

Skupovi – Izveštaji

15. Međunarodna istraživačko/ekspertna konferencija „Trendovi u razvoju mašina i srodnih tehnologija“ – TMT 2011

Konferencija je održana u Pragu od 12. do 18. septembra 2011. godine. Konferenciju je otvorio predsednik organizacionog odbora profesor Sabahudin Ekinović koji ju je i osnovao 1994. godine. Pozdravili su nas zatim i kopredsednici, iz Španije profesor Joan Calvet i iz Turske profesor Senay Yalcin.

Odmah po otvaranju usledila su dva plenarna predavanja. Prvo predavanje održao je Dr Ivo Bukovsky sa Mašinskog fakulteta Tehničkog Univerziteta iz Praga na temu *New Neural Architectures and New Adaptive Evaluation of Chaotic Time Series*. Drugo predavanje je održao profesor Paul Mehta, predavač na američkom Univerzitetu Bradley na temu *Applications of Waste Heat Recovery in Automotive Manufacturing Related Industries*.

Nastavljen je rad po sekcijama i održana je poster prezentacija.

Session 1 – Manufacturing Technologies and Materials

Session 2 – Industrial Engineering

Session 3 – Applied Technologies and Software Engineering

Session 4 – Mechanical Constructions and Design

Radovi su štampani u knjizi zbornika radova sa ISSN brojem.

Izdvojila bih kao interesantno najavu profesora Ekinovića za naredne konferencije. Naime, počev od iduće godine, umesto knjige zbornika radova biće objavljivan elektronski časopis *Journal of TMT* koji će biti referisan u EBSCO bazi. Obim radova i dalje ostaje isti, 4 strane, ali će oni biti dvojno recenzirani, a biće objavljeni samo usmeno izloženi radovi. Poster sekcija će biti ukinuta.

Ekipa iz Srbije je i ovoga puta bila brojna, pored nas, sa Tehnološko-metalurškog i Mašinskog fakulteta Univerziteta u Beogradu, učestvovali su i kolege iz Čačka, Bora, Novog Sada, Kraljeva, Kragujevca i Prištine.

Članovi DIVK koji su izlagali usmeno svoje radove:

- Menmed Behmen, Angela Topić, Miron Torlo, Mersida Manjgo (BiH): *Possibilities of applying technology vibrational relaxation on residual stresses in welding joints and its impact on the quality of weld characteristics*
- Ljubica Milović, Mersida Manjgo, Nina Andelić, Vesna Milošević, Zorana Jeli i Nikola Dondur (Srbija): *Behavior of P91 steel simulated HAZ at 600°C*
- Damir Hodžić, Ismar Hajro (BiH): *Investigation of ductile fracture arrest of high strength steels for gas pipeline application*
- Nedeljko Vukojević, Mustafa Imamović, Fuad Hadžikadunić (BiH): *Experimental and numerical analysis of stress conditions on turret*
- Fadil Islamović, Dženana Gačo, Esad Bajramović, Bahrudin Hrnjica (BiH): *Stress-strain analysis of the pressure vessels with the application of laws of similarity in mechanics*

Članovi DIVK koji su radove predstavili posterom:

- Meri Burzić, Olivera Popović, Radica Prokić-Cvetković, Zoran Radaković (Srbija): *Experimental determination of dynamic fracture toughness K_{Ia} with high strength metallic materials*
- Radomir Jovičić, Aleksandar Sedmak, Olivera Popović, Srđan Tadić, Aleksandar Bukvić, Katarina Jovičić (Srbija): *Influence of tensile flow aspects on the fracture of austenite–ferrite welded joints*
- Radica Prokić-Cvetković, Olivera Popović, Radomir Jovičić, Meri Burzić, Lazić Vukić, Dragan Cvetković (Srbija): *Possibilities of improving properties of microalloyed steel weld metal by choice of welding process and technology*
- Jasna Stajić-Trošić, Aleksandar Grujić, Dragutin Nedeljković, Aleksandar Stajčić, Mirko Stijepović, Tomáš Žák, Radoslav Aleksić (Srbija, Katar, Češka): *Magnetic behaviour of polymer bonded Nd-Fe-B composite materials*
- Endre Romhanji, Zijah Burzić, Vencislav Grabulov, Miljana Popović (Srbija): *Mechanical properties of two Al-Mg welded plates after applying different welding procedures*

Events – Reports

15th International Research/Expert Conference “Trends in the Development of Machinery and Associated Technology” – TMT 2011

The Conference was held in Prague, from September 12 to 18, 2011. The Conference was opened by the president of the organizing committee Professor Sabahudin Ekinović, who is also its founder in 1994. An opening speech followed by co-presidents, Professor Joan Calvet from Spain, and Professor Senay Yalcin from Turkey.

After the opening ceremony, two plenary lectures followed. The first lecture titled *New Neural Architectures and New Adaptive Evaluation of Chaotic Time Series* was given by Dr Ivo Bukovsky from the Technical University, Faculty of Mechanical Engineering, in Prague. The second lecture *Applications of Waste Heat Recovery in Automotive Manufacturing Related Industries* was presented by Professor Paul Mehta, from Bradley University, USA.

Conference activity continued in sessions with poster presentations.

Session 1 – Manufacturing Technologies and Materials

Session 2 – Industrial Engineering

Session 3 – Applied Technologies and Software Engineering

Session 4 – Mechanical Constructions and Design

Papers are printed in Conference Proceedings with ISSN number.

Very interesting is the announcement by Professor Ekinović concerning upcoming events. Apparently, from next year, conference proceedings will not be printed, rather the papers will be published in the electronic *Journal of TMT*, referenced in EBSCO. Paper length remains 4 pages, and shall be reviewed twice, and only oral presentations will be published. The poster session is cancelled.

Our team from the University of Belgrade, Faculties of Technology & Metallurgy and the Faculty of Mechanical Engineering were numerous again. Many of our colleagues from Čačak, Bor, Novi Sad, Kraljevo, Kragujevac and Priština had also participated.

