Book of Proceedings

The Ninth International Congress
of the Serbian Society of Mechanics
July 5-7, 2023, Vrnjačka Banja, Serbia

The Ninth International Congress of the Serbian Society of Mechanics, July 5-7, 2023, Vrnjačka Banja, Serbia – Book of Proceedings

Editor
Professor Nenad Filipović
Professor Miloš Kojić

Technical Editor
Đorđe Dimitrijević

Proofreaders
Neda Vidanović Miletić
Milena Đorđević
Marijana Dimović

Year of publication
2023

ISBN-978-86-909973-9-8

TABLE OF CONTENTS

INTRODUCTION **1**

BOOK OF PROCEEDINGS **3**

UPGRADED TWO-STEP-SCALING APPROACH TO THE DTB CHARACTERIZATION OF FERRITIC STEELS **4**
Sreten Mastilović, Branislav Đorđević and Aleksandar Sedmak

REALIZATION OF THE BRACHISTOCHRONIC MOTION OF CHAPLYGIN SLEIGH IN A VERTICAL PLANE WITH UNILATERAL NONHOLONOMIC CONSTRAINT **12**
Aleksandar M. Obradović, Oleg Yu. Cherkasov, Luka N. Miličić and Slaviša Šalinić

PARALLELIZED SOFTWARE FOR FAST VIRTUAL STENTING SIMULATION OF PATIENT-SPECIFIC CORONARY ARTERY **25**
Tijana Đukic, Igor Saveljić and Nenad Filipović

LEADING EDGE SHAPE OPTIMIZATION OF A NOVEL FAMILY OF HYBRID DOLPHIN AIRFOILS **35**
Zorana Z. Dančuo, Ivan A. Kostić, Olivera P. Kostić, Aleksandar Č. Bengin and Goran S. Vorotović

MODELLING OF LANDSLIDE DYNAMICS: ROLE OF DISPLACEMENT DELAY AND NATURAL BACKGROUND NOISE **45**
Srđan D. Kostić

A BRIEF REVIEW OF THE RESULTS OF FORCED VIBRATIONS OF ELASTICALLY COUPLED NANO-STRUCTURES **55**
Marija Stamenković Atanasov and Ivan R. Pavlović

DYNAMIC BEHAVIOR OF A NANO-SYSTEM UNDER THE INFLUENCE OF MOVING EXTERNAL NANOPARTICLE **63**
Marija Stamenković Atanasov, Danilo Karličić and Ivan R. Pavlović

FREE VIBRATION ANALYSIS OF FGM PLATES BY USING LAYER WISE DISPLACEMENT MODEL **71**
M. Ćetković

STABILITY ANALYSIS OF FGM PLATES USING LAYER WISE DISPLACEMENT MODEL **81**
M. Ćetković

VIBRATIONS OF A VISCOELASTIC ROD MODELED BY FRACTIONAL BURGERS CONSTITUTIVE EQUATIONS **91**
Slađan Jelić and Dušan Zorica

AN OVERVIEW: WITH THE ANĐELIĆ AND RAŠKOVIĆ TENSOR INTO TRANSFORMATIONS OF THE BASE VECTORS IN THE TANGENT SPACE OF THE POSITION VECTOR OF THE KINETIC POINT **101**
Katica R. (Stevanović) Hedrih

DEVELOPMENT OF A HYBRID FIXED-WING VTOL UNMANNED AERIAL VEHICLE **109**
Radoslav D. Radulović and Milica P. Milić

DETERMINATION OF THE OVERALL MATERIAL PARAMETERS IN THE SERIESPARALLEL ROCK-MASS MIXTURE **119**
Dragan M. Rakić, Miroslav Živković and Milan Bojović

CORRUGATION ELASTICITY AS A NEW PROPERTY OF NANOSTRUCTURED MATERIAL: HOLOGRAPHIC ANALYSIS OF APATURA BUTTERFLY WINGS **128**
Marina Simović Pavlović, Katarina Nestorović, Aleksandra Radulović, and Maja Pagnacco

