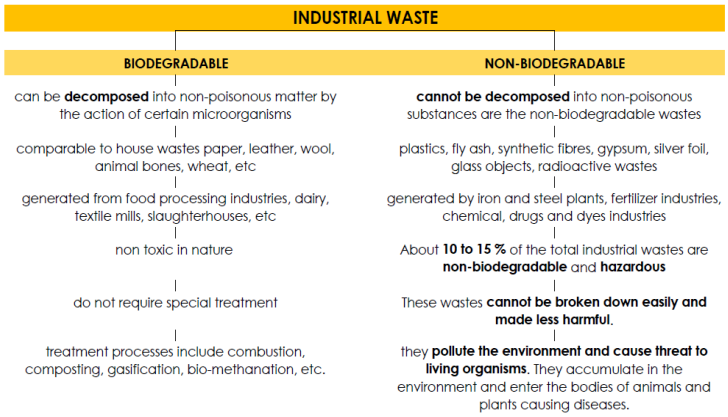


Figure 1 Segregation of waste

About **10 to 15 %** of the total industrial wastes are **non-biodegradable** and **hazardous,** and the rate of increase in this category of waste is only increasing every year.
These wastes **cannot be broken down easily and made less harmful**.
Hence, they **pollute the environment and cause threat to living organisms**.
They accumulate in the environment and enter the bodies of animals and plants causing diseases.
However, with the advancement in technology, several disposal and reuse methods have been developed.
Wastes from one industry is being treated and utilised in another industry.
For example, the cement industry uses the slag and fly ash generated as waste by steel industries.
Landfill and incineration are other methods which are being resorted to, for the treated of hazardous wastes.

NEED OF THE STUDY

Industrial waste is simply a catchall term for the undesired by-products of industrial activities such as mining and manufacturing.
Basic need of this study would be,

a) IMPROVE THE QUALITY OF ENVIRONMENT
b) PROTECTING HUMAN HEALTH
c) LEGAL LIABILITY

Inefficient Waste Disposal: Water pollution and soil pollution are often caused directly due to inefficiency in disposal of waste. Long term exposure to polluted air and water causes

chronic health problems, making the issue of industrial pollution into a severe one.

CURRENT SCENARIO

Industrial waste dumped on road

Oct 4, 2017, 06:25 IST (www.timesofindia.indiatimes.com)

Figure 2: Bali silan hospital, Sundarbans, India. Photo: Samrpan Foundation

Throwing of industrial waste is a serious concern in our area..In spite of several complaints through this app no work has been done. Authorities pass the ball to one another. Small industries from Sultanpuri area dump these on the road during early morning hours.

Experts say damage done to wetlands is beyond repair

Written by Garima Mishra | Pune October5,2017 8:57 am October5,2017 8:57 am (http://indianexpress.com)

In 1840, a study on the fish of Mula-Mutha found 120 species; the figure dipped to 62 in a survey conducted between 1997 and 2002.

Figure 5 solid waste dump

Figure 4 solid waste collection in bags

Figure 6 solid waste dump

AIM & OBJECTIVE

The achievable aim & objective of this study would be to understand, in what ways the industrial wastes can be reutilized in construction.

The thesis is focused on;

- Use of industrial waste in the field of construction.
- The scope is limited with the use of the air bubble sheet as a construction material
- Use of the air bubble sheet in construction practice as fillers, insulating materials etc.

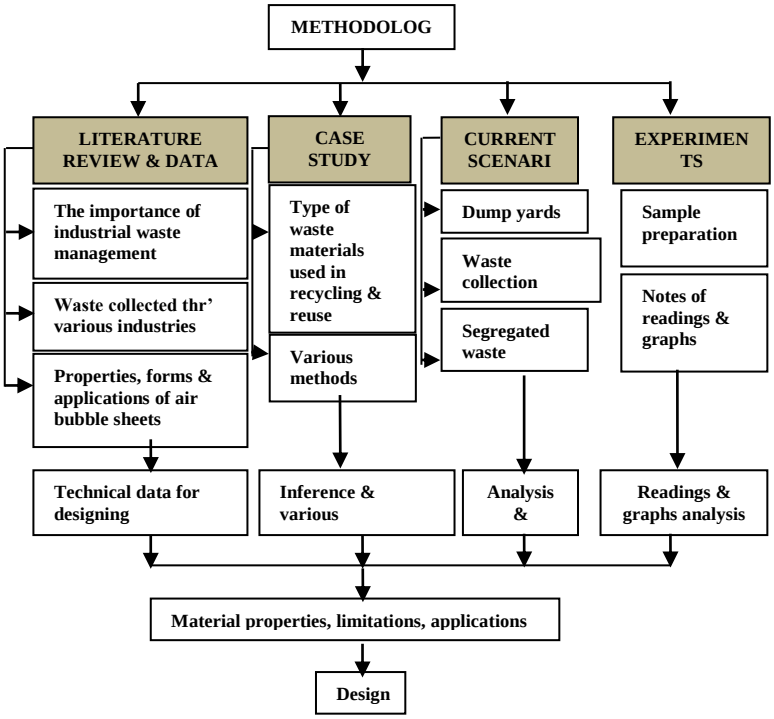
METHODOLOGY

Identified issue is dangerous to the society, it has to control. But the technique to be developed which is not harmful to the society as well as environment.

The methods to be used to reuse or recycle the waste material is without burning it or incinerate it.

To start with, the research & in depth literature survey was carried out to understand the theory & reasons behind the issue and framed the critical analysis of the same.

Case studies & experiments played the major role in finding out to identify the major problems in current scenario & the solution to the said problem.



A. LITERATURE STUDY

1. THE IMPORTANCE OF INDUSTRIAL WASTE MANAGEMENT

Industrial waste is simply a catchall term for the undesired by-products of industrial activities such as mining and manufacturing.

Basic need of this study would be,

a) <u>Improve The Quality Of Environment</u>

Poor industrial waste management can lead to those wastes getting into the local environment and then causing possibly irreparable damage.

For example, chemical pollutants from manufacturing and similar industrial processes can enter the water and get into the bodies of everything living in that water.

Certain chemicals can build up if ingested, meaning that higher and higher concentrations build up in the bodies

of animals higher on the food chain, including potentially humans.

Proper industrial waste management will help deter such outcomes while also ensuring that less hazardous industrial wastes are recycled, which is something that comes with its own benefits.

b) Protecting Human Health

Improper handling and disposal of industrial waste can contribute to increased incidents of serious medical conditions among the human residents of the local region.

For example, if the run-off from a cattle ranch enters the local river, residents living down-river from that ranch can find themselves falling ill with diseases such as e-coli infections.

Effective industrial waste management will not only do a better job of ensuring that such outcomes never happen, but also reducing the amount of industrial waste that is produced in the first place.

2. LEGAL LIABILITY

Businesses have the obligation to effectively manage and dispose of their industrial waste.

If they fail to do so, they will become liable for the damages caused through their negligence.

CAUSES OF INDUSTRIAL POLLUTION

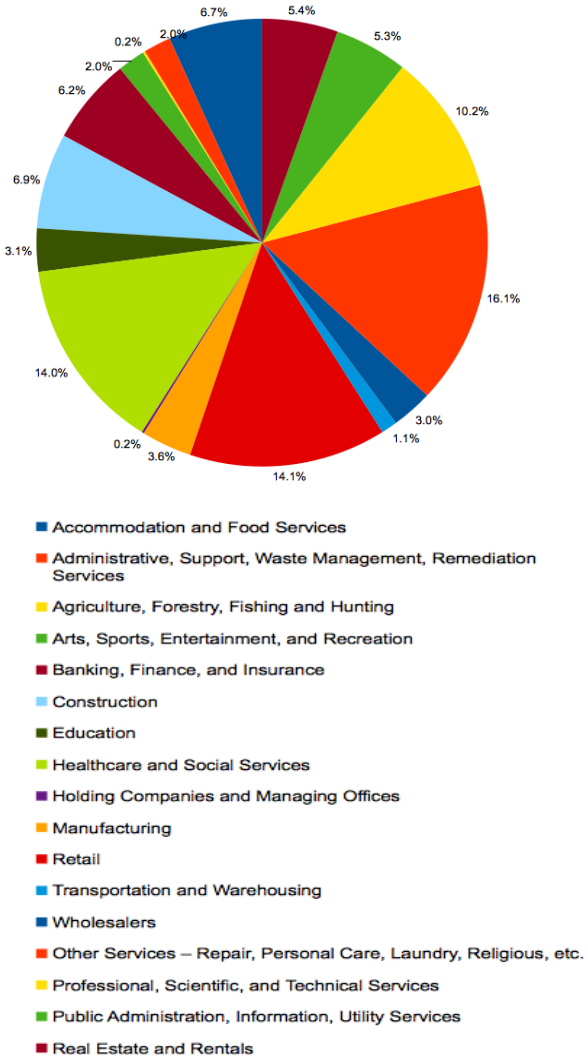
1. Lack of Policies to Control Pollution:
2. Unplanned Industrial Growth:
3. Use of Outdated Technologies:
4. Presence of Large Number of Small Scale Industries:
5. Inefficient Waste Disposal:
6. Leaching of Resources From Our Natural World:

EFFECTS OF INDUSTRIAL POLLUTION

1. Water Pollution:
2. Soil Pollution:
3. Air Pollution:
4. Wildlife Extinction:
5. Global Warming:

WASTE COLLECTED THR' VARIOUS INDUSTRIES

Figure 7 Pie Chart showing waste collected thr' various industries



AIR BUBBLE SHEET FORMS:

Air Bubble Sheet / Film
Reflective Bubble Insulation
Air Bubble Pouch
Air Bubble Film Rolls / Bags

A. PROPERTIES OF AIR BUBBLE SHEETS

Air bubble LDPE film has following properties.

1. Excellent water resistance
2. Atmospheric resistance
3. High dielectric properties.
4. Resistance to termite and white ant.
5. Easy and economical packaging process.
6. Very high shock absorption property.
7. Resistant to most acid and alkalis for moderate duration.
8. Light in weight, attractive look, printable, washable and heat sealable.

B. CASE STUDY

This study is conducted thr' books, net & live case study. Interview method & observations in case of live case study. Case study has been selected by having certain parameters such as use of waste materials in any form or methods in construction, the application of the same, any techniques which can be incorporated for the same purpose. Materials used such as bottle, can, cardboards,

ANALYSIS WITH VARIOUS BUILDING ELEMENTS

List of all building elements to analyze, various possible alternative solutions using Air Bubble Wrap.

Table 7: analysis of various building elements for possible alternative solution using air bubble sheet.

NO	ELEMENT	ALTERNATIVE SOLUTION	FOR
1	Plinth	-	
2	Flooring	below the tiling material	water proofing the surface
3	Columns	-	
4	beam	-	
5	Walls	creating cavity within the reinforced wall - air bubble pouch	thermal insulation
6	plaster	-	
7	Window	-	
8	Sill	beneath the plaster or on the plaster beneath sil covering stone material	water proofing
9	Lintel		
10	Chhajja	covering on concrete surface	water proofing
11	shutters	sandwich between double glass	protection against harsh UV rays
12	frame	-	
13	partition	preparing partition sandwiched with A B Wrap sheets	light weight easy transportation
15	slab	on slab below flooring tiles / flooring material	water proofing
16	waterproofing	-	
17	tiles	-	
18	cladding	-	
19	roof	on terrace slab below flooring tiles / flooring material	protection against harsh UV rays waterproofing
20	electrification	-	
21	plumbing	-	
22	sanitation	-	
23	drainage	-	

EXPERIMENTS

A. *Stitched with cloth or sandwich paneled in frame – for insulation*

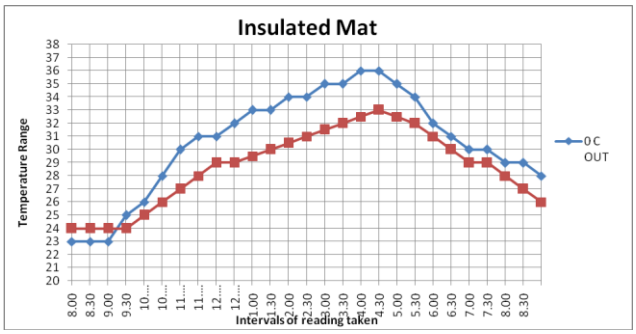
Figure 8 created with sandwiched air bubble sheet in cotton cloth.

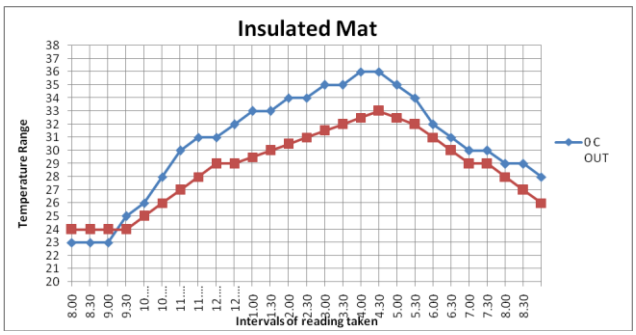
Thermal test:

The air bubble sheet is stitched sandwiched in cloth.

This improves the insulating property of the cloth.

- The place where there is tremendous cold & cannot be protected by a simple tent, this kind of insulating tent material can be helpful for the same. This increases the cavity or air gap in two cloths.
- If this kind of a panel is used as flooring material also, it will help in trapping the heat & reduce the heat loss.





Graph 1: temperature graph on 25 February 2018

Graph 2: temperature graph on 26 February 2018

Sound Test:

This mat was hanged in the door of a room and checked on sound meter for the sound penetration through it.

The sound created outside the room was 60 – 62 DB & inside the room was 40 – 45 DB.

B. Sandwich with glass for window

When a bubble sheet is sandwiched in two glass panels, it creates cavity n traps the heat inside reduces the loss of heat which is there inside the room.
Need to observe the same experiment in summer season too.

Figure 11 single glass with a backing of air bubble sheet

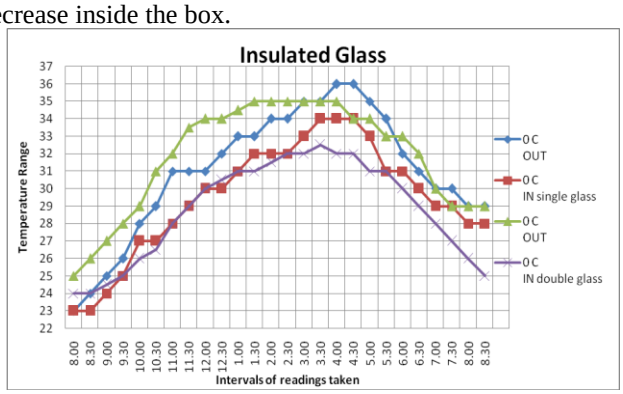
Figure 10 sandwich glass with air bubble sheet

Figure 12 sandwich glass on box for the whole day

When a bubble sheet is sandwiched in two glass panels, it creates cavity n traps the heat inside reduces the loss of heat which is there inside the room.
Need to observe the same experiment in summer season too.

The panel of air bubble sheet sandwiched in two glasses.
Size: 15'' x 15" sticked together.
The panel kept covering the box for two days sequentially single glass & double glass.

Thermal Test:
The temperature records taken on thermometer continuously for these days give the graph showing the temperature decrease inside the box.



Graph 3: temperature graph for 22 & 23 February 2018 for glass panel single & double.

Sound Test:
This insulated glass was kept on the box and checked on sound meter for the sound penetration through it.
The sound created outside the room was 45 – 47 DB & inside the box was 37 - 38 DB.

C. Sandwich with cardboard

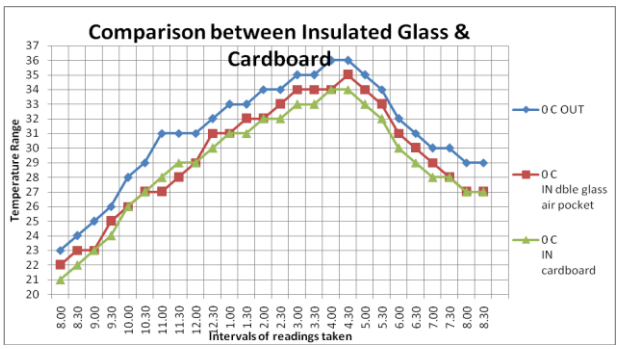
Figure 9 air wavy strips sandwiched in card board

When a spiral wavy thick air bubble sheet is sandwiched with cardboard can be utilized as insulating panels, as there is an air gap created This air gap makes it light in weight and can be applicable for light weight

Figure 13: comparison between two covering panels, glass & cardboard sequentially.

The panel of air bubble sheet sandwiched in cardboard.
Size: 15'' x 15" sticked together.
To compare two different materials in the same situation, this cardboard sandwich mat is kept with the glass panel on another box.
But this time, the box covering with glass has the air circulation pockets on its sides.

Thermal Test:
The temperature records taken on thermometer continuously for these days give the graph showing the temperature decrease inside the box.



graph 4 temperature graph for 24 Feb, 2018 for glass sandwich & cardboard panel

Sound Test:
This cardboard was kept on the box and checked on sound meter for the sound penetration through it.
The sound created outside the room was 45 – 47 DB & inside the box was 40 - 42 DB.

D. Sandwich in concrete block

Figure 14 concrete block with insulating air bubble pouches inside

The cube of concrete with air bubble pouches is prepared and tested NDT, Non Destructive Test, with Rebound Hammer.
The rebound hammer, tests the compressive strength of the concrete block without breaking it down.

Compressive strength: 125 Kg/cm^2.
Weight: 15 kg.

ANALYSIS OVERALL TEMPERATURE RATING & GRAPH

Graph 5: graph representing the temperature readings taken for a period of a week.

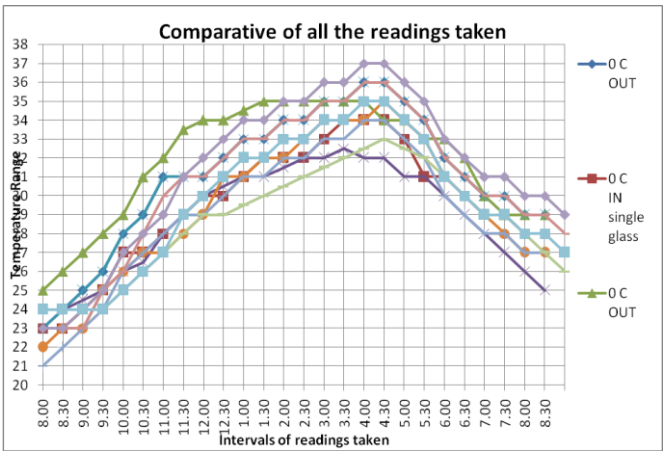


Table 9: overall temperature reading taken

	22/02/18		23/02/28		24/02/18			25/02/18		26/02/18		
	OPEN BOX	SINGLE GLASS	OUT	DOUBLE GLASS	OUT	DOUBLE GLASS WITH AIR POCKET ON SIDE	CARDBOARD SANDWICH	OUT	CLOTH	OUT	CLOTH	
TIME	^{0}C OUT	^{0}C IN single glass	^{0}C OUT	^{0}C IN double glass	^{0}C OUT	^{0}C IN dble glass air pocket	^{0}C IN cardboard	^{0}C OUT	^{0}C IN MAT	^{0}C OUT	^{0}C IN MAT	^{0}C IN Another room
8.00	23	23	25	24	23	22	21	23	24	23	24	23
8.30	24	23	26	24	24	23	22	23	24	23	24	23
9.00	25	24	27	24.5	25	23	23	23	24	24	24	23.5
9.30	26	25	28	25	26	25	24	25	24	25	24	24.5
10.00	28	27	29	26	28	26	26	26	25	27	25	26.5
10.30	29	27	31	26.5	29	27	27	28	26	28	26	27
11.00	31	28	32	28	31	27	28	30	27	29	27	28
11.30	31	29	33.5	29	31	28	29	31	28	31	29	31
12.00	31	30	34	30	31	29	29	31	29	32	30	31
12.30	32	30	34	30.5	32	31	30	32	29	33	31	31.5
1.00	33	31	34.5	31	33	31	31	33	29.5	34	32	32
1.30	33	32	35	31	33	32	31	33	30	34	32	33
2.00	34	32	35	31.5	34	32	32	34	30.5	35	33	33.5
2.30	34	32	35	32	34	33	32	34	31	35	33	34
3.00	35	33	35	32	35	34	33	35	31.5	36	34	34.5
3.30	35	34	35	32.5	35	34	33	35	32	36	34	35
4.00	36	34	35	32	36	34	34	36	32.5	37	35	35.5
4.30	36	34	34	32	36	35	34	36	33	37	35	36
5.00	35	33	34	31	35	34	33	35	32.5	36	34	35.5
5.30	34	31	33	31	34	33	32	34	32	35	33	34.5
6.00	32	31	33	30	32	31	30	32	31	33	31	34
6.30	31	30	32	29	31	30	29	31	30	32	30	32
7.00	30	29	30	28	30	29	28	30	29	31	29	31.5
7.30	30	29	29	27	30	28	28	30	29	31	29	30
8.00	29	28	29	26	29	27	27	29	28	30	28	29.5
8.30	29	28	29	25	29	27	27	29	27	30	28	29.5
								28	26	29	27	29

FINDINGS

Table 10: comparison of all combinations

	Experiment	Temp. difference	positive point	Negative point
cloth as a mat	covered the window for the period of a week in mid of winter & summer season, in February 2018	the temperature of the room remains unchanged & warm because the cool breezes outside can not enter the room, due to these insulating panels.	1. light weight 2. Thermal insulation good in winter season as well as sound insulator 3. easy to carry 4. easy to install as a tent 5. cost effective	1. not appropriate in case of rain and summer (need to test more) 2.
6mm thk glass	this sanwiched glass panel kept on the box which has pockets on its side for air circulation.	the air is circulated from given air pockets, the temperature is traped in side the box, it remains unchanged even if the box is kept in sun.	1. thermal insulation 2. reduces UV rays to enter inside 3. traps heat inside the room 4. good in winter as well as summer season 5. sound insulating material	Need to test in summer
cardboard	the spiral wavy air strip is insulated in card board	as compared to anything else, the cardboard structure is more thermally insulated & helpful in summer season	1. light weight 2. good to use in prefabricated walls 3. thermally insulated panel 4. easy to install 5. cost effective	construction details
concrete block	the NDT: non destructive test	-	Comparatively light in weight Reduced thickness	Need to test on heat factor

CONCLUSION

In this thesis, the problem of waste generated from industries and not treated it properly to reduce the pollution in surrounding is addressed.

One of the most contributions of this work is to avoid various treatments on the waste generated & try to use it as it is available, and to propose the methods to solve the problem by hybridization.

The experiments & readings helped to establish the graph stating the efficiency of the material if clubbed in best possible ways with other materials.

To conclude on the note of application of these materials,

Mat is light in weight, thermally insulated, easy to carry, easy to install as a tent, & cost effective; but not appropriate in case of rain.

With Glass it is thermally insulated, reduces UV rays to enter inside, and traps heat inside the room, good in winter as well as summer season.

In combination with Cardboard is light weight, good to use in prefabricated walls, thermally insulated panel, easy to install & cost effective, only construction details are to be worked out critically.

RECOMMENDATION

Sandwiched in	applicable for	applicable in
cloth as a mat	1. Tents 2. Mats 3. Thermal partitions 4. Thermal Paneling 5. light weight traveling blanket or sleeping bag 6. sound proof panels	Extreme climatic conditions; Rajasthan, in deserts. Where in winters the outside temperature is extremely cold and same as inside the tent. Which unable to live inside. Insulate your dog's outdoor house with bubble cushioning to keep him warm when the temperature begins to drop in the fall.
6mm thk glass	1. Window glass 2. panels	Windows can help retain heat indoors and help keep homes cool during summer, with the trapped air in the bubbles having a thermal retention effect.
cardboard	1. Partitions 2. light weight constructed walls- alterative for pre fabricated walls	
concrete block	reinforced constructions light weight non structural members	

REFERENCES

i. *Architecture – time space & people june 2014 page no.38*

ii. *Industrial waste type: November 28, 2016; byjus learning app, chemistry article.*

iii. *International Journal of Environmental Research & Development.*
ISSN 2249-3131 Volume 4, Number 4 (2014), pp. 317-324 © Research India Publications
http://www.ripublication.com

iv. *Haseeb Jamal; Hospital Waste Types & Segregation Guidelines, Healthcare waste; On: Jan 21, 2017, types of Hospital waste; https://www.aboutcivil.org/hospital-waste-types.html.*

v. *Joannis s. Arvanitoyannis; Waste management for food industries / food science & technology, international series, Food packaging industry waste.*

vi. *John's Refuse & recycling; Refuse and Recycling Blog/bid/227351; The Importance of Industrial Waste Management; Posted on Tue, Oct 23, 2012.*

vii. *M. Ramesh 1 ,K.S.Karthic2, T. Karthikeyan 3 and A. Kumaravel 4*
Published in: International Journal of Environmental Research and Development. ISSN 2249-3131 Volume 4, Number 4 (2014), pp. 317-324 © Research India Publications

viii. *Latimer Christchurch, May 2014, Target Sustainability. www.targetsustainability.co.nz*

ix. *Biomedical waste solutions; Ways for treating medical waste http://www.biomedicalwastesolutions.com/medical-waste-disposal/*

x. *Types of packaging material, Bizkaia Garbiker, page no 124. Http://garbiker.bizkaia.eus/ing/*

xi. *Thermacol: Http://kiwithermopack.blogspot.in/*

xii. *Alluminium packaging (http://www.world-aluminium.org/applications/packaging/index.html).*
Can Construction KEIREN December 21, 2017 https://insteading.com/blog/aluminum-can-construction/ via @NiftyHomestead

xiii. *Packaging Waste By Waste Operations And Waste Flow*
http://ec.europa.eu/eurostat/cache/metadata/en/env_waspac_esms.htm

xiv. *Pirjo Honkimo, assessment of packaging material life cycle, Spring 2013 Degree program in Industrial Management Oulu University of Applied Sciences, 6 th March 2013.*

xv. *https://www.theseus.fi/bitstream/handle/10024/55127/Honkimo_Pirjo.pdf?sequence=1*

xvi. *Sophia Bennett, May 8, 2014, Recycle Nation, bubble wrap, https://recyclenation.com/2014/05/recycle-bubble-wrap - How to dispose a bubble wrap?*

xvii. *Evolution & some facts about air bubble sheet*

xviii. *Transport information system, Comparison with other packing materials http://www.tis-gdv.de/tis_e/verpack/polster/polster.htm#polster3*

xix. *When using air bubble sheet as building insulating material*
Energy.gov. – national labs: https://www.energy.gov/energysaver/weatherize/insulation/types-insulation#radiant

THE ROLE OF BUILDING SERVICES IN ARCHITECTURAL EDUCATION

Dr. Ar. Kalyani Nilesh Junankar

Looking at today's scenario, teaching and learning services-related matters to students have become extremely important. It is necessary for this subject to be taught and learnt properly, and incorporated in a structure. We cannot just have a structure without lights, electricity, HVAC, without water supply, without a drainage system. Can we live in a situation where we still have to struggle for water storage in our house? Can we live with open drainage trails running around our house? Nowadays it is impossible to live without the internet and electricity in houses or offices. Therefore, it is essential that we also focus on these fundamental issues as much, or more than the design and external façade or elevational treatment of the building.

Julia Evans, CEO of Building Services Research and Information Association (BSRIA), in her interview with *Designing Buildings Wiki* (DBW), explained the increasing importance of building services:

Architects can design the most beautiful or complex building, but without building services being introduced effectively it's not going to work. It won't give Generation Z the kind of environment they expect - natural light, air conditioning which is not intrusive, clean air, and so on. The flexibility of buildings needs to be constantly at the forefront of the architect, builder and any other subcontractors' minds - they need to be thinking about what else the building might look like or be used for in the future.

There is a list of services one needs to understand the details of, and incorporate in buildings, not only for correct working of structure but also to maintain the comfort and hygiene of the working environment. Though there are experts, known as MEP consultants, who exclusively work on such facilities, it is also the architect's role as well to take part in the decisions of the specifications, details, sizes and finishes which ultimately are going to affect the final experiential output.

However, when architectural design is taught or implemented, the main focus is almost always towards the views - external or internal. It is equally important to pay attention towards the services while designing, which absolutely helps at the execution stages. The services mentioned in Table 1 are all equally important, and none can be missed out, albeit variations in materials, systems and applications. This could be the checklist for an architect before finalising the layout or design or to analyse the basic requirements and mandatory services provided.

Table 1: **Important areas where focus is required on types of services to be provided**
(Source: Collated by Author)

Mechanical services	Electrical services	Plumbing systems	Data-based / Low voltage systems
Fire-fighting systems	Power supply	Water supply	Security systems
Elevators and escalators	Backup power (diesel generators)	Drainage of wastes	fire alarm systems
HVAC systems (heating, ventilation, air-conditioning)	Emergency power (battery-based uninterrupted power supply)	Water recycling systems (Which allow recovery of water from waste and re-use that water for low-grade applications such as flushing)	Building management systems
Gas supply systems (for heating and cooking in residential buildings, or oxygen and nitrogen in hospitals)		Rainwater harvesting	Public address systems
			Cable TV systems
			Data networks
Compressed air systems used in industries		Storm water drainage	Voice networks

Figure 1: Wrong positions of two WCs within the same toilet

Figure 2: No space to open the door due to WC positioned in the entrance

Figure 3: Basin tap fixed in the wall with no extension pipe for a usable water flow

Figure 4: Side by side positioning of the urinals in public toilets without separator or usable space

Figure 5: Position of the shower rose is such that a shower can be taken by even seating on the WC. No space for standing below the shower

Figure 6: Position of pillar taps on Jacuzzi

Figure 8: Narrow space to access WC

Figure 10: No task light or sufficient light provided in the kitchen to work on the platform

Figure 7: Corner WC with no space to stand, while close to the WHB

Figure 9: Inadequate arrangement of lighting design to light the living space

Figure 11: Ventilator provided in flooring due to which the mat has to be cut

Figure 12: A single plug point with multiple chargers. No provision of sufficient plug points

There are some hilarious images showing the results of incomplete or incorrect knowledge or misunderstanding of services leading to the undesirable situations in a house, as seen in figures 1 to 12. The solution to this is that there has to have at least 50 % focus on services for the design to work efficiently in reality. A checklist in the design preamble itself while designing, given at the institute or college level only would provide a good grounding. Otherwise there will be no dearth of bad projects coming up, with a lot of extra and unnecessary expense incurred in order to rectify connections for water supply, electrification, HVAC and drainage lines or as remedial treatment for such circumstances.

There are some important points to be focused upon by teachers as well as students:
i) Building services play a pivotal role in contributing to the design of a building, in terms of overall strategies and standards to be achieved, as well as in façade engineering, the weights, sizes and location of major plant and equipment, the position of vertical service risers, routes for the distribution of horizontal services, drainage, energy sources, sustainability, and so on.

ii) Building services design must be integrated into the overall building design from a very early stage, particularly in complex building projects such as hospitals. For the services requirements of such large and complex buildings, a building services engineer might be appointed as the lead designer.

iii) As time passes, technology, treatment, tools, are all going to progressively change. We, as architects, need to move with this evolution and try to learn and incorporate all new terms and techniques into our buildings as well as in study materials in schools and colleges.

This is definitely going to help our students who are the future of society.

Image Sources

Figure 1 :
https://www.loveproperty.com/gallerylist/75500/epic-home-fails-worlds-worst-design-and-diy-mistakes
Figure 2 :
https://www.reddit.com/r/funny/comments/2hpvg0/fixing_a_toilet_leak_i_took_2_trips_to_home_depot/
Figure 3 :
https://www.boredpanda.com/poor-design-decisions-fails/?utm_source=-googleandutm_medium=organicandutm_campaign=organic
Figure 4 :
https://www.google.com/search?q=architectural+mistakesandhl=enandsx-srf=AOaemvKKL8xAwhbeSCBMb-ARqfT8BfOwHA:1636445594201and-source=lnmsandtbm=ischandsa=Xandved=2ahUKEwjZhNjy6or0AhUZuksFHY-WIDxkQ_AUoAXoECAEQAwandbiw=1707andbih=802anddpr=1.13#imgrc=c-JZSzC3H0rncJM
Figure 5 :
https://www.instagram.com/p/BfzRoPvg9C3/
Figure 6 :
https://old.reddit.com/r/CrappyDesign/comments/b13w0p/this_bathtub_looks_like_somebody_was_killed_in_it/
Figure 7 :
https://admin.nanoresort.com/stories/these-are-probably-the-worst-de-signed-bathrooms-of-all-time/
Figure 8 :
https://www.reddit.com/r/backrooms/comments/hz215n/the_bathrooms/
Figure 9 :
https://www.google.com/search?sa=Gandhl=en_GBandtbs=simg:-CAQSiwIJ8Ya9E7qrL4oa_1wELELCMpwgaOwo5CAQSFMMYkzT7M4s1n-CaiGbsQnhy9D8QJGhsEvX0hYAKI_1M5zDvyw2k8GIwdEg8AG7PuGZ-TMgBTAEDAsQjq7-CBoKCggIARIEK9o-rAwLEJ3twQkangEKIgoPZnVybm-l0dXJIIHN0eWxl2qWI9gMLCgkvai85dzBxanMKHQoKZGVjb3JhdGlvbtqliPYD-CwoJL2ovNzZ5dHIkCh8KDGNvZmZlZSB0YWJsZdqliPYDCwoJL20vMDc4bjZ-tCh4KC2xpdmluZyByb29t2qWI9gMLCgkvbS8wM2Y2dHEKGAoFY291Y-2japYj2AwsKCS9tLzAyY3JxMQwandsxsrf=AOaemvLHLUyNSz2k5LEIqT99aW-ShCmcDWQ:1636446347351andq=hue+light+strip+behind+couchandtbm=is-chandved=2ahUKEwjL3OjZ7Yr0AhULed4KHddrDq8Qwg4oAHoECAEQMgand-biw=1707andbih=802anddpr=1.13#imgrc=KXyP-TeG3RpNGM
Figure 10 :
https://in.pinterest.com/pin/324259241923389688/
Figure 11 :
https://www.google.com/imgres?imgurl=https://bemorepanda.com/files/2020-08-17/images/529140.jpegandimgrefurl=https://bemorepanda.com/en/posts/1597922492-the-family-turned-their-home-into-a-disney-fairy-tale-where-magic-awaits-you-behind-every-door-20-photosvideo-andh=692andw=700andtbnid=6QN5RI4Ej_OQsMandtbnh=223andtbn-w=226andusg=AI4_-kTOr1tChO-uO5DQSf-ZOz6fQz8SpAandvet=1anddo-cid=uc1zTNQ2FNILZManditg=1andhl=en_GB
Figure 12 :
https://d.facebook.com/100370951396938/photos/pcb.180565746710791/180564210044278/?type=3andsource=49

