European Safety and Reliability Association

Newsletter

ESRA

Editorial

Enrico Zio
ESRA Chairman
Politecnico di Milano, Italy
École Centrale Paris,
Supelec, France

Dear ESRA member,

We are entering Fall full of energies, after the intense days of the ESREL 2013 Conference in Amsterdam, which was yet another "experimental evidence" of the relevance of our meeting in the scientific and technical communities interested in the development of the Safety and Reliability fields. As usual, during the Conference we have learned and shared knowledge and expertise, as well as continued the development of our network for future engagements in research and application collaborations.

At the Conference we also had our annual General Assembly. This is an important occasion to discuss on all issues related to the running of the Association and its activities. The regularization of the statutes of the Association is under development, and efforts are also being made to clean the list of members so as to retain only those which confirm their interest through the payment of the registration fee: this is quite important in respect to the Association regulations and in this view, I urge you all to verify your payment status. Overall, the Association is healthy and its running seems not to pose any particularly critical issue. Also, activities are already well under work for the next ESREL 2014 Conference in Wroclaw, Poland and the colleagues from Switzerland have

offered to hold the ESREL 2014 Conference in the premises of Zurich.

Once again, thank you all for your continuing support to ESRA and participation to its activities and running.

With kind regards,

Enrico Zio
Chairman of ESRA

Feature Articles

Improving the Man-Machine-Organization System (MMOS) Management for Nuclear Facilities in Accident Conditions

M. Farcasiu
Institute for Nuclear
Research Pitesti,
Romania

I. Prisecaru
University Politehnica, of
Bucharest,
Romania

The nuclear installations are complex socio-technical systems whose reliable operation is based on the

success both of the technical equipment and of the human and organizational factors.

Starting from an international conclusion (NEA/CSNI, 2009) that "*many technical problems of nuclear field have solved but only human and organizational factors issues are still in phase of finding solutions to be solved*" this research frame "*contributions to improving the Man-Machine-Organization System (MMOS) management for nuclear facilities in accident conditions*" was proposed.

The activities performed in this research frame were structured and established in according to proposed objectives:

(I) Study on the actual situation of research in the human performance assessment
domain included in complex system management. In this phase the studies on used techniques and methods to investigate and analyze human errors which lead to the occurrence or the exacerbation of the accidents, the human and organizational factor and human reliability was achieved.
The results of this study are the data and the information necessary for each method or technique, the advantages and disadvantages of their use, so depending on research requirements can justify the development of other method.

(II) Theoretical study of the interfaces in MMOS. In this phase were performed the
following:

- The identification of the characteristics of each element (man. machine, organization)
- The identification and the analyzing of the man-machine interfaces (equipment)
- The identification and the analyzing of the man-organization interfaces (communication, procedures, work process, training, time, work environment). So that for each interface was developed a circumstances module which can influence positive or negative the MMOS performance in accident conditions.
- The identification and the analyzing of the machine -organization interfaces (maintenance plan, modification plan, management of aging, state of man-machine interfaces). So that for each interface was developed a circumstances module which can influence positive or negative the MMOS performance in accident conditions.

All interfaces identified in MMOS and the conditions which could be at any given time are in the database records (HUFAD_E – Human Factor Analysis Database _English). This database was developed in Microsoft Visual Basic 6.0 environment using SQL language query relational database.
Using the results of the studies, developed database and a software application (it was developed in Microsoft Visual Basic 6.0) a new approach (MMOSA) was developed. This method contents the following phases: the investigation process of the human actions; the appraisal of the possible human errors; the estimation of Basic Human Error

Probabilities (BHEP) from generic or/and specific database; the estimation of Conditional Human Error Probabilities (CHEP) by the determination of the dependence level between actions using a positive dependence model; the comprehension of the human actions in MMOS to identify the MMOS interfaces using our qualitative analysis model and the database (the positive or negative conditions which can influence the human action at the analysis moment are identified for each interface); the estimation of the human error probabilities (HEP); the documentation (it is a report which will contain all elements considered in analysis and all results to be incorporated both in PSA study and design process).