DIVK members who had oral presentations:

- Menmed Behmen, Angela Topić, Miron Torlo, Mersida Manjgo (BH): *Possibilities of applying technology vibrational relaxation on residual stresses in welding joints and its impact on the quality of weld characteristics*
- Ljubica Milović, Mersida Manjgo, Nina Andelić, Vesna Milošević, Zorana Jeli, Nikola Dondur (Serbia): *Behavior of P91 steel simulated HAZ at 600°C*
- Damir Hodžić, Ismar Hajro (BH): *Investigation of ductile fracture arrest of high strength steels for gas pipeline application*
- Nedeljko Vukojević, Mustafa Imamović, Fuad Hadžikadunić (BiH): *Experimental and numerical analysis of stress conditions on turret*
- Fadil Islamović, Dženana Gačo, Esad Bajramović, Bahrudin Hrnjica (BH): *Stress-strain analysis of the pressure vessels with the application of laws of similarity in mechanics*

DIVK members who had poster presentations:

- Meri Burzić, Olivera Popović, Radica Prokić-Cvetković, Zoran Radaković (Serbia): *Experimental determination of dynamic fracture toughness K_{Ia} with high strength metallic materials*
- Radomir Jovičić, Aleksandar Sedmak, Olivera Popović, Srđan Tadić, Aleksandar Bukvić, Katarina Jovičić (Srbija): *Influence of tensile flow aspects on the fracture of austenite–ferrite welded joints*
- Radica Prokić-Cvetković, Olivera Popović, Radomir Jovičić, Meri Burzić, Lazić Vukić, Dragan Cvetković (Serbia): *Possibilities of improving properties of microalloyed steel weld metal by choice of welding process and technology*
- Jasna Stajić-Trošić, Aleksandar Grujić, Dragutin Nedeljković, Aleksandar Stajčić, Mirko Stijepović, Tomáš Žák, Radoslav Aleksić (Serbia, Qatar, Czech): *Magnetic behaviour of polymer bonded Nd-Fe-B composite materials*
- Endre Romhanji, Zijah Burzić, Vencislav Grabulov, Miljana Popović (Serbia): *Mechanical properties of two Al-Mg welded plates after applying different welding procedures*

- Emina Džindo, Jasmina Lozanović, Jasmina Milenković (Serbia): *Risk and safety management in industry, methodology for the identification of major accident hazards*
- Zijah Burzić, Meri Burzić (Serbia): *Stress state of boiler tubes for structural integrity assessment*
- Zoran Perović (Crna Gora): *The weld profile effect on stress concentration factors in weldments*
- Josip Kacmarcik, Nedeljko Vukojević (BiH): *Comparison of design methods for openings in cylindrical shells under internal pressure reinforced by flush (set-on) nozzles*
- Fadil Islamović, Dženana Gačo, Atif Hodžić, Esad Bajramović, Bahrudin Hrnjica (BiH): *The selection of the optimum construction solution for the multi-chamber tank of large volume*

Lj. Milović

PROMOCIJE DIVK IZDANJA

Društvo za integritet i vek konstrukcija, pored vlastitog časopisa izdaje i stručne publikacije iz nauke i tehnike. Na ovogodišnjem 56. međunarodnom beogradskom sajmu knjiga (23–30. oktobar), na štandu Centra za promociju nauke je, u subotu 29. oktobra, predstavljena monografija u izdanju DIVK pod nazivom

Pressure Equipment Integrity Assessment by Elastic-Plastic Fracture Mechanics Methods

autora Aleksandra Sedmaka, Stojana Sedmaka i Ljubice Milović. Monografiju su predstavili dr Vencislav Grabulov i prof. dr Dragoslav Šumarac, a u ime autora je govorila Ljubica Milović. To je ujedno bila i najposećenija promocija na štandu Centra za promociju nauke.

Za sve zainteresovane koji nisu prisustvovali premijeri održana je reprizna promocija u svečanoj sali Tehnološko-metalurškog fakulteta Univerziteta u Beogradu, u sredu 9. novembra. O knjizi su tom prilikom govorili dr Marko Rakin i dr Vencislav Grabulov, a u ime autora Aleksandar Sedmak.

Knjiga se u bibliografsko-kataloškoj bazi podataka vodi kao naučna monografija pisana na engleskom jeziku, ISBN 978-86-905595-1-0 i sadrži sledeća poglavlja:

1. Fracture mechanics and fracture resistance in elastic-plastic range
2. Factors affecting loaded pressure equipment in service
3. Maintenance
4. Quality assurance, directives and structural integrity
5. Case studies
6. Index

Na kraju svakog poglavlja čitaoca očekuje iscrpan spisak kako korišćene tako i literature koja će pomoći čitaocu da upotpuni znanja iz date oblasti. Ukoliko ste zainteresovani da kupite preostale nepoklonjene primerke monografije možete nam pisati na našu e-mail adresu:

kancelarija@divk.org.rs

DIVK EDITION PROMOTIONS

The Society for Integrity and Life (DIVK) issues professional publications in science and technology apart from the scientific journal. This year DIVK has published a monograph titled

Pressure Equipment Integrity Assessment by Elastic-Plastic Fracture Mechanics Methods

by Aleksandar Sedmak, Stojan Sedmak and Ljubica Milović.

The monograph was presented by Dr Vencislav Grabulov and Prof. Dr Dragoslav Šumarac at the 56th Belgrade International Book Fair (October 23-30, 2011), at the *Centre for the Promotion of Science* exhibit. Ljubica Milović spoke in the name of the authors. It was the most visited promotion at the exhibit of the Centre for the Promotion of Science.

For all interested parties who did not attend the premiere at the book fair, another promotion was held in the Ceremonial Hall of the Faculty of Technology and Metallurgy, University of Belgrade, on November 9, 2011. The book was discussed by Dr Marko Rakin and Dr Vencislav Grabulov, and by Prof Dr Aleksandar Sedmak in name of the authors.

The book is registered in the bibliographic catalogue database as a leading scientific monograph written in English, ISBN 978-86-905595-1-0 with the following contents:

1. Fracture mechanics and fracture resistance in elastic-plastic range
2. Factors affecting loaded pressure equipment in service
3. Maintenance
4. Quality assurance, directives and structural integrity
5. Case studies
6. Index

At the end of each chapter, the reader can find an exhaustive list of literature that is used and the literature that can help the reader to complete the knowledge of a given area. If you wish to buy this monograph, please write to us at:

kancelarija@divk.org.rs

Lj. Milović

DIVK FORUM – PRIKAZ

Na sednici UO DIVK je rešeno da Društvo nastavi sa mesečnim stručnim okupljanjima u vidu tematskih foruma koje će voditi moderator zadužen da pozove goste, stručnjake iz oblasti o kojoj će biti diskutovano na forumu.

