

PROJECT MANAGEMENT FOR AN EARTHQUAKE RISK RESPONSE

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ABSTRACT: Risk management is the process of identification, measurement, and risk assessment, followed by development of strategies for risk management. The essence of risk management process is represented by a series of five steps: setting the context; risk identification; risk analysis; risk evaluation; risk treatment. Emergency situation - exceptional event, of a nonmilitary nature, that by scale and intensity threatens the lives and health of the population, environment, important materials and cultural values and to restore normality urgent measures and actions are necessary, the allocation of additional resources and unified management of forces and means involved. Project management is the application of knowledge, skills, instruments and techniques on the project activities to meet its requirements.

KEY WORDS: Risk Management, Emergency Situation, Earthquake, Project Management, Project Statement, General Objectives of the Project, Work Breakdown Structure

1. INTRODUCTION

1.1 Risk management general elements

In the past, were developed several theories on the causes of accidents and risk control, although anticipating some accidents does not seem possible, many people have studied accidents to determine causes that lead to their appearance. It was considered that by understanding the causes which caused various accidents, people are able, to a greater extent, to prevent future accidents by removing these causes.

Risk management (Bujoreanu, Julian, 2006) - which is practiced at a level not far from new to Romanian governmental organizations - should be approached in an integrated and systemic way, with greater emphasis on consultation and communication with social and public stakeholders, in general. In present days, the risk management can be seen as a problem of wide interest in any organization that, in coordination with other organizational initiatives, will enable the improvement of decision making process.

Risk management is the process of identification, measurement, and risk assessment, followed by development of risk management strategies (internal/organizational management).

Traditionally, risk management focuses on risks that are rooted in physical or legal causes (for example: natural disasters or fires, accidents, legal actions). Financial risk management, for example, focuses on risks that can be managed by using financial instruments. Whatever type of risk management involved, organizations have (or should have) risk management teams to practice risk management activity.

1.2. Risk management – in a current approach

The Objective faced with the risk management is to identify and control significant risks. This implies the existence of several key stages, with feedback in monitoring process.

The essence of risk management process is represented by a series of five steps (sub-process): a) setting the context; b) risk identification; c) risk analysis; d) risk evaluation; e) treatment of risk.

2. EMERGENCY SITUATIONS AND TERRITORIAL RISKS

2.1. Emergency situations

Emergency situation - exceptional event, nonmilitary nature, that by scale and intensity threatens the lives and health of the population, environment, important materials and cultural values and to restore normality are necessary measures and urgent action, the allocation of

additional resources and unified management of forces and means involved;

Types of risk - fires, earthquakes, floods, accidents, explosions, damage, landslide or collapse of land, mass illness, collapse of some buildings, facilities or arrangements, failure or sinking ships, objects falling from the atmosphere or of outer space, tornadoes, avalanches, failure of public utility services and other natural disasters, serious sinister or large public events caused or favored by a specific risk factors;

2.2. Plan analysis and risk hedging (PARH)

PARH is the document that contains the potential risks identified in a county or its components (city, town, and commune), institution/business operator, measures, actions and resources to manage those risks.

PARH is the legal document that includes: Risk factors and their types identified in the administrative-territorial units; Measures, actions and resources needed for management and emergency situations management to prevent and/or remove (counteract) negative effects of such exceptional events.

Thus, among The Annexes of PARH can be found plans and intervention procedures, which is itself the answer to that type of risk.

How the management of emergency situation caused by earthquake is functioning

Risk types management for emergency situations generators spread over different ministries and other central public institutions (Government Decision no. 2288/2004).

Ministry of Interior coordinates emergency management at the central level, through General Inspectorate for Emergency Situations and at the territorial level, through the county inspectorate for emergency and of Bucharest.

Conduct of operative intervention in case of a specific emergency situation is done by legal authority with duties and responsibilities entrusted with the design, planning, organization and control in this area, namely the prefects, mayors and executives of economic operators and public institutions under the law.

