

# 5th International Conference on Structural Integrity and Durability - ICSID 2021 & Summer School - Fatigue and Fracture Modelling and Analysis

Centre for Advanced Academic Studies, Dubrovnik, Croatia, 6 - 10 Sep 2021



## Program Overview

Monday 6 September 2021	Tuesday 7 September 2021	Wednesday 8 September 2021	Thursday 9 September 2021	Friday 10 September 2021
08:00-08:45 Registration	08:00-09:00 Registration	08:00-08:40 Registration	08:00-09:00 Registration	08:00-09:00 Registration
08:45-09:00 Summer School Opening		08:40-09:00 Conference Opening		
09:00-12:00 <b>Fracture Mechanics in Nanometer Scale</b>  Takashi Sumigawa	09:00-12:00 <b>Multiscale Materials Modeling</b>  Siegfried Schmauder	09:00-09:40 <b>Plenary Lecture</b> Richard Clegg	09:00-09:40 <b>Plenary Lecture</b> Takashi Sumigawa	09:00-09:40 <b>Plenary Lecture</b> Robert Basan
		09:40-11:00 <b>Presentation Session</b>	09:40-11:00 <b>Presentation Session</b>	09:40-11:00 <b>Presentation Session</b>
12:00-14:00 Lunch	12:00-14:00 Lunch	11:00-11:20 Coffee Break	11:00-11:20 Coffee Break	11:00-11:20 Coffee Break
14:00-17:00 <b>Materials parameters determination and fatigue behavior modeling</b>  Robert Basan	14:00-17:00 <b>Numerical Modelling of Fracture and Fatigue - Finite Element Analysis</b>  Aleksandar Sedmak	11:20-13:00 <b>Presentation Session</b>	11:20-13:00 <b>Presentation Session</b>	11:20-13:00 <b>Presentation Session</b>
	15:00-20:00 Registration	13:00-14:00 Lunch	13:00-14:00 Lunch	13:00-14:00 Lunch
	18:00-20:00 Welcome Reception	14:00-14:40 <b>Plenary Lecture</b> Katarína Monková George Pantazopoulos	14:00-14:40 <b>Plenary Lecture</b> Aleksandar Grbović	14:00-16:00 <b>Online Session</b>
		14:40-16:00 <b>Presentation Session</b>	14:40-16:00 <b>Online Session</b>	16:00-16:30 Conference Closing
		16:00-16:20 Coffee Break	16:00-16:20 Coffee Break	
		16:20-18:00 <b>Parallel Online Session</b>	16:20-18:00 <b>Parallel Online Session</b>	
		19:00-21:00 Dubrovnik City Center Tour	18:00-18:30 <b>Poster Session</b>	
			19:30-22:00 Conference Dinner	

# 5th International Conference on Structural Integrity and Durability - ICSID 2021

## & Summer School - Fatigue and Fracture Modelling and Analysis

Centre for Advanced Academic Studies, Dubrovnik, Croatia, 6 - 10 Sep 2021

### Detailed Program

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#### Tuesday, 7 September 2021

15:00 - 20:00 Registration

18:00 - 20:00 Welcome Reception  
Room: Atrium

#### Wednesday, 8 September 2021

08:00 - 08:40 Registration

08:40 - 09:00 Conference Opening  
Room: CONFERENCE HALL

09:00 - 09:40 Plenary Lecture:  
*STRUCTURAL INTEGRITY ISSUES IN SOLAR THERMAL POWER GENERATION*  
*Richard Clegg*  
Room: CONFERENCE HALL  
Chair: Željko Božić

09:40 - 11:00 Presentation Session  
Room: CONFERENCE HALL  
Chair: Željko Božić

09:40 - 10:00 INVESTIGATING CRACK NUCLEATION AND PROPAGATION BY THE PHASE FIELD METHOD WITH A NEW FAMILY OF DEGRADATION FUNCTIONS  
B.T. Vu, H. Le Quang, Q.C. He

10:00 - 10:20 ON THE ROAD TOWARDS UNDERSTANDING SQUATS: RESIDUAL STRESS STATE OF RAILS  
T. Gschwandl, W. Daves, T. Antretter, C. Bucher, D. Künstner

10:20 - 10:40 A METHOD TO REDUCE COMPUTATION TIME IN FINITE ELEMENT SIMULATIONS OF DEEP ROLLING  
J. Białowas, S. Gapp, M. Pletz, J. Maierhofer

10:40 - 11:00 -  
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11:00 - 11:20 Coffee Break