PhD Degrees Completed

Development of Advanced Computational Methods for Prognostics and Health Management in Energy Components and Systems

*Francesca Mangili
Supervisor: Prof. Enrico Zio
Co-supervisors: Piero Baraldi, Giulio Gola, Bent Helge Nystad*

For industry, unforeseen equipment failure is costly, both for repair and lost revenue. The maintenance strategies that are set up to face this problem traditionally fall into two categories: preventive maintenance, performed on a time-based schedule, and corrective maintenance, which is done when the equipment fails. The former is performed regardless of the actual condition of the equipment and may result in unnecessary maintenance; the latter may take long times and result in significant lost revenue. In recent times, a third strategy, predictive maintenance, is emerging, which is based on assessing the actual equipment condition and predict the optimal time at which performing maintenance. The underlying concept is that of failure prognostics, i.e., predicting the Remaining Useful Life (RUL) of the equipment defined as the amount of time it will continue to perform its function according to design specifications.

Prognostics is a relatively new research field which is still in the development phase. Many diverse prognostic methods have been proposed in the last decades, primarily due to the wide variety of systems, components and applications they have been designed for. Those methods can be classified in model-based methods, which make use of an explicit mathematical model of the degradation process to predict the future equipment degradation state and, thus, its RUL, and

data-driven methods, which base their predictions on the historical data available. Among data-driven approaches one can distinguish between degradation-based methods, learning a model of the degradation process from the time series of the observed degradation states through regression/trend analysis or stochastic process modeling, and direct RUL prediction methods, deriving the equipment RUL from a mapping between the observations and the equipment RUL, which has been learned from historical data through Artificial Intelligence techniques.

Two of the main open issues that remain in the field of prognostics are how to efficiently use different types of information available and how to correctly treat all possible sources of uncertainty affecting this information. Indeed, different forms of information and data may be available for the assessment of the evolution to failure of degrading equipment. Depending on the situation, different prognostic approaches may be applied to develop a prognostic model which should project the current equipment condition in time, in the absence of future measurements about its degradation state and operational conditions; this leads to propagating large uncertainties which need to be assessed and managed. Prognostic uncertainty management requires the identification, classification and analysis of all sources of uncertainty with the aim of associating uncertainty estimates to the RUL predictions provided, so to measure the expected mismatch between the real and predicted equipment failure times, which can be used by the decision maker to confidently plan maintenance actions, according to the desired risk tolerance.

In this context, the goal of this PhD work has been to identify the most representative situations of information available, develop properly tailored prognostic approaches, and provide a critical investigation of the capabilities of different prognostic approaches to deal with various sources of uncertainty in the RUL prediction. The work has been performed within a cooperation between the Laboratorio di Analisi di Segnale ed Analisi di Rischio (LASAR) of the Department of Energy of Politecnico di Milano (lasar.cesnef.polimi.it), and the division of Computerised Operation Support Systems (COSS) of the Institute For Energy Technologies, OECD Halden Reactor Project in Halden, Norway (www.ife.no), which has financially supported the PhD grant.

As first undertaking, we have identified three practical situations with decreasing information available for the prognostic task, and developed prognostic methods properly tailored to tackle each of them. We have supplied methods for the quantification of the RUL prediction uncertainty and characterized the performance of the proposed prognostic methods in a case study with simulated data concerning prediction of the RUL of a turbine blade in which creep damage is developing. The use of artificial data has allowed performing a consistent analysis about the impact of the uncertainty affecting the prognostic information and develop models on the accuracy of the RUL prediction. In this respect, the work performed during this PhD has contributed to the way of investigating the capabilities of prognostic methods to deal with the RUL prediction uncertainty. Furthermore, we have investigated how the performance of the three proposed approaches varies depending on the quantity and quality of the available information. From this analysis, we have been able to provide the guidelines for the choice of the prognostic approach based on the observation that, if one is very confident about the accuracy of the available physical degradation model, the model-based approach should be preferred: on the other side, if one doubts about the model accuracy, the data-driven approach are, in general, more accurate, especially if the number of historical degradation trajectories observed is large. Finally, when multiple approaches with comparable degree of accuracy are available, an alternative strategy to the choice of the best performing approach consists in the combination of the outcomes of the different approaches. In this context, ensemble techniques have been introduced as an effective tool for aggregating different sources of available information and achieving high prediction accuracy and reliable confidence estimate.