Data on the risks of earthquake, necessary for risk evaluation

The categories of buildings most vulnerable in case of a strong earthquake are: Tall buildings (7-12 levels) with reinforced concrete frame, built before 1940 without earthquake protection; Construction completed between 1950 and 1976 under existing design norms that have been designed with consideration of lower seismic forces; they have performed satisfactorily in

1977 (the last strong earthquake in Romania) but some cases (for example those with flexible floor) have suffered more damage; Low brick buildings and other local materials traditionally built without specialized technical control.

TECHNOLOGICAL RISK

- a. *Industrial*
- b. *Transport and storage of dangerous goods*
- c. *Water pollution*
- d. *The failure of public utilities*

BIOLOGICAL RISKS

Epidemics are widespread and spreading in a short time of a disease transmissible to humans, leading to erosion of the health of people and disrupting economic activities, social and otherwise. The outbreak is due to deleterious effects caused by specific action on human pathogens.

2.3. Response to types of territorial risk by project management

Project management is the application of knowledge, skills, instruments and techniques on their project activities to meet requirements.

Project management is achieved through the application and integration of **project management processes: *initiating, planning, execution, monitoring, control*** and *closure*.

3. PROJECT MANAGEMENT FOR AN EARTHQUAKE RISK RESPONSE

The project fits into the concept of local management of emergency situations, seeking lines of organization and functioning of the National System of Management of Emergencies, namely: prevention and emergency management, insurance and coordinate human, material, financial and otherwise needed to restore a state of normality.

As part of the National System, the so-called local system is organized by the local government, consisting of a network of organizations, bodies and skill in emergency situations management, set up by level or area of competence, which has the infrastructure and the resources required to perform under specific legislation.

Vision: Getting a credible earthquake response capability in emergency situations at the local level;

Strategy: Browse all necessary steps to be taken by those responsible for ensuring an efficient and effective response in emergency situations at the local level.

Strategic objectives:

- Risk Management taken step by step;

- Achieving territorial risk map related to the city;
- Risk analysis for an earthquake in the city;
- Answer to the identified risks (Earthquake Response Plan);
- Monitoring and control of risks to the earthquake in the city.

STATEMENT OF WORK (Mission):

The project team plans to legally base (or based on good practice, where there are no clear rules) all the project team. Project aims to rationally exploit the full potential of the relief, economic and social characteristics given by the area of interest to efficiently and effectively managing risk. Project team puts first the protection of human, material values and the environment. The project team proposes that the project results become references of good practices at the county level (a model for other local emergency committees in the county).

STATEMENT OF PURPOSE OF PROJECT:

- **Justification for the project:** the need to prepare the response actions in case of a major earthquake;
- **Product of the project:** capacity and response capability consistent and comply with existing legislation;
- **Deliverables of the project:** analysis and risk evaluation, response plan (and training), register of risks, knowledge deposit; (See WBS in Appendix 2)
- **The general objectives of the project with specific sub-objectives:**

a) Technical objectives:

- Setting up the project team, drawing and ownership directives;
- Active involvement in the project of local bodies with responsibilities in managing this risk, and of those who, by law, shall provide support functions for specific emergency situations management;
- Collecting the necessary data for risk analysis and design response to the type of specific risk, ensure functioning of information flow-decision, both for normal cases (training) as for real situations (during the emergency situation);
- Attending the risk management processes, with parallel between requirements of risk management and what is found in the ground;

b) objectives of programming: implementation of the project in a period of one year, including

the verification through two exercises in the field of the viability response plan resulted;

c) objectives of cost:

- studies on the impact of the type of risk to the community prepared compared to the one of a community that does not have a response plan;
- funds requirements for preparing the annual city budget for the response to the earthquake (as proposed tactical variants);

d) The objectives of the organization:

- To raise the project's human resources team that has the expertise necessary to ensure fulfillment of objectives;
- Involvement in preparing the response to specific risk type of university staff from the Valahia University of Tîrgoviște, which is active in providing support functions in the line of emergency situations management;
- Structure of project team to serve as a basis for the team that will get together advance tactical exercises or during emergencies, later to the implementation of the project.

