Emergency Situation Management of High Floods and Calamity Financial Aspects on Dornesti Bridge, Suceava, Romania

Case Study

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National Company for Motorways and National Roads (C.N.A.D.N.R.)

Strategy/Objectives:

- Upgrading and rehabilitation of national roads network;
- Building by-passes for cities with large volumes of traffic;
- Building new motorways and by-passes at motorway profile for the large cities;
- Connection to the European transport corridors;
- Maintenance of the existing road network;
- Strengthening administrative capacity in the field of road infrastructure;
National Company of Motorways and National Roads (C.N.A.D.N.R.) - Romanian Road Authority

<table>
<thead>
<tr>
<th>Regional Directorates for Roads and Bridges</th>
<th>National Roads (km)</th>
<th>Highways (km)</th>
<th>National Roads + Highways (km)</th>
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<tbody>
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<td>1. BUCURESTI</td>
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<td>2. CRAIOVA</td>
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<td>3. TIMISOARA</td>
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<td>4. CLUJ</td>
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<td>5. BRASOV</td>
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<td>6. IASI</td>
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<td><strong>3,283.265</strong></td>
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<td>7. CONSTANTA</td>
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<td>TOTAL</td>
<td><strong>15.408.390</strong></td>
<td><strong>529.75</strong></td>
<td><strong>15,938.140</strong></td>
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</table>

T.C. 1.5 – Risk Management
International Seminar Risk Management for Highways Infrastructure,
October 9th to 11th 2013, Mérida, Yucatán - Mexico
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National Company for Motorways and National Roads (C.N.A.D.N.R.)

Regional Directorate for National Roads Iasi (D.R.D.P. Iasi)
National Road Network
Suceava County
329.93 km
Technical information's

National Road 17A characteristics:

• 7.00 m carriageway width and two shoulders of 0.5 m each
• counted traffic of 8,400 standard vehicles/24 hours (year of counting – 2010)
• 70% of the route in mountain region
• links the North West of Suceava County, Radauti municipality to Siret city and further to the border between Romania and Ukraine
Technical information's

Dornesti Bridge characteristics:

- Situated on DN 17A at km 77+575
- Built in 1966
- Total length – 433.45 m
- Carriageway width – 7.80 m
- Bridge width – 11.20 m
- Superstructure - 18 spans:
  - 17 spans of 23.00 m length
  - 1 span of 36.60 m length
Occurrence of the High Flood Disaster

Severe rainfalls forecasted by The National Meteorological Administration (NMA) affected Romania starting 22.06.2010

- 37 counties (in Romania 41 counties) affected by floods, torrents, flash floods or landslides
- in two counties (Suceava and Botosani) rainfall during 6 days (22-28.06.2010) exceed 237 liters/ m²
- 94 national road sectors of Directorate of Iasi were seriously damaged (50 sectors - Suceava County)
- 7,000 houses were damaged
- 800 houses were completely destroyed
High Flood Consequences
Flooded Bridges
High Flood Consequences
Traffic disrupted
High Flood Consequences
Embarkment collapse
High Flood Consequences
Damaged/completely destroyed houses
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IGSU

Notification

Minister of Transport
National Company for Highways
and National Roads in Romania

DRDP
Regional Directions for Roads and Bridges

Creates

Commission for a Special Road
Technical Inspection

Takes

Decision

Traffic Restriction

Weight Restriction

Traffic Deviation

Total Closure of the Traffic
Road authority (D.R.D.P. Iasi) actions during disaster

Temporary Activity Operational Units (crisis units) were formed to manage the emergency situations:

• road network inspection (no ITS systems)
• collecting/checking information about road conditions
• traffic guidance and signalization
• establish alternative routes, road traffic deviations for damaged road sectors to allow interventions in disaster areas
• request local construction companies for temporary interventions
Road authority (D.R.D.P. Iasi) actions during disaster

All important information’s were collected and transmitted every 3 hours and when needed to:

- Regional Directorate for National Roads Iasi → Romanian National Company of Motorways and National Roads (published on company website) → Ministry of Transports (press releases)
- General Inspectorate for Emergency Situations
- Police Road Department
- Mass media
Road authority (D.R.D.P. Iasi) actions after disaster:

- Damages evaluation (needed works & funds)
- Contact and invite contractors to negotiate contracts of repairing works (design & built)
- Request Ministry of Transports for needed funds
Contract for repairing works

- Road authority (D.R.D.P. Iasi) formed two committees to negotiate contract prices
- 94 damaged sectors of national roads and bridges
- Each damaged sector - separate contract.
- Contractors request bigger prices than usually use, due the nature of “emergency works” (they tried to squeeze every money they could)
- Low budget
Following the floods, after inspecting the Dornesti bridge:

- Pier no.2 (P2) and pier no.4 (P4) were scoured.
- Pier no.3 (P3) was scoured and rotated.
- Bridge decks adjacent pier no.3 (P3) were tilted from the bearings.

Dornesti Bridge repairing evaluation.
Dornesti Bridge damages evolution
Ensurance of the traffic continuity:

• Ministry of Transports, Ministry of Defence and Ministry of Internal Affairs were mobilized to undertake appropriate actions.

• Near Dornesti Bridge, a pontoon bridge was built by the troops of the 72nd Engineer Battalion of Romanian military forces.
Ensurance of the traffic continuity
Dornesti Bridge restoration

• Contractor - S.C.C.F. Iasi Group COLAS
• Solution - single span of 46 meters long between pier no2 (P2) and pier no.4 (P4) and consolidation of the adjacent piers
• Cost of the repairing works - 3,631,000 euro (design and built)
• Site inspection - Regional Division of Roads and Bridges Iasi own staff
Dornesti Bridge reparation
COST/RESOURCES

The Financial support is covered in Romania from:

• Government Intervention;
• European Union Solidarity Fund;
• Own revenues of affected legal and natural persons;
• Optional or compulsory insurances;
• Donations from Romanian legal and natural persons, or aid from other organizations or foreign countries;
COST/RESOURCES

Dornești Bridge Infrastructure repairing costs (3,631,000 Eur) were supported as follows:

• 2,928,200 EUR - Solidarity Fund of EU
• 702,800 EUR - Government Intervention Fund (VAT on eligible expenses);

Financial support for Romania was approved about one year after the disaster occurrence (August 31st 2010-request submitted, June 6th-2011 approval date)
High floods main causes:

• climate change causing large amounts of rainfalls in short periods of time on limited areas;

• excess transport capacity of the bridges and culverts sections

• obstruction of the drain sections by timber and household wastes deposited in river bottoms or river slopes;
High floods main causes:

• widespread deforestation and improper execution of agricultural works facilitating land erosion;
• placement of unauthorized construction (houses, household, etc.) in the riverbed;
• changes of the riverbed course
High floods main causes:

• riverbed erosion caused by ballast and sand excavations
• lack or insufficient funds for hydraulic works necessary for defense against flood, both in the beds of watercourses and on slopes
• insufficient funds for maintenance and reparation of the road infrastructure;
Conclusions/Lessons learned:

• funding need for hydraulic works necessary for defense against flood
• prohibiting ballast and sand excavations near bridges in order to eliminate the most riverbed erosion
• prohibiting the placement of unauthorized construction in riverbed
Conclusions/Lessons learned:

• need to improve/implement a legislative framework to stop the widespread deforestation of privately-owned forests

• ITS systems need to be implemented in order to facilitate road surveillance and to get information at the right time;

• need of contract/agreement between road administrator and contractors for immediate intervention in case of emergency situation;
THANK YOU FOR YOUR KIND ATTENTION!
GRACIAS POR SU AMABLE ATENCION!