In the industrial application of the prognostic approaches investigated in this work, one may very likely have to face additional problems related to the limited and unreliable information available about the equipment degradation state or about its future operating conditions. We have tackled these problems in two case studies with data collected from real industrial applications. In the first case study, we have faced the problem of deriving exploitable prognostic information from noisy and unreliable data taken from eroding choke valves used in the oil & gas industry, and provided a solution for data pre-treatment based on a hybrid ensemble of physics-based and data-driven models. In the second case study, we have considered the problem of predicting the RUL of clogging filters which are used to clean the sea water entering the condenser of a Swedish nuclear power plant. The challenge in this prognostic problem has been to handle the very large and unpredictable variations of the external conditions affecting the clogging process, in the absence of physics-based information about the degradation mechanism. To handle this situation, we have developed two advanced prognostic approaches based on nonparametric data-driven models: the first approach developed uses Gaussian process regression to build a probabilistic model of the clogging evolution; the second approach uses similarity-based regression to generate direct RUL predictions by comparing the observations collected on the filter of interest with some available historical sequences of observations collected on similar filters. In order to increase the robustness of the RUL prediction, we resorted to the belief function theory for treating the large uncertainties involved in the clogging process and combining the different types of uncertainty measures provided by the two approaches adopted.

From the results obtained with real data, we have derived the conclusion that, for an effective decision making policy, one should consider aggregating multiple pieces of information treated by complementary prognostic approaches, within an ensemble approach.

Information about Robustness Reliability and Safety in Early Design Phases

Vinicius Kaster Marini, Technical University of Denmark
Supervisor: Saeema Ahmed-Kristensen
Co-supervisor: Igor Kozine and Frank Markert

This thesis is motivated by the need for the support of robustness, reliability and safety (R2S) during early design phases. The thesis deals with the question of how to codify and communicate failures and hazards, and devises measures against R2S. The work has been performed at the Division for Technology and Innovation Management, a research unit within the Department of Management Engineering of the Technical University of Denmark.

Problems in the use of information about R2S do affect the timeliness of design decisions based on these attributes during the design process. The need to anticipate the handling of information about R2S in the design process stems from the need to ensure the right course on design options towards a solution candidate that should then undergo less significant changes after the design freeze. As current practice fails to benefit from knowledge about early designs, with information about R2S as criteria, design leaders become afraid of exploring new solutions. To address the use of information about R2S during early design phases, this research employs case studies to assess issues in the use of information about R2S: a pilot case to assess information requirements from R2S methods, and an industrial case to assess how the use of information about R2S influences concept development.

In the pilot case, FMEA, FTA and HAZOP were the current R2S methods selected for analysing the use risks from the reverse-engineered information on the washing machine design. Information about the behaviour of the washing machine was acquired from documentation and records, and then organized into categories. These compose a taxonomy developed to assess the information about these attributes that current methods require, and to address the need for clarity about design issues that result in risks to the development process. The taxonomy represented characteristics that affect R2S attributes in design, and helped to assess the availability of information about the design of the washing machine – used to fulfil the queries of the R2S methods selected for use in the pilot case.

As result, system components, their modes and states of operation were identified; moreover, direct dependencies (foreseeable) between events and their effects were also described. However, detailed design information was missing throughout the study, which impeded the evaluation and improvement of R2S attributes with the selected R2S methods. Design information needed to assess conditional dependencies between design parameters and events, such as situation-dependent events (FTA), provisions (FMEA) and safeguards (HAZOP), was poorly determined in the information available from reverse engineering. A conclusion from the pilot case regards the inability to complete selected R2S methods in the absence of detailed design information; information in conceptual design models can only be used to frame the scope of risks to the analyses of R2S attributes carried out with the selected models.

In the industrial case, a longitudinal study following the development of 20 alternatives for an insulin injection device was performed in partnership with the manufacturing company; there, concept development aimed at delivering a principle solution for further development as result from the design and evaluation of several solution alternatives. There, analyses of R2S attributes were carried out by the means of purpose-specific routines (e.g. parametric measurements and tolerance chains), and current R2S methods (ISO 31010, 2011). designers established criteria to evaluate the performance of alternatives; these reflected the degree to which alternatives were seen as meeting performance requirements regarding R2S attributes. Design decisions were found to be motivated by characteristics accessible through sufficient level of detail in the models of alternatives that were available for evaluation.

Evaluations on R2S attributes of alternatives were carried out less frequently during concept design, due to the actual construction and development of several alternatives. Here, a significant finding is the repetition of failure modes in apparently different designs, originated by similar failure mechanisms in two or more cases. In this situation, unnecessary iterations were carried out in developing separate alternatives that were rejected due to the same failure mode. This situation came as result of inconsistency between how designers understood failure modes as motivating rejection of designs (information from R2S methods) and how they reused that knowledge to solve that problem. This occurred mainly in functions with more physical interfaces, as this made more difficult for designers to identify failure mechanisms. Clear characterization of failure mechanisms during concept design was needed.
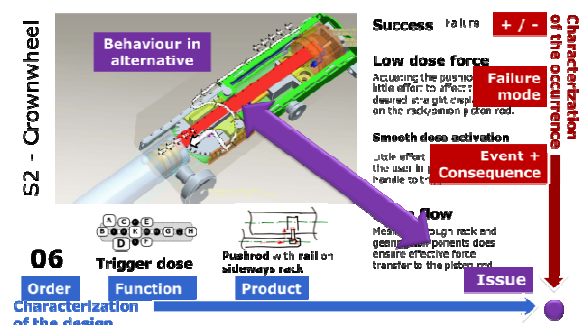
Figure 1 – Visual record for displaying failure and success modes during early design phases

