RAPSODI
Risk Assessment and design of Prevention Structures for enhanced tsunami disaster resilience

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Discipline Leader Tsunami

CONCERT-Japan Resilience Against Disasters
NGI-PARI Kick-off meeting @ NGI 8.10.2013
## Agenda

### Thursday 24 October

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>09:45</td>
<td>Arrival Nakamura, Oslo Airport</td>
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<tr>
<td>11:25</td>
<td>Arrival Yalciner and Kanoglu, Oslo Airport</td>
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<tr>
<td>19:20</td>
<td>Arrival of Strusinska and Kortenhaus, Oslo Airport</td>
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<tr>
<td>14:45</td>
<td>Nakamura arrives at NGI</td>
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<tr>
<td>15:00</td>
<td>PARI-NGI annual MoU meeting</td>
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<tr>
<td>16:30</td>
<td>Leave NGI</td>
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<tr>
<td>18:00</td>
<td>Joint dinner Egon Ullevaal</td>
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<tr>
<td>20:30</td>
<td>Social arrangement at NGI</td>
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### Friday 25 October

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>09:00</td>
<td>Arrival at NGI</td>
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<tr>
<td>09:00</td>
<td>Welcome and presentation of NGI</td>
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<tr>
<td>09:00</td>
<td>About NGI</td>
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<tr>
<td>09:30</td>
<td>Intro about RAPSODI and related projects</td>
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<tr>
<td>09:30</td>
<td>FAQs, homepage, related projects</td>
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<tr>
<td>10:30</td>
<td>Consortium agreement; project coordination and management</td>
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<tr>
<td>11:00</td>
<td>PARI contributions</td>
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<tr>
<td>11:00</td>
<td>Summary of October 8 meeting; work performed, further plans</td>
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<tr>
<td>11:45</td>
<td>Lunch</td>
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<tr>
<td>12:45</td>
<td>TU-BS contributions</td>
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<td>13:15</td>
<td>METU contributions</td>
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<tr>
<td>13:45</td>
<td>NGI contributions</td>
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<tr>
<td>14:15</td>
<td>Discussion on coming work, next meetings, exchange</td>
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<tr>
<td>15:00</td>
<td>AOB, Concluding remarks</td>
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<tr>
<td>15:30</td>
<td>Strusinska, Kortenhaus, Yalciner leave NGI</td>
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<tr>
<td>18:00</td>
<td>Joint dinner Grilleriet “Folketeaterpassasjen” 22835600</td>
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<tr>
<td>18:05</td>
<td>Departure Strusinska and Kortenhaus, Oslo Airport</td>
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<tr>
<td>18:15</td>
<td>Departure Yalciner, Oslo Airport</td>
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### Saturday 26 October

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>16:40</td>
<td>Departure Prof. Nakamura, Oslo Airport</td>
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<tr>
<td>Noon/evening</td>
<td>Departure Kanoglu</td>
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The background / FAQs

- **CONCERT-Japan** is an international *ERA-NET* program with the objective of enhancing the cooperation of European countries with Japan in various areas of science and technology.
  - An ERA-NET is a formalized program-to-program cooperation between European national programs in selected thematic areas. The ERA-NET Scheme is an instrument under the EU Framework Program for Research and Innovation.

- In 2012, CONCERT-Japan announced a Research and Innovation Joint Call within two scientific areas:
  1. Efficient Energy Storage and Distribution
  2. Resilience against Disasters

- NGI, PARI, TU-BS and METU (Turkey) were successfully awarded funding for RAPSODI
The background / FAQs

• The work is supported by funding received from the CONCERT-Japan Joint Call

• The CONCERT-Japan programme is funded through the 7th EU Framework Programme for Research and Technological Development (FP7) and runs from January 2011 to December 2013.

