ENGINEERING MECHANICS 2024

30th INTERNATIONAL CONFERENCE

MAY 14 – 16, 2024, MILOVY, CZECH REPUBLIC



PROGRAMME OF THE CONFERENCE

Institute of Solid Mechanics, Mechatronics and Biomechanics, Faculty of Mechanical Engineering, Brno University of Technology

Institute of Thermomechanics, Academy of Sciences of the Czech Republic, v.v.i. – branch Brno

> Institute of Theoretical and Applied Mechanics, Academy of Sciences of the Czech Republic, v.v.i.

> > ŽĎAS, a. s., Žďár nad Sázavou

IFToMM Member Committee of Czech Republic

Czech Society for Mechanics

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CONTACT ADDRESS OF THE ENGINEERING MECHANICS 2024

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Conference EM2024 is hosted by the OREA Resort Devět Skal, Milovy

Address:

OREA Resort Devět Skal Sněžné - Milovy 11 592 02 Svratka Czech Republic

Hotel reception and Registration Desk:

Tel.: +420 566 585 111 e-mail: <u>rezervace.9skal@orea.cz</u> <u>www.resortdevetskal.cz</u>

1. GENERAL INFORMATION

ACCOMMODATION

The accommodation of the participants is reserved in the **OREA Resort Devět Skal** (see map in the chapter 5.). Please contact kindly the reception of the hotel immediately after your arrival. For information regarding other **hotel services** (swimming pool, etc.), please contact hotel reception.

BADGES

The participants are kindly requested to **wear their badges during the conference** to be admitted to scientific sessions, meals, transportation and other services.

BOARDING

Boarding is provided for participants in the hotel restaurant, **starting with Tuesday dinner and ending by the breakfast on Thursday**. Breakfasts are served from 7:00, lunches and dinners are scheduled according to the conference programme. The meal costs are included in the conference fee. The visible conference badge is a sign for the staff to serve you.

CONFERENCE REGISTRATION

The **Registration corner of the EM2024 Conference** is located in front of the Conference Hall (on the 2nd floor) of the hotel Devět Skal. It is open from 13:00 to 18:30 on Tuesday (14th May) and from 8:30 to 16:00 on Wednesday (15th May).

INSURANCE

The Conference Committee is not responsible for the health problems of the participants nor for losses. The visitors from abroad are recommended to take out insurance in the country of their origin.

INTERNET SERVICES

Wi-Fi coverage of the entire hotel is ensured during the conference.

REFRESHMENT

Coffee, tea and cookies are available during the Coffee Breaks for all conference participants. Outside these breaks, snacks can be purchased at the hotel bar (11:00 - 23:00). For other possibilities, please contact the staff of the hotel.

TRANSPORTATION

- A special bus to Milovy will be leaving Žďár nad Sázavou (bus station in front of the railway station) at 12:45 on Tuesday 14 May, 2024.
- A special bus to Žďár nad Sázavou (bus & railway station) will be leaving hotel Devět Skal approximately at 9:30 on Thursday 16 May, 2024.

2. SCIENTIFIC INFORMATION

The **30th International Conference ENGINEERING MECHANICS 2024** continues in the tradition of the fruitful meetings which have been held in Svratka for many decades.

The Scientific Committee reviewed and chose **75 papers** for the presentation (57 lectures and 18 posters) including **2 invited keynote lectures**, which will be heard on Tuesday and Wednesday. All accepted papers are published in **Conference Proceedings "Engineering Mechanics 2024"**. The proceedings will be also published on-line on <u>www.engmech.cz</u>.

OFFICIAL LANGUAGE

The official languages of the conference are **Czech**, **Slovak and English**. No simultaneous translation is provided. All presentations/posters must be written in English.

LECTURES

The conference includes the **Keynote lectures** (plenary session) and parallel sessions in the conference facilities located on the 2^{nd} floor of the Devět skal hotel. The plenary sessions will take place in the main lecture hall (**Conference Hall**), the **parallel sections** in three smaller lounges (**Lecture Hall I – III**) that are accessible from the Conference Hall.