For that purpose, an approach based on visual records (figure 1) was developed. The taxonomy generated in the pilot case was augmented to comprise the following types of information: Function, product, issue, failure mode, event and consequence. Information about these types of information was defined to be carried by text and icons, complemented by a graphic rendering of the alternative with icons representing individual design issues – failure and success modes. The approach was verified in a proof-of-concept basis by a team of engineering designers working in the manufacturing company, having between three and 15 years of experience; the verification was performed as an experimental task regarding the selection of alternatives and the solution of outstanding failure mechanisms in the selected design.

The procedure was observed and video-recorded; notes written by participants were also analysed and reverse-engineered against the original development project. Designers used the records of failure and success modes in two ways: firstly, by browsing through the records to find out obvious threads supporting their judgment; and secondly, by analysing individual records in more detail to clarify the implications of failure and success mechanisms to design requirements at the functional level. Participants agreed that the tool was providing better information about failure and success mechanisms than they used to have in their practice. As a result, they also reflected that the visualization of failure and success mechanisms in records helped them keep the focus on R2S attributes during the exercise.

Past Safety and Reliability Events

The 9th International Conference on Digital Technologies 2013 (DT 2013)
Zilina, Slovakia, 29-31 May 2013

Elena Zaitseva, co-chair of DT 2013,
University of Zilina, Slovakia

The "Digital Technology" is traditional International conference that is organized at University of Zilina (Slovakia). The 9th International Conference on Digital Technologies (DT 2013) was held on May 29-31, 2013 (http://dt.fri.uniza.sk/dt2013/). The Conference obtained the organization and financial support of ESRA and technical support of the IEEE.

The Conference covers a number of topics within digital signal processing, communication and control systems and networks, hardware and software solutions, reliability, risk and safety, testing and fault-

tolerant systems, pattern recognition and image processing, etc. The aim of the Conference is to bring together researches, teachers from academy as well as industry working in all areas of digital technologies. More than 50 papers from 15 countries were obtained. About 35 papers were selected on the basis of a review. Each paper has been reviewed more than two reviewers. The approved papers are organized into 4 plenary presentation and 7 working sections. In the plenary session, distinguished plenary speakers give a review of the future perspectives in their research areas: information technologies, telecommunication and its reliability and medical applications. The submitted papers were reviewed at least two reviewers from Conference Program Committee. The work and effort of the peers involved in the Program Committee in helping the authors to improve their papers are greatly appreciated. I thank all member of the Scientific Program Committee for support of reviewing process. About 75% submitted papers were published in the Conference Proceedings. The Conference Proceedings of DT 2013 has been included in the data base of IEEE Xplore and Scopus. Some selected papers have been recommended for publication in journals.

Three special workshops were organized in the framework of the Conference. One of them is International Workshop on Reliability Technologies (RT 2013). All papers presented at this Workshop were published in the Conference Proceedings. The Program Committee of this Workshop was formed by internationally recognized experts. Co-chairs of this Workshop Prof. R.Briš (Czech Republic) and Prof.E.Zio significantly contributed to organization of the RT 2013. Two plenary presentations were at this Workshop. I am especially grateful to Prof. R.Briš for his encouragement and help in the Conference and Workshop development. I would also like to acknowledge the local organizing committee, and in particular the team of Ph.D students from the University of Zilina (the firstly, to Jozef Kostolny for technical and administrative help during the Conference).

The 9th International Conference "Digital Technology" was supported by European Safety and Reliability Association. It was very important and useful for development of the Conference. The topic within reliability engineering has been one of

principal part of the Conference. Over 10 papers were presented in this Workshop. Four PhD students presented papers in reliability engineering at the RT 2013. They got grants of ESRA that support participation of PhD students and young researches. One of the Conference specificity is to involve scientists from EU-countries and post-Soviet countries.

