INTERNATIONAL UNION
OF RAILWAYS

unity, solidarity, universality

ARISCC

Adaptating Rail Infrastructure

to Climate Change

Adaptating Rail Infrastructure to Climate Change

ÖBB Infrastruktur

Risks from impacts by climate and natural hazards are already handled by the railways

Danger processes for railway infrastructure

Interpraevent I 2010 I Taiwan

Christian Rachoy

ARISCC – Scope

Factor	Effect	Impact on Railways/Assets
Temperature		
High temperatures and heat waves	overheating	infrastructure & rolling stock equipment
Sudden temperature changes	tension	track buckling
Intense sunlight	overheating	track buckling, slope fires, signaling problems
Precipitation		
Intense rainfall	soil erosion, land sides, flooding	damage to embankments, earthwork
Extended rain periods	slower drainage, soil erosion	other infrastructure assets, operation
Flooding: coastal, surface water, fluvial	landslides	drainage systems, tunnels, bridges
Drought	desiccation	earthworks desiccation
Wind		
Storm/gale (inland)	higher wind forces	damage to installations, catenary
	uprooting of trees	restrictions/disruption of train operation
Coastal storms & sea level raise	Coastal flooding	embankments, earthwork, operation
Lightning strikes & thunderstorms	Overvoltage	catenary and signaling
Vegetation	Faster plant growth, new plants	vegetation management

The Focus of ARISCC

Climate Change will increase the risks because events will happen more often, with higher intensity, or new impacts will occur in one region, which are met already in other regions.

We have to

- Identify risks/ vulnerabilities,
- Mange quantitative risk assessments,
- Classify and prioritise risks
- Learn from best practice

The informations are needed by

- Governments for longterm planning and financing infrastructure projects,
- Infrastructure managers for planning and managing the risks,
- Companies within the risk assurance and construction business.

Deliverables of ARISCC

D1 Solutions and Examples for Natural Hazard Management & Early Warning Systems (monitoring, impact assessment, vulnerability mapping, early warning, risk assessment)

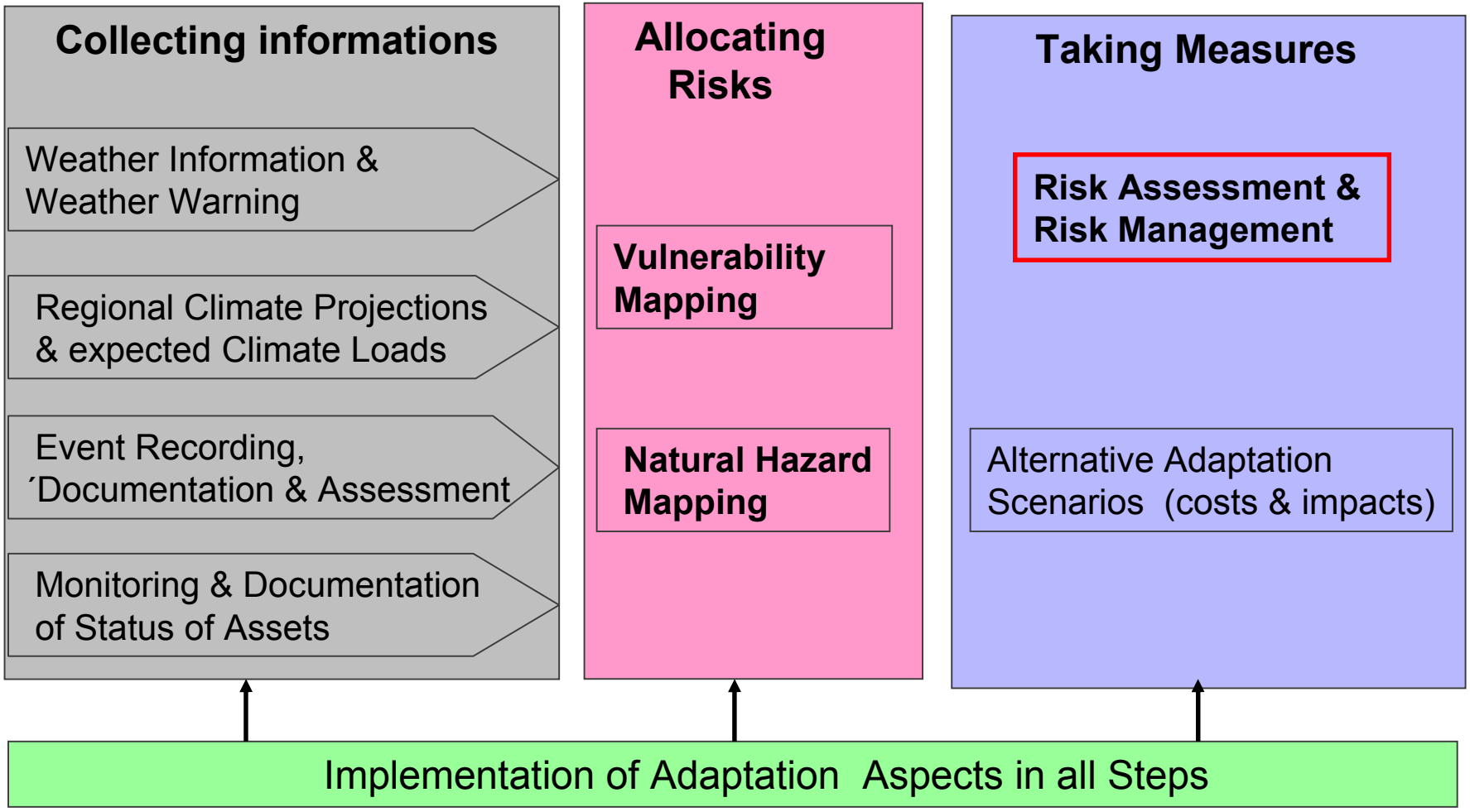
D2 Knowledge Base & Exchange Platform (good practice, pilot projects, competence mapping, country profiles, contacts…)

