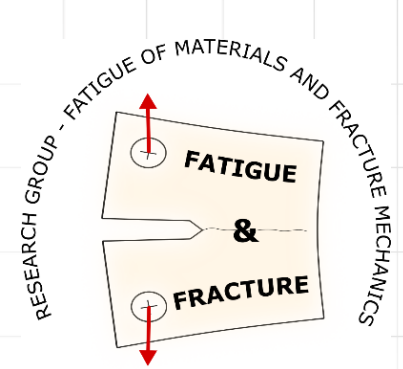




Wrocław University
of Science and Technology



RESEARCH GROUP – FATIGUE OF MATERIALS AND FRACTURE MECHANICS

DEPARTMENT OF MECHANICS, MATERIALS SCIENCE AND
BIOMEDICAL ENGINEERING



HR EXCELLENCE IN RESEARCH



Wrocław University
of Science and Technology

WUST TEAM MEMBERS



MSc. Eng.
Krzysztof Junik

HEAD
PhD. DSc. Eng.
Grzegorz Lesiuk,
Associate
Professor



PhD. Eng. Piotr
Kotowski



MSc. Eng.
Michał Smolnicki

PhD. DSc. Eng.
Mieczysław Szata,
Full Professor
(**Honorary Head**,
Former Director of
the Institute of
Materials Science
and Applied
Mechanics)



MSc Eng.
Szymon Duda



MSc Eng.
Monika Duda



HR EXCELLENCE IN RESEARCH



Wrocław University
of Science and Technology

RESEARCH ACTIVITY:

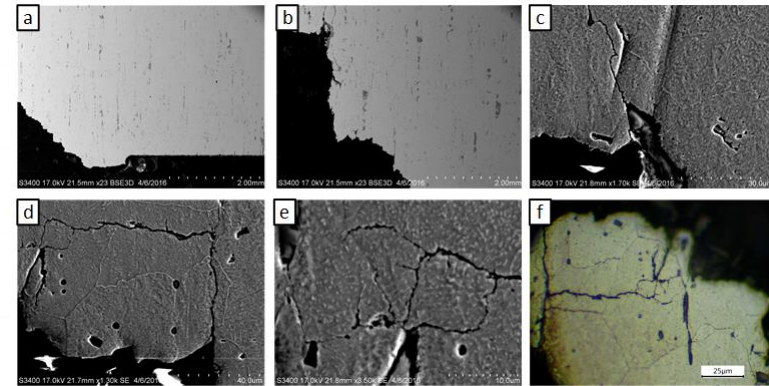
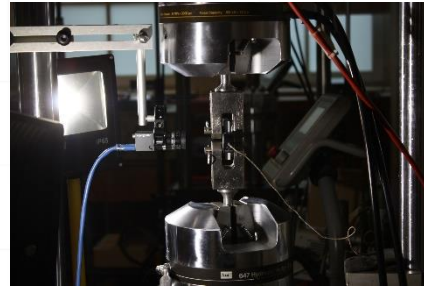
www.kmim.wm.pwr.edu.pl/fatigue

- Fundamental problems in fracture mechanics (metals, non-metals, polymers, composite materials, fibre-metal laminates)
- Fatigue fracture
- Structural Integrity of Materials and Structures
- Computational Fracture Mechanics
- Fatigue of Metals and non-metals
- Energy approach in fatigue and fracture modelling
- Experimental methods in fatigue and fracture of materials
- Fatigue and Fracture of hyperelastic materials
- Degradation of the materials – testing and modelling
- Multiaxial fatigue and mixed mode FCGR

LOCAL APPROACH - IN SITU MICROCRACK ANALYSIS DURING FATIGUE FRACTURE PROCESS

PhD. Thesis: MSc. Eng. Monika Duda „Effect of crack closure in 42CrMo4 steel under mixed mode loading condition” (in progres)

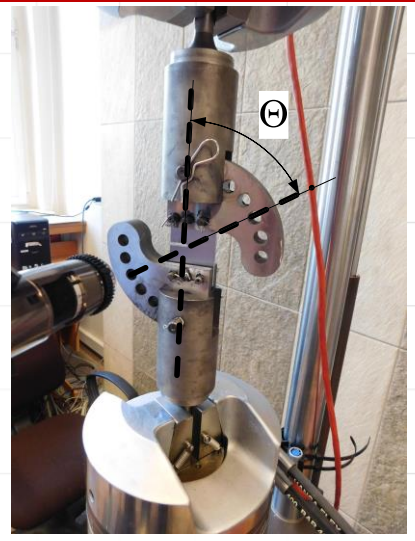
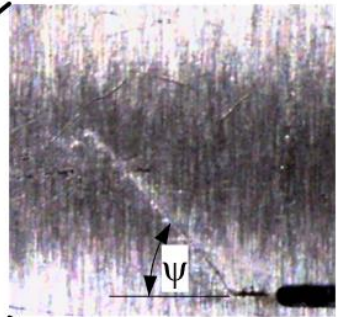
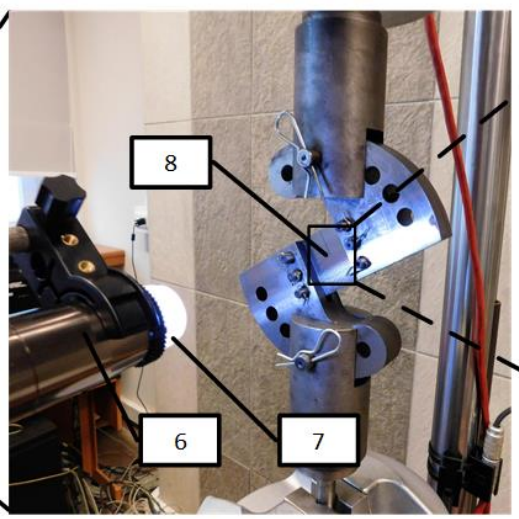
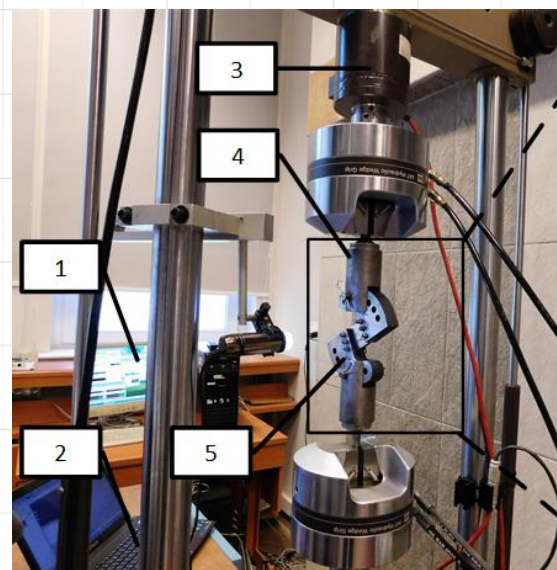
Supervisor (PhD. DSc. Eng. Grzegorz Lesiuk, Assoc. Prof.)



Mixed mode (I+II) fatigue crack growth – technical recommendations of testing

Technical recommendations – fatigue crack closure measurements

KINETICS OF CRACK GROWTH UNDER MIXED-MODE LOADING (I+II, II+III, I+III)



International Journal of Fatigue 113 (2018) 160–170

Contents lists available at ScienceDirect

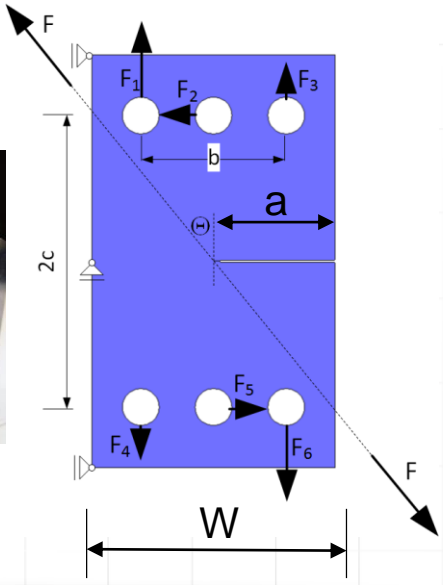
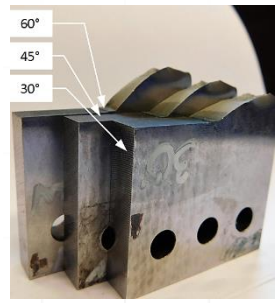
International Journal of Fatigue

journal homepage: www.elsevier.com/locate/ijfatigue

Experimental and numerical investigation of mixed mode I + II and I + III fatigue crack growth in S355J0 steel

Dariusz Rozumek^{a,*}, Zbigniew Marciniak^a, Grzegorz Lesiuk^b, José A. Correia^a, Abílio M.P. de Jesus^c

^a Opole University of Technology, Department of Mechanics and Machine Design, Mikołajczyka 5, 45-271 Opole, Poland
^b Faculty of Mechanical Engineering, Department of Mechanics, Materials Science and Engineering, Wrocław University of Science and Technology, Smoluchowskiego 25, 50-370 Wrocław, Poland
^c INEGI, Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal



MULTIAXIAL FATIGUE AND DAMAGE MODELING



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

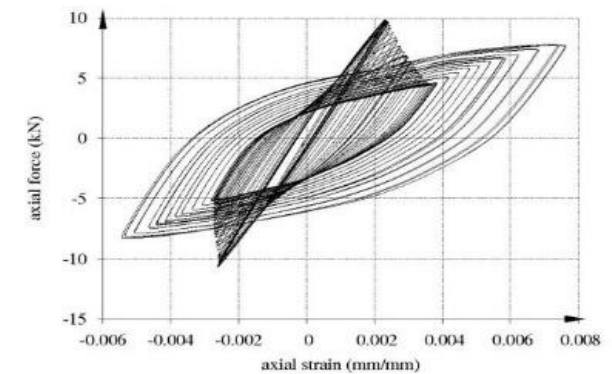
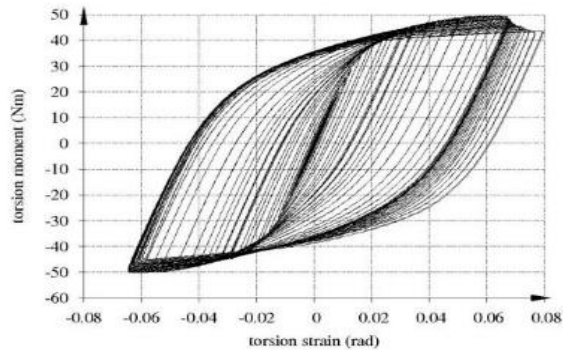
Engineering Failure Analysis

journal homepage: www.elsevier.com/locate/engfailanal



Evaluation of multi-axial high-cycle fatigue criteria under proportional loading for S355 steel

Rita Dantas^{a,*}, José Correia^{a,*}, Grzegorz Lesiuk^b, Dariusz Rozumek^c, Shun-Peng Zhu^d, Abílio de Jesus^a, Luca Susmel^e, Filippo Berto^f



MULTIAXIAL FATIGUE ctd.

AND NONLINEAR DAMAGE ACCUMULATION HYPOTHESIS



Received: 19 July 2018 | Revised: 12 September 2018 | Accepted: 14 September 2018
 DOI: 10.1111/ffe.12937

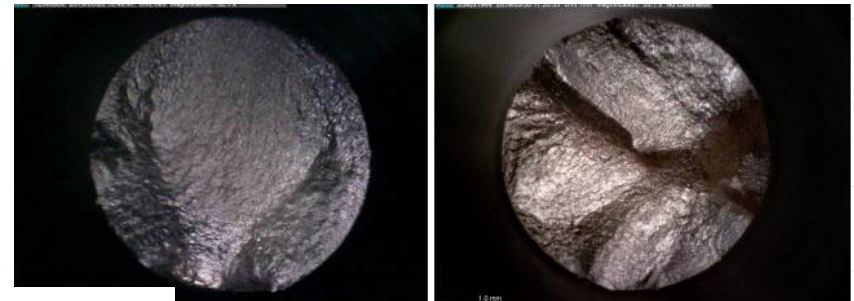
SPECIAL ISSUE CONTRIBUTION

WILEY **FFEMS** Fatigue & Fracture of Engineering Materials & Structures

Nonlinear fatigue damage accumulation and life prediction of metals: A comparative study

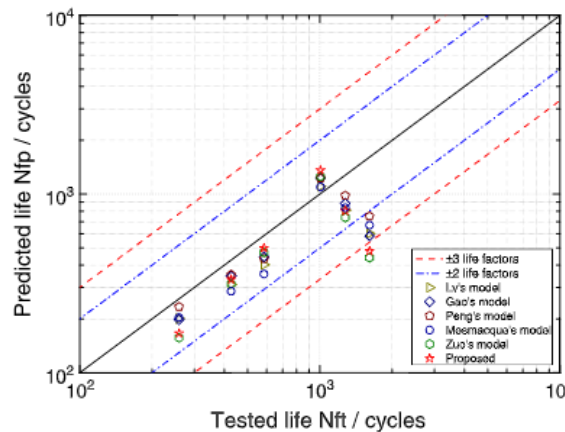
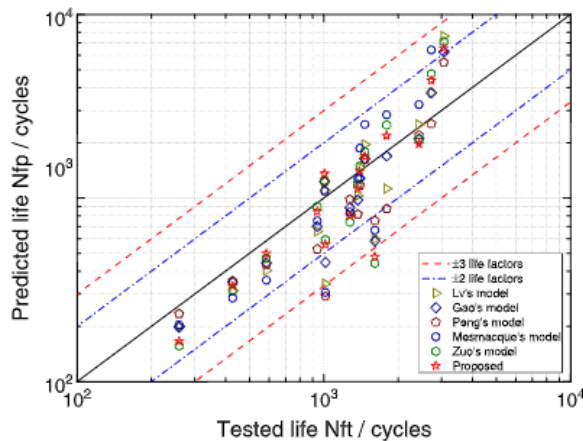
Shun-Peng Zhu^{1,2} | Yong-Zhen Hao¹ | José A.F. de Oliveira Correia³ |
 Grzegorz Lesiuk⁴ | Abílio M.P. de Jesus³

$$\frac{n_i}{N_{fi}} = \left(1 - \frac{n_1}{N_{f1}} - \frac{n_2}{N_{f2}} - \dots - \frac{n_{i-1}}{N_{fi-1}} \right) \left(\frac{\ln N_{f1}}{\ln N_{fi}} \right)^{\frac{\sigma_i - 1}{\sigma_i}}$$



Specimen 15

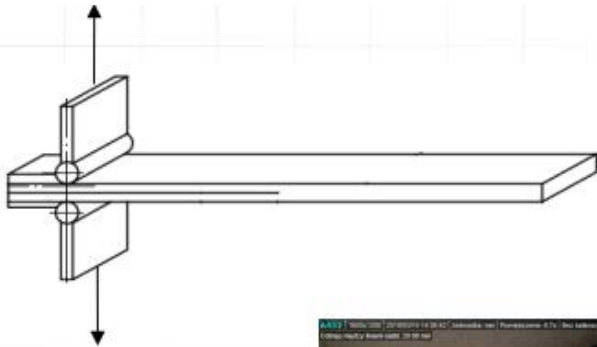
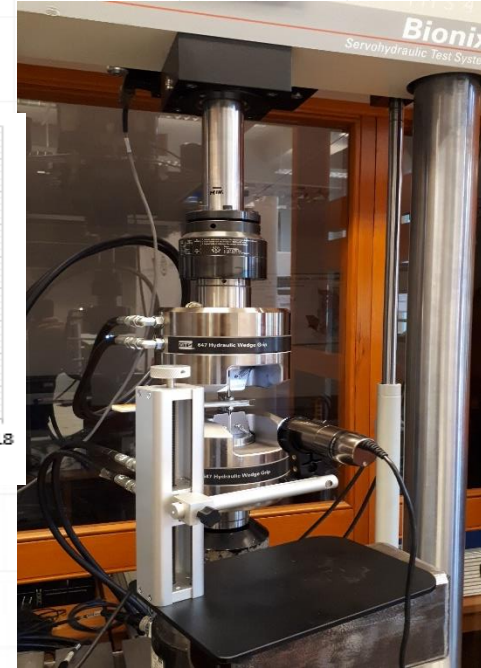
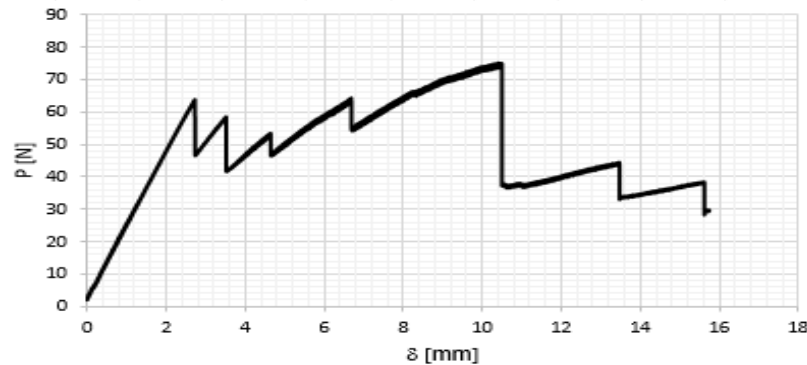
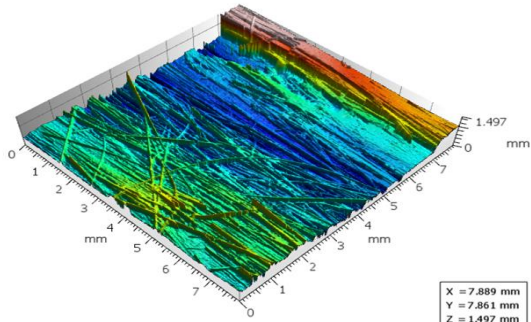
(b) Specimen 16



FRACTURE MECHANIC OF COMPOSITES

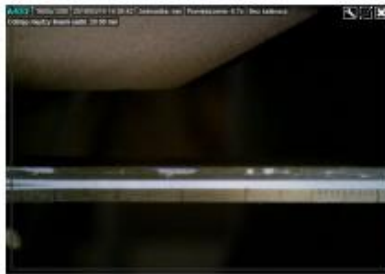
PhD. Students: **Michał Smolnicki** (supervisors: prof. K. Jamroziak, prof. G. Lesiuk, **Szymon Duda** (supervisors: prof. G. Lesiuk, prof. J. Correia (UPorto))

ENERGY RELEASE RATE – GI, GII, GIII



$$G_{IC} = 667 \text{ J/m}^2$$

(wg ISO 15024)



