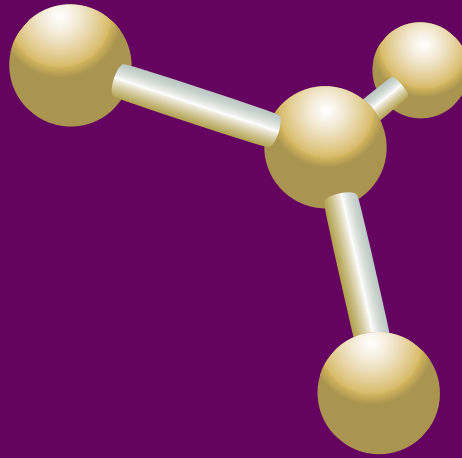
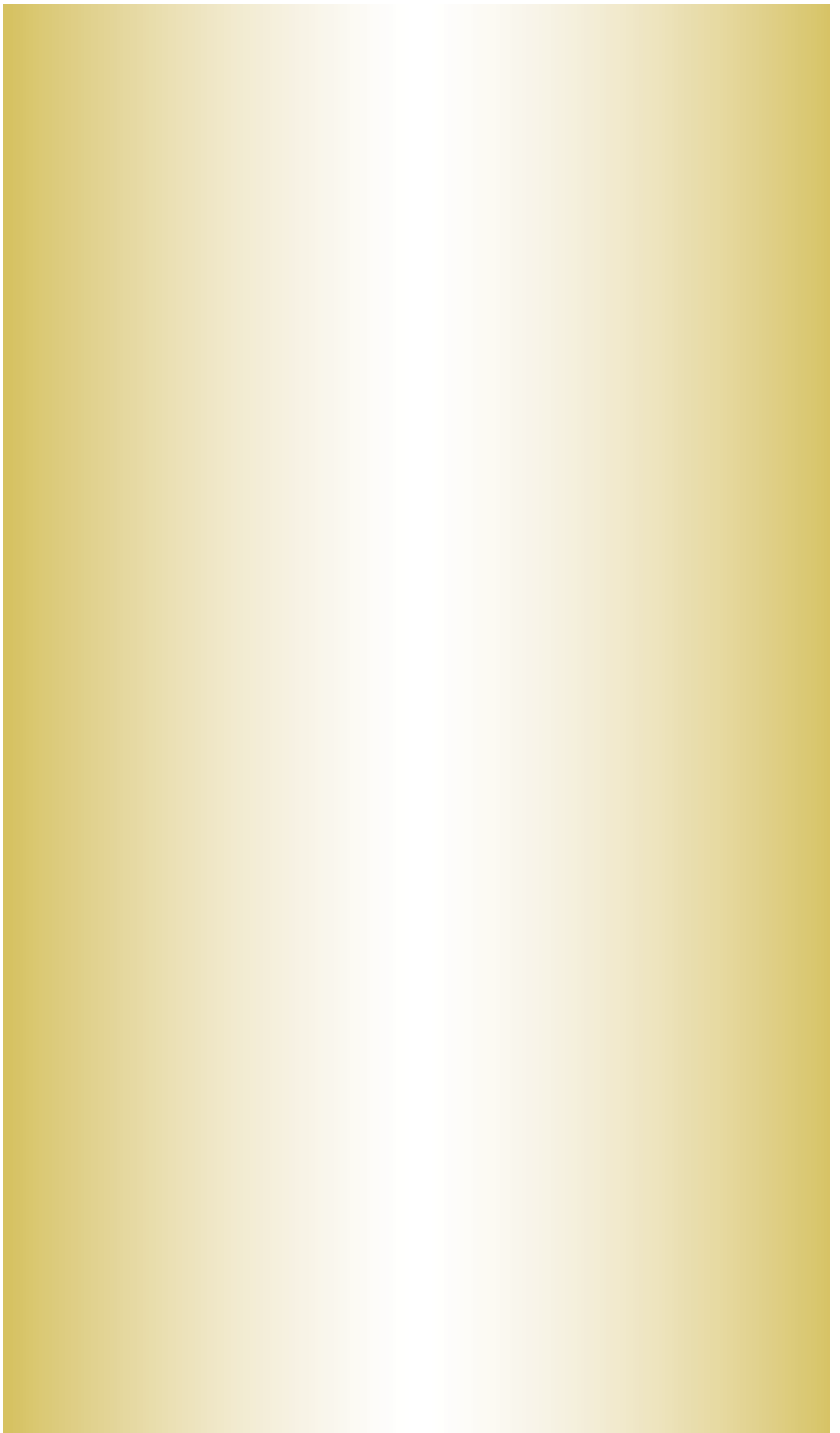


8. TRIMOVE
RAZISKOVALNE
NAGRADE



8TH TRIMO
RESEARCH
AWARDS

2009



KAZALO

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NAGOVOR GLAVNE DIREKTORICE

GENERAL MANAGER'S ADDRESS

Pokaži, kaj znaš

Živimo v času različnih, a vendarle izredno pomembnih izzivov, kot so globalizacija, klimatske spremembe, spreminjajoča se demografska struktura prebivalstva ... Zato je razumljivo, da bo naša prihodnost odvisna od tega, kar bomo na novo ustvarili in pri tem upoštevali nove spremenjene zahteve ljudi, narave in planeta.

Pred nami so mnoge dileme in vprašanja. Ključno vprašanje pa je, kako zagotoviti nenehen razvoj v času, ko se tako gospodarski kot poslovni svet nahajata v nezavidljivem položaju? S čim spodbuditi inovativno razmišljanje? Na podlagi česa graditi napredek? Odgovore lahko najdemo v novem znanju, povezovanju le-tega in še zlasti v konkretni uporabi znanja v praksi, s čimer ustvarjamo novo vrednost.

Znanje je temelj sedanjega in prihodnjega razvoja. Zato je pomembno spodbujati povezovanje mladih, ki so polni novih in svežih idej, s poslovnim svetom, saj tako najhitreje dosežemo novo ustvarjeno vrednosti na trgu. Za mladega ustvarjalca je prav preizkušanje teoretičnega znanja v praksi tista energija, ki še dodatno vzpodbuja nove ideje.

V Trimu močno podpiramo znanje, inovacije, stalno učenje ter izboljšave, pa naj bo to razvoj naših zaposlenih, okolice, s katero sobivamo in jo soustvarjamo, ali pa naših novih potencialnih sodelavcev. Zavedamo se namreč, da je znanje pomembna investicija. Seveda pa je potrebno za vsako investicijo poskrbeti, da prinaša ustrezne donose, kar velja tudi za investicijo v znanje. Cilj pri tem ni znanje. Končni cilj je novo ustvarjena vrednost iz tega znanja. Tako se z vsakoletnim razpisom Trimovih raziskovalnih nagrad trudimo, da v zgodbo spodbujanja inovativnosti in razvoja znanja dodamo nov košček in omogočimo nove priložnosti.

Evropska Komisija je letošnje leto določila za Evropsko leto kreativnosti in inovativnosti, katerega cilj je prav vzpodbujanje kreativnosti in inovacij v individualnem, ožjem poslovnem ali širšem ekonomskem okolju. Zato nas veseli, da tudi mi s Trimovimi raziskovalnimi nagradami prispevamo svoj del k evropski in svetovni zakladnici znanja, kreativnosti in novo ustvarjene vrednosti.

Vsem dobitnikom letošnjih Trimovih raziskovalnih nagrad iskreno čestitam in vam želim veliko ustvarjalne energije, odličnih rezultatov pri vašem delu ter veliko sreče v življenju.

Tatjana Fink, MBA
Glavna direktorica, Trimo, d. d.

Just do it. The best you can.

We live in a period with different, yet very important challenges, such as: globalisation, climate change, the changing demographic structures of population ... Therefore, our future depends on what will be created, while taking into account the new and changing demands of people, nature, and our planet.

There are many dilemmas and questions. But the key challenge is - how to ensure continuous development at a time when both the economic and the business world are in an unenviable position? And how to stimulate innovative thinking? And how to make progress? The answer is, to gain new knowledge, and put this knowledge into practice - thereby creating new values.

Knowledge is the basis of both the present and future development. It is important to encourage the connection of young people, - who have many new and fresh ideas - with the business world, to achieve newly created values in the market in the shortest possible time. Putting theoretical knowledge into practice represents, for a young creator, that energy which further stimulates new ideas.

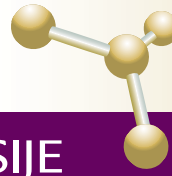
In Trimo we strongly encourage knowledge, innovation, continual learning, and improvements, whether they refer to development of our staff, or the community we live in and help to create, or to the development of our potential future employees. We are aware that knowledge is an important investment.

It is certainly necessary to care for each investment so that it is profitable - and the same is true for an investment in knowledge. The main aim is not knowledge. The ultimate aim is a newly created value from this knowledge. With our annual, Trimo Research Awards, open competition we are trying to add a new piece into the story of encouraging innovation and developing knowledge, so enabling new opportunities.

The current year has been established by the European Commission as the Year of Creativity and Innovation. Its aim is to encourage creativity and innovation from individuals, the small business environment, and the wider economic environment. Therefore, we are glad that with the Trimo Research Awards we can contribute to the European and Global treasury of knowledge, creativity, and newly created values.

I would like to sincerely congratulate all the award holders of this year's Trimo Research Awards and wish you a lot of creative energy, excellent results in your work, and a lot of happiness in your lives.

Tatjana Fink, MBA
General manager, Trimo, d. d.



NAGOVOR PREDSEDNIKA KOMISIJE

PRESIDENT OF THE RESEARCH BOARDS' ADDRESS

Spoštovani nagrajenci!

Živimo v najbolj nepredvidljivem od vseh svetov, v svetu, v katerem se vedno znova porajajo vprašanja, za katera smo bili prepričani, da smo jih že zaprli, v svetu, ki naenkrat govori o prevrednotenju vrednot in o krizi kot priložnosti. Živimo v svetu, ki išče odgovore in se sprašuje, v svetu, ki »ne verjame« več nikomur, v svetu, ki se ne zdi ne stabilen in ne trden kot nekoč, v svetu, ki išče samega sebe in svoje tečaje, da se na njih upre in odpre. In, če odštejemo različne –izme, ki nam jih bodo kmalu spet ponujali v paketu z »novimi vrednotami«, kaj je pravzaprav tisto, česar ni uspela odplaviti reka skepticizma in razočaranj, kaj je resnični temelj današnjega sveta, ki nam lahko pomaga znova stopiti na trd(n)a tla in kaj je naš pravi, dolgoletni zaveznik in generator napredka, ki je in je vedno bil tukaj z nami - tudi takrat, ko se krize, vojne in revolucije končajo in ko pride čas obnove? To sta brez dvoma znanost in znanje ter z njima povezana radovednost, stremljenje k napredku, resnici in dejstvih ter želja po odkrivanju novega, drugačnega, boljšega sveta pa tudi upanje, da nam bo uspelo premakniti meje znanega. Kajti, če kdaj, danes to potrebujemo bolj kot kdajkoli.

In zato hvala vsem vam, ki ste prav to svojo radovednost, svoje znanje in svoje upanje delili z nami na že osmih Trimo raziskovalnih nagradah. Od leta 2001, ko smo podelili prve Trimove raziskovalne nagrade, do danes je z nami sodelovalo več kot 287 nagrajencev in 170 mentorjev iz 39-ih fakultet iz devetih sodelujočih držav. Samo to leto bomo podelili 54 nagrad, kar je največje število do sedaj in še en dokaz, da sta znanje in znanost lahko odgovor na probleme današnjega sveta. Naj bo to vaš in naš konkreten prispevek k boljši, odprtejši in srečnejši družbi.

Nekoliko zanemarjeno dejstvo je, da je letos evropsko leto ustvarjalnosti in inovacij in sama po sebi se odpira povezava med težavami današnje družbe in možnimi rešitvami, ki naj bi jih prinesli prav ustvarjalnost in inovativnost. Pa vendar, kot sem pred kratkim prebral na svetovnem spletu: **»Če je inovativnost odgovor, kakšna so vprašanja?«**. In res, zdaj ni čas odgovorov, je bolj čas pravih vprašanj. Zato je ena osnovnih nalog znanosti, da nenehno dvomi in sprašuje - pravilno zastavljena vprašanja pa so ponavadi že del odgovora.

Za konec še enkrat hvala vsem nagrajencem, njihovim mentorjem, recenzentom, komisiji za Trimove raziskovalne nagrade ter vsem tistim, ki ste omogočili letošnji dogodek, skratka vsem vam, ki ste letos dvomili in se spraševali skupaj z nami! Prepričan sem, da bomo skupaj našli tudi prave odgovore!

Miloš Ebner, MBA
Predsednik komisije za znanstveno delo
Trimo, d. d.

Dear Award Holders

The present period is one of the most unpredictable because we live in a world in which new questions constantly arise, although we were all sure that these questions would never have to be confronted again. We live in a world in which, all of a sudden, re-valuation of our values is becoming an important issue, and the crisis is seen as a new opportunity. Today's world is looking for answers and asking questions and »does not believe« in anyone any longer. The world seems to be unstable and not as firm as it used to be, and is searching for itself and its own poles, to use them to resist and to open up on them. And what, apart from different –isms, will again be offered in a package, together with »new values«, and what remains and has not been swept away by the river of scepticism and disappointment. What is the true basis of today's world to help us step on firm ground again, and has been our real and long-term ally, and generator of progress, and has always been here with us – even in the period when crises, wars, and revolutions end, and the time of revival arrives?

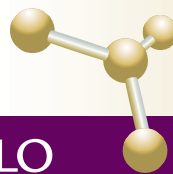
It is, undoubtedly, science and knowledge and, in connection with them, curiosity, striving for progress, truth and facts, as well as the wish to discover a new, different, and better world. And there is also a wish that we will manage to move the barriers of the known. For, we need this today, more than we ever needed it in the past.

Therefore, thank you all – for having shared your curiosity, your knowledge, and your hopes with us since 2001, when the first Trimo research awards were granted. More than 286 award winners, and 170 mentors from 38 university faculties and 9 different countries, have cooperated with us in these eight years. This year 53 awards will be granted, which has been the biggest number so far, and it represents proof that knowledge and science can provide answers to problems in today's world. Let this be yours and our concrete contribution to a better, open, and happier society.

The fact that the current year is the European year of creativity and innovation has been a bit neglected. Nevertheless, the connection between problems of today's society, and possible solutions, gained by creativity and innovation, arises spontaneously. But, the question remains: **»If innovation is the answer, what are the questions?«** It is the question I have recently seen on the Internet. Now, indeed, is not the time for answers, it is more the time for right questions. Therefore, one of the main duties of science is to doubt and ask questions, continually – appropriate questions are, usually, part of the answer.

Once again, thanks to all award winners, their mentors, reviewers, the committee for Trimo research awards, and to all of you who have made possible this year's event. In summary, thanks to all of you who, this year, had doubts and questions together with us! I am sure that together we will find the right answers.

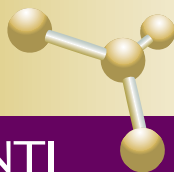
Miloš Ebner, MBA
President of the research work committee
Trimo, d. d.



KOMISIJA ZA RAZISKOVALNO DELO

RESEARCH BOARD

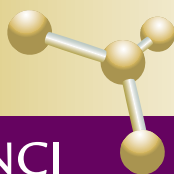
1. Miloš Ebner - *predsednik / president*
2. Danijel Zupančič - *član / member*
3. Breda Kotar - *član / member*



RECENZENTI

REVIEWERS

1. Bojan ADAMOVIČ JUG
2. Polona BRIŠKI
3. Boštjan ČERNE
4. Pavel DEMŠAR
5. Jože DRČAR
6. Miloš EBNER
7. Urška FRANKO ĐIPALO
8. Meta GABRIJEL
9. Barbara GORENC
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12. Breda KOTAR
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26. Marta STRMEC
27. Silvo ŠTIH
28. Irena VINDER
29. Mitja VOVKO
30. Viktor ZALETEJ
31. Boštjan ZUPANC



NAGRAJENCI

AWARDEES

DIPLOMSKA DELA

DIPLOMA PAPERS

1. Kaja ANTLEJ, *Slovenija / Slovenia*
2. David ANTOLINC, *Slovenija / Slovenia*
3. Branko BELAČEVIĆ, *Srbija / Serbia*
4. Matevž BOKALIČ, *Slovenija / Slovenia*
5. Aleksander CILENŠEK, *Slovenija / Slovenia*
6. Andrej CUPAR, *Slovenija / Slovenia*
7. Blaž ČERMELJ, *Slovenija / Slovenia*
8. Marko DIMITRIJEVIĆ, *Srbija / Serbia*
9. Uroš DIMNIK, *Slovenija / Slovenia*
10. Darko GRM, *Slovenija / Slovenia*
11. Klavdija GRM, *Slovenija / Slovenia*
12. Primož HAUPTMAN, *Slovenija / Slovenia*
13. Nina HERCOG, *Slovenija / Slovenia*
13. Mateja MARTINI, *Slovenija / Slovenia*
14. Tadej JAKŠE, *Slovenija / Slovenia*
15. Matej KOCJAN, *Slovenija / Slovenia*
16. Jerneja KOLŠEK, *Slovenija / Slovenia*
17. Urška KRAMER, *Slovenija / Slovenia*
18. Branka LAPORNIK, *Slovenija / Slovenia*
19. Aljaž MAČEK, *Slovenija / Slovenia*
20. Csaba MONYÓK, *Madžarska / Hungary*
21. Vesna MURGELJ, *Slovenija / Slovenia*
22. Tijana NIKOLIĆ, *Srbija / Serbia*
23. Ana OCVIRK, *Slovenija / Slovenia*
24. Simon PETROVČIČ, *Slovenija / Slovenia*
25. Tanja PUHAR, *Slovenija / Slovenia*
26. Ivko RAKIĆ, *Srbija / Serbia*
27. Tomaž RUGELJ, *Slovenija / Slovenia*
28. Janez SLUGA, *Slovenija / Slovenia*
29. Nataša ŠINKOVEC, *Slovenija / Slovenia*
30. Tina ŠINKOVEC, *Slovenija / Slovenia*
31. Marina TRKMAN, *Slovenija / Slovenia*
32. Matjaž VIDOVIČ, *Slovenija / Slovenia*
33. Ana VRHOVEC, *Slovenija / Slovenia*
34. Miha ZIBELNIK, *Slovenija / Slovenia*
35. Jurij ŽEJN, *Slovenija / Slovenia*
36. Rok ŽGALIN KOBE, *Slovenija / Slovenia*

MAGISTRSKA DELA

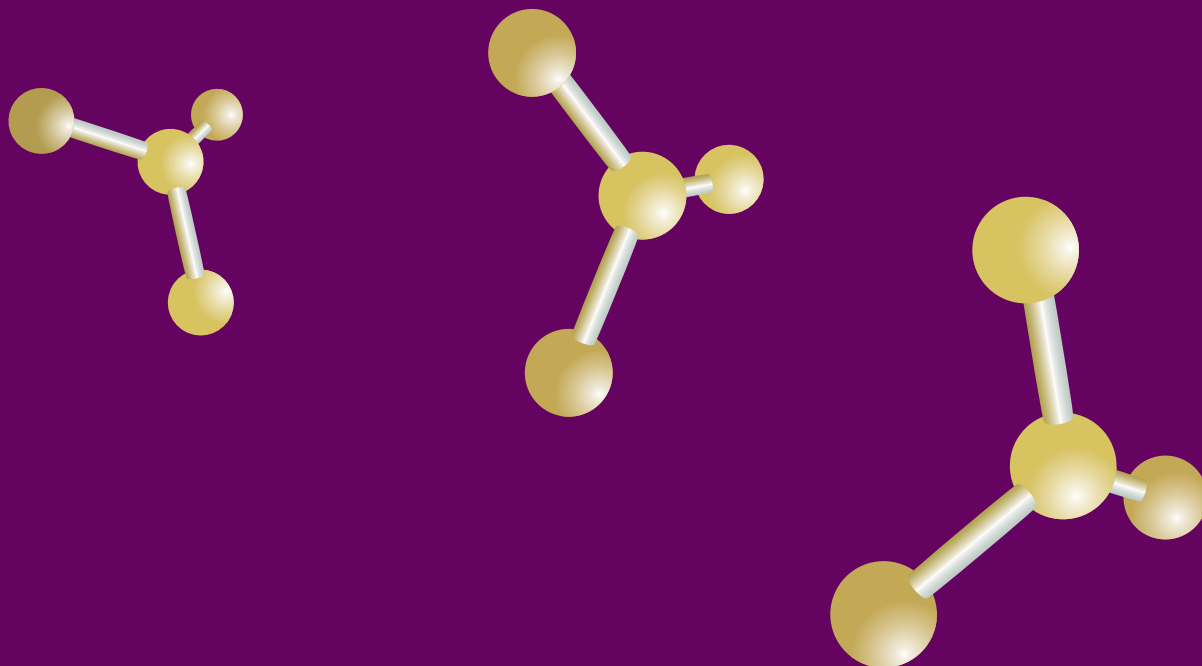
DISSERTATIONS

1. Alenka GODNJAVEC, *Slovenija / Slovenia*
2. Dragana GRAHOVAC, *Srbija / Serbia*
3. Jasmin KALJUN, *Slovenija / Slovenia*
4. Bojan KONČAREVIĆ, *Srbija / Serbia*
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9. Drago PAPLER, *Slovenija / Slovenia*
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11. Marjetka VOZELJ, *Slovenija / Slovenia*

DOKTORSKE DISERTACIJE

DOCTORAL THESES

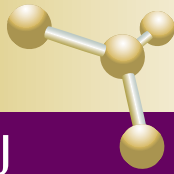
1. Boštjan JAPELJ, *Slovenija / Slovenia*
2. Niko KRISTANIČ, *Slovenija / Slovenia*
3. Primož MOŽE, *Slovenija / Slovenia*
4. Ksenja PUŠNIK, *Slovenija / Slovenia*
5. Angela TOPIĆ, *Bosna in Hercegovina / Bosnia and Hercegovina*
6. Peter TRKMAN, *Slovenija / Slovenia*
7. Boštjan VAUPOTIČ, *Slovenija / Slovenia*



ZBORNİK POVZETKOV NAGRAJENIH DEL
ABSTRACTS OF THE PROJECTS AWARDED

DIPLOMSKA DELA

DIPLOMA PAPERS



KAJA ANTLEJ

Diplomsko delo

RAZVOJ INDUSTRIJSKO OBLIKOVANEGA IZDELKA Z UPORABO 3D TEHNOLOGIJ

Mentor: red.prof. Saša J. Mächtig
Univerza v Ljubljani, Akademija za likovno umetnost
in oblikovanje

Avtorica v analitično-raziskovalnem delu preko različnih avtorjev obravnava nekatere definicije industrijskega oblikovanja, povzetih pa je tudi nekaj oblikovalskih procesov. V nadaljevanju kratko predstavi zgodovino računalniško podprtega načrtovanja in tematik, povezanih s tem področjem. Navede nekaj primerov prostorskega zajema podatkov, vendar več prostora nameni tehnologijam hitrega prototipiranja oziroma hitre proizvodnje, kakor so ti postopki vedno bolj pogosto poimenovani.

V diplomskem delu poglobljeno predstavi spremembe estetskih načel, ki so se razvile pod vplivom sodobnih tehnologij. Sodobna orodja, kot sta na primer mikroskop in daljnogled, oblikovalcem, poleg različnih pogledov na pojave v naravi (kreativno iskanje idej), ponujajo tudi možnost integriranja novih idej v različne aplikacije (realizacija produkta). Tako je s prihodom grafičnih računalniških programov in drugih orodij s področja 3D tehnologij omogočeno načrtovanje in realizacija nekaterih kompleksnih, v največji meri sferičnih form.

