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A Project Management Approach to Disaster Response and Recovery Operations

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ABSTRACT
In the last decade the world has seen some of the most devastating natural and manmade disasters on record. These include the 2004 Asian tsunami, Hurricane Katrina, 9/11, the Haiti earthquake, the 2009 Victorian bushfires and more recently the Pakistan floods, the Christchurch earthquake and the Japanese earthquake, tsunami and radiological contamination. These disasters require substantial relief and recovery efforts that are in many cases beyond the capabilities of the countries concerned. The discipline of project management is continually gathering interest from varied sectors. Such interest has seen its body of knowledge applied to many diverse fields such as construction, defence, information technology, health, etc. In fact supporters of project management ideology advocate that all management situations should adopt a “management by projects” philosophy. This paper presents a preliminary study in respect to disaster management. It reviews disaster management literature and follows on to provide a commentary on the topic using a project management approach that examines project stakeholders, organisation, lifecycles, processes and the knowledge areas. The intention of the study is to provide a foundation for upcoming collaborative research into the management of disaster related operations. Disaster management efforts have attracted significant criticism in recent times. It is believed that viewing disaster response and recovery operations from a project management perspective could provide a useful approach that may lead to improved outcomes within this very challenging area.

KEYWORDS
project management, disaster relief and reconstruction

INTRODUCTION
The world has witnessed many devastating disasters with recent events still creating massive challenges in this area. Shaluf (2007) contends that disasters can be classified into three types namely natural, man-made and hybrid varieties. The natural types are
created by natural forces such as tsunami, hurricanes and earthquakes and flooding. Man
made types result from human decisions such as building collapses, transport accidents
and war. The hybrid types are a combination of both. Many believe that the occurrence of
disasters is on the increase (Ofori, 2004; Whybark 2007; Kovacs and Spens, 2007).
Hence further research seems worthwhile.
The aim of disaster relief, restoration and reconstruction operations is to mitigate human
suffering and return regions to normality. This is usually a complex undertaking requiring
high levels of management capability and resources availability. Ofori (2004) points out
that disaster situations have a great impact on the built environment and this is
particularly compounded in the case of developing countries. This creates a situation
where economic and social recovery in those regions takes many years with the
consequence being the prolonged suffering of inhabitants.
The application of project management has seen its body of knowledge applied to many
diverse fields including construction, defence, information technology and health.
Publications such as the Project Management Body of Knowledge (PMBoK®) (PMI,
2008) espouse concepts within project lifecycles, techniques, processes and the various
knowledge areas. Many systems exist to manage projects but the underlying concepts
remain the same. A good way to think of project management is in terms of “achieving
project goals with resources available” (Lock, 1994 p. 3). Also, projects typically have
scheduled start and completion points. Furthermore project management dictates that
there should always be a single point of responsibility catering to the many stakeholders
that are involved. Project management is increasingly extending its knowledge to place
greater emphasis on other areas such as soft skills, strategy and sustainability. It is
thought that using a structured project management approach that looks at the concepts
within project stakeholders, organisation, lifecycles, processes and knowledge areas could
be at this time useful to disaster management.
It would appear that there is ample literature regarding disaster management operations,
however, there is little written on the topic that takes a more holistic project management
approach. Hence, the following will review disaster management and then follow on to
provide a project management commentary as applied to disaster situations.

DISASTER MANAGEMENT REVIEW
The following sections review the published literature in respect to disaster management.
The sections cover disaster management concepts in the chronological order of disaster
readiness, disaster relief and disaster recovery.
Disaster readiness

In recent times increased attention has been paid to pre-disaster preparations. Paton and Jackson (2002) contend that fundamental to disaster readiness or preparedness is the planning and developing of appropriate training arrangements. They suggest that there are limited opportunities to actually acquire the experience to deal with disasters so this option can help prepare emergency workers for the challenge.

