

Preparing Construction Contractors for Post-Disaster Recovery Operations

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Abstract

In the aftermath of a disaster there is a need for conventional and specialist contractors to perform immediate mitigation and rectification of hazardous situations followed by expeditious restoration and reconstruction of the built environment. The question is what can they do to prepare their companies for service both to themselves and to the affected community? This area of disaster reconstruction project management is quite complex and presents unique challenges in respect to the availability of skilled personnel, materials, equipment and supporting infrastructure. Hence, a special type of planning is required for contractors to be appropriately prepared so that they can serve the disaster affected community. This paper presents a review on disaster management and reconstruction research and literature. It follows on to provide a commentary on the subject and how contractors can better prepare their organisations for disaster events. The study is important as disaster preparedness is quite often taken from that of a first responder, community or government perspective but rarely from that of the contractor. Hence, further thinking is required to offer a more strategic view in respect to disaster preparedness and gearing contractor operations to be agile enough to cope with the influx of such projects. The benefit to disaster affected people, the built environment and indeed the contractors themselves could be measurably significant.

Keywords

Disaster Preparedness, Reconstruction, Contractor Planning

1. Introduction

Disaster events create situations outside of the norm causing disruption to people, communities and business. It is held by many that disasters are occurring more often with this increase creating a real problem for those living in populated urbanised areas (Asian Disaster Reduction Centre 2012, Abkowitz and Chatterjee 2012, Guha-Sapir et al. 2014, Mitchell et. al. 2014, Ingirige 2016). Once a disaster strikes there is an immediate need for first responders to attend to medical emergencies and immediate community needs. Following this comes the task of restoring and reconstructing the built environment to its original (or better) condition. As such, it is for contractors to prepare their companies in readiness for disaster events so that they can serve the affected community and benefit their business operations.

Walker et al (2017) contend that reconstruction projects are quite different to standard construction projects having to compress the required recovery works into a very short time period. It is this heightened level of expectation that contributes to making disaster recovery projects quite challenging. Sun and Xu's (2011)

investigation of the 2008 Wenchuan Earthquake and reconstruction also points to reconstruction time and the critical importance that is placed on this factor within post disaster recovery operations. They also go on to describe ‘post-earthquake reconstruction project management’ as an area which concerns a multiple project management approach which requires the ability to act quickly and flexibly to deliver required outcomes.

This study aims to look at disaster restoration and reconstruction preparedness from the contractor standpoint and the challenges that they face in this respect. This is as opposed to a first responder perspective which is quite typically what many focus on when addressing these events. A literature review that outlines some current thinking in respect to disaster events and preparedness, and organisational planning and project implementation will be presented. This will be followed by a commentary from the authors who have combined experiential and research backgrounds within disaster management, construction and project management. It will particularly look at contractor perspectives of disaster preparedness via the lens of strategic organisational and operational planning so that project objectives have the best chance of success. It is expected to contribute knowledge to the project and construction management disciplines within the disaster recovery context.

2. Disaster Events and Stakeholders

General disaster events and catastrophes create dire circumstances that society is more often than not ill equipped to handle. Opdyke et al. (2017) contend that disasters impact social, economic and infrastructure systems having real consequences for many stakeholders such as affected communities, governments and various organisations. Comfort (2005) adds that extreme events such as disasters highlight a cascading effect of failures due to independencies within our societal systems in affect causing disruption to everyday life. As such, it would seem important that sensible disaster recovery planning that serves individuals, organisations and the broader community is undertaken.

Eid and El-adaway (2017) believe that for success to be achieved in disaster recovery operations a wide array of stakeholders need to be actively engaged during the planning stage and throughout the implementation or execution of work activities. Essentially the process requires broad involvement with those potentially affected. Chan and Oppong (2017) contend that in any project situation it is important to meet stakeholder expectations. They put forth that on construction projects engaging stakeholders and having them participate is an effective way of ensuring that their varying and diverse expectations are met. Within the disaster context it perhaps becomes more crucial to engage with stakeholders at a deeper level and look more broadly at those affected and how satisfactory outcomes can be achieved. This is challenging with severe resource shortages and poor work environments typical of post disaster scenarios.

It would seem imperative that stakeholders such as government agencies, insurance companies, businesses or individuals engage appropriate contractors for disaster recovery projects. San Cristóbal (2012) contend that selecting the right contractor for projects is critical and that the client needs to be confident that the contractor can deliver as required. It is put forth that this is one of the biggest challenges within what could said to be business-as-usual environments. This situation would be significantly magnified when a region is in post disaster disorder and demand for contractors is at a high level. Furthermore, in these instances the ‘right’ contractor would not only be qualified both technically and commercially, but would also be able to demonstrate empathy towards victims. Preplanning the selection process or adopting some form of contractor register may be of benefit to both client and contractor preparedness should disaster strike.

