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POST DISASTER RECONSTRUCTION : URBAN CONTEXT

A thought to include resource planning during post disaster reconstruction of urban neighbourhoods : An integral part of academics in an Urban Design program

Abstract

The paper intends to first understand the importance of Post disaster reconstruction in an urban context; it analyzes the importance of managing urban reconstruction projects. It clearly projects the effects on the community that in turn impacts the socio economic stature of a nation. A micro analysis of the project reveals various knowledge areas that need to be managed in a post disaster reconstruction of urban neighborhoods that all urban designers and architects must learn to plan and manage the resources. The resources play a crucial role in the success of the project. It affects the key parameters of managing urban reconstruction like scope, time, cost and quality. The paper gives an insight into the material and human resources that are presented contextually, further it gives various sources for each type that may be considered during resource planning. This paper intends to make one understand the grave importance of the aspect and make it an integral part of urban design academic program.

Key words: *Disaster resilience; Post Disaster Reconstruction; Post Disaster Waste; Beneficarie*

1. Introduction

Natural disasters are an integral part of the physical environment which impacts human settlements inhabiting any geographic region. The communities adapt themselves to the context on the pretext of conserving the available resources for their livelihood and wellbeing, binding themselves to the region through generations. The development of the society from generation to generation has made the communities more advanced backed by technological innovations resulting in its dependency on complex infrastructure [1]. The dependency of communities on the complex systems has presented more open ends vulnerable to disasters and its impact severely affecting the communities.



Disasters take a toll on the communities, even though the human beings are technically advanced in terms of early warning systems, preparedness to face an anticipated catastrophe; it is very negligible in comparison to the massive unpredictable forces of nature. Though the preparedness helps in reducing the impact destruction is bound to happen. Scale of natural disasters are signified by the extent of fatalities and loss of physical assets like homes, socio-economic infrastructure including, roads, connecting bridges, railways, airports, harbors, power and communication lines. Fatalities and loss of assets directly impacts the productivity leading to economic loss affecting the GDP of the nation. A quick resilience is of utmost priority to be addressed by the urban planners, to prevent socio economic degeneration that further weakens a country's economic stature.

The situation calls for an effective management of the entire reconstruction process to bring the communities back to a state of resilience that existed prior to the disaster. To achieve effective resilience the urban designers must manage all necessary knowledge areas during Post Disaster Reconstruction (PDR) of the assets.

2. Need for managing knowledge areas

Any disaster brings assistance to revive the affected communities on humane grounds. Help pours in various forms depending on the scale of destruction at both domestic and international levels. It calls for the involvement of all levels of the government statutes from the local authorities to state and central governance including expert planners and architects. Aids are provided in the form of relief funds, donations in cash and various

forms like materials and technology for reconstruction.

This generates the need to manage the following aspects in unison during PDR:

- Stakeholders
- Scope, Time and Cost
- Resources
- Communication
- Quality & Safety
- Procurement & Contracts

An effective management to handle these complexities is a must to overcome delays, cost overruns during reconstruction enabling the communities to come out of the ordeal and continue their normal routines.

3. Resources and Its importance in PDR Projects

The scale of PDR is often massive. The success lies in achieving the objectives through efficient management of the knowledge areas throughout its lifecycle. The PDR requires the necessary resources to facilitate its planned process. Here the resources play a vital role. Its availability controls time and cost schedules. A resource available timely reduces time delays and its availability in abundance locally reduces cost overruns. Out of the three categories of resources- Materials, Human resources and Machinery, the first two have to be organized whereas the machinery is prerequisite.

4. Accumulation of resources

The PDR requires accumulation of requisite materials and human resources necessary for its uninterrupted execution to achieve the set objectives within planned time and cost.



Materials suitable for the hazard resistant construction as stipulated by codes have to be stacked in what is termed as Material banks along with an efficient workforce skilled in hazard resistant construction techniques and methods need to be organized.

4.1 Sources of Materials

New material in the form of steel, wood, bricks, cement and sand are readily available, that can be procured from vendors. However the initial activity during post impact phase of any disaster involves clearing debris and demolition waste of structures on the verge of collapse termed as Post Disaster Waste (PDW). PDW management itself becomes a major activity.

4.1.1 PDW as a source for material

Disasters destroy physical property leaving a huge amount of debris, further many structures are damaged beyond repair that needs to be demolished, which also generates demolition waste.

Many experts have classified the waste in different ways.

In 1995 Kobayashi classified PDW as [2]:

- Rubble and waste accumulated on roads
- Demolition and dismantling waste of buildings
- Bulky waste and raw materials. In 2004 Baycan refined the classification to [3]
- Recyclable materials (concrete, wood, masonry, metal, soil and excavated material)
- Non-recyclable materials (Household inventories, organic and inert material)
- Hazardous material (Asbestos, Chemicals)

The listed classification of PDW is based on the objectives of PDW management. This gives an insight into the materials that are

available from the point of view of PDR. The PDW can be re classified in accordance with the PDR as follows.