Moe and Pathranarakul’s (2006) investigations of the 2004 Asian tsunami as it affected Thailand revealed that the country was ill prepared for such an event. It was thought that a disaster management plan would have helped. Such a plan could include the elements of prediction, warning, mitigation and preparedness, clear lines of authority, effective collaboration, education of communities in potential disaster areas and an adequate information base to work from. Furthermore Athukorala and Resosudarmo (2005) studies of the 2004 Asian tsunami as it affected Indonesia and Sri Lanka found response systems to be inadequate. Their assessment of the disaster management process led them to conclude that the public should be better educated about simple safety measures that can be taken during a disaster.

Following the September 11 terrorist attacks in the United States, Perry (2003) suggests that much attention was given to the area of Incident Management Systems (IMS). These systems are basically a way of predicting possible disasters and then planning for the required resources that might be needed in preparation for identified disaster emergencies. Whybark (2007) also looked at how communities can be better prepared. He sees it in two ways. One which highlights the need for required items to be acquired and stored in preparation for when a disaster strikes. The other focuses on planning for the sourcing and distribution of items during the relief operations.

Disaster readiness is believed to be an imperative part of any disaster or emergency management system. This would include planned measures to be taken during and after a disaster event. It should also include preparing the built environment for the possible consequences of disaster via building codes and regulations.

Disaster relief

Disaster relief is the first response during or after a disaster incident. Klein and Weigelt (1991) suggest that once a disaster has struck we cannot expect everything to be seen in its normal context. In fact, they puts forth that the best we could hope for is some form of “controlled chaos”. They also argue that we cannot allow the ethos of goodwill and good intentions to pull us through disaster relief situations. These events must have appropriate planning and management.
Yi and Kumar (2007) contend that there are the two major activities that feature in a disaster response. These are evacuation of the affected and logistics support. Their view is that evacuations are the initial response to remove people from a place of harm or danger. Logistics support is that what is required in the time after the initial disaster incident to help survivors that are still within the disaster zone. This help can be in the form of food, shelter, medicine and getting the wounded to hospital. Kovacs and Spens (2007) describe logistic support in terms of humanitarian logistics. They see it as an umbrella term for various disaster relief operations. They say it covers the initial response as well as continuous support for affected regions. Schneider (2005) suggests that the U.S. government’s initial disaster response to Hurricane Katrina in 2004 attracted widespread criticism. She views natural disasters such as these as extremely challenging management problems and puts forth that such events are enormous in scale, quite complex and can affect large populations. She believes the poor management of Hurricane Katrina’s disaster relief response was due to bureaucratic government systems and an emergency plan that did not cope well with the situation. Moreover, Sobel and Leeson (2007) question why private sector businesses that supply goods and services during disaster relief are much quicker to respond than government agencies such as the U.S.’s Federal Emergency Management Agency (FEMA). It could be argued that the profit motive is stronger than motivations of public sector administrators. However it could quite simply be that FEMA has more issues to manage. Meissner et al. (2002) add that disasters pose great challenges to a region’s public emergency services. Government agencies including police, fire departments, hospitals and military forces are needed as well as the assistance of a myriad of private organisations. These all need to be able to react quickly and in a coordinated manner. Thus they say there is a need for both intra and inter organisation coordination for an effective response to be mounted. Furthermore, it would seem that exercises to train the players in their respective roles and resource planning are critical.

Disaster relief efforts require a region’s government to manage required operations. This management should be inclusive of their agencies, the private sector and the public.

Disaster recovery

Rapp (2010) views disaster recovery as a combination of restoration and reconstruction. Restoration refers to repairing existing structures to their pre-disaster state whilst reconstruction is rebuilding from new. It is the sum of these two activities that place affected regions on the road to recovery. Coles and Buckle (2004) suggest that effective recovery can only take place if the whole community works in behind the effort. However, the community must have the capacity and knowledge to undertake the works.
They go on to say that in recent times disaster management is not seen as much as managing the hazard but as managing the risks involved.