Prvi u nizu DIVK foruma ove godine je održan na Mašinskom fakultetu Univerziteta u Beogradu 17. novembra 2011. Moderator je bio dr Nenad Radović, vanredni profesor Tehnološko-metalurškog fakulteta Univerziteta u Beogradu, tema je bila *Mikrolegirani čelici danas*. Interesovanje je bilo prilično pa je forum trajao 90

The Society's Governing Board has decided to the DIVK Society should continue with monthly professional meetings in the form of thematic forums (round tables) that shall be led by a host who shall invite guests, experts in fields that shall be discussed.

This year's first such DIVK Forum was held at the Faculty of Mechanical Engineering, University of Belgrade, November 17, 2011, and hosted by Dr Nenad Radović, Associate Professor from the Faculty of Technology and Metallurgy, University of Belgrade. The theme was *Microalloyed Steels Today*, and the forum lasted

minuta, u diskusiji je pojašnjeno ponašanje ovih čelika u eksploataciji i mogućnosti degradacije osobina usled nepropisnog zavarivanja ili održavanja. Neki od prisutnih su izneli i svoja iskustva iz korišćenja ovih čelika.

Sledeće okupljanje je zakazano za decembar ove godine, tema je *Most Gazela-dan posle*, a moderator je inž. Miodrag Pavišić. O detaljima predstojećeg foruma možete se obavestiti na sajtu DIVK <http://divk.inovacionicentar.rs>

U nastavku sledi kratak pregled rada prvog foruma ove sezone.

MIKROLEGIRANI ČELICI DANAS

Godišnja proizvodnja čelika za 2010 godinu od 1413,6 miliona tona predstavlja istorijski maksimum i povećanje od preko 80% u odnosu na 1999. godinu. Velika potražnja za čelikom je podstakla intenzivni razvoj različitih kvaliteta i vrsta čelika. Kontinuirani razvoj konstrukcionih čelika je rezultirao razvojem mikrolegiranih čelika, koji su uspeli da ispune dva najvažnija zahteva: (1) značajno povećanje čvrstoće i žilavosti, koje rezultira smanjenjem težine konstrukcije ili povećanjem nosivosti i (2) potrebu svetskog tržišta za cevovodima koji se lako zavaruju.

Da bi se ispunili ovi zahtevi, moralo se odstupiti od klasičnog „recepta“ za povećanje čvrstoće na bazi povećanja sadržaja ugljenika i legirajućih elemenata, jer je to povezano sa veoma skupim dodatnim materijalima i rigoroznim ograničenjima pri zavarivanju.

Mikrolegirani čelici su čelici kod kojih mali dodatak legirajućih elemenata dovodi do intenzivnog smanjenja zrna i/ili taložnog ojačavanja usled izdvajanja stabilnih čestica karbida, nitrida ili karbonitrida. To su čelici legirani niobijumom (Nb) i/ili vanadijumom (V) i/ili titanom (Ti), u ukupnom sadržaju sva tri elementa ispod 0,15%; od drugih legirajućih elemenata mogu se dodavati i bor (B) i molibden (Mo). Sa masovnom primenom i razvojem ovih čelika počelo se šezdesetih godina prošlog veka, što se poklapa sa počecima komercijalne proizvodnje ferolegura, pogotovo feroniobijuma.

Glavni mehanizam za istovremeno povećanje i čvrstoće i žilavosti je smanjenje veličine zrna. U niskougljeničnim mikrolegiranim čelicima se smanjenje veličine zrna ostvaruje primenom različitih tehnologija termomehničke prerade. Predvaljanje i završno valjanje se izvode u temperaturnim intervalima u kojima se kontrolišu međusobni odnosi između deformacionog ojačavanja, rekristalizacije i taloženja, u toku provlaka i u toku pauza između provlaka. Na taj način se dobija austenitna struktura sa sitnim zrnom iz koga se zatim dobija veoma sitno feritno zrno. Nivo osobina može se dodatno kontrolisati i izborom hemijskog sastava i promenom brzine hlađenja. Sa druge strane, sadržaj ugljenika (C) je ispod 0,08%, što uz prisustvo 0,015% Ti, koji sprečava rast zrna u zoni pod uticajem toplote, obezbeđuje bolju zavarljivost.

Druga namena mikrolegiranih čelika je rezultat potrebe da se smanje proizvodni troškovi poboljšanih (kaljenih i otpuštenih) čelika. Oni se posle kovanja kale, otpuštaju, a često i ispravljaju i žare da bi se uklonili zaostali naponi. Sa druge strane, srednje-ugljenični mikrolegirani čelici nakon kovanja, u uslovima kontinuiranog hlađenja (hlađenje na mirnom vazduhu – normalizacija), dobijaju finalnu strukturu. Pošto se ovi čelici ne deformišu na temperaturama na kojima je sprečena rekristalizacija, zadovoljavajuća žilavost se postiže stvaranjem faza koje imaju dobru žilavost - acikularnog ferita. Pogodnim legiranjem moguće je kontrolisati kinetiku izdvajanja vanadijum-nitrida (VN) u austenitnoj matrici, odnosno, formiranje velikog broja preferentnih mesta za kasniji nastanak acikularnog ferita prilikom razlaganja austenita. U ovom trenutku ovi čelici ispunjavaju zadate zahteve, ali još uvek nisu dostigli žilavost poboljšanih čelika.

90 minutes. The discussion clarified the behaviour of these steels in exploitation and degradation of properties due to the improper welding and maintenance. Some colleagues who were present presented their experiences about these steels.

The next forum is scheduled in December this year, and the topic is *The Gazela Bridge-Day After*. The host will be Miodrag Pavišić. You may find some details on the next forum at DIVK website: <http://divk.inovacionicentar.rs>

A short review on the activity of the season's first forum follows.

MICROALLOYED STEELS TODAY

The annual steel production for 2010 of 1413.6 million tonnes is a historical maximum and an increase of over 80% compared to 1999. Strong demands for steel have prompted intensive development of various qualities and grades. Continuous development of structural steels has resulted in the development of microalloyed steels, which had managed to meet two major requirements: (1) significant increase of strength and toughness, resulting in a reduction of structural weight capacity and (2) the world market's necessity for pipelines that are easily welded.

