

# Risk Management For High Rise Building

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**Abstract-** *This Sustainable development and Risk mitigation are mutually necessary preconditions. Natural Risk s hinder the advancement and accomplishments of sustainable growth, whilst the physical infrastructure we are developing which become a source of risk in the event of future Risk s. This is especially true in earthquakes, where the majority of casualties are killed by the collapse of their own homes. Risk management is a pressing issue for all of us in terms of environmental destruction, human interference, and security issues, and it should be viewed holistically. Communities at risk are encouraged to participate in all phases of the approach: prevention, mitigation, preparedness, response, and recovery. To create Risk -resilient societies, people must first be motivated so that they can cope with the negative effects of natural Risk s. This is the most successful tool for ensuring long-term sustainability in the face of natural Risk s. UNCRD is introducing a variety of community-based projects aimed at establishing Risk reduction as a critical component of long-term development. Its activities include ensuring the protection of key community facilities such as colleges, disseminating best practices in Risk management at the community level, and implementing comprehensive Risk management strategies for sustainable growth.*

**Keywords-** RISK MANAGEMENT, HIGH RISE BUILDING, earthquakes

## I. INTRODUCTION

Risk Management, Risk s are seen as the effect of hazards on vulnerable areas. Hazards that occur in areas with low vulnerability do not result in a Risk. Depending on the intensity and severity of the Risk the normal needs and processes are badly affected and deteriorated.

### 1.1 Fundamentals of Risk

This module provides a common starting point for understanding and discussing Risk s, Risk management, and Risk preparedness as part a National Society's mission, and discusses the potential scope of Risk preparedness measures. This module is appropriate for anyone who has general responsibilities for Risk management and programme implementation. Non-technical personnel interested in

acquiring a better understanding of Risk preparedness and the strategies and measures that may be implemented as part of a preparedness plan can also benefit from reading this module.

- How Risk preparedness fits into the work of the International Federation and National Societies
- The overarching aims and objectives of Risk preparedness
- Definitions of the term's hazards, Risk s and vulnerability
- Identification of different types of Risk s
- The scope of Risk preparedness measures
- The concept of community-based Risk



Fig 1 management system

### 1.2 Overview of Risk preparedness

Risk preparedness refers to measures taken to prepare for and reduce the effects of Risk s. That is, to predict and—where possible—prevent them, mitigate their impact on vulnerable populations, and respond to and effectively cope with their consequences. Risk preparedness is best viewed from a broad perspective and is more appropriately conceived of as a goal, rather than as a specialized programme or stage that immediately precedes Risk response. Risk preparedness is a continuous and integrated process resulting from a wide range of activities and resources rather than from a distinct sectoral activity by itself. It requires the contributions of many different areas—ranging from training and logistics, to health care to institutional development.

To promote and encourage the science and practice of conceptualizing, planning, designing, constructing, caretaking and maintaining built environment, by adopting the latest standards, State of the Art practices, use of innovative and new materials. To review and make suggestions to the Government for improving the built environment, working

conditions and general welfare of construction workers and to provide a channel for expression of collective opinion of members on the matters relating to built environment, achieving the following aims:

Increasing the efficiency, effectiveness and impact of Risk emergency response mechanisms at the community, national and Federation level. This includes: the development and regular testing of warning systems (linked to forecasting systems) and plans for evacuation or other measures to be taken during a Risk alert period to minimize potential loss of life and physical damage the education and training of officials and the population at risk the training of first-aid and emergency response teams the establishment of emergency response policies, standards, organizational arrangements and operational plans to be followed after a Risk

- Strengthening community-based Risk preparedness through National Society programmes for the community or through direct support of the community's own activity. This could include educating, preparing and supporting local populations and communities in their everyday efforts to reduce risks and prepare their own local response mechanisms to address Risk emergency situations
- Developing activities that are useful for both addressing everyday risks that communities face and for responding to Risk situations—for example, health, first aid or social welfare programmes that have components useful for Risk reduction and response.

### 1.2.1 Risk preparedness and the Red Cross and Red Crescent Movement

The purpose of the International Red Cross and Red Crescent Movement, as embodied in its Constitution and the principle of humanity, is to prevent and alleviate human suffering wherever it may be found, to protect life and health and ensure respect for the human being. Risk preparedness fits within this overarching purpose and has been identified in IFRC's Strategy 2010, as one of the "core areas" that National Societies should prioritise and integrate into their overall programming efforts.