V zaključku teoretičnega dela so predstavljeni najzanimivejši primeri uporabe 3D tehnologij s poudarkom na hitri proizvodnji na področju vizualnih umetnosti, predvsem v kiparstvu, na področju oblikovanja in arhitekture.

Kreativno-načrtovalski del pa je razdeljen na več manjših projektov, ki bi jih lahko imenovali tudi pilotski projekti. Zastavljeni so kot primeri uporabe 3D tehnologij v začetnem, kreativnem delu oblikovalskega procesa.

Diploma paper

THE DEVELOPMENT OF AN INDUSTRIALLY DESIGNED PRODUCT THROUGH THE USE OF 3D TECHNOLOGIES

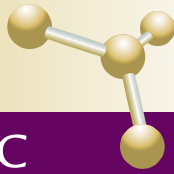
*Mentor: Prof. Saša J. Mächtig
University of Ljubljana, Academy of Fine Arts and
Design*

The author in the analysis and research part discusses some definitions related to industrial design by various authors. This is followed by a presentation of some design processes and a brief history of computer aided design and other related issues. A few examples of 3D scanning are mentioned. More detailed attention is given to rapid proto-typing technologies or rapid manufacturing technologies (as these procedures have often been recently called).

In this diploma paper the author thoroughly introduces a study of changes in aesthetic principles influenced by the introduction of contemporary technologies. Modern tools, such as microscopes and binoculars, besides providing different insights into natural phenomena (creative search for ideas), offer designers an option to integrate new ideas into various applications (product implementation). The introduction of graphic computer programmes and other 3D tools enable planning and realization of certain complex, mostly spherical forms.

In the conclusion of the theoretical part the author presents the most interesting examples of 3D technologies, with an emphasis on rapid proto-typing employed in the sphere of visual arts, particularly sculpture, design, and architecture.

The creation and planning part of the thesis consists of several smaller, pilot projects. These projects are designed as examples of use of 3D technologies in the initial, creative part of a design process.



Diplomsko delo

ANALIZA OBNAŠANJA MOSTU IZ ARMIRANE PLASTIKE

Mentor: izr. prof. dr. Roko Žarnić
Somentor: doc. dr. Vlatko Bosiljkov
Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

V diplomskem delu je avtor obravnaval analizo obnašanja mostne konstrukcije iz armirane plastike.

Na začetku naloge so predstavljeni kompoziti oz. armirane plastike in njihova uporaba. Temu sledi pregled mostov iz armirane plastike (FRP-jev), ki so že zgrajeni in v fazi uporabe. Za razumevanje rezultatov in obnašanja konstrukcije je na kratko opisana teorija laminatnih kompozitnih konstrukcij od nivoja mikromehanike pa vse do globalne analize celotne konstrukcije.

Analiza mostne konstrukcije je bila izvedena v programu SAP 2000. Konstrukcija je modelirana s »Shell-layered« ploskovnimi končnimi elementi, saj nam omogočajo kontrolo napetosti po posameznih plasteh. Najprej je na osnovi parametrične analize izmed treh različnih tipov prečnih prerezov izbran najugodnejši. Na koncu je izvedena še optimizacija izbranega prereza glede na konstrukcijsko višino. Zaradi izredno lahke in razmeroma toge konstrukcije ima obravnavani most zelo dobre dinamične karakteristike. Za dimenzioniranje obravnavanega mostu je merodajno mejno stanje uporabnosti.

Diploma paper

ANALYSIS OF FRP BRIDGE BEHAVIOR

Mentor: Assoc. Prof. Dr. Roko Žarnić
Co-Mentor: Doc. Dr. Vlatko Bosiljkov
University of Ljubljana, Faculty of Civil and Geodetic Engineering

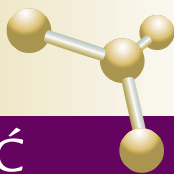
The diploma paper focuses on the load-carrying behaviour of hybrid fibre reinforced thin-walled, main bridge beams, with sandwich deck panels on top.

Firstly, there is a comprehensive overview of the composite materials and their constitutions (matrix, fibres), mainly to show their mechanical advantages and disadvantages with the possibilities for using them in civil engineering applications. After this is a short state-of-the-art review of all FRP bridges constructed in the past. For a better understanding of the behaviour of bridge structure I provided a brief explanation of the theory of thin-walled laminates from micro-mechanical level to global analysis of the whole structure.

To perform optimization of the mentioned bridge structure under determined boundary conditions, the FE software package, SAP 2000, was used to create a 3D layered shell model. Based on that analysis the whole bridge structure was designed for three different types of transverse bridge sections to sustain defined loads, to meet the requirements of the ultimate limit state and serviceability limit state of the structure, in accordance with the EUROCOMP handbook.

From the final results for these three types of bridge sections the most adequate type of section based on optimum criteria (mass, final costs) was selected. Finally optimization of the height for the selected cross section was determined.

Due to a low 'mass to stiffness' ratio structures made of FRP bridge have good dynamic characteristics. The serviceability limit is a decisive factor for predicting suitability of the structure to sustain all applied loads.



BRANKO BELAČEVIĆ

Diplomsko delo

MODELI ZA PROSTORSKO IN PROGRAMATIČNO INTERPOLACIJO V CENTRALNIH DELIH BEOGRADA

Mentor: doc. mag. Vladimir Milenković
Univerza v Beogradu, Fakulteta za arhitekturo

Beograd je šel skozi socialno, politično in gospodarsko tranzicijo kot tudi skozi ostale urbane spremembe. Do določenih sprememb je prišlo bodisi zaradi arhitekturnih praks tega časa ali zaradi neformalnih arhitekturnih odstopanj.

Danes smo priča novi akumulaciji praznega prostora skozi devalvacijo trga majhnih parcel in hiš na njih. Današnje neo-liberalno gospodarstvo vidi tak prostor kot nedobičkonosen in je zato na voljo možni javni sceni (ali njeni mreži). Razlike v tipologiji parcel in v kontekstu, v katerem obstajajo, zahtevajo diferencialen pristop s specifičnim programom in zasnovno.

Upošteva, da je prvotni prispevek kontekst, gledamo na program kot na dodatek – kulturni pojav. Antropološke domneve razlagajo kulturo ne le kot produkt, temveč tudi kot proces ustvarjanja in njegovo socialno interpretacijo ter tako nakazujejo, da se proces ne konča s produktom samim. Zaključek je: kultura ni le umetnost in znanost – je tudi sistem moralnih vrednosti in kapacitet. Skladno s tezo, kulturni pojav temelji na interpretaciji socialnih odnosov in procesa oblikovanja.

Projekti ne iščejo svoje vrednosti v volumetrični kapaciteti – temeljijo na konceptualnih ponovnih odkritjih obstoječega ali pa na iskanju novih socialnih odnosov. Zaradi tega se ne zanašajo na enkratno remodeliranje programa in njegovi uvrstitvi v parcelo, prej gre za razumevanje konteksta in disperzije kulturnega pojava. Njihov cilj je potrditev lokacije brez ogrožanja njenega obstoja. Prav tako poudarja vrednote kot so javna površina, interijer bloka ulic, javni prehodi, itd. in tako postaja shema artikulacije, ki nas vodi do nove interpretacije takega prostora.

Diploma paper

MODELS FOR SPATIAL AND PROGRAMMATIC INTERPOLATION IN CENTRAL ZONES OF BELGRADE

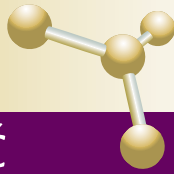
Mentor: Doc. Mr. Vladimir Milenković
University of Belgrade, Faculty of Architecture

Belgrade has been through different social, political, economic transitions and various urban transformations. Due to established architectural praxis of the period or non formal architectural deviation, some changes have been made.

Today we are witnessing a new accumulation of voids through market devaluation of small plots and houses on them. Such spaces are viewed as unprofitable for today neo-liberal economics and therefore are left to the possible public scene (or its network). Differences in plot typology and contexts in which they exist, require a differential approach with a specific program and layout.

Taking into account that the context is the first input, the program is seen as a supplement, as a cultural phenomenon. The anthropology thesis explains culture not just as a product but also as a process of creation and its social interpretation, showing that the process does not stop with a product. The conclusion is: culture is not just art and science - it is also a system of moral values and capacities. In accordance with the thesis, the cultural phenomenon is based on the interpretation of social relations in the process of designing.

Projects are not searching for their value in volumetric capacity - they are based on conceptual rediscovering of the existing or on finding new social relations. Therefore they do not rely on singular remodeling of the program and its placement on plot. They are rather an understanding of the context and dispersing a cultural phenomenon. Their goal is the affirmation of the location without menacing its existence. They also have to emphasize values such as public surface, block interior, public passage ... and become a scheme of articulation leading to new interpretations of such spaces.



MATEVŽ BOKALIČ

Diplomsko delo

SISTEM ZA DOLOČEVANJE LOKALNE OBČUTLJIVOSTI OPTOELEKTRONSKIH ELEMENTOV

Mentor: prof. dr. Marko Topič
Univerza v Ljubljani, Fakulteta za elektrotehniko

Tema diplomskega dela je merilni sistem, ki omogoča merjenje lokalne občutljivosti optoelektronskih elementov.

Prvi del je namenjen opisu teoretičnega ozadja, ki je potrebno za razumevanje delovanja optoelektronskih elementov in merilnega sistema.

V drugem delu je zasnovan strojni in programski del merilnega sistema za določanje lokalne občutljivosti, izbrani in opisani pa so tudi uporabljeni elementi strojne opreme. Za avtomatizirano izvajanje meritev skrbi aplikacija, ki je izdelana s pomočjo programskega okolja LabVIEW in se izvaja na nadzornem računalniku. Program omogoča popoln nadzor nad sistemom za pozicioniranje in nastavitve večine parametrov »lock-in« ojačevalnika. Preko enostavnega uporabniškega vmesnika, ki je razdeljen na levi – vedno vidni – del in desni del z zavihki, se nastavlja območje in ločljivost meritve, ki se izvaja samodejno ter sproti grafično in tabelarično prikazuje merilne rezultate.

Verifikacijo in validacijo delovanja realiziranega sistema se izvede na različnih testnih merjencih. Merilni rezultati amorfno-silicijske sončne celice in elektrokemijske sončne celice pokažejo precej nehomogeno delovanje, ki je odraz časovne degradacije posameznih plasti ali celo pomanjkljivosti pri proizvodnem procesu. Tudi merilni rezultati testnega kristalno silicijskega mini modula pokažejo razlike med posameznimi celicami.

Na podlagi verifikacijskih meritev in enostavnega rokovanja s programskim vmesnikom merilni sistem zadosti vsem zahtevam diplomske naloge, nekatere pa celo preseže.

Diploma paper

SYSTEM FOR LIGHT BEAM INDUCED RESPONSE MEASUREMENTS OF OPTOELECTRONIC DEVICES

Mentor: Prof. Dr. Marko Topič
University of Ljubljana, Faculty of Electrical Engineering

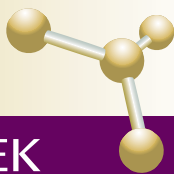
The aim of this diploma paper is to design and construct a system which can measure light-beam induced response in optic-electronic devices.

The first part of the paper briefly presents the theoretical background, which is fundamental for understanding the principles of optic-electronic devices, and the principles behind LBIC measurements.

In the second part, the hardware and software design of the measurement apparatus is carried out. Hardware devices are chosen and described. Automatic measurement is controlled by a LabVIEW application, running on the master computer. The application provides complete control over the positioning system, as well as configuration of the majority of lock-in amplifier parameters. The easy-to-use graphical-user interface is composed of 2 parts, the ever-visible left part, and the right part with various tabs. Apart from the measurement area and resolution settings, the graphical-user interface also provides live measurement results in graphical and tabular form.

The completed system is verified and validated on the basis of various solar-cell measurements. Measurements of amorphous silicon solar-cells and dye-sensitized solar-cells show a non-uniform efficiency distribution, which might be caused by time degradation or even by imperfections during manufacture. Poly-crystalline silicon solar mini-module measurements also show differences in efficiency distribution between individual solar cells.

Based on the verification measurements and the simple graphical-user interface usage, the measuring set-up not only meets all, but also exceeds some, requirements.



Diplomsko delo

SVETLEČE DIODE V APLIKACIJAH RAZSVETLJAVE

Mentor: doc. dr. Marko Jankovec
Univerza v Ljubljani, Fakulteta za elektrotehniko

V diplomskem delu je predstavljena uporaba močnostnih svetlečih diod v razsvetljavi, ki poleg dolge življenjske dobe in mnogo večjega izkoristka kot pri drugih virih umetne svetlobe, omogočajo tudi zmanjšanje svetlobne onesnaženosti, saj je njihova svetloba usmerjena brez uporabe dodatnih leč ali zrcal. Vendar je ustrezno rokovanje s svetlečimi diodami vse prej kot enostavno, kajti potrebno je paziti na učinkovito napajanje, ustrezno tokovno regulacijo in odvod toplote.

V prvem delu so predstavljene nekatere najpomembnejše karakteristike svetlečih diod, ki jih je treba upoštevati pri izbiri za določeno aplikacijo, ustrezni načini napajanja in regulacija toka ter toplotne razmere pri dveh najpogosteje uporabljenih laminatih v tiskanih vezjih: aluminiju in FR4. Predstavljenih je tudi nekaj uspešno izvedenih aplikacij v avtomobilski in pohišveni industriji, kot so visokonapetostni regulator navzdol, RGB gonilnik ter nekaj komercialnih svetil za notranjo razsvetljavo.

V drugem delu diplomske naloge je s pomočjo pospešene degradacije močnostnih belih svetlečih diod predstavljena analiza sprememb v karakteristikah. Izmerjena so odstopanja starih svetlečih diod v IU karakteristiki, svetilnosti, spektru izsevane svetlobe in barvi, izraženi v barvnem prostoru CIE 1931. Rezultati analize so neposredno uporabni v določanju načrtovalskih parametrov in napovedovanju življenjske dobe svetil iz svetlečih diod.

Diploma paper

LIGHT-EMITTING DIODES IN LIGHTING APPLICATIONS

Mentor: Doc. Dr. Marko Jankovec
University of Ljubljana, Faculty of Electrical Engineering

This thesis examines the use of high-power light-emitting diodes (LEDs) in lighting applications. The main advantages of LEDs compared to other light sources are a long-life and much higher conversion efficiencies. The inherently focused light emitted by LEDs also reduces light pollution of the environment. However, proper handling of LEDs is a demanding task, because it is necessary to provide appropriate power supply and heat transfer.

In the first part of the thesis, the main characteristics of LEDs, which are important for choosing the appropriate LED for a particular application, are presented. Also, the appropriate methods of power supply, current control, and thermal properties of the two mostly used laminates for printed circuit boards - Aluminum and FR4 - are investigated. Two commercial applications for the furniture and automotive industries are developed, i.e. RGB driver and high voltage regulator. In addition, some commercial lamps for interior lighting are described.

The second part of the thesis is an analysis of the changes in characteristics of high power, white LEDs, after accelerated degradation is presented. Deviations in the IU characteristics, output light spectrum, intensity and color, expressed in CIE 1931 color space, are measured. Results of the analysis can be directly applied in determining design parameters and life expectancy calculations of LED lamps.



ANDREJ CUPAR

Diplomsko delo

OBLIKOVANJE JEDRA IN OHIŠJA MERILNE NAPRAVE

Mentor: doc. Vojimir Pogačar, akad. slikar
Univerza v Mariboru, Fakulteta za strojništvo

To diplomsko delo je rezultat projekta za slovensko podjetje, ki izdeluje merilno tehniko na področju elektrike. Merilna naprava, poimenovana Power Quality Tester, je namenjena spremljanju kakovosti električne energije, s katero se označujejo tehnični parametri v določeni točki, v določenem času.

Razvoj merilne naprave je potekal v več stopnjah. Zasnova in vizualizacija je bila prva stopnja, kjer je avtor najprej iskal splošne koncepte instrumenta kot celote in jih izrisal v virtualnem računalniškem okolju.

Pri razporejanju teh elementov je vpeljal koncept jedra in nato še vmesne plošče. V naslednji stopnji, komprimiranje jedra, je z večkratnimi iteracijami iskal najbolj optimalno prostorsko razmestitev elementov. Sledila je faza iskanja tehničnih rešitev posameznih sklopov in izdelava oblikovnih rešitev. Optimizacija kot končna faza je pravzaprav posegala v vse predhodne. Na tej stopnji je bil aparat dokončno usklajen kot celota s funkcijskega in oblikovnega vidika.

S tehnologijo selektivnega slojevitega nanašanja materiala je izdelan tudi realen prototip. Vanj so bile vstavljene vse komponente, tiskano vezje, ekran in vsi konektorji, tako da je funkcionalen.

Diploma paper

DESIGN OF CORE AND CASING OF MEASURING DEVICE

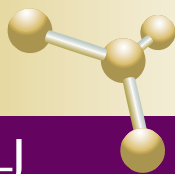
*Mentor: Doc. Vojimir Pogačar, Academic painter
University of Maribor, Faculty of Mechanical Engineering*

This diploma paper is a result of a project for a Slovene manufacturer of instruments and tester of electricity. A measurement device, also called a Power Quality Tester, is designed for power quality analysis to indicate technical parameters at a certain place at a particular time.

The instrument was developed in several stages. Following the design from inside out, the first stage of development was conception and visualization. The author collected general concepts of an overall instrument and drew individual components in a virtual computer environment.

The concepts of the core and intermediary board were introduced when arranging individual components. At the next stage, the stage of core compression, the author aimed to find the most optimal spatial arrangement of components with multiple iterations. The following stage was a search for technical solutions of individual assemblies and design solutions for the whole device. Optimization was the last stage and was linked to all other stages. In this stage we built an instrument as a whole and – it was functional and we improved the design.

A selective laser sintering technique was used to produce a real prototype. The prototype contains all components, a printed circuit board, display, and all connectors. This means that it is completely functional.



Diplomsko delo

ODZIV JEKLENIH STAVB NA POŽARNE VPLIVE

Mentor: prof. dr. Darko Beg
Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

V diplomskem delu je predstavljen postopek požarne analize jeklenih stavb z naprednimi računskimi metodami v skladu z zahtevami Evrokod standardov. Poleg požarne analize jeklene konstrukcije je obravnavan tudi primer sovprežnega stropa. Predstavljeni so splošni principi in postopki ter ideja požarne analize stavb. Skladno z idejo napredne požarne analize sta bila uporabljena napredni požarni in računski model.

Z uporabo naprednih računskih metod je mogoče bolj realno in zanesljivo določiti obnašanje stavb v primeru požara kot z uporabo doslej uveljavljenih metod, ki so v analizo vključevale uporabo standardnih temperaturnih krivulj. Z upoštevanjem dejanskih karakteristik požarnega sektorja, požara in aktivnih protipožarnih ukrepov, ki so izvedeni v stavbi, je takšna analiza mogoča.

Za napredni računski požarni model je uporabljen program OZone V2.2, s katerim je določena temperatura plinov v izbranem požarnem sektorju ter temperatura elementov jeklene konstrukcije. Abaqus 6.7 predstavlja napreden računski model, s katerim je bila izvedena mehanska analiza konstrukcij za projektno požarno obteženo stanje.

Požarna analiza je bila izvedena za posamezne nosilne elemente in konstrukcijske sklope. Za vsak posamezen primer so predstavljeni rezultati mehanske in požarne analize, ki v glavnem predstavljajo deformacije in čase mehanske odpornosti na požar.

Diploma paper

RESPONSE OF STEEL STRUCTURES TO FIRE ACTIONS

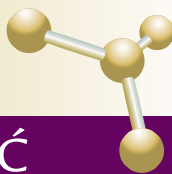
Mentor: Prof. Dr. Darko Beg
University of Ljubljana, Faculty of Civil and Geodetic Engineering

This diploma paper the fire analysis procedure of steel buildings with advanced methods, in accordance with Eurocod standards. Also, fire analysis of steel constructions of composite plates, is also introduced. The introduction consists of basic information, procedures, and the concept of the fire analysis of buildings. Because the entire work is based on advanced fire analysis, advanced fire models and advanced calculation models were used.

Fire analysis of buildings using the advanced methods describes the behaviour of structures in the case of fire, more realistically and accurately in comparison with well-known methods that use standard temperature curves. Advanced fire analysis takes into account the characteristics of the fire sector, real fire characteristics, and active fire fighting measures.

Ozone V2.2 software was used as the advanced fire model to calculate the temperature of gases and steel structures in the compartment. Abqus 6.7 presents an advanced calculation model which was used to calculate the mechanical response of the structure at elevated temperatures because of design fire load case.

Fire analyses were made for individual members and sub-assemblies. Results of mechanical and fire analysis as deformations, and time of mechanical resistance, are represented in each case.



MARKO DIMITRIJEVIĆ

Diplomsko delo

MUZEJ FOTOGRAFSKEGA PREOBLIKOVANJA BLOKA ULIC, BEOGRAD

Mentor: prof. dr. Dragana Vasiljević Tomić
Univerza v Beogradu, Fakulteta za arhitekturo

Diplomsko delo je zasnovano kot prispevek k raziskovalni metodologiji procesa oblikovanja in muzejskih vprašanj, in sicer moderni interpretaciji prostora za razstavo.

Pričetek koncepta tega projekta je raziskovalna izkušnja dojemanja fotografskega prostora. V raziskovalnem procesu avtorjevo delo oživlja začetek razvoja fotografije.

Kot referenco za arhitekturni koncept je avtor uporabil odnos med fotografskim medijem in principom stvaritve umetniškega dela nekega avantgardnega gibanja, pričeniši z domenvo, da je kubistična metoda razkroja/razčlenbe Evklidskega prostora zasnovana v izkušnjah in učinkih, dobro znanimi v fotografiji večkratne izpostavitve.

Na ta način raziskava principov kubistične umetnosti ali sočasno dojetanje, kjer so obsežne izkušnje dojetanja razbite v zaporedja, postane osnova za ustanovitev odnosov med fotografskim postopkom in arhitekturnim projektom. Fotografska metoda zaporednih podob, ki je prenešana na kubistično razkrajanje/razčlenitev prostora, z opazovanjem nekega objekta iz različnih točk dojetanja, uvaja pojav procesa arhitekturnega oblikovanja, ki temelji na teh principih.

Diploma paper

MUSEUM OF PHOTOGRAPHY- REMODULATION OF CITY BLOCK, BELGRADE

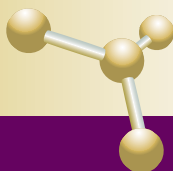
Mentor: Prof. Dr. Dragana Vasiljević Tomić, PhD
University of Belgrade, Faculty of Architecture

This diploma paper is conceived as a contribution to the research methodology of the design process and museum issues - namely, a modern interpretation of spaces for display.

The starting point for the concept of this project is the research experience of the perception of the photographic space. In the research process, the author's work reviews the beginning of the development of photography.

As the reference for architectural concept, the author has used relationships between the photographic media and the principle of creating a work of art of some avant-garde movements, starting from the assumption that the cubist method of decomposing Euclid's space is conceived in the experiences and effects, well-known in the photos with multiplied exposition.

Thus, research of the principles of cubistic art or simultaneous perception, where comprehensive experience of the perception is broken into sequences, becomes the basis for establishing relations between the photographic procedure and the architectural project. A photographic method of successive images transferred to a cubistic decomposition of space, by observing one object from several perceptive points, initiates the appearance of the process of architectural design, based on these principles.



Diplomsko delo

NOVA TOBAČNA LJUBLJANA – 18-NADSTROPNA STOLPNICA Z JEKLENO NOSILNO KONSTRUKCIJO

Mentor: prof. dr. Darko Beg
Univerza v Ljubljani, Fakulteta za gradbeništvo in
geodezijo

V diplomskem delu je prikazana statična in dinamična analiza ter dimenzioniranje nove jeklene 18-nadstropne stolpnice na mestu Tobačne Ljubljana. V prvotni ideji je bila nosilna konstrukcija stolpnice izvedena z armiranim betonom.