In order to meet these requirements, the classic “recipe” for strength increase on the basis of increased carbon content and alloying elements did not satisfy, since it is associated with very expensive materials and additional limitations in welding.

Microalloyed steels are steels where small addition of alloying elements leads to a high reduction of grain size and/or precipitation strengthening due from the stable carbide particle precipitates, nitrides or carbo-nitrides. These steels are alloyed with niobium (Nb) and/or vanadium (V) and/or titanium (Ti). The total content of all three elements is below 0.15%, and other alloying elements can be added as boron (B) and molybdenum (Mo). Wide usage and development of these steels began in the sixties, and coincides with the start of commercial production of ferro-alloys, especially ferro-niobium.

The main mechanism for simultaneous increase of both strength and toughness is the decrease in grain size. The grain size reduction in low carbon microalloyed steels is achieved by applying various thermomechanical processing technology. The pre-rolling and final rolling is performed in the temperature range in which mutual relations between deformation hardening, recrystallization and precipitation during the rolls are controlled and during breaks between passes. In this way, fine austenitic grain is achieved, from which very fine ferritic grain is produced. Properties can be further controlled by selecting and changing chemical composition and cooling rate. On the other hand, the content of carbon (C) is below 0.08%, which in the presence of 0.015% Ti, which prevents grain growth in the heat affected zone, provides better weldability.

The second purpose of microalloyed steels comes as the result of the need to reduce manufacturing costs of quenched and hardened steels. After forging they are quenched, tempered, and often straightened and annealed to remove residual stresses. On the other hand, the microalloyed mild steels after forging, under continuous cooling conditions (cooling the still air – normalisation), a final structure is obtained. As these steels do not deform at temperatures at which recrystallization is prevented, satisfactory toughness is achieved by creating phases of good toughness – acicular ferrite. Suitable alloying allows to control the kinetics of vanadium nitride (VN) precipitation in the austenitic matrix, i.e. the formation of a large number of preferential sites for subsequent formation of acicular ferrite during austenitic transformation. At this point, these steels meet the set requirements, but have not yet reached the toughness of quenched and tempered steels.

N. Radović

Skupovi u 2012.

Events in 2012

EUROJOIN 8 - Eighth European Congress on Joining Technologies

Pula (Hotel Histria), Croatia
May 24-26, 2012

<http://www.fsb.unizg.hr/hdtz>

NT2F12

Brasov, Romania
May 28-30, 2012

http://www.dimeg.poliba.it/NT2F/NT2F/Home_NT2F12.html

International Conference on Damage Mechanics

Belgrade, Serbia
June 25-27, 2012

<http://www.icdm.rs/icdm>

ECF19 – 19th European Conference on Fracture 2012

Kazan Scientific Centre of the Russian Academy of Sciences, Kazan, Russia
26-31 August 2012

<http://www.ecf19.ru>

International Conference on Fatigue Damage of Structural Materials IX

The Resort and Conference Centre at Hyannis, MA, USA
September 16-21, 2012

<http://fatiguedamageconference.com/index.html>

11th International Conference on Fracture and Damage Mechanics

Xi'an City, Shaanxi Province, China
September 18-21, 2012

<http://conference.hrbeu.edu.cn/conference/ShowArticle.asp?ArticleID=21>

M. Tošić

PREGLED STRANIH IZDAVAČA – REVIEW OF FOREIGN PUBLISHERS

Blackwell
Publishing



BUTTERWORTH
HEINEMANN
Engineering



WOODHEAD PUBLISHING LIMITED
incorporating CHANDOS PUBLISHING



Wiley-VCH

Advanced Materials

Advanced Materials brings the latest progress in materials science for more than 20 years. Selected, top-quality reviews, communications, research news at the cutting edge of chemistry and physics of functional materials. ISI 2010 Impact Factor is 10.857, as one of the leading journals in materials science. ISSN: 0935-9648 (print), 1521-4095 (online). CODEN: ADVMEW. Volume 23. 48 Issues in 2011. KoBSON service.

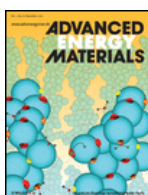
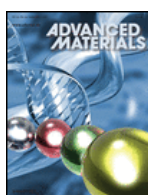
Readership: materials scientists, chemists, physicists, ceramists, engineers, metallurgists.

Keywords: materials science, nanotechnology, liquid crystals, semiconductors, superconductors, optics, lasers, sensors, porous materials, light emitting materials, ceramics, thin films, colloids, biological, magnetic, advanced and energy materials.

Wiley-VCH

Advanced Energy Materials

New journal: *Advanced Energy Materials* is an international, interdisciplinary, English-language forum of original peer-reviewed contributions on materials used in all forms of energy harvesting, conversion and storage. The journal covers all topics in energy-related research: organic and inorganic



photovoltaics, batteries and supercapacitors, fuel cells, hydrogen generation and storage, thermoelectrics, water splitting and photocatalysis, solar fuels and thermosolar power, magnetocalorics, piezoelectronics. ISSN: 1614-6832 (print). 1614-6840 (online). Volume 1, 6 Issues in 2011. KoBSON service.

Readership: materials scientists, chemists, physicists and engineers in academia as well as industry.

Wiley-VCH

X-Ray Spectrometry

Devoted to rapid publication of papers dealing with theory and application of x-ray spectrometry using electron, x-ray photon, proton, gamma and gamma -x sources. Covers advances in techniques, methods and equipment, provides platform for the discussion of more sophisticated X-ray analytical methods. Both wavelength and energy dispersion systems are covered together with a range of data handling methods, from the most simple to very sophisticated software programs. Online ISSN: 1097-4539. IF: 1.661. KoBSON service.

Readership: chemists, physicists, geochemists, researchers in environmental analysis and surface analysis

Keywords: x-ray spectrometry, electron, photon, proton, gamma-ray, wavelength, energy dispersion, diffraction, fluorescence.



Wiley-Blackwell

Experimental Techniques

Bimonthly interdisciplinary publication of the Society for Experimental Mechanics focusing on the development, application and tutorial of experimental mechanics techniques. Promotes pedagogical, technical and practical advancements in experimental mechanics while supporting commitment to interdisciplinary application, research and development, education. Online ISSN: 1747-1567. IF: 0.505. KoBSON service.