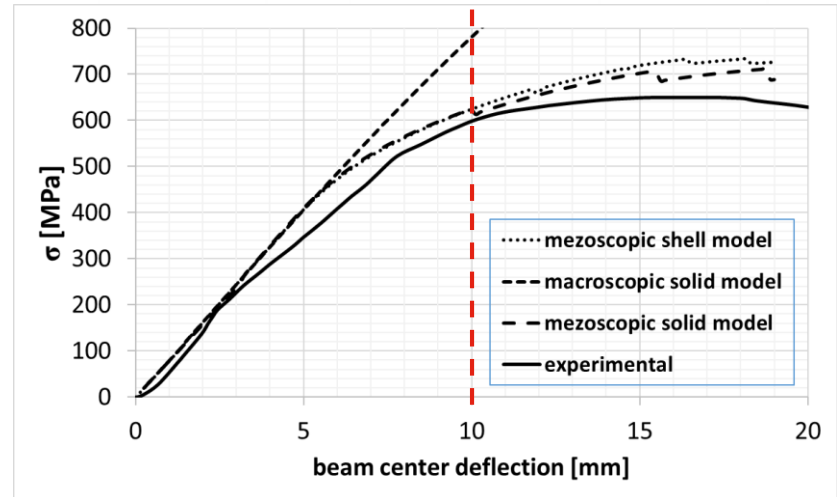
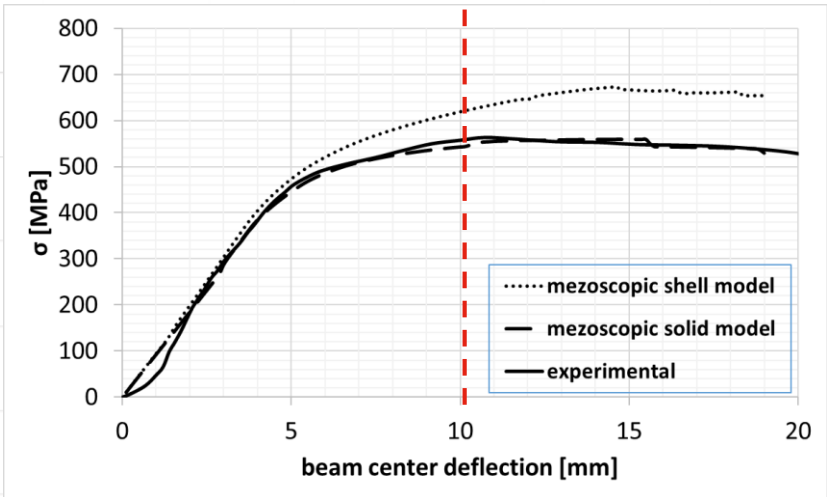
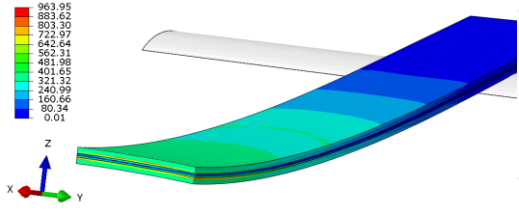
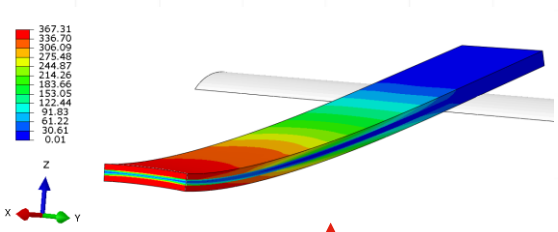


Research Article

Finite element method analysis of fibre-metal laminates considering different approaches to material model

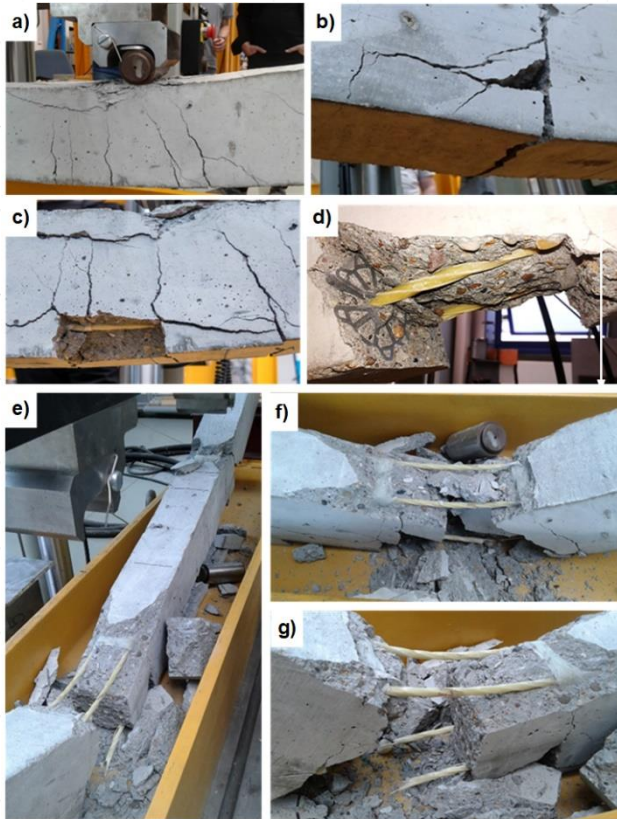


Michał Smolnicki¹ · Paweł Stabła¹



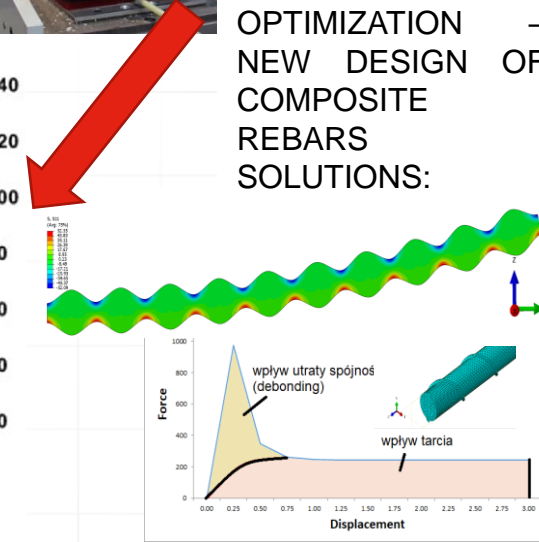
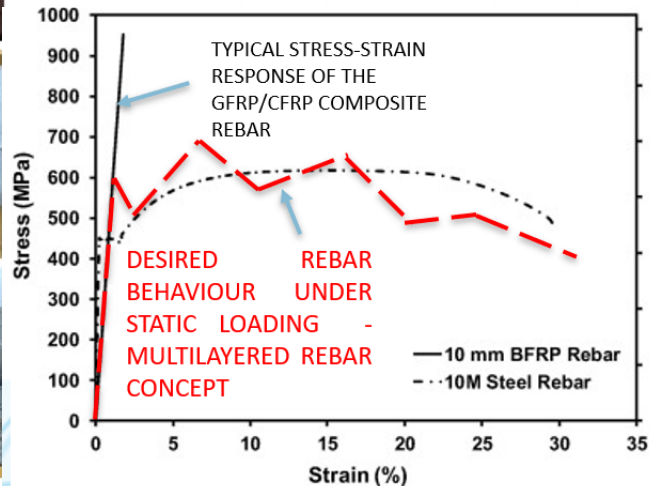
COOPERATION WITH COMPOSITE RESEARCH GROUP (prof. W. Błażejowski, WUST)
 AND CIVIL ENGINEERS (Univ. Of. Zielona Góra, WUST, FEUP – PORTO, UMFG BRAZIL)
**DESIGN OF REBARS AND ANCHORING SYSTEM – project: hybrid rebars (leader
 WUST – PhD. DSc. Eng. Grzegorz Lesiuk, budget approx: 330 kEUR)**

PRE-ELIMINARY STUDY OF
 THE EXISTING SOLUTIONS



PROBLEM →

MANUFACTURING
 OPTIMIZATION –
 NEW DESIGN OF
 COMPOSITE
 REBARS
 SOLUTIONS:



Stroński, P., Błażejowski, W., Socha, T., Denisiewicz, A., Kula, K., Lesiuk, G., & Correia, J. A. F. O. (2020). Influence of reinforcement Type on Flexural Behaviour of Reinforced Concrete Beams. Proceedings of the Institution of Civil Engineers - Forensic Engineering, 1–9. doi:10.1680/jfoen.20.00009



