


International Projects and Conferences

	<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 – Kick-off Meeting, Hurzuf, Ukraine

The Department of Mechanical Engineering of the Petroleum-Gas University of Ploiești has a research team that participates in an international FP7 Project, financed by the *European Commission*, that has begun on the 1st of September 2012 and has a duration of 48 month: the Project No. 318874, *INNOPIPES – “Innovative Nondestructive Testing and Advanced Composite Repair of Pipelines with Volumetric Surface Defects”*, within the programme: FP7-PEOPLE-2012-IRSES, *International Research Staff Exchange Scheme, Marie Curie Actions*.

The project coordinator is the Institute of Materials and Structures from the Riga Technical University, Estonia (the coordinator of the Riga research team being Prof. Evgeny Barkanov, which had the initiative of this project). Other six research institutes or Universities from the



European Union and third countries are also involved as partners: the Department of Mechanics and Applied Computer Science from the Military University of Technology, Warsaw, Poland; the Institute of Mechanics from the Bulgarian Academy of Sciences, Sofia; the E. O. Paton Electric Welding Institute of the National Academy of Science of Ukraine,

Kiev; the State Scientific Institution V.A. Belyi Metal-Polymer Research Institute of the National Academy of Sciences of Belarus, Gomel; the Research Institute for Mechanics and Applied Mathematics from the Southern Federal University, Rostov-on-Don, Russia; the Department of Dynamics and Strength of Machines from NTU Kharkov Polytechnic University, Ukraine.

The *strategic objective* of the project is the improvement of the infrastructure by increasing the reliability of existing gas pipeline transmission systems. The development of this project will serve the IRSES programme main goal – strengthening research partnerships through short period staff exchanges and networking activities between research organizations from EU and third countries. Therefore, the financial contribution of the programme is intended only to cover, or contribute to, the mobility costs of participating European researchers going to the eligible other third countries, as well as those of incoming researchers from these countries.

The *scientific and technical objectives* of INNOPIPES Project are the improvement of existing methods and developing of new ones for the detection of volumetric surface defects (local metal loss), based on low-frequency ultrasonic testing with directional waves, and for their repair using advanced composite wrap systems in order to bring the efficiency of the damaged section to the level of the undamaged pipeline. These objectives will be achieved within the five work packages, each one coordinated by one partner and subdivided into several tasks:

WP 1 – *Innovative nondestructive testing*, coordinated by the Bulgarian Academy of Sciences and aiming at improving and developing modern innovative technologies for nondestructive testing of long distance pipelines.



WP 2 – *Materials and technologies for advanced composite repair*, coordinated by the National Academy of Sciences of Belarus, which has the objectives to define the selection criteria for the materials and technologies used for preparing the surface in the zones

with defects and for repairing the pipelines using composite materials wraps, and to develop the repair technology and composite materials with polymeric matrix.

WP 3 – *Optimal design of advanced composite repair*, coordinated by our University, which aims at modeling, analyzing and optimizing the advanced composite materials for pipeline repair developed in WP2 under pipe operational conditions (using FEM) and to define an initial data sheet for the composite material to be used for the repair.

WP 4 – *Prototype development and numerical models validation*, coordinated by the Paton Welding Institute and having as main goal to verify experimentally the finite element models developed within WP3 on the base of static and cyclic loading of a damaged pipe prototype repaired with an advanced composite material wrap and to determine the effectiveness of the proposed composite repair method.



WP 5 – *Management and dissemination*, coordinated by the

Riga Technical University, addresses the project management and coordination activities, the dissemination of the project results through workshops, seminars and conferences, and the organization of training events for the young researchers involved in the project.

The research team from our University is coordinated by Assoc. Prof. Andrei Dumitrescu, seconded by Prof. Ionuț Lambrescu, and includes at present the following members: Prof. Gheorghe Zecheru (to whom the merit and initiative of our involvement in the project must be granted), Assoc. Prof. Gheorghe Drăghici, Assoc. Prof. Ioan Popa, Assist. Prof. Alin Diniță, Ph.D. students Ibrahim Ramadan and Maria Zaharia. The team is opened as other colleagues from the Mechanical Engineering Department or Ph.D. students can participate in the future to the project activities.

The start of the INNOPIPES Project has been marked by a *Kick-off Meeting*, organised by the E. O. Paton Electric Welding Institute on the 1st of October 2012, at the “Ai-Daniil” Hotel in Hurzuf, Crimea, Ukraine. The research team from our University has been represented by Prof. Gheorghe Zecheru, Assoc. Prof. Gheorghe Drăghici, Prof. Ionuț Lambrescu, and Assoc. Prof. Andrei Dumitrescu. The agenda of the meeting included a project presentation performed by the coordinator (strategic objectives, research and scientific objectives, management and financial problems), presentations made by each project partner (including general information, fields of research and development, international expertise, partner planned contribution to the project WPs and Tasks; Prof. Ionuț Lambrescu presented our University), and discussions regarding all the aspects of our project.