Keywords: experimental techniques, engineering, technical, computational, technology, analytical, materials science, mechanics.



Wiley-Blackwell

Quality and Reliability Engineering International

Devoted to practical engineering aspects of quality and reliability. A refereed bimonthly technical journal, it covers the development and practical application of existing theoretical methods, research and industrial practices. Articles are concerned with case studies, tutorial-type reviews and applications of new or well-known theory to the solution of actual quality and reliability problems in engineering. The scope includes components, physics of failure, equipment and systems from fields of electronic, electrical, mechanical and systems engineering. Areas covered are communications, aerospace, automotive, railways, shipboard equipment, control engineering and consumer products. Online ISSN: 1099-1638. IF: 0.452. KoBSON service.

Readership: electronic, aeronautic, transportation, communications, and mechanical engineers.

Keywords: design of experiments, statistical process control, process monitoring, process capability analysis, control charts, robust design, reliability engineering, capability indices, engineering process control, factorial designs, quality improvement, variability reduction.



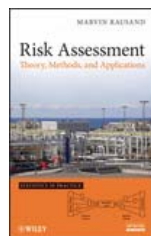
Wiley-Blackwell

Risk Assessment: Theory, Methods, and Applications

Marvin Rausand (Norwegian Univ. of Science and Technology)

Balanced coverage of theory and applications along with standards and regulations, serves as a comprehensive introduction to the topic. The book serves as a practical guide to current risk analysis and risk assessment, emphasizing the possibility of sudden, major accidents across various areas of practice from machinery and manufacturing processes to nuclear power plants and transportation systems. Organized into two sections that outline key theory, methods, and applications. *Introduction to Risk Assessment* defines key concepts and details the steps of a thorough risk assessment along with necessary quantitative risk measures. Chapters outline the overall risk assessment process, and a discussion of accident models and accident causation offers new insights into how and why accidents occur to help make better assessments. *Risk Assessment Methods and Applications* carefully describes the most relevant methods for risk assessment, including preliminary hazard analysis, HAZOP, fault tree-, and event tree analysis. Each method is accompanied by a self-contained description as well as workflow diagrams and worksheets that illustrate the use of discussed techniques. Problem areas in risk assessment, such as barriers and barrier analysis, human errors, and human reliability, are discussed along with uncertainty and sensitivity analysis.

An excellent book for courses on risk analysis and risk assessment at the upper-undergraduate and graduate levels. Serves as a



valuable reference for engineers, researchers, consultants, and practitioners who use risk assessment techniques in their everyday work.

Contents:

Part I. Introduction to Risk Assessment. (1. Introduction. 2. The Words of Risk Analysis. 3. Hazards and Threats. 4. How to Measure and Evaluate Risk? 5. Risk Management. 6. Accidents Models. 7. Data for Risk Analysis.)

Part II. Risk Assessment Methods and Applications. (8. Risk Assessment Process. 9. Hazard Identification. 10. Causal and Frequency Analysis. 11. Development of Accident Scenarios. 12. Barriers and Barrier Analysis. 13. Human Reliability Analysis. 14. Job Safety Analysis. 15. Common Cause Failures. 16. Uncertainty and Sensitivity. 17. Development and Applications of Risk Assessment.)

Part III. Appendices. (Elements of Probability Theory. Acronyms. Glossary. References.)

ISBN: 978-0-470-63764-7

Hardcover, 664 p. September 2011

Wiley-Blackwell

Practical Reliability Engineering, 5th Ed. Patrick O'Connor, Andre Kleyner

With emphasis on practical aspects of engineering, this bestseller has gained worldwide recognition through progressive editions as the essential reliability textbook. Unique balanced mixture of reliability theory and applications, thoroughly updated with latest industry best practices. Fulfills the requirements of the Certified Reliability Engineer curriculum of the American Society for Quality (ASQ). Each chapter is supported by practice questions, and a solutions manual is available to course tutors via the companion website. Enhanced coverage of mathematics of reliability, physics of failure, graphical and software methods of failure data analysis, reliability prediction and modelling, design for reliability and safety, and management and economics of reliability programmes.

New chapters on applications of Monte Carlo simulation methods and reliability demonstration methods. Software applications of statistical methods, including probability plotting and wider use of common software tools. More detailed descriptions of reliability prediction methods. Comprehensive treatment of accelerated test data analysis and warranty data analysis. Revised and expanded end-of-chapter tutorial sections. For a wide range of readers from college students to seasoned engineering professionals involved in the design, development, manufacture and maintenance of reliable engineering products and systems.

Contents:

Prefaces to I, II, III, Revised, IV, and V Edition.

Notation and Definitions.

1 Introduction to Reliability Engineering.

2 Reliability Mathematics.

3 Life Data Analysis and Probability Plotting.

4 Monte Carlo Simulation.

5 Load–strength Interference.

6 Reliability Prediction and Modelling.

7 Design for Reliability.

8 Reliability of Mechanical Components and Systems.

9 Electronic Systems Reliability.

10 Software Reliability.

11 Design of Experiments and Analysis of Variance.

12 Reliability Testing.

13 Analysing Reliability Data.

14 Reliability Demonstration and Growth.

15 Reliability in Manufacture.

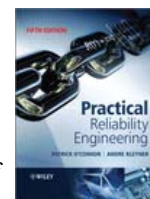
16 Maintainability, Maintenance and Availability.

17 Reliability Management.

Appendix 1 The Standard Cumulative Normal Distribution Function

Appendix 2 $\chi^2(a, n)$ Distribution Values

Appendix 3 Kolmogorov–Smirnov Tables



Appendix 4 Rank Tables (5%, 95%)

Appendix 5 Failure Reporting, Analysis and Corrective Action System (FRACAS)

Appendix 6 Reliability, Maintainability (and Safety) Plan Example

Appendix 7 Matrix Algebra Revision, Index

ISBN: 978-0-470-97981-5, Paperback, Wiley Desktop Edition, Hardcover, E-Book, 512 p., January 2012

Wiley-Blackwell

System Health Management: with

Aerospace Applications

Stephen B Johnson (Editor), is Health Management Systems Engineer at NASA Marshall Space Flight Center (USA), and associate research professor at University of Colorado, Colorado Springs.



