	<p>Marie Curie Actions International Research Staff Exchange Scheme</p>	<p>INNOVATIVE NONDESTRUCTIVE TESTING AND ADVANCED COMPOSITE REPAIR OF PIPELINES WITH VOLUMETRIC SURFACE DEFECTS Project acronym: INNOPIPES Project number: 318874 Project duration: 1 September 2012 - 31 August 2016</p>
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INNOPIPES European Project

Second Training Event at the Southern Federal University – Rostov-on-Don, Russian Federation, 11-19 September 2014

Between the 11th and 19th of September 2014, at the *Southern Federal University (SFedU)*, located in Rostov-on-Don (Russian Federation), an important scientific event, involving also our university, has taken place: the *Second training event* of an European FP7 project, Project No. 318874, *INNOPIPES - “Innovative Nondestructive Testing and Advanced Composite Repair of Pipelines with Volumetric Surface Defects”*, financed by the *European Commission*, within the *7th Framework Programme*, FP7-PEOPLE-2012-IRSES, *International Research Staff Exchange Scheme*, *Marie Curie Actions*. Our university has a research team from the Department of Mechanical Engineering that is involved in this project (its general presentation has been included in a previous issue of our *Bulletin*: Vol. LXIV, No. 4/2012, pp. 97-99, within the section *International Projects and Conferences*).



The *second edition of the training event* has been attended by researchers from all the partners of the *INNOPIPES Project*, Universities and academic research institutes from EU and third countries: the Institute of Materials and Structures from the Riga Technical University, Latvia (represented by the project coordinator, Prof. Evgeny BARKANOV, and by Pavel AKISHIN); the Department of Mechanics and Applied Computer Science from the Military University of Technology, Warsaw, Poland (represented by Dr. Kamil SYBILSKI and Pawel BARANOWSKI); the Institute of Mechanics from the Bulgarian Academy of Sciences, Sofia (represented by Prof. Mitko MIHOVSKI, Assist. Prof. Alexander ALEXIEV, Yordan MIRCHEV and Ivaylo VASILEV); the Department of Mechanical Engineering of the Petroleum-Gas University of Ploiești (represented by Assist. Profs. Alin DINITA and Adrian NEACSA and by Ph.D. students

Maria ZAHARIA and Ibrahim Naim RAMADAN); the State Scientific Institution V.A. Belyi Metal-Polymer Research Institute of the National Academy of Sciences of Belarus, Gomel (represented by Dr. Vladimir SERGIENKO); the Research Institute for Mechanics and Applied Mathematics from the Southern Federal University, Rostov-on-Don, Russia (host organisation, represented by a team coordinated by Prof. Mikhail CHEBAKOV); the Department of Dynamics and Strength of Machines from the National Technical University “Kharkov Polytechnic Institute”, Ukraine (represented by Prof. Gennadiy LVOV).



The host of the event, the *Southern Federal University*, from Rostov-on-Don (Russia), is an important university that was created in 2006, following a decision to set up two federal universities, taken within the framework of “Education” National Project. One university was to be established in the Siberian Federal District, the second one – in the Southern Federal District. The strategic goal of the Programme was to establish a world-class university to promote the innovative development in Russia and give it a competitive edge in the market of scholastic attainment and technologies.



A number of universities in the Southern Federal District took part in the Programme in order to compete for the right to be called “Federal University”, but only four universities came through as winners. These four united into Southern Federal University. Thus, Southern Federal University was established by the RF Government Decree № 1616-p, dated November 23, 2006, as a result of Rostov State Academy of Architecture and Arts, Rostov State Pedagogical University and Taganrog State Radio Engineering University being affiliated to Rostov State University. Each of the institutions has its unique history.