3. Contractor Organisational Planning

Hwang et al (2007) inform that disasters create a situation of facility dysfunction and disruption to everyday activities creating a loss of work continuity and potentially business failure. This creates a risk to

contractors, suppliers and the community at large. Those charged with organisational planning need to consider disaster driven disruption and how operations and resourcing can be maintained in situations of recovery. In respect to project resourcing Chang et al. (2010) put forth that there are huge problems in this area in the post-disaster recovery phase. They say that the construction marketplace can be in complete disorder with supply chains cut or disrupted throughout the region due to damaged facilities and general infrastructure. Perhaps the worst result is the loss of electrical power for many days or weeks as this impacts almost every business function. For example, credit systems may not function, so much so that cash and a means to secure it are often required. Hence, contractors need to look closely at their organisations and think about the possible occurrence of extreme events and how they can sustain business continuity and serve the affected community.

The issue of contingency planning is at the forefront for disaster recovery operations in the built environment. Thomas (2010) discusses contingency situations as related to incidents such as disasters in a military sense which is of value to this inquiry. He says that contingency construction has three broad classifications of temporary, expeditionary and permanent. These classifications provide a range of construction type deliverables that span from three months to one year for temporary and expeditionary with permanent being the final finished deliverable. Construction contractor planning may need to consider the possible need of supporting facilities for humanitarian relief alongside the more long term objectives, i.e. to maintain life and implement recovery actions to bring back semblance of normalcy to full pre-disaster conditions.

Kim and Choi's (2013) research on flood disasters discussed a need for clear 'post-disaster rebuild methodology'. They highlighted that recognised processes and techniques as offered by the project management discipline can assist in post disaster recovery reconstruction situations. They discussed it more from an overarching client view but similar actions could be taken by contractors when thinking about reconstruction activities. Contractors could benefit by integrating such methodologies into their overall organisational planning initiatives. Furthermore, Hwang (2016) see the necessity to seek improvement within construction processes so that time, cost and resource constraints are addressed and they see it particularly so in construction operations of a complex and uncertain nature. In a post disaster reconstruction this would certainly be the case which further underlines the need for contractors to prepare their organisations in readiness for such situations.

4. Project Operational Preparedness

Considered organisational planning is important providing a foundation for operational solutions to post disaster problems at the project level. The appointment of qualified project and construction managers is important for successful disaster recovery operations. At the forefront is that they must be standout leaders and as Toor and Ofori (2009) point out effective leadership is required to succeed when confronted with the many challenges that come with construction projects. Strength of leadership is particularly required in difficult environments such as that offered by post disaster events. Furthermore, Rapp and Baroudi's (2014) research found that in the disaster recovery context leadership traits and core values such as communication skills, personal integrity and compassion were identified as of high importance. When planning for disaster reconstruction projects contractors may need to consider the more unique qualities required and designate project personnel accordingly.

The Christchurch earthquake disasters of 2010 and 2011 can offer something on how to lead disaster recovery reconstruction teams. Walker et al (2017) discuss the Stronger Christchurch Infrastructure Rebuild Team (SCIRT) who were charged with undertaking the disaster recovery operations including the reconstruction and repair works as required. This was based around creating an alliance of construction companies. Five companies were chosen and each used their own employees and subcontractors on the various reconstruction projects. The companies assembled delivery teams with individual project directors

and delivery leaders and these people managed the connection between the various parties from planning and design through to the reconstruction activities. Orabi et al (2010) can also contribute within the area of project resourcing. They developed a resource utilisation model so as to distribute competing resources during post disaster recovery operations. This model could possibly assist project leaders of reconstruction projects with a resource planning approach in preparedness for a disaster event. The model is based around three levels of allocation. First to look at the contractor level, followed by the project level and then to focus in on the activity level. By splitting the process into three levels it makes it easier to approach the problems associated with reconstruction and frontline resourcing.

To look at project operations and the planning for preparedness thereof in the broader context Ingrige (2016) offers insight in respect to selfless actions and working towards a common goal. He suggests that key people in the supply chain system that provide reconstruction project requirements should go beyond self-interest and break free from a silo driven inward view to one which is more outward so as to build a more resilient approach to disruptive events and improve project outcomes. This infers that preparation for disaster events at the project level should include an open exchange between contractors, subcontractors and suppliers, with the outcome outlining potential disaster recovery involvement and subsequent behaviours.