Statična analiza obsega kontrolo mejnega stanja nosilnosti ter uporabnosti v skladu s standardi Evrokod in je bila izvršena z računalniškim programom SCIA ESA-PT. Pri dinamični (potresni) analizi je bila uporabljena modalna analiza s spektri odziva. Zaradi neugodnih potresnih vplivov je bilo potrebno na kritičnih mestih (previsi) posebno pozornost posvetiti betonskemu delu sovprežne plošče, ki ima vlogo toge diafragme in je še posebej občutljiva, saj je vzdolžna tlorisna dimenzija objekta izrazito večja od prečne. Poleg tega je objekt po višini geometrijsko nepravilen.

Za medetažno konstrukcijo je bila izvedena analiza vibracij. Stopnja stabilnosti konstrukcije je bila preverjena s pomočjo faktorja kritične obtežbe.

Avtor je v diplomskem delu naredil še nekaj osnovnih kontrol požarne analize konstrukcije in s tem določil potrebne ukrepe za predpisano protipožarno odpornost konstrukcije.

V zaključku je prikazal ustreznost konstrukcije glede na težo porabljenega materiala na bruto uporabno površino objekta.

Diploma paper

NEW TOBAČNA LJUBLJANA – 18-STOREY BUILDING OF STEEL CONSTRUCTION

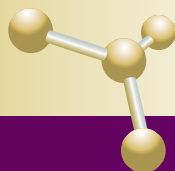
Mentor: Prof. Dr. Darko Beg
University of Ljubljana, Faculty of Civil and
Geodetic Engineering

In this diploma paper, the static and dynamic analysis and design of an 18-storey building - Tobačna Ljubljana - is presented. The basic project included a construction made of reinforced concrete, but arrangements with the architects were made to design and analyse steel construction.

In the first part the control of the Ultimate and Serviceability Limit State is performed in accordance with recommendations of the Eurocode provisions, followed by a spectrum response analysis in the second part of the thesis.

Both analyses were performed with a SCIA ESA-PT program. Special attention was focused on the composite floor system because of an unfavourable dynamic effect, especially on the overhangs.

Problems occurred because of a geometrical ground plan and elevation irregularity. Vibration analysis was performed for this systems because of the problems with free vibrations. The level of stability is calculated by means of a critical load factor and the basic calculations of fire analysis are performed. Also the provisions for fire-resistant buildings are presented. Finally the weight per m² serviceable area is calculated.



Diplomsko delo

SPREMEMBA IN PROCES UVAJANJA SPREMENJENE EMBALAŽE V PODJETJU TRIMO D.D.

Mentor: mag. oec. Franci Žohar, inž. grad.
Fakulteta za komercialne in poslovne vede

Novi predlogi in nove izboljšave na področju embalaže in pakiranja imajo velik gospodarski in ekološki pomen, saj z njimi pripomoremo k reševanju problematike na področju varstva okolja in prihranimo naravne vire.

Namen diplomskega dela je proučiti in nadgraditi spremembe embalaže in procesa embaliranja Al dekorativnih elementov v proizvodnji strešnih in fasadnih panelov v izbranem podjetju.

Ker se embalaže enostavno ne da odpraviti, avtor ugotavlja, da se s procesom kontinuiranih izboljšav na področju pakiranja dekorativnih elementov ter ob vzpostavitvi sistema ravnanja z odpadno embalažo odpirajo nove možnosti za embalažo in ponovno uporabo sekundarnih surovin. Zaradi ekoloških zahtev tudi kupci želijo embalažo, ki ne obremenjuje okolja in jo je možno reciklirati.

Zmanjševanju vpliva embalaže na okolje bo potrebno v prihodnje posvečati posebno skrb že pri načrtovanju in projektiranju naprav ter postopkov in nenazadnje pri zaključku življenjskega cikla proizvodov. V okviru izvajanja okoljske politike si bo potrebno prizadevati za čim bolj racionalno rabo naravnih virov, hkrati spremljati najnovejše okoljske smernice ter si prizadevati za vključitev teh smernic v svoje proizvodne procese.

Diploma paper

THE PROCESS OF IMPLEMENTING CHANGED PACKAGING IN TRIMO D.D.

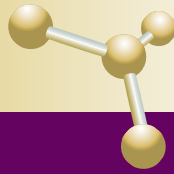
*Mentor: Franci Žohar, MSc
Faculty for Commercial and Business Sciences*

New suggestions and new improvements in the field of packaging and packing are of great economic and ecologic importance, and they help us to contribute to the environmental solution and saving natural resources.

The purpose of this diploma paper is to examine and improve changes in the packaging and packing process of Al decorative elements, in the production of façade panels, in the selected company.

Since packaging cannot be simply ignored, the author presumes that, with the process of continued improvements in packing decorative elements, and with the establishment of a system of waste packaging treatment, there are new possibilities for packaging and the re-cycled use of secondary raw materials. Also customers are aware of the ecological requirements, so they are asking for packaging which is not polluting the environment and can be recycled.

Particular attention to reducing the influence of packaging on the environment already in the planning and projecting processes, and in the final part of a product's life-cycle will have to be undertaken. Within the sphere of environmental policy implementation, the rational use of natural resources will have to be pursued and at the same time recent environmental directives will have to be followed so that they could be included inside the production processes.



Diplomsko delo

NASPROTJA ZNOTRAJ TRAJNOSTNEGA RAZVOJA V PRIMERU UVEDBE BIOGORIV

Mentor: prof. dr. Bogomir Kovač
Univerza v Ljubljani, Ekonomska fakulteta

Trajnostni razvoj je opredeljen kot zadovoljevanje lastnih potreb, ne da bi pri tem ogrozili ali omejili potrebe drugih. V nasprotju s to idejo sta visok gospodarski razvoj in pospešen demografski razmah v zadnjem stoletju povzročila pritiske na naravno okolje z onesaženjem in izrabljanjem naravnih virov, katerih rezultat je okoljska degradacija, ki se kaže predvsem v podnebnih spremembah ter ostalih pojavih v naravnem okolju.

Okoljske vsebine se prebijajo vse višje po političnem dnevnem redu in kot rezultat so se oblikovali mnoge mednarodne pobude, sporazumi in pogodbe, ki postavljajo okvirje tudi regionalnim okoljskim politikam. Znotraj teh politik predstavlja pomembno področje tudi uvedba biogoriv.

V diplomskem delu se je avtorica lotila pomembnega področja analize alternativnih virov energije. Svoje delo je zastavila najprej z vidika splošne opredelitve trajnostnega razvoja in zahtev, da se ekonomični (energetski) razvoj poveže z okoljevarstvenim (biogoriva) in socialnim razvojem (vključevanje novih kmetijskih pridelovalcev).

Avtorica je ponudila dober pregled svetovne literature na področju razumevanja trajnostnega razvoja, nato je analizirala tehnične in ekonomske pogoje pridobivanja biogoriv prve in druge generacije, na koncu pa je podala ekonomsko in politično analizo možnosti zamenjave goriv in posledice, ki izhajajo iz te usmeritve na nacionalni in tudi globalni ravni.

Diploma paper

THE CONTRADICTIONS IN SUSTAINABLE DEVELOPMENT IN INTRODUCING BIO-FUELS TO THE MARKET

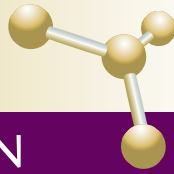
Mentor: Prof. Dr. Bogomir Kovač
University of Ljubljana, Faculty of Economics

Sustainable development is defined as satisfying one's own needs without violating or limiting the needs of the others. In contrast to that, high economic growth and accelerated demographic swings during the last century produced pressure on the natural environment with pollution and exploitation of natural resources. The effect of that is the degradation of nature, which is primarily obvious in climate change and other phenomena in the natural environment.

Environmental issues are pushing their way up the political daily agenda and as a result many international initiatives, agreements, and contracts have been formed. They set the frame for regional environmental policies. The introduction of bio-fuels plays an important role in the above policies.

In her paper the author analyses the important issue of alternative energy resources. Her work is based primarily on the aspect of the general definition of sustainable development and demands to connect economical (energy) development with environmental protection (bio-fuels) and social development (including new farm products).

The author offers a good overview of world literature on understanding sustainable development and analysed technical and economic conditions of producing first and second generation of bio-fuels. Finally an economic and political analysis of the possibility of replacing fuels, and the consequences that arise from this at a national and global level, is offered.



Diplomsko delo

STATIČNA STANJA V KROVNI PLOČEVINI NAD VMESNO PODORO SOVPREŽNIH NOSILCEV S PODAJNIM JEDROM

Mentor: izr. prof. dr. Janez Kramar
Univerza v Ljubljani, Fakulteta za strojništvo

V diplomskem delu so raziskane statične razmere dvopoljnih sendvič plošč v okolici vmesnih podpor, kjer se kot mejna statična stanja pojavijo mehanske poškodbe jedra ali krovnih pločevin zaradi lokalnih koncentracij napetosti v posameznih plasteh sendvič plošč.

V uvodnem delu je predstavljena upogibno-strižna teorija sendvič plošč z nestisljivim jedrom. Nad podporami in v bližnji okolici podpor je izrazita stisnitev jedra sendvič plošč, zaradi česar teorija nestisljivih jeter ne sledi več lokalnemu napetostno-deformacijskemu stanju, ki se pojavi v realnosti. Analize lokalnih stanj v okolici vmesne podpore so bile izvedene numerično z metodo končnih elementov v sklopu računalniškega programa Ansys. V ta namen je bil izdelan numerični model dvopoljne sendvič plošče s povečano gostoto mreže končnih elementov v območju srednje podpore. Tako je bil raziskan vpliv povečane reakcije na vmesni podpori na porazdelitev lokalnih upogibnih momentov v krovnih pločevinah ter tlačnih in strižnih napetosti v jedru sendviča. Numerični rezultati so bili preverjeni tudi z meritvami na treh vzorcih sendvič plošč.

V nadaljevanju so analizirani vplivi več dimenzijskih in materialnih parametrov na nosilnost in lokalne statične razmere sendvič plošč v območju vmesne podpore. Na podlagi rezultatov je bilo ugotovljeno, da je porazdelitev interakcijskih sil med srednjo podporo in sendvič ploščo ugodnejša od porazdelitve, ki je zapisana v literaturi. Izpeljan je bil obrazec porazdelitve normalnih napetosti v smeri debeline jedra sendviča nad vmesno podporo. Ugotovljena je bila tudi optimalna vrednost normalnega modula jedra v smeri debeline sendviča, nad katero stisnitev jedra ni več izrazita.

Diploma paper

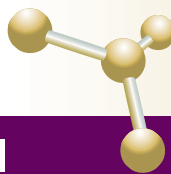
STATIC STATES IN COVER PLATES AT INTERMEDIATE SUPPORT OF COMPOSITE BEAMS WITH COMPRESSIBLE CORE

Mentor: Associate Prof. Dr. Janez Kramar
University of Ljubljana, Faculty of Mechanical Engineering

The diploma paper includes research of the static condition of two span sandwich panels at their intermediate supports, where mechanical failures of core or cover plates appear as ultimate limit states, as a result of local concentration of stresses in particular layers of sandwich panels.

At the beginning, the bending-shear theory of sandwich panels with an incompressible core is introduced. At the supports, the compression of the core is significant. Therefore, the theory of an incompressible core no longer follows a local stress-strain state of real sandwich panel behaviour. Analyses of local static states at intermediate supports were calculated numerically with FEM analyses with the computer programme, Ansys. For this purpose, the numerical model of two span sandwich panels with an increased density of mesh in the region of the middle support was built. In this way, the influence of increased support reaction at intermediate support on distribution of local bending moments in cover plates and compressive and shear stresses in the core was researched. Numerical results were compared experimentally on three specimens.

Furthermore, influences of more dimensional and material parameters on capacity load and local static conditions of sandwich panels in the region of middle support were researched. On the basis of the results a more favourable support reaction distribution was established. A simple form of normal stresses distribution in the direction of core thickness at the intermediate support was defined. The optimum value of the core modulus of elasticity in the direction of thickness, at which the compression of the core is no longer significant, was also determined.



NINA HERCOG, MATEJA MARTINI

Diplomsko delo

ZAČASNA BIVALNA ENOTA ZA REŠEVANJE BIVANJSKE STISKE PO NARAVNIH NESREČAH

Mentor: prof. dr. Stane Bernik
Somentor: prof. Vladimir Pezdirc
Univerza v Ljubljani, Akademija za likovno umetnost in oblikovanje

V zadnjem času je vedno več naravnih nesreč, zato je pomembno, da se nanje dobro pripravimo. K temu sodi vnaprejšnje načrtovanje pomoči žrtvam nesreč, kar ob katastrofi omogoči hitrejši in kakovostnejši odziv.

Avtorici v diplomskem delu obravnavata bivalno enoto, katere prednost je predvsem v zložljivosti. V skladišču in med prevozom tako ne zavzame veliko prostora, po postavitvi pa nudi prostor za udobno bivanje.

Veliko prednost predstavlja tudi dejstvo, da enota vsebuje vso za bivanje potrebno opremo, ki z zlaganjem omogoča različne možnosti uporabe bivalnega prostora. Enota proizvaja lastno električno energijo, uporablja obnovljive vire, varčuje s porabo vode in stoji na nogah, da za seboj pusti čim manjše sledi in zmanjša svoj vpliv na že tako krhko okolje. Sončne celice na strehi proizvajajo električno energijo tudi med skladiščenjem in tako pokrivajo energetske potrebe skladišča.

Vsi uporabljeni materiali so izbrani zaradi dobrega razmerja med težo in velikostjo. Vakuumska izolacija omogoča, da stranske stene nudijo odlično toplotno izolacijo, hkrati pa ostajajo dovolj tanke.

Membranska streha daje enoti edinstven izgled. Omogoča prehajanje svetlobe, tako da je prostor podnevi svetel, medtem ko ponoči enota nežno osvetljuje svojo okolico. V poletnem času je membransko streho mogoče odpreti, s čimer se bivanjski prostor razširi tudi na zunanost. Zaradi modularne zasnove je enoti mogoče dodati zunanjo teraso ali pa se posamezne enote združuje in tako ustvari večje prostore za skupno rabo.

Diploma paper

TEMPORARY LIVING UNIT FOR DEPLOYMENT AFTER NATURAL DISASTERS

Mentor: Prof. Dr. Stane Bernik
Co-mentor: Prof. Vladimir Pezdirc
University of Ljubljana, Academy of fine arts and design

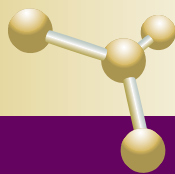
Nowadays more and more frequent natural disasters threaten all over the world and we need to prepare ourselves for the worst, including pre-planning which is crucial for an effective response.

The authors in this diploma paper discuss the temporary living unit which is designed to be used after different natural disasters when quick and quality response is vital. The folding capacity of the unit enables it to be small in storage and transport, but large and comfortable while in use.

The unit contains all the necessary equipment which, through folding, provides different uses of the living spaces. In order not to further harm the fragile environment, it produces its own energy, uses renewable materials, saves in water usage, and stands on legs to reduce the footprint. The solar cells on the roof also produce energy while the units are stored and therefore they can supply the storage with the necessary electrical energy.

All of the materials used are chosen for their good weight/size relationship. The Vacuum insulation enables the side walls to be thin enough but at the same time offer great thermal insulation in hot and cold weather.

The membrane roof offers the unit a unique look. It allows the light to pass through which during the day makes interior space brighter while at night it gently lightens the surroundings. In the summertime, the membrane roof can be opened to extend the living space to the exterior. Because of modular design, it is possible to add a summer terrace or to join units together into bigger living spaces that are also appropriate for community needs.



Diplomsko delo

UPRAVLJANJE S TVEGANJI V GRADBENIH PROJEKTIH

Mentor: doc. dr. Jana Šelih, univ. dipl. inž. gradb. Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

Izvajanje vsakega gradbenega projekta je povezano s tveganji. Projekti se zaradi svoje edinstvenosti razlikujejo med seboj, vzorec tveganj pa se kmalu začne ponavljati. Vpliv tveganj se kaže v zamudi pri izpolnjevanju rokov, slabši finančni realizaciji in slabši kakovosti končnega izdelka. Učinkovito upravljanje s tveganji lahko pripomore k večji poslovni uspešnosti projekta in zadovoljstvu naročnika.

V začetnih poglavjih so podane teoretične osnove za razumevanje tveganj, vezane na podjetje in gradbene projekte. Vezni člen med podjetjem, gradbenim projektom in projektnim timom predstavlja register tveganj kot osnovni pripomoček pri enostavnem upravljanju s tveganji.

V nadaljevanju avtor predstavi podjetje, ki je izvajalo vseh pet obravnavanih projektov visoke gradnje. Projekti so predstavljeni s povzetki osnovnih pogodb in aneksov. S pomočjo vprašalnika so bili pridobljeni podatki o vodjih posameznih projektov, njihovem razumevanju tveganja, predvsem pa podatki o konkretnih tveganjih in predlogih za njihovo zmanjšanje. Po interpretaciji rezultatov vprašalnika so bili izdelani registri tveganj za vsak izveden projekt in register tveganj, ki lahko služi kot osnova za začetek upravljanja s tveganji s pomočjo registra tveganj.

Upravljanje s tveganji v gradbenih projektih je pomembnejše, kot meni povprečen vodja projekta. Le načrtno upoštevanje tveganj, kar register tveganj nedvomno omogoča, bo v prihodnosti zagotavljalo konkurenčnost, predvsem pa dodano vrednost gradbenega podjetja.

Diploma paper

RISK MANAGEMENT IN CONSTRUCTION PROJECTS

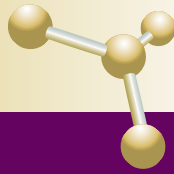
Mentor: Doc. Dr. Jana Šelih, BSc (Civil Engineering)
University of Ljubljana, Faculty of Civil and Geodetic Engineering

The execution of every construction project is associated with risks. Risk patterns soon start to repeat. However, projects differ due to their uniqueness. The influences of risk manifest as deadlines being exceeded, poor budget balances, and a lower quality of the final product.

The first three sections of the thesis present a theoretical background for understanding enterprise risk management and risk factors in construction projects. The bond between enterprise, the construction project, and project team is risk register, which can be applied as basic, risk-management tool.

The next sections present the enterprise that has executed all five high-rise building construction projects under consideration. Projects are presented by summaries of basic contracts and annexes. Questionnaire surveys were used to collect data about each project manager, their understanding of risks and concrete risks, together with proposals for lowering the risks. Based on the outcomes of the questionnaires, registers for each project have been created. A general risk register that can be used as a basis for starting risk-management by using a risk register, was established.

Risk management in construction projects is more important than the average project manager is aware of. Only planned risk-management, which a risk register undoubtedly is, will in future assure competitiveness, and above all, add value to a construction enterprise.



MATEJ KOCJAN

Diplomsko delo

DOLOČEVANJE OPTIMALNE ZASNOVE KONSTRUKCIJSKIH ELEMENTOV

Mentor: izr. prof. dr. Jože Korelc
Univerza v Ljubljani, Fakulteta za gradbeništvo in
geodezijo

Diplomska naloga obravnava določevanje optimalne zasnove konstrukcijskih elementov.

Postopek optimalne zasnove, ki je opisan v prvem delu naloge, je sestavljen iz dveh ločenih delov. V začetni fazi optimiziranja je izvedena topološka optimizacija, pri kateri grobo opisana konstrukcija naznani optimalno obliko. Pri tem sta na voljo dve metodi, in sicer optimiziranje na mejno obtežbo ter optimiziranje na maksimalno togost pri danem volumnu.

V drugi fazi je oblika, dobljena s topološko optimizacijo, približno opisana z novimi parametri na način, ki upošteva tudi tehnologijo izdelave končne konstrukcije, čemur sledi ponoven zagon računa. V tej fazi se uporabi optimizacija na mejno obtežbo.

V drugem delu naloge so opisani postopki, uporabljeni na dejanskih primerih. Vsi matematični postopki se izvajajo v programskem paketu Mathematica s pomočjo dodatkov AceGen in AceFEM, ki sta okolji za analizo po metodi končnih elementov. Topološka optimizacija je bila izvedena za primer konzole, preklade in stebra, medtem ko je bila optimizacija parametrov izvedena samo na primeru konzole.

Na koncu je bilo še preverjeno, ali dobljeni rezultat zadosti zahtevam standarda EN 1993-1-1.

Diploma paper

DETERMINATION OF OPTIMAL TOPOLOGY OF STRUCTURAL COMPONENTS

*Mentor: Assistant Prof. Dr. Jože Korelc
University of Ljubljana, Faculty of Civil and
Geodetic Engineering*

The thesis discusses the determination of optimal design for structural elements.

The first part of the thesis describes the optimum design which consists of two separate parts. The topology optimization, which puts roughly outlined constructions into an optimal form, is made in the initial phase of optimization. There are two methods available; the first is to optimize on a limit load, and the second, to optimize on maximum rigidity for a given volume.

In the second stage, the form obtained by topology optimization is described with new parameters in a way that also takes the technology of producing the final construction into account. At this stage we use the optimization on limited load.

The second part of the thesis describes procedures that are used in actual examples. All mathematical procedures are implemented in the software Mathematica with the help of AceGen and AceFEM appendix, which are analysis programs using the method of finite elements. Topology optimization for examples of a cantilever, beam, and column were carried out; whereas for the optimization of parameters only for a cantilever example is used.

Results obtained during research were checked for the EN 1993-1-1 requirements.

Diplomsko delo

MANAGEMENT INOVACIJ V GRADBENEM SEKTORJU

Mentor: doc. dr. Jana Šelih, univ. dipl. inž. gradb. Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

Namen diplomskega dela je predstaviti možnosti uporabe managementa inovacij v gradbenem sektorju, ki kot tradicionalna panoga le počasi uvaja sodobne pristope v svoje delovanje. V diplomskem delu so predstavljene osnove managementa inovacij in specifičnosti gradbenega sektorja na tem področju. Delo predstavi udeležence inovacijskega procesa na območju Evropske unije in na območju Slovenije, kjer je natančneje opisan Slovenski gradbeni grozd kot institucija tehnološkega transferja ter institucija sočasnega sodelovanja in konkurence.

V diplomskem delu je predstavljen tudi izbran primer inovacije, na katerem je pojasnjena ena izmed metod vrednotenja inovacije, t.i. metoda analize življenjskih stroškov. Tu je obravnavana t.i. pasivna hiša kot nov, izčrpen pristop k energetsko učinkoviti, zdravi in trajnostni gradnji, ki zahteva nekoliko višje stroške izvedbe, vendar po drugi strani terja tudi bistveno nižje stroške ogrevanja stavbe v času njene obratovalne dobe. Analiza življenjskih stroškov obravnava primer tipične, konvencionalne enodružinske hiše v primerjavi z enako hišo, zgrajeno v pasivnem standardu. Rezultat je doba po končani gradnji, v kateri se nekoliko višja začetna investicija v pasivni standard obravnavane hiše, glede na trenutno ekonomsko stanje v Sloveniji, povrne.

Na podlagi dodatne analize, ki se obravnava problema loti še glede na trenutne ekonomske pogoje v Nemčiji, pa je izpostavljenih še nekaj predlogov za izboljšanje mehanizmov finančnih spodbud v Sloveniji, s pomočjo katerih bi število pasivnih objektov tudi pri nas v prihodnosti lahko naraščalo hitreje.