The Conference has become well established in the international community, attracting a good mix of academics and industry participants that present and discuss subjects of interest and application across various industries. Beside the scientific field, several cultural and social events held in pleasant atmosphere. One of them is dinner at Museum of the Slovak Village and second is visit to vaults of the old city.

Zilina is a city located in the centre of Northwest Slovakia. The beauty of nature, the richness of cultural and historical monuments is typical for the region of Zilina.

I hope that next International Conference DT 2014 (http://dt.fri.uniza.sk/) in July 2014 involves a lot of participants active in reliability engineering and the Workshop on Reliability Technology will be developed.

Summer Safety and Reliability Seminar , SSARS 2013
Sopot, 29 June 2013

Krzysztof Kołowrocki
Joanna Soszyńska-Budny

The SSARS Seminars are organized each year by Polish Safety and Reliability Association – PSRA and European Safety and Reliability Association – ESRA in a resort Sopot placed at the Baltic seaside in Poland. The 7-th Seminar took place on 23-29.06.2013. and was chaired by Prof. Krzysztof Kołowrocki and Prof. Joanna Soszyńska-Budny from Gdynia Maritime University and Prof. Enrico Zio from Polytechnic of Milan.

The idea beyond the organization of the annual, one-week *Summer Safety and Reliability Seminars* is to provide a forum for discussing, advancing and developing methods for the safety and reliability analysis of the complex systems, which form the backbone of our modern Societies. The subjects of the Seminars are chosen each year by the Programme Board in an effort to dynamically represent the methodological advancements developed to meet the newly arising challenges in the field of safety and reliability analysis.

This year the emphasis was addressed to the following subjects:
• Reliability, Safety and Vulnerability of Systems and Networks;
• Risk Analysis Methods;
• Monte Carlo Simulation Methods Applications in Safety and Reliability;
• System Maintenance Optimization;
• Safety of Critical Infrastructures.

Both 1-2 hours lectures on advanced methods (accompanied by a corresponding full text of up to 12 pages) and technical presentations of 20-30 minutes on applications of such methods (with corresponding full text of up to 8 pages) were offered during the plenary sessions and the seminar sessions, respectively. Moreover two training courses and two workshops were organized.

The extended version of papers and lectures in the form of articles were collected in the *Journal of Polish Safety and Reliability Association, Summer Safety and Reliability Seminars – JPSRA, Volume 4, Numbers 1-2* (currently rated at 6 points on the Poland's Ministry of Science and Higher Education List of Scientific Journals and sent to Thompson & Reuters for evaluation and Impact Factor indexation), http://jpsra.am.gdynia.pl which constituted a reference textbook for the participants of the Seminars and all the researchers in the field. The *JPSRA* Editorial Board had performed the evaluations of all contributions and in all, 33 papers and lectures have been accepted for presentation during the Seminar and 26 out of them were published in the *JPSRA Volume 4*. 13 of the papers and lectures are included in its Number 1 and 13 of the papers and lectures are included in its Number 2.

Excellent social events, including Bowling Evening, Visiting Old Town Gdansk and Seminar Gala Dinner, were organized during SSARS 2013. At Seminar Gala Dinner, the Coronation of two New SSARS Professors, Prof. Joanna Soszyńska-Budny and Prof. Barbara Tchórzewska-Cieślak, was celebrated. The Coronation is illustrated in the attached photo.

SSARS 2013 was financially supported by the ESRA. This support, we thank a lot, helped us to make SSARS 2013 one of the excellent safety and reliability event of this year.
More details on SSARS 2013 may be found at http://ssars.am.gdynia.pl

The next SSARS 2014 will be he held in Sopot on 22-28.06.2014 and be mainly focused on the Safety, Security and Reliability, Preparedness and Resilience of Critical Infrastructures, Accident Consequences Analysis and Complex Systems and Processes Safety and Reliability Optimization which are currently main subjects in the world safety and reliability science activity.

PHM 2013

Piero Baraldi, The TPC Chairman
Francesco Di Maio, The Local Organizing
Committee Chairman
Enrico Zio, The General Conference Chairman