Provides the first complete reference text for System Health Management (SHM), the set of technologies and processes used to improve system dependability. Edited by a team of engineers and consultants with SHM design, development, and research experience from NASA, industry, and academia. Written primarily as reference text for practitioners, for those in related disciplines, and for graduate students in aerospace or systems engineering. Provides an introduction to major technologies, issues, and references in these disparate but related SHM areas. Since SHM has evolved most rapidly in aerospace, the various applications described in this book are taken primarily from aerospace industry. However, the theories, techniques, and technologies discussed are applicable to many engineering disciplines and application areas. Sections include basic theories and concepts of SHM, how it is applied in the system life cycle (architecture, design, verification and validation, etc.), most important methods used (reliability, quality assurance, diagnostics, prognostics, etc.), and how SHM is applied in operations (commercial aircraft, launch operations, logistics, etc.), to subsystems (electrical power, structures, flight controls, etc.) and to system applications (robotic spacecraft, tactical missiles, etc.).

Contents:

About the Editors, List of Contributors, Foreword, Preface.

Part One THE SOCIO-TECHNICAL CONTEXT OF SYSTEM HEALTH MANAGEMENT (The Theory of System Health Management; Multimodal Communication; Highly Reliable Organizations; Knowledge Management; The Business Case for SHM)

Part Two SHM AND THE SYSTEM LIFECYCLE (Health Management Systems Engineering and Integration; Architecture; System Design and Analysis Methods; Assessing and Maturing Technology Readiness Levels; Verification and Validation; Certifying Vehicle Health Monitoring Systems)

Part Three ANALYTICAL METHODS (Physics of Failure; Failure Assessment; Reliability; Probabilistic Risk Assessment; Diagnosis; Prognostics)

Part Four OPERATIONS (Quality Assurance; Maintainability: Theory and Practice; Human Factors; Launch Operations; Fault Management Techniques in Human Spaceflight Operations; Military Logistics)

Part Five SUBSYSTEM HEALTH MANAGEMENT (Aircraft Propulsion Health Management; Intelligent Sensors for Health Management; Structural Health Monitoring; Electrical Power Health Management; Avionics Health Management; Failure-Tolerant Architectures for Health Management; Flight Control Health Management; Life Support Health Management; Software)

Part Six SYSTEM APPLICATIONS (Launch Vehicle Health Management; Robotic Spacecraft Health Management; Tactical Missile Health Management; Strategic Missile Health Management; Rotorcraft Health Management; Commercial Aviation Health Management)

Glossary, Acronyms, Index

ISBN: 978-0-470-74133-7

Hardcover, E-Book, 664 p. July 2011

Wiley-Blackwell

Fatigue Design of Steel and Composite Structures: Eurocode 3: Design of Steel Structures. Part 1-9 Fatigue. Eurocode 4: Design of Composite Steel and Concrete Structures.

ECCS - European Convention (Editor), Associazione Portuguesa de (Editor) Alain Nussbaumer is professor of steel construction (laboratory ICOM)

at the Swiss Federal Institute of Technology in Lausanne (EPFL). Luis Borges is structural engineer at BG Consulting Engineers Ltd., Lausanne. Holds a PhD degree from EPFL in the domain of fatigue of tubular bridges and is a specialist for steel and steel-concrete composite structures. Laurence Davaine is senior engineer at France's national railway company (SNCF) and is specialist for steel and steel-concrete composite bridges. She holds a PhD degree from the French National school of Bridges and Roads (ENPC) in the domain of stability of plated girders for bridge applications.

This volume addresses the specific subject of fatigue, a subject not familiar to many engineers, but still relevant for proper and good design of numerous steel structures. It explains all issues related to the subject: Basis of fatigue design, reliability and various verification formats, determination of stresses and stress ranges, fatigue strength, application range and limitations. Contains detailed examples of application of the concepts, computation methods and verifications.

Contents:

Preface, Acknowledgments, Symbology, Terminology

1 Introduction (Basis of fatigue design in steel structures, Damage equivalent factor concept, Codes of Practice, Description of the structures used in the worked examples)

2 Application Range And Limitations (Introduction, Materials, Corrosion, Temperature, Loading rate, Limiting stress ranges)

3 Determination of Stresses and Stress Ranges (Fatigue loads, Damage equivalent factors, Calculation of stresses, Modified nominal stresses and concentration factors, Geometric stresses (hot spot stresses), Stresses in orthotropic decks, Calculation of stress ranges, Modified Nominal stress ranges, Geometric stress ranges)

4 Fatigue Strength (Introduction, Fatigue detail tables, Determination of fatigue strength or life by testing)

5 Reliability and Verification (Generalities, Strategies, Partial factors, Verification)

6 Brittle Fracture (Introduction, Steel quality, Relationship between different fracture toughness test results, Fracture concept in EN 1993-1-10, Standardisation of choice of material: maximum allowable thicknesses)

References, Annex A Standards for steel construction, Annex B Fatigue detail tables with commentary, Annex C Maximum permissible thicknesses tables

ISBN: 978-3-433-02981-7

Paperback, 334 p., October 2011

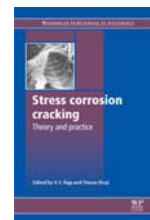
Woodhead Publishing Limited

Stress corrosion cracking: Theory and practice

V S Raja (Ed.) Professor at Department of Metallurgical Engineering and Materials Science at Indian Institute of Technology Bombay, India

T Shoji (Ed.) Professor at Fracture and Reliability Research Institute at Tohoku University, Japan

Examines the mechanisms of stress corrosion cracking (SCC) presenting recognising testing methods and materials resistant to SCC. Assesses the effect of SCC on particular metals featuring steel, stainless steel, nickel-based alloys, magnesium alloys, copper-based alloys and welds in steels. Reviews the monitoring and management of SCC and the affect of SCC in different industries such as petrochemical and aerospace. The book is divided into four parts. Part one covers the mechanisms of SCC and hydrogen



embrittlement, while the focus of part two is on methods of testing for SCC in metals. Chapters in part three each review the phenomenon with reference to a specific material, with a variety of metals, alloys and composites discussed, including steels, titanium alloys and polymer composites. In part four, the effect of SCC in various industries is examined, with chapters covering subjects such as aerospace engineering, nuclear reactors, utilities and pipelines. The book is an essential reference for engineers and designers working with metals, alloys and polymers. Invaluable tool for industries in which metallic components are exposed to tension, corrosive environments at ambient and high temperatures.