Diploma paper

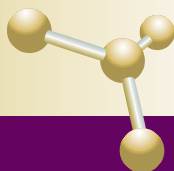
INNOVATION MANAGEMENT IN CONSTRUCTION SECTOR

Mentor: Doc. Dr. Jana Šelih, BSc (Civil Engineering)
University of Ljubljana, Faculty of Civil and Geodetic Engineering

The main goal of this diploma paper is to present possibilities to use innovation management in the construction sector, which, as a traditional sector, is slow to implement modern concepts. The fundamentals of innovation management and special features of the construction industry in this field are presented. Innovation process stakeholders, both in the European Union as well as Slovenia, are described, with particular emphasis on the Slovenian Construction Cluster as the institution carrying out both technological transfer and competition co-operation.

In the final part of the thesis the cost evaluation of the selected product, using the LCCA method (Life-Cycle-Cost-Analysis), is presented. In the case of the LCCA study products, known as Passive Houses, are selected. The Passive House concept is a comprehensive approach to energy-efficient, high quality, healthy and sustainable buildings, which require additional construction costs, but on the other hand promise lower expenses for heating the building in the longer term. The whole life-cycle costing method draws an economic comparison with a typical conventional, detached-house with an equivalent house, built to the passive standard, during construction, as well as operational, phase. The result of the analysis is the time by which the higher initial investment in the passive standard for this particular house, in present economic conditions in Slovenia, pays-off.

An additional analysis of the same issue, which takes into account economic conditions in Germany, makes proposals how financial stimulation, to increase the number of future Slovenian passive buildings, can be improved.



Diplomsko delo

EKONOMSKI UČINKI INVESTIRANJA V IZOBRAZBO ZAPOSLENIH PODJETJA »X«

Mentor: doc. dr. Branko Ilič
Somentor: izr. prof. dr. Valentina Hlebec
Univerza v Ljubljani, Fakulteta za družbene vede

Cilj diplomskega dela je z različnimi metodološkimi pristopi preveriti veljavnost teorije človeškega kapitala znotraj podjetja »X«, raziskati ekonomski pomen investiranja v izobraževanje ob delu in na delovnem mestu z vidika posameznika oziroma zaposlenega in podati zaključke in smernice za podjetja, kako človeški kapital, »združen« v podjetju, čim bolj spodbuditi k učinkovitosti, produktivnosti in uspešnosti.

Izkazalo se je, da formalno izobraževanje pozitivno prispeva k delovni uspešnosti zaposlenega, nasprotno pa količina dodatnega izobraževanja nikakor ne izboljša izvajanja njihovih delovnih nalog. Razlog je mogoče iskati v sistemih nagrajevanja, ki so jih zaposleni deležni v podjetjih, saj le-ta velikokrat nagrajujejo le neposredno produktivnost zaposlenih, ne pa tudi same kvalitete izvajanja delovnih nalog, ki je dolgoročna osnova za večjo učinkovitosti zaposlenih. Tako je danes priporočljivo, da se podjetja ne osredotočajo le na delovni proces kot končni produkt dobička, pač pa tudi na kader, ki predstavlja zalogo človeškega kapitala podjetja, in zadovoljstvo zaposlenih, ki bo prispevalo k uspešnosti podjetja kot celote.

Le kader, ki je cenjen in jasno pozna pot in način razvoja v podjetju, je lahko dober kader, saj vanj in vase vlagajo tudi za lastno ekonomsko in socialno korist.

Diploma paper

ECONOMIC EFFECTS OF INVESTMENTS IN EMPLOYEE TRAINING IN COMPANY »X«

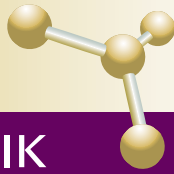
Mentor: Doc. Dr. Branko Ilič
Co-mentor: Assistant Prof. Dr. Valentina Hlebec
University of Ljubljana, Faculty of Social Sciences

The aim of this diploma paper is to verify the validity of the human-capital theory for employees inside a company »X«; to research the economic significance of investing in education at work from the perspective of the employee; and, finally, to give conclusions and guidelines for companies how to stimulate human capital towards productivity, success, and efficiency.

It proved that formal education positively contributes to the working efficiency of employees and, conversely, additional education does not in any way improve the execution of their working assignments.

The reason could be found in the reward systems in companies, because they often reward only the direct productivity of employees and not also the quality of how work is performed, which is the long-term foundation for employee efficiency. Thus, it is recommended that companies do not focus only on the work process as a final product of profit, but also on employees, which represent the stock of human capital for the company and also on their satisfaction, which contributes to the efficiency of a company as a whole.

Only respected and well informed employees can be good employees, because investing in them also means investing in their own economic and social benefits.



Diplomsko delo

MEDNARODNO SISTEMSKO TRŽENJE PODJETIJ IN PONUDBENI POSTOPKI MEDNARODNIH RAZVOJNIH BANK PRI FINANCIRANJU EKOLOŠKIH PROJEKTOV

Mentor: dr. Milan Jurše
Univerza v Mariboru, Ekonomsko-poslovna
fakulteta

Diplomsko delo je raziskava sodobnega koncepta sistemskega trženja, v kateri je avtorica celovito in poglobljeno na osnovi strokovne literature orisala teoretični model mednarodnega sistemskega trženja na področju kompleksnih industrijskih projektov, nato pa model aplicirala na področje mednarodnega trženja ekoloških projektov skozi optiko ponudbenih postopkov in financiranja tovrstnih projektov s strani mednarodnih strokovnih bank.

Po uvodni razčlenitvi metodologije raziskave je avtorica najprej opredelila ključne vidike koncepta mednarodnega trženja med organizacijami, zlasti z zornega kota razvoja odnosov med dobavitelji in njihovimi odjemalci, značilnosti nakupnega odločanja kupcev, tveganj v nakupnih situacijah ter koncepta trženja v mednarodnem tržnem okolju.

V osrednjem, raziskovalnem delu je avtorica razčlenila sodoben koncept mednarodnega trženja projektov in sistemov, pri čemer je izhajala iz opredelitve koncepta in značilnosti projektov, njihovega razvoja skozi posamezne projektne razvojne faze, značilnosti poslov in razvoja odnosov med udeleženci projektnega trženja, nato pa predstavila glavne oblike pridobivanja poslov v mednarodnem projektne trženju s poudarkom na sodelovanju ponudnikov na tenderskih razpisih.

V sintezi je orisan proces strateškega načrtovanja mednarodnega trženja, vpetega v proces strateške analize in segmentacije trgov, izbora ciljnih skupin odjemalcev in oblikovanje trženjskih strategij s poudarkom na celovitih rešitvah na področju ekologije.

Diploma paper

INTERNATIONAL SYSTEMATIC SALES OF COMPANIES AND TENDER PROCEDURES OF INTERNATIONAL DEVELOPMENT BANKS FOR FINANCING ECOLOGICAL PROJECTS

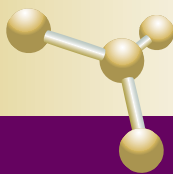
Mentor: Dr. Milan Jurše
University of Maribor, Faculty of Economics and
Business

The paper researches the modern concept of systematic sales, in which the author describes the theoretical model of international systematic sales of complex industrial projects using a holistic and thorough approach, based on expert literature. She then applies the model to the international systematic sales of ecological projects, using tender procedures and finance models of international banks.

After the introductory analysis of the research methodology, the author defines key aspects of international sales among organisations, especially from the perspective of developing relationships between suppliers and their clients, characteristics of customer purchase decisions, risks in purchase situations, and the sales concept in an international sales environment.

In the central research work the author analyses the concept of international sales of projects and systems, where she derives from definitions of the concept and project characteristics, their development through individual project development phases, characteristics of business events, and development of relationships among participants in project sales. Then she describes the principal ways of acquiring business in international project sales with an emphasis on peer applicant co-operation at tenders.

The synthesis describes the process of strategic planning of international sales, which is an integral part of strategic analysis and market segmentation. The process of target customer choices and the process of forming market strategies with an emphasis on holistic ecological solutions are also described.



Diplomsko delo

ANALIZA MOŽNOSTI UVEDBE ODDELKA ZA MANAGEMENT ZNANJA V PODJETJU STUDIO MODERNA

Mentor: doc. dr. Branko Ilič
Univerza v Ljubljani, Fakulteta za družbene vede

Avtor v diplomskem delu opiše in analizira stanje upravljanja znanja v podjetju Studio Moderna.

Glavni poudarek je na procesih deljenja znanja, ki so po avtorjevem mnenju ključni procesi pri multiplikaciji znanja, to pa vpliva tudi na uspešnost podjetij. Na podlagi teoretičnih nastavkov, ki jih je podrobneje predstavil v prvem delu naloge, je v drugem delu predlagal nekaj novosti v zvezi z upravljanjem znanja, predvsem v povezavi s tehnološko platformo za deljenje znanja.

Ker je za uspeh pri upravljanju znanja nujno razumevanje in sodelovanje vseh zaposlenih, je deloma razdelana tudi motivacija, predvsem vpliv različnih motivacijskih faktorjev na deljenje znanja. Brez kvalitetnega motivacijskega sistema je namreč uvajanje upravljanja znanja nepopolno in ne daje pravih rezultatov. Le motivirani zaposleni so pripravljeni sprejeti in uveljaviti spremembe, ki jih od njih zahteva današnje poslovno okolje.

Motiviranje zaposlenih naj bi podpiralo organizacijsko kulturo, preko nje pa naj bi bili zaposleni usmerjeni in spodbujeni v sodelovanje in kolegialno delo. Pridobivanje, deljenje, shranjevanje, obnavljanje in ustvarjanje novega znanja naj v organizaciji postanejo imperativi, upravljalec ali manager znanja pa naj jih promovira, izobražuje vodje oddelkov o načinih upravljanja znanja in bedi nad rezultati upravljanja znanja.

Diploma paper

ANALYSIS OF THE POSSIBILITY OF INTRODUCING KNOWLEDGE MANAGEMENT DEPARTMENT IN THE STUDIO MODERNA

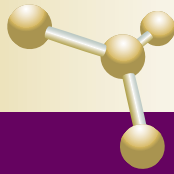
Mentor: Doc. Dr. Branko Ilič
University of Ljubljana, Faculty of Social Sciences

The author of this diploma paper writes about the key concepts of knowledge management and the situation in knowledge management in the company, Studio Moderna.

The focus of this diploma paper is on the processes of knowledge sharing, because these processes are crucial for multiplying knowledge, which also affects the overall success of the company. Based on theoretical knowledge about knowledge management that the author presented in the first part, some new ways for knowledge management in Studio Moderna are proposed, especially about the technological aspect of knowledge sharing in the second part of the diploma paper.

Employees need to understand the importance of co-operation for knowledge management to be successful, so the author dedicated some lines to motivation also. The paper discusses motivation factors that enable and encourage knowledge transfer and knowledge sharing among employees.

Motivation should help to promote an organizational culture which should promote co-operation and partnership. Acquiring, sharing, saving, updating and making new knowledge, should become imperatives and a knowledge manager should promote them all. Tasks that are also important are teaching managers how to foster knowledge management between their colleagues and monitor the results of knowledge management.



Diplomsko delo

RAZISKAVA ZGRADB IZ JEKLENEGA OKVIRJA, NAREJENIH IZ SEKCIJ TANKIH, HLADNO OBLIKOVANIH STEN

Mentor: dr. László Dunai
Univerza za tehnologijo in ekonomijo v
Budimpešti, Oddelek za gradbeno tehniko

Tanke jeklene sekcije se redno uporabljajo v gradbeni industriji, vendar večinoma kot sekundarni nosilni strukturni elementi (npr. strešine).

Avtor tega diplomskega dela se je osredotočil na preračunavanje težav glavnih nosilnih delov teh tankih jeklenih hangarskih struktur. Lokalni in globalni spoji in interakcije med njimi povzročajo večino težav pri uporabi tovrstnih zgradb. Drugi zapleteni del meritve je razmislek o poltrdih spojih, ki so narejeni s samovrtalnimi vijaki na vogalih in na dnu glavnih nosilnih okvirjev.

V laboratoriju BUTE so izvedli obsežne eksperimentalne teste s hangarskimi okvirji. Avtor je rezultate uporabil v svojem delu. Merilne metode so bile izvedene v skladu s standardom Eurocod, vendar je avtor želel podati bolj splošen in bolj natančen proces.

Avtor je uporabil večkratno nelinearno metodo končnih elementov za modeliranje struktur okvirjev ob posebnem upoštevanju spojev s samovrtalnimi vijaki. Te modele je verificiral z eksperimentalnimi rezultati (npr. tresljaji, premiki izmerjenimi med testi), nakar je izdelal metodo za izračun nosilne kapacitete zgoraj omenjenih struktur, ki ima za osnovo ravno tako Eurocod standard.

V raziskavi je avtor dokazal, da je obstoječa metoda meritve – ki sta jo izdelala BUTE in Lindab – veljavna in ima primerno varnost. Uspel je razviti tudi računsko metodo, ki bolj natančno opisuje zapleteno obnašanje teh tankih jeklenih struktur.

Diploma paper

INQUIRY OF STEEL FRAME STRUCTURES MADE OF THINWALL COLDFORMED SECTIONS

Mentor: Dr. László Dunai
Budapest University of Technology and Economics,
Department of Structural Engineering

Thin-wall steel sections are widely used in the building industry, but mainly as secondary load-bearing structural elements (e.g. purlins).

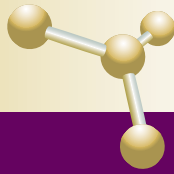
The author in this diploma paper focuses on the calculating difficulties of the main load bearing parts of these thin-wall steel hangar structures. Local and global buckling and the interaction of them cause the most problems using these kinds of structures. The other complicated part of the measurement is the consideration of the semi-rigid joints made with self-drilling bolts at the corners and the bottom of the main load bearing frames.

At the laboratory of BUTE more full-scale experimental tests were made with these hangar frames whose results the author used during his work.

The measurement methods were carried out in accordance with Eurocode using its special formulas, but the author wanted to use a more general and more precise process.

The author used a multiple non-linear finite element method for modelling the frame structures with special regard to the joints with self-drilling screws. He verified these models with experimental results (e.g. stresses, displacements measured during the tests) and then he worked out a method for calculating the load-bearing capacity of the structures mentioned above which is also based on the actual Eurocode but not using its special formulas.

During the inquiry the author proved that the existing method of measurement - worked out by BUTE and Lindab - is valid and bears adequate safety and he has succeeded in developing a method of calculation method which describes more accurately the complicated behaviour of these thin-wall steel structures.



VESNA MURGELJ

Diplomsko delo

MOČ ZNAMKE DELODAJALCA

Mentor: red.prof.dr. Boris Snoj
Univerza v Mariboru, Ekonomsko-poslovna
fakulteta Maribor

Danes se dogajajo hitre spremembe v družbenem in ekonomskem okolju, ki zahtevajo hiter odziv in prilagodljivost organizacij ter inovativne pristope do vseh deležnikov. Za obvladovanje sprememb pa že dolgo ne zadostuje iskanje najboljših tehnoloških in kapitalskih rešitev. Številni strokovnjaki namreč menijo, da je ključ v ljudeh, in v tem, kako jih spodbujamo za boljše osebne ter skupne delovne rezultate, jih vodimo, usmerjamo in skrbimo za njihov razvoj. Premik pomena poslovnega uspeha na vodenje ljudi je hkrati tudi premik pomena kadrovske funkcije v podjetjih, saj nekoč klasična vloga kadrovske funkcije prerašča v podjetniško funkcijo, ki ustvarja svojo strategijo.

Moč znamke delodajalca vidno posega na dve področji znotraj podjetja, in sicer na področje marketinga ter na področje kadrovanja. Obe poslovni funkciji sta v podjetju izredno pomembni. Glavni cilj oblikovanja znamke delodajalca z marketinškega vidika je ustvariti močno znamko, ki privabi v podjetje nadarjene in visoko strokovno usposobljene posameznike ter zadrži uspešne zaposlene. Biti korak pred konkurenco in ohraniti podjetje privlačno za zaposlene je izziv današnjih kadrovskih menedžerjev povsod po svetu, pa tudi zaposlenih, ki nastopajo na trgu dela.

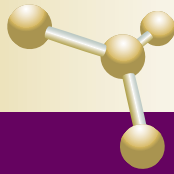
Diploma paper

EMPLOYER BRAND POWER

Mentor: Prof. Dr. Boris Snoj
University of Maribor, Faculty of Economics and
Business

Nowadays, fast social changes are happening, as well as changes in the economic environment which demand fast responses and adjustments to organisations, as well as innovative approaches to all stakeholders. For managing changes, searching for the best technological and capital solutions has not been sufficient. Numerous experts believe that the key is in people, how we encourage them to achieve better personal and collective working results, how we manage them, direct them, take care of their progress. The shift from the meaning of business success onto the management of people also is a shift in the role of human resource management in companies, because the classical role of human resource management has grown into a entrepreneurial function which creates its own strategy.

The power of the employer's brand visibly expands into two fields inside companies, particularly marketing and human resource management. Both business functions are extremely important in a company. The main goal of creating the employer's brand from a marketing view is to create a strong brand to attract talented, highly-qualified individuals and simultaneously satisfy effective employees already employed in the company. Being one step ahead of the competition and maintaining a company attractive to employees is a challenge for up-to-date human resource managers around the world, as well as employees who are presently on the labour market.



Diplomsko delo

DELAVSKI KAMP – LUMBAGO

Mentor: Prof. Mihailo Timotijević
Univerza v Beogradu, Fakulteta za arhitekturo

Gradbeno podjetje iz Srbije bo gradilo letališče v Lumbagu. Na gradbišču bodo delali delavci iz Srbije, ki bodo nekaj let živeli v Angoli. Zaradi tega bi morala biti namestitve, v kateri bodo delavci počivali, ko ne bodo na gradbišču, prijetna in dobro opremljena s prostori za šport in zabavo.

Ko bodo dela na letališču zaključena, bo imelo podjetje nove posle na čisto drugem gradbišču v neki drugi državi. Uporabljeni montažno demontažni sistem gradnje je omogočil, da se lahko predizdelani paneli, iz katerih so narejeni objekti za bivanje delavcev, transportirajo in izkoristijo za gradnjo novih objektov na popolnoma novem gradbišču.

Sinergija z naravo in njena ohranitev je bistvena potreba moderne dobe – ozelenjena streha centralnega objekta izboljšuje zvočno izolacijo objekta, kar ima velik pomen glede na to, da je lokacija v bližini letališča.

Prostorsko-programski koncept je zasnovan z namero, da se oblikuje večslojni urbani sklop, ki se s svojo lego in obliko prilagaja funkcionalnim zahtevam, morfologiji terena, vizuram in tokom, hkrati pa je del širšega konteksta in podrejanja celoti.

Diploma paper

WORKERS CAMP – LUMBAGO

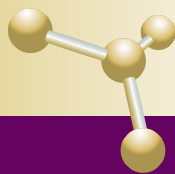
Mentor: Prof. Mihailo Timotijević
University of Belgrade, Faculty of Architecture

A construction company from Serbia will be participating in building the airport in Lumbago. The workers from Serbia, who will be working on the building site, will spend a few years in Angola. This is the reason why the accommodation facilities for them, outside the building site, should be especially pleasant and offer facilities for sports and entertainment.

When the work at the airport finishes, the company will have new tasks at a totally different building site in a different country. The assembly ~ dis-assembly building system that is used for accommodation of workers has enabled transport and the use of pre-fabricated panels at a totally different building site.

The synergy with nature and its preservation is an essential need of modern times – the living green roof of the central object enhances sound insulation, which is quite important, given the fact that the location is close to the airport.

The spatial-program concept with its position and shape is based on the intention to form a multi-level composition to fit the functional needs, morphology of the land, scenery, and flows, but at the same time it should remain part of the broader context and subject to the whole setup.



Diplomsko delo

GLEDALIŠČE OB VODI

Mentor: prof. dr. Aleš Vodopivec
Univerza v Ljubljani, Fakulteta za arhitekturo

Objekt gledališča je zasnovan kot razgiban teren proti Ljubljani, ki se spušča preko teras z odri do zunanjšega avditorija - trga na Špici. Terasasto nizajoči prehodi na posamezne avditorije nudijo tudi izven organiziranega programa prostor za zbiranje in druženje. Te značilnosti lokacije pričarajo vzdušje dnevne sobe mesta.

Stavba z nizajočimi dvoranami je oblikovana kot večnamenski paviljon, ki lahko gosti več dogodkov hkrati, ali kot enoten objekt, ki služi večjim prireditvam. Med različnimi dvoranami, ki se delijo z drsnimi akustičnimi stenami, se nahajajo prehodi s posameznih odrov v zaodrje. Te hkrati služijo tudi kot dodatni akustični tamponi med dvoranami.

Vsak avditorij posebej ima s steklenim ozadjem odra možnost oblikovanja scene s pogledi na reko, s tem pa uprizoritve ambientalnega gledališča. Možnost odpiranja steklenih sten proti reki nudi neposredno povezavo gledališča z vodo in dogajanjem na njej.

Streha, ki lebdi nad celotnim objektom, tako programske kot tudi simbolno označuje kraj dogajanja. S svojo prosojnostjo posnema krošnje dreves. Rob strehe, ki se previsno spušča proti reki, uokvirja in usmerja poglede. S svojim volumnom omogoča potrebne tehnične nastavitve in s tem postavitev vizualno in akustično raznolikih scen. Ker so zaradi dvoran razponi zelo veliki, je strešna konstrukcija dodatno podprta (obešena) preko vertikalnih konzol, vpetih v armiranobetonski del objekta.

Diploma paper

A THEATRE BY THE WATER

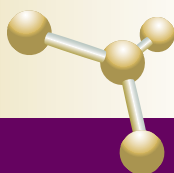
Mentor: Prof. Dr. Aleš Vodopivec
University of Ljubljana, Faculty of Architecture

The building is designed as a multi-level terrain, descending over terraces with stages that lead to an open auditorium - the public square on the very edge of where the river crosses. The passages that blend into various auditoriums are an ideal place for gatherings and socializing. All these characteristics make the location feel like a living room of the town.

The theatre building, designed as a multi-purpose pavilion, houses several performance halls that can host more events at once or a bigger happening when they are united. The auditoriums are divided by sliding acoustic walls and passages to the backstage, which also act as additional padding between the halls.

All auditoriums have a glass wall by which different water scenes can be designed and ambient theatre can be hosted. By opening the glass walls in the summer time the theatre connects with the river and its atmosphere.

The venue is marked by the roof that »floats« over the building. Being semi-transparent it represents the crowns of nearby trees. The edge of the roof overhang sweeps down to the river, and frames the views. The volume of the roof makes it possible to house the required technical placements and the settings for various acoustical and visual scenes. Because of the large roof-span, additional vertical brackets, fastened into the reinforced concrete walls of the building, had to be used.



SIMON PETROVČIČ

Diplomsko delo

ANALIZA IN PROJEKTIRANJE TANKOSTENSKIH CILINDRIČNIH SILOSOV V SKLADU Z EVROKOD STANDARDI

Mentor: izr. prof. dr. Boštjan Brank, univ. dipl. inž. grad.
Somentor: izr. prof. dr. Werner Guggenberger
Univerza v Ljubljani, Fakulteta za gradbeništvo in
geodezijo

Diplomsko delo obravnava analizo in projektiranje tankostenskih cilindričnih silosov v skladu z Evrokod standardi.

V prvem delu so obravnavane najpomembnejše obtežbe, ki delujejo na silose. Poseben poudarek je namenjen obtežbam, ki nastanejo pri polnjenju in praznjenju silosa, ter obtežbam zaradi vetra in potresa. Raziskane so tudi nekatere nejasnosti, ki se pojavljajo v standardu EN 1991-4, in predstavljene obtežne kombinacije, ki jih je potrebno upoštevati pri projektiranju. V drugem delu je izveden praktičen računski primer z upoštevanjem postopkov iz prvega dela.