This year's Prognostics and System Health Management Conference, PHM 2013, took place at Politecnico di Milano, Milan (Italy) on September 8-11. The conference was the 4th edition of the IEEE Prognostics and System Health Management Conference series.
Prognostics and health management (PHM) is a field of research and application which aims at making use of past, present and future information on the environmental, operational and usage conditions of an equipment in order to detect its degradation, diagnose its faults, predict and proactively manage its failures. PHM provides solutions for effective condition-based and predictive maintenance strategies which reduce the risk of failure while supporting low maintenance costs. For these reasons, many efforts

are being devoted to the development of techniques for health monitoring, fault detection, diagnosis and prognosis with the intent of improving the safety and economic performances of existing and future structures, systems and components.
Close to 250 attendees from universities, research laboratories, industries and consultancy firms, shared four days of intense technical and social activities, creating a stimulating and pleasant atmosphere. The participation covered more than 20 countries, with a large contingent of young students.
The programme of the Conference has presented the state of the art and the new trends in prognostics and health management methods along with its various technical applications. To this aim has worked the Technical Programme Committee (TPC) of the Conference when reviewing the 306 abstracts and 276 papers submitted.
Thanks to ESRA financial support the conference programme was enriched by 4 plenary talks given by internationally recognized experts in the PHM field. Furthermore, the programme included 198 papers selected by the 93 reviewers. These papers ranges on a variety of methodological developments dealing with health monitoring, fault detection, diagnostics and prognostics, data-driven, model-based and hybrid PHM methods, uncertainty treatment in PHM, system-level PHM, design and integration of PHM systems, cost analysis of PHM, verification, validation, and maturation of PHM systems, standards for PHM, advanced sensors, data and signal processing, vibration analysis, condition-based and predictive maintenance, maintenance decision support systems, maintenance and human and organizational factors, physics of failure, reliability prediction, simulation and optimization.
Also practical PHM applications in the following industrial areas are presented: Aeronautics, Aerospace Automotive, Chemical and Process Industry, Electronics, Energy, Information Technology and Telecommunications, Manufacturing, Maritime Industry, Nuclear Industry, Oil & Gas, Structural Engineering, Train & Railway Industry.
Overall, we, as Organizers, feel very satisfied with the outcome of the PHM 2013 Conference: we certainly realize that this would have not been possible without the enthusiastic participation of all the authors, the Technical Programme Commette members, the reviewers, the Chairman and the local organizing committee.

ESRA News

"Continuing education course: Advanced methods for reliability, availability, maintainability, diagnostics and prognostics of industrial equipment"

Piero Baraldi

Since 1998, Politecnico di Milano has been organizing a professional one week training course on advanced methods for reliability, availability, maintainability, diagnostics and prognostics of industrial equipment. The goal of the course is to provide participants with the methodological competences and the computational tools necessary to tackle critical problems in the areas of reliability, availability, maintainability, diagnostics and prognostics. To this purpose, the course presents proven methods to improve safety, increase efficiency, manage equipment aging and obsolescence, automate maintenance and reduce maintenance costs of industrial systems. Since the beginning, the course has been officially supported by ESRA and since 2005 official scholarships have been offered; the last recipients have been a young Chinese researcher of Beihang University (2010), and three Ph.D. students (2011 and 2012). The 2013 edition of the course will be supported by ESRA with two scholarships covering the registration fee.

The first part of the course is devoted to the presentation of advanced methods for the availability, reliability and maintainability analysis of complex systems and for the development of Prognostics and Health Management (PHM) and Condition Based Maintenance (CBM) approaches. In this respect, the basics of Monte Carlo Simulation, nonlinear regression and filter models (Artificial Neural Networks, Principal Component Analysis, Auto Associative Kernel Regression, Ensemble Systems) and evolutionary optimization methods (Genetic Algorithms) is illustrated. In the second part of the course, exercise sessions on Monte Carlo simulation, Artificial Neural Networks, Principal Component Analysis, Auto Associative Kernel Regression and Genetic Algorithms provide the participants with the opportunity of directly applying the methods to practical case studies. Finally, in the last part of the course, real applications of the advanced methods are illustrated. The applications range from the evaluation of maintenance costs taking into account the reliability and availability of equipment, to the application of Monte Carlo Simulation for availability analysis and condition-based maintenance management and of regression and classification techniques to fault detection, classification and prognosis in complex industrial plants.

This year the course will be held between October 21 and 24 at the Energy Department of the Politecnico di Milano, Italy. For further information and registration you can send an email to piero.baraldi@polimi.it.

Calendar of Safety and Reliability Events

2013 Prognostics and System Health Management Conference - PHM 2013
Milan, Italy, 8-11 September 2013

Presentation of developments in various industrial fields is expected to highlight differences in research challenges and practical needs, while at the same time beneficiating from cross-fertilization of methods and applications.

The event is organized by AIDIC, The Italian Association of Chemical Engineering.