DIFFERENT BUTTERFLY WING STRUCTURES AS AN INSPIRATION FOR MILITARY APPLICATIONS **136**
Marina Simović Pavlović, Katarina Nestorović, Darko Janković, Aleksandra Radulović and Maja Pagnacco

NONLINEAR SEA SURFACE WAVES **142**
Teodor Vrećica

PHASE-FIELD MODELING OF HIGH CYCLIC FATIGUE IN BRITTLE MATERIALS **149**
Vladimir Lj. Dunić, Miroslav M. Živković, Vladimir P. Milovanović and Jelena M. Živković

PREDICTING EPILEPTIFORM ACTIVITY USING MEMRISTIVE LONG SHORT-TERM MEMORY 155
Svetlana A. Gerasimova, Nikolay V. Gromov, Albina V. Lebedeva, Tatiana A. Levanova and Alexander N. Pisarchik

AGE-RELATED PROBLEMS OF POLYPROPYLENE HERNIA MESHES 162
M. Kirilova-Doneva and D Pashkouleva

AN OVERVIEW: ABOUT TWO DOCTORATES IN SERBIAN SCIENCE ON BALL ROLLING AND NEW MODERN RESULTS 168
Katica R. (Stevanović) Hedrih

A NOTE ON THE EFFECT OF STATISTICAL SAMPLE SIZE ON FRACTURE TOUGHNESS CHARACTERIZATION IN THE DTB TRANSITION REGION 174
Sreten Mastilović, Branislav Đorđević and Aleksandar Sedmak

COMPARATIVE STRUCTURAL ANALYSIS OF ALUMINUM AND COMPOSITE WING OF PASSENGER AIRCRAFT 182
Radoslav D. Radulović, Milica P. Milić and Xun Fei

PREDICTING EPILEPTIFORM ACTIVITY USING MEMRISTIVE LONG SHORT-TERM MEMORY 191
Svetlana A. Gerasimova, Nikolay V. Gromov, Albina V. Lebedeva, Tatiana A. Levanova and Alexander N. Pisarchik

ENSTROPHY STUDY OF THE TURBULENT SWIRLING FLOW IN PIPE 198
Đorđe S. Čantrak, Novica Z. Janković, Dejan B. Ilić, and Lazar M. Lečić

STOCHASTIC STABILITY OF THE TIMOSHENKO BEAM RESTING ON THE MODIFIED ELASTIC FOUNDATION . 205
Dunja Milić, Jian Deng, Vladimir Stojanović and Marko D. Petković

CHAPLYGIN SYSTEMS WITH GYROSOPIC FORCES 208
Vladimir Dragović, Borislav Gajić and Božidar Jovanović

DEVELOPMENT OF A METHOD FOR THE CALCULATION OF MULTISTAGE GAS TURBINES AND ESTIMATION OF THE REQUIRED AMOUNT OF COOLING AIR 214
Nikola M. Marković

WAVE PROPAGATION IN PERIODIC TIMOSHENKO BEAMS ON DIFFERENT ELASTIC FOUNDATION TYPES 217
Nevena A. Rosić, Danilo Z. Karličić, Milan S. Cajić and Mihailo P. Lazarević

EXAMPLES OF INTEGRABLE NONHOLONOMIC SYSTEMS WITH AN INVARIANT MEASURE 220
Vladimir Dragović, Borislav Gajić and Božidar Jovanović

FURTHER RESULTS ON ROBUST FINITE-TIME STABILITY NONSTATIONARY TWO-TERM NEUTRAL NONLINEAR PERTURBED FRACTIONAL - ORDER TIME DELAY SYSTEMS 225
Mihailo P. Lazarević, Darko Radojević, Petar Mandić and Stjepko Pišl