V tretjem delu sta predstavljena dva računalniška programa, ki sta bila izdelana v sklopu diplomskega dela. Izdelana sta bila v programskem jeziku VBA in delujeta kot samostojna modula znotraj programa Microsoft Excel. Prvi program služi izračunu pritiskov in notranjih sil, ki se pojavijo v tankostenskem osno simetričnem silosu med polnjenjem in praznjenjem shranjenega materiala. Pred izdelavo programa so bili razviti ustrezni algoritmi, ki zajemajo določila iz standarda EN 1991-4. Drugi program služi določitvi razporeditve pritiskov zaradi delovanja vetra, ki deluje na cilindrični silos. Pri izdelavi programa so bile izpeljane ustrezne enačbe, ki zajemajo delovanje vetra na osno simetrične cilindre po standardu EN 1991-1-4. V skladu z najnovejšimi trendi v informacijski tehnologiji sta programa registrirana pod GNU GPL licenco, ki dovoljuje vpogled in spreminjanje izvorne kode. To pomeni, da si lahko uporabniki sami, če to želijo, predelajo oz. dopolnijo programa glede na svoje potrebe.

Diploma paper

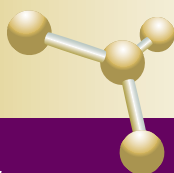
ANALYSIS AND DESIGN OF THIN- WALLED CYLINDRICAL SILO STRUCTURES IN ACCORDANCE WITH EN EUROCODES

Mentor: Associate Prof. Dr. Boštjan Brank, BSc
(Civil Engineering)
Co-mentor: Associate Prof. Dr. Werner Guggenberger
University of Ljubljana, Faculty of Civil and
Geodetic Engineering

This diploma paper considers the analysis and design of thin-walled cylindrical silo structures in accordance with EN Eurocodes.

In the first part the most important loads on silo structures are considered. An emphasis is given on loads due to the stored solid material, wind, and seismic loads. Simple and clear procedures (with step-by-step instructions and flowcharts) for determining pressures acting on a silo are given. Expressions for membrane section forces are presented. Some discrepancies in the EN 1991-4 code are identified and investigated. Load combinations, which are needed for design, are also given. In the second part of the work an example of analysis and design of a silo is presented by using the procedures introduced in the first part.

In the third part, two computer programs are presented, which were also developed in the scope of the work. They were written in VBA programming language and work as independent applications in Microsoft Excel. The first program determines the loads on silo walls due to filling and discharge of the stored solid material. Appropriate algorithms had to be developed, which follow the provisions of the EN 1991-4 standard. The second program determines the wind pressure on a silo structure. Equations that consider wind loading around an axis-symmetric cylinder under the EN 1991-1-4 code were derived for this program. Following the latest trends in information technology, the two programs are licensed under the GNU GPL software license. This allows the user to alter the source code and modify the programs to meet their specific needs.



Diplomsko delo

VPLIV INVESTICIJ V IZOBRAŽEVANJE NA POSLOVNO USPEŠNOST PODJETJA X

Mentor: doc. dr. Branko Ilič
Univerza v Ljubljani, Fakulteta za družbene vede

V diplomskem delu je avtorica iskala korelacijo med investicijami v izobraževanje in poslovno uspešnostjo ter učinkovitostjo podjetja, kar je bil nenazadnje tudi njen poglavitni cilj.

Empirični del predstavlja kvantitativna analiza študije primera podjetja Luka Koper d.d., v okviru katere je avtorica s pomočjo analize poti, ki je del regresijskega modela, in ostalih statističnih metod uvodoma preverjala postavljene kavzalne zveze oziroma hipoteze.

Raziskovalni model vključuje zadovoljstvo zaposlenih z delom in fluktuacijo kot intervenirajoči variabli pri identifikaciji vpliva vložkov v izobraževanje na poslovno uspešnost, sicer merjeno skozi produktivnost in čisti dobiček. Rezultati analize kažejo, da množičnost in intenzivnost investicij v izobraževanje ni ključni dejavnik poslovne uspešnosti Luke Koper d.d. Analiza poti z vidika sklepne verifikacije modela torej sporoča, da med investicijami v izobraževanje in poslovno uspešnostjo ni direktne povezanosti.

Z raziskavo je uspela potrditi le del zastavljenega modela, ugotovila pa je, da merjenje učinkovitosti izobraževanja ni enostavno, zato tudi verifikacija modela ni enoznačna. Pomembno je bilo spoznanje, da izobraževanje samo še ne pomeni osvajanja znanja, ampak zgolj povečuje verjetnost uspešnega razvoja.

Zaključno spoznanje, ki ga je avtorica uspela pridobiti s študijo primera, je dejstvo, da se rešitve v teoriji nizajo kot zelo preproste, v realnosti pa so to dolgoročni in izredno ambiciozno usmerjeni procesi.

Diploma paper

THE INFLUENCE OF INVESTMENTS IN EDUCATION ON THE FIRM EFFECTIVENESS OF COMPANY X

Mentor: Doc. Dr. Branko Ilič
University of Ljubljana, Faculty of Social Sciences

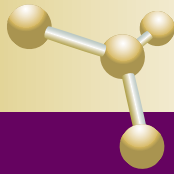
The author tried to determine verification of the latter by finding correlations between investments in education and business performance, and efficiency, which was the last, but not least, her main goal.

The empirical part presents a quantitative analysis of the case study of company Luka Koper d.d. in which the author initially checked out, through Path analysis, which is part of regression model and other statistical methods, causal relationship or hypothesis.

The research model includes employee satisfaction with work and fluctuation as influencing the variable in identification of the impact of inputs in training on business performance, measured through productivity and net profit. The results of the analysis show that the mass and intensity of investments in education is not a key factor for business success of Luka Koper d.d. Path analysis in the light of the final verification of the model thus communicates that investments in education and business performance are not directly related.

With study the author successfully confirmed a part of the set model, when she found out that measuring the effectiveness of education is not easy, hence, the verification of the model is not conclusive. Also important was the recognition that education itself does not mean adaptation of knowledge, but only increases the likelihood of successful development.

Therefore, it is questionably easily to conclude that companies, that massively and intensively train their employees, are just, by that reason, more effective. The final realization which the author has managed to obtain with a case study is the fact that the solutions in theory are denoted very simply, but in reality this is a long-term and extremely ambitious process.



Diplomsko delo

REKONSTRUKCIJA MODERNOSTI – KOMPLEKS ZGRADB VOJAŠKEGA POVELJSTVA V BEOGRADU

Mentor: doc. mag. Vladimir Milenković
Univerza v Beogradu, Fakulteta za arhitekturo

Sodobni vplivi arhitektonskega in umetniškega napredka in interaktivni mehanizem definirajo sočasne procese lastne transformacije v sodobni družbi. Spodbujeni z novimi ali na novo definiranimi problemi gredo naravnost v nove, spremenljive možnosti osnovnega dojetanja.

Lokalni standardi in njihove preobrazbe, ki so jih povzročili različni vplivi sodobnih trendov, so v okviru nestabilnega sistema vrednosti jasno pokazali krizo identitete. Arhitektonska praksa izgublja konceptualno vrednost preko komercializiranega vprašanja interesa in postaja bolj banalna. Definirana tema tega diplomskega dela je kritični primer beograjske sodobne arhitekture. Zgradbe vojaškega poveljstva so pomembna enota. Sočasno je pojav skrivnosten in visoko izpostavljen.

Vprašanje rekonstrukcijskih možnosti je zelo zapleteno. Izvirni namen zgradbe kot vojaškega objekta je v njeni popolni unikatnosti skozi obliko zgradbe zelo hermetičen. Glavna ideja za rekonstrukcijo je nasprotna glavni funkciji: preoblikovati zgradbo v center za predstavitev in proizvodnjo umetnosti v izpostavitvi množici in v povezavi s tokovi evropske in svetovne prakse ustvarjanja.

Diploma paper

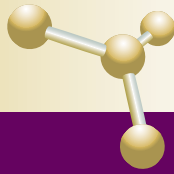
RECONSTRUCTION OF MODERNITY – COMPLEX OF ARMY HEADQUARTER BUILDINGS IN BELGRADE

Mentor: Doc. Mr. Vladimir Milenković
University of Belgrade, Faculty of Architecture

The contemporary influences of architectonic and artistic progression, as an interactive mechanism, are defining the simultaneous processes of their own transformation in modern society. Pushed up with new or redefined old problems, it goes straight into new, fluid possibilities of base perception.

Local standards and their transformations, caused by different influences of modern trends, in a framework of an unstable system of worth, have manifested a distinctive crisis of identity. Architectural practice, through commercialized questions of interest, is losing its conceptual value and becoming more banal. The defined theme of this diploma paper is a critical case of Belgrade contemporary architecture. Buildings of the Army Headquarters are a very important entity. At the same time as much as it is mysterious phenomena or highly exposed.

The question of reconstruction possibilities are very complex. The original function as a military object in its complete unique form of a building is very hermetical. The main idea for the reconstruction is the opposite of its main function: to transform the building into the centre for presentation and production of art for exposure to the masses and connecting with streams of European and World practice of creating.



Diplomsko delo

UPORABA INJEKTIRANIH VIJAKOV V JEKLENIH KONSTRUKCIJAH

Mentor: prof. dr. Darko Beg
Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

Namen diplomskega dela je bil ugotoviti obnašanje injektiranih vijakov in v končni fazi določiti nosilnost injekcijske mase na bočni pritisk.

Za injektiranje je bila uporabljena dvokomponentna smola Aradit SW404 v kombinaciji s trdilcem HY2404. Vijaki sestavi so bili v skladu s skupino standardov EN 14399. Preizkušanci in predelava vijakov in podložk so ustrezali direktivam standarda EN 1090-2. Preiskave so bile izvedene po navodilih standarda EN 1090-2 in priporočilih dokumenta ECCS N°79.

Na 21 preizkušancih so bili testirani štirje različni tipi spojev: navadni strižni spoji, injektirani strižni spoji, torni spoji in prednapeti injektirani spoji. Na teh spojih so bili opravljeni monotono natezni testi, ciklični testi in testi lezenja. Pri monotoni natezni preizkusih je bila določena sila pri zdrsu. Ti rezultati so uporabljeni za izračun nosilnosti injekcijske mase na bočni pritisk, ki znaša 200 MPa. Ciklični testi so bili narejeni pri različnih amplitudah pomikov in različnih frekvencah.

Ugotovljeno je bilo zelo dobro obnašanje strižnih injektiranih spojev pri cikličnem obremenjevanju. Obnašanje strižnih injektiranih spojev je bilo v primerjavi z navadnimi strižnimi spoji zelo togo. Prav tako je bil odziv prednapetih injektiranih spojev precej boljši od tornih spojev. S tem so bile potrjene do sedaj znane ugotovitve.

Diploma paper

APPLICATION OF INJECTION BOLTS IN STEEL STRUCTURES

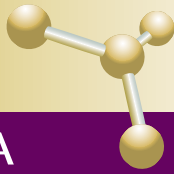
Mentor: Prof. Dr. Darko Beg
University of Ljubljana, Faculty of Civil and Geodetic Engineering

The aim of this diploma paper is to verify the behaviour of injection bolts and, in the final stage, to determine the bearing strength of injection resin.

A two component resin, Araldite SW404, was used in combination with the hardener HY2404. The used bolt/nut assemblies were in accordance with a group of standards - EN 14399. Specimens, alteration of bolts, and washers, are all in accordance with EN 1090-2. The testing was carried out in accordance with EN 1090-2 and recommendations of ECCS N°79.

The following 21 types of connections were tested: shear, injection shear, pre-loaded, and pre-loaded injection connections. The tension loading tests were carried out on these types of connections, including cyclic tests and creep tests. During tension loading tests the slip loads were determined. The bearing strength of resin from these results was calculated to be 200 MPa. Cyclic tests were carried out at various deformation amplitudes, and at various frequencies.

The outstanding behaviour of shear injection connections at cyclic loading was observed. The research also showed very rigid behaviour of shear injection connection and pre-loaded injection connections, in comparison with shear connections and pre-loaded connections, respectively. Consequently, this research is in excellent agreement with established known findings.



Diplomsko delo

IZVEDBA KRMILNO-ANALIZNEGA SISTEMA PRI NEPORUŠNEM TESTIRANJU KAKOVOSTI SENDVIČ PANELOV

Mentor: prof. dr. Andrej Žemva
Univerza v Ljubljani, Fakulteta za elektrotehniko

Del informacij o kakovosti mehanskih karakteristik sendvič panelov se dobi na osnovi merjenja kvalitete spoja med pločevino in jedrom, ki je bila do sedaj pridobljena s porušnimi meritvami. Pri slednjih se iz linijske proizvodnje odvzamejo vzorci sendvič panela in se na njih opravijo meritve natega. Tu gre za diskretno vzorčno testiranje, katerega rezultat je pričakovana informacija o kvaliteti vzorca in s tem le statistična ocena kakovosti celotne proizvodnje. Vsak vzorec je potrebno pred meritvijo pripraviti, kar zahteva velike časa in človeške vire. Odvzeti panel pa je na koncu uničen in zahteva postopek reciklaže.

V diplomskem delu je opisan razvoj in zasnova programske opreme krmilno-analiznega sistema za novo razvito metodo neporušnega merjenja kvalitete spoja sendvič panelov. Sistem omogoča »on-line« merjenje kvalitete neposredno na proizvodni liniji lahkih gradbenih plošč. Merilni proces je implementiran z vzbujevalno napravo, senzoriko ter ustrezno krmilno-analizno logiko. Rezultati meritve in posledično ocene kakovosti panela so podani operaterjem linije ter tako zagotavljajo hitro odzivnost na sicer neopazne motnje v proizvodnem procesu. 100% kontrola izdelkov omogoča zagotovilo kakovosti in sledljivost v primeru reklamacij.

V ta namen so bili izvedeni večnivojska krmilno-analizna logika, prenos in shranjevanje podatkov, ovrednotenje in indeksacija napak, ki jih določimo preko spremenljivke delta ter osnove sinhronizacije merilnega podsistema s proizvodno linijo.

Delovanje razvitega programskega modula, in s tem metode same, je dokazano z meritvami vsiljenih napak, za bolj natančno interpretacijo meritev pa so v izvajanju še vzporedne primerjave neporušnih meritev s porušnimi.

Diploma paper

IMPLEMENTATION OF THE CONTROL-ANALYSIS SYSTEM FOR NONDESTRUCTIVE QUALITY TESTING OF SANDWICH PANELS

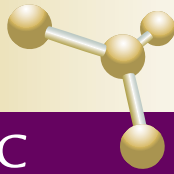
Mentor: Prof. Dr. Andrej Žemva
University of Ljubljana, Faculty of Electrical Engineering

Information about sandwich panel mechanical characteristics can be given by measuring the quality of the junction between the sheet metal and core, which has been, until now, measured only by a destructive method. For destructive measurements of sandwich panels samples must be taken from the production line and a stretching test done. This is discreet sample testing which gives information about quality and a statistical estimation of the quality for all production. Every sample must be prepared before test, requiring a lot of time and human resources.

This diploma paper describes the development and design of software for controlling and analysing a system for a newly developed method of non-destructive measurement of sandwich panel junction quality. The system is designed using an »on-line« method of continuously measuring the quality by a light construction plate production line. The measuring process is implemented with a supply device, sensors, and control-analysing logic. The results of measurements and the estimated quality of panels, are given to production line operators which ensures a quick response to non obvious disturbances in the production process. All controlled products give an assurance of quality and proof in cases of reclamation.

For this reason multi-level control-analysing logic, transfer and saving of data, and synchronization with the production line, were made.

The success of the method is demonstrated by measuring deliberate mistakes into sandwich panels, and for more accurate interpretation of the data measured, destructive and non-destructive measurements were made and compared.



Diplomsko delo

UPORABA UMETNIH NEVRONSKIH MREŽ ZA OCENO TRDNOSTI LESENIH ELEMENTOV

Mentor: prof. dr. Goran Turk, univ. dipl. inž. grad.
Somentor: doc. dr. Dejan Zupan, univ. dipl. inž. mat.
Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

Pri načrtovanju konstrukcij ima poleg pravilnega projektiranja in izvedbe konstrukcije ključen pomen konstrukcijski material. Ta mora imeti zadovoljivo trdnost, ki zagotavlja ustrezno nosilnost konstrukcije.

Za določitev lastnosti lesenih elementov se uporabljajo destruktivne metode, kar pomeni, da preizkušane obremenimo do porušitve, in nedestruktivne metode. V diplomskem delu je avtorica za oceno trdnosti lesenih elementov uporabila umetne nevronske mreže. Uporabila je bazopodatkov 293 lesenih preizkušancev, za katere je poznala gostoto in sedem elastičnih modulov, ki so bili dobljeni na podlagi nedestruktivnih metod preizkušanja, ter trdnost, dobljeno na osnovi destruktivne metode. Naključno je izbrala 250 preizkušancev za učenje umetnih nevronske mreže, preostalih 43 pa za testiranje mreže. Obravnavala je pet primerov, ki so se med seboj ločili v izbiri vhodnih podatkov.

Za gradnjo in učenje nevronske mreže se uporablja fortranski program NTR 2003 in program, ki ga je zasnovala na osnovi knjižnice nevronske mreže v programskem paketu Matlab. Med sabo primerja uspešnost različnih mrež na osnovi več statističnih kazalcev. Ukvarja se tudi z analizo vpliva raztrosa podatkov in predstavi postopek združevanja učnih parov.

Diploma paper

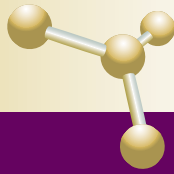
THE USE OF ARTIFICIAL NEURAL NETWORKS FOR TIMBER STRENGTH ESTIMATION

Mentor: Prof. Dr. Goran Turk, BSc (Civil Engineering)
Co-mentor: Doc. Dr. Dejan Zupan, BSc in Mathematics
University of Ljubljana, Faculty of Civil and Geodetic Engineering

In the design of various engineering structures, structural materials, together with proper planning and construction realisation, is of key importance. Structural materials should have a satisfactory strength that enables a proper load-carrying capacity.

To determine the characteristics of wooden elements, destructive and non-destructive methods are used. In destructive methods the tested materials are loaded until failure occurs. Artificial neural networks have been used in this diploma paper to estimate the strength of structural timber. 293 wooden specimens were taken into consideration. For all specimens the density and seven elastic modules were measured by non-destructive testing methods and the strength was based on the destructive method. 250 specimens were randomly chosen for the training of artificial networks and 43 were left for the test procedure. Five examples, in which different input data is used, were taken into closer consideration, the fifth example also considers different output data.

For generating and learning about neural networks, two programs were used: (i) a fortran code NRT2003 and (ii) a code based on Neural Network Library in Matlab. The efficiency of various neural networks is compared through several statistical quantities. The effect of data dissipation is also considered and a method for data integration is presented.



Diplomsko delo

RAZMEJEVANJE PRIHODKOV IN STROŠKOV GLEDE NA STOPNJO DOKONČANOSTI GRADBENIH PROJEKTOV

Mentor: prof. dr. Slavka Kavčič
Univerza v Ljubljani, Ekonomska fakulteta

V diplomskem delu je avtorica prikazala vpliv razmejevanja prihodkov in stroškov z metodo stopnje dokončanosti del pri dolgoročnejših gradbenih projektih na izkaz poslovnega izida podjetja. Ugotovila je, da pripoznavanje prihodkov in stroškov po tej metodi znatno vpliva na končni izid poslovanja podjetja.

Diplomsko delo je razdelila na tri dele. Najprej je predstavila pomen razmejevanja prihodkov in stroškov. Gradbeni projekti namreč trajajo daljše časovno obdobje, poleg tega pa prihodki in stroški niso časovno usklajeni, zato se z razmejevanjem najpogosteje srečujejo prav v gradbenih podjetjih.

V drugem poglavju je predstavila pojem stopnje dokončanosti projektov in možne metode izračunavanja po MRS 11 (2006). Prikazala je tudi prednosti metode spremljanja projektov glede na stopnjo dokončanosti del in se osredotočila na pomanjkljivosti, s katerimi se srečujemo pri spremljanju dolgoročnih projektov.

V tretjem, praktičnem delu diplomskega dela pa je predstavila spremljanje gradbenih projektov v podjetju SGP Tehnik, d. d., iz Škofje Loke, ki se ukvarja predvsem z visoko gradnjo.

Avtorica je na praktičnem primeru prikazala, kako vnaprejšnje pripoznavanje prihodkov pri pogodbah s stalno ceno na enoto povečuje dobiček in da je posledično pripoznana tudi večja obveznost do države v obliki plačila davka od dohodka pravnih oseb. Ob pripoznavanju prihodkov, kot jih določa metoda izpolnjenosti pogodbe (npr. pri gradnji za trg), ko se prihodki pripoznajo pri 100-odstotni dokončanosti del, pa se celotni prihodki pripoznajo na koncu, ob predaji objekta.

Diploma paper

DEFERRING OF REVENUES AND COSTS DEPENDING ON THE STAGE OF COMPLETION OF CONSTRUCTION PROJECTS

Mentor: Prof. Dr. Slavka Kavčič
University of Ljubljana, Faculty of Economics

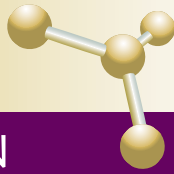
In the diploma paper the author presents the influence of deferring revenues and costs depend on the stage of completion of construction projects, for long-term construction projects, on the income statement of a company. The author found out that deferring revenues and costs depending on this method substantially affects the final result of the company's business.

The author divided the diploma paper into three parts. In the first part she presented the meaning of deferring revenues and costs. Namely, construction projects last a longer time period. Beside this, revenues and cost are not time adjusted; therefore construction companies are most frequently faced with deferring.

In the second part the author introduced the term the stage of completion and possible methods for its computing according to IAS 11 (2006).

In the third part she presented the observation of construction projects in the company SGP Tehnik, d. d., from Škofja Loka, which is engaged especially in high-building.

The author confirmed the hypothesis, stated in the diploma paper, that the manner of deferring revenues and costs of the project with the certain stage of completion, influences the income statement. Namely, it is presented for the real project, how acknowledgment of revenues in advance for contracts with a fixed price per unit, increases profit and, consequently, there is also a higher liability to the government in the form of paying corporate tax. When deferring revenues according to the method of contract completion (i.e. building for the market), its revenues are acknowledged at 100 percent of building completion.



Diplomsko delo

UPORABA IN ANALIZA ORODJA WIKI KOT INTRANETA V PODJETJU ISKRA SISTEMI D. D.

Mentor: mag. Aleš Popovič, asistent
Univerza v Ljubljani, Ekonomska fakulteta

Podjetja potrebujejo učinkovite in zanesljive komunikacijske kanale za posredovanje informacij in znanja, zato je tema diplomskega dela wiki, ki predstavlja enega od fenomenov koncepta 'Web 2.0'.

Študija se začne z implementacijo wikija in konča z analizo njegove uspešnosti. Strežniška aplikacija MedaWiki je prilagojena potrebam uporabnikov, po navodilih vodje oddelka in sicer v obdobju od marca do julija 2007. Leto kasneje je avtorica analizirala stanje uporabe wikija ter ugotavljala zadovoljstvo zaposlenih in kvaliteto kreirane vsebine v njem.

75% anketirancev potrjuje, da so objavljena sporočila v člankih v splošnem resnična, vendar pa večina člankov ni dovolj popolnih za splošno uporabo. Edina opora zaupanju v vsebino je vera v strokovnost kolegov, ki to pišejo. Kljub temu pa je opazna nižja stopnja zaupanja v ažurnost in celovitost vsebine. Anketa je pokazala, da so bile implementirane razširitve osnovne aplikacije, ki so vzele veliko časa pri implementaciji, zelo malo uporabljane.