D3 Case Studies: UK West Coast, Rhine Valley, Global Case Study (mapping, risk & costs assessment, cost scenarios 2030 with/without adaptation)

D4 Guidance Document: Risk Analysis & Adaptation Measures(guidance for integrated natural hazard management, easy to use document, example for concrete line)

D5 Standards for new and existing Infrastructure(integration of climate change into standards, different procedures in Europe)

Integrated Natural Hazard Management & Adaptation to Climate Change -
Elements of Guideline



Intermediate Results

Backup

- Solutions for Integrated Natural Hazard Management (detailed)
- Collection of good practice projects and measures (30 examples)
- Competence mapping for adaptation of railway infrastructure to climate change
- Swedish Guidance document on risk analysis – methodology paper
- Structure of guidance document (Integrated natural hazard management)
- Increased number of actively contributing partners
- Coordination with relevant adaptation to climate change projects (TraCCa, Chamäleon, PARA*mount*)

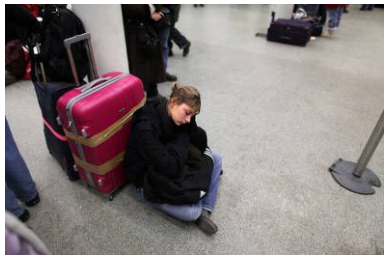
The Winter Season 2009/2010

What happened?

