



Univerza v Mariboru

Fakulteta za gradbeništvo



Seismic isolators with composite neoprene for high damping bridge and buildings, innovative containment systems with hysteretic polygonal characteristic and dissipative systems with silicone oil hydraulic multistage functional bridges

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- **Organization:**
 - Name:* Research Institute for Construction Equipment and Technology – ICECON SA
 - Type:* Research Institute
 - Country:* Romania
 - City:* Bucharest

ICECON - Fields of Activity

- Research – development and construction technical regulations
- New materials, technologies, internal systems and equipment, built-in equipment, technological equipment, town management, environment protection, waste recycling;
- Standards, technical specifications, guidelines, guides of good practice and manuals) according to the European Documents for construction, internal systems and equipment, town management, environment protection, waste recycling;
- National research – development and innovation programs: RELANSIN (Grand Prize CONRO 2003, Excellence Prize), AMTRANS, CALIST, INFRAS, MENER, INVENT, MATNANTECH, CEEX;
- Technical Agreements;
- Third party inspection for construction products and equipment, internal systems and equipment, town management, environment protection, waste recycling;
- Specialized services;
- Scientific and technical books publishing.

ICECON - QUALIFICATIONS:

- ICECON INSPECT third party inspection body accredited by RENAR (Romanian Accreditation Association)
- ICECON TEST first degree testing laboratory for construction products authorized by the State Construction Inspection, accredited by RENAR (Romanian Accreditation Association)
- Notified at the European Commission as Notified Body no. 1803 / 2007-10-23
- 7 Technical Committees within ASRO (Romanian Standard Association)
- 2 Working Groups within ISO Technical Committees.

ICECON – EXPERTISE OFFER:

- Theoretic studies and researches: Constructions, Internal systems instalations, Equipment, National programs
- Applied studies and researches: Constructions, Internal systems instalations, Equipment, National programs
- Technical Agreements: Construction products, Internal systems instalations products, Built-in construction equipment
- Third party inspections
- Laboratory tests
- Scientific and technic books publishing
- Specialized services

PROJECT IDEA:

Project objectives:

- a) Substantiation and developing of innovative concepts regarding the anti-seismic systems intended for bridges and viaducts realized as products embedding one, two or three devices with distinct operating principles. Every system consists of a neoprene anti-seismic device in connection with a curved spherical or plane sliding anti-seismic device.

Conception of one device consisting on one elastomeric element and one hydraulic dissipater in-steps operated, so that the reaction force is monotony increasing with asymptotic limit parallel to the speed axis.

System consisting of one elastomeric anti-seismic device in connection with one friction sliding device and one hydraulic dissipater having in-step force variation.

- b) The anti-seismic systems that will be conceived and realized should attain high performances concerning the energy dissipation (over) with the fraction of the critical damping $\zeta = 0,5 \div 0,7$, and the elasticity in horizontal plan could be at controlled values, on the basis of the system configuration parameters related to the area seismic degree.
- c) Determination of innovative solutions realized both by laboratory tests on every dissipater and on anti-seismic systems constructed in three versions.
- d) The technical solutions will be conceived in order to allow attaining of significant performances in respect to the real systems, as well as to ensure the technological transfer to the participant companies.

Information on existing partnership:

- **Technical University for Construction** (Romania): has a data base regarding the earthquakes in Romania, Japan and Italy as well as testing facilities under static and dynamic regime
- **“Eftimie Murgu” University from Resita – UEMR** (Romania): has specialists dealing with modeling of dynamic systems and bridge and railway maintenance
- **Institute of Solid Mechanics** (Romania): specialized in physical and harmonic modeling of the dynamic processes, of behavior analysis in case of vibrating and shock devices and equipment. The institute has personnel specialized in anti-seismic and antivibrating devices basing on magneto-rheological fluids.

Requirements with respect to additional partners:

- analysis and processing of complex signals, and determination of significant results concerning the earthquake action, specific for different seismic areas;
- performing of structural, functional and parametric analysis under seismic actions, in different versions of the innovative solutions previously proposed;
- possessing of data specific to the construction and viaducts, based on significant typologies or specific typology for the individual solutions or unique design and construction;
- possessing of apparatus and instrumental means, aiming to measure the kinematic parameters in case of “in situ” experiments for bridge and viaducts structures.