Extreme Weather Impacts on European Networks of Transport - EWENT

Proposal for the call TPT.2008.1. Assessing disruptive effects of extreme weather events on operation and performance of EU transport system

Dr. Pekka Leviäkangas
VTT Transport & Logistics
Goal and research strategy

The goal of EWENT project is to assess the impacts of extreme weather events on EU transport system. These impacts are monetised. EWENT will also evaluate the efficiency, applicability and finance needs for adoption and mitigation measures which will dampen and reduce the costs of weather impacts. The methodological approach is based on generic risk management framework that follows a standardised process from identification of hazardous phenomena (extreme weather), followed by impact assessment and closed by mitigation and risk control measures.

EWENT will start this by identifying the hazardous phenomena, their probability and consequences and proceed to assessing the expected economic losses caused by extreme weather when it impacts the European transport system, taking also into account the present and expected future quality of weather forecasting and warning services within Europe.

EWENT will apply the IEC 60300-3-9 risk management standard framework all the way through its research process and the project’s work breakdown also follows the standard structure (see slide no 4).
# The consortium

List of participants:

<table>
<thead>
<tr>
<th>Participant no.</th>
<th>Participant organisation name</th>
<th>Short name</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Coordinator)</td>
<td>VTT Technical Research Centre of Finland</td>
<td>VTT</td>
<td>FI</td>
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<tr>
<td>2</td>
<td>German Aerospace Center</td>
<td>DLR</td>
<td>DE</td>
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<td>3</td>
<td>Institute of Transport Economics</td>
<td>TÖI</td>
<td>NO</td>
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<tr>
<td>4</td>
<td>Foreca Consulting Ltd</td>
<td>Foreca</td>
<td>FI</td>
</tr>
<tr>
<td>5</td>
<td>Finnish Meteorological Institute</td>
<td>FMI</td>
<td>FI</td>
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<tr>
<td>6</td>
<td>Meteorological Service of Cyprus</td>
<td>CYMET</td>
<td>CY</td>
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<tr>
<td>7</td>
<td>Österreichische Wasserstraßen GmbH</td>
<td>via donau</td>
<td>AT</td>
</tr>
<tr>
<td>8</td>
<td>European Severe Storms Laboratory</td>
<td>ESSL</td>
<td>DE</td>
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<tr>
<td>9</td>
<td>World Meteorological Organisation</td>
<td>WMO</td>
<td>UN</td>
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</table>
OBJECTIVE: Risk management strategy for the EU transport system to prepare for and mitigate the impacts and costs of extreme weather phenomena

WP1: Extreme weather phenomena that have potential internal and external cost impacts on EU transport system; the threshold criteria for weather parameters

WP2: The probability of extreme weather and scenarios for increased probabilities and intensity

WP3: Impact mechanisms for system failures or disturbances (mobility meltdown, reduced safety and security) and operational failures (predictable mobility of passengers and goods); impacts on selected transport system performance indicators

WP4: Estimation of expected costs of extreme weather on time axis, based on identified impacts and scenarios: infrastructure (material damages), operations and traffic (accidents, time delays)

WP5: Evaluation of likely scenarios and most relevant costs; listing of prospective mitigation and adaptive strategies; risk panorama for EU transportation system

WP6: Assessing the effectiveness and preliminary investments required by different mitigation strategies on time axis; e.g. new weather information services, new institutional co-operative models (especially between authority functions and across national boundaries), development needs of standards and engineering guidelines for transportation infrastructures
## Modal coverage

The transport system is viewed from three angles:

- **infrastructure**: these are direct material damages or deterioration of physical infrastructures
- **operations**: these are harmful impacts on traffic safety and transport reliability (both freight and passenger)
- **indirect impacts to third parties**, e.g. supply chain customers and industrial actors.

<table>
<thead>
<tr>
<th>Depth of analysis</th>
<th>Aviation</th>
<th>Land transport</th>
<th>Marine &amp; waterways</th>
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<tbody>
<tr>
<td></td>
<td>Passenger</td>
<td>Freight</td>
<td>Road</td>
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<table>
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<tr>
<th></th>
<th>Passenger</th>
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<th>Passenger</th>
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<td>Ocean</td>
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<td>Short sea/coastal</td>
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<tr>
<td>Inland ww</td>
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<tr>
<td>Freight</td>
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</table>
Cost impact vs. cost absorption

System impact disruptive level

*rain fall
*snow fall
*wind speed
*etc.