Details on the Conference may be found at http://www.aidic.it/phm>www.aidic.it/phm

The First Deadline for Abstract Submission is: **23 October, 2012**

Submission of abstracts can be done electronically at

http://www.aidic.it/phm/abstractsubmission.html>http://www.aidic.it/phm/abstractsubmission.html

Accepted papers presented during the Conference will be published in Chemical Engineering Transactions http://www.aidic.it/cet>http://www.aidic.it/cet. The quality of this publication is valued by ISBN & ISSN numbers, referenced by SCOPUS and THOMSON REUTERS (ISI Web of Knowledge, conference proceedings) indexes.

Also, the extended version of selected papers presented at the Conference will be proposed for special issues on indexed scientific journals.

For any further information or assistance you may contact the secretariat at phm@aidic.it.

Important dates

October 23, 2012 - Abstract Submission
November 23, 2012 - Abstract Acceptance
January 23, 2013 - Full Paper Submission
March 23, 2013 - Notification of Acceptance/Rejection
April 3, 2013 - Notification of lecture/poster presentation
May 23, 2013 - Final revised manuscript submission and Registration deadline for Authors to have the paper included in final program and proceedings

Secretariat

Correspondence should be addressed to AIDIC Secretariat:
PHM-2013 Secretariat
c/o AIDIC – The Italian Association of Chemical Engineering
Attn. Raffaella DAMERIO
Via Giuseppe Colombo 81/A - 20133 Milano (Italy)
Tel: +39-02-70608276; Fax: +39-02-70639402; e-mail: phm@aidic.it

Conference Website: www.aidic.it/phm

45th ESReDA Seminar on Dynamic Learning from Incidents and Accidents
Porto, Portugal, 23-24 October 2013

This seminar will be a forum for exploring several questions and solutions on dynamic learning in order to prevent accidents and improve business performance. It aims to discuss the issues related to learning opportunities, barriers and deficiencies and to share experiences from different sectors to identify possible paths ahead to better improve the implementation of lessons learned in risk management practice.
This international seminar is hosted by EDP - Gestão da Produção de Energia, S.A. a company of Energias de Portugal (EDP Group) in Porto Portugal.

Contact: johan.vandervorm@tno.nl

Website:
http://www.esreda.org/Events/Details/tabid/1814/articleType/ArticleView/articleId/850/45th-ESReDA-Seminar.aspx

11th International Probabilistic Workshop
Brno, Czech Republic
6 - 8 November 2013

The conference is intended for civil and structural engineers and other professionals concerned with structures, systems or facilities that require the assessment of safety, risk and reliability. Participants could therefore be consultants, contractors, suppliers, owners, operators, insurance experts, authorities and those involved in research and teaching.

Contact

Drahomír Novák and Miroslav Vorechovský
Brno University of Technology (BUT)
Faculty of Civil Engineering
Institute of Structural Mechanics
Czech Republic
Veverí 95, 602 00 Brno
Czech Republic
Tel: +420 541 147 360
Fax: +420 541 240 994
Email: ipw11@fce.vutbr.cz

Dirk Proske
University of Natural Resources and Applied Life Sciences, Vienna
Institute for Mountain Risk Engineering
Peter Jordan-Street 82
1190 Wien, Austria
Email: dirk.proske@boku.ac.at

Conference Website: http://ipw11.fce.vutbr.cz/

Workshop: Integration of stochastic energy in power systems (ISEPS)
Bucharest, Romania
7 November 2013

ISEPS brings together researchers and developers from both academia and industry to report on the latest scientific advances, to discuss major issues, to demonstrate state of-the-art systems, and trace the road to the future. The technical committee is responsible for plenary lecturing, workshop session chairing, identification of the potential developments and significant improvements of the contributions and selection of those improved lectures and papers worthy of publication in scientific journals. You may send your paper using ISESP workshop management tool

http://cmt.research.microsoft.com/ISEPS2013

The papers should comply to IEEE specifications for conference proceedings articles, as they will be indexed in IEEE Xplore, according to IEEE policy.

Please use Manuscript Templates for Conference Proceedings for A4 page size.