- Recyclable material (concrete, Masonry, steel and wood)
 - Reusable material (dismantled building elements like doors, windows, columns, girders, gates, roofing sheets and tiles)
 - Non-recyclable material that is dumped in landfills.
- A. Recyclable building material requires to be converted to a usable form. This calls for an industrial setup to recycle massive quantities that are collected during disasters. An analysis from the project management point of view reveals the following points making it not viable for PDR.
- It requires a huge industrial setup with heavy investments, resources to process the material.
 - Setup requires good amount of time which might delay the PDR process.
 - It requires technical knowhow and skilled Human resources for the management of the facility.
 - It incurs huge cost to recycle a given material increasing its output costs thereby making it financially feasible to implement recycled material.
- B. Reusable building materials can be used with a little refurbishment. These materials are easily and quickly available. This has an advantage over the recyclable materials in PDR situation such as:
- No major setup is required.
 - The materials can be refurbished at a low cost as and when it is to be installed.



- Procurement cost is very low and equal to salvage value there by reducing the project costs.
- Since it's readily available saves precious project time.
- Though the quantity available is very minimal it helps in reducing the burden during procurement in terms of cost and time.

This justifies the feasibility of adopting dismantled building elements and materials, saving time and cost incurred due to material resources, though not fully but marginally reducing the resource burden of PDR projects.

4.1.2 Aid and procurement as a source

PDR involves many stakeholders like Donors, NGO's, INGO's and the Government. Accordingly material for PDR is sourced through vendors and supply chains that are procured and aid in the form of materials by humanitarian agencies. This forms a major source for necessary construction materials.

- Can be procured to the required quantity
- Needs lead time to procure the requisite quantity
- Scarcity of materials suitable for the context might force the vendors to outsource it.
- Risk in terms of time delay and cost overruns due to demand supply gaps.
- Pilferage and overbilling.

In spite of some lapses this forms the conventional method of sourcing and gathering resources controlled by binding the vendors in strict contract agreements to mitigate the risks mentioned above.

4.2 Sources of Human resources

Skilled human resources are equally important to achieve the intended objectives. All levels of Human resources are necessary during a PDR project. In a PDR skilled, semiskilled and unskilled are required. The sources to these can be classified as:

- Voluntary human resources
- Sourced human resources and
- Beneficiaries as human resources

4.2.1 Voluntary Human resources

Most PDR projects witnesses the roles of various levels of human resources representing NGO's and INGO's who work on humanitarian grounds performing various activities including PDR. The volunteers are trained to deal with such situations at all levels of skills. They are well acquainted with hazard resistant building codes and methods and form a reliable source.

4.2.2 Sourced Human resources

In normal PDR projects skilled human resourced of all levels are outsourced contractually for the duration of the project. They are usually local professionals hired for PDR. Their expertise and contextual understanding forms an added advantage to the PDR projects. Outsourcing incurs cost and must be included in the budget. The added advantage is they can be made to strictly adhere to the norms thereby ensuring a proper implementation of hazard safety codes and construction techniques.

4.2.3 Beneficiaries as Human resources

Beneficiaries are those people of the communities identified as the disaster affected by the governing authorities in need



of help and aid. This proved to be very successful in many cases especially in PDR project after 2001 Bhuj earthquake. The involvement of the beneficiaries in what is called Owner driven Reconstruction, the beneficiaries were trained and made to build their own homes all by themselves, with assistance in hazard resistant techniques and materials. This case of ODR in Gujarat was a worldwide success in achieving the targets within the stipulated time, cost and quality [4].

- The beneficiaries showed extreme interest and participation in the process
- They followed the safety codes and techniques since they were building their homes with their own hands.
- They were ready to work on their homes.
- They participated in the hands on workshops to learn the techniques to be implemented on their homes.
- For many it became an alternate livelihood.

5. Conclusion

A PDR project is crucial for the resilience of affected communities, and so is its management this brief study analyzes the various possible ways of amassing resources that include materials and human resources that give insights to urban planners and architects about resources in case of a PDR scenario. With resources being important to projects, it prepares the future planners in understanding the options available for securing and utilizing resources in a sustainable manner. The reusing method not only reduces burden on the procurement but also cost and making it an option environmentally feasible reducing the

exploitation of natural resources that are otherwise used to produce new material. It also gives rise to new strategies to manage PDW. With the need of the hour to go green this seems to be a feasible technique in managing disaster waste. The ODR is an ideal way to engage the beneficiaries enabling them to achieve quickly recover from the trauma and lead a better life. The management of resources helps affected communities re-establish themselves in a shortest period of time, there by engaging themselves in their livelihood, contributing their bit to the economy of the country avoiding its socio-economic degeneration. It gives the urban planners, architects and policy makers to make suitable provisions while planning any PDR of destroyed neighborhoods thereby making disaster resilience and resource management a necessary academic part of the Urban design program.

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