

Polytechnic & Design

Vol. 12, No. 2, 2024.

DOI: 10.19279



**TEHNIČKO VELEUČILIŠTE U
ZAGREBU** ZAGREB UNIVERSITY
OF APPLIED SCIENCES

Izdavač / Publisher

Tehničko veleučilište u Zagrebu
Vrbik 8, 10000 Zagreb

Glavni urednik / Editor in chief

Vilko Žiljak

Zamjenice urednika / Deputy editors

Aleksandra Bernašek Petrincec
Darija Čutić

Uredništvo / Editorial office

Dražen Arbutina
Toni Bjažić
Ivica Dodig
Lidija Tepeš Golubić
Petar Jandrić
Stjepan Tvorčić
Jana Žiljak Gršić
Krunoslav Pavković
Sonja Zlatović

Savjet časopisa / Journal advisors

Davor Cafuta
Tin Kramberger
Dario Matika
Goran Sirovatka
Igor Gukov
Alen Šimec
Dunja Bjelobrk Knežević
Vesna Alić Kostešić
Vladimir Mateljan
Krešimir Meštrović
Marin Milković
Damir Modrić
Nikola Mrvac
Mario Tomiša
Darko Agić
Stjepan Car
Klaudio Pap
Damir Boras
Slavica Čosović Bajić
Ivica Pogarčić
Krešo Ivandić
Mario Uroš

**Međunarodni uređivački savjet /
International Editorial Board**

Rajendrakumar Anayath (Indija)
Anastasios Politis (Grčka)
Borut Zalik (Slovenija)
Atilla Ansal (Turska)
Pisit Kuntiwattanakul (Tajland)
Rolando P. Orense (Novi Zeland)
Shamsher Prakash (Sjedinjene Američke Države)
Yoshimichi Tsukamoto (Japan)
Mitsutoshi Yoshimine (Japan)

Programski odbor / Program Committee

Dalibor Gelo
Vatroslav Zuppa Bakša
Stjepan Tvorčić
Ivana Lovrić
Željko Lebo
Renata Kramberger
Darijo Čerepinko
Ante Elez
Igor Gukov
Igor Kuzle
Ivan Legac
Sonja Lozić
Dijana Nazor Čorda
Igor Majnarić
Mile Matijević
Dario Matika
Miroslav Mikota
Mladen Petrićec
Sonja Zentner Pilinsky
Tomislav Plavšić
Dubravko Sabolić
Miroslav Slamić
Sejid Tešnjak
Zvonimir Valković
Damir Vusić
Mladen Zeljko
Igor Zjakić
Denis Jurečić
Andrija Bernik
Dubravko Žigman
Ivan Rajković
Marinko Žagar
Zdenko Balaž
Diana Bratić
Petar Miljković
Katja Milković
Maja Rudolf
Dražen Crčić
Krunoslav Hajdek

Lektori i prevoditelji /

Proofreaders and translators

Dina Fističić Bernardi

Amelia Kovačević

Grafička redakcija / *Graphic editorial*

Tomislav Bogović

Dizajn naslovnice / *Cover design*

Ulla Leiner Maksan

Internet stranica / *Website*

Slaven Crnjac

Tajnica časopisa / *Journal secretary*

Sunčica Perković

Administratori / *Administrators*

Sara Slamić Tarade

Slaven Crnjac

*Elektroničko (HR, ENG) i tiskano izdanje (HR).
Izlazi 4 puta godišnje.*



Kontakt · Contact

Adresa · Address

Tehničko veleučilište u Zagrebu

Polytechnic and Design

Vrbik 8

10000 Zagreb

Croatia

E-mail

pd@tvz.hr

pd-recenzenti@tvz.hr

Internet adresa · web

<http://polytechnicanddesign.tvz.hr>

<http://pd.tvz.hr>

DOI: 10.19279

Članci se nalaze u bazama:

<http://hrcak.srce.hr>

<https://scholar.google.hr>

Mrežna inačica: ISSN 2459-6302

Tiskana inačica: ISSN 1849-1995

Datum izdavanja: 20.11.2024.