EXPERIMENTAL AND NUMERICAL APPROACH TO NATURAL FREQUENCY OF TAPERED 3D PRINTED CANTILEVER BEAM A TIP BODY 235
Marko Veg, Aleksandar Tomović, Goran Šiniković, Stefan Dikić, Nemanja Zorić, Slaviša Šalinić, Aleksandar Obradović, and Zoran Mitrović

MECHANICAL RESPONSE OF V-SHAPED PROTECTIVE PLATES WITH DIFFERENT ANGLES UNDER BLAST LOADING 245
Miloš S. Pešić, Aleksandar S. Bodić, Živana M. Jovanović Pešić, Nikola B. Jović and Miroslav M. Živković

COMPARATIVE ANALYSIS OF SPH AND FVM NUMERICAL SIMULATIONS OF BLOOD FLOW THROUGH LEFT VENTRICLE 253
Aleksandar S. Bodić, Marko D. Topalović, Miljan S. Milošević, Miroslav M. Živković and Miloš S. Pešić

PHASE-FIELD MODELING OF LOW CYCLIC FATIGUE IN DUCTILE MATERIALS 261
Vladimir Lj. Dunić, Miroslav M. Živković, Vladimir P. Milovanović and Jelena M. Živković

AN OVERVIEW: ABOUT THREE MODELS OF MITOTIC SPINDLE OSCILLATIONS AND THEIR MODS 267
Andjelka Hedrih and Katica R. (Stevanović) Hedrih

ANALYTICAL DESIGN OF RESONANT CONTROLLER APPLIED FOR SOLVING ROBOT ARM TRACKING PROBLEM 275
Petar D. Mandić, Tomislav B. Šekara and Mihailo P. Lazarević

ANALYSIS OF PLANAR COMPLEX MOTION OF A HOMOGENEOUS DISK AND A MATERIAL POINT WITH EULER-LAGRANGE EQUATIONS IN QUASI-VELOCITIES 283
Marko M. Gavrilović

EXPERIMENTAL AND NUMERICAL ANALYSIS OF THE STRENGTH OF A DRONE ARM MADE OF COMPOSITE MATERIAL 293
Petar R. Ćosić, Miloš D. Petrašinović, Aleksandar Grbović, Danilo Petrašinović, Mihailo Petrović, Veljko Petrović, Nikola Raičević and Boško Rašuo

A SIMPLIFIED NONLINEAR DYNAMIC MATHEMATICAL MODEL OF A CONTROLLED REAL TURBOJET ENGINE 301
Miloš M. Živanović

PARAMETER IDENTIFICATION OF VISCOELASTIC MATERIALS USING DIFFERENT DEFORMATION VELOCITIES 313
Iva R. Janković, Nenad M. Grahovac and Miodrag M. Žigić

SYSTEMATIC DESIGN OF A DESKTOP ROBOT ARM IN SOLIDWORKS AND MATLAB SIMULINK 319
Andrija A. Dević, Jelena Z. Vidaković, Nikola Lj. Živković and Mihailo P. Lazarević

AN ALTERNATIVE FOR THE GRÜNWALD-LETNIKOV-TURNER METHOD FOR SOLVING SET-VALUED FRACTIONAL DIFFERENTIAL EQUATIONS OF MOTION 327
Filip V. Jakovljević, Miodrag M. Žigić, Nenad M. Grahovac and Dragan T. Spasić

DESIGNING, OPTIMISING AND FABRICATING OF MICROFLUIDIC DEVICES, BASED ON TOPOLOGY OPTIMISATION AND 3D PRINTING 337
Dalibor Nikolić, Nevena Milivojević, Ana Mirić, Marko Živanović and Nenad Filipović

APPLICATION OF COMPOSITE SMEARED FINITE ELEMENT FOR MECHANICS (CSFEM) ON TUMOR GROWTH MODEL 345
Vladimir Simić, Miljan Milošević and Milos Kojić