Wrocław University
 of Science and Technology

BIOMATERIALS – SELECTED FRACTURE ANALYSIS

Research paper

FRACTURE RESISTANCE ANALYSIS OF PEEK-POLYMER

Grzegorz LESIUK^a, Aleksandra SAWICKA^b, José CORREIA^c, Roman FRĄTCZAK^d

FRACTURE TOUGHNESS OF PEEK composite

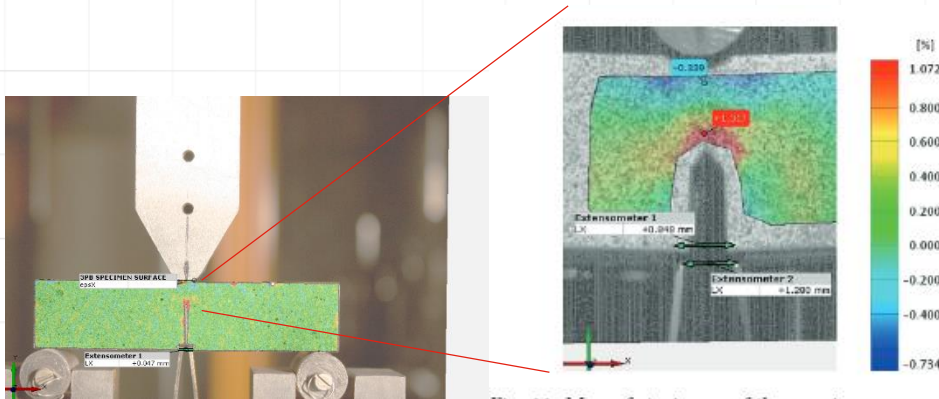
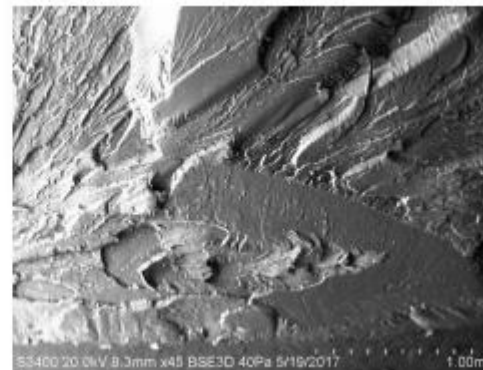
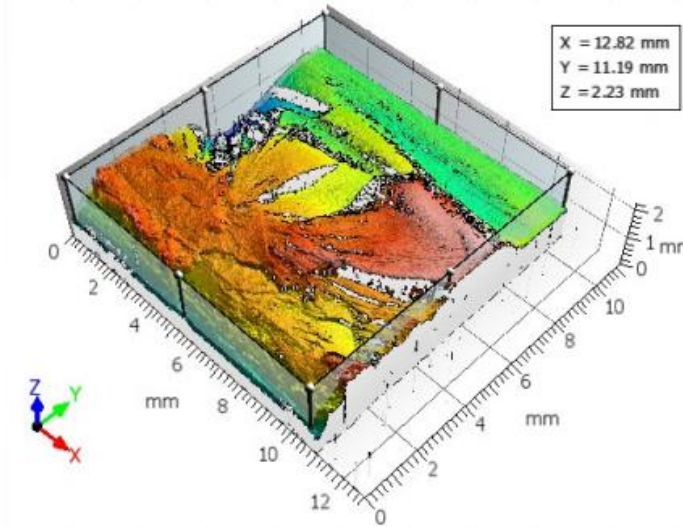
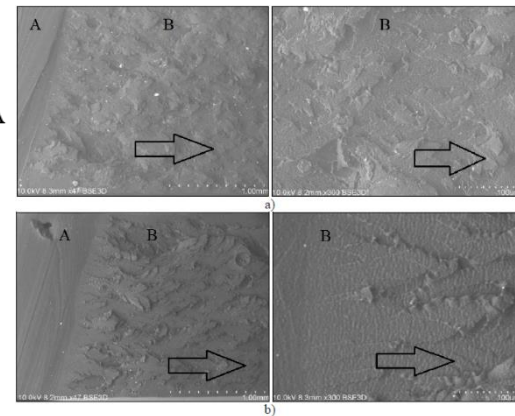
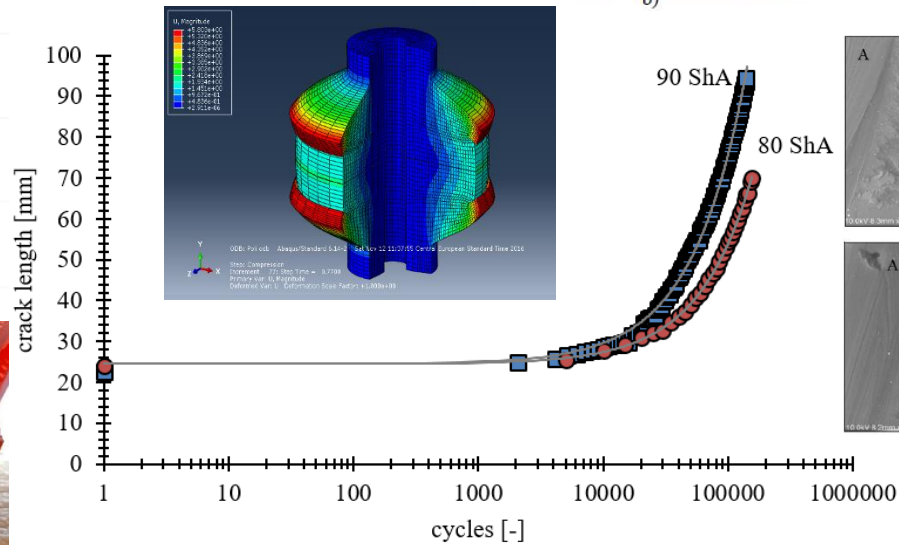
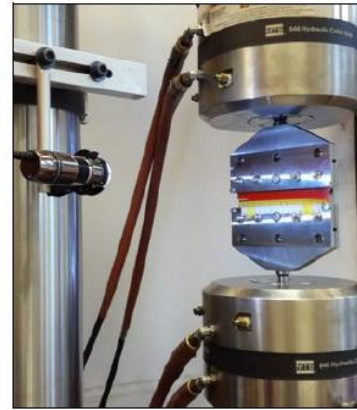
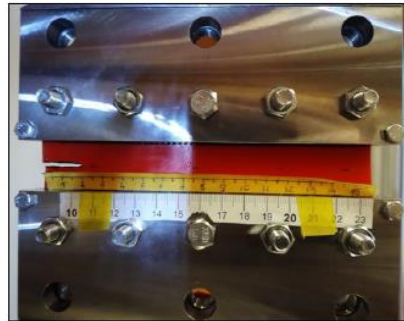


Fig. 11. Map of strain ϵ_{xx} of the specimen corresponding to the force value equal to $P_Q = 850$ N

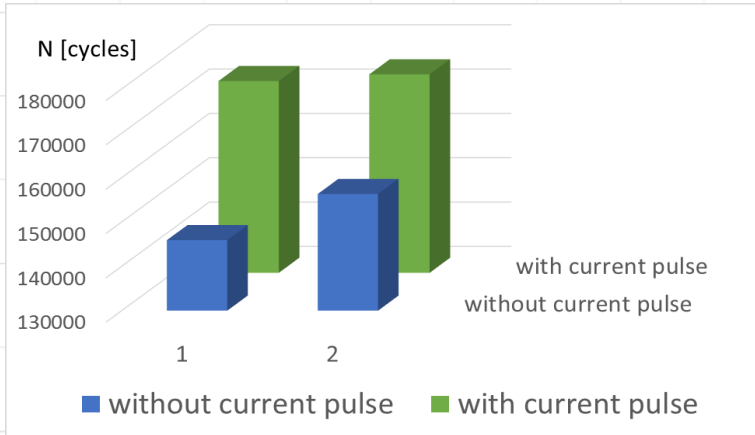


AUTOMOTIVE APPLICATIONS - FATIGUE AND FATIGUE CRACK GROWTH IN POLYURETHANE COMPONENTS COMMONLY USED IN SUSPENSION SYSTEM

INSUTRIAL PHD THESIS – „DOKTORAT WDROŻENIOWY” – MSc. Eng. Krzysztof JUNIK Strongflex Company, supervisors: Prof. K. Jamroziak, prof. G. Lesiuk



CRACK „HEALING” – ELECTROPLASTICITY PHENOMENON – ELECTRO-MECHANICAL EFFECT

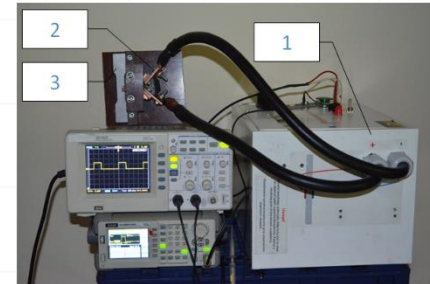
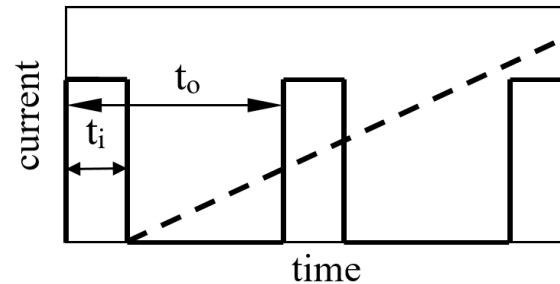
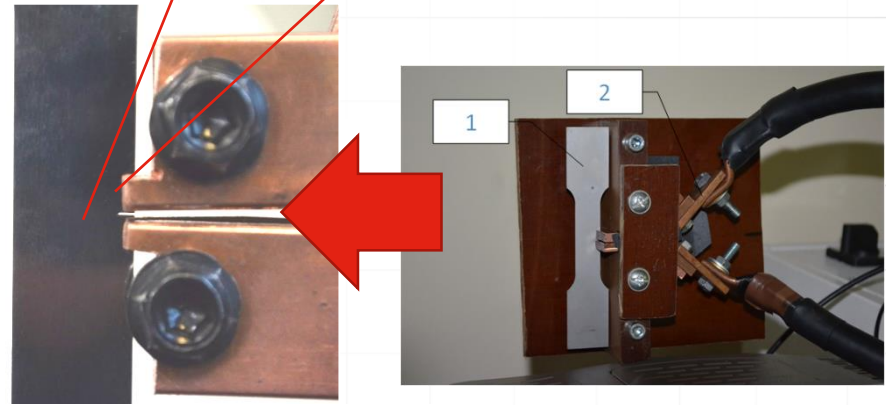
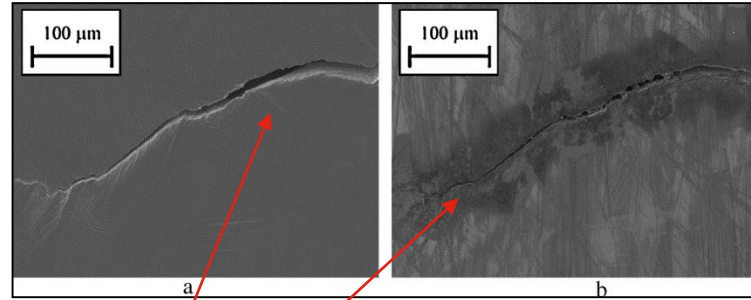


