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MONITOR II

Recommendation report for improvement of contingency plans and hazard maps

Case Study Arlberg

March 2012

MONITOR II

Contingency Planning Guidelines

Although in recent years the European Union made an effort to raise awareness for disaster risk management within its member states, at present there is no standardized approach defined for contingency planning in the partner countries participating in MONITOR II. According to the European Council (2010) action should be guided by the objectives of reducing vulnerability to disasters by developing a strategic approach to disaster prevention and by further improving preparedness and response while recognising national responsibility.

Contingency planning in this context is seen as a management process in which scenarios and objectives are agreed, managerial and technical actions defined, and potential response systems put in place. The aim of contingency planning is, in a state of uncertainty, to ensure adequate and appropriate response in case of an emergency. The output of the planning process is the contingency plan which represents the synthesis of the discussions, analysis and decisions made during the planning process.

Structure of the Contingency Planning Guidelines developed in MONITOR II:

	Chapter	Subchapter
A	**Basics**	A1: The need for contingency planning A2: The goal of contingency planning A3: The stakeholders involved in contingency planning
B	**Sample plan**	B1: Typical contents and structure of a CP B2: Categorization of tools and their definitions B3: Template and technical template description of a CP
C	**Workflow of CP development**	C1: Process of contingency planning C2: Hazard analysis C3: Risk analysis C4: Contingency plan C5: Implementation
D	**Case studies**	D1 BG/GR Evros river D2 SLO Savinja D3 AT Arlberg

Figure 1: Structure of the Contingency Planning Guidelines

The overall goal of MONITOR II is to improve information provision for disaster risk management. Some of the specific results of the project are:

Better connection between hazard analysis and contingency planning, which is based on a thorough definition of scenarios (hazard ⇨ risk ⇨ response) and first steps towards a standardization of the planning process.

Design and application of a CSA prototype (Continuous Situation Awareness) system, a web-based information platform for all stakeholders involved in disaster risk management. It serves as a tool to integrate all relevant information from different sources, as a knowledge exchange platform for different stakeholders by integrating hazard scenarios and contingency plans and as a documentation platform of hazards for further analysis.

Taking these results into account the most useful tools which have to be included in a contingency plan became obvious. The obligatory tools and optional tools are shown and specified in detail in the guidelines. Below the obligatory tools and their content are described in brief:

- **Event flowchart** to visualize event scenarios, responsibilities and measures;
- **Emergency measures** as information about necessary tasks before the event is actually triggered**;**
- **Checklist** containing specific information about measures and responsibilities shown in the event flowchart;
- **Intervention map** is a scenario based map showing all measures necessary to accomplish and makes use of a design mode providing best usability for end-users.

To develop and implement a contingency plan based on an in-depth analysis of hazards, risks, vulnerabilities and capacities in a specific area, it is recommended to follow a stepwise approach. This comprises the four phases hazard analysis, system analysis, contingency planning and implementation. See below the process of contingency planning developed in MONITOR II:

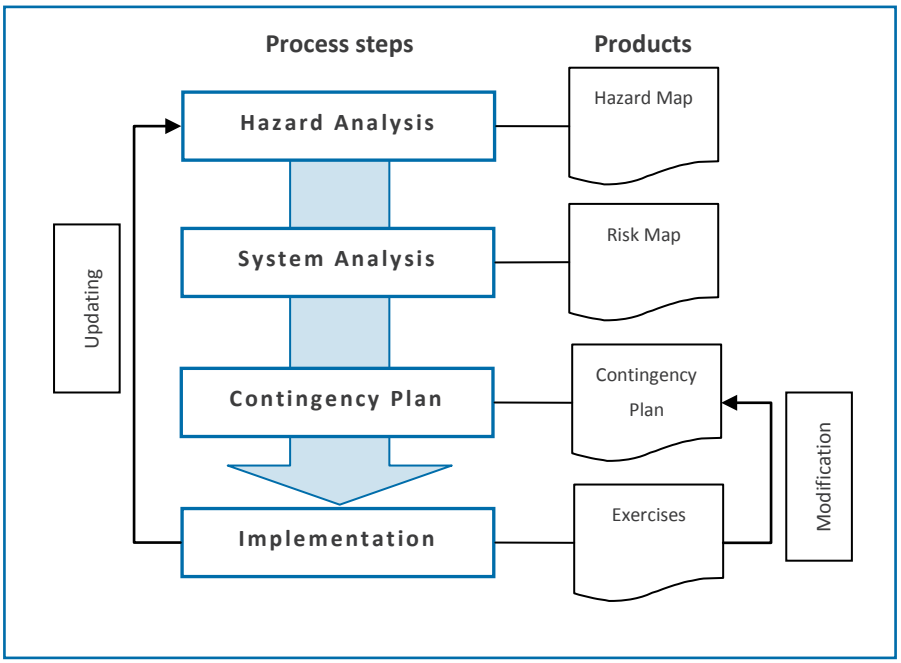

Figure 2: Process of contingency planning

Within the contingency planning process "hot spots" can be defined and allocated to domains. These domains are subdivided in the process domain, the risk domain and the response domain. The relevant points can be information points, critical points, observation points and intervention points. This "domain model" evolved in MONITOR II WP3 "State-of-the-art analysis and methodology", was further developed and is described in detail in the Contingency Planning Guidelines.

Process Domain ⇨ Risk Domain ⇨ Response Domain

Case Study Arlberg/Austria

To illustrate the process of contingency planning the approach was applied on a test-bed of the Austrian Federal Railways located in the inner alpine Stanzer Valley in the province of Tyrol in Austria and was added to the guidelines. The railway line in the Arlberg area is extremely exposed to natural hazards such as avalanches, rock fall, debris flow or flooding. The major part of this railway line is without specific monitoring systems, but extensive structural protection measures guarantee the level of security necessary to maintain train operations even under extreme weather conditions.

According to the theoretical structure of the contingency planning process the approach was applied and different products were elaborated (e.g. event flowchart or catalogue of measures). In each of the domains four different points were determined (information point, critical point, observation point and response point).

Process domain: The test-bed was examined in regard to different hazard process and hazard maps were produced to provide general information on the processes.

Risk domain: On the basis of the process analysis general information on possible loss of life and assets was evaluated.

Response domain: General information was provided on the intervention measures and indicates the locations where they must be carried out.

See below an example of an intervention map which shows some of the torrent catchments with medium or high protection deficit at the railway track in the test-bed and different points related to the different domains as described above.