• The core consortium of CONCERT-Japan consists of 13 organizations from 9 countries
  • Turkey (coordinator), Germany, France, Hungary, Italy, Spain, Switzerland, Norway and Japan. In addition, several observers are involved in some parts of the project

• In total 96 proposals (16 with Norwegian partners), 9 selected for funding; only 2 projects with Norwegian partners (one on energy storage, one on resilience 😊)
Partners

- NGI – Norwegian Geotechnical Institute, Norway
- PARI – Port and Airport Research Institute, Japan
- MoU between NGI and PARI on Natural Hazards
Partners

- METU – Middle East Technical University, Turkey
- TU-BS – TU Braunschweig, Leichtweiss – Institute for Hydraulic Engineering and Water Resources
- Long term collaborations between all partners
  - Previous and coming EU projects
Complementary background

• All partners do physical and numerical tsunami modelling
• All partners have experience with coastal management and mitigation structures
• PARI has data and expertise on fatalities and damages caused by tsunami impact
• NGI has experience within vulnerability and risk assessment; a GIS model for tsunami risk assessment;  
  ➔ Suggestions for further development based on analyses of the 2011 Tohoku tsunami
• METU has expertise on mitigation strategies, socio economic impact analysis, structural and social resilience
• TU-BS has laboratory facilities and expertise on coastal engineering, flood risk, and structural behaviour
Main objectives

1. Establish a new method for quantitative tsunami risk assessment

2. Design of novel mitigation measures

3. Cooperation and exchange of knowledge

http://www.ngi.no/en/Project-pages/RAPSODI/
Tsunami risk assessment

Today’s quantitative models for tsunami risk assessment have clear limitations, in particular for the vulnerability

Idea:

• Combine information on tsunami vulnerability
  • mortality rates and damages as function of tsunami flow depth and current velocities, buildings and other infrastructure, population capabilities and exposure, mitigation structures, etc.

• with existing models for tsunami risk assessment
Mitigation measures

- Perform detailed laboratory analysis of tsunami impacts
  - Buildings, structures, coastal protection
- Loads and functionality
  - Various foundation and design of tsunami protection structures

Ohtsuchi Area
Courtesy: T. Arikawa
Cooperation and exchange

• Complementary expertise
  • Learn from each other
  • Produce results that we could not achieve alone

• Japan: Earthquake tsunamis, inundation, mitigation
• Europe: Landslide tsunamis, generation and propagation, coastal engineering, vulnerability and risk assessment
  • Suggestions for further development based on analyses of the 2011 Tohoku tsunami

• Networking:
  • Smaller meetings, workshops, research visits, exchange, larger dissemination seminar
**EU 7FP ASTARTE**

Assessment, Strategy And Risk reduction for Tsunamis in Europe

- 22 European partners (**NGI+METU**)
- 4 Non-European partners (**PARI, ERI, NOAA, USC**)
- 10 WPs
  - …Long-term recurrence, Sources and generation mechanisms (NGI), Numerical modelling, Coastal impact, Detection, Warning, From hazard to risk, Tsunami resilient societies, …

- Project co-ordinator: Prof. M.A. Baptista, IPMA, Portugal
- Kick-off meeting in Lisbon 7-8 November 2013
Related projects 2

• Tsunami building damage and fragility functions

**URBAN WAVES**

AIM: To develop tools and guidance for the assessment of coastal urban infrastructure and defences to tsunami preceded (or not) by earthquakes

Multi-disciplinary experimental and numerical (different scales and codes) research approach supplemented by field observations

• J. Macabuag / Prof. Rossetto: Building engineers @ EPICentre, UCL

www.epicentreonline.com
RAPSODI home page

http://www.ngi.no/en/Project-pages/RAPSODI/

Need for extranet?
Consortium Agreement (CA)

- First version rejected (based on RCN template)
- Next version based on EU DESCA template
- Distributed for partners’ comments week 42
- To be signed, but first:
  - Correct reference document in § 1.2 (TU-BS & NGI)
  - Access rights / Background material in Annexes 1 & 2
  - Third party (Annexes 3 and 5)
Consortium agreement

