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### 1. Project Proposal Information

<b>Project Proposal Title</b>	Increasing the buildings, bridges and cables earthquake and wind protection, using the new revolutionary European VZN damper concept
<b>Project Proposal Acronym</b>	COVZN
<b>Keywords</b>	Buildings, bridges, electrical cables, bridges stay cables, progressive damping characteristic, constant damping characteristic, wind protection, earthquake protection
<b>Abstract (Max. 2000 words)</b>	<p>The new European VZN damper concept increases automatically the damping coefficient according to the piston stroke, without electronics and mechanism, protecting thus the the system.</p> <p>So it gives comparative to standard ones:</p> <ul style="list-style-type: none"> <li>• Increased system stability giving SKYHOOK behavior;</li> <li>• Decreased maximal and average acceleration</li> <li>• High protection at stroke ends, reducing the number and the intensity of the stopper bumper collision;</li> </ul> <p>The VZN damper concept consist in placing the damping valves along the inner cylinder. At the cheap solution the damping valves are reduced to the metering orifices.</p> <p>The VZN damper concept is realized at the same prices with the standard one.</p> <p>The VZN solutions are grated with European Patents EP 1 190 184 and EP EP 2 078 168, United States Patent US 2 010 044 173, and Romanian patents</p>
<b>Project Description (Main Work Packages)</b>	<p>The general research objectives are to adjust the VZN dampers for each applicability areas, to demonstrate its superiority comparative to the standard and rheological ones and it for industry supplying.</p> <p>The proposed research areas are:</p> <ul style="list-style-type: none"> <li>• Buildings :the based isolation, coupling the floors together using a bracing system and dynamic dissipater (on the upper floor)</li> <li>• Bridges : the longitudinal, transversal and vertical protection</li> <li>• electrical cables, bridges stay cables,</li> </ul> <p>The research will evolve in parallel for each VZN damper application areas</p>

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	<p>For each applicability domain the research activity will contain 2÷3 stages, presented below:</p> <p style="text-align: center;">THE FIRST STAGE</p> <ol style="list-style-type: none"><li>1 Study the state of the art (solutions, dimensions, characteristics, performances, requests);</li><li>2 The technical requirements/ tunings for the 1st VZN dampers releases (for normal or reduced models);</li><li>3 Models and simulation for proposed VZN devices, to optimize the tuning;</li><li>4 Drawings for the VZN devices;</li><li>5 The VZN devices manufacture;</li><li>6 The VZN devices dimensions, characteristic evaluation and their correction if necessary</li><li>7 The VZN devices tests on rigs and in real condition, comparative to the standard ones and technical test report release;</li></ol> <p style="text-align: center;">THE SECOND STAGE</p> <ol style="list-style-type: none"><li>8 The technical requirements/ tunings for the 2nd VZN dampers releases;</li><li>9 the steps 3-5 repeated;</li><li>10 the steps 6-7 repeated</li></ol> <p style="text-align: center;">THE THIRD STAGE</p> <ol style="list-style-type: none"><li>11 The technical requirements/ tunings for the 3rd VZN dampers releases ( if is necessary);</li><li>12 The steps 3-5 repeated;</li><li>13 The steps 6-7 repeated;</li><li>14 Final technical test report releases;</li></ol> <p style="text-align: center;">PERMANENT ACTIVITIES</p> <ol style="list-style-type: none"><li>15 Solution protection;</li><li>16 Results dissemination on papers, books, congresses, seminars, salons etc.</li></ol> <p>The same the researches in 3 steps are justified by the great number of shock absorber variants depending by:</p> <ul style="list-style-type: none"><li>• the damping characteristic tuning possibilities for metering orifices/valves<ul style="list-style-type: none"><li>o with internal tuning (imposes dismantling)</li><li>o with external tuning (2 or more steps on rebound and</li></ul></li></ul>
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	<p>compression);</p> <ul style="list-style-type: none"> <li>• the solution for the piston rod volume compensation:             <ul style="list-style-type: none"> <li>o internal balance chamber</li> <li>o external balance chamber</li> </ul> </li> <li>• rigid with the outer (reservoir) cylinder</li> <li>• independent</li> <li>• pressurized or not</li> </ul> <p>In the FIRST STAGE will realise VZN car dampers with planar filling valves and metering orifices with characteristics established based on the studies of the shock absorbers made by the consecrated companies Monroe, Ohlins, Bilstein, Fichtel Sachs, Lord etc. After efficiency at speeds between 0.05÷2.5 [m/s] and temperatures of 20°C and 80°C and the test anti-blockage at -30°C evaluate, the improving solutions if necessary will do, e.g. synthetic oil, metering orifices arrangement and dimension changing, or using long pistons (to increase efficiency on rebound), levelling pistons (to increase efficiency an compression and rebound and for anti-blockage at -30°C), solutions for metering orifices control (the active number, dimension, flowing control), solution with damping valves. This reason a damping diagram rig with thermal chamber must be purchased.</p> <p>The practical solutions established in first stage will apply to all kind of vehicles but realised function the each application specific condition. Internal and/or external tuning control will be provided for easy damping characteristic control. Thus a large shape of the damping diagrams will have, permitting to evaluate their influence in the vehicle suspension behaviour.</p> <p>Will develop a new damping valves solution, more compact, and adapted to the VZN dampers.</p> <p>The easiest solutions for metering orifices/slots adjustment changes are to increase the orifices dimension, or placing an annular body having desired metering orifices/slots centred or convenient rotated.</p> <p>The simulation will be realised in Mat Lab and in ADAMS software.</p>
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<b>Current Consortium (Partners, Organisation Types)</b>	University Transilvania Brasov, Construction University Bucharest, Research Institute for Construction Equipment and Technology
<b>Deadline for Responses</b>	30 days

## 2. Profile of the Partners Sought

<b>Organisation Type</b>	Dampers/Shock absorbers Factory; Buildings, bridges and cables research institutes; Buildings, bridges and cables companies
<b>Required Skills and Expertise</b>	Dampers manufacture; High buildings design; Bridges design; Aerial electrical cables design;
<b>Role in the project</b>	Lead partner/partner
<b>Other Requirements</b>	availability to develop VZN damper concept

## 3. Project Proposer Information

<b>Name of the Organisation</b>	Institutul de Mecanica Solidelor-Institute of Solid Mechanics
<b>Organisation Type</b>	Research Institute
<b>Country</b>	Romania
<b>Fields of Activity</b>	Vibration mitigation and control using VZN and standard dampers
<b>Contact Person</b>	Adrian Ioan NICULESCU
<b>Position in the Organisation</b>	VZN Program Manager
<b>Tel</b>	+40745187595
<b>Email</b>	adrian_ioan_niculescu@yahoo.com
<b>URL</b>	<a href="http://imsar.ro">http://imsar.ro</a>
<b>Previous FP Projects Participated</b>	No



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Please send filled in form by 25. 3. 2011 to: [fg.tec@uni-mb.si](mailto:fg.tec@uni-mb.si)