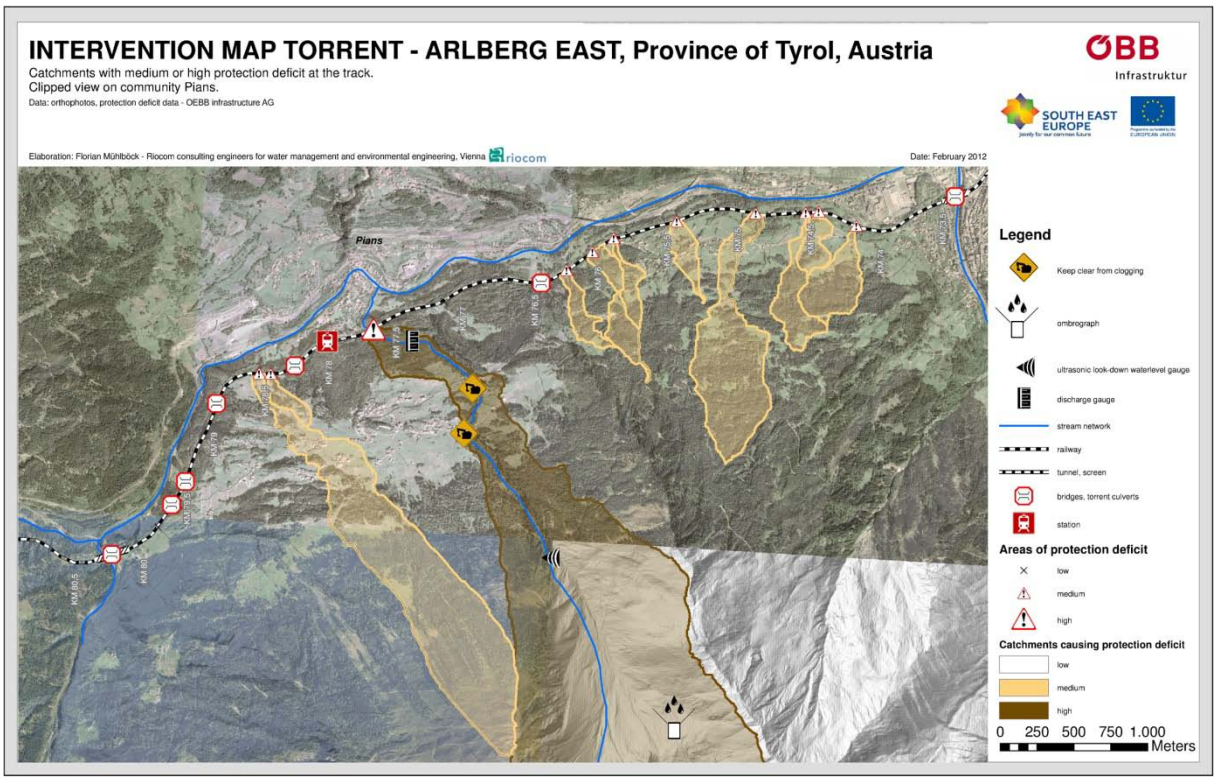

Figure 3: Intervention map of the test-bed in Tyrol/Austria

See below an extract of a measures catalogue containing information about measures and responsibilities giving a comprehensive overview of a situation and measures of a pre-defined scenario:

		D	E	I			
1	Weather warning - intense rainfall forecasted				forecast	weatherdevelopment / decision / information	weather forecast
2	Provide information		Haz	regio local TCU			
3	Observation weather development - aerial precipitation and intensity pattern		Haz	regio local TCU			
4	Prepare rail replacement transport	RCB	RCB	TCU			
5	Gather information on catchment condition: Hydrological Service Tyrol		Haz	regio			
6	Gather information on potential debris in catchment: TACS ob. Inntal		Haz	regio			
7	Assessment of catchment by trained staff, completion of catchment condition form		CG				
8	Check culverts along the track on clogging (e.g. woody debris)		CG				
9	Consultation weather service: actual development		Haz			verification preparation	
10	Limited service / prepare closure	Haz					
11	Observation precipitation gauges St. Anton a.A., Pettneu, Flirsch, See/Paznaun, Kappl-Oberhaus, Landeck, Zams		regio HydS		precipitation	forecast development	discharge-/ precipitation gauge
12	Observation discharge gauge St. Anton/Salzhütte, St. Anton / Moos, lake Verwall, Strengen, See/Paznaun		regio HydS PPO				
13	Observe precipitation progress		regio HydS				
14	Carry out closure - if necessary stop trains in next safe station	Haz					
15	Prepare clearing team	Haz	regio				
16	Prepare repair unit	Haz	regio				
17	Observe discharge		IC		rising discharge	accident avoidance	
18	Keep clear sections that are prone to blocking (bridges, culverts,...) (see map)	Haz	clearT				
19	Summon regional crisis board	Haz			flooding	evaluation & repair	damage / victims
20	Summon emergency staff leader	RCB					
	SUBSCENARIOS TORRENTIAL FLOOD EVENT **go to**						
	Catenary damaged? CP 1.1						
	Catenary pole damaged? CP 1.2						
	Train hit? CP 1.3						
	Tunnel blocked? CP 1.4						
21	Decide on reopening	RCB			no danger	all clear	expert decision
22	Dontinue regular service	RCB					
23	Dismiss regional crisis board	RCB					

D... decision, E... execution, I... information

Figure 4: Extract of a measure catalogue for the test bed