e) quality objectives:

- All products must comply with the law on line of emergency situations management, regulation regarding emergency situations management caused by earthquakes, the general and specific concept of response and action procedures of each factor with responsibilities in specific emergency management (earthquake);
- Since currently there are many "gaps" on the regulation of specific actions (procedures), we propose that all actions in the response plan to be based at least on best practices gathered from other similar structures in the country and abroad, on the line of management of earthquakes;
- Transparency on action - informing the population in the area of interest about the activities and results of the project team;

f) Environmental objectives:

- Sound management of specific emergency situations posing a risk to the objectives which, according to field of activity, after the earthquake may affect the environment;
- Secondary problems management (emergency situations also) caused by an earthquake (epidemics, epizootics);

g) Targets on work health:

- Conducting trainings for targets on work health, as required by law, on:
- Activities within the project team;
- Training on the response actions;

h) Targets for contracting:

- Considering that specific emergency situation management requires the involvement of both factors, the public and private ones, the project team will follow the conclusion of firm cooperation protocols between responsible authorities and private partners, regarding the rights and obligations of each party involved in the management of specific emergency situations;
- Will avoid that, through protocols concluded occur exceptions to the legal obligations of involved factors, both in terms of the normal, everyday, and supporting activities of specific emergency management;

i) Objectives of management system:

- The responsible for project wants to achieve the specific objectives in close liaison with the other two coordinates (time, cost) in this respect, aims to brows the **planned activities** (Appendix 1) to achieve specific objectives (GANTT chart – Appendix 3);
- Also establishes the “benchmarks” of the project, moments when is analyzed the state of activities development and reporting (communication) to stakeholders of project progress;
- Responsible for attending specific activities that follow established benchmarks for each objective.

**WORK BREAKDOWN STRUCTURE (WBS)
– APPENDIX 2**

4. CONCLUSIONS

4.1. Regarding the key elements to be considered in the analysis and evaluation of earthquake risks.

Except for very small projects, risk identification is generally counter-productive if you try to consider the project as a whole. It is more efficient to divide the project into sections or key elements to risk identification.

The key elements are a set of statements (points, indicators) to be considered one by one, during risk identification. Key elements allow to the ones that carry out target identification to point the thinking and to go more into detail than would've had if they tried to work with the project as a whole.

A set of clearly defined key will stimulate creative thinking, ensuring that any outstanding questions will be put before those responsible for identifying risks.

As key elements in the event of an earthquake can be listed: accidents, damage, explosions and fires in industry, accidents, damage, explosions and fires in the transport and storage of hazardous substances, nuclear accidents, water pollution, collapse of buildings, facilities or arrangements, failure of public utilities, epidemic, degradation or destruction of the environment, affecting social conditions, economic and environmental degradation, affecting the political and administrative capacity, affecting public health system; negative consequences on security, degradation/destruction of cultural values and heritage.

Their treatment will be done in the following manner:

- a) Describe the impact;
- b) The assumption (how this key event will take place);
- c) Indicating the source of information on the key element;

For example, key elements can be declared and treated as follows:

TABLE 1

Key elements for the analysis and evaluation of earthquake risk

<i>Nr. crt.</i>	<i>Key element</i>	<i>Impact description</i>	<i>Assumptions</i>	<i>Source</i>
1.	Accidents, damage, explosions and fires in industry	Impact on workers. Impact on the economic activity of the operator. Impact on neighborhoods.	Breaking/cracking of gas pipelines fuel; loss of control over technologic process, overheating, overheat due to damage, mechanical action on appliances or items of hazardous installations;	PARH of: - objective source of risk; -vulnerable target; -CLSU;
2.	Water pollution	Environmental	Leakage of chemicals into rivers or	PARH of:

<i>Nr. crt.</i>	<i>Key element</i>	<i>Impact description</i>	<i>Assumptions</i>	<i>Source</i>
		impact. Impact on water users of water sources.	groundwater due to damage/destruction of storage systems, drainage, retention;	- objective source of risk ; -CLSU;
3.	The failure of public utilities etc.	Impact on people. Economic impact in the affected area.	Damage of important water supply networks, gas, electricity, heat, radio, television, telephone, communications, sewerage and wastewater treatment and storm water;	PARH of CLSU;

4.2. Conclusions and proposals on Risk Register

Risk Register treats each key risk, setting for this: a) Reference (s); b) Group risks; c) Unique identification number of risks; d) Existing control; e) Consequences (impact); f) The likelihood of appearance; g) Proposed priority (initial prioritization); h) Accepted priority; i) The inherent risk; j) The responsible for managing that risk;

It requires the following observations on the register of risks:

- Treatment of all key elements (or risks associated with the earthquake), will be in the Earthquake Response Plan;
- Accepted priority and inherent risk established in project progress communication session, attended by CLSU (met) and the project team;
- Priority Information accepted and inherent risk will be used as follows:

A. Risks classified as EXTREME or LARGE on both scales - is likely that these risks occur and have potential serious consequences, even if exists a control for them. It requires detailed planning and increased attention to the discretion of the management;

B. Risks classified as EXTREME or LARGE on the scale of inherent risks, but not on the scale of priorities approved (by considering the control set) - these have potential serious risks if control fails. Management attention should be directed towards improving the monitoring and control;

C. Risks classified as AVERAGE on both scales - may be likely to occur or to have serious consequences, but not necessarily both,

regarding the control. These require planning and attention from management to improve control.

D. Risks classified as AVERAGE on risks scale, but only SMALL on the scale of those accepted, after taking the control into consideration. Attention of management should be directed to monitoring the control and improving it, when applicable;

E. Risks classified as being SMALL on bought scales - may be, typically, managed using routine procedures.

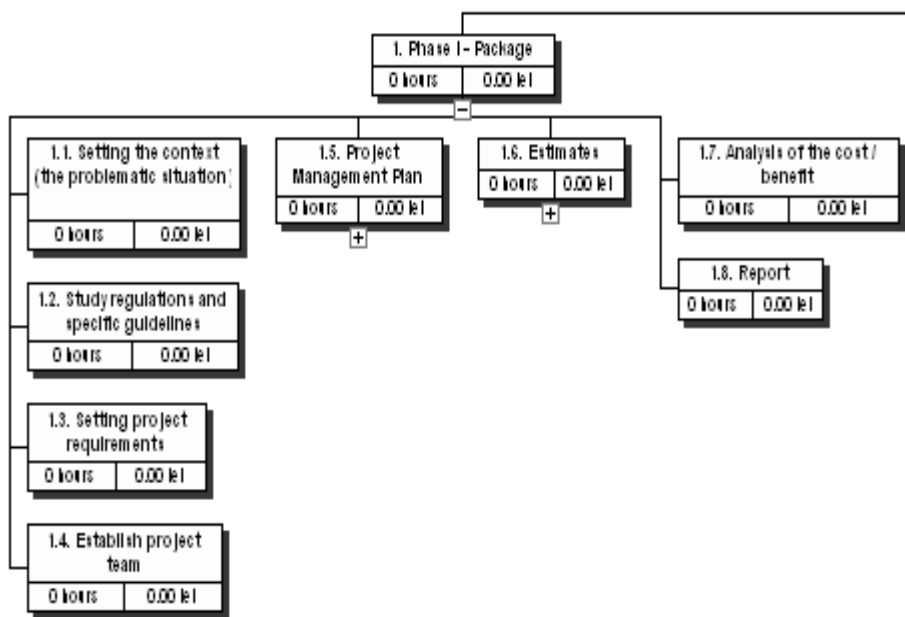
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- Guide to preparing people for seismic protection - Research Institute for Construction (INCERC);
- Government Decision 2288/2004 to approve the allocation of main support functions that are provide bz ministries, other central agencies and NGO's on prevention and emergency management;