**11:20 - 13:00 Presentation Session**

Room: CONFERENCE HALL

Chair: Sanjin Braut

11:20 - 11:40 **APPLICATION OF MATERIAL FATIGUE PARAMETERS ESTIMATION IN ANALYSIS OF ROLLING-SLIDING CONTACT FATIGUE OF GEARS**

R. Basan, T. Marohnić, Ž. Božić

11:40 - 12:00 **DEVELOPMENT OF A CARGO-BICYCLE FRAME CONCERNING MULTIAXIAL LOADED WELDS**

T. Fürstner, J. Köckritz, M. Kröger

12:00 - 12:20 **ANALYTICAL AND EXPERIMENTAL EVALUATION OF NON LINEAR STRAIN MEASURES ON REINFORCED CONCRETE BEAM FOR SHM WITH BODTA SENSORS.**

R. Zona, L. Di Gennaro, L. Esposito, P. Ferla, S. Palladino, V. Minutolo

12:20 - 12:40 **THE EFFECT OF PROCESS PARAMETERS ON MECHANICAL BEHAVIOUR OF SELECTIVE LASER MELTED TI6AL4V ALLOY**

D. Liović, M. Franulović, D. Kozak

12:40 - 13:00 **IN SITU FULL-FIELD STRAIN MEASUREMENT OF PIPELINE SAMPLES OBTAINED USING ADDITIVE MANUFACTURING PROCESS**

I. Trajkovic, B. Medjo, M. Rakin, M. Milosevic, A. Sedmak

**13:00 - 14:00 Lunch**

**14:00 - 14:40 Plenary Lecture:**

***FRACTURE BEHAVIOUR OF 3D PRINTED INCONEL 718 FOR POROUS STRUCTURES APPLICATIONS***

***Katarína Monková / George Pantazopoulos***

Room: CONFERENCE HALL

Chair: Siegfried Schmauder

**14:40 - 16:00 Presentation Session**

Room: CONFERENCE HALL

Chair: Siegfried Schmauder

14:40 - 15:00 **FAILURE ANALYSIS OF GEARS MANUFACTURED USING ADDITIVE MANUFACTURING**

A. Muminović, S. Braut, N. Pervan, A. Skoblar

15:00 - 15:20 **APPLICATION OF DIGITAL IMAGE CORRELATION METHOD FOR VERIFICATION OF TOPOLOGY OPTIMIZATION OF 3D PRINTED LOAD-BEARING ELEMENT**

D. Ivaničić, T. Marohnić, R. Basan

15:20 - 15:40 **EFFECTS OF PROCESS ON HIGH CYCLE FATIGUE LIFE OF ADDITIVELY MANUFACTURED TI-6AL-4V PARTS**

S. Milhomme, C. Brugger, J. Lartigau, C. Froustey

15:40 - 16:00 **DYNAMIC PHOTOELASTIC STUDY OF FLEXURE HINGES PRODUCED BY ADDITIVE MANUFACTURING TECHNOLOGY**

M. Dundović, K. Marković, M. Franulović, Ž. Vrcan

**16:00 - 16:20 Coffee Break**

**16:20 - 18:00 Parallel Online Session - CONFERENCE HALL**

ON-SITE and WEB

Chair: Qi-Chang HE

- 16:20 - 16:40 **CHARACTERISATION OF CRACK GROWTH COMBINING THE CJP MODEL AND SEM IN AL2024 AL-LOY**  
J.M. Robles, J.M. Vasco-Olmo, C. Lopez-Crespo, A.S. Cruces, F.A. Díaz, M.N. James, P. Lopez-Crespo
- 16:40 - 17:00 **NUMERICAL MODELLING AND EXPERIMENTAL TESTING TO DETERMINE THE FATIGUE STRENGTH OF 7075-T6 AFTER FOREIGN OBJECT DAMAGE**  
E.V. Arcieri, S. Baragetti, Ž. Božić
- 17:00 - 17:20 **ORIENTATION AND LOCATION OF SHEAR WALLS IN RC BUILDINGS TO CONTROL DEFLECTION AND DRIFTS**  
A.R. Simon, F.K. Hridoy, M.F. Siddique, S.A. Safat, T. Uddin.
- 17:20 - 17:40 **ON THE PREDICTIVE CAPABILITY OF STRESS-BASED MULTIAXIAL HIGH-CYCLE FATIGUE CRITERIA**  
T.L. Castro, T.A. Peixoto, B. Carvalho, M.V. Pereira, F.A. Darwish
- 17:40 - 18:00 **DETERMINATION OF STANDARD DEVIATION FOR FATIGUE STRENGTH BASED ON THE TENSILE TEST**  
P. Strzelecki