Čeprav wiki prinaša spremembe in koristi v upravljanju z informacijami, glavni izzivi uvajanja tehnologij v podjetje ostajajo (kot na primer: podpora višjega menedžmenta, primerno vodenje, motiviranje in treniranje zaposlenih itd.). Dodatni problemi se pojavijo zaradi »stare« kulture dela ter pomanjkanja kontrole nad kvaliteto vsebine, ki je v celoti odvisna od uporabnikov.

Diploma paper

USABILITY ANALYSES OF WIKI IN A COMPANY ENVIRONMENT

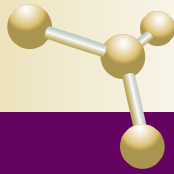
Mentor: Assistant Aleš Popovič, MSc
University of Ljubljana, Faculty of Economics

Companies need efficient and reliable ways of communicating and transferring information and knowledge. The focus of the diploma paper is on the wiki, often regarded as one of the most interesting phenomena of the so-called 'Web 2.0.' concept. The wiki as an intranet concept is presented.

Firstly, the author has implemented a wiki based on server application MediaWiki following requests of the company's management in March-July 2007. Secondly, in July 2008 (after one year of use) she has analysed the current state of user satisfaction and the created content. Several data sources were used to assess the system, information, and service quality, including a semi-structured interview with the project leader, a survey of employees, and automatically generated data by the wiki.

While published information is generally truthful (over 75% of the employees in the survey trust its contents), several articles are not complete enough to be a commonly useful source. The main reason underpinning the trust in the content is the trust in the expertise of colleagues. However, there is a much weaker belief in the timelines and completeness of the contents. The survey of the usefulness of added functionalities showed that extensions were rarely used and did not encourage many users to contribute.

While wiki may create important benefits and a change in a company's information management approach, the main challenges remain the same as with earlier technological solutions (e.g. support of top management, proper leadership, along with the communication and motivation/training of end-users). Additional problems arise due to cultural issues, the lack of control over quality, and the fact that the service quality largely depends on the users.



MATJAŽ VIDOVIČ

Diplomsko delo

MODELIRANJE POSLOVNIH PROCESOV V VELIKEM TRGOVSKEM PODJETJU

Mentor: prof. dr. Mojca Indihar Štemberger
Univerza v Ljubljani, Ekonomska fakulteta

Prenova poslovnih procesov zajema modeliranje in analiziranje obstoječih poslovnih procesov (angl. »AS-IS« modeli), kreiranje predlogov prenovljenih modelov poslovnih procesov (angl. »TO-BE« modeli) ter konkretno prenovo in informatizacijo poslovanja. Modeliranje poslovnih procesov predstavlja torej začetni korak k prenovi poslovnih procesov. Če modeliranje ni izvedeno uspešno, lahko propade celoten projekt prenove, zato je zavedanje o pomenu modeliranja v celotni sliki managementa poslovnih procesov toliko bolj pomembno.

Med izvajanjem modeliranja v podjetju se običajno pojavijo težave, ki podaljšajo čas modeliranja ter v določenih primerih povzročijo slabše modele procesov. To pa posledično vpliva tudi na prenovo poslovanja. Da bi se tem težavam lahko izognili že pri samem izvajanju modeliranja, jih je dobro prepoznati. Najpogostejše težave, na katere je potrebno biti še posebej pozoren, so: pomanjkanje pobude vodstva, nenaklonjenost spremembam, neenakomerna zasedba izvajalcev pri intervjujih, poudarjanje prevelikih podrobnosti modeliranja, osredotočenost na predloge prenovljenih modelov namesto na obstoječe modele, upad volje do projekta zaradi trajanja ter druge.

Predlogi možnih rešitev težav so: izvajanje delavnic z vodstvom in zaposlenimi, poudarjanje pomena podpore vodstva in pomena modeliranja poslovnih procesov, motiviranje izvajalcev, udeležba različnih nivojev predstavnikov izvajalcev in ohranjanje osredotočenosti na obstoječe in ne na prihodnje, ter druge procese.

Diploma paper

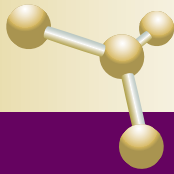
BUSINESS PROCESS MODELLING IN A LARGE WHOLESAL COMPANY

Mentor: Prof. Dr. Mojca Indihar Štemberger
University of Ljubljana, Faculty of Economics

Business process modelling represents the first step towards business process improvement. If the modelling is not effectively carried out, the entire improvement project may be jeopardised. Understanding the significance of business process modelling is therefore all the more imperative in the scope of business process management.

While performing modelling in a company, one commonly encounters various problems that prolong modelling time and are, in some cases, the cause of inferior process models which, in turn, affects business process improvement. In order to avoid these difficulties as early as during the modelling process itself, one ought to be able to recognise them. The most frequent problems that call for closer attention are: lack of management initiative, disinclination to change, irregular sets of interviewers, placing too much emphasis on modelling details, focusing on re-engineered model proposals instead of existent models, loss of resolve to proceed with the project due to its drawn-out process, and others.

Proposals for possible solutions to these issues are: workshops with the collaboration of management and staff, stressing the significance of management support and business process modelling, the motivation of personnel, the demand for different personnel representatives, preserving focus on existent, not future, processes, and others.



Diplomsko delo

VEČNAMENSKI CENTER V ROGAŠKI SLATINI

Mentor: prof. mag. Peter Gabrijelčič
Somentorja: doc. dr. Alenka Fikfak,
mag. Edo Wallner
Univerza v Ljubljani, Fakulteta za arhitekturo

Tema diplomskega dela je idejna rešitev večjega javnega kompleksa na jasi pobočja, ki se dviguje za hotelom Soča v Rogaški Slatini. Naloga raziskuje razmerje novega posega z obstoječim historičnim kompleksom, ki ohranja kvaliteto naravnih in grajenih danosti, obenem pa dodaja nove bivalne možnosti.

Projekt predvideva javen objekt velikih razsežnosti in programske raznolikosti, ki bo izpolnil potrebno kritično maso ljudi za oživitev zdravilišča, hkrati pa poskuša najti primeren okvir novim tendencam po njegovi fizični in programski razširitvi.

Gradnja pod zemljo na izbrani lokaciji omogoča ohranitev historičnega centra, hkrati pa nov potencial z novimi funkcijami, dotokom ljudi in kapitala brez vdora novih struktur velikega merila. Vizualni vpliv novega objekta na obstoječe okolje je minimalen, njegova eksistenca pa bistveno vpliva na izboljšanje atmosfere - je neke vrste nevidni generator.

Arhitekturna zasnova izhaja iz različnosti programa, ki se kaže tako v tlorisu kot prerezu. Projekt skuša ustvariti prostor, ki obiskovalca popelje v nov svet, drugačen od tistega na površju. Značilen je preplet etaž in programa - brisanje meje med stenami, stropom in tlemi, ki omogoči spontano doživljanje drugačne stavbe - stavbe kot krajine.

Posebno pozornost projekt posveča svetlobnim učinkom, zlasti v odprtem dvoranskem delu, ki se tudi konstrukcijsko in tehnološko razlikuje od preostalega kompleksa. Jeklena steburna konstrukcija predstavlja tudi glavni svetlobni vir, ki transportira svetlobo v globino prostora s sistemom heliostatov.

Namen te naloge ni razmišljati o rentabilnosti posega, temveč preizkusiti alternativo ustaljenemu vzorcu kot eno od možnosti razvoja v bodočnosti.

Diploma paper

MULTIPURPOSE CENTER IN ROGAŠKA SLATINA

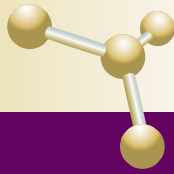
Mentor: Prof. Peter Gabrijelčič, MSc
Co-mentors: Doc.dr. Alenka Fikfak, Edo Wallner, MSc.
University of Ljubljana, Faculty of Architecture

The subject of the thesis is a design of a larger public complex set on the clearing of the slope behind the Soča hotel in Rogaška Slatina. It deals with the relationship of an intervention with the existing historical health resort that preserves the quality of natural and built fabric, and adds new residing possibilities at the same time.

The design envisages a large public building with various programmes that will fulfil the critical mass required for the resort's rehabilitation and also tries to find a suitable solution for its functional and spatial growing tendencies.

Building underground at the same time enables preservation of the historical centre, creation of new businesses, and an increase in visitors and investment without irruption of large structures. The visual impact of the new structure on the surrounding environment is minimal. This design makes an effort to create a new reality different to one on the surface. Distinctive in this project is blurring the boundary between walls, floor and ceiling, and an interweaving concept - an interlacement of different stories and functions. This enables spontaneous experience of a building as a landscape. Design without an exterior emphasizes the interior and is thus based on contrast, play of light, and engagement of human senses.

The project takes a special interest in lighting, especially in the part of the complex with the open floor plan, which technically and in construction, distinguishes itself from the rest of the building. This part is supported by large steel columns, which are also the main source of light. They transport light into the space depth through the system of heliostats.



Diplomsko delo

VPLIV DEBELINE PLOČEVINE NA NJENE PREOBLIKOVALNE SPOSOBNOSTI

Mentor: prof. dr. Karl Kuzman, univ. dipl. inž
Univerza v Ljubljani, Fakulteta za strojništvo

V svetu se pojavlja trend miniaturizacije izdelkov in njihovih komponent. Posledica so preoblikovalne operacije na vse manjših preoblikovancih, ki imajo zaradi drugačnih preoblikovalnih lastnosti materialov specifične probleme.

Pri preoblikovanju pločevine, tanjše od 1 mm, naletimo na problem, da se pri tanjšanju obdelovancev procesni parametri preoblikovanja ter materialne lastnosti in preoblikovalnost ne spreminjajo več po enakih zakonitostih kot pri debelejših pločevinah. Temu pojavu pravimo 'Size Effect', ki se ga pri obravnavanju debelin pločevine najbolje opiše s krivuljami mejnih deformacij.

V diplomskem delu se je avtor osredotočil na določanje vpliva debeline pločevine za eno kakovost pločevine. Opravljeni so bili enoosni natezni preizkusi za določitev materialnih lastnosti. Uporabljena je bila Marciniakova metoda za določitev krivulj mejnih deformacij. Preizkušena je bila nerjaveča pločevina X5CrNi1810 po DIN treh različnih debelin: 0,4 mm, 0,6 mm in 0,8 mm.

V zaključku diplomskega dela so bili primerjani eksperimentalni rezultati, opisane vrednosti in primerjave ter prikazane možnosti za nadaljnje raziskovalno delo.

Diploma paper

THE INFLUENCE OF SIZE EFFECT ON SHEET METAL FORMABILITY

Mentor: Prof. Dr. Karl Kuzman, BSc
University of Ljubljana, Faculty of Mechanical Engineering

Globally, there is a trend of product miniaturization resulting in reducing the size of components. Therefore, doing operations on smaller and smaller work-pieces brings specific problems caused by deviations of common forming properties.

Considering the forming of sheet metal components with thicknesses below 1 mm, some difficulties are observed. Forming parameters, mechanical properties of the material, and its formability, do not change according to the defined principles of sheet thicknesses above 1 mm. This phenomenon is called "Size Effect" best described on sheet metals with forming limit curves.

This diploma paper focuses on the size effect of single sheet metal quality. The material properties were determined with uni-axial tensile tests and the Marciniak method was applied in order to define forming limit diagrams. For experimental work the stainless steel DIN X5CrNi1810 of three sheet thicknesses of 0.4 mm, 0.6 mm and 0.8 mm was used.

The conclusions of the diploma paper present a comparison of the experimentally obtained results for all sheet thicknesses, as well as guidelines for future research work.

Diplomsko delo

SIMULACIJA PORUŠITVE TRIMO SENDVIČ PANELOV ZARADI GUBANJA PLOČEVINE

Mentor: izr. prof. dr. Boštjan Brank
Somentor: univ. dipl. inž. str. Bojan Jarc
Univerza v Ljubljani, Fakulteta za gradbeništvo in
geodezijo

Diplomsko delo obravnava numerično simulacijo eksperimentalnih preizkusov na Trimo sendvič ploščah (panelih).

Paneli imajo sredico iz mineralne volne, skorjo pa iz rahlo profilirane pločevine. Preizkuse so izvedli na Zavodu za gradbeništvo Slovenije. Njihov namen je bil določiti silo (obtežbo), pri kateri pride do porušitve panelov zaradi gubanja pločevine. Pločevina panela se naguba, ko pride do razslojevanja (delaminacije) med volno in pločevino, in pločevina, ki je tlačena, se ukloni.

Numerična simulacija je bila izvedena po nelinearni metodi končnih elementov s programom ABAQUS. Predstavljeni so končni elementi, ki so bili izbrani za obravnavo problema, še posebej kohezivni končni elementi, ki so bili uporabljeni za modeliranje obnašanja stika med jedrom in skorjo. Numerični model je bil pripravljen s pomočjo rezultatov eksperimentov na panelu tipa FTV 60. Najprej se je bilo potrebno odločiti za osnovni model, nato pa postopno spreminjati parametre, ki se jih manj pozna, da bi iz primerjave z eksperimentom ocenili njihove vrednosti in velikost njihovega vpliva na rezultate. Na ta način je bil določen »optimalen« model.

Z izbranim modelom se je naredila tudi simulacija eksperimentalnega preizkusa še za panela tipa FTV 120 in FTV 200. Rezultati simulacij pri vseh treh panelih so odstopali do 10 odstotkov od eksperimentalnih rezultatov.

Diploma paper

FAILURE ANALYSIS OF TRIMO SANDWICH PANELS DUE TO FACE WRINKLING

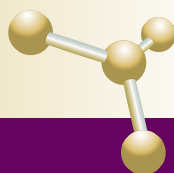
Mentor: Associate Prof. Dr. Boštjan Brank
Co-mentor: Bojan Jarc, BSc (Mechanical
Engineering)
University of Ljubljana, Faculty of Civil and
Geodetic Engineering

This diploma paper deals with numerical simulation of experimental tests on Trimo's sandwich panels.

Panels are made of a foam core and lightly profiled steel faces. The experiments were performed at the Slovenian National Building and Civil Engineering Institute. They were designed to evaluate the failure force (load) due to wrinkling of the steel face. Wrinkling is a consequence of buckling due to delamination between the core and the compressed face. The setup of the experimental tests and some experimental results are briefly presented.

Numerical simulations are based on the non-linear finite element method and commercial code ABAQUS. The finite elements chosen for simulation of the problem are presented; especially the cohesive elements used to model connections between faces and the core. A numerical model was prepared by using the experimental results on a panel called FTV 60. First a basic model was chosen. Then several poorly-known parameters of basic model were varied in order to estimate their values and their influence on numerical results. In such a way the basic model was improved and an »optimal« model was finally obtained. It was discovered that a good knowledge of the shear strength, between facings and the core, as well as the physical properties of the core material, are very important.

Once the model was chosen, the numerical simulations were also performed on panels FTV 120 and FTV 200. All numerical results are within a 10 percent agreement with experimental results.



Diplomsko delo

STOLPNICA NA BAVARSKEM DVORU

Mentor: prof. mag. Peter Gabrijelčič
Somentorja: doc. dr. Alenka Fikfak,
mag. Edo Wallner
Univerza v Ljubljani, Fakulteta za arhitekturo

Avtor v diplomskem delu najprej predstavi izbor tako zglednih kot tudi razvpitih primerov visokih gradenj iz mest Evrope, Amerike in Azije, v nadaljevanju pa se posveti konceptu, ki preplete programska, oblikovna, ekološka in tehnična izhodišča.

Programska zasnova novega objekta izhaja iz dejstva, da so najuspešnejši in najpopularnejši predeli mesta tisti, ki vsebujejo radikalno mešanico različnih programov.

Iz različnih analiz in lastnega poznavanja mesta je razvidno, da lokacija ne prenese sedaj predvidene gostote programa. Pretežno pisarniške stavbe bodo predvsem prometno drastično obremenile območje. Cilj je torej zasnovati objekt, ki skupnosti ni v breme, temveč ji zaradi raznolikoga programa služi in dviguje kvaliteto bivanja.

Forma ne sledi zgolj funkciji; v duhu ljubljanske šole za arhitekturo, ki daje prednost odnosu do okolice pred bahavostjo na zunaj kričeče arhitekture, je oblika nove stolpnice posledica skrbnega upoštevanja tako obstoječega tkiva kot tudi zgodovine in tendenc razvoja širšega območja.

V času, ko arhitekturo po vsem svetu zaznamuje težnja po čim večji ekspresivnosti, je torej stolpnica na Bavarskem dvoru projekt, katerega zasnova je posledica občutljivosti za prostor in ne lahkomišelnosti.

Diploma paper

TOWER BLOCK AT BAVARSKI DVOR

Mentor: Prof. Peter Gabrijelčič, MSc
Co-mentors: Doc. Dr. Alenka Fikfak, Edo Wallner, MSc
University of Ljubljana, Faculty of Architecture

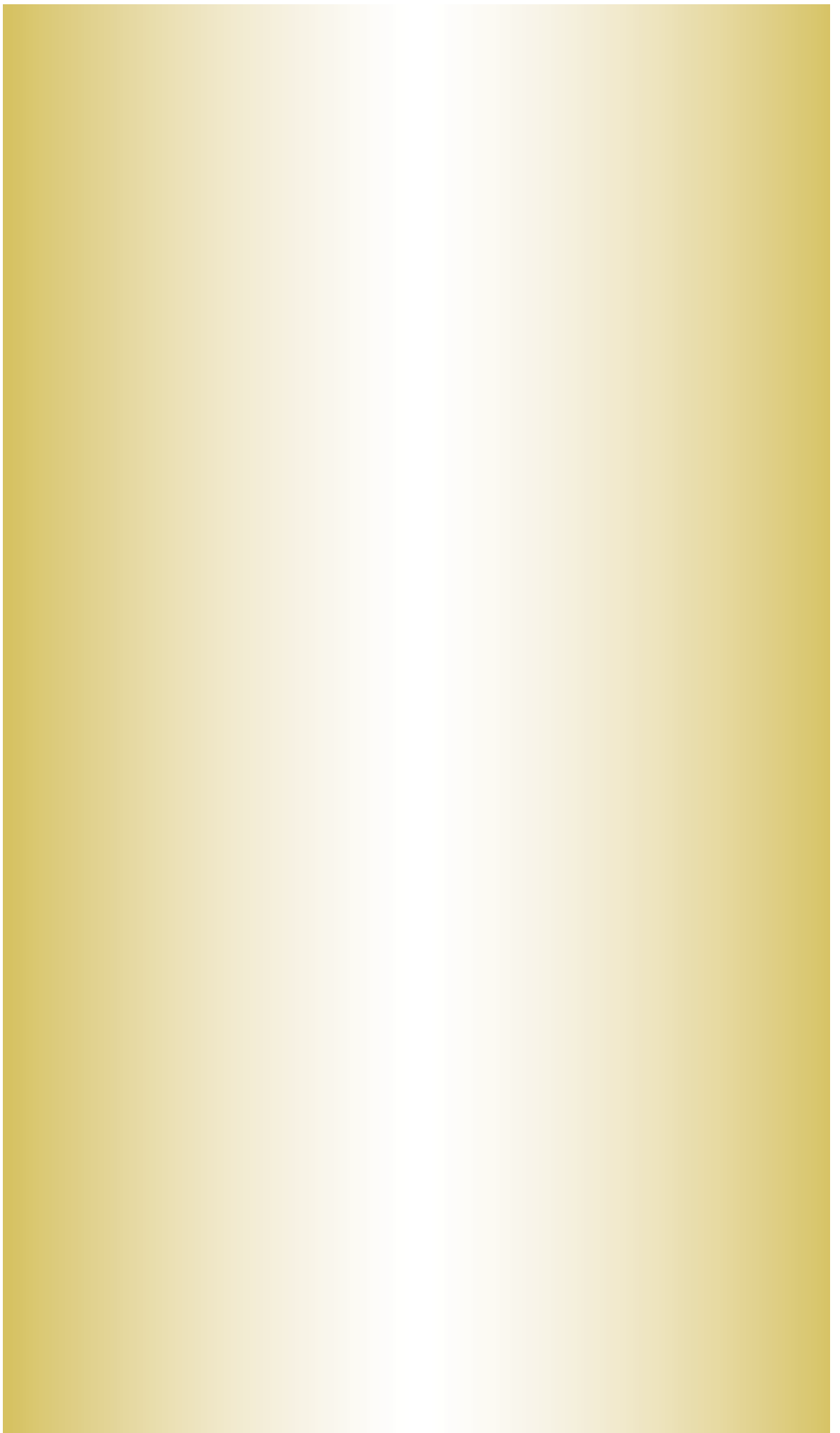
In the first part of this diploma paper a selection of both exemplary and notorious examples of high constructions, from cities in Europe, America, and Asia, are presented, and then it focuses on the concept which interweaves programme, design, environmental, and technical aspects.

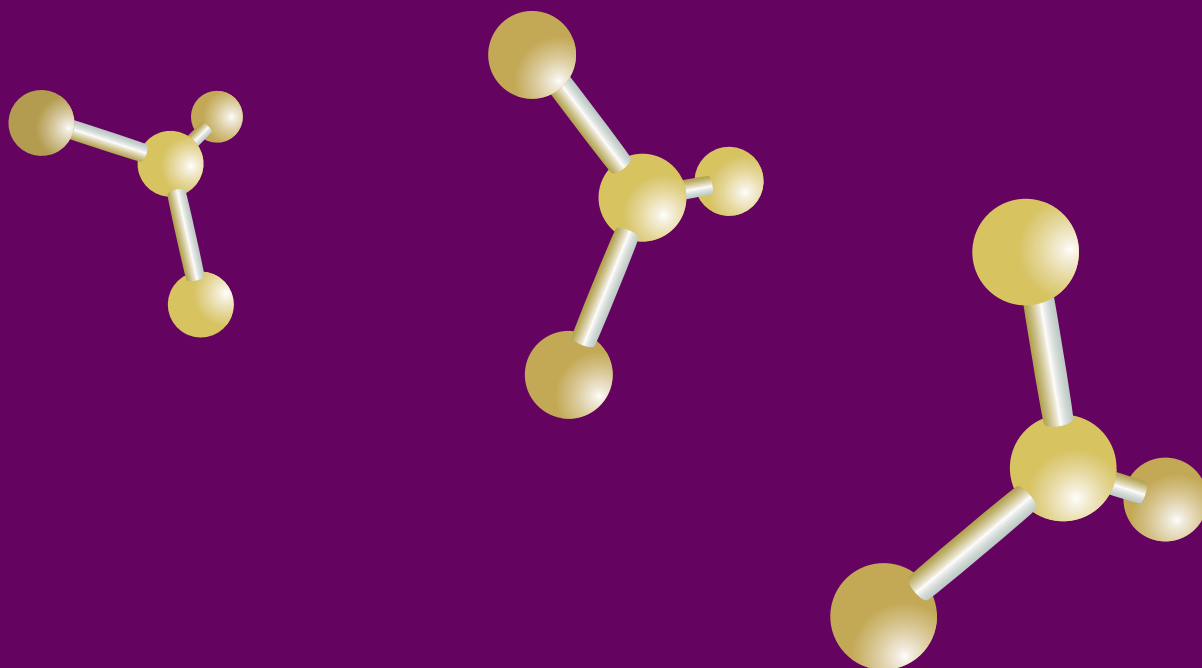
The programme concept of a new building derives from the fact that the most successful and popular parts of a city are those that contain a radical mixture of various designs.

It is clear from analyses and also from one's own familiarity with the city, that the location does not support the currently envisaged programme density. What are predominantly office buildings will drastically burden the area, especially with traffic. The aim is to design a building that is not a burden on the community, but rather, through design diversity, serves the community and raises the quality of life.

The form, meanwhile, does not merely pursue function; in the spirit of the Ljubljana school of architecture, which attaches priority to the relationship with the surrounding environment over the display of outwardly exclamatory architecture, the design of the new tower block is the result of careful consideration of both the existing fabric and the history and development trends of the wider area.