FORCED VIBRATIONS WITH BURGERS TYPE OF DAMPING 349
Dragan T. Spasić

COMPARATIVE NUMERICAL ANALYSES OF TOOTH RESTORED WITH HYDROXYAPATITE CERAMIC INSERT VERSUS TRADITIONAL COMPOSITE RESTORATION 355
Aleksandar Bodić, Maja Ležaja Zebić, Milan Bojović, Đorđe Veljović and Vladimir Milovanović

NUMERICAL SIMULATIONS IN THE DESIGN AND OPTIMIZATION OF A FLUID-DYNAMICAL VALVE IN REGENERATIVE BURNERS INSTALLATION 363
Mirjana S. Stamenić

EXPERIMENTAL INVESTIGATION AND MATHEMATICAL MODELLING OF VORTEX STRUCTURES FOUND AT IMPINGING TURBULENT AXISYMMETRIC AIR JET MODIFIED BY LOW-AMPLITUDE SOUND MODULATION 372
Dejan Cvetinović, Aleksandar Erić, Nikola Ćetenović, Djordje Čantrak, Jaroslav Tihon and Kazuyoshi Nakabe

NUMERICAL INVESTIGATION OF FLOWS AROUND SMALL-SCALE PROPELLERS: POSSIBILITIES AND CHALLENGES 384
Jelena Svorcan

VIBRATIONS OF FLUID-CONVEYING FUNCTIONALLY GRADED NANOTUBES 390
Nikola Despenić and Goran Janevski

ON THE TRAIL OF VUJIČIĆ'S COORDINATES-INDEPENDENT POSITION VECTOR FORM: ROTATIONALLY-INVARIANT/(CLASSICALLY-)COVARIANT TRAJECTORIAL COORDINATES SYSTEM FORMULATION AND OTHER REPERCUSIOS FOR THE MECHANICS / DYNAMICS MODELING 398
Slobodan Nedić

INFLUENCE OF REFLECTED SHOCKWAVES ON NORMAL FORCE COEFFICIENT OF GRID FINS IN SUPERSONIC FLIGHT REGIME 411
Ognjen Ristić

IMPROVING AIRFOIL PERFORMANCE BY DESIGNED BLOWING 421
Jelena Svorcan, Toni Ivanov and Aleksandar Simonović

3D PRINTING TECHNOLOGY IN CRANIOPLASTY: CASE STUDY 424
Tijana Geroski, Dalibor Nikolić, Vojin Kovačević and Nenad Filipović

ON DEVIATIONS IN NONLINEAR TIME DOMAIN REGIME OF VIBRATIONS OF THE PARTLY COUPLED STRUCTURES WITH THE CURVATURES 428
Vladimir Stojanović, Jian Deng, Dunja Milić and Marko D. Petković

CLOSED-FORM SOLUTIONS AND STABILITY OF SHELLS UNDER THE WHITE NOISE EXCITATION 430
Vladimir Stojanović, Jian Deng, Dunja Milić and Marko D. Petković

DYNAMICS OF A MULTILINK AERODYNAMIC PENDULUM 432
Yury D. Selyutskiy and Andrei P. Holub

DYNAMICS OF ASYMMETRIC MECHANICAL OSCILLATOR MOVING ALONG AN INFINITE BEAM-TYPE COMPLEX RAIL SYSTEM 434
Vladimir Stojanović, Jian Deng, Dunja Milić and Marko D. Petković

THREE-LINK SNAKE ROBOT CONTROLLED BY AN INTERNAL FLYWHEEL 436
Yury D. Selyutskiy, Liubov A. Klimina and Anna A. Masterova

WAVE PROPAGATION CHARACTERISTICS OF CURVED HEXAGONAL LATTICE WITH RESONATORS 438
S. Mukherjee, M. Cajić, S. Adhikari and S. Marburg

PARAMETRIC AMPLIFICATION IN PERIODIC CHAIN SYSTEM 441
Milan Cajić, Nikola Nešić and Danilo Karličić

MODELING AN INDENTATION OF A HEAD OF VIDEO-TACTILE SENSOR INTO A LINEAR ELASTIC TISSUE 444
Marat Z. Dosaev and Anfisa S. Rezanova

