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Breaking the vicious cycle of flood disasters: Goals of project management in post-disaster rebuild projects

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Abstract

Korea has witnessed a significant number of post-disaster rebuild (PDR) projects following flood damages caused by unforeseeable super-typhoons. Efforts to improve the management performance of such projects are mostly limited to the development of several administrative guidelines for faster construction starts to avoid secondary damage from subsequent typhoons. However, no explicit and comprehensive studies have thus far been initiated to identify the causes of low performance outcomes of flood PDR projects in quantitative and qualitative ways. Hence, this study performed macro- and micro-level analyses to provide an overall view of the performance of flood PDR projects as well as created a comprehensive cause and effect (C&E) diagram, which reveals 12 major factors and 19 sub-factors adversely affecting the project outcomes. The findings of this study are expected to be useful in improving current project management capability as well as relevant laws and regulations both in Korea and in developing countries.

Keywords: Post-disaster; Rebuild; Flood; Typhoon; C&E; Performance

1. Introduction

In many parts of the world, natural disasters such as floods, tornados, hurricanes, volcanic eruptions, earthquakes, and landslides have led to considerable loss of human life and tremendous socioeconomic costs. Obviously, such events have also had a negative impact on the already deteriorating ecosystem (ISDR, 2001). With the exceptions of volcanic eruptions and earthquakes, most of these disasters are caused by persistent and abnormal climate changes, which lead to unexpected situations characterised by uncommon complexities and widespread uncertainty. Examples of recent natural disasters and extreme weather events that have caused widespread devastation are the Tohoku Earthquake and the Tsunami in Japan in March 2011; the floods and mudslides in Rio de Janeiro in January 2011; the severe heat wave in the Northern Hemisphere from May through August 2010; the earthquake in Haiti in January 2010; Cyclone Nargis in Myanmar and the Sichuan Earthquake in China, both in May 2008; Hurricane Katrina in New Orleans, US, in August 2005; and the Indian Ocean Tsunami in December 2004 (Debby et al., 2011; Wikipedia, 2008).

The Korean Peninsula has also been susceptible to such natural disasters. Spring season in this area is characterised by drought, yellow dust, and record low and high temperatures; summer in the area is characterised by numerous typhoons and localized torrential downpours. The typhoons continue into autumn, and subsequently, winter experiences cold waves and heavy snowfall. Natural disasters and extreme weather events are actually no longer annual events but can almost be considered as chronic conditions that persist throughout the year. According to Kim Tae-Ryong, Director of the National Typhoon Centre of the Korea Metrological Administration (Dongailbo, 2011), seasonal typhoons cause the greatest damage among all the natural disasters that strike Korea annually.

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The Director has also noted that although the frequency of typhoons is decreasing, their intensity is increasing; in addition, typhoon damage in the new millennium was 11.7 times that in the 1980s. Overall, natural disasters occurring in Korea are increasingly being characterised by far greater severity and intensity and unseasonal occurrences. These observations have recently led the Korean government to initiate an overall reappraisal of the national disaster prevention system and recovery process with a special emphasis on mitigating flood damages caused by typhoons—the nation's most commonly occurring and most severe natural disaster (CRED, 2011; KEI, 2008).

Several experts advise that for effective flood disaster prevention and recovery, it is preferable to prepare for disaster prevention than to focus on post-disaster rebuild (PDR), because the possible occurrence of unforeseen major disasters is on the rise. The justification for this advice is that from 1997 to 2006, the annual average property damage was 1.82 billion USD, whereas the annual recovery cost was 2.87 billion USD (i.e. 1.5 times the property damage) (Dongailbo, 2011). A PDR project can be conceptualized as a dynamic process in which the roles of various stakeholders are significantly overlapped and various project resources such as labour, materials, and equipment are concentrated in a limited time and space. Prieto and Whitaker (2011) insisted that post-disaster project management activities are modified from non-disaster activities inducing significant changes to the fundamental project model employed to the management of PDR project. The post-disaster project management activities require a fundamental re-think of skill sets, management processes, risks and constraints. They suggested three key themes; 1) government and NGO community must plan for assisting in PDR, 2) engagement with engineering and construction community must begin at pre-disaster stage for earlier contracting (i.e., program management and EPC), mobilization to disaster zone, and activation of logistics chains. Rapp (2011) discussed some parameters what can make recovery work so different and challenging from non-disaster projects by categorizing the dimensions of contractor performance into four areas: schedule, budget, quality, and safety. Some of the key features are little time for detailed planning, faster consumption of money, increased importance of industry consensus standardized restoration, greater indirect cost due to multitude of interaction between stakeholders, and safety neglect due to the sense of urgency.

The performance of a PDR project varies over time and space owing to socioeconomic and political factors as well as a multitude of decisions made before, during and after a disaster (Brown et al., 2008; Olshansky et al., 2003). According to the Project Management Institute (PMI) (2005), a clear methodology (i.e. post-disaster rebuild methodology, PDRM) for implementing established principles of project management and sub-processes for impossibly long lists of reconstruction priorities are essential prerequisites for staying organized and focused and for satisfying the needs of the local community at risk of natural disaster. Rubin (1985) suggested that reconstruction work should be carried out both at high speed and with high quality to ensure proper functioning of the local economy and to prevent further losses. Masurier et al. (2006) insisted upon a fast and efficient contractual framework for PDR projects. New forms of procurement, such as partnering and construction management (CM), can be applied to PDR projects, which are characterised by factors such as extensive damage, multiple stakeholders (e.g. national and local governments, several engineering contractors, insurance companies, private organizations, and individuals), limited restoration budgets and project timelines, urgent construction, lack of capable project managers, involvement of small local engineering and construction companies, and sudden demands owing to civil complaints. Wilkinson et al. (2006) asserted that the influx of technical and administrative support from private engineering and construction sectors into entire processes over the life cycle of the PDR project can greatly enhance the efficiency and predictability of the project as opposed to simply operating on an ad-hoc basis. Choi and Yu (2004) compared the CM project applied to an urgent typhoon reconstruction project to similar projects with the aim of illustrating the applicability of the CM approach. They concluded that the CM approach might be more beneficial in improving the time performance of the project than its cost performance.

In addition, some experts emphasize the importance of starting a construction faster in PDR projects, since a significant number of construction work zones in such a large-scale project often cannot meet the scheduled completion date and are thus severely affected by secondary damage caused by typhoons in succeeding years (Kim, 2004). Above all, fast recovery in a PDR project is important because it leads to prompt stabilization of disaster victims and early recovery of damaged infrastructure. For these reasons, in Korea, the main area of focus in terms of disaster response in the past was mainly setting up a series of administrative guidelines to ensure faster construction starts and transparent budget execution. However, only a few studies and qualitative and quantitative analyses have been conducted to determine how well these guidelines are being followed and to examine important achievements and challenges from past experiences to maximize the outcomes of future PDR projects. The understanding of what causes PDR project to be inefficient is far from comprehensive. This study helps fill such gaps in the research on PDR projects. We expect the lessons learned from this study to add to the knowledge about project management in the PDR setting and to be useful in improving relevant laws and regulations both in Korea and in developing countries.

2. Research methodology

This study was conducted using two primary methodologies: macro-level and micro-level analyses of flood PDR projects. Macro-level analysis involves the study of a group of sample flood PDR projects, whereas micro-level analysis involves the study of just one particular flood PDR project. The projects subjected to both these analyses in our study were limited to real flood PDR projects specifically initiated