Contents:

Part 1 Fundamental Aspects of SCC and Hydrogen Embrittlement (Mechanistic and fractographic aspects of SCC; Hydrogen embrittlement (HE) phenomena and mechanisms)

Part 2 Test Methods for Determining SCC Susceptibilities (Testing and evaluation methods for SSC in metals)

Part 3 SCC in Specific Materials (SCC in low and medium strength carbon steels; SCC in stainless steels; Factors affecting SCC and fundamental mechanistic understanding of stainless steels; SCC in nickel-based alloys; SSC in aluminium alloys; SCC in magnesium alloys; SCC and hydrogen-assisted cracking in titanium alloys; SCC in copper and copper-based alloys; SCC of austenitic stainless and ferritic steel weldments; SCC in polymer composites)

Part 4 Environmentally-Assisted Cracking (EAC) Problems in Various Industries (SCC in boilers and cooling water systems; EAC in oil and gas production; SCC in aerospace vehicles; Prediction of SCC in nuclear power systems; Failures of structures and components by metal-induced embrittlement; SCC in pipelines)

ISBN 1 84569 673 5, ISBN-13: 978 1 84569 673 3

Hardback, 816 p., September 2011

© 2011 Woodhead Publishing Limited

Woodhead Publishing Limited

Power plant life management and performance improvement

J E Oakey (Ed.), Head of Energy Technology Centre at Cranfield University, UK

Woodhead Publishing Series in Energy No.23

Provides an overview of the improvements to plant efficiency in coal- and gas-based power plants. Critically reviews fundamental degradation mechanisms that affect conventional power plant systems and components, noting mitigation routes alongside monitoring and assessment methods. Addresses plant operation issues including fuel flexibility, condition monitoring and performance assessment. Examines operation, maintenance approaches and advanced plant rejuvenation and retrofit options that industries are applying to ensure overall plant performance improvement and life management.

Part one initially reviews plant operation issues, including fuel flexibility, condition monitoring and performance assessment. Parts two, three and four focus on coal boiler plant, gas turbine plant, and steam boiler and turbine plant respectively, reviewing environmental degradation mechanisms affecting plant components and their mitigation via advances in materials selection and life management approaches, such as repair, refurbishment and upgrade. Part five reviews issues relevant to the performance management and improvement of advanced heat exchangers and power plant welds. Is an essential reference for power plant operators, industrial engineers and metallurgists, and researchers.

Contents:

Part 1 Power Plant Fuel Flexibility, Condition Monitoring and Performance Assessment (Solid fuel composition and power plant fuel-flexibility; Condition monitoring and assessment of power plant components; Availability analysis of integrated gasification combined cycle (IGCC) power plants)



Part 2 Coal Boiler Plant: Materials Degradation, Plant Life Management and Performance Improvement (Environmental degradation of boiler components; Creep in boiler materials: mechanisms, measurement and modelling; Microstructural degradation in boiler steels: materials developments, properties and assessment; Boiler steels, damage mechanisms, inspection and life assessment)

Part 3 Gas Turbine Plant: Materials Degradation, Plant Life Management and Performance Improvement (Creep, fatigue and microstructural degradation in gas turbine superalloys; Gas turbine materials selection, life management and performance improvement; Gas turbine maintenance, refurbishment and repair)

Part 4 Steam Boiler and Turbine Plant: Materials Degradation, Plant Life Management and Performance Improvement (Steam oxidation in steam boiler and turbine environments; Steam boiler component loading, monitoring and life assessment; Steam turbine materials selection, life management and performance improvement; Steam turbine upgrades for power plant life management and performance improvement)

Part 5 Heat Exchangers and Power Plant Welds: Materials Management and Performance Improvement (High-temperature heat exchangers in indirectly fired combined cycle (IFCC) systems: materials management and performance improvement; Heat recovery steam generators: performance management and improvement; Power plant welds and joints: materials management and performance improvement)

ISBN 1 84569 726 X, ISBN-13: 978 1 84569 726 6

Hardback, 704 p., September 2011

© 2011 Woodhead Publishing Limited

Woodhead Publishing Limited

Pressure vessels: External pressure technology (Second edition)

C T F Ross, Professor of Structural Dynamics, University of Portsmouth

Presents an overview of the types of vessels under external pressure and materials used for construction. Assesses axisymmetric deformation and different types of instability covering vibration of pressure vessel shells. Explores novel pressure hulls, covering design, vibration and collapse concentrating on the design and non-linear analysis of submarine pressure hulls. Chapters 5 and 6 cover vibration of pressure vessel shells, both in water and out. Chapters 7 and 8 focus on novel pressure hulls, covering design, vibration and collapse, while chapters 9 and 10 concentrate on the design and non-linear analysis of submarine pressure hulls under external hydrostatic pressure. In chapter 11, the design, structure and materials of deep-diving underwater pressure vessels are discussed, focusing on their application in missile defence systems. Finally, chapter 12 analyses the vibration of a thin-walled shell under external water pressure, using ANSYS technology. Essential reference for stress analysts, designers, consultants and manufacturers of pressure vessels.

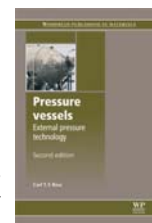
Contents:

An overview of pressure vessels under external pressure; Axisymmetric deformation of pressure vessels; Shell instability of pressure vessels; General instability of pressure vessels; Vibration of pressure vessel shells; Vibrations of pressure vessel shells in water; Novel pressure hull designs; Vibration and collapse of novel pressure hulls; Design of submarine pressure hulls to withstand buckling under external hydrostatic pressure; Non-linear analyses of model submarine pressure hulls, using ANSYS; Star Wars underwater: deep-diving underwater pressure vessels for missile defence systems; Vibration of a thin-walled shell under external water pressure, using ANSYSTM; Appendix.

ISBN 0 85709 248 0, ISBN-13: 978 0 85709 248 9

Hardback, 488 p., April 2011

© 2011 Woodhead Publishing Limited



Woodhead Publishing Limited

Fracture and fatigue of welded joints and structures

K Macdonald (Ed.), Professor, Department of Mechanical and Structural Engineering and Materials Science, University of Stavanger, Norway

Analyses the processes and causes of fracture and fatigue, focusing predicting and minimising the failure of welded joints in the design process. Assesses the fracture of welded joints and structure featuring constraint-based fracture mechanics for predicting joint failure. Explores specific considerations in fatigue analysis including the assessment of local stresses in welded joints and fatigue design rules for welded structures. Essential reference for mechanical, structural and welding engineers.