The presentation of a keynote lecture lasts 40 minutes while that one of a normal lecture 15 minutes including the discussion. The Chairmen of scientific sessions are responsible for keeping the timetable. The presenting authors are kindly asked to contact their PC Service at least 10 minutes before starting of the session and to check functionality of their presentation.

The data projector with PC is available in all Lecture Halls as a standard. No other facilities will be provided, unless the speaker employs its own device – please contact the PC Service in that Lecture Hall.

POSTER SESSION

The area for the poster session is reserved in the back of the Conference Hall from Tuesday afternoon. For every paper announced for the poster session, a particular panel of ca. $0.9 \times 1.2 \text{ m}$ (width x height) is assigned and labelled by the number and title of the poster. The fixing material will be available at the place and at the Registration Desk.

The authors of the posters exhibited at the Conference can register at the Registration Desk to the **competition for the Prize of the Managing Director of the ŽĎAS**. The only condition for participation is the personal presence of the author at the Award Ceremony.

The Special Poster Committee – under chairmanship of Mr. Radek Vlček, MSc., technical director of the $\check{Z}\check{D}AS$ company – will conclude the assessment of the posters exhibited on Wednesday (11:15 – 11:45). The winners of the competition will be announced and awarded on Wednesday evening at 19:00 before the Group Photo and Conference Dinner.

The authors are kindly asked to dismount their posters by Wednesday evening.

VARIATIONS

The Scientific Committee is entitled to vary the conference programme if necessary for scientific or technical reasons. If a speaker is missing in the planned time the next speakers take the order and the break after that particular session will be longer.

LIST OF SECTIONS

Section	Abbreviation	Lecture Hall
Keynote Lectures	KEY I and II	
Poster Session	POS	Conference Hall
Dynamics + Kinematics	DYN I and II	
Technological Processes	TEC	Lecture Hall I
Mechatronics	МСТ	
Mechanics of Solids	SOL	
Thermomechanics	TER	Lecture Hall II
Fluid Mechanics	FLU I and II	
Biomechanics	BIO	Lecture Hall III
Reliability of Structures	REL	Lecture Hall III

3. CONFERENCE TIMETABLE

	Tuesa	$d a y - 14^{th} N$	May 2024	
13:00 - 18:30	Regi	stration – in fr	ont of the Conferen	ice Hall
		Confer	ence Hall	
15:15 - 15:30		O p e n i n g	Ceremony	
15:30 - 16:10		<i>KEY I –</i> Ke	ynote lectures	
16:10 - 16:30		Coffee	Break	
	Conference Hall	Lecture Hall I	Lecture Hall II	Lecture Hall III
16:30 - 19:00		DYN I	SOL TER	BIO
19:00 - 20:20		Dinner –	Restaurant	

	Wedne	$s d a y - 15^{th}$	^a May 2024	
8:30 - 16:00	Regi	stration – in fr	ont of the Conferen	ce Hall
	Conference Hall	Lecture Hall I	Lecture Hall II	Lecture Hall III
9:00 - 9:40	KEY II			
9:45 – 11:15		DYN II	FLU I	REL
11:15 - 11:45	Coffee	Break & Pos	ster Session((see bellow)
	Conference Hall	Lecture Hall I	Lecture Hall II	Lecture Hall III
11:15 - 11:45	POS			
12:00 - 14:00		Lunch –	Restaurant	
	Conference Hall	Lecture Hall I	Lecture Hall II	Lecture Hall III
14:00 - 15:15		TEC MCT	FLU II	
15:15 – 15:45		Coffee	Break	
15:45 - 19:00		Free	time	
19:00 - 19:15		Confere	nce Hall	
19:00 - 19:15	Award of	f the Prize of the T	Cechnical Director	of ŽĎAS
19:15 - 19:20	Group p	hoto in front of th	e OREA Hotel Do	evět Skal
19:20 - 24:00	C o	nference Di	nner – Restau	rant