Intensity

Impact

Disruptive level

Costs associated!

Cost absorption
Impact analysis – example railways

Phenomena

- Thunderstorms
- Storm winds
- Snow storms

Impact

- Lightning strikes
- Falling trees
- Stacking snow
- Electricity shocks
- Line cuts
- Frozen switches
- Power failures
- Power supply systems
- Switches

Consequences

- System failure
- Time delays
- Accidents
- Customer dissatisfaction
- Disturbances in operations
- Increased maintenance / repair costs
## Indicators & cost assessment & economic analysis

<table>
<thead>
<tr>
<th>Performance indicator</th>
<th>Cost item</th>
<th>Method for unit values</th>
<th>Source or reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Accidents</td>
<td>WTP</td>
<td>eIMPACT study or alternative EU covering studies</td>
<td>Covers material and human losses (injuries, fatalities)</td>
</tr>
<tr>
<td>Time, reliability, profitability, revenues</td>
<td>Time</td>
<td>WTP</td>
<td>eIMPACT study or alternative EU covering studies</td>
<td>Covers both passenger time and freight time; freight time must be upscaled from road transportation to other modes</td>
</tr>
<tr>
<td>Reliability, profitability, revenues</td>
<td>Hindered journeys and transports</td>
<td>Opportunity cost of a transport; WTP</td>
<td>Indirect assessment from other studies</td>
<td>The most uncertain cost item to assess</td>
</tr>
<tr>
<td>Accessibility, cost (infrastructure investments and repair)</td>
<td>Damage to infrastructures</td>
<td>Historical cost (market cost); some available through insurance sector</td>
<td>Other studies, statistics from selected countries and up-scaling</td>
<td>Up-scaling across EU-27 can be done by e.g. purchasing power parities (ppp) adjustments for countries from where there is no data</td>
</tr>
<tr>
<td>Cost (maintenance, operation)</td>
<td>Increased maintenance</td>
<td>Historical cost (market)</td>
<td>Other studies, statistics from selected countries and up-scaling</td>
<td>Up-scaling can be done by e.g. purchasing power parities (ppp) adjustments for countries from where there is no data</td>
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Schedule & other info (preliminary)

• The project will be likely to start in December 2009.
• Duration: 30 months.
• Total budget: ca 2 MEUR
Overall management architecture

- Project co-ordinator
  - quality control
  - day-to-day operation
  - internal communication
  - Planning, reporting, financial control

- EC-DG RTD

- Consultative Board

- Broad Management Team
  - Assistant project manager

- Core Management Team

- Partner 2
- Partner 3
- Partner 4
- Partner 5
- Partner 6
- Partner 7
- Partner 8
- Partner 9

- Steering Committee
Key persons (foreseen, to be confirmed)

**Policy Officer:** Dr Karsten Krause  European Commission

**Coordinator:** Dr Pekka Leviäkangas  VTT

**Core Management Team:** Dr Leviäkangas, Ms Molarius, Dr Veikko Rouhiainen, Dr Lasse Makkonen, Ms Ulla Peltonen, Ms Anu Tuominen, Mr Pekka Kulmala – all from VTT

**Broad Management Team:** Dr Leviäkangas, Ms Molarius  VTT

Dr Frank Rehm  DLR
Dr Johanna Ludvigsen  TÖI
Dr Pirkko Saarikivi  Foreca Consulting
Dr Pertti Nurmi  FMI
Dr Silas Michaelidis  CYMET
Dr Juha Schweighofer  via donau
Dr Nikolai Dotzek  ESSL
Mr D.Ivanov, Mrs N.Berghi  WMO
Key body members (invited, to be confirmed, changes possible)

Consultative Board: Dr. Nancy Saichs, EIB
                Mr. Martti Mäkelä, Ministry of Transport Finland
                Dr. Cristina Pronello, Politecnico di Turin
                Dr. Olaf Novak, Allianz
                (Dr Karsten Krause European Commission)

“Steersmen”: NN  VTT
              OO  DLR
              PP  FMI
              QQ, ”steersman” to be nominated by the SC
VTT creates business from technology
Liikennejärjestelmän primääriset varautumiskeinot ilmastonmuutoksessa

Sijoittaminen → Mitoittaminen → Tekniikat ja laatutaso → Tietopalvelut käyttäjille, hinnoittelu