5. Commentary: Contractor Disaster Preparedness

Disaster events create disorder within our social systems unlike any other occurrence. They destroy life and property and generally raze the natural and built environment. However, humankind is yet to come to terms on how to prepare and plan for such events and in fact are still on a learning trajectory which would currently seem in its infancy. Disasters are increasingly discussed in many discipline areas including health, transport, architecture and building, the environment, engineering, IT and social sciences. This is because disasters are non-discriminatory and impact on many parts of society. In turn this creates many disaster affected stakeholders as Opdyke et al. (2017) and others have expressed. Academics and practitioners alike are constantly adding new knowledge in an attempt to progress society in respect to dealing with disaster events so that ad-hoc retrospective actions are replaced with resilient ready-to-go plans. One area that appears to be lacking in knowledge and requiring more attention is the contractor viewpoint in respect to post disaster operations. Hence, this commentary will focus on the construction sector and contractor preparedness and planning as needed in post disaster situations to expeditiously reinstate the built environment back to a habitable condition.

Contractor organisations in their normal course of business take on building and infrastructure projects within their scope of capability and as suits their company objectives. They must deal with internal and external stakeholders on an ongoing basis to manage and deliver client requirements. However, when it comes to a post disaster situation the business-as-usual assumptions that one might make cannot be relied upon. For example, organisational functionality, resource bases, operating supply chains, location accessibility and infrastructure requirements are just some items that have been highlighted by many in the generic sense. These areas become problematic for contractors, suppliers and associated businesses and hinder efficient disaster recovery operations. Hence, it is deemed necessary that organisational and project requirements require significant operational planning in preparedness for what a post disaster landscape may hold for contractors. The area requires both experienced personnel and innovators to contribute to the conversation. In essence, it requires deep thinking and strategic intentions to ensure that the assumptions made in everyday situations are viewed in terms of greater uncertainty and complexity with increased personal and business risk inherent in the decision-making.

Common experience tells us that speed and thoroughness of sufficient analysis of an operational planning problem can be improved with a routine format and content for consideration of relevant factors. The success of highly contingent operations such as those post disaster depend on more thorough planning than

routine operations require. Perhaps no organisations routinely plan to deal with contingent operations of greater scope and impact than the military such as discussed by Thomas (2010). Outcomes of their efforts can change lives especially during the response phase but even the recovery phase operations can result in stark changes for the economic and social trajectories of affected citizens, local communities and regions. Analysis that weighs such conclusive possibilities is appropriate for response to major natural or man-made disasters, since lives can also be at risk for such events. The operational planning format applied by military organisations of many nations thus merits consideration; modified to suit unique needs of construction contracting organisations. A mere format, no matter how long used or proven, does not necessarily equate to a good plan of action. However, the planning process that it guides is certainly a major step to a good plan. Furthermore, the format lends itself to assignment of related tasks to responsible personnel within functional areas. No operational plan has much value unless it focuses on action. Applying that operational planning format to the contractor organisation will provide guidelines on how the entity is expected to perform in post disaster situations.

It is deemed that having an operational plan for post disaster preparedness is of importance. However, it would seem that it is not a concept that many contractor organisations give much attention. In between, the daily efforts of running the contractor business, winning new work and maintaining project progress and profitability there is a time deficit that not many organisations can overcome. However, if post disaster operational planning can be integrated into everyday organisational functions perhaps there is a chance of addressing the issue. For example, company directors can produce a policy document in addition to their general policies, certain employees can be designated time to implement policies and develop plans and general personnel can be kept up to date during normally scheduled meetings. During these meetings contractor staff can be informed on how the company will seek to operate during and after post disaster events. Of course the plans will need to consider issues regarding existing project operations and associated project safety, resourcing, schedules, costs and quality. So a documented operational plan should display some form of resilience in organisational and project terms. For example, what are the lines of responsibility and who are the operationally essential people in this respect and can a typical action list be formatted to assist. Furthermore, disaster recovery project communications require serious consideration. In this day and age communication can be made via various devices and mediums. However, when disaster strikes many if not all of these may become disabled. This could particularly impact remedial and mitigation works in the first instance. Of note is post Hurricane Katrina both cellular communication and electrical power were compromised for nearly a week in some areas with costly fossil fuel generators powering satellite phones and internet saving the day for many organisations. As such, the operational plan should include how the work is to proceed until normal communications are restored. It should also list various emergency contact details so that appropriate agencies, contractor personnel, subcontractors, suppliers etc. can be reached in a time of crisis.