Home / Archives / Vol 90 No 2 (2018): WELDING TECHNOLOGY REVIEW / Articles

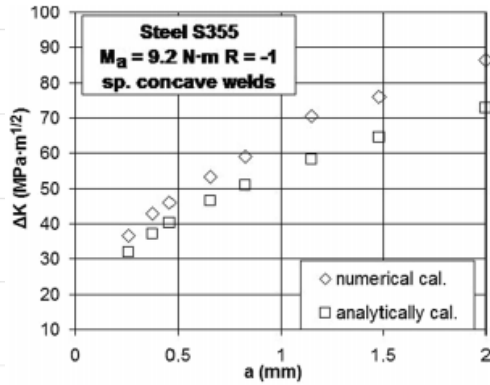
Supercapacitors electropulsing method for improvement the fatigue resistance of the austenitic steel sheets



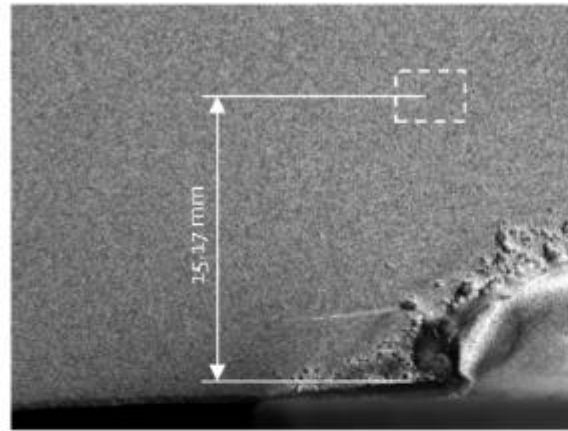
Zbigniew Zimniak
Wrocław University of Science and Technology
Grzegorz Lesiuk
Wrocław University of Science and Technology
Wojciech Wiśniewski
Wrocław University of Science and Technology



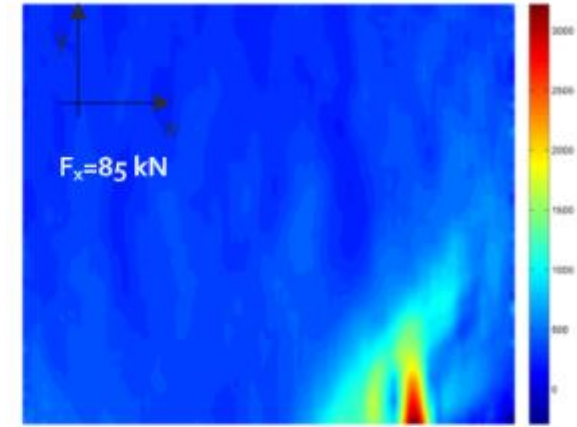
CRACK GROWTH ANALYSIS IN WELDED JOINTS



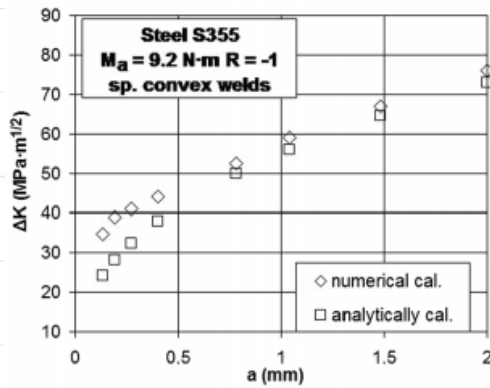
a)



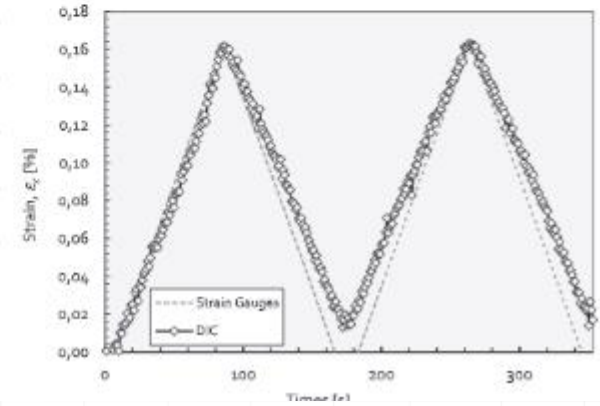
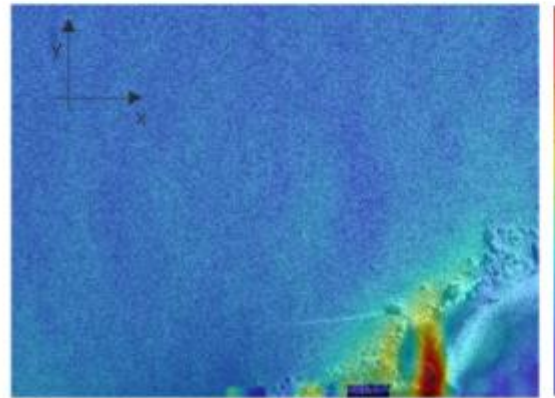
a)



b)



a)



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Contents lists available at ScienceDirect

International Journal of Fatigue

ELSEVIER

journal homepage: www.elsevier.com/locate/ijfatigue



The influence of heat treatment on the behavior of fatigue crack growth in welded joints made of S355 under bending loading

Dariusz Rozumek^{a,*}, Janusz Lewandowski^b, Grzegorz Lesiuk^b, José A. Correia^c

^aOpole University of Technology, Department of Mechanics and Machine Design, Mikolajczyka 5, 45-271 Opole, Poland

^bFaculty of Mechanical Engineering, Department of Mechanics, Materials Science and Engineering, Wrocław University of Science and Technology, Smoluchowskiego 25, 50-370 Wrocław, Poland

^cINESC/Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

Influence of fillet end geometry on fatigue behaviour of welded joints

António L.L. da Silva^{a,b}, José A.F.O. Correia^{a,b,c}, Abílio M.P. de Jesus^{a,b}, Grzegorz Lesiuk^c, António A. Fernandes^{a,b}, Rui Calçada^d, Filippo Berto^e

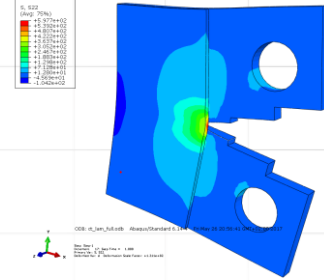
^aINESC, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

^bFaculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

^cFaculty of Mechanical Engineering, Department of Mechanics, Material Science and Engineering, Wrocław University of Science and Technology, Smoluchowskiego 25, 50-370 Wrocław, Poland

^dNNTU, Department of Engineering Design and Materials, Richard Birkelandstret 2B, 7891 Trondheim, Norway

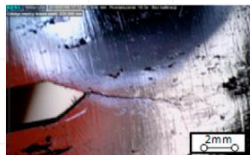
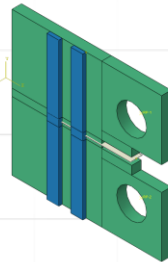
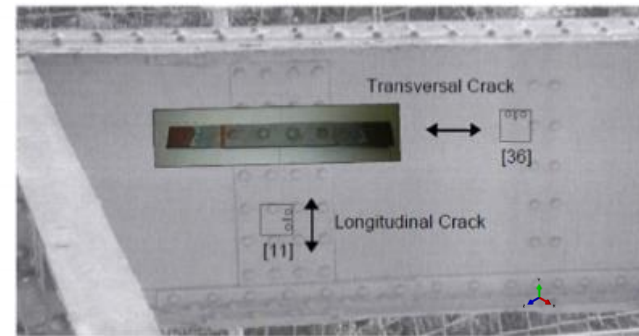
FATIGUE AND FRACTURE OF MATERIALS COMMONLY USED IN CIVIL ENGINEERING - BRIDGES AND REINFORCED STEEL STRUCTURES WITH CFRP STRIPS



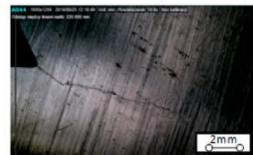
a)



b)



(a)



(b)

Contents lists available at ScienceDirect

Engineering Failure Analysis

ELSEVIER

journal homepage: www.elsevier.com/locate/engfailanal

Fatigue resistance curves for single and double shear riveted joints from old portuguese metallic bridges

Bruno Pedrosa^{a,*}, José A.F.O. Correia^b, Carlos Rebelo^a, Grzegorz Lesiuk^c,
Abílio M.P. De Jesus^b, António A. Fernandes^b, M. Duda^c, Rui Calçada^b,
Milan Veljkovic^d



ENGINEERING SOFTWARE DEVELOPMENT SUPPORT – IT TOOLS FOR FRACTURE MECHANICS

COOPERATION WITH NOBO SOLUTIONS S.A. – FM TOOL/FMPIPE – FATIGUE CALCULATOR FOR CRACKED COMPONENTS

a)

Model parameters

| Parameter | Value | Unit |
|-----------|---------|------|
| 1 | t= 0.50 | [m] |
| 2 | w= 1.00 | [m] |

Model selection

| Type | Details |
|--------|---|
| Plates | |
| | Semi circular surface crack in a semi Infl... |
| | Semi elliptical surface crack in a plate |
| | Trough thickness edge crack |

Model references:
J. C. Newman, I.S. Raju, Stress-intensity factor equations for cracks in three-dimensional finite bodies subjected to tension and bending loads, NASA, 1984

b)

Grow settings

| Parameter | Value | Unit |
|-----------|--------------|------|
| 1 | dN= 1.00 | - |
| 2 | a0= 9.00e-03 | [m] |
| 3 | c0= 9.60e-03 | [m] |
| 4 | a=c= 0.00 | - |

Results

| Parameter | Value | Unit |
|-----------|--------------------------|---------|
| 1 | afinal= 0.21 | [m] |
| 2 | cfinal= 0.29 | [m] |
| 3 | cycles= 985.00 | - |
| 4 | ΔK_a = 603.45 | [MPa√m] |
| 5 | ΔK_c = 698.58 | [MPa√m] |
| 6 | σ_{liq} = 1699.86 | [MPa] |

Crack size grow diagram

Crack Size vs Cycles plot showing two curves (red and blue) on a semi-log scale. The y-axis ranges from 0.01 to 0.31, and the x-axis ranges from 0.9 to 1082.4.