ISSN 1849 – 1995



9771849199002

Polytechnic and Design

Sadržaj · Content





- 1. FREIGHT VEHICLES PAYLOAD AND DESIGN ANALYSIS** **76**
Dinko Mikulić, Andrija Šaban, Josip Rauker
 DOI: 10.19279/TVZ.PD.2024-12-2-11

- 2. SNAGA BOJA U VIZUALNOM KOMUNICIRANJU**
THE POWER OF COLORS IN VISUAL COMMUNICATION **87**
Damir Vusić
 DOI: 10.19279/TVZ.PD.2024-12-2-02

- 3. PRILOG RAZUMIJEVANJU TEORIJA ČVRSTOĆE**
A CONTRIBUTION TO THE UNDERSTANDING OF FAILURE THEORIES **95**
Branimir Markulin Grgić, Vladimir Markulin Grgić, Miroslav Radaković, Ante Zaninović
 DOI: 10.19279/TVZ.PD.2024-12-2-03

- 4. ANALIZA I PREGLED NOVIH IGRIFIKACIJSKIH OKVIRA U PRAKSI**
*ANALYSIS AND OVERVIEW OF NOVEL GAMIFICATION FRAMEWORKS
IN PRACTICE* **105**
Željko Kovačević, Marko Horvat, Aleksandar Stojanović
 DOI: 10.19279/TVZ.PD.2024-12-2-14

- 5. NOVA LEGISLATIVA – „LJUDSKO DJELOVANJE“ ZA REGULATORNE OBRADU,
CJELOŽIVOTNO OSPOSOBLJAVANJE I STRUČNO USAVRŠAVANJE**
*NEW LEGISLATION – „HUMAN PERFORMANCE“ FOR REGULATORS,
LIFELONG EDUCATION AND PROFESSIONAL TRAINING* **114**
Zdenko Balaž, Dubravko Žigman, Sunčica Perković
 DOI: 10.19279/TVZ.PD.2024-12-2-15

- 6. RAZVOJ EDUKACIJSKOG MODELA MJENJAČKE KUTIJE**
DEVELOPMENT OF AN EDUCATIONAL GEARBOX MODEL **125**
Neven Krulić, Filip Mateša
 DOI: 10.19279/TVZ.PD.2024-12-2-16
- 7. USPOREDBA METODE FOTOGRAMetriJE I GAUSSOVOG RASPRŠIVANJA KOD REKONSTRUKCIJE 3D MODELA**
COMPARISON OF PHOTOGRAMMETRY METHOD AND GAUSSIAN SPLATTING IN 3D MODEL RECONSTRUCTION **131**
Emanuel Dubovečak, Ivan Rajković, Dinka Radonić
 DOI: 10.19279/TVZ.PD.2024-12-2-07
- 8. „LOW-POLY“ GRAFIKE KREIRANE U ADOBE PHOTOSHOPU**
"LOW-POLY" GRAPHICS CREATED IN ADOBE PHOTOSHOP **146**
Darija Ćutić, Ana Lacković, Marta Kaleta, Emanuel Šarotar, Dora Starčević
 DOI: 10.19279/TVZ.PD.2024-12-2-08
- 9. STUDIJE SLUČAJA: DOBRE PRAKSE UPRAVLJANJA KNJIGOVEŠKIM PROIZVODNIM PROCESIMA U PODUZETNIČKOM OKRUŽENJU**
CASE STUDIES: AFFIRMATIVE MANAGING PRACTICES OF BOOK BINDING PROCESSES INNER THE ENTREPRENEURIAL ENVIRONMENT **152**
Suzana Pasanec Preprotić, Anja Cetinjanin, Diana Bratić, Gorana Petković
 DOI: 10.19279/TVZ.PD.2024-12-2-19

Uvodne riječi · *Introduction*

Riječ glavnog urednika časopisa Polytechnic and Design



Novi broj časopisa tiskan je sa zakašnjenjem, premda su recenzirani članci na mrežnim stranicama objavljeni u planirano vrijeme.

Prof. Damir Vusić dugogodišnji je suradnik ovog časopisa, a u ovom broju predstavio je temu koja mu je bliska, budući da je diplomirao na Grafičkom fakultetu. U svom izlaganju posvetio je značajan prostor korištenju boja, pa izdvajam dio njegovog izlaganja: “Zahvaljujući upotrebi boja olakšana je diferencijacija različitih religija, kultura, političkih ili društvenih grupacija, sportskih klubova, brendova”. Potpuno drugu temu pod naslovom *Freight vehicles payload and design analysis* prikazali su kolege Dinko Mikulić, Andrija Šaban i Josip Rauker. Spominjem to s naglaskom na širinu područja istraživanja koje naš časopis prihvaća. U ovom broju časopisa predstavljene su nove teme istraživanja, od tehničkih gledišta do tehnologija algoritmiranja i konvencionalnog programiranja za izvedbu 3D modeliranja. Povezuju se izrazito različita područja – znanost i umjetnost.