ELEMENTS OF THE THEORY OF CONSTITUTIVE RELATIONS AND FORMULATIONS OF THE LINEARIZED PROBLEMS ON STABILITY 446
Dimitri V. Georgievskii

DEVELOPMENT AND MOULD TECHNOLOGY FOR TESTING OF BIOCOMPOSITE STRUCTURES (APPLICATION FOR THERMOINSULATED BIO PLATES) 448
Marija Baltić, Milica Ivanović, Dragoljub Tanovi1 and Miloš Vorkapić

LEFT VENTRICLE CARDIAC HYPERTROPHY SIMULATIONS USING SHELL FINITE ELEMENTS 450
Bogdan Milićević, Miljan Milošević, Vladimir Simić, Danijela Trifunović, Goran Stanković, Nenad Filipović and Miloš Kojić

NONLINEAR CHARACTERIZATION OF A VIBRATION SYSTEM MODEL 453
Tamara Nestorović, Umaaran Gogilan and Atta Oveisi

AN EXERGAME-INTEGRATED IOT-BASED ERGOMETER SYSTEM FOR PERSONALIZED TRAINING OF THE ELDERLY 456
Fong-Chin Su, Chih-Chun Lin, Li-Chieh Kuo, Yu-Sheng Lin, Chia-Ming Chang, Fang Wen Hu, Yi-Jing Chen, Chun-Tse Lin

L-TYROSINE INFLUENCE ON THE REACTION KINETICS OF IODATEHYDROGEN PEROXIDE OSCILLATORY REACTION 457
J. Maksimović, A. Ivanović-Šašić, S. Maćešić, Ž. Čupić and Lj. Kolar-Anić

PSO-OPTIMIZED FRACTIONAL ORDER ITERATIVE LEARNING CONTROLLER FOR 3 DOF UNCERTAIN EXOSKELETON SYSTEM 459
Nikola Lj. Živković and Mihailo P. Lazarević

INHIBITORY EFFECT OF 4-HYDROXYCOUMARIN DERIVATIVE ON KRAS PROTEIN 461
Marko Antonijević, Žiko B. Milanović, Edina H. Avdović, Dušan S. Dimić and Zoran Marković

GALLIC ACID DERIVATIVES AS INHIBITORS OF CARBOXY ANHYDRASES 463
Marko Antonijević, Dušica Simijonović, Jelena Đorović Jovanović and Zoran Marković

DEEP LEARNING IN PIV APPLICATIONS 466
Jelena T. Ilić, Ivana M. Medojević and Novica Z. Janković

SECONDARY FLOWS OF PRANDTL'S SECOND KIND MECHANISM OF FORMATION AND METHOD OF PREDICTION 468
N. Nikitin

RESEARCH ON HIGH EFFICIENCY AND HIGH RELIABILITY PUMPS IN JIANGSU UNIVERSITY 470
Ji Pei and Wenjie Wang

VISCOUS GENERALIZED MAXWELL-STEFAN MODEL OF DIFFUSION 472
Damir Madjarević and Srboljub Simić

COMPUTATIONAL ANALYSIS OF DRUG EFFECTS ON HYPERTROPHIC CARDIOMYOPATHY 474
Smiljana Tomašević, Miljan Milošević, Bogdan Milićević, Vladimir Simić, Momcilo Prodanović, Srboljub M. Mijailovich and Nenad Filipović

OBLIQUE TRANSITION IN HIGH-SPEED SEPARATED BOUNDARY LAYERS 476
Anubhav Dwivedi, G. S. Sidharth and Mihailo R. Jovanović

THERMODINAMICAL RESTRICTIONS FOR MOVING POINT LOAD MODEL INVOLVING GENERALIZED VISCOLEASTIC FOUNDATION 477
Lidija Z. Rehlicki Lukešević, Marko B. Janev, Branislava B. Novaković and Teodor M. Atanacković