Many people and agencies take part in emergency response operations including local populations and community-based organizations, Civil Defence and national emergency structures, fire brigades, Red Crescent/Red Cross Societies, international agencies, NGOs and others. The International Federation and National Societies need to recognize that Risk preparedness, particularly in terms of post-Risk response, is primarily a government responsibility but

that the National Society, as an auxiliary of the public authorities, can also make an important contribution. Therefore, National Societies should Introd.doc June 2000 6/20 Risk Preparedness Training Programme International Federation of Red Cross and Red Crescent Societies communicate and coordinate their plans with those of other government agencies and nongovernmental organizations involved in Risk preparedness and response. This will improve planning, reduce duplication of efforts, make plans more realistic and increase the overall effectiveness of NS Risk preparedness and response efforts.

### Objectives

1. To identify the prevention and damage control system for Risk.
2. To study various equipment's, structural elements and materials used for Risk management.
3. To develop activity-based schedule in MSP for Risk management cycle including cost estimate.
4. **To identify the risk reduction factors for man-made Risk such as terrorist attack.**

## II. LITERATURE REVIEW

**2.1 Miller, Holmes E.; Engemann, Kurt J.; and Yage, Ronald R. (2006) "Risk Planning and Management," *Communications of the IIMA*: Vol. 6: ISS. 2, Article 4**

Recent events such as hurricanes, tsunamis, earthquakes, power outages, and the threat of pandemics have highlighted our vulnerability to natural Risk s. This vulnerability is exacerbated by many organizations' increasing dependence on computer, telecommunications, and other technologies, and trends toward integrating suppliers and business partners into everyday business operations. In response many organizations are implementing Risk recovery planning processes. In this paper we discuss how to identify threats and scenarios; how to articulate the Risk recovery strategies; and four elements of the generic Risk recovery plan: Mitigation, preparedness, response, and recovery. We then provide examples of software that can help Risk recovery professionals in the planning and implementation process. Finally, we present some trends that will reinforce the criticality of the issue.

**2.2 Ben Wisner<sup>1</sup>, Ben Wisner<sup>2</sup>, J.C. Gaillard<sup>3</sup> and J.C. Gaillard<sup>4</sup> University College London, UK, 2 Oberlin College, USA, 3 University de Grenoble, France and 4 University of the Philippines Diliman,**

**Philippines Jamba : Journal of Risk Studies, Volume 2, Issue 3, Dec 2009, p. 151 – 158 ’**

Integrated Risk management is a lofty and ambitious goal. It would bridge scales from the global to the local, involving a wide range of actors or stakeholders. It would draw on local as well as outside specialist knowledge, and this external knowledge would come from a wide array of professional and scientific fields from economics and the social sciences to the earth and biological science and engineering, public administration and communication. Above all the word ‘integration’ implies that established distinctions are bridged, such as between planning for development and planning for Risk management. This paper argues that over the past ten years some progress has been made in laying out the road map, but that we are not there yet. In fact, the journey has only begun. There have been key events that have motivated people to seek IDRiM such as the Indian Ocean tsunami and Haitian earthquake and their aftermaths. New institutions have been created that have the potential to move us toward IDRiM such as UN-ISDR. Finally, a series of concepts have emerged from many reports, evaluations, and research. These ideas are discussed, and the challenge for the next 5-10 years mapped out.

**2.3 Katsuya YAMORI’ Action Research on Risk Reduction Education: Building a “Community of Practice” through a Gaming Approach’ Volume 30, Number 2, 2009**

This paper reports a research study on Risk reduction education, at both a senior high school and in a local community in Japan. The research was guided mainly by the theory of “community of practice (CoP)” proposed by Lave and Wenger (1991). This theory provided a useful framework by which we achieved long-term and collaborative learning in Risk education, to deal with natural Risk s with a long return period. A gaming approach was introduced in this year-long action research project, as a key medium to realize long-term and cogenerative learning by diverse stakeholders, ranging from high school students, local residents, local government workers, and Risk experts. This gaming approach covered the whole process, from co-planning, co-production, and co-dissemination of game-like education materials. The results suggested the clear superiority of cogenerate Risk education (along with a transformation of CoP structure) over conventional, knowledge internalization-oriented Risk education.