At a time when architecture throughout the world is being marked by a tendency towards the greatest possible expressiveness, the tower block at Bavarski dvor is therefore a project whose design is the result of sensitivity to physical space and not insensitivity to it.





ZBORNİK POVZETKOV NAGRAJENIH DEL
ABSTRACTS OF THE PROJECTS AWARDED

MAGISTRSKA DELA

DISSERTATIONS



Magistrsko delo

POGOJI ZA ORGANIZACIJSKO UČENJE

Mentorica: izr.prof.dr. Dana Mesner Andolšek
Univerza v Ljubljani, Fakulteta za družbene vede

Pristop upravljanja organizacijskega učenja izhaja iz predpostavke, da se vse organizacije učijo, saj imajo v svoje delovanje že naravno vpete procese učenja. Za to perspektivo je ključno vprašanje, kakšni so procesi učenja in kako jih razvijati in usmerjati. V izčrpnem pregledu modelov, ki pojasnjujejo kako se organizacijsko učenje odvija, je avtorica ugotovila, da prevladujejo tisti, ki le-to naslanjajo na učenje posameznika v delovni sredini.

Najvišjo raven učenja, to je učenje z dvojno zanko, organizacije dosežejo šele takrat, ko spreminjajo temeljna prepričanja in predpostavke – ko spreminjajo svojo kulturo. Organizacijsko učenje zato razumemo predvsem kot proces oblikovanja skupnih pomenov, kar je kolektivna dejavnost in se vrši v družbenih interakcijah. Ker je to kulturni proces, ga ni moč spodbujati zgolj s spodbujanjem učenja posameznikov, temveč je potreben razvoj možnosti organizacije kot celote.

Pristop upravljanja organizacijskega učenja poudarja, da se organizacije v zmožnostih za učenje razlikujejo in da je te zmožnosti treba neprestano razvijati. Ta pristop zato avtorica vidi kot nadgradnjo normativnega pristopa.

V empiričnem delu, na podlagi analize merskih inštrumentov drugih raziskovalcev, avtorica oblikuje inštrument analize organizacijske kulture in praks vodenja, ki spodbujajo organizacijsko učenje, s katerim na podatkih slovenskih organizacij prikaže možen način analize pripravljenosti organizacije za organizacijsko učenje. Takšna analiza, v kombinaciji z analizo drugih pogojev za organizacijsko učenje, omogoča oblikovanje vodil za razvoj učnih zmožnosti organizacije.

Dissertation

CONDITIONS FOR ORGANIZATIONAL LEARNING

Mentor: Associate Prof. Dana Mesner Andolšek PhD.
University of Ljubljana, Faculty of Social Sciences

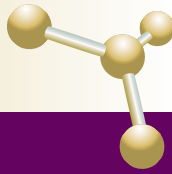
The concept of Organizational Learning refers to an organization's capability to learn and it focuses on learning processes of, and within, organizations. All organizations learn, but their capabilities to do so, depend on different sets of conditions. In contrast to the normative concept of a Learning Organization, this is seen as an ideal type of organization, in which learning will occur only when certain criteria are met.

Organizational learning is something we cannot support, facilitate, or manage just by facilitating an individual's learning. It is not about how individuals learn in an organizational context, it is about how organizations learn as a whole.

The highest level of learning – double-loop learning – takes place when shared meanings and assumptions are changed. The author argues that organizational learning needs to be seen primarily as a social and cultural process.

This understanding has consequences on how we understand and facilitate organizational learning. By reviewing organizational learning theory and research, we define boundary and contextual conditions for organizational learning. Organizations have different learning capabilities and they need to develop them continuously.

In empirical research the author develops an instrument with which one condition – organizational culture and leadership – is analyzed and applied to data of Slovenian companies. Combining this with an analysis of other conditions (e.g. organizational environment, organizational structure, life-cycle, strategy etc.) is what she suggests to be a basis for creating a framework to improve organizational learning capabilities.



Magistrsko delo

ARHITEKTURA IN VSAKDANJE ŽIVLJENJE: NAČRT TRŽNICE

Mentor: prof. Branislav Mitrović
So-mentorji: prof. dr. Milica Jovanović Popović,
izr. prof. dr. Vladan Đokić, mag. Marija Milinković
Univerza v Beogradu, Fakulteta za arhitekturo

Pri izbiri lokacije za tržnico sta bili ključnega pomena dejstvi, da je tržnica prostor, kjer se zbirajo ljudje in da v malih mediteranskih mestih tržnica predstavlja osnovo vsakdanjega življenja. Zato je bila tržnica postavljena v samem centru Pantellerie, kjer jo obkrožajo cerkev, mestni trg in mestna hiša, odlikuje pa jo tudi razgled na morje.

Vpliv na okolico utelešata prostorska vrzel in odstopanje od predpisane poravnosti stavb kot tudi trdna struktura, ki je postavljena nasproti severni razvrstitvi stavb. Zelo pomembno je, da ne posegamo v vizualno in fizično vez med centrom in obalo; prav temu ta projekt posveča pozornost z omogočanjem enostavne komunikacije.

Zaradi različnih prostorskih zahtev določenih objektov sta bila v tem projektu ustvarjena dva osnovna tipa prostora.

Zaprti prostori so primerni za zahteve, ki jih narekujejo funkcije drugotnega pomena (skladišča, servisne službe, delavnice, javna stranišča, trgovski prostori) in so locirane tako pod nivojem tržnice kot tudi znotraj obstoječega prostora. Po drugi strani pa je plato tržnice, kot prvotni prostor, lociran in vizualiziran kot prostorski in programski podaljšek mestnega trga. Plato je napol odprta struktura katere streha je narejena iz lahke konstrukcije, ki jo sestavljajo plasti belega, vodoodpornega materiala, ki omogoča zaščito pred močnim mediteranskim soncem in slabim vremenom.

Ta prostor je, zahvaljujoč njegovim osnovnim enotam – zložljivim stojnicam, zmožen popolne preobrazbe. Ta projekt torej živi tudi takrat, ko tržnica ne obratuje. Prostor tržnice lahko služi za različne dogodke kot so razstave, gledališke predstave, promocije, tekmovanja, izobraževalne dogodke in zabavne prireditve.

Dissertation

ARCHITECTURE AND EVERYDAY LIFE: A MARKET PROJECT

Mentor: Prof. Branislav Mitrović
Co-mentor: Prof. Dr. Milica Jovanović Popović,
Associate Prof. Dr. Vladan Đokić, Marija Milinković, MSc
University of Belgrade, Faculty of Architecture

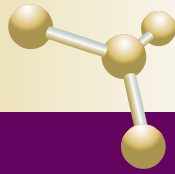
Location selection for the market was led by the fact that it is a place for people gathering and the essence of life in a small Mediterranean town. Therefore, the market took place in the very centre of Pantelleria, surrounded by the church, town square and town hall, with a sea-view.

The reaction on the surrounding is embodied by a spatial gap and recession from the regulation alignment of the block, as well as a solid structure facing the northern alignment. It is very important not to intercept with the visual and physical connection of the centre and the sea-shore; to which this project pays attention, by enabling simple communication.

Due to the different spatial requirements of certain utilities, it comes to forming two basic types of space in this project.

The spaces that are closed are suitable for requirements of secondary functions (depot, services, workshops, public toilet, commercial space) and are located beneath the market plateau, as well as within the existing structure on the location. On the other hand, the market plateau, as a primary space, is located and visualized as a spatial and programmatic extension of the town square. The plateau is a semi-open structure, roofed by a light construction, of sheets of white water-resistant fabric, which are for protection from the severe Mediterranean sun and bad weather.

This space is capable of total transformation, thanks to its basic units: flexible market stands. Therefore, this project continues to live when the market-trading period is over and it can be used as a stage for a variety of happenings, such as exhibitions, theatre plays, promotions, competitions, educational, and fun-related events.



Magistrsko delo

ERGONOMSKI IN ESTETSKI VIDIKI RAZVOJA IZDELKOV

Mentor: izr. prof. dr. Bojan Dolšek
Somentor: doc. Vojko Pogačar, akad. slikar
Univerza v Mariboru, Fakulteta za strojništvo

Oblikovalci in konstruktorji se srečujejo z različnimi dilemami glede oblike (estetike) in v povezavi z njo tudi ergonomije izdelka, kar jih mnogokrat sili v različne kompromise. Da bi bili ti kompromisi optimalni, morajo oblikovalci poznati tako področje ergonomije kot tudi estetike, oziroma morajo pri razvoju izdelka sodelovati ekipa strokovnjakov različnih profilov, katerih naloga je predvsem nudenje ekspertne pomoči. Kot dodatna, alternativna oblika pomoči oblikovalcem in konstruktorjem so v pričujočem magistrskem delu v obliki ergonomskih in estetskih priporočil predstavljeni rezultati raziskav ergonomskih in estetskih vidikov razvoja izdelkov.

V ta namen je bilo treba pregledati in analizirati trenutno stanje na področju ergonomskega in estetskega oblikovanja ter poiskati, pripraviti in urediti vire, iz katerih se je zajemalo znanje z obravnavanih področij. Zbrano znanje je bilo v naslednjem koraku urejeno in ovrednoteno, čemur je sledilo oblikovanje ustreznih konstrukcijskih oziroma oblikovalskih priporočil, ki zbrana na enem mestu omogočajo lažji in učinkovitejši razvoj ergonomsko in estetsko ustrežnejših izdelkov.

Ob teoretičnem delu raziskav, katerih rezultat so že omenjena priporočila, predloženo magistrsko delo zajema še praktično analizo že izvedenih oblikovalskih projektov, katere namen je preveriti upoštevanje in praktično vrednost priporočil, zbranih v prvem delu magistrskega dela.

Na koncu magistrskega dela so predstavljene smernice za nadaljnje raziskovalno delo na tem področju, predvsem v smeri uporabe naprednih računalniških tehnologij s poudarkom na metodah umetne inteligence.

Dissertation

ERGONOMIC AND AESTHETIC ASPECTS OF PRODUCT DEVELOPMENT

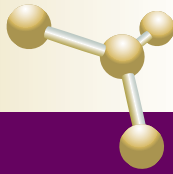
Mentor: Associate Prof. Dr. Bojan Dolšek
Co-mentor: Doc. Vojko Pogačar, Academic Painter
University of Maribor, Faculty of Mechanical
Engineering

Today, aesthetics and ergonomics are becoming indispensable. When determining the aesthetic value of a new product (styling phase) designers have to consider ergonomics in order to create an optimal design. Thus, compromises have to be considered at every design step. In order to create optimal compromises designers have to possess a wide range of knowledge regarding aesthetics and ergonomics, or an expert team has to collaborate in the development process. In this dissertation the results of the research into ergonomic and aesthetic influences on product development are presented in the form of ergonomic and aesthetic design recommendations, which are meant to serve as an alternative solution to the expert team in the development process.

In order to derive design recommendations, today's ergonomic and aesthetic design procedure had to be analysed. Adequate research literature was therefore collected, studied, and organised, to be used during data acquisition. Collected knowledge was organised and evaluated before relevant ergonomic and aesthetic design recommendations were derived. These recommendations, held in one place, can now be used to develop ergonomically and aesthetically improved products.

Along with the theoretical part, the dissertation also contains practical analyses of already designed products, where the practical value of derived design recommendations has been evaluated.

The last part of this dissertation describes the possibility for future research work of more intelligent computer aided ergonomic and aesthetic design, by applying artificial intelligence methods.



BOJAN KONČAREVIĆ

Magistrsko delo

SEKVENCE, MUZEJ RASTLIN, OTOK PANTELLERIA, ITALIJA

Mentor: Prof. Branislav Mitrović
Univerza v Beogradu, Fakulteta za arhitekturo

Magistrsko delo je usmerjeno v analizo estetskih vrednot dinamike, ki postajajo bistven ustvarjalni vidik arhitekturnega vedenja, ob čigar uporabi se bo razpustil in pojasnil kot snov vpliva na področju izkušnje obsega artefakta in prostorske formalnosti, ki se medsebojno definirata.

Umeten objekt katerekoli vrste ne obstaja kot izoliran, abstrakten pojav, ker so stvari samo sektorske točke dogodka - nivoji znotraj procesa.

Delčki bi lahko bili neodvisni, v trku ali delili absolutno skladnost. Ta odnos definira značaj končne impresije. Pristranost sektorjev in njihovo napredovanje bi lahko neposredno primerjali z besedilom, pripovedjo znotraj naravnih pojavov – znakov – ki pridobivajo pomen in niso absolutni brez vrste črt ki jih tvorijo. Tako nas lahko pri predstavitvi ene hiše vodi ena teh črt.

Ta vrsta dizertacije krepi intenzivnost odnosa med obliko, oblikovno narejenim objektom, uporabnikom prostora z jasnim rezultatom kot reinterpretacija in stimulacija med arhitekturnim oblikovnim delom in kontekstualno okolico.

Kar to magistrsko delo naredi izjemno kontekstualno vplivajoče kot referenčno kvaliteto, je uporabljena metoda razčlenbe slikovno oblikovanih okvirjev, kar podpira sočasno dožemanje prostora, kjer jo predstavlja popolna percepcija obsega z vsemi linijami in odločitvami arhitekta, vendar je sočasno dožemanje nenehno drugače konstruirano v naših mislih znotraj številnih sektorjev človeškega zornega področja.

Dissertation

SEQUENCES, MUSEUM OF PLANTS, PANTELLERIA ISLAND, ITALY

Mentor: Prof. Branislav Mitrović
University of Belgrade, Faculty of Architecture

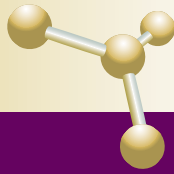
This dissertation is about the analysis of the dynamics of aesthetic values which are becoming a substantial creative aspect of architectural behaviour which using is going to be dissolved and explained as the substance of its influence in the field of experiencing the volume of an artefact, spatial ceremony, and each other's stipulation.

There does not exist any kind of artificial object as an isolated, abstract appearance, because things are just the sectional points of the event, levels inside the process.

Fractions could be independent, in the collision, or sharing an absolute harmony. That relation is defining that character of the final impression. Partiality of the sequences and their progression could directly match the text, the narrative, within the course of appearances – signs – are getting the meaning and are not absolute without the line row they are building; and so in representing one house one can only be led by one of the movement lines.

This kind of dissertation is strengthening the intensity of a relation between design, design made objects, use of the space, with a clear result as a re-interpretation and stimulation in-between architectural design work and the contextual surrounding.

What this work makes an extraordinary contextual influence as a referential quality is the method used of decomposing the pictorial designed frames which are backed with the simultaneous perception of the space, where the full perception of the volume, with all its lines and architectural decisions present, however, a simultaneous perception perpetually differently constructed in our minds, within the numerous sequences of the human view field.



Magistrsko delo

REHABILITACIJSKI IN REKREACIJSKI CENTER, SATARIA, PANTELLERIA

Mentor: prof. Branislav Mitrović
Univerza v Beogradu, Fakulteta za arhitekturo

Projekt predstavlja zanimiv odnos med jamo Sataria in prostori centra. Struktura centra je bila oblikovana kot odziv na jamo, teren in sosedne objekte. Center uporablja termalno energijo za rekreacijo, rehabilitacijo in podzemno hranjenje energije.

Magistrsko delo sledi dveh osnovnim razmišljanjem – obe se opirata na geologijo otoka Pantelleria. Prvo razmišljanje temelji na lokalnem materialu – vulkanskem kamnu, drugo pa na termalnih virih.

Avtor je arhitekturo meril z izkušnjami/vtisom, ki so jih prostori vzbudili v njem. Avtor je užival v miru, lahkotnosti in tišini. Eden od načinov, da se to doseže je uporaba in razmišljanje o materialih.

Uporaba lokalnega in dostopnega materiala ter moderne tehnologije lahko da nekaj drugačnega – nekaj novega. Medtem ko je avtor razmišljal o vulkanskem kamnu iz Pantellerie, je poskušal razmišljati o pomenu materiala v tem kontekstu. Raziskal je naravo materiala, njegove fizične, mehanske in tehnične lastnosti in tako ugotovil različne načine njegove uporabe. To je poskus izkusiti vulkanski kamen v novi obliki.

Vulkanski izvor otoka se nanaša na termalno energijo. Obstaja 8 krajev s termalnimi izviri. Pojavila se je ideja, da se izbere 3 kraje in se jih s programom poveže. Ti kraji so: jezero (Speccio di Venere), gore (Sauna naturale), in morje (Caverna di Sataria). Vsak izmed njih ima drugačno obliko in stopnjo uporabe termalnih virov.

Križišče obeh razmišljanj je končni rezultat magistrskega dela.

Dissertation

REHABILITATION AND RECREATION CENTRE, SATARIA, PANTELLERIA

Mentor: Prof. Branislav Mitrović
University of Belgrade, Faculty of Architecture

The project presents an interesting relation between the Sataria cave and spaces of the centre. The structure of the centre was formed as an answer to the cave, the terrain and the surrounding objects. The centre uses thermal energy for recreation, rehabilitation and underground energy storage.

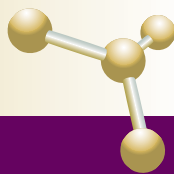
The dissertation has two basic lines - both based on Pantelleria island geology. First is local material - volcanic rock, and second are thermal resources.

The author measured architecture with experience / impression that spaces invoke in him. The author enjoyed the feelings of peace, ease, and calmness. Thinking about the materials and their use is one of the ways to accomplish this.

Using local and available material as well as the modern technology can give something different - something new to its purpose. While the author was thinking about volcanic rock from Pantelleria, he tried to consider what the material represents in its context. The author researched material's nature, its physical, mechanical and technical qualities and found different ways of using it. It is an attempt to experience volcanic stone in a new form.

Volcanic origin of the island refers to thermal energy. There are 8 places with thermal springs. The idea was to choose 3 spots and form a program connection. The spots are: The Lake (Speccio di Venere), The Mountain (Sauna naturale), The Sea (Caverna di Sataria). Each of them has a different form and level of using the thermal sources.

The intersection of these two lines is the final result of the dissertation.



Magistrsko delo

MREŽA TURISTIČNIH VSEBIN OBLIKOVANA Z ADAPTACIJO IN RAZŠIRITVIJO FIZIČNE STRUKTURE

Mentor: prof. Branislav Mitrović
Somentorji: prof. dr. Milica Jovanović Popović
prof. dr. Vladan Đokić, mag. Marija Milinković, asistent
Univerza v Beogradu, Fakulteta za arhitekturo

Teza magistrskega dela je disperziven turizem na otoku Pantellerija. Disperzija v nalogi zadeva oblikovanje hotelskih vsebin - sistema manjših enot - ki se distribuirajo ter tako oblikujejo posebno obliko turizma, specifičnega za neko lokacijo. Logika teh mrežnih enot je, da se sistemsko aplicirajo in implementirajo v že obstoječo strukturo. S širjenjem in velikim obsegom vsebin se uresničuje nova kakovost dogajanja in delovanja turizma - interpolacija ali vgradnja med obstoječe objekte, obstoječo mestno dediščino in kontinuiteto zgrajenega okolja.

Tema magistrskega dela predstavlja razmišljanje o adaptaciji ravnih streh in prostih parcel mestnih blokov ulic - proste parcele v notranjosti blokov ulic se oživljajo skozi programsko rekonstrukcijo in površinsko adaptacijo s ciljem, da ostanejo nepozidane / vkop prostorov nujno potrebnih za uresničitev programa, ozelnevanje... - tak pristop bi lahko bil rešitev za osamitev, pretirano gradnjo ali zapustitev notranjosti blokov ulic ter rekonstrukcijo obstoječih objektov.

Za študijo modela specifičnega turizma so bili izbrani objekti v ožjem centru mesta in v pristanišču, ker niso bili projektirani za ta namen in se lahko sprašujemo o različnih modelih intervencije. Že sama naloga te teme predstavlja razmišljanje in možnosti programske dograditve ter ustvarjanja prostorov za nove dogodke. Na tak način se skozi nalogo udeležujejo tudi različni modeli širjenja na otoku: prilagodljivost že obstoječih struktur, prilagodljivost delov parcel v notranjosti blokov ulic, ki niso primerno izkoriščeni ali sploh niso zgrajeni; možnost adaptacije z ohranitvijo pristnosti mesta. Večino starih objektov čaka dograditev ali rekonstrukcija, ki je potrebna zaradi ohranitve avtentičnosti otoka in pridobitve raznolike strukture.

Dissertation

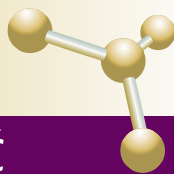
THE NETWORK OF TOURIST OFFER FORMED BY ADAPTATION AND EXTENSION OF PHYSICAL STRUCTURE

Mentor: Prof. Branislav Mitrović
Co-mentors: Prof. Dr. Milica Jovanović Popović
Prof. Dr. Vladan Đokić, Marija Milinković, MSc assistant
University of Belgrade, Faculty of architecture

The thesis of the paper is dispersive tourism on Pantelleria Island. Dispersion in this paper refers to forming a hotel offer - a system of smaller units which are distributed and form a special kind of tourism, specific for the location. The logic of the network units is to be applied systematically and to be implemented into an existing structure. This expansion and a wide range of the offer provides a new quality of tourism functions - interpolation or installation among existing objects, town heritage, and continuity of the existing building environment.

The topic of the paper deals with adaptation of flat roofs and free plots within city blocks - free plots in the middle of blocks are revived through programmed reconstruction and surface adaptation with the aim of keeping them un-built; necessary parts built underground; and planting... Such an approach could be a solution to isolation, over-building, or deserting the inner parts of the blocks, and reconstruction of existing buildings.

For the specific tourist model studies, buildings in the centre of the city and the port have been chosen, as they had not been designed to suit the purpose in question and it is possible to tackle different models of intervention. The mere task of the paper itself tackles the possibilities of systematic extension building and making space for new events. In such a way, the paper realises different extension models on the island - the flexibility of the existing structures and part of the inner plots in the blocks, which are not used in an appropriate way or have not been built at all; a possibility of adaptation without damaging the authenticity of the city. Most of the old buildings are set for extension building, or reconstruction, which is necessary to keep the authenticity of the island and provide a diversified structure.



SLAVKO MILANOVIĆ

Magistrsko delo

BIOMIMIKRIJA IN NJENA UPORABA V ARHITEKTURI NA PRIMERU NOVE ZGRADBE PRIRODOSLOVNEGA MUZEJA V BEOGRADU

Mentor: izr. prof. dr. Lidija Đokić
Somentorja: doc. Jelena Živković, doc. Borislav Petrović
Univerza v Beogradu, Fakulteta za arhitekturo

Cilj tega magistrskega dela je osvetliti raziskave na področju biomimikrije in njene povezave s trajnostnim razvojem ter izbiro in raziskavami točno določenega načela in njegovega prenosa na koncept nove zgradbe Naravoslovnega muzeja v Beogradu.

Narava z enostavno manipulacijo parametrov ustvari variacijo ene učinkovite konfiguracije določenega organizma. Glede na lokalne pogoje se ta konfiguracija spremeni, zato da izpolni zahteve, ki jih določa okolje. Ta parametrična prilagodljivost lahko znatno prispeva k razvoju arhitekture in smernic trajnostnega razvoja ter k razvoju nove vrste kontekstualizacije objekta in njegove okolice.

Biomimikrija temelji na ideji, da en element lahko uporabimo v raznovrstne namene in zagovarja integracijo mnogovrstnih sistemov kot enega izmed načinov, ki vodijo k trajnostnemu razvoju.