FLEXIBLE DEPLOYABLES MADE FROM SOFT KIRIGAMI COMPOSITES 480
Jan Zavodnik, Mohammad Khalid Jawed and Miha Brojan

THIN COMPOSITE PLATES WITH STRESS CONCENTRATORS ANALYZED BY THEORY OF CRITICAL DISTANCES 483
Ivana D. Atanasovska and Dejan B. Momčilović

STEADY STATE SOLUTION FOR DYNAMICS OF A NONIDEAL CRANKSLIDER MECHANISM WITH AN ACTIVE MASS DAMPER (AMD) 485
Julijana Simonović, Nikola D. Nešić, José Manoel Balthazar, Maurício Aparecido Ribeiro and Jorge Luis Palacios Felix

DESIGN AND OPTIMIZATION OF SPLITTER BLADE OF RETURN CHANNEL FOR THE IMPROVEMENT OF PUMP TURBINE PERFORMANCE 488
Geyuan Tai, Wenjie Wang, Ji Pei, Giorgio Pavesi and Shouqi Yuan

AN OVERVIEW: ON NONLINEAR DIFFERENTIAL EQUATIONS AND INTEGRALS OF THE DYNAMICS OF BALL ROLLING ALONG CURVED LINES AND SURFACES 491
Katica R. (Stevanović) Hedrih

A SIS MODEL WITH A SATURATED INCIDENCE RATE 493
Marcin Choiński

MODELING OF PENETRATION DEPTH OF A SHAPED CHARGE JET 495
Predrag M. Elek, Miloš D. Marković, Dejan T. Jevtić and Radovan V. Đurović

EFFECT OF SMOOTH MUSCLE ACTIVATION IN THE STATIC AND DYNAMIC MECHANICAL CHARACTERIZATION OF HUMAN AORTAS 496
Marco Amabili, Ivan Breslavsky, Francesco Giovanniello, Giulio Franchini, Ali Kassab and Gerhard Holzapfel

PLANE MOTION OF A BODY RESTING ON ONE CYLINDRICAL HINGE AND ONE SLIDING ELASTIC SUPPORT RESTING ON A ROUGH PLANE 497
Marat Z. Dosaev and Vitaly A. Samsonov

THE INFLUENCE OF MAGNUS FORCE ON TURBULENT PARTICLE-LADEN FLOWS IN HORIZONTAL NARROW CHANNEL 499
Darko Radenković and Milan Lečić

ANALYTICAL AND NUMERICAL ANALYSIS OF COMPRESSIBLE ISOTHERMAL FLOW BETWEEN PARALLEL PLATES 501
Petar V. Vulićević, Snežana S. Milićev and Nevena D. Stevanović

FREQUENCY BAND STRUCTURE ANALYSIS OF A PERIODIC BEAM-MASS SYSTEM FOR PIEZOELECTRIC ENERGY HARVESTING 503
Stepa M. Paunović

STABILITY OF PARAMETRIC VIBRATIONS OF THE COUPLED RAYLEIGH BEAMS 506
Dunja Milić, Jian Deng, Vladimir Stojanović and Marko D. Petković

DEVELOPMENT AND MOULD TECHNOLOGY FOR TESTING OF BIOCOMPOSITE STRUCTURES (APPLICATION FOR THERMOINSULATED BIO PLATES)

Marija Baltić[1], Milica Ivanović[1], Dragoljub Tanović[1] and Miloš Vorkapić[2]

[1] Faculty of Mechanical Engineering, University of Belgrade, Kraljice Marije 16, 11120 Belgrade 35
e-mail: mbaltic@mas.bg.ac.rs,
[2] ICTM - CMT, University of Belgrade, Njegoševa 12, 11000 Belgrade, Republic of Serbia