An important point to make is that the operational plan needs to address existing projects first then seek to venture into the approach of acquiring new projects – disaster reconstruction projects. It is analogous to stabilising the ship then trying to sail forward. There will be an abundance of reasons why post disaster reconstruction projects will be difficult to manage and deliver. However, planning needs to look at innovative ways of addressing constraining issues. The study has already raised possible reconstruction project constraints such as availability of resources and broken supply chains. However, reconstruction contractors and project managers need to forecast further out in respect to what they see as disaster imposed constraints as applicable to their region. This could be possible infrastructure scenarios learned from past disaster events (e.g. flooding of roads), or any safety aspects including special job hazards, or the difficulty of acquiring project staff. The aspect of acquiring qualified staff that can work long hours, in extreme and fairly primitive environments for many weeks or months on end could be particularly challenging. Of course time constraints as mentioned by Walker et al (2017) and Sun and Xu's (2011) will further compound most other project constraints. So planning for the logistical requirements will be uncertain and possibly difficult but having a set of documented actions in place is perhaps better than having none.

It has been put forth that a judicious operational plan with adequately format processes and procedures for carrying out disaster recovery reconstruction projects as well as maintaining continuity of existing projects is needed. Contractors and their site managers should work at organisation and project levels to seek solutions to multidimensional problems as can be forecasted. This perhaps summons a need to look outwards and seek answers outside of normal business-as-usual conditions. For example, preparing by investigating potential business/financial partners, project staff, subcontractors and suppliers from possibly unaffected regions unconstrained by catastrophe and stating how these could be operationalised within documented plans could help. At least contractors would be in a more assured position should a disaster situation present itself with possible prior written agreements such as memorandums of understanding between parties where assets in unaffected regions can move to the assistance of those in the disaster zone. Such a move may even blossom into beneficial relationships whether a disaster event occurs or not. This is essentially about the contractor organisation planning for a form of agility to move quickly and efficiently with specified reconstruction project delivery options. Moreover, planning is important but so is rehearsing the plan as time and money permits. In this context, one can only hope that forward thinking public agencies provide funds for periodic involvement of private sector entities whose capabilities will be useful to the post-disaster public well-being.

To broaden the discussion one step further, another aspect of disaster recovery projects is for contractor planning to go beyond borders and seek opportunities in disaster affected regions that may be accessible to the organisation. This would be more the case if the contractor's region has not been affected by disaster. In this way the unaffected contractor organisation can work from a home base with subcontractors and supply chains relatively intact and assist the disaster affected community in a more stable and controlled manner. National firms would be well placed in respect to this initiative. Contractors could send staff, subcontractors and workers to affected areas on a rotating basis to reconstruct affected buildings and facilities. Of course, part of the planning would need to investigate general business, building licencing and statutory requirements of neighbouring regions.

6. Conclusion

This paper set out to investigate how construction contractors can best prepare for post disaster events via the use of strategic operational planning. It is surmised that maintaining contractor business continuity whilst seeking reconstruction opportunities in disaster affected environments is challenging. Hence, broad informed discussion is needed in the development of disaster recovery operational plans. The plans should include strategic intent on aspects such as organisational positioning, leadership structures, project resourcing, communication channels and much more. This will facilitate for better outcomes for business, projects and affected communities.

There will always be the naysayers who claim that disasters are rare so why go through all the time consuming planning. However, adequate preparations would serve the contractor and community well and the disaster itself does not have to be at the catastrophic level for the planning activities to be of valuable use. The benefits of contractor planning include stabilising the contractor's business and current operations, delivering on pre disaster contracts, taking on reconstruction projects in their region and also further away in disaster affected regions in cases where their region has possibly not been unaffected. It's about being flexible and having a plan that creates a ready-to-go mantra. Furthermore, such contingency planning can lead to improvements in routine operations by a compellingly close look at assets and their employment, personnel capabilities, and the innovative melding of their performance characteristics. At another level, planning for disaster events is important so as to reduce hardship and stress for affected people and notably aspects such as compassion, personal integrity and selfless actions as mentioned by Rapp and Baroudi (2014) and Ingirige (2016) should be promoted from the outset.

In conclusion, effective strategies that encourage ongoing development via lessons learned in respect to disaster recovery operations will produce maturity within operational plans and ultimately lead to continuous improvement. This will in turn benefit contractor businesses and organisational and project preparedness providing a greater service to disaster affected communities. It is intended that future empirical research will investigate the current situation in respect to contractor viewpoints on disaster recovery preparedness and report the results in the form of evidence based findings.

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