Crack sketch

Grow rate diagram

Plot of da/dN vs ΔK on a log-log scale. The y-axis ranges from 0.000 to 0.040, and the x-axis ranges from 1 to 1000000. A blue curve shows the crack growth rate.

Clear plots

Current /selected/ scientific cooperation – selected activity

-  1. **University of Porto (PT)** - prof. Abilio M.P. De Jesus (fatigue & fracture mathematical and numerical modeling), prof. Rui Calcada (structural integrity of civil engineering structures)
-  2. **University of Coimbra (PT)** prof. Carlos Rebelo (fatigue crack growth rate description in long term operated structures)
-  3. **University of Oviedo (ESP)** - prof. Fernandez Canteli - probabilistic approach in fatigue
-  4. **Norwegian University of Science and Technology, Trondheim (NO)** - prof. Filippo Berto - numerical modeling of cohesive zone with theory of critical distances
-  5. **University of Electronic Science and Technology of China, Chengdu (CN)** - prof. Shun Peng-Zhu - multiaxial fatigue
-  6. **University of Waterloo (CA)** - prof. Grzegorz Glinka - crack growth modeling in welded structures
-  7. **Opole University of Technology** - prof. Dariusz Rozumek - mixed-mode fatigue crack growth and multiaxial fatigue models
-  8. **University of Zielona Góra (PL)**- Dr Tomasz Socha, Dr Arkadiusz Denisiwicz - hybrid lightweight structures modeling for civil engineering applications
-  9. ***Institute of Lightweight Structures, Chemnitz University of Technology, Chemnitz (GER), prof. Lothar Kroll - polymers, composite mechanical damage modeling (MSc. Mikołaj Katkowski)***
-  10. **Ukrainian Academy of Science, Physico-Mechanical Institute - Karpenko, Lviv (UKR)** - prof. Nykyforchyn, prof. Zvirko, prof. Student, dr Krechkovska - material degradation modeling
-  11. **Algeria** -University M'Hamed Bougara of Boumerdes, prof. Mohamed El. Amine Ben Seghier, pipelines reliability modeling with Monte Carlo approach and M5 trees
-  12. **University of Brest (FR)**, Prof. Stephane Sire - structural integrity analysis of the long term operated railway structures
-  13. **Czech Academy of Sciences, Institute of Physics of Materials (CZ)**, prof. Stanislav Seitl - modeling of the stress fields and multiaxial fatigue under random loads, additive manufacturing fatigue analysis



14. University of Delft (NL) - prof. Milan Veljkovic (numerical analysis of the riveted joints)
15. University of Bologna (IT) - prof. Cristiano Fragassa, prof. Ana Pavlovic (new technologies of the composite manufacturing and neural network analysis of the damage process)
16. University of Minas Gerais (UMFG), Brazil (BR) - prof. Hermes Carvalho, fracture mechanics approach in concrete structures, damage modeling

COOPERATION IN NUMBERS OF PAPERS

| | |
|-----------------|----|
| ALGERIA | 3 |
| BRAZIL | 2 |
| CANADA | 1 |
| CZECH REPUBLIC | 1 |
| DENMARK | 1 |
| FRANCE | 2 |
| GERMANY | 2 |
| IRAN | 2 |
| ITALY | 6 |
| NETHERLANDS | 1 |
| NORWAY | 5 |
| PEOPLES R CHINA | 1 |
| POLAND | 64 |
| PORTUGAL | 45 |
| SLOVENIA | 1 |
| SPAIN | 5 |
| UKRAINE | 4 |
| USA | 2 |

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| UNIVERSITE DE M'HAMMED BOUGARA BOUMERDES |
| UNIVERSIDADE FEDERAL DE MINAS GERAIS |
| UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE |
| UNIVERSIDADE FEDERAL RURAL DO SEMI-ARIDO (UFERSA) |
| UNIVERSITY OF WATERLOO |
| CZECH ACADEMY OF SCIENCES |
| FORCE TECHNOL |
| CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS) |
| SNCF RESEAU |
| UNIV OVIEDO |
| TECHNICAL UNIVERSITY OF BERLIN |
| TECHNISCHE UNIVERSITAT CHEMNITZ |
| UNIV ZABOL |
| UNIVERSITY OF BOLOGNA |
| UNIVERSITY OF PARMA |
| DELFT UNIVERSITY OF TECHNOLOGY |
| FORCE TECHNOL NORWAY AS |
| NORWEGIAN UNIVERSITY OF SCIENCE & TECHNOLOGY (NTNU) |
| UNIVERSITY OF ELECTRONIC SCIENCE & TECHNOLOGY OF CHINA |
| NOBO SOLUT SA |
| OPOLE UNIVERSITY OF TECHNOLOGY |
| RD & BRIDGE RES INST |
| WROCLAW UNIV SCI & TECHNOL |
| WROCLAW UNIV TECHNOL & SCI |
| WROCLAW UNIVERSITY OF SCIENCE & TECHNOLOGY |
| UCVE |
| UNIVERSIDADE DE COIMBRA |
| UNIVERSIDADE DO PORTO |
| FAC INFORMAT SCI NOVO MESTO |
| UNIVERSITY OF OVIEDO |
| MINISTRY OF EDUCATION & SCIENCE OF UKRAINE |
| NATIONAL ACADEMY OF SCIENCES UKRAINE |
| DEERE & COMPANY |
| VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY |

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| NETHERLANDS | 1 |
| NORWAY | 2 |
| NORWAY | 3 |
| PEOPLES R CHINA | 1 |
| POLAND | 1 |
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| POLAND | 1 |
| POLAND | 1 |
| POLAND | 1 |
| POLAND | 63 |
| PORTUGAL | 2 |
| PORTUGAL | 8 |
| PORTUGAL | 45 |
| SLOVENIA | 1 |
| SPAIN | 5 |
| UKRAINE | 1 |
| UKRAINE | 3 |
| USA | 1 |
| USA | 1 |

U. PORTO



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SELECTED (CURRENT) PROJECTS WITH TEAM MEMBERS AS PRINCIPAL INVESTIGATORS

1. **NCN – PRELUDIUM 2018/31/N/ST8/03590** (2019/07/12-2021/07/11) *Fatigue crack closure analysis under multiaxial loading conditions in terms of energy approach* – 139 800 zł – PI: MSc. Eng. Monika Duda, Supervisor of PI PhD. DSc. Eng. Assoc. Prof. Grzegorz Lesiuk
2. **NCBIR – LIDERX 0219/L-10/2018** „*New generation of composite rebars and anchoring systems*„ - PI PhD. DSc. Eng. Assoc. Prof. Grzegorz Lesiuk – 1.498.400 zł (30 months 2019/2020-2023)
3. **NAWA – PPN/BUA/2019/1/00086** (2020-2022) *Interfacial strength examination of new hybrid composite materials using fracture mechanics approach: Polska - Politechnika Wroclawska (PhD. DSc. Eng. Assoc. Prof. Grzegorz Lesiuk), Ukraina – Physico-Mechanical Karpenko Institute, Lviv, (prof. Olha Zvirko)*

SELECTED (CURRENT) EUROPEAN PROJECTS WITH TEAM MEMBERS AS INVESTIGATORS

1. Fatigue strengthening and assessment of railway metallic bridges using fiber-reinforced polymers (**FiberBridge**) - **02/SAICT/2017 / PT2020**, 3 years (07/2018-06/2021) - leader: University of Porto – Investigator: PhD. DSc. Eng. Grzegorz Lesiuk, Assoc. Prof. role: execution of fatigue and fracture tests, preparation of CFRP patches, material tests .