Abstract

Biocomposite materials are a combination of two or more different biomaterials at the macroscopic level, with competitive mechanical and insulation properties, relatively stable when exposed to high temperatures and tailorable. In this paper, materials are with a vegetative part of fungi (mycelium-mesh structure of hyphae) which are increasingly used to create biocomposites with unique processing technology. The vegetative part of a fungus called mycelium, can serve as a natural binder for products made of biocomposite and acts like a self-assembling adhesive by digesting and adhering to the surface of specific organic matter. This paper presents the development of mould technology to set the biocomposite structure and test its mechanical characteristics. The primary purpose of the mould is to bring the loose natural material into a solid preparation following the standards ASTM D7250 and ASTM D1037, which include testing the technologically prepared and hardened sample for tensile and pressure. Development and moulding of biocomposite are the technological processes of drying after sowing mycelium so a variant of the mould with a perforated upper part was used to harden the samples thoroughly.

Keywords: mycellium biocomposite, mould, 3D printing, testing, thermoinsulation.

1. Introduction

With global carbon emissions of 39% [1], the building industry has a large responsibility to constantly propose new and improved low-carbon solutions. It takes over a million years to decompose standard synthetic thermal insulation materials. The general characteristic of organic materials is that they have a lower coefficient of thermal conductivity and a higher heat capacity compared to most synthetic materials. The thermal conductivity of such materials varies significantly, greatly depending on different characteristics: degree of porosity, the temperature of the material, the moisture content, the direction of fiber propagation, which affects the direction of the temperature gradient. Mycelium-based polymers hold special potential as thermal insulation foams due to their low thermal conductivity and inherent fire safety features. Research that has been done on thermal conductivities refers that mycelium composites based on hemp fibers or wheat straw have low thermal conductivities (0,04 W/(mK)) and can compete with polystyrene (0.03-0.04 W/(mK)) and polyurethane foam (0.006-0.18 W/(mK)) [2].

2. Development and manufacturing of a mould

Manufacturing of biocomposite structure usually proposes the next steps: 1) preparation of mould according to the type of testing and appropriate standards; 2) binding of plies with natural glue in order to prevent the growth of mycelium; 3) forming, sterilization and hardening plies and structure; 4) filling of mould by mycelium biomaterial; 5) drying and prevention growth of mycelium fibres; 6) infusion of natural resin to improve mechanical characteristics [3]. For the first phase - tensile testing, 10 moulds were manufactured for the production of specimens according to standard D1037. The mould was first created and developed in CATIA and by appropriate software printed in the 3D printer (additive technology).

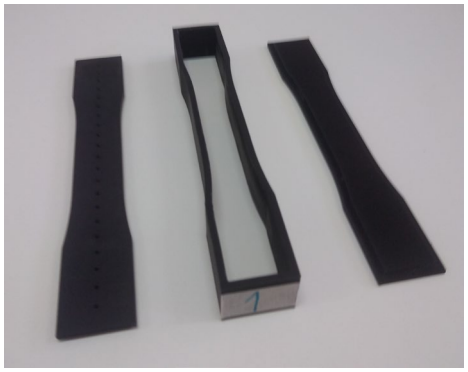

Fig 1. Parts of mould

Fig 2. Moulds for production of testing specimen

3. Conclusion

Moulds for the production of biocomposite mycelium structures (for tensile and pressure testing) were developed, simulated and manufactured. The next phase involves experimental testing and analysis of drying and hardened biocomposite specimens according to appropriate standards and determination of mechanical characteristics.

References:

[1] IEA (2019), Global Status Report for Buildings and Construction 2019, IEA, Paris
[2] Mitchell Jones, Andreas Mautner, Stefano Luenco, Alexander Bismarck, Sabu John, *Engineered mycelium composite construction materials from fungal biorefineries: A critical review*, Materials & Design, Volume 187, 2020, 108397, ISSN 0264-1275
[3] Jiang L., Walczyk D., McIntyre G., Bucinell R., Li B., *Bioresin infused then cured mycelium-based sandwich-structure biocomposites: Resin transfer molding (RTM) process, flexural properties, and simulation*, Journal of Cleaner Production 207 (2019) pp. 123-135, 2018.