- Needed to obtain funding from our national funding org.
- Based on the EU-DESCA template
- We have tried to simplify by:
  - Adapting definitions and terms to our project proposal
  - Rewriting text referring to EC-GA articles
  - Omitting reference to contract with EC (as we have our own national contracts), but retaining text on required reporting to EU
  - Omitting paragraph on budgeting (presumably not needed when all parties cover their own costs)
  - Omitting Management Support Team and EEAB (External Expert Advisory Board)
  - Reducing the requirements for GA (Steering Committee) meetings
- To avoid introduction of possible errors in text and cross-references, we have also retained much of the text as is even though it might seem a bit redundant
Reporting

CA 6.2: The members shall submit progress reports to the General Assembly every six months. Each Member is further responsible for reporting to their own national funding organizations.
Dissemination

CA 8.3.3: All publications or any other dissemination relating to Foreground prepared within the funded project must bear the CONCERT-Japan logo, the internet address http://www.concertjapan.eu and the following sentence: “This work was supported by funding received from the CONCERT-Japan Joint Call on Efficient Energy Storage and Distribution/Resilience against Disasters.” Published outputs (such as results, event agendas and reports) have to be submitted to the Joint Call Secretariat and the CONCERT-Japan coordinator.
Project coordination and management

• **Steering committee (SC)**
  • *In proposal and CA*
  • *Consisting of one representative from each of the four partners to oversee the project wrt objectives, activities, quality, timely deliverable, dissemination*

• **Networking: (Last point!?)**
  • *Smaller meetings, workshops, research visits, exchange, larger dissemination seminar*
Cooperation and exchange

• Larger dissemination seminar
  • EU Secretariat wants a joint workshop for the five CONCERT–Japan Disaster Resilience projects early 2015
  • NGI has suggested Japan
  • Awaiting response from the other Japanese project managers. As desired by the EU secretariat, the planning is recently put on hold owing to a possible prolongation of the CONCERT-Japan project. More information is expected in September
  • EU Secretariat waiting; possible one year prolongation of the CONCERT-Japan project?
Cooperation and exchange

- Smaller meeting events/workshops
  - 2013 Norway (early) and Turkey; PARI to TU-BS?
  - 2014 Germany and Japan
  - Electronic meetings, international tsunami conferences
  - Plan can be flexible and adapted to scientific needs, but must fulfil what is needed for the annual reporting

- Other opportunities:
  - Skype (August 22nd 2013)
  - EGU 27 April 2 – 2 May 2014, Vienna
    http://www.egu2014.eu/
  - IAEG 15-19 Sep 2014, Torino (CH)
    http://www.iaeg2014.com/
  - AGU 2013? 2014?
  - Others!?
PARI will summarize existing knowledge tsunami defence structures and foundations (WP1; D1, D3, D8)
- Focus on impact loads and failure modes
- Input to matrix for different types of structures and buildings

Numerical studies of impact loads on tsunami defence structures with varying characteristics of incident wave (WP2; D5&D6)

PARI will suggest a location where data exist so that NGI+PARI together can improve the GIS tsunami vulnerability and risk model

Interest to see the unstable rock slopes along the fjords in western Norway
Main objectives again (from the proposal)

1. Assess vulnerability
   - Structural, socio-economic, ecological
   - Compare tsunami mitigation strategies in Japan and Europe

2. Update numerical models
   - Currents and fluxes around structures and in complex areas
   - Validation from 2011 event
   - Used for design of prevention structures and for risk assessment

3. Laboratory analyses of tsunami impact for various design
   - Loads
   - Functionality, test new measures, matrix for different types of structures with their potential failure modes

4. Quantitative assessment of vulnerability and risk (GIS)

5. Exchange experience, knowledge, results, staff; dissemination
NGI Reports ➔ Publications

- 2 reports on local risk assessment
- 1 report on 2011 Tohoku tsunami
  - Numerical modelling
  - Suggestions for improvement of NGI tsunami risk model

- Publication to be submitted (NHESS?)
  - RAPSODI deliverable