SELECTED RECENT PAPERS AND BOOKS (only 2020)

1. Marciniak, Z., Rozumek, D., **Lesiuk, G.**, & Correia, J. A. (2020). Fatigue failure assessment of S355J2G1W structural steel under biaxial in-and out of phase loading regarding geometrical constraints of samples. *Engineering Failure Analysis*, 117, 104785., **IF=2.897**
2. Szymczyk, P., Hoppe, V., Ziółkowski, G., **Smolnicki, M.**, & Madeja, M. (2020). The effect of geometry on mechanical properties of Ti6Al4V ELI scaffolds manufactured using additive manufacturing technology. *Archives of Civil and Mechanical Engineering*, 20(1), 1-13. **IF=3.672**
3. **Lesiuk, G.**, Pedrosa, B. A., Zięty, A., **Błażejowski, W.**, Correia, J. A., De Jesus, A. M., & Fragassa, C. (2020). Minimal Invasive Diagnostic Capabilities and Effectiveness of CFRP-Patches Repairs in Long-Term Operated Metals. *Metals*, 10(7), 984. **IF=2.117**
4. **Correia, J.**, Carvalho, H., **Lesiuk, G.**, Mourão, A., Grilo, L., de Jesus, A., & Calçada, R. (2020). Fatigue crack growth modelling of fão bridge puddle iron under variable amplitude loading. *International Journal of Fatigue*, 105588. **IF=4.369**
5. Rozumek, D., Lewandowski, J., **Lesiuk, G.**, & Correia, J. A. (2020). The influence of heat treatment on the behavior of fatigue crack growth in welded joints made of S355 under bending loading. *International Journal of Fatigue*, 131, 105328. **IF=4.369**
6. **Lesiuk, G.**, **Smolnicki, M.**, Rozumek, D., Krechkovska, H., Student, O., Correia, J., & De Jesus, A. (2020). Study of the fatigue crack growth in long-term operated mild steel under mixed-mode (I+ II, I+ III) loading conditions. *Materials*, 13(1), 160. **IF=3.325**
7. **Lesiuk, G.**, **Smolnicki, M.**, **Mech, R.**, **Zięty, A.**, & Fragassa, C. (2020). Analysis of fatigue crack growth under mixed mode (I+ II) loading conditions in rail steel using CTS specimen. *Engineering Failure Analysis*, 109, 104354. **IF=2.897**
8. Rita Dantas, **Grzegorz Lesiuk**, Dariusz Rozumek, Shun-Peng Zhu, Abilio de Jesus, Luca Susmel, Filippo Berto, EVALUATION OF MULTIAXIAL HIGH-CYCLE FATIGUE CRITERIA UNDER PROPORTIONAL LOADING FOR S355 STEEL, *Engineering Failure Analysis*. 2020. art. 105037, 1-48, ISSN, **IF=2.897**
9. **Lesiuk, G.**, Correia, J.A.F.O., Krechkovska, H.V., **Pękałski, G.**, Jesus, A.M.P. de, Student, O., *Degradation Theory of Long Term Operated Materials*, **Structural Integrity Series vol.15**, ISBN 978-3-030-43710-7, 2021 (2020 accepted), **Springer Nature** (in press), <https://www.springer.com/gp/book/9783030437091>, Book
10. **Junik K.**, **Lesiuk G.**, **Barcikowski M.**, **Błażejowski W.**, Niemiec A., Grobelny M., Otczyk K., Correia J., IMPACT OF THE HARDNESS ON THE SELECTED MECHANICAL PROPERTIES OF RIGID POLYURETHANE ELASTOMERS COMMONLY USED IN SUSPENSION SYSTEMS, (in press, accepted), *Engineering Failure Analysis*, **IF=2.897**

Structural Integrity 15
Series Editors: José António Correia · Abílio M.P. De Jesus

Grzegorz Lesiuk · José A.F.O. Correia
Halyna V. Krechkovska
Grzegorz Pękałski · Abílio M.P. de Jesus
Oleksandra Student

Degradation Theory of Long Term Operated Materials and Structures

 Springer



UNDER EVALUATION – TEAM MEMBERS AS PI

RFCS

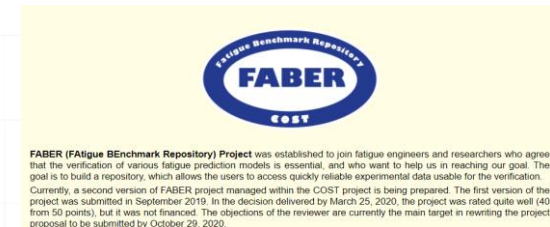
- Budget: 2 mln EUR
- LIDER: RINA Consulting Centro Sviluppo Materiali S.p.A (CSM SpA) – Rzym, Włochy
- University of Porto (UPORTO), Portugalia
- University of Thessaly, Grecja
- A. Silva Matos Metalomecânica (ASMM) – Portugalia – przemysłowy partner producent metalowych zbiorników
- COST ACTION – submitted
11.2020 leader prof. Jan Papuga, CUT, PRAGUE
Prague, Czech Republik



FORMS B

TECHNICAL ANNEX

| | |
|------------------|---|
| Project acronym: | NOLDER-PVP |
| Project title: | Non Linear Design Rules for Pressure Vessels and Piping |



CO OFERUJEMY

PRACĘ W CIEKAWYCH PRZEDSIĘWZIĘCIACH O ZNACZENIU ROZWOJOWYM (HAB., DR)
OBSZARY SPERSONALIZOWANEJ MEDYCYNY – TECHNOLOGIE PRZYROSTOWE W
UJĘCIU MECHANIKI PĘKANIA I WIELOOSIOWEGO ZMĘCZENIA

- OPUS PROJECT (złożony): *Additive manufacturing and modelling of fatigue and fracture process of Ti-13Nb-13Zr alloy for biomedical applications under multi-axial loading conditions* (Partnerzy: IPM Brno, **Dr Jan Klusak**, Czechy).
Budżet: 1.5 mln zł
- SHENG-2 – planned budget (15.03.2020 deadline) – approx. 2 mln, tematyka: *In-situ and ex-situ modeling of fatigue damage in XXX alloys for aerospace industry* – partnerzy: **prof. Shun-Peng Zhu**, UESCT, CHENGU Chiny.
- RCFS...

ROZWÓJ KADRY (planowane staże)

- W ciągu 18-24 miesięcy lat nastąpi finalizacja 3 prac doktorskich:

mgr inż. Krzysztof Junik, mgr inż. Monika Duda (2021 - Lwów, Ukraina), mgr inż. Michał Smolnicki (2021 Ukraina – Lwów, JAFOC – Vila Real, Porto)

- Zespół uzupełniają osoby związane w ramach 4 „międzynarodowych” doktoratów /obecnie z powodu pandemii ich przyjazd jest wstrzymany/:
 - **Mgr inż. Rita Dantas (FEUP, Porto)** – była na stażu, obroniła pracę mgr, kontynuuje w ramach doktoratu (promotorzy; prof. Jose Correia, **prof. Grzegorz Lesiuk**) – tematyka: modele wieloosiowego zmęczenia i hipotezy kumulacji uszkodzeń zmęczeniowych (obrona za 3-4 lata)
 - **Mgr inż. Felipe Klein Fiorentin (FEUP, Porto)** – doktorat p.t. „A Numerical and Experimental Study on Residual Stresses, Distortion and Fatigue Behaviour of Additive Manufactured Components” promotorzy: prof. Abilio De Jesus, DEMEC, FEUP, PORTO, prof. Luis Reis, ULisboa, Lisbon, Portugal, **prof. Grzegorz Lesiuk, WUST**) – obrona za ok. 3 lata
 - **Mgr inż. Victor Ribeiro (FEUP, Porto)** – doktorat z zakresu efektu zamykania się pęknięcia zmęczeniowego w stopach AL. – promotorzy; prof. Jose Correia FEUP, **prof. G. Lesiuk WUST** (obrona 2021)
 - **Mgr inż. Cristine Caroline Lopes** (UMFG, Brazylia) – doktorat z zakresu modelowani procesu zmęczenia i pęknięcia betonu zbrojonego kompozytowymi prętami – promotorzy; prof. Hermes Carvalho (Brazylia), prof. Grzegorz Lesiuk, obrona za 4 lata

ORGANIZING ACTIVITY (2020-2021)

www.vcmf.eu

VCMF2020


VIRTUAL CONFERENCE ON MECHANICAL FATIGUE



www.icmfmxx.pwr.edu.pl

20th International Colloquium on Mechanical Fatigue of Metals

The XX International Colloquium on Mechanical Fatigue of Metals (ICFM XX) is postponed to the next year!



Organizers

- tr POLISH SOCIETY OF THEORETICAL AND APPLIED MECHANICS
- WROCLAW UNIVERSITY OF SCIENCE AND TECHNOLOGY
- FACULTY OF MECHANICAL ENGINEERING

News

- 20th ICMFM Postponed to the next year (Date: 24.04.2020)
- An abstract template is now available (Date: 23.01.2020)



Wrocław invites you!