The three days following the Kick-off Meeting, all the participants attended, at the same location, the 20th *International Conference and Exhibition „Modern Methods and Means of Non-Destructive Testing and Technical Diagnostics”*, organised by the *Ukrainian Society for Non-*



Destructive Testing and Technical Diagnostics, the *Russian Society for Non-Destructive Testing and Technical Diagnostics*, and the *Belorussian Association for Non-Destructive Testing and Technical Diagnostics*, where they have presented several papers linked to the topics of the project in a separate section: *Preliminary experience on NDT of INNOPIPES project partners*. Assoc. Prof. Andrei Dumitrescu has presented the paper “*Specific features concerning non-destructive control, mechanical testing and technical diagnosis when using composite materials for transmission pipeline repair*”, elaborated by all four participants from our University. The paper was followed with much interest by the other participants and generated interesting discussions regarding the pipeline systems repair by means of composite material wraps, one of the research fields of the INNOPIPES Project.

This issue the *Technical Series of the Petroleum-Gas University of Ploiesti Bulletin* includes a paper, written by Prof. Gh. Zecheru and B.Sc. student Evelyn Nicolae, addressing a topic included in the preliminary research performed by our team within this project: assessment of the remaining strength factor of a pipeline with defects.

We are looking forward to receive and publish other valuable papers, describing the results of INNOPIPES Project, from the members of the research team from our University and/or from the other seven partners of the project.



Universitatea
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din Ploiești

A R M R
Asociația Română
de Mecanica Ruperii

XVIIIth National Symposium of Fracture Mechanics with International Participation

The Petroleum-Gas University of Ploiesti has been the host, on the 7th of December 2012, of the 18th *National Symposium of Fracture Mechanics*, with international participation, organised by the Mechanical Engineering Department of our University and the Romanian Association of Fracture Mechanics (*Asociația Română de Mecanica Ruperii – A.R.M.R.*).

The *Romanian Association of Fracture Mechanics* is an important professional society having about 170 members, all prestigious specialists (researchers and/or academic staff members) in the field of Fracture Mechanics from all the important University centres from our country. ARMR is affiliated, beginning with the year 2005, to E.S.I.S. (*European Structural Integrity Society*), a prestigious European organisation from the same research field, about 50 ARMR members composing the ESIS Romanian Group. Recently, the headquarters of ARMR have been moved from Bucharest to Ploiesti, our University offering a space to the Association.

The Symposium has enjoyed a large participation, numerous specialists from several important research centres from our country, Slovakia and U.S.A. presenting papers of high scientific quality and technical applicability. About 60 specialists attended the work of the Symposium and 32 scientific papers have been selected by the Scientific Committee, composed of: Prof. N.N. Antonescu, Prof. Al. Pavel (both from our University), Prof. R. Iatan ("Politehnica" University of Bucharest), Prof. M. Teodorescu (ICEM S.A. Bucharest), Prof. V. Zichil (University of Bacău), Prof. M. Frănilă (University of Sibiu), Assoc. Prof. I. Popa (University of Ploiești). According to the tradition of the Conferences organised by ARMR, each paper has been presented not by its authors, but by the member of the Scientific Committee that has performed its review.

The works of the Symposium has been followed by the General Assembly of ARMR, at which 68 members have been present. After the presentation, discussion and approval of the Report of the ARMR Council, of the Financial Report and of the Censors Committee Report, the new ARMR Council has been elected. In recognition of the efforts made for the development and good functioning of the Association, our University has been awarded several important positions in the Committee: Prof. Vlad Ulmanu has been re-elected as President of ARMR, Prof. Gheorghe Zecheru as Vice-president, and Assoc. Prof. Gheorghe Draghici as ARMR Secretary, while Assoc. Prof. Andrei Dumitrescu has been elected as Treasurer, after holding a position in the Censors Committee.

In the end, all participants have visited the laboratories of the "*Regional centre for the determination of the characteristics and monitoring of the technical state of OCTG – oil country tubular goods*", that has been recently developed within a POSCCE program by a team from the Mechanical Engineering Department, coordinated by Prof. Vlad Ulmanu (a short presentation of this centre will be included in the next issue of our *Bulletin*). The visitors have expressed their admiration for the high quality of the equipment available, allowing for complex experimental research programs involving all types of petroleum industry tubulars.

This issue of our *Bulletin* includes some of the most interesting papers presented at the Fracture Mechanics Symposium, selected by the Editorial Board of the Bulletin. The other papers chosen will be published in the first two issues from the next year, 2013.