Moe (2010) makes mention on how Hurricane Katrina scattered a large amount of debris from manmade structures and vegetation over a wide area. This amounted to an estimated 85 million cubic metres of debris which had to be cleaned up. The clearing of the debris needs to precede any construction related activities. It was also pointed out that this work accounted for as much as 40 percent of the total disaster rectification cost. The government departments and agencies involved included Defence, Homeland Security and FEMA, Health and Human Services, Environmental Protection Agency, U.S. Army Engineers, U.S. Coast Guard as well as local authorities.

Building restorations would seem the preferred option ahead of reconstruction. Peacock et al. (2007) see it as “restoration of the restorable”. This is basically the repairing and restoring of buildings which have only suffered partial damage. Facilities that do not qualify for restoration must be rebuilt. Armstrong (2000) looks to the U.S.A. for approaches to disaster restoration and suggests that they are more advanced in the area than the U.K. He points out that the U.S.A has organisations that are specifically set up to deal with this sort of remedial work. It is surmised that the market place would govern the viability of these types of organisations within a country or region.

Where restoration is not possible reconstruction activities need to take place. These are deemed much more extensive and time consuming in nature. Baradan (2006) indicates that overall reconstruction periods after a disaster can take anywhere between two and four years. This would likely be dependent on the developed status of the region in question. She states “post-disaster housing reconstruction is a process that is the interaction of complex social, technological and economic factors and actions” (p. 1).

Rehabilitation efforts require decision making on what is to be done and how and an implementation plan is needed. Then the building work can be assessed, quantified and executed as necessary to see recovery in motion. As indicated these stages can take some time. Furthermore, Alexander (2004) puts forth that reconstruction that occurs too quickly after a disaster possibly indicates a lack of conformity and consultation with stakeholders.

Boen and Jigyasuui (2005) contend that with reconstruction projects the cultural background of the affected region should demand significant attention. They argue that all too often money can flow in for disaster recovery operations with the emphasis being on rebuilding structures rather than communities. Therefore they say it important when redeveloping disaster affected areas that professionals take a cultural perspective. Aldrich (2008) demonstrates that the social capital of a stricken area can affect the speed of recovery. Neighbourhoods that are closely knit before the disaster and maintain contact with each other after evacuation will reconstitute themselves quicker. For example, two
years after Hurricane Katrina, ninety percent of the inhabitants of New Orleans’ closely
knit Village de L’Est returned and ninety percent of businesses reopened. The remainder
of the city only witnessed a fifty percent return. Furthermore, Rotimi et al. (2006) suggest
that disaster recovery requires facilitation for capacity building and community
sustainability with the potential of mitigating risk and vulnerability to future disasters.
Disaster recovery requires the integration and coordination of many services to ensure an
orderly progression back to a region’s pre-disaster condition.

PROJECT MANAGEMENT COMMENTARY
The following sections discuss various project management principles as applied to
disaster management operations. Project stakeholders, organisation, lifecycles, processes
and knowledge areas are covered. The intention is to highlight how a project management
approach can provide a useful perspective on disaster situations.

*Project stakeholders and organisation*
A project stakeholder refers to any organisation or person that is influenced or affected by
a situation. With disaster situations the spectrum of stakeholders is seen to be vast. That is
particularly more so in the affected regions. The range of stakeholders that would be
affected by a disaster from a leadership and management perspective would include
government authorities, emergency services, hospitals, utilities, building regulators, etc.
Then there would be other stakeholders that could assist in the efforts and these people
would include engineers, contractors, suppliers, charity, groups, private businesses,
insurers, etc. The largest stakeholder group is the actual affected community at large. One
other stakeholder group worthy of note are the various national and international
contributors from outside the affected area. As can be seen project management on this
scale involves many more stakeholders than most conventional project types.
The various parties referred to above should be seen as the project stakeholders. They all
have a role to play in the course of disaster readiness, relief and recovery. Their actions
are critical to any successful operation within these challenging situations. However,
project management principles dictate that there should only be one single point of
responsibility for all activities associated with managing projects. The project leadership
should undoubtedly come from the government authority charged with dealing with
emergency situations such as FEMA in the U.S. Within disaster management these
people could be seen as the “project managers”. Their responsibilities would include
preparing the project plan inclusive of information in respect to emergency operations
aimed at reducing human suffering, logistics support, coordination of other public and
private organisations pre and post disaster, disaster awareness promotion, community
engagement and various other tasks. However, lessons learned indicate that whilst centralised planning can be effective, success can come only with decentralised execution. That is “power down” as much as possible to get the work done. In the U.S., federal authorities have learnt to resource, facilitate and support local and state efforts rather than to direct them. As such, project planning should adopt this approach and the designated disaster emergency authority needs to ensure that their role is well communicated to all stakeholders.