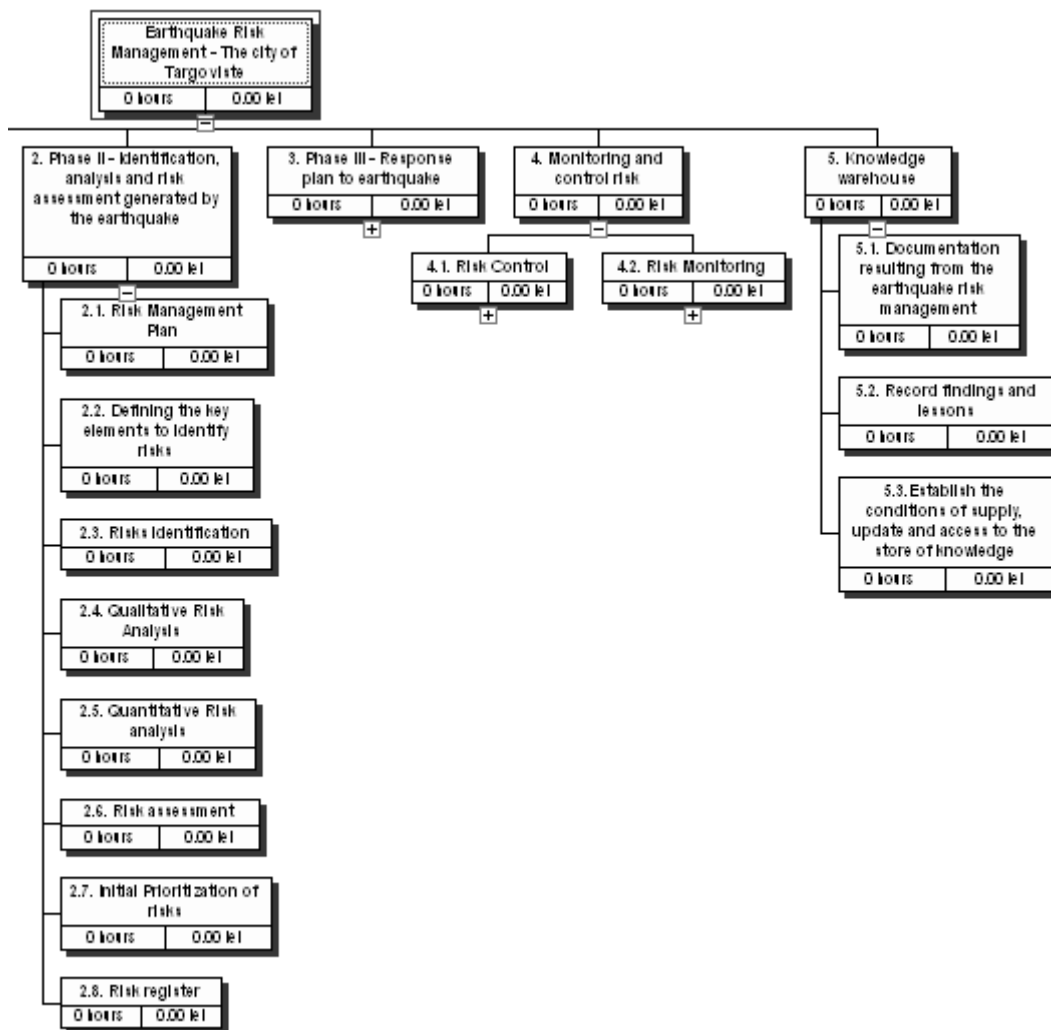
Planned activities

ID	Task Name	Duration	Start	Finish	Predecessors
1	Earthquake Risk Management - The city of Targoviste	268 days	Mon 3/1/10	Wed 3/9/11	
2	1. Phase I - Package	53 days	Mon 3/1/10	Wed 5/12/10	
3	1.1. Setting the context (the problematic situation)	5 days	Mon 3/1/10	Fri 3/5/10	
4	1.2. Study regulations and specific guidelines	5 days	Mon 3/8/10	Fri 3/12/10	3
5	1.3. Setting project requirements	3 days	Mon 3/15/10	Wed 3/17/10	4
6	1.4. Establish project team	2 days	Thu 3/18/10	Fri 3/19/10	5
7	1.5. Project Management Plan	15 days	Mon 3/22/10	Fri 4/9/10	6
14	1.6. Estimates	15 days	Mon 4/12/10	Fri 4/30/10	13
18	1.7. Analysis of the cost / benefit	5 days	Mon 5/3/10	Fri 5/7/10	17
19	1.8. Report	3 days	Mon 5/10/10	Wed 5/12/10	18
20	2. Phase II - Identification, analysis and risk assessment generated by the earthquake	35 days	Thu 5/13/10	Wed 6/30/10	19
21	2.1. Risk Management Plan	5 days	Thu 5/13/10	Wed 5/19/10	19
22	2.2. Defining the key elements to identify risks	5 days	Thu 5/20/10	Wed 5/26/10	21
23	2.3. Risks identification	5 days	Thu 5/27/10	Wed 6/2/10	22
24	2.4. Qualitative Risk Analysis	5 days	Thu 6/3/10	Wed 6/9/10	23
25	2.5. Quantitative Risk analysis	5 days	Thu 6/10/10	Wed 6/16/10	24
26	2.6. Risk assessment	5 days	Thu 6/17/10	Wed 6/23/10	25
27	2.7. Initial Prioritization of risks	3 days	Thu 6/24/10	Mon 6/28/10	26
28	2.8. Risk register	2 days	Tue 6/29/10	Wed 6/30/10	27
29	3. Phase III - Response plan to earthquake	151 days	Thu 7/1/10	Thu 1/27/11	28
30	3.1. Establish the purpose and objectives	3 days	Thu 7/1/10	Mon 7/5/10	28