Main areas of SFedU development are:

- training programs for Specialist’s, Bachelor’s and Master’s degrees on the basis of integrated instruction vs research approach, employment of all modern methods of instruction, including distance (on-line) learning in the sphere of management, economics, education, science, culture and other national priorities;
- creation of an environment for the academic mobility of students, faculty and research staff; as well as integration of the University into the global educational environment and acquiring the world-wide recognition of its educational programs in order to be able to export educational services and technologies;
- carrying out fundamental and applied research in the research fields of top priority; developing efficient interaction with the Russian Academy of Sciences;
- active international cooperation with universities in Europe, Asia and Americas; participation in international educational and research programmes.



The training event has been opened by the following SFedU officials, who had warmly welcomed the participants and wished them success and fruitful discussions on the issues of the project: **Prof. M. J. Korjakin**, Director of the Institute of Mathematics, Mechanics and Computer Science, and **Prof. M. Chebakov**, Head of the Department for Contact Mechanics, Vorovich Research Institute of Mechanics and Applied Mathematics.



The first day of the event (the 11th of September) was dedicated to a *Project meeting*, conducted by the project coordinator, **Prof. Evgeny Barkanov**, Riga Technical University. Each Work Package (WP) leader has presented the general conclusions about the work performed within each WP in the first two years of the project and the future plans for the second project stage (1 September 2014 – 31 August 2016). The project is divided in five WP (described in our general presentation previously mentioned), coordinated

by the Bulgarian Academy of Sciences, V.A. Belyi Metal-Polymer Research Institute, the Petroleum-Gas University of Ploiești, E. O. Paton Electric Welding Institute and Riga Technical University (coordinating WP5 – Management and dissemination). Each presentation has been followed by discussions which defined the future lines of action required by an optimal development of the research activities within INNOPIPES Project. Dissemination, financial management and budget distribution aspects have also been discussed and decided, as well as the organization of the final project meeting and workshop which will be hosted by V.A. Belyi Research Institute in Belarus, in the summer of 2016.

The next day, 12th of September, an excursion was organized to see the facilities of SFedU in Taganrog at the State Radio Engineering University and Aeronautical Engineering Faculty.



In the following days of the event (15-16 September), experienced researchers from the organizations involved in the project held several lectures for the young researchers included in the research teams, followed by constructive discussions. The topics of these lectures, describing the partners experience in the various fields connected to the project, are shown below.

- On the 15th of September, the following lectures have been presented:
 - *Qualification of non-destructive testing of pipelines*, by **Prof. M. Mihovski**;
 - *Application of polymer composites for the repair of corrosion-mechanical damages of pipeline systems*, by **Dr. V. Sergienko**;
 - *Experimental and numerical testing of pipe elements subjected to stamping test*, by **Dr. K. Sybilski**;
 - *Comparative analysis of the procedures for the evaluation of the remaining strength factor for transmission pipelines with interacting volumetric surface defects*, presented by our colleague, **Assist. Prof. A. Dinita**, on behalf of **Prof. Gh. Zecheru**;
 - *Contact problems of viscoelasticity for metal-composite shells*, by **Prof. G. Lvov**;



- *Optimisation methodology based on the planning of experiments and response surface technique for the advanced composite repair of pipelines*, by **Prof. E. Barkanov**.
- On the 16th of September, the following lectures have been held by Professors from SFedU:
 - *About inverse problems in the mechanics of deformable bodies*, presented by **A. O. Vatulyan**;
 - *Methods of defect's image identification in elastic materials*, presented by **M. A. Sumbatyan**;
 - *Application of genetic algorithms and artificial neural networks in inverse problems of the theory of elasticity*, presented by **A. N. Soloviev**;
 - *New results in the development of the method of acoustic emission diagnostics stages of predestruction*, presented by **S. I. Builo**;
 - *Computer design of piezoelectric composite structures and devices for ultrasound and nondestructive testing applications*, presented by **A. V. Nasedkin**;
 - *Crack identification in rod structures on the basis of the analysis of vibration parameters*, presented by **A. V. Cherpakov**.