Post emergency the restoration and reconstruction of damaged property commences. This sub-project should be a government facilitated endeavour using local building authorities assisted by the private sector. Recovery of public buildings, private dwellings and infrastructure would need significant input from regulators and this should include planning for repeat occurrences. Then the nature of market forces would see designers, engineers, contractors, subcontractors and suppliers quickly vie for construction related work.

*Project lifecycle and processes*

All projects contain many interrelated activities. These activities or processes make up the project lifecycle. Viewing disaster management in terms of a project lifecycles could be useful. Examining project lifecycles offers the possibility of dividing the required processes into phases or stages within any project. Each of these phases has many processes that must be undertaken. Their durations are estimated then a sequencing exercise sets out the order of events. Once executed the outputs must match the objectives and associated deliverables as set out within the project plan. These phases are typically described as the project initiation, project planning, project execution and project closure phases.

The project initiation phase consists of instigating the necessary processes. Within disaster management this should occur prior to any events occurring such as establishing the responsible emergency management agency and employing qualified personnel. In project management terms that is establishing the project team. Project planning entails establishing how activities are to be managed in a general sense. For example, in this phase the emergency management project team would need to formulate and document emergency plans and analyse logistical scenarios. The planned deliverables would include reduce human suffering, mitigate after affects, provide essential services and facilitating for work to damaged structures. Project initiation and planning stages are basically the disaster readiness or preparedness aspect of disaster management.

The project execution phase is the implementation stage. Hence, this only occurs when a disaster strikes and a disaster relief response is required. This is quite different to
conventional projects where the intention is that the execution stage almost always needs to take place. In disaster management the execution involves the emergency plan moving into action. The project team then manage, monitor and control activities against documented baselines. The execution phase also extends to the restoration and reconstruction period although various responsibilities may transfer to other agencies for this phase. Note these agencies could possibly fall under the authority of the emergency management project team. Finally, the closure phase marks the finalisation of all processes and activities. For example, final inspections, commissioning facilities, building handovers, documenting outcomes and addressing lessons learned are typical of what should be carried at the end of a “disaster lifecycle”. The project execution and closure stages essentially cover the disaster relief and recovery operations.

With disasters the project lifecycle can be significantly different in approach to other more conventional projects. For example the initiating and planning phases for a disaster can go on indefinitely without an execution or close out phase ever taking place. Furthermore, some processes such as scope planning or work breakdown structures cannot properly occur until the actual disaster event is known. However, comprehensive generic formats could be produced based on previous experience. Then the elements that are needed for the current scope of work can be selected to comprise the project effort.

The timeline associated with disaster management activities can also be viewed in many ways. This is dependent on the type of disaster encountered and the level of development within the affected region. It is thought that a project management approach to disaster situations provides a way of defining phases and required activities within a disaster lifecycle.

*Project management knowledge areas*

Generic project management has many knowledge areas to draw from. For example, PMBoK® (2008) outlines nine knowledge areas dealing with scope, integration, time, cost, quality, human resources, communications, risk and procurement. These and other knowledge areas provide a framework for project managers to assemble their project requirements. Within disaster management the concepts involved could be of assistance.

In project scope management the emphasis is on discovering what is included in the project but also what is excluded. In standard projects this would wholly occur in the initiation phase however, this would not work for disasters. Hence, as previously indicated generic scoping formats could be developed at an early stage and then finalised on the cusp of the execution phase. For example, if a hurricane strikes, in the first instance the prepared scoping formats could determine the regions that have been significantly affected. Hence, this is where the greater relief and recovery efforts need to
be concentrated. Then the generically identified activities could be checked off so as to foster the desired project deliverables.