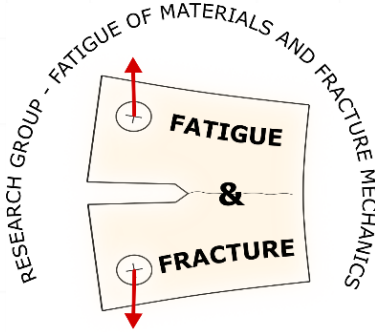
www.sympozjon.pwr.edu.pl

IX Sympozjon Kompozyty – Konstrukcje Warstwowe

Organizatorzy:
Polskie Towarzystwo Mechaniki Teoretycznej i Stosowanej
Wydział Mechaniczny Politechniki Wrocławskiej



www.kkmp2021.pwr.edu.pl



20TH

Event organizers

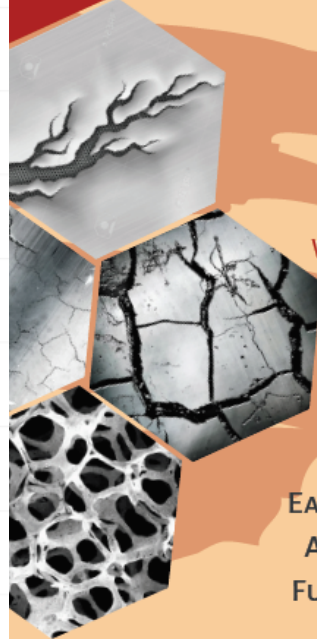


Wrocław
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International Colloquium on Mechanical Fatigue of Metals

15–17 SEPTEMBER 2021

WROCLAW UNIVERSITY OF SCIENCE AND TECHNOLOGY
BUILDING D-20



TIME TABLE

EARLY BIRD REGISTRATION: 31.03.2021

ABSTRACTS SUBMISSION: 31.03.2020

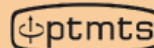
FULL PAPERS SUBMISSION: 10.06.2021

Under the auspices of



Additional Information
on conference web page:

icmfmxx.pwr.edu.pl



Wrocław University
of Science and Technology

WYBRANE NAGRODY (z ost. 3 lat)

Nominacja dla **Grzegorza Lesiuka** odebrana z rąk **Prezydenta Wrocławia Rafała Dutkiewicza** – akt przyjęcia w poczet Członków Akademii Młodych Uczonych i Artystów, działających przy Departamencie Prezydenta Miasta Wrocławia, w trakcie uroczystego posiedzenia KRUWiO - 15.11. 2018
Wrocław



AKADEMIA MŁODYCH UCZONYCH I ARTYSTÓW

jedność wiedzy, jedność państwa

Nr 44

AKT POWOŁANIA

Kapituła Akademii Młodych Uczonych i Artystów w składzie:

prof. dr hab. Andrzej Białas, prof. dr hab. Marek Bojarski, dr Rafał Dutkiewicz,
prof. dr hab. Michał Kleiber, prof. dr hab. Tadeusz Luty, prof. dr hab. Maciej Żylicz

powołuje niniejszym aktem

dra inż. Grzegorza Lesiuka

do grona członków Akademii Młodych Uczonych i Artystów

dr Rafał Dutkiewicz

Przewodniczący Kapituły

Wrocław, 15 listopada 2018 r.

NAGRODA ESIS EUROPEAN STRUCTURAL INTEGRITY SOCIETY



Grzegorz Lesiuk został nagrodzony nagrodą Award Merit za działalność na rzecz komitetu technicznego ESIS i wkład naukowy w międzynarodową konferencję IRAS 2019 stowarzyszoną z TC 12 ESIS. Nagrodę tę dr Lesiuk otrzymał w trakcie gali konferencji IRAS 2019 na której obecny był także Dziekan Wydziału, Pan prof. Tomasz Nowakowski.

AWARD OF MERIT ESIS-TC12



The ESIS-TC12 Technical Committee on Risk Analysis and Safety of Large Structures and Components presents this
AWARD OF MERIT

Grzegorz Lesiuk

in recognition of an outstanding contribution to IRAS 2019 event at Porto, 1-2 July 2019 as well as for the ESIS-TC12 technical committee.

July 2019



NAGRODA ZA NAJLEPSZĄ PRACĘ DLA DOKTORANTKI

mgr inż. Monika Duda, mgr inż. M. Smolnicki, promotor prof. Grzegorz Lesiuk



Best Student Paper Award

This certificate is awarded to

G. Lesiuk, D. Rozumek, M. Duda, M. Smolnicki, Z. Marciniak, J.A.F.O. Correia, A.M.P. De Jesus, H. Krechkovska

for the paper

Fatigue crack growth in long term operated 19th/20th century steel members under mixed mode loading (I+II, I+III)

presented at the 19th International Colloquium on Mechanical Fatigue of Metals (ICMFM XIX), 5-7 September 2018, Porto, Portugal

Abilio de Jesus
Abilio de Jesus

José António Correia
José António Correia

ICMFM XIX conference chair

NAGRODA DLA DOKTORANTA

Doktorant Bruno Pedrosa – stażysta w Katedrze K58, Univ. of Coimbra, Portugalia
Opiekun: dr hab. inż. Grzegorz Lesiuk, prof. uczelni



MODE I FATIGUE CRACK GROWTH TESTS ON PUDDLE IRON STRENGTHENED WITH CFRP PLATES

B. Pedrosa¹, J. Correia², G. Lesiuk³, C. Rebelo¹, A. Jesus², R. Calçada²

¹Institute for Sustainability and Innovation in Structural Engineering (ISISE), Department of Civil Engineering, University of Coimbra, Coimbra, Portugal

²Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

³Department of Mechanics, Materials Science and Engineering, Faculty of Mechanical Engineering, Wrocław University of Science and Technology, Wrocław, Poland

e-mail: bruno.pedrosa@uc.pt



NAGRODY ZA DZIAŁALNOŚĆ RECENZENCKĄ W MIĘDZYNARODOWYCH CZASOPISMACH

PUBLONS AND WEB OF SCIENCE AWARD:
TOP 1% REVIEWER – IX. 2019 – MATERIALS SCIENCE



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NAGRODA CZASOPISMA NAUKOWEGO

DLA MGR INŻ. MONIKI DUDY
(DOKTORANTKA dr hab. G. Lesiuk)

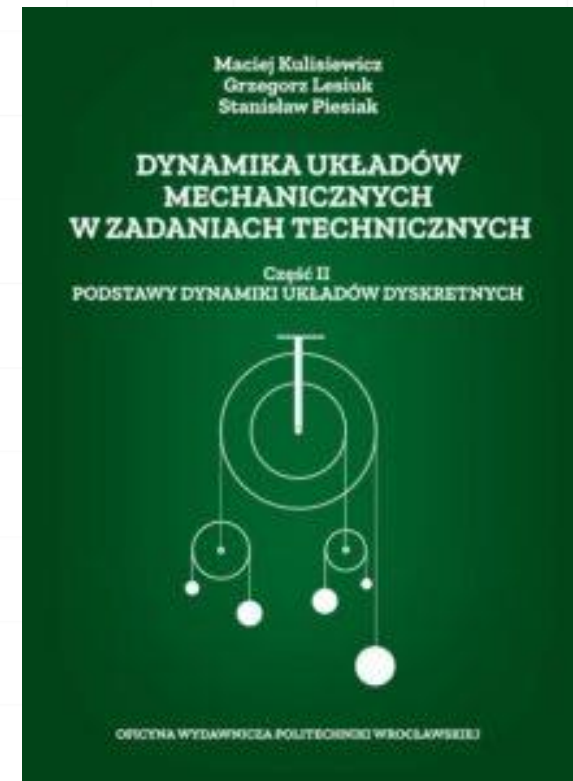


DYDAKTYKA

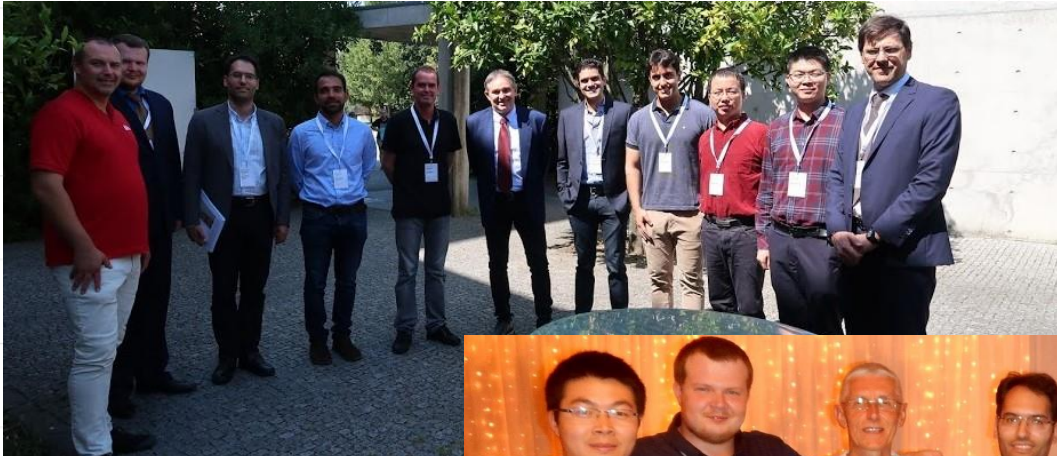
PANDEMIA A NOWE MOŻLIWOŚCI...

- Kurs Mechanika Pęknięcia – IB
- Kurs Wytrzymałościowe i Strukturalne Aspekty Dekohezji Materiałów (W+L) IPS 15/15 – postuluje się rozszerzenie o elementy mechaniki pęknięcia w ujęciu komputerowym
- Pandemia otworzyła dostępność do wielu osób z którymi współpraca poprzez e-wykłady i kursy sprawia, że dla nauki znikają wszelkie granice. Należy rozwijać wszelkie kontakty i na bieżąco organizować „Summer School”
- Internacjonalizacja siatki kursów – MBM+Automotive Engineering dla ERASMUS
- Internacjonalizacja siatki kursów w szkole doktorskiej

SKRYPT DLA STUDENTÓW



DZIĘKUJĘ ZA UWAGĘ



Pamiętkowe zdjęcie komitetu sterującego XIX ICMFM po przekazaniu nominacji prawa organizacji XX ICMFM we Wrocławiu, Porto 2018



Polsko-Niemiecko-Portugalsko-Chińskie spotkanie w trakcie 2nd ICSI



Spotkanie z prof. R.O. Ritchie. Univ. Of California, Berkley – lider amerykańskiej grupy mechaniki pekania <https://www2.lbl.gov/ritchie/>



Robert O Ritchie

ORCID iD 154.27 · MA, PhD, ScD, FEng, FRS

h-index ⓘ

103

h-index

99



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