4. DETAILED PROGRAMME

4.1. Conference Hall

	Tuesday – 14 th May 2024 – Conference Hall	
15:15 - 15:30	Opening Ceremony – Plenary session	
	<i>Keynote lectures – Plenary session</i> Chairman: J. Petruška	(KEY I)
15:30 - 16:10	Sant Z.: QUO VADO BIOMECHANICS	24
16:10 - 16:30	Coffee Break	

V	Vednesday – 15 th May 2024 – Conference Hall	
	<i>Keynote lectures – Plenary session</i> Chairman: J. Petruška	(KEY II)
9:00 - 9:40	Hajžman M., Bulín R, Byrtus M., Dyk Š., Polach P., Rendl J., Smolík DYNAMICS OF ROTATING SYSTEMS FOCUSED ON INDUSTRIAL APPLICATIONS	L.: 18

4.1.1. Poster session (POS)

	Wednesday – 15 th May 2024 – Conference Hall	
11:15 11:45	Note: All of the entered posters exhibited at the Conference will be accepted into the compe for the Prize of the Managing Director of the ŽĎAS Company . The special committee – under chairmanship of Ing. Radek Vlček , technical direct of the ŽĎAS company.	
BIO	Gzik-Zroska B., Joszko K., Stradomski G., Piątek A., Wolański W., Kawlewska E.: ASSESSMENT OF MECHANICAL PROPERTIES OF TITANIUM SAMPLES, MANUFACTURED WITH THE USE OF ADDITIVE TECHNOLOGIES	102
BIO	Thomková B., Hrubanová A., Košková O., Richtrová M., Skácel P., Štourač P., Marcián P.: <i>EXPERIMENTAL ASSESMENT OF THE MECHANICAL BEHAVIOR</i> <i>OF IMPRESSION MATERIAL FOR ANAESTHESIOLOGY USE: A PRELIMINARY STUDY</i>	298

BIO	Thomková B., Borák L., Podešva P., Podešva M., Joukal M., Marcián P.: <i>INFLUENCE</i> <i>OF DENTAL IMPLANT INSERTION DEPTH ON STRAIN IN PERIIMPLANT BONE</i> <i>TISSUE</i>	302
DYN	Čečrdle J., Vích O., Stárek J., Vlach J., Kolář M., Šmíd M.: NEW DESIGN AND UPGRADE OF WHIRL FLUTTER AEROELASTIC DEMONSTRATOR	66
DYN	Pavlenko M. V.: <i>DEGEREE OF SUSCEPTIBILITY OF THE GAS-BEARING COAL</i> <i>MASSIF TO CHANGES UNDER VIBRATION AND TECHNICAL SOLUTIONS</i> <i>FOR INCREASING METHANE EXTRACTION FROM THE RESERVOIR</i>	234
FLU	Balážová R., Ferrari S., Hlinka J., Santus A.: <i>TURBULENCE ESTIMATION BY EDDY</i> <i>DISSIPATION RATE AT LOW-ALTITUDES USING UAV IN-SITU DATA</i>	42
FLU	Pařez J., Vampola T.: <i>PREDICTION OF NON-STATIONARY DEFORMATION OF GAS</i> <i>TURBINE USING MACHINE LEARNING APPROACH COUPLING BETWEEN CFD</i> <i>AND FEM MODEL</i>	226
KIN	Hroncová D., Delyová I., Sivák P., Prada E.: MANIPULATOR TRAJECTORY AND WORKSPACE IN THE MATLAB AND MSC ADAMS ENVIRONMENTS	130
МСТ	Miková Ľ., Šarga P., Vagaš M., Prada E., Brada L.: <i>MODELING OF A QUARTER-CAR</i> <i>MODEL PASSING AN OBSTACLE USING LAPLACE TRANSFORMS,</i> <i>MATLAB/SIMULINK AND SIMSCAPE</i>	202
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SOL	Kovář J., Fuis V.: INFLUENCE OF BERKOVICH INDENTER TILT ON THE PROJECTED CONTACT AREA AT NANOINDENTATION TEST	166
SOL	Ondrášek J.: DESIGN OF AN INDEXING GEARBOX WITH RADIAL CAMS	218
SOL	Rackovský D. M., Czakó A.: INFLUENCE OF SINE-SHAPED PROFILE DEVIATIONS ON STATIC TRANSMISSION ERROR	246
SOL	Wdowiak-Postulak A., Świt G., Krampikowska A.: <i>PREFABRICATED SYSTEM FOR</i> <i>STRENGTHENING FULL-SIZE WOODEN GIRDERS USING PRE-STRESSED FIBER-</i> <i>REINFORCED POLYMERS AND STEEL – BENDING SHEAR TESTS</i>	318
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TER	Chudý D., Jegla Z.: <i>PERSPECTIVE WAYS OF HEAT TRANSFER ENHANCEMENT</i> FOR HEAT EXCHANGERS IN FOULING CONDITIONS	74
TER	Zabloudil J., Jegla Z., Daxner J., Babička Fialová D., Freisleben V., Reppich M.: <i>CONSTRUCTION OF A MODULAR DEVICE FOR TESTING HIGHTEMPERATURE</i> <i>FLUE-GAS FOULING IN WASTE-HEAT SOURCES</i>	322