Contents:

Part 1 Analysing Fracture of Welded Joints and Structures (Constraint-based fracture mechanics in predicting the failure of welded joints; Constraint fracture mechanics: test methods; Fracture assessment methods for welded structures; The use of fracture mechanics in the fatigue analysis of welded joints)

Part 2 Analysing Fatigue of Welded Joints and Structures (Fatigue strength assessment of local stresses in welded joints; Improving weld class systems in assessing the fatigue life of different welded joint designs; Fatigue design rules for welded structures; Fatigue assessment methods for variable amplitude loading of welded structures; Reliability aspects in fatigue design of welded structure using selected local approaches: example of k-nodes for offshore constructions; Assessing residual stresses in predicting the service life of welded structures; Fatigue strength improvement methods)

ISBN 1 84569 513 5, ISBN-13: 978 1 84569 513 2

Hardback, 360 p., April 2011

© 2011 Woodhead Publishing Limited



Woodhead Publishing Limited

Gaseous hydrogen embrittlement of materials in energy technologies: The problem, its characterisation and effects on particular alloy classes (Volume 1)

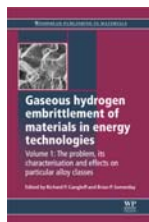
R P Gangloff (Ed.), is Ferman W. Perry Professor of Materials Science and Engineering, University of Virginia, Charlottesville, VA, USA.

B P Somerday (Ed.), member of the technical staff at Sandia National Laboratories, Livermore, California, USA.

Summarises the wealth of recent research on understanding and dealing with the safety, durability, performance and economic operation of using gaseous hydrogen at high pressure. Reviews how hydrogen embrittlement (HE) affects particular sectors such as the petrochemicals, automotive and nuclear industries and discusses how HE can be characterised and its effects on particular alloy classes. Reviews ways of characterising and testing for hydrogen-assisted fatigue and fracture and analyses the ways gaseous HE affects high-performance steels, superalloys, titanium and aluminium alloys.

Volume 1 is divided into three parts, the first of which provides an overview of the HE problem in specific technologies including petrochemical refining, automotive hydrogen tanks, nuclear waste disposal and power systems, and H₂ storage and distribution facilities. Part two examines modern methods of characterization and analysis of hydrogen damage, and part three focuses on the hydrogen degradation of various alloy classes.

A reference tool for engineers, designers, materials scientists, and solid mechanics working with safety-critical components fabricated from high performance materials required to operate in severe environments based on hydrogen. Impacted technologies include aerospace, petrochemical refining, gas transmission, power generation and transportation.



Contents:

Part 1 The Hydrogen Embrittlement (HE) Problem (Hydrogen production and containment; Hydrogen-induced disbonding and embrittlement of steels used in petrochemical refining; Assessing HE in automotive hydrogen tanks; Gaseous hydrogen issues in nuclear waste disposal; HE in nuclear power systems; Standards and codes to control hydrogen-induced cracking in pressure vessels and pipes for hydrogen gas storage and transport)

Part 2 Characterisation and Analysis of HE (Fracture and fatigue test methods in hydrogen gas; Mechanics of modern test methods and quantitative-accelerated testing for HE; Metallographic and Fractographic techniques for characterising and understanding hydrogen-assisted cracking of metals; Fatigue crack initiation and fatigue life of metals exposed to hydrogen; Effects of hydrogen on fatigue-crack propagation in steels)

Part 3 The HE of Alloy Classes (HE of high-strength steels; Hydrogen trapping phenomena in martensitic steels; HE of carbon steels and welds; HE of high-strength low-alloy (HSLA) steels and welds; HE of austenitic stainless steels and welds; HE of nickel, cobalt and iron-based superalloys; Hydrogen effects in titanium alloys; HE of aluminium and aluminium-based alloys; Hydrogen-induced degradation of rubber seals)

ISBN 1 84569 677 8, ISBN-13: 978 1 84569 677 1

Hardback, 864 p., January 2012

© 2011 Woodhead Publishing Limited

Woodhead Publishing Limited

Gaseous hydrogen embrittlement of materials in energy technologies: Mechanisms, modelling and future developments (Volume 2)

R P Gangloff (Ed.), is Ferman W. Perry Professor of Materials Science and Engineering, University of Virginia, Charlottesville, VA, USA.

B P Somerday (Ed.), member of the technical staff at Sandia National Laboratories, Livermore, California, USA.

Volume 2 is divided into three parts, part one looks at the mechanisms of hydrogen interactions with metals including chapters on the adsorption and trap-sensitive diffusion of hydrogen and its impact on deformation and fracture processes. Part two investigates modern methods of modelling hydrogen damage so as to predict material-cracking properties. The book ends with suggested future directions in science and engineering to manage HE of high-performance metals in energy systems.

Contents:

Part 1 Mechanisms of Hydrogen Interactions with Metals (Hydrogen adsorption on the surface of metals; Analysing hydrogen in metals: bulk thermal desorption spectroscopy (TDS) methods; Analysing hydrogen in metals: surface techniques; Hydrogen diffusion and trapping in metals; Control of HE of metals by chemical inhibitors and coatings; The role of grain boundaries in HIC of steels; Influence of hydrogen on the behavior of dislocations)

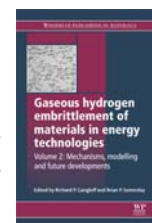
Part 2 Modelling Hydrogen Embrittlement (Modelling hydrogen induced damage mechanisms in metals; Hydrogen effects on the plasticity of fcc crystals; Continuum mechanics modelling of HE; Degradation models for HE; Effect of inelastic strain on hydrogen-assisted fracture of metals; Development of service life prognosis systems for hydrogen energy devices)

Part 3 The Future (Gaseous HE of high-performance metals in energy systems: future trends)

ISBN 0 85709 536 6, ISBN-13: 978 0 85709 536 7

Hardback, 520 p., January 2012

© 2011 Woodhead Publishing Limited



Z. Radaković