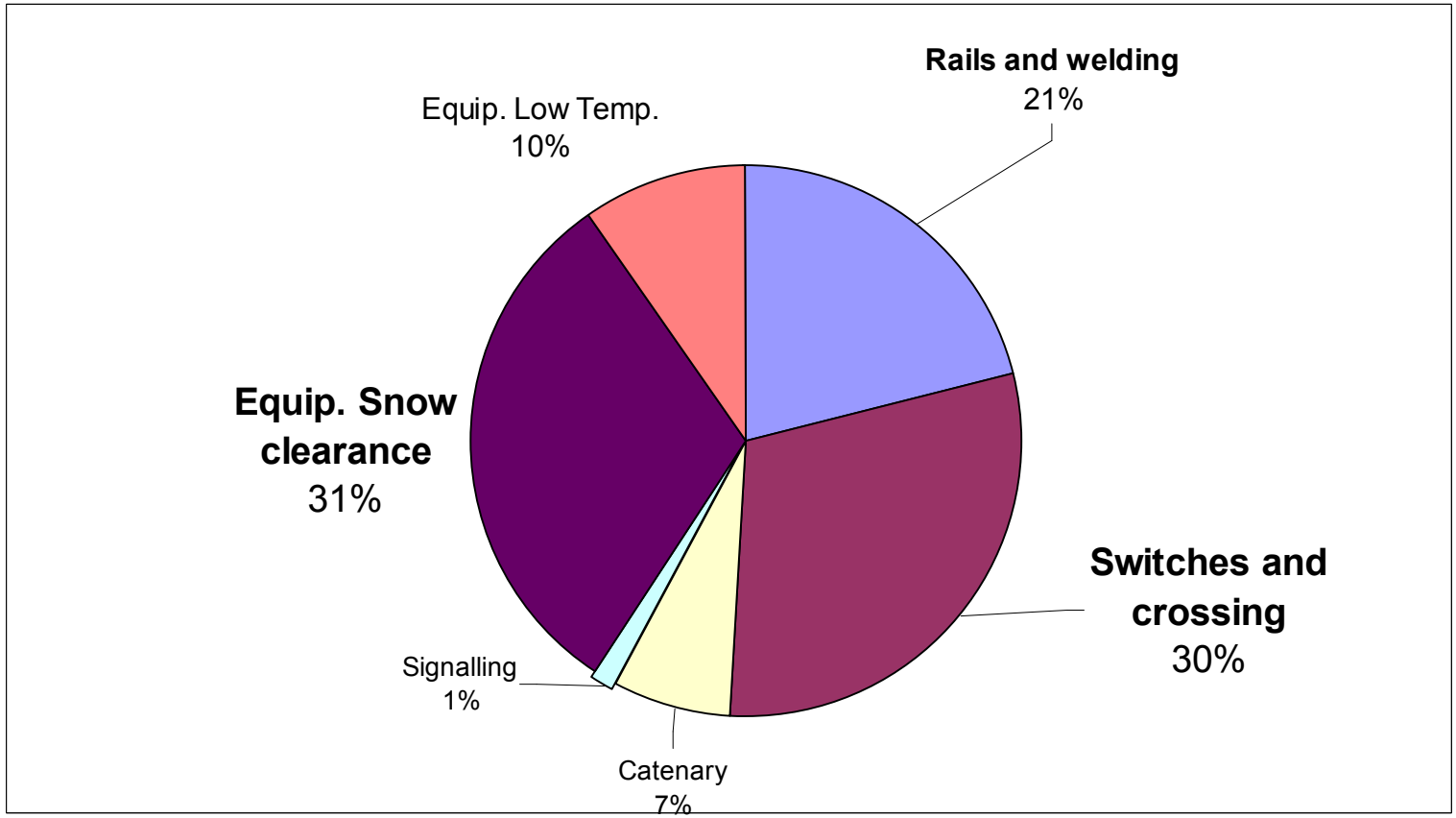
- Heavy snowfalls
- Temperatures between -5°C - +5°C
- Long winter season

What failed?

- Rolling Stock (Frozen couplings and doors)
- Infrastructure (Frozen switches, crossings)
- Catenary



Overview
Problems with the Infrastructure



Source: First Evaluation of the UIC “Winter and Railways” Survey

The UIC Experience Platform "Winter and Railways"

- **Request the members of the UIC Rail System Form (RSF) Steering Committee**

Work Plan

- Questionnaire „Winter and Railways“ sent to all UIC RSF members
- Feedback received and evaluated
- First overview "Problems/ Challenges/ Experience" to be circulated before the summer break
- Workshop "Winter and Railways" (jointly TOC, IM and the industry) in September 2010
- Report "Experience & Recommendations" in October 2010