To magistrsko delo zagovarja tezo, da moramo tako pomembno zgradbo načrtovati in oblikovati v skladu z načeli trajnostnega razvoja in oblikovanja kot tudi načeli bioklimatske arhitekture. Cilj tovrstnega oblikovanja je zmanjšati vpliv na okolje. Tovrstna zgradba naj predstavlja primer integracije različnih pasivnih sistemov s ciljem ohraniti energijo in aktivne sisteme oz. vzpodbujati samoohranljivost.

Kot specifičen del takšnega načrtovanja to delo poudarja uporabo načela mimikrije in njenih orodij, z namenom ustvariti strukturo, obliko in učinkovitost zgradbe. Ta načela, ki so učinkovita v naravi, naj bodo vidna tudi na zgradbi. S tem dosežemo sovisnost med izbranimi načeli filotaksije, ki vladajo naravi, prepletajo pa se tudi s samo zgradbo ter njeno uporabo.

Dissertation

BIO-MIMICRY AND ITS APPLICATION TO ARCHITECTURE IN THE EXAMPLE OF A NEW NATURAL HISTORY MUSEUM BUILDING IN BELGRADE

Mentor: Associate Professor Lidija Đokić, PhD
Co-mentors: Doc. Jelena Živković, Doc. Borislav Petrović
University of Belgrade, Faculty of Architecture

This dissertation highlights research of bio-mimicry and its connection with sustainable development, with the choice and research of a specific principle, and its transfer to the concept of the new Natural History Museum building in Belgrade.

By simple manipulation of parameters nature creates a variation of one effective configuration of a specific organism. Depending on local conditions configuration changes to meet the requirements of the environment. This parametric flexibility can significantly contribute to development of architecture towards sustainable development and a new kind of contextualization of an object in its surroundings.

Bio-mimicry supports the idea that one element has multiple purposes and proclaims the integration of multiple systems as one of the ways that lead to sustainability.

This dissertation promotes the idea that such an important building should be planned and designed using the principles of sustainable development and design, as well as that of bio-climate architecture. The aim of this manner of design is to have a minimal influence on the environment. This building needs to serve as an example of the integration of different passive systems aiming to preserve energy, and active systems; and promote self-sustainability respectively.

As a specific part of such drafting, the thesis endorses the use of the bio-mimicry principle and its tools for creating the structure, form and efficiency of the building. These principles which are efficient in nature should also be displayed on the building dedicated to its research. Thus, the interdependence between the chosen principles of phylotaxis, which rules nature, is also intertwined with the building itself, as well as its use.



Magistrsko delo

NUMERIČNO VREDNOTENJE BARVNIH VZORCEV S POMOČJO OPTIČNEGA ČITALNIKA

Mentor: izr. prof. dr. Bojan Dolšak
Somentor: doc. Vojko Pogačar, akad. slikar
Univerza v Mariboru, Fakulteta za strojništvo

Merjenje in vrednotenje barve v tekstilni industriji je bistvenega pomena za nadzor proizvodnje in komuniciranje s kupci.

Sistemi za barvno metriko so namensko izdelani za merjenje barve in vsebujejo v ta namen razvite komponente. Klasični skenerji so namenjeni zajemanju slike in besedila, zato se pojavlja vprašanje, v kolikšni meri lahko zagotovijo potrebno natančnost izmerjenih vrednosti, saj delujejo na popolnoma drugačnih principih.

Da bi skener lahko uporabili kot merilno napravo, ga je potrebno opredeliti, kar pomeni definirati odvisnosti med RGB izhodnim signalom skenerja in vrednostmi referenčnega barvnega prostora (CIE L*a*b*). Postopek se izvede s t.i. skener-kalibrirno tarčo (npr. IT 8.7/2), ki je definirana v standardu ISO 12641: 1997. Povezavo med RGB barvnim obsegom skenerja in CIE L*a*b* barvnim prostorom se ustvari, če se barvna tarča izmeri s spektrofotometrom in nato še skenira. Ustrezni programi primerjajo izmerjene in skenirane vrednosti ter sestavijo t.i. ICC barvni profil vhodne naprave (skenerja), ki enolično opredeljuje matematični model pretvorbe med RGB barvnim obsegom skenerja in referenčnim CIE L*a*b* barvnim prostorom.

Nadalje je treba izdelati barvno tarčo na substratu, ki se ga skenira (tekstilni material), izdelati je treba tudi datoteko referenčnih vrednosti in seveda barvni profil.

V doktorski disertaciji je bilo ugotovljeno, da današnji namizni skenerji zaenkrat še ne omogočajo dovolj kvalitetnega numeričnega vrednotenja barve, ki bi bilo praktično uporabno ali vsaj na določeni stopnji natančnosti primerljivo z rezultati uporabe namenske opreme za barvno metriko.

Dissertation

NUMERICAL EVALUATION OF COLOUR SAMPLES USING A FLATBED SCANNER

Mentor: Associate Prof., Dr. Bojan Dolšak
Co-mentor: Doc. Vojko Pogačar, Academic Painter
University of Maribor, Faculty of Mechanical Engineering

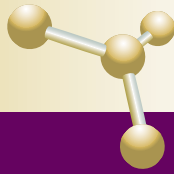
Measuring and evaluating colour in the textile industry is significant for production control and for communication with costumers.

Colour measurement systems are created from elements developed for measuring colours. A flatbed scanner, also called a desktop scanner, is a computer input device. The question to be investigated is are flatbed-scanners precise enough, because they operate on different principles?

To use the scanner as a measuring device, it has to be defined as the relationship between the device 'colour space' (RGB) and the CIE system of colour measurement (L*a*b*). In other words, the scanner has to be characterized. Scanner profiles translate raw digital RGB values into a standard colour space, such as CIELAB. The profile is generated by scanning an 'IT8' colour target. Profiling software combines the digital scanner value with the data measured from the target item to be scanned, with a spectrophotometer, to form a 'source' profile, which translates RGB values into CIELAB.

To convert a flatbed colour scanner into a measuring device a colour target has to be made (similar to IT8.7/2 for photography) and reference values filed with input profiles, for the textile materials has to be created.

In this dissertation it has been established that the present flatbed scanners do not enable practical, numerical colour evaluation, in comparable quality to special colour measurement.



DRAGO PAPLER

Magistrsko delo

PRIMERJAVA RAZVOJNIH UČINKOV OBNOVLJIVIH VIROV ENERGIJE

Mentor: doc. dr. Henrik Gjerkeš
Univerza v Novi Gorici, Poslovno-tehniška
fakulteta

V magistrskem delu sta v okviru primerjave razvojnih učinkov obnovljivih virov energije prikazana dva najznačilnejša obnovljiva vira za proizvodnjo električne energije v slovenskem prostoru: hidroelektrarne in sončne elektrarne.

Učinke hidroelektrarn in vodnih elektrarn je avtor proučil z vidika sodobnih tehnoloških sistemov ter primerjal prednosti in slabosti izkoriščanja. Vplivne dejavnike na področju hidroproizvodnje električne energije je ugotovil z analizo tabelarnih podatkov in regresijsko analizo. Za podporo odločanja pri investicijski izgradnji hidroelektrarn je uporabil metode in sisteme za vrednotenje, analizo in izbiro alternativ.

Zasnoval je partnerski razvojno izobraževalni model obnovljivih virov energije od dogovora, projekta, proizvodnje, marketinga, izobraževanja do razvoja, in ga potrdil v praksi pri izgradnji sončne elektrarne. Analiziral je tehnologijo in odločujoče dejavnike za energetska izkoriščanje sončne energije. S pomočjo informacijskih tehnologij je izdelal ustrezen model za vodenje postopkov izgradnje sončnih elektrarn od ideje do izvedbe z vidika udeležencev, dokumentov in nalog. Na podlagi analize tekstovnih podatkov objav v medijih je z nivojskim rudarjenjem ugotavljal povezave in podkoncepte obnovljivih virov energije.

Izdelal je koncept poslovnega komuniciranja na študiji primera in ga potrdil v praksi. Podal je predloge za boljšo organizacijo in poslovne odnose z vidika strateških priložnosti, organiziranosti, znanja in poslovnega komuniciranja.

Dissertation

THE COMPARISON OF DEVELOPMENT EFFECTS OF RENEWABLE ENERGY SOURCES

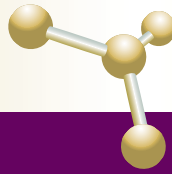
Mentor: Doc. Dr. Henrik Gjerkeš
University of Nova Gorica, School of Engineering
and Management

In this dissertation the author has shown the development effects of renewable energy sources in two of the most typical sources: hydro-power stations and solar power stations.

With a table of data analysis of hydro-power stations, the author managed to create a model for forecasting production range, and with regression analysis estimated influential factors of hydro-power production, and with statistical analysis calculated the environmental effects of reducing green-house gas emissions. From the method's 'and decision-support system's' point of view the author prepared a model for evaluating investment alternatives using evaluation systems, analysis, and alternative choice, and tested them. A stimulative mechanism of assured purchase prices for electrical energy, for qualified power plants, were analyzed.

The author has shown the contemporary technologies of solar power plants. Using information technology a solar power plant design guide has been created, from concept to realization. An education-development partnership model, "DP2MIR", for renewable energy sources from the agreement, project, production, marketing, education to development, has been designed. Solar power plant investment is evaluated from economical efficiency and cash-flow perspectives.

With media publication analysis, the author investigated the connections and concepts of renewable energy sources and level mining. With the help of opinion polls and factor analysis a connection between distributor characteristics and ecology preservation interests was established. In a case study a concept of business communication was created. Suggestions for better organization and business relations for strategic opportunities, organisation, education and business communication is given.



TATJANA STRATIMIROVIĆ

Magistrsko delo

POJAV NEPREKINJENEGA PROSTORA / MODALITETE MODERNE HIŠE OB KONCU XX. STOLETJA

Mentor: prof. Darko Marušić
Univerza v Beogradu, Fakulteta za arhitekturo

Pojav »neprekinjenega prostora« lahko danes v najgloblji plasti razumemo kot metafizični pojav razgradnje tradicionalne snovi arhitekture – stroke in njenih tehnik, principov, metod ...proizvodov – z ozirom na tiste, ki smo jih do sedaj poznali, ki pa se v fizičnem smislu uresničuje v procesu dematerializiranja arhitekturnih struktur.

Analiza razumevanja arhitekture in pojavov, ki jo tvorijo, je instrumentalizirana skozi tri modele: arhitekturno-ustvarjalnega, psihološko-sociološkega in filozofsko-estetskega. Ustvarjalni model je po svoji naravi edini neposreden in ima moč, da transcendirajo razdaljo med čutnim uživanjem ter nas tako prisili, da si celovitost arhitekture tolmačimo kot mistiko lepega doživljanja prostora.

Spremenjeno stanje sodobne arhitekture se morda najbolj odraža v avantgardnih spremembah, ki zajemajo prostor družinske hiše. Družinska hiša - fenomen že sama po sebi – ki je hkrati poligon in izhodišče emancipirane zavesti o kakovosti življenja, je nerazdružljiva od pojava neprekinjenega prostora, ker bi tako bila orošana svojega bistva.

Modernistični odmev tokov novega danes s presenečujočo svežino zaznavamo v programiranju kot modelu prostorske organizacije, v transparentnosti kot estetskem principu in v nematerialnosti sredstev kot bazi za izdelavo sodobne projektantske delovne metode – s pojavom neprekinjenega prostora kot njihovo vseobsežno objavo.

Dissertation

THE PHENOMENON OF UNINTERRUPTED SPACE / MODALITIES OF THE MODERN HOUSE AT THE END OF THE 20TH CENTURY

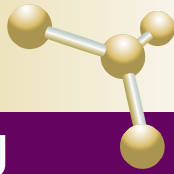
Mentor: Prof. Darko Marušić
University of Belgrade, Faculty of Architecture

The phenomenon of 'uninterrupted space' today can be understood as a metaphysical occurrence of dissolving the architectural traditional matter: profession and its techniques, principles, methods ...products - in relation to those we have known until today, and which is physically manifested in a process of de-materialisation of architectural structures.

The analysis of architecture and consisting phenomena is conducted through three models: architecturally-creative, psycho-sociological and philosophically-aesthetic. By its nature, creative model is the only straightforward model, and has the power to transcend the distance between sensitive pleasure and spiritual understanding, which forces us to explain the wholeness of architecture by mystery of personal space experience. By two remaining models it is possible to give further theoretical explanations, bearing in mind all their limitations due to their post-festum nature.

The altered state of contemporary architecture is faithfully reflected in conceptual changes overtaking the space of the family house. The phenomenon itself, the Modern house - both the rehearsing field and the outcome of emancipated life qualities - is inseparable from the phenomenon of uninterrupted space. At the same time, we still feel the freshness of the Avant-garde work method, based on general change of approach to the form and contents as separated, mutually excluding phenomena.

Contemporary qualitative echo of this work method establishes contemporary forms of architectural action principles: programming - a principle of organization, transparency - a principle of form and the immateriality of means - as a principle of materialization.



Magistrsko delo

OBLIKOVANJE KONTROLINGA ZA OBVLADOVANJE HČERINSKIH DRUŽB V TUJINI NA PRIMERU DRUŽBE »TRIMO INŽENJERING«

Mentor: red. prof. dr. Marko Hočevar
Univerza v Ljubljani, Ekonomska fakulteta

Delo proučuje, na kakšen način zagotoviti ustrezno podporo odločanju v konkretnem multinacionalnem podjetju, kar je eden izmed pomembnih izzivov kontrolinga. Poseben izziv za matična podjetja je obvladovanje hčerinskih podjetij v tujini. V ta namen je potrebno oblikovati učinkovit kontroling tako v matičnem kot tudi v hčerinskih podjetjih.

Cilj dela je analizirati uvedbo integriranega informacijskega sistema na področju kontrolinga v hčerinska podjetja v tujini. Pri tem je poudarjen pomen številnih dejavnikov, ki v veliki meri vplivajo na definiranje zahtev po informacijah, ki naj jih ima primeren informacijski sistem. Delo tako proučuje posamezne značilnosti konkretnega multinacionalnega podjetja, kot so strategije, organizacijska struktura, stopnja centralizacije odločanja, vrste informacij, ki jih podjetje uporablja za spremljanje uspešnosti odvisnih podjetij, prenosne cene ipd. Na podlagi tega je podan predlog primerne koncepta kontrolinga konkretnega multinacionalnega podjetja. Predstavljen je primer uporabe integriranega informacijskega sistema SAP za podporo kontrolingu v skupini Trimo. Poudarjena je smiselnost njegove uporabe za podporo odločanju tako v matičnem kot tudi v vseh odvisnih podjetjih konkretnega multinacionalnega podjetja.

Oblikovan koncept kontrolinga mora zagotavljati informacije za podporo odločanju tako poslovodstvu hčerinskih podjetij kot tudi poslovodstvu matičnega podjetja za lažje in boljše obvladovanje hčerinskih podjetij. Pomembno pa je, da si vsako podjetje omenjeni koncept kontrolinga prilagodi glede na svoje značilnosti, potrebe, zmožnosti in cilje.

Dissertation

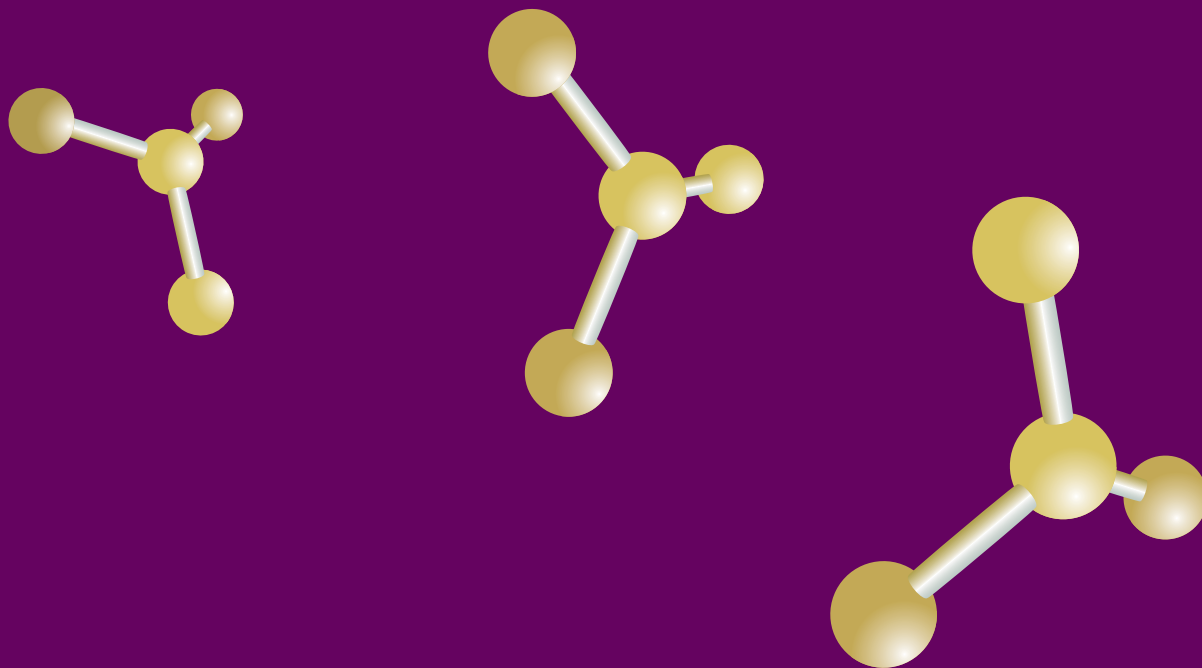
CONTROLLING DESIGN FOR A MANAGEMENT OF FOREIGN SUBSIDIARY COMPANIES ON THE CASE OF THE COMPANY »TRIMO INŽENJERING«

Mentor: Prof. Dr. Marko Hočevar
University of Ljubljana, Faculty of Economics

This dissertation examines the optimal way for assuring support to decision-making in a concrete multinational company. This is one of the important challenges of controlling. A special challenge for parent companies is monitoring and re-training subsidiaries. For this reason it is important to design an effective control in the parent company and in the subsidiaries.

The aim of this dissertation is to analyze the implementation of the integrated informational system in controlling a foreign subsidiary. Several factors influence demands for information within each company. That is why the individual characteristics of a concrete multinational company are examined. The most important of them are strategies, organizational structure, the degree of centralization of decision-making, type of information required by the parent company to monitor the performance of subsidiaries, transfer prices, etc. Considering features of those characteristics, the proposal for an appropriate concept is given. This work presents the case for using the integrated information system, SAP, for control support in the Trimo Group. This kind of information system is found to offer optimal support to decision-making in all companies in the Trimo Group.

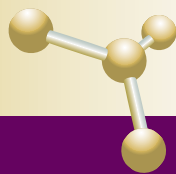
A formulated concept of controlling has to ensure information to managers in subsidiaries for decision-making, as well as to managers in the parent company for easier and better monitoring of subsidiaries and decision-making at the level of a multinational company as a whole. It is important that each company creates a controlling concept, according to its own characteristics, needs, abilities, and goals.



ZBORNİK POVZETKOV NAGRAJENIH DEL
ABSTRACTS OF THE PROJECTS AWARDED

DOKTORSKE DISERTACIJE

DOCTORAL THESES



Doktorska disertacija

NANOKOMPOZITNE HIDROFOBNE, OLEOFOBNE IN ABRAZIJSKO ODPORNE PREVLEKE IZ ORGANSKIH-ANORGANSKIH HIBRIDOV

Mentor: dr. Boris Orel
Sommentor: izr. prof. dr. Matjaž Krajnc
Univerza v Ljubljani, Fakulteta za kemijo in kemijsko tehnologijo

Avtor je okviru doktorske disertacije pripravil TiMEMO, organsko-anorganski nanokompozit, po sol-gel postopku iz prekurzorjev 3-(trimetoksilil)propilmetakrilata (MAPTMS) in titanovega(IV) izopropoksida (TIP).

Ta nanokompozit je uporabil kot vezivo za pripravo barvnih spektralno selektivnih premazov za sončne absorberje. Spektralno selektivnost premazov je optimiziral s spreminjanjem vsebnosti nanokompozitnega veziva in različnih pigmentov: črnega in rdečega pigmenta ter aluminijevih (Al) lusk, slednjih tudi oplaščenih z različnimi barvnimi plastmi (zelenimi in modrimi). Aluminijeve luske so dale premazu nizko termično emitivnost, ki je odvisna tudi od vsebnosti titanovih atomov v TiMEMO sol-gel mreži. Tvorbo in nastanek struktur v TiMEMO hibridu je natančno preučil z različnimi kemijskimi analiznimi metodami (IR, ²⁹Si NMR, XPS, XRD spektroskopskimi meritvami). Nanokompozitni premaz, ki ga je pripravil, je bil prepoznan tudi kot abrazijsko odporen in samočistilen premaz. Njegovo površinsko trdoto je avtor določil s Taberjevimi in Königovimi abrazijskimi testom, medtem ko je njegovo hidrofobnost določil z omakalnimi koti.

Rezultati so pokazali, da so omakalni koti za vodo narasli od 70° za nepigmentirana TiMEMO veziva do 125-135° za odgovarjajoče pigmentirane spektralno selektivne premaze, na podlagi česar je avtor sklepal, da hrapavost površine v prisotnosti pigmentov vpliva na površinsko energijo premaza. Meritve Königove trdote pa so pokazale, da je površinska trdota premazov na osnovi 20TiMEMO veziva višja od površinske trdote primerljivih komercialnih veziv. Tudi SEM posnetki so razkrili znatno hrapavo morfologijo površin.

Doctoral Theses

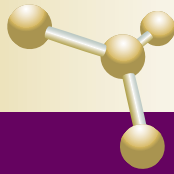
NANOCOMPOSITE HYDROPHOBIC, OLEOPHOBIC AND ABRASION RESISTANT COATINGS FROM ORGANIC-INORGANIC HYBRIDS

Mentor: Dr. Boris Orel
Co-Mentor: Associate Prof. Dr. Matjaž Krajnc
University of Ljubljana, Faculty of Chemistry and Chemical Technology

An organic-inorganic nanocomposite TiMEMO was prepared via sol-gel processing from 3-(trimethoxysilyl)propyl methacrylate (MAPTMS) and titanium(IV) isopropoxide (TIP) precursors.

This nanocomposite was used as a binder for the preparation of coloured spectrally selective paint coatings for solar absorbers. The spectral selectivity of coatings was optimized by varying the concentrations of the binder and different pigments: black and red pigments, aluminium (Al) flakes and the latter coated with various pigments (green and blue). Al flakes impart to paints low thermal emittance, which was correlated to the presence of titanium in the TiMEMO sol-gel host. The formation and the ensuing structure of the sol-gel TiMEMO hybrid was studied in detail using various chemical analytical methods (IR, ²⁹Si NMR, XPS and XRD spectroscopic methods). The above mentioned nanocomposite coating was also recognised as self-cleaning and abrasion resistant coating. The abrasion resistance of the coating was assessed by the Taber and König abrasion test, while its hydrophobicity was determined from contact angle measurements.

The results showed that the water contact angles of non-pigmented TiMEMO binder increased from 70° to 125-135° for the corresponding pigmented spectrally selective paint coatings, inferring the influence of surface roughness on surface energy in the presence of pigments. The König hardness measurements showed that the surface hardness of the TiMEMO based paint coatings was higher than the surface hardness of corresponding commercial binders. SEM measurements revealed a striking similarity in the surface morphology of TiMEMO coatings.



NIKO KRISTANIČ

Doktorska disertacija

SINTEZA KONSTRUKCIJ Z UPORABO TOČNE OBČUTLJIVOSTNE ANALIZE IN OPTIMIZACIJE OBLIKE V NELINEARNEM PODROČJU

Mentor: prof. dr. Jože Korelc
Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

Optimizacija postaja vedno bolj pomembno orodje v inženirski praksi, saj predstavlja sistematično metodo izboljšanja izdelkov glede na dane kriterