Identification of Waste Materials in Construction Site and Practice of 3r in Construction Projects

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Abstract: ***Construction building waste management has conventional globalized attention from the times. It consequences scientist ongoing investigate and examination extensively on construction waste management. In building waste management be able to create a float in reusing, lessening or recycling building waste the building owners and engineers be supposed to be alive educate about the strategies as well as valuable reuse for partition as well as detection of building waste fabric. This lessons spotlight on waste material classification in construction location, the fritter away know how to be majorly separated into two parts they are inert in addition to non inert through the combining in cooperation this mixtures construction fritter away resolve be obtained. The most important plan of this document is to bring together the information related to waste management of material in building to recognize the high fritter away materials taking place throughout the building, for this case feedback analysis will be conducted, 22 questions equipped in with the intention of 19 questions associated to waste formed and how it is managed and three questions are associated to individual estimation on waste materials in building projects***

Keywords: ***identification of waste materials, 3R practices, questionnaire survey, analysis of questionnaire survey***

I. INTRODUCTION

The recovery of construction and demolition waste, which requires a reduction in the volume of waste produced during building activities, the separation of waste materials, and a twofold increase in the use of C&D waste; and reducing pollute emissions into the environment during the production of building materials and the construction production process. The latter aspect means paying attention to the environmental impact of building materials and building products, and controlling the production techniques that create harmful substances at all stages of the building process. In terms of sustainability, the topic of prevention of the generation of construction waste can be considered an issue that focuses on the danger of depletion of materials used in the construction industry, such as timber, sand, gravel, and marl. Timber frameworks with an average waste of 13% and sand with an average 9% showed the highest percentages of waste among all materials. While other materials such as reinforcing steel with an average 5%, cement 5%, and concrete 4% were within the acceptable rates: 7% steel, 5% cement (Risk et al. 1998). Tiles and Masonry wastes varied according to their types, which prevent the generalization of presented figures for all types,Waste reduction in the construction industry is important not only from the perspective of efficiency, but also concern has been growing in recent years about the unfavorable outcome of the waste of building materials on the environment. This type of waste in general accounts for between 15 and 30% of urban waste materials waste is difficult to recycle due to high levels of contamination and a large degree of quality, and often there is inadequate space for its disposal in large cities

A. Waste generation at various phases

Waste may result from the processes preceding construction, such as materials manufacturing, design, materials supply, and planning, as well as the construction stage classified the main waste causes in construction into:

- Design
- Procurement
- Materials Handling
- Operation
- Residual

Design phase:

- Blueprint error
- Detail error
- Design changes

Blue print error*:* blue print error is caused due to the changes in the plan or the site issues. So this may causes to the waste so it have to rectify the errors and then it will be reduced this is the reason for the blueprint error.

Detail error*:* detail error is caused due to the planning mistakes and the items which are incorrect to the plan. So this can be rectified by making the correct steps to the detail error

Design changes*:* design changes also effects the waste . if the construction is started and then the change in the plan occurs then waste will be more so it should be rectified in the preliminary stage of analysis

a) Procurement

In procurment stage most commonly found errors are as follows

- Shipping error
- Ordering error

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Shipping error: This is one of the mistakes in the procurement stage. In this shipping error many mishandling or incorrect placements of orders or less placements of orders or incorrect shipping are found.

***Ordering error*:** Ordering incorrectly or inwisely may result in ordering error. The order must be placed correctly and wisely to avoid this error.

b) Handling of Materials

- Improper storage/deterioration
- Improper handling (off-site and on-site)

c) Operation

Mostly in construction sites the problems occur through the operation. It may be by problems through the labour or may be by the in correct equipment in the site or equipment to the labour less ratio or the factors by the environment or change in the weather conditions may result the stop in work.

- Problems occurred by labour
- Equipment break down
- Environmental conditions

d) Residual

- Leftover scrap
- Un reclaimable non consumables

B. Major waste generating materials at construction site

These wastes may result from a wide variety of sources. Some builders have reported having to reorder construction materials because they cannot find the original order on the work site. When the unique order is found, it may wind up as waste.

Demolition waste materials list:

1. Asphaltic concrete paving
2. Concrete
3. Concrete reinforcing steel
4. Bricks
5. Concrete masonry units
6. Wood studs
7. Wood joists
8. Plywood and oriented strand board
9. Wood paneling
10. Wood trim
11. Structural and miscellaneous steel
12. Rough hardware
13. Roofing
14. Insulation
15. Doors and frames
16. Doors hardware
17. Windows
18. Glasing
19. Metal studs
20. Gypsum boards
21. Acoustical tile and panels
22. Carpet
23. Carpet pad
24. Demountable partitions
25. Equpment
26. Cabinets
27. Plumbing fixers
28, piping
29. Supports and hangers
30. Valves
31. Spronklers
32. Machanical equipment
33. Refrigerants
34. Electrical conduct
35. Copper wirings
36. Lighting fixtures
37. Lamps
38. Ballasts
39. Electriczl devices
40. Switchgear and panel boards

C. Building waste can be reducing by using 3R role:

Concrete fritter away reduction from side to side 3R is single of the thrusts of National Solid Waste Management (NSWM) strategy. Building waste is one of the forbidden concrete wastes. 3R practices symbolize the perception of decrease, reuse and recycle.

Reuse: use again is more often than not a most wanted option for the reason that some building waste can be reused in additional building project. Use again is the majority beneficial and contractors can save capital because dumping involved cost. Reuse is by means of the same textile additional than once for the same meaning such as formwork in building. Any material which cannot be reused but know how to be second hand will be sent to recycling center.

***Reduce**:* Decrease is well thought-out as the nearly everyone useful and competent method to administer building waste. Reduce does not simply decrease building waste generation, it also can decrease the charge for transportation, waste discarding and fritter away recycling

Recycle: At what time decrease and reuse turn out to be difficult, recycling is preferred. a number of new resources can be completed out from side to side recycling. Recycling building waste can be categorized into on-site and off-site. On-site recycling is definite as separation of building waste for following use as the underdone materials in building project. in the intervening time, off-site recycling is separation of building waste which are then in seventh heaven to additional organizations or locations and the fritter away is used as raw resources.

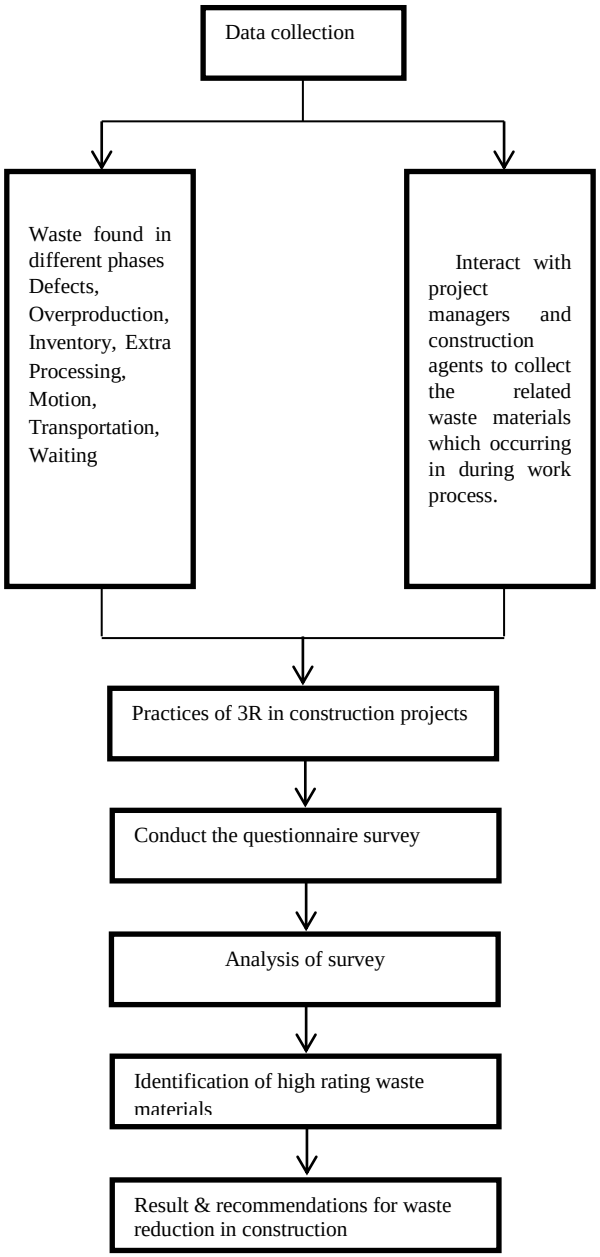
II. OBJECTIVE:

1. Identification of waste materials and reduction waste materials using 3R in construction
2. Investigate the current practices of construction waste materials in construction site and reducing the waste through 3R practice among the contractors.

III. METHODOLOGY:

1. Collected the data related to the waste materials in construction projects
2. Identifying the basic type of waste material commonly found in construction practices

3. Practices of 3R in construction projects
4. Conduct the questionnaire survey related to waste materials and practices of 3R in construction
5. Analysis the questionnaire survey



Flow Chart 1 : Methodology

IV. RESULTS AND ANALYSIS:

A. Analysis of survey

The Analysis of the questionnaire survey respondents were project in-charge, construction agents and stakeholders we have recognized the high ranking waste materials and low ranking waste resources, compute the causes of waste materials in construction site and to give the examination which causes high priority to some questions connected to the waste materials and also rate the factors influencing the practices of construction waste management. Calculations part of the questionnaire Survey shown in Table.

Ranking analysis $i_X = \sum_{i=1}^{5} \frac{(X_i \times Y_i)}{N}$

Where,

Xi= Response rating
Yi= number of points (value from 1 to 5)
N= total number of responses

The examination mostly focal point on the fritter away resources in construction location, we comprise recognized the far above the ground rating fritter away resources and near to the ground ranking waste materials, and also determine the cause of fritter away equipment in building location and to give the psychoanalysis which causes elevated precedence to a quantity of questions correlated to the fritter away resources how they are worn in building location.

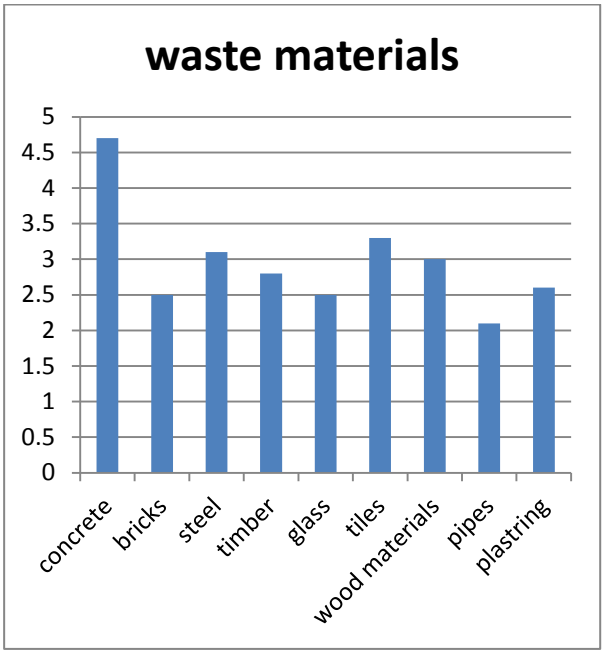


Figure 1: Graphical depiction of waste materials in position wise in construction location

Figure 1 show with the intention of concrete fritter away has got towering rating measure up to to other resources. Pipes fritter away has got smallest amount ranking (2.1) and outstanding resources approximately have identical ranking, the fashioned waste ranking ranged sandwiched among 2.5 to 3.2. In that total psychoanalysis the bits and pieces fritter away can be for the most part fashioned owing to a few causes of fritter away resources in building site, table shows the position level of fritter away causes in position wise. The fritter away bits and pieces in site for the most part causes by inappropriate preparation of resources usage and also numerous companies are not subsequent the fritter away organization techniques.

Table 1: Waste production causes ratings

s. no	fundamental types of waste normally found on building projects	Rating
1.	Defects	4.3
2.	Over productions	2.5

3.	Inventory	3.5
4.	Extra processing	4.5
5.	Motion	3.1
6.	Transportation	2.5
7.	Waiting	2

Table 1 shows that extra processing has got soaring rating judge against to other causes. Waiting has got smallest amount ranking (2) and remaining has same difference at one point. In that total analysis the material fritter away can be mostly fashioned due to a quantity of causes of waste resources in building location, the squander bits and pieces in site for the most part causes by inappropriate development of resources usage and also numerous industries are not subsequent the waste organization technique.

Table 2: Questionnaire survey for causes of waste materials.

S.No	Rating issues	1	2	3	4	5	Rank
1	Supervision issues	4	6	5	17	37	4
2	Poor labour manage	2	21	15	18	13	3.3
3	Environmental problems	2	14	22	17	19	3.45
4	Waste management issues	8	12	18	25	13	3.7
5	Resources replaced	3	9	21	22	15	3.26
6	Drawing mistakes	3	13	21	20	13	3.4
7	Plan changing issues	4	14	16	24	13	3.5
8	storage facilities iss	8	9	18	18	15	3.8
9	Materials improperly stored	4	12	21	14	16	3.1
10	Labour mistakes	14	8	14	20	12	3.6
11	Customer mistakes	7	13	20	16	12	3.2
12	Problems in Equipment	9	21	16	14	6	3.0
13	Inappropriate maintenance	7	15	20	12	14	2.8

In regarding to the analysis of figure 2 & 3 shows that the issues of waste material in construction projects. On the basis of analysis of survey, supervision issues has high rating and its ranking is No.1, many construction industries in India having issues in planning and maintaining of waste materials, the analysis shows that the causes of production waste in construction site . And not conducting maintenace issues in the waste management , drawing issues and plan changing issues are main causes for more waste in construction projects. Acquirement in the poor quality of resouces

at the preliminary stage of work to ensure the all circumstances get effected in the entire project, in that case gaining of best quality may not affect the project. In some circumstances labour mistakes equipment break down can also produce the waste in construction projects, so we have to preserve the suitable planning.

Table 3 : Analyzing the opinion poll survey of waste causes in construction site based on ranking.

S.N	Causes of waste in construction s	Rating	Rank
1	supervision issues	4	1
2	storage facilities issues	3.8	2
3	waste management issues	3.7	3
4	Labour mistakes caused	3.6	4
5	Plan changing issues	3.5	5
6	Environmental problems	3.45	6
7	Drawing mistakes	3.4	7
8	Poor labour management	3.3	8
9	Resources replaced	3.26	9
10	Customer mistakes	3.2	10
11	Materials improperly stored	3.1	11
12	Problems in equipment	3.0	12
13	Inappropriate maintenance	2.8	13

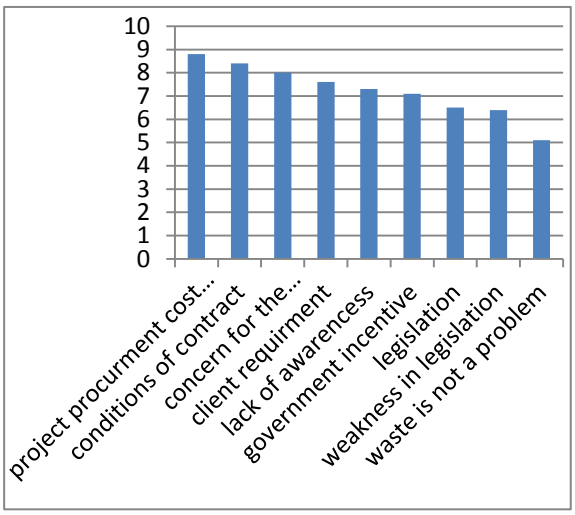


Figure 2: Factors influencing practices of waste management ratings

Table 4: Analysis of factors influencing waste management in construction projects

14.	Project procurement cost reduction	Y(61)	N(8)
15.	Concern for the environment	55	13
16.	Legislation	44	23
17.	Client requirement	52	16
18.	Condition of the contract	56	10
19.	Government incentive	49	17
20.	Lack of awareness	48	19
21.	Waste is not a problem on site	34	32
22.	Weakness in legislation.	41	23

Above figure 2 & table 4 shows to facilitate the factors influencing the practices of construction waste management and also to show in that figure it's in number of responses to give the answer related to that question.

V. CONCLUSION:

Identified the waste and reduction of waste in the construction projects. Investigated the 3R practices among the contractors and the engineers. Analyses have been done related to the waste produced in the construction projects. By investigating and taking the analysis it came to conclude that many issues are sorted out about the labour issues supervision issues and transportation and improper management. Done the analysis by investigating contractors , engineers and builders. By all these analysis the 3R practices are not regularly or not properly implemented by the project managers, contractors or the engineers. In regarding to the analysis it is been concluded that 3R practices must be implemented in all the construction projects.

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