**16:20 - 18:00 Parallel Online Session - Room 5**

ON-SITE and WEB

Chair: Peter Monka

- 16:20 - 16:40 **DIRECT CURRENT POTENTIAL DROP CHARACTERISATION OF FORMING-INDUCED PRE-DAMAGE INFLUENCE ON THREE-POINT BENDING FATIGUE BEHAVIOR OF 16MNCRS5**  
L. Lückner, F. Walther
- 16:40 - 17:00 **EFFECTS OF HIGH-PRESSURE HYDROGEN CHARGING ON THE DURABILITY OF HEAT-EXCHANGE TUBES**  
O. Hembara, O. Chepil, N. Hembara, M. Hrynenko, V. Vira
- 17:00 - 17:20 **SIMULATION OF LOW CYCLE FATIGUE BY USING THE PHASE FIELD APPROACH ALONG WITH THE ARMSTRONG-FREDERICK MODEL**  
S. Aygün, S. Klinge
- 17:20 - 17:40 **THE INFLUENCE OF WELDING VELOCITY ON THE PROPERTIES OF SC-MODIFIED AA2519-T62 LASER BEAM WELDED JOINTS**  
R. Kosturek, L. Śniezek, K. Grzelak, J. Torzewski, M. Wachowski
- 17:40 - 18:00 -  
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**19:00 - 21:00 Dubrovnik City Center Tour**

## Thursday, 9 September 2021

08:00 - 09:00 Registration

09:00 - 09:40 Plenary Lecture:

### FATIGUE OF MICRO-SIZED METALS

Takashi Sumigawa

Room: CONFERENCE HALL

Chair: Robert Basan

09:40 - 11:00 Presentation Session

Room: CONFERENCE HALL

Chair: Robert Basan

09:40 - 11:00 Room: CONFERENCE HALL

Chair: Robert Basan

09:40 - 10:00 PRECISELY CONTROLLED DYNAMIC DISINTEGRATION OF STEEL-CONCRETE COMPOSITE STRUCTURES

K. Uenishi, H. Yamachi, J. Nakamori

10:00 - 10:20 THE INFLUENCE OF WELDING VELOCITY ON THE PROPERTIES OF AZ31 FSW JOINTS

M. Wachowski, R. Kosturek, L. Śnieżek, J. Torzewski, I. Szachogłuchowicz, M. Małek

10:20 - 10:40 DIAGNOSTIC RELIABILITY IN THE EVALUATION OF CARBONATION AND DEGRADATION IN PRECAST CONCRETE ELEMENTS

R. Serpieri, A. Bossio, G. Faella, G. Frunzio, M. Guadagnuolo

10:40 - 11:00 -

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11:00 - 11:20 Coffee Break

11:20 - 13:00 Presentation Session

Room: CONFERENCE HALL

Chair: Marina Franulović

11:20 - 11:40 CONSTRAINT DEFINITION AT A CRACK TIP FOR THE STRIP YIELD MODEL

J. Šedek

11:40 - 12:00 EFFECT OF WASTE STEEL ADDITION ON CEMENT-GLASS COMPOSITE PROPERTIES

M. Małek, W. Łasica

12:00 - 12:20 MODELING OF WIRE STRANDS CONSIDERING THE STRESSES DUE TO STRANDING

A. Wetzel, P.C. Clausnitzer, R. Szlosarek, B. Eickhoff, M. Kröger

12:20 - 12:40 INVERSE MODEL OF DISPLACEMENT FOR THREE-POINT BENDING TEST

I. Kožar, N. Bede, S. Mrakovčić, Ž. Božić

12:40 - 13:00 -

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13:00 - 14:00 Lunch

14:00 - 14:40	<b>Plenary Lecture:</b> <b>PREDICTING FATIGUE CRACK GROWTH PATHS USING NUMERICAL METHODS</b> <b>Aleksandar Grbović</b> Room: CONFERENCE HALL Chair: Aleksandar Sedmak
14:40 - 16:00	<b>Online Session - CONFERENCE HALL</b> ON-SITE and WEB Chair: Aleksandar Sedmak
14:40 - 15:00	<b>ELEVATED TEMPERATURE LOW CYCLE FATIGUE PERFORMANCE OF SELECTIVE LASER MELTED Ti-6Al-4V BRACKET FOR AEROENGINE APPLICATION</b> A. Gupta, C. Bennett, W. Sun
15:00 - 15:20	<b>NON-DESTRUCTIVE ASSESSMENT OF SOFT CHANGES IN THE RAIL HEAD OF HEAVY DUTY GLUED INSULATED RAIL JOINTS USING BRINELL HARDNESS METHODS</b> I. Hoather, N.K. Mandal, M. Spiragin
15:20 - 15:40	<b>ON FUNDAMENTAL ISSUES OF THE STRUCTURAL INTEGRITY OF LARGE-SCALE PRESSURE SYSTEMS</b> T. Fekete
15:40 - 16:00	<b>FATIGUE CRACK PREDICTION IN CERAMIC MATERIAL AND ITS POROUS MEDIA BY USING PERIDYNAMICS</b> C.T. Nguyen, S. Oterkus, E. Oterkus, I. Amin, M. Ozdemir, A.H. El-Aassar, H. Shawky
16:00 - 16:20	<b>Coffee Break</b>
16:20 - 18:00	<b>Parallel Online Session - CONFERENCE HALL</b> ON-SITE and WEB Chair: Ivica Kožar
16:20 - 16:40	<b>METHODOLOGY TO IMPROVE THE RELIABILITY OF THE COOLING ENCLOSURE SYSTEM IN A REFRIGERATOR</b> S. Woo, D.L. O'Neal
16:40 - 17:00	<b>FRACTURE TOUGHNESS OF INTERFACES BETWEEN VARIOUS MINERALS AND ROCKS</b> A.S. Voznesenskii, Yu.V. Osipov, E.I. Ushakov, Ya.G. Semyonov
17:00 - 17:20	<b>HOW TO CONSERVE THE INTEGRITY OF TRANSPORTING PIPELINE GIRTH WELDS?</b> J. Lukács, Z. Koncsik, P. Chován
17:20 - 17:40	<b>A TOPOLOGY-BASED HOLISTIC RESILIENCE METRIC FOR WATER DISTRIBUTION NETWORKS</b> W. Li, R.K. Mazumder, Y. Li
17:40 - 18:00	<b>ESTIMATION OF HIGH CYCLE FATIGUE LIFE OF ADDITIVELY MANUFACTURED Ti6Al4V USING DATA ANALYTICS</b> N. Konda, R. Verma, R. Jayaganthan

**16:20 - 18:00 Parallel Online Session - Room 5**

ON-SITE and WEB

Chair: Kristina Marković

16:20 - 16:40 **NUMERICAL STUDY TO ADDRESS THE STRESS DISTRIBUTION IN CIRCULAR STEEL TUBE CONFINED CONCRETE COLUMNS CONSIDERING VARIOUS CONCRETE STRENGTHS**

H.A. Le, D.D. Pham, Q.V. Pham, P.C. Nguyen, Q.P. Tran

16:40 - 17:00 **INTERIOR FATIGUE CRACKING BEHAVIOR OF ADDITIVELY MANUFACTURED NI-BASED SUPERALLOY AT ELEVATED TEMPERATURE**

W. Li, T. Hu, Y. Zhang

17:00 - 17:20 **FAILURE ANALYSIS AND DIE CORRECTION FOR AN EXTRUSION ELEMENT SUPPORT BY FEM**

S. Ranđelović, N. Kostić, S. Mladenović, V. Blagojević, M. Milutinović

17:20 - 17:40 -

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17:40 - 18:00 -

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**18:00 - 18:30 Poster Session**

Room: HALL

**RECIPROCATING SLIDING WEAR TEST OF WC-CO-CR AND CRC-NICR COATINGS**

S. Kšišňanová, K. Lencová, J. Antoš, M. Vostřák

**INNOVATION OF THE PRODUCTION PROCESS OF COIN DIES TO INCREASE THEIR SERVICE LIFE**

M. Ťavodová, P. Beňo, K. Monkova, D. Stančeková

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**19:30 - 22:00 Conference Dinner**

Friday, 10 September 2021

08:00 - 09:00 Registration

09:00 - 09:40 Plenary Lecture:

**CONVENTIONAL METHODS AND MACHINE LEARNING-BASED MODELS FOR ESTIMATION OF MATERIALS FATIGUE PARAMETERS AND BEHAVIOR**

*Robert Basan*

Room: CONFERENCE HALL

Chair: Katarína Monková

09:40 - 11:00 Presentation Session

Room: CONFERENCE HALL

Chair: Katarína Monková

09:40 - 10:00 **ADAPTATION OF THE COMPRESSION SHPB TEST FOR THE YOUNG'S MODULUS CALCULUS**

A. Rotariu, L. Matache, F. Bucur, F. Dirloman

10:00 - 10:20 **ASSESSMENT OF THE IMPACT LOAD MEASUREMENT METHODS FOR BILAYER THIN TARGETS**

F. Bucur, A. Rotariu, E. Trană, G. Toader

10:20 - 10:40 **STRUCTURAL ANALYSIS OF CANISTER PROJECTILE FIRED BY RIFLED GUN BARRELS**

L.C. Matache, A. Rotariu, S. Bălașoiu, M. Ungureanu, M.V. Cîrmaci-Matei

10:40 - 11:00 **DEVELOPMENT OF A NUMERICAL 3D MODEL OF THE LUMBAR SPINE (L4-L5) BASED ON THE MOVABLE CELLULAR AUTOMATION METHOD**

G. Eremina, A. Smolin

11:00 - 11:20 Coffee Break

11:20 - 13:00 Presentation Session

Room: CONFERENCE HALL

Chair: George Pantazopoulos

11:20 - 11:40 **THERMAL FRACTURE OF FUNCTIONALLY GRADED COATINGS WITH SYSTEMS OF CRACKS, APPLICATION OF A RULE OF MIXTURES**

V. Petrova, S. Schmauder

11:40 - 12:00 **SIMULATION OF THE FATIGUE CRACK INITIATION IN BEARING STEEL 100CR6 DURING ROLLING CONTACT**

K.J. Dogahe, V. Guski, M. Mlikota, S. Schmauder, W. Holweger, J. Mayer, B. Görlach, J. Spille, J. Wranik

12:00 - 12:20 **COMPONENT TESTS AND NUMERICAL INVESTIGATIONS TO DETERMINE THE LIFETIME AND FAILURE BEHAVIOR OF END STAGE BLADES**

L. Frank, S. Weihe

12:20 - 12:40 **FATIGUE RESISTANCE OF THE AUXETIC HONEYCOMBS**

B. Nečemer, Ž. Božić, S. Glodež

12:40 - 13:00 -

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13:00 - 14:00 Lunch



**14:00 - 16:00 Online Session - CONFERENCE HALL**

ON-SITE and WEB

Chair: Tea Marohnić

- 14:00 - 14:20 **EFFECTS OF POST PROCESSING ON SURFACE ROUGHNESS, RESIDUAL STRESS AND DEGRADATION BEHAVIOR OF IN718 FABRICATED THROUGH ADDITIVE MANUFACTURING**  
O.V. Mythreyi, R. Jayaganthan
- 14:20 - 14:40 **A STUDY ON THE INFLUENCE OF JOHNSON COOK PARAMETERS ON THE FLOW BEHAVIOUR OF AA2024 ALLOY AGAINST BALLISTIC IMPACT**  
N. Gara, R. Velmurugan, R. Jayaganthan
- 14:40 - 15:00 **A STUDY ON FATIGUE AND FRACTURE BEHAVIOUR OF AL 2024 ALLOY FOR DIFFERENT HEAT TREATMENT CONDITIONS THROUGH XFEM AND STRESS-LIFE APPROACH**  
S. Gairola, R. Verma, R. Jayaganthan
- 15:00 - 15:20 **FRACTURE TOUGHNESS AND FATIGUE CRACK GROWTH BEHAVIOUR OF LASER POWDER BED FUSION (LBPF) PROCESSED TI-6AL-4V ALLOY THROUGH XFEM**  
R. Verma, P. Kumar, S. Gairola, R. Jayaganthan
- 15:20 - 15:40 **FATIGUE LIFE ASSESSMENT OF ADDITIVE MANUFACTURED CENTRIFUGAL COMPRESSOR IMPELLER BASED ON FEA**  
S. Rakesh Ch., S. Kumar, K.M. Narayanan, R. Jayaganthan, N.J. Vasa
- 15:40 - 16:00 **THE EFFECT OF DIE DESIGN ON RESIDUAL STRESSES OF ZR-4 PROCESSED BY SWAGING**  
G. Singh, R. Raj, V. Narayanan K.I., U.K. Arora, R. Jayaganthan

**16:00 - 16:30 Conference Closing**

Room: CONFERENCE HALL

# 5th International Conference on Structural Integrity and Durability - ICSID 2021 & Summer School - Fatigue and Fracture Modelling and Analysis

Centre for Advanced Academic Studies, Dubrovnik, Croatia, 6 - 10 Sep 2021

Conference Venue

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The address of the Conference Venue:  
CENTRE FOR ADVANCED ACADEMIC STUDIES  
Don Frana Bulica 4  
20000 Dubrovnik  
CROATIA