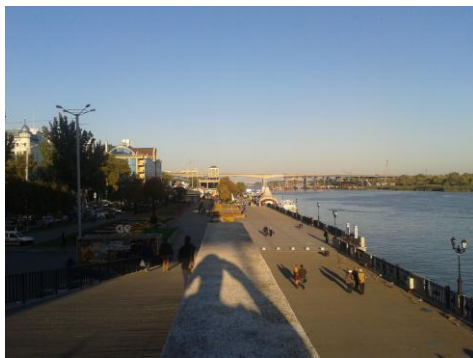


The training event has been closed in the following days (17-18 September) with a *Round table* for the early stage researchers involved in the project, where young professionals and Ph.D. students of the partner organizations reported their research results and use within the project.

- On the 17th of September, discussions have been moderated by **Prof. E. Barkanov** and **Assist. Prof. A. Dinita**. The following research reports have been discussed:
 - *Calculation of bandaged pipelines by FEA*, presented by **I. Vasilev**;
 - *Buckling analysis of a thin-walled cylindrical shell strengthened by fibre-reinforced polymer*, presented by **M. Tanase**;
 - *Development of a database containing the existing pipeline repair systems which use composite materials*, presented by **I.N. Ramadan**;
 - *Experimental and numerical testing of tube element in 3-point bending test*, presented by **P. Baranowski**;
 - *Restriction of the elastic volume extension of metallic and composite balloons under test pressure*, presented by **S. Prokopchuk**;
 - *Plane problem for viscoelastic coaxial cylinders*, presented by **V. Martynenko**;
 - *Finite element modelling of the pultrusion process for a production of pipelines made of composite materials*, presented by **P. Akishins**.
- On the 18th of September, the discussions have been moderated by **Prof. M. Mihovski** and **Dr. K. Sybilski**, regarding the following research reports:
 - *Composites based on epoxy resin reinforced with carbon and fiberglass for the repair of main pipelines*, presented by **N. Yakimovitch** (Metal-Polymer Research Institute of Belarus);
 - *Steady-state vibrations of 1-D poroelastic bodies with account of initial state*, presented by **Al. Lyapin** (SFedU);
 - *Autonomous sensor of fluid pressure pulsations in pipeline based on piezoelectric transducer*, presented by **V. Chebanenko** (SFedU);
 - *Analysis of residual stress state in elastic bodies*, presented by **R. Nedin** (SFedU);
 - *Identification of skin properties*, presented by **I. Bogachev** (SFedU);
 - *Damping vibration of plate in the air*, presented by **A. Tarasov** (SFedU).

In the end of our report regarding the *INNOPIPES Second Training Event*, a few words about the city where it was held and which left a very positive impression to all visiting participants that had a chance to get acquainted with it – *Rostov-on-Don*, administrative centre of *Rostov*

oblast (province), South-West Russia. It lies along the lower Don River, 30 miles (50 km) above the latter's mouth on the Sea of Azov. It was founded in 1749 as the customs post of Temernika, when the river mouth was still in Turkish hands; it then became a flourishing trade centre. Between 1761 and 1763 the fortress of St. Dmitry of Rostov was built there, and a town developed around it, near the Armenian settlement of Nakhichevan-na-Donu, which later merged with Rostov. In 1797 town status was granted, and in 1806 it was named Rostov-na-Donu. Because of its key position as a transport centre and port, the town grew steadily with the 19th-century Russian colonization and development of the north Caucasus region and conquest of the Transcaucasia. These functions remain of great importance. The Don River route to the interior was improved by the opening of the Volga-Don Shipping Canal in 1952, linking the town to the entire Volga basin; a dredged channel gives access to the sea. Rostov lies on road, rail, and oil and natural-gas pipeline connections between central European Russia and the Caucasus region.



This nodal location and the nearness of the great Donets Coal Basin have led to major industrial development, especially in engineering. Two huge plants make Rostov the largest producer of agricultural machinery in Russia. Other engineering products include ball bearings, electrical and heating equipment, wire, self-propelled barges, road-construction equipment, and industrial machinery. There are ship and locomotive repair yards and a range of consumer-goods industries. Rostov State University was founded in 1917, and there are numerous other institutions of higher education and scientific-research.