Kolegice s Grafičkog fakulteta, Suzana Pasanec Prepotić, Anja Cetinjanin, Diana Bratić i Gordana Petković predstavljaju temu s grafičkog studija *Case studies: Affirmative managing practices of book binding processes inner the entrepreneurial environment*. Kolege Emanuel Dubovečak, Ivan Rajković i Dinka Radonić ponudile su nam rad pod naslovom *Comparison of photogrammetry method and gaussian splatting in 3D model reconstruction*. Kolege Neven Krulić i Filip Mateša priredili su članak o razvoju edukacijskog modela mjenjačke kutije. Kolegice Darija Ćutić, Ana Lacković, Marta Kaleta, Emanuel Šarotar i Dora Starčević istražuju novitete u digitalnoj rasterskoj grafici u Adobe Photoshopu. Očekujemo primjenu novih algoritama koji se razvijaju za separaciju procesnih bojila s paralelnom primjenom za tisak u infracrvenoj tehnologiji, što je najavljeno u prijašnjim brojevima časopisa Polytechnic and Design. Naši nastavnici s Tehničkog veleučilišta u Zagrebu Branimir i Vladimir Markulin Grgić, Miroslav Radaković te Ante Zaninović prikazuju svoj *prilog razumijevanju teorije čvrstoće*. Ovaj članak bit će dodatak u nastavi na Tehničkom veleučilištu u Zagrebu. I od ostalih radova objavljenih u časopisu očekuje se isto.

Glavni urednik časopisa Polytechnic and Design

prof. emeritus dr. sc. Vilko Žiljak

A word from the editor-in-chief of Polytechnic and Design magazine

The new issue of the magazine was printed late, although the peer-reviewed articles on the website were published at the planned time.

Prof. Damir Vusić is a long-time collaborator of this magazine, and in this issue, he presented a topic that is close to him, since he graduated from the Faculty of Graphic Arts. In his presentation, he dedicated a significant space to the use of colours, and I would like to highlight a part of his presentation: "Thanks to the use of colours, the differentiation of different religions, cultures, political or social groups, sports clubs, brands are facilitated." A completely different topic entitled *Freight Vehicles Payload and Design Analysis* was presented by colleagues Dinko Mikulić, Andrija Šaban and Josip Rauker. I mention this with an emphasis on the breadth of research areas that our journal accepts. In this issue of the journal, new research topics are presented, from technical viewpoints to algorithmic technologies and conventional programming for the performance of 3D modelling. Extremely different fields are connected - science and art.

Colleagues from the Faculty of Graphic Arts, Suzana Pasanec Prepotić, Anja Cetinjanin, Diana Bratić and Gordana Petković present the topic from the graphics studio *Case studies: Affirmative managing practices of book binding processes within the entrepreneurial environment*. Colleagues Emanuel Dubovečak, Ivan Rajković and Dinka Radonić offered us a paper entitled *Comparison of photogrammetry method and gaussian splatting in 3D model reconstruction*. Colleagues Neven Krulić and Filip Mateša prepared an article *on the development of an educational model of the gearbox*. Colleagues Darija Ćutić, Ana Lacković, Marta Kaleta, Emanuel Šarotar and Dora Starčević are investigating novelties in digital raster graphics in Adobe Photoshop. We expect the application of new algorithms that are being developed for the separation of process dyes with a parallel application for printing in infrared technology, which was announced in previous issues of Polytechnic and Design magazine. Our teachers from the Zagreb University of Applied Sciences Branimir and Vladimir Markulin Grgić, Miroslav Radaković and Ante Zaninović present their *contribution to understanding the theory of strength*. This article will be an addition to classes at the Zagreb University of Applied Sciences. The same is expected from other works published in the magazine.

Polytechnic and Design magazine Editor-in-Chief

Professor emeritus Vilko Žiljak, PhD