Time, cost and quality management are often thought of as core objectives within project management. Within disaster management the scale and complexity of operations can have a great impact within these areas. Time management would seem to be of the essence. The response time to mobilise the execution phase into effective operation could be the difference between life and death during disaster relief. Extended timelines during the recovery period could prolong suffering. Cost could possibly be seen as inconsequential during the disaster relief period but then poorer underdeveloped nations would need to source funding to limit harm from disasters. Cost management during restoration and reconstruction requires due diligence with limited resources and tight timelines likely to have significant impact within this area. Quality management is important in the delivery of the required assistance and services to people in need. It is also seen in terms of the restored or reconstructed product being “fit for purpose”. This should also allow improved structures for future disaster challenges. Stringent project control methods are required within time, cost and quality management to achieve desired project outcomes.

Being disaster ready requires human resources and communications management to be adequately considered. Effective human resources management identifies qualified leaders with response teams needing to be acquired and developed. These people need to understand their mission and what resources are available to them to execute their tasks in a time of emergency. Project communications is two dimensional within project management. In one dimension it is the use of appropriate personal communications, e.g. well directed orders, discussion, negotiation. The other dimension takes the form of documented communications, e.g. emergency plans, maps, drawings, reports. Both are required in approaching disaster situations appropriately.

The area of risk analysis within project management seeks to identify, assess, mitigate and control uncertainties. The area is highly relevant to disaster situations carrying dire consequences if mismanaged. For example, could better risk analysis have foreseen the possibility of New Orleans levees failing as occurred during Hurricane Katrina? As such, the processes within risk management are particularly important during the disaster readiness stage. The project team needs to be able to identify possible disaster scenarios and effective response strategies to alleviate potential suffering and damage. Risk management is also critical during the disaster relief stage to ensure challenging situations are kept under control. For example the recent Japanese situation of controlling radiological contamination due to damage by the tsunami is evidence of how critical risk management is in this area. Risk in other more conventional fields pale in comparison.
Risk management during the recovery stage is thought of in terms of that similar to general business risk management.

Project procurement is basically the external sourcing of all goods and services required to carry out the work within a project. In disasters this would essentially involve government agencies such as an emergency response project team procuring contractors and suppliers to assist with disaster relief operations. It would also include sourcing of requirements for restoration and reconstruction activities by the various stakeholders. The procurement area could include anything from medicines, food supplies, and temporary shelters to transport, machine hire, consulting engineers, building contractors and suppliers.

Other broader areas such as soft skills, safety management, human ethics, cultural management and sustainability are also of possible interest in disaster situations. These areas could influence the style of project management applied to disaster response and recovery operations.

CONCLUSIONS

The above review and commentary provides for a preliminary study into disaster response and recovery operations using a project management approach. The study essentially looked at various disaster management findings from around the world and then used project management concepts as a lens to examine various aspects.

Current disaster management concepts can be broadly placed into the areas of disaster readiness, relief and recovery. Disaster readiness was found to be an important part of disaster management. Planning for the potential effects of a disaster at least provides a strategy if such an event occurs. This planning flows into the disaster relief operations possibly allowing for better outcomes than might have otherwise been experienced. The recovery stage allows for reconstruction activities to take place and is inclusive of restoration work where possible.

Project management knowledge provides many industries and fields with a framework to deliver desired outcomes from complex and challenging situations. It is thought the same could apply to disaster situations. Having understandings in the workings of projects and the application of associated concepts can prove useful. This could be in the form of identifying stakeholders, mapping lifecycles, driving processes or applying knowledge areas. It is thought that project management best practice has many tried and proven techniques which could assist within disaster situations.

In concluding, natural and manmade disasters do present enormous challenges. This is evident within recent events where disasters have caused harm to people, the natural environment and the built environment. Hence, it is important that investigations continue
to discover improved ways to manage the effects of disasters. This preliminary study provides a base for upcoming collaborative research integrating disaster situations and project management.

REFERENCES