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Anatoli Paul Ulmeanu - University Politehnica of Bucharest, Romania
Nikolaos Limnios - Universite de Technologie de Compiegne, France

Important dates

May 30, 2013 - Proposals for invited sessions
July 30, 2013 - Electronic submission of papers
Sept 15, 2013 - Notification of acceptance
October 10, 2013 - Submission of camera-ready papers

mail: paul.ulmeanu@energ.pub.ro
Website: www.fiab.pub.ro

33rd International Conference on Offshore Mechanics and Arctic Engineering (OMAE 2014) Structures Safety and Reliability Symposium
San Francisco,CA,USA

8-13 June, 2014

Coordinator: Carlos Guedes Soares

Important dates
September 30, 2013 - Abstract Submission
October 21, 2013 - Abstract Acceptance
January 6, 2014 – Submission of Full-Length draft paper to review
January 27, 2014 – Notification of Paper Acceptance
March 16, 2014 – Submission of Final Paper

Conference Website: http://www.omae2014.com

7th International Conference Workingonsafety.net
Learning from the past to shape a safer future
Scotland, UK,
30 September – 03 October 2014

Workingonsafety.net is an international network of decision-makers, researchers and professionals responsible for the prevention of accidents at work. The network attracts researchers, regulators, inspection bodies, safety professionals and other experts in this field of research and policy-making. It consists of an Internet platform (www.workingonsafety.net) and a biennial conference).
The organizing committee of the 7th conference invite to Scotland, United Kingdom. The hosting organization is the Institution of Occupational Safety and Health (IOSH), based in Leicestershire, England. Abstracts should be submitted electronically through the conference website, www.wos2014.net.

Important dates

January 31, 2014 – Abstract Submission
Mid March, 2014 - Notification of Acceptance
June 15, 2014 - Full Paper Submission and end of early registration
August 31, 2014 – Deadline for the receipt of presentations
Secretariat

WOS Administrative Secretariat and National Organising Committee
Institution of Occupational Safety and Health
The Grange, Highfield Drive, Wigston, Leicestershire
LE18 1NN, UK
Tel: +44 (0) 116 257 3378
mail: info@wos2014.net

Conference Website: www.wos2014.net

ESRA Information

1 ESRA Membership

1.1 National Chapters
- French Chapter
- German Chapter
- Italian Chapter
- Polish Chapter
- Portuguese Chapter
- Spanish Chapter
- UK Chapter

1.2 Professional Associations
- The Safety and Reliability Society, UK
- Danish Society of Risk Assessment, Denmark
- SRE Scandinavia Reliability Engineers, Denmark
- ESReDA, France
- French Institute for Mastering Risk (IMdR-SdF), France
- VDI-Verein Deutscher Ingenieure (ESRA Germany), Germany
- The Netherlands Society for Risk Analysis and Reliability (NVRB), The Netherlands
- Polish Safety & Reliability Association, Poland
- Asociación Española para la Calidad, Spain

1.3 Companies
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- IDA Kobenhavn, Denmark
- VTT Industrial Systems, Finland
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- INRS, France
- Total, France
- Commissariat á l'Energie Atomique, France
- DNV, France
- Eurocopter Deutschland GMbH, Germany
- GRS, Germany
- SICURO, Greece
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- Autostrade, S.p.A, Italy
- D'Appolonia, S.p.A, Italy
- IB Informatica, Italy
- RINA, Italy
- TECSA, SpA, Italy
- TNO Defence Research, The Netherlands
- Dovre Safetec Nordic AS, Norway
- PRIO, Norway
- SINTEF Industrial Management, Norway
- Central Mining Institute, Poland
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- Cia. Portuguesa de Producção Electrica, Portugal
- Siemens SA Power, Portugal
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- IDEKO Technology Centre, Spain
- TECNUN, Spain
- TEKNIKER, Spain
- CSIC, Spain
- HSE - Health & Safety Executive, UK
- Atkins Rails, UK
- W.S. Atkins, UK
- Railway Safety, UK
- Vega Systems, UK

1.4 Educational and Research Institutions

- University of Innsbruck, Austria
- University of Natural Resources & Applied Life Sciences, Austria
- AIT Austrian Institute of Techn. GmbH, Austria
- Université Libre de Bruxelles, Belgium
- University of Mining and Geology, Bulgaria
- Czech Technical Univ. in Prague, Czech Republic
- Technical University of Ostrava, Czech Republic
- Technical University of Liberec, Czech Republic
- University of Defence, Czech Republic
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Technical University of Ostrava, Czech Republic

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4   Standing Committees

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The aim of this committee is to establish the general policy and format for the ESREL Conferences, building on the experience of past conferences, and to support the preparation of ongoing conferences. The members are one leading organiser in each of the ESREL Conferences.

4.2 Publications Standing Committee

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This committee has the responsibility of interfacing with Publishers for the publication of Conference and Workshop proceedings, of interfacing with Reliability Engineering and System Safety, the ESRA Technical Journal, and of producing the ESRA Newsletter.

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