4.2. Lecture Hall I

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16:45	Macháček M., Hračov S.: <i>GALLOPING OF INSULATED BUNDLED</i> OVERHEAD LINE - NONLINEAR NUMERICAL ANALYSIS IN TIME DOMAIN	190
17:00	Isoz M., Gruber P., Ježek O., Kubíčková L., Gabriel D., Kaufman J., Brajer USING FINITE VOLUME METHOD TO SIMULATE LASER SHOCK PEENING OF 7050 AL ALLOY	
17:15	Dohnal J., Šebík M.: BATTERY CRASH SIMULATION IN ANSYS LS-DYNA	86
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18:00	Bayer J.: APPLYING A TWO DEGREE OF FREEDOM MODEL FOR DRIVE-B IDENTIFICATION	Y 46
18:15	Byrtus R.: CGA-BASED SNAKE ROBOT CONTROL MODEL	54
18:30	Kumar Y.: FREE AXISYMMETRIC VIBRATION OF ELASTICALLY RESTRAINED POROUS ANNULAR PLATE USING HAAR WAVELETS	178
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10:15	Sokol M., Crespo-Sanchez S., Rodríguez-Paz M., Mazáčková K., Gogová Z. <i>DAMAGE IDENTIFICATION OF SMALL HOUSES IN DIFFERENT SEISMIC</i> <i>REGIONS</i>	278
10:30	Dupal J.: PROBABILITY LIMITS OF THE CRITICAL ROTOR SPEEDS	94
10:45	Sosna P., Hadaš Z.: <i>DEVELOPMENT AND VERIFICATION OF NOVEL DUA</i> <i>PLUNGER HYBRID KINETIC ENERGY HARVESTER</i>	L 286
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4.3. Lecture Hall II

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16:30	Cimrman R.: WEAK IMPOSITION OF POTENTIAL DIRICHLET BOUNDARY CONDITIONS IN PIEZOELASTICITY: NUMERICAL STUDY	78
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17:00	Hrstka M., Bajer J., Hadaš Z., Sharif Khodaei Z., Aliabadi F., Kotoul M.: MODELLING OF LEADING EDGE MORPHING BY USING GEOMETRICALLY EXACT BEAM THEORY	134
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17:45	Blacha L.: B-SPLINE BASED DENSITY ESTIMATION OF FATIGUE FAILURES IN SLM 18NI300 STEEL	5 50
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18:30	Vacek V., Petrášek Š., Horvath J.: <i>DESIGN STUDY OF COOLING</i> <i>FOR FORWARD-TYPE DETECTORS UNDER INCREASED</i> <i>LUMINOSITY EXPECTED AT THE FUTURE LHC OPERATING CONDITIONS</i>	306
18:45	Panfilov I. A., Aizikovich S. M., Vasiliev A. S.: <i>ELASTOPLASTIC MODELS</i> <i>FOR INTERPRETING INDENTATION RESULTS</i>	222