31	3.2. Establish the characteristic of high-risk areas	10 days	Tue 7/6/10	Mon 7/19/10	30
32	3.3. Establish structures and their functions	5 days	Tue 7/20/10	Mon 7/26/10	31
33	3.4. Concept of operation of protective measures - Intervention	10 days	Tue 7/27/10	Mon 8/9/10	32
34	3.5. Setting-decision information flow scheme	3 days	Tue 8/10/10	Thu 8/12/10	33
35	3.6. Establish procedures for protective measures - Intervention	4 days	Fri 8/13/10	Wed 8/18/10	34
36	3.7. The management and coordination assistance	2 days	Thu 8/19/10	Fri 8/20/10	35
37	3.8. Logistics preventive and protective measures - Intervention	3 days	Mon 8/23/10	Wed 8/25/10	36
38	3.9. Way to ensure human, material, financial resources	3 days	Thu 8/26/10	Mon 8/30/10	37
39	3.10. Develop contingency plan	6 days	Tue 8/31/10	Tue 9/7/10	38
40	3.11. Planning the activities of preparing the response	102 days	Wed 9/8/10	Thu 1/27/11	39
41	3.11.1 Semestrial training I	16 days	Wed 9/8/10	Wed 9/29/10	
49	3.11.2 Semestrial training II	16 days	Thu 1/6/11	Thu 1/27/11	48FS+70 days
57	4. Monitoring and control risk	116 days	Wed 9/8/10	Wed 2/16/11	39
58	4.1. Risk Control	104 days	Wed 9/8/10	Mon 1/31/11	39
64	4.2. Risk Monitoring	12 days	Tue 2/1/11	Wed 2/16/11	63
70	5. Knowledge warehouse	15 days	Thu 2/17/11	Wed 3/9/11	69
71	5.1. Documentation resulting from the earthquake risk management	5 days	Thu 2/17/11	Wed 2/23/11	69
72	5.2. Record findings and lessons	5 days	Thu 2/24/11	Wed 3/2/11	71
73	5.3. Establish the conditions of supply, update and access to the store of knowledge	5 days	Thu 3/3/11	Wed 3/9/11	72

Work Breakdown Structure



Work Breakdown Structure



GANTT Chart