Ar. Kalyani Nilesh Junankar is Principal Architect at *Antaranga Associates Architects and Interior Designers,* Pune, since 2004. She has handled several projects including town planning as well as auditoriums, residential and commercial interiors. Her major focus has been on construction detailing and services in an effort to improve the experience and appearance of the executed design. She has taught the subjects of services and construction in various institutes. Currently, she has been teaching at Smt. Kashibai Navane College of Architecture, Pune, since 2017.
kalyanilesh2911@gmail.com

PRCA BOOK OF ABSTRACTS 2022

ISBN: 978-93-92774-00-3

LOKNETE DR. BALASAHEB VIKHE PATIL
(PADMA BHUSHAN AWARDEE)
PRAVARA RURAL EDUCATION SOCIETY'S
PRAVARA RURAL COLLEGE OF ARCHITECTURE
LONI

In Collaboration With

Council of Architecture

SPPU Pune

INTACH Pune Chapter

Ahemednagar Centre Maharashtra Chapter

Virtual national conference on

RURAL ARCHITECTURE AND REGIONAL PLANNING

February 2022

ISBN: 978-93-92774-00-3

Virtual national conference on

RURAL ARCHITECTURE AND REGIONAL PLANNING

3rd and 4th February, 2022

Editorial Team

Chief Editor

Ar. Sonali S. Chaskar
(M. Arch. Landscape)
Professor, PRCA, Loni

Team Members

Dr. Parag Narkhede
HOD Bharatiya Kala Prasarini Sabha's
College of Architecture (BKPS), Pune

Ar. Kapil Burhade (M. Design)
Associate Professor, PRCA, Loni

Ar. Ashwini Gholap (B. Arch)
Assistant Professor, PRCA, Loni

LOKNETE. DR. BALASAHEB VIKHE PATIL
(PADMA BHUSHAN AWARDEE)
PRAVARA RURAL EDUCATION SOCIETY

PRAVARA RURAL COLLEGE OF ARCHITECTURE

LONI

https://pravara.in/college-of-architecture-loni/

CHALLENGES FOR CURRENT ARCHITECTURAL PRACTICE IN RURAL CONTEXT

Ar. Kalyani Nilesh Junankar
M. Arch. (Construction Management)
Assistant Professor, SKN College of Architecture, Ambegoan, Pune. 41.
kalyanilesh2911@gmail.com

Abstract
It is said that India is a country of villages. Rural areas usually refer to villages. Total no of villages in India in 2001 was 638,365 out of which Maharashtra had 43,722 no of villages in 2001 & 63,663 in 2020. Overall statistics says that, ¾ of the population lives in villages only. So, the first priority of development has to be in rural areas. Developing the country should start with the villages or rural areas. A focus of this research is on coastal areas, Maharashtra has about 720 km long coastline. Though each of the village situated near coastline is famous for offbeat weekend gateways, but the structures, services & facilities in these area for a common man is very much poor. The village named Kondivali, small area situated on the coastal road between Diveagar & shrivardhan is a same kind of a village. Total population of this area is maximum 1000 people out of which ½ of the populations has shifted to Mumbai due to lack of infrastructure, employment, worst services regarding education, water, hygiene & houses. Aim is to understand the difficulty level of people living in this village, their struggle & problems they are facing regarding the facilities. The main objectives of this research paper are to solve the basic problems in economical way, Development of the streets, services, water problems, drainage issues & Use of the various innovative techniques to reduce the financial problems & increase the stability of the structure. Methodology towards solving these issues will create a significant difference in current situation. To start with, the research & in depth literature survey was carried out to understand the theory & reasons behind the issue and framed the critical analysis of the same. Case studies & experiments played the major role in finding out to identify the major problems in current scenario & the solution to the said problem.

Keywords: coastline villages, structures, services, economics, architectural practice