	Wednesday – 15 th May 2024 – Lecture Hall II	
9:45 - 11:15	Fluid Mechanics(FChairmen: D. Duda, M. Isoz	LUI)
9:45	Šnábl P., Procházka P., Uruba V., Pešek L.: INVESTIGATION OF 3D FLOW STRUCTURES IN A LINEAR BLADE CASCADE WITH STEREO PARTICLE IMAGE VELOCIMETRY	270
10:00	Duda D., Uruba V., Yanovych V., Klimko M., Tomášková T., Jeřábek M., Žitek P., Milčák P.: <i>PIV MEASUREMENT OF WAKES PAST STATOR WHEEL</i> <i>INSIDE AIR TEST TURBINE VT-400 IN TWO AXIAL×TANGENTIAL PLANES</i>	90
10:15	Khýr M., Plachá M., Hlavatý T., Isoz M.: <i>DATA-DRIVEN APPROACH</i> <i>TO ESTIMATING SOOT DISTRIBUTION INSIDE CATALYTIC FILTERS</i> <i>IN AUTOMOTIVE EXHAUST GAS AFTERTREATMENT</i>	154
10:30	Hlavatý T., Isoz M.: ON DIFFUSION, REACTION, AND FLOW OF HIGHCONCENTRATION MULTICOMPONENT GAS MIXTURES	114
10:45	Ledvinková B., Hračov S., Macháček M.: LES SIMULATIONS OF AIRFLOW AROUND RECTANGLE WITH SIDE RATIO 2:1 AND THEIR COMPARISION WITH EXPERIMENTS	182
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12:00 – 14:00 14:00 – 15:15	L u n c h – Restaurant Fluid Mechanics (FI Chairmen: M. Isoz, D. Duda Ples M., Wolański W., Sobkowiak M.: ENHANCING MEDICAL INSIGHTS THROUGH COMPUTATIONAL FLUID DYNAMICS: VALIDATING	238 174
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4.4. Lecture Hall III

Tuesday – 14 th May 2024 – Lecture Hall III		
16:30 - 18:30	<i>Biomechanics</i> Chairmen: Z. Sant, M. Pásek	(BIO)
16:30	Abramczyk I., Ligaj B.: <i>INFLUENCE OF THE ETCHING TIME OF TI6AL4V</i> <i>TITANIUM ALLOY WITH SELECTED ACID SOLUTIONS ON CHANGES</i> <i>IN PHYSICAL PARAMETERS OF THE ELEMENT</i>	38
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17:00	Radolf V., Horáček J., Košina J.: <i>EXPERIMENTAL INVESTIGATION</i> <i>OF FLUID-STRUCTURE-ACOUSTIC COUPLINGS BY STUDYING</i> <i>THE RESONANCE PROPERTIES OF VOCAL TRACT MODELS WITH YIELDING</i> <i>WALLS</i>	₃ 250
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17:30	Hrubanová A., Thomková B., Košková O., Richtrová M., Borák L., Štourač P. Marcián P.: IMPACT OF DIFFERENT DISINFECTION SOLUTIONS ON MECHANICAL PROPERTIES OF ORTHODONTIC IMPRESS SILICONE MATERIAL	., 138
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18:00	Votava T., Marcián P., Borák L., Fuis V., Zikmund T., Kaiser J., Wolff J.: <i>APPARENT YOUNG'S MODULUS OF HUMAN CRANIAL CANCELLOUS BONE</i>	314
18:15	Raziyan M. S., Janusas G.: <i>ENHANCING SENSITIVITY IN PIEZOELECTRIC</i> <i>MICRO CANTILEVER DESIGNS USING STRESS CONCENTRATION REGIONS</i> <i>FOR LABEL FREE DETECTION</i>	254
18:45 - 20:20	Dinner – Restaurant	

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10:00	Slowik O., Šomodíková M., Novák D.: NON-LINEAR PROBABILISTIC ASSESSMENT OF EXISTING BRIDGE CONSIDERING DETERIORATION	266	
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5. *Map*



Conference Hotel - OREA Resort Devět Skal Vysočina, Milovy

source: www.mapy.cz