**2.4 Palliyaguru, R.’ Policy Implications of Integration of Risk Reduction to Infrastructure Reconstruction’ Journal of Risk Studies 5, pp 1 - 10 (2013)**

Infrastructure facilities need to be planned and constructed in such a way not only to change the vulnerable conditions of the infrastructure facility itself but also the society, the economy and the environment. Literature emphasises that integration of Risk reduction (DRR) to planning processes is a key to reduce natural Risk losses, boost socio-economic development needs and ensure sustainability in development gains. But linking development concerns and DRR to infrastructure reconstruction has become a challenge in developing country settings. Therefore, the purpose of the main research, of which this paper is based on, is to explore how integration of DRR to infrastructure reconstruction could contribute to socio-economic development process. However, this paper focuses on the existing gap in the concept of DRR at the policy making level and the construction project level. Thus, the paper seeks to review the current policies on post-Risk reconstruction and DRR at the national and intermediate-organisational level and integration of DRR concept within these policies. Not limiting to the policies, those were assessed on their success through the level of implementation of them at the post-Risk infrastructure reconstruction projects. This paper is based on data collated from a case study conducted in a water supply and sanitation reconstruction project in Sri Lanka supported by expert interviews among national and intermediate-organizational level policy makers.

**2.5 Mohammad Farajzadeh1’Preparedness of Nurses for Crises and Risk s in Imam Khomeini and Social Security Hospitals of Saqqez’ International Journal of Medical Research & Health Sciences, 2016, 5, 9S:471-478**

Risk s outside of human control can severely affect public health. In addition, the lack of appropriate planning and preparedness to face Risk s can exacerbate the problems emerging from Risk s. The current study aimed to determine the preparedness of nurses in facing Risk s. Materials and Methods: This was a cross-sectional study conducted on 257 nurses of the Imam Khomeini and Tamin Ejtemaei hospitals of Saqqez in 2017 using the census method. Demographic forms and a questionnaire consisting of knowledge, attitude, and performance were used to collect data. In this study, there were 86(33.5%) men and 171(66.5%) women with the mean age of 33.9±7.3 years. The mean score of knowledge (36±11.9), attitude (65.3±11.02), performance (51.9±27.5), and preparedness (153.2±31.3) were higher than that of the average values. The result showed that knowledge was correlated with age (P=0.010). Also, there was a correlation of attitude with marriage (P=0.017) and performance with gender (P=0.0103) and management experience (P=0.002). The result of the study showed that the score preparedness of the nurses was average, which was undesirable. It is recommended that

the nurses should be provided continuous training to deal with Risk s by creating an appropriate environment and motivating them to improve preparedness conditions.

## 2.6 Dr. Priyanka Banerji' Comparative Analysis of Risk management between Japan & India' Volume 13, Issue 6

Natural Calamity is a bitter truth from which no one can escape. So many deaths, diseases, economic and social loss are few results of natural calamity. Risk is on the rise all the way through the world. The economic losses and the number of people who have been affected by natural calamities have increased significantly over the past decades than the population growth, which slows down the economic growth of the affected country. The physical, social, particularly the emotional aspect and economic losses caused by these Risk s are particularly more expensive for developing countries. To minimize the damages caused by Risk s, various efforts have been taken by government, society, NGO's and international communities. Despite highest Risk preparedness by Japanese Government, on March 11, 2013, northeastern part of Japan has been severely devastated by magnitude 9 earthquake followed by tsunami (called Tohoku Earthquake) which killed 25,000 people, 50,000 people missing and made 250000 people homeless and preliminary loss of lives and properties worth of \$310 billion dollars. The severity of the Risk was beyond imagination which caused such big damage of valuable lives and properties. Even as horrific Risk that struck Japan continues to linger in our minds, one cannot but wonder what would happen if a similar Risk were to strike India?

### III. METHODOLOGY

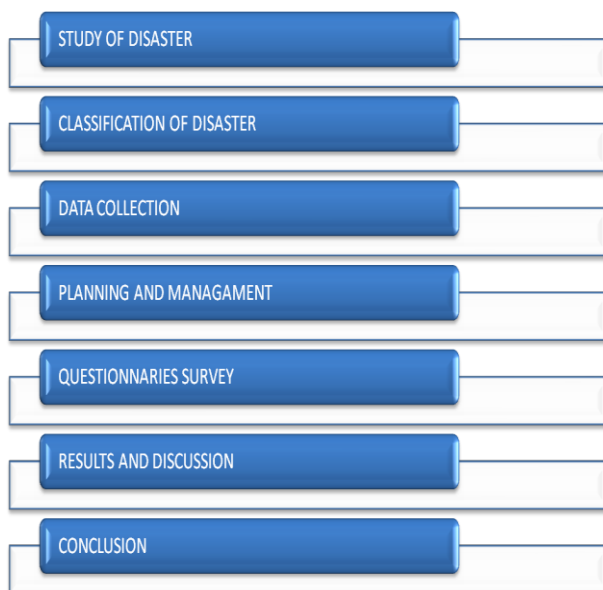


Figure 3 methodology

### 3.1 introduction:

Risk management is the discipline of dealing with and avoiding both natural and manmade Risk s. It involves preparedness, response and recovery in order to lessen the impact of Risk s. All aspects of emergency management deal with the processes used to protect populations or organizations from the consequences of Risk s, wars and acts of terrorism. Risk management doesn't necessarily avert or eliminate the threats themselves, although the study and prediction of the threats is an important part of the field. The basic levels of emergency management are the various kinds of search and rescue activity. Risk management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of Risk s.

### 3.2 Here are few Risk management techniques that can be useful in reducing the damage caused

Prevention is better than cure. Risk prevention is the first and foremost thing one can do. Be prepared according to the natural Risk s that may occur according to the locality area. Know the hazards in your area and know the risk. The information about natural hazards, their occurrence and effect should be known according to the location, region, etc. Geographical information systems (GIS) play a crucial role in this criterion.

Social media is a great tool now-a-days, make use of it. Social network can help in communicating with those who are aware and can help you, before or during a Risk.

Know about your nearby community officials and government servants who can help you and your neighbors in evacuating the place and also announce a 'mandatory evacuation' in the hazard prone area.

Identify your nearest local media sources so that they provide valuable information and useful safety measures to people living in the area. Make sure you have a stock of first aid kit or a go-kit that helps you and your family during a Risk. If possible, make sure you have stock pile of medication, food and enough water for at least 3 days during the Risk.

In order to make sure you are not affected by the hazards, be in touch with any of your friends or relatives who stay far from you or from the Risk hit area. So that when you are evacuated, you are least affected in any terms. Raising your home, buying flood insurance, securing heavy furniture to the walls all are a part of mitigation, and these help in reducing or eliminating the impact caused by the Risk s.

Make sure you are adaptable to the environment or surrounding that you are evacuated to, so that no day of your work is missed out in case it takes long time for your previous area where you have lived to cope up from the Risk effect.

Making use of Remote sensors in natural hazard assessments with the help of satellites or sensors mounted to aircrafts. They are very helpful in showing the evidences for occurrence and presence of the Risk s according to the geographical, geological and hydrologic and natural phenomena.

Public awareness is the most important one in Risk management. Development, planning and management will only be possible with the people being aware of the natural hazards and safety measures that are to be followed during or before a Risk. The study or knowledge on Risk management helps in taking good decisions regarding buying homes, building and living in hazard-prone areas.

#### **Risk management applied in present case study:**

**Risk is classified for earthquake, fire and flood following provisions are provided in present building to do so**

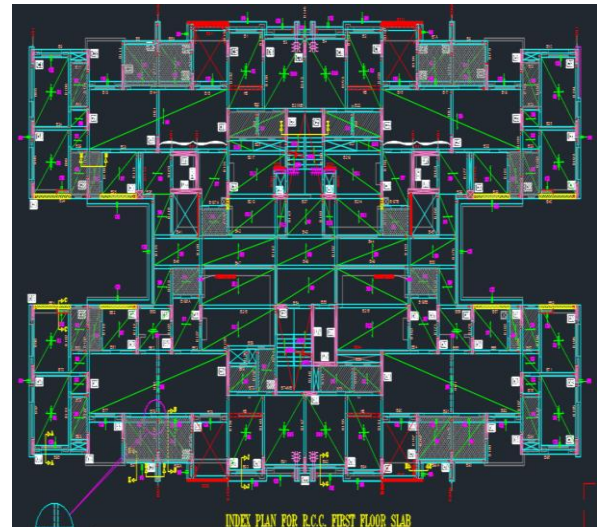
#### **-1. Refuge Area**

An area of refuge is a location in a building designed to hold occupants during a fire or other emergency, when evacuation may not be safe or possible. Occupants can wait there until rescued or relieved by firefighters. This can apply to the following:

any persons who cannot access a safe escape route  
any persons assisting another person who is prevented from escaping

- patients in a hospital
- sick people
- people with disabilities
- old people
- very young children or infants
- medical personnel who may be operating on a patient at the time of the emergency

operators in a critical facility whose function must not be interrupted (such as nuclear power station, a key military fortification, or a high security prison



**Figure 3. Shear wall**

#### **2. shear wall:**

Shear wall is a structural member used to resist lateral forces i.e., parallel to the plane of the wall. For slender walls where the bending deformation is more, Shear wall resists the loads due to Cantilever Action. In other words, Shear walls are vertical elements of the horizontal force resisting system.

In building construction, a rigid vertical diaphragm capable of transferring lateral forces from exterior walls, floors, and roofs to the ground foundation in a direction parallel to their planes. Examples are the reinforced-concrete wall. Lateral forces caused by wind, earthquake, and uneven settlement loads, in addition to the weight of structure and occupants, create powerful twisting (torsional) forces. This leads to the failure of the structures by shear.

Shear walls are especially important in high-rise buildings subject to lateral wind and seismic forces. Generally, shear walls are either plane or flanged in section, while core walls consist of channel sections. They also provide adequate strength and stiffness to control lateral displacements.

The shape and plan position of the shear wall influences the behavior of the structure considerably. Structurally, the best position for the shear walls is in the center of each half of the building. This is rarely practical, since it also utilizes the space a lot, so they are positioned at the ends. It is better to use walls with no openings in them. So, usually, the walls around lift shafts and stairwells are used. Also, walls on the sides of buildings that have no windows can be used.

#### **3. Fire Extinguisher:**

A fire extinguisher is an active fire protection device used to extinguish or control small fires, often in emergency situations. It is not intended for use on an out-of-control fire, such as one which has reached the ceiling, endangers the user (i.e., no escape route, smoke, explosion hazard, etc.), or otherwise requires the expertise of a fire brigade. Typically, a fire extinguisher consists of a hand-held cylindrical pressure vessel containing an agent which can be discharged to extinguish a fire. Fire extinguishers manufactured with non-cylindrical pressure vessels also exist but are less common.

There are two main types of fire extinguishers: stored-pressure and cartridge-operated. In stored pressure units, the expellant is stored in the same chamber as the firefighting agent itself. Depending on the agent used, different propellants are used. With dry chemical extinguishers, nitrogen is typically used; water and foam extinguishers typically use air. Stored pressure fire extinguishers are the most common type. Cartridge-operated extinguishers contain the expellant gas in a separate cartridge that is punctured prior to discharge, exposing the propellant to the extinguishing agent. This type is not as common, used primarily in areas such as industrial facilities, where they receive higher-than-average use. They have the advantage of simple and prompt recharge, allowing an operator to discharge the extinguisher, recharge it, and return to the fire in a reasonable amount of time. Unlike stored pressure types, these extinguishers use compressed carbon dioxide instead of nitrogen, although nitrogen cartridges are used on low temperature (-60 rated) models. Cartridge operated extinguishers are available in dry chemical and dry powder types in the U.S. and in water, wetting agent, foam, dry chemical (classes ABC and B.C.), and dry powder (class D) types in the rest of the world. Fire extinguishers are further divided into handheld and cart-mounted (also called wheeled extinguishers). Handheld extinguishers weigh from 0.5 to 14 kilograms (1.1 to 30.9 lb), and are hence, easily portable by hand. Cart-mounted units typically weigh more than 23 kilograms (51 lb). These wheeled models are most commonly found at construction sites, airport runways, heliports, as well as docks and marinas. In case study one fire extinguisher is provided at each floor.



Fig 4. Fire Extinguisher

Factors missing for Risk management for present case study:

The following factors are missing in case of Risk management in case study:

- Fire sprinkler are not provided in present case study which are more effective than Fire Extinguisher.
- Proper schedule training of residents for Risk management is not provided.

#### IV. CONCLUSIONS

- In this project so far concept of Risk management is studied. Firstly, Risk is classified in to Risk due to earthquake, fire and tsunami waves.
- It is found that in PMC area the Risk management is required which include refuge area and provision for fire safety which covers natural Risk. Although some manmade Risk such as terrorist attack is not covered yet.
- For Risk analysis IS1893:2016 is used in which earthquake zones are mentioned. For present case study the location is pune hence it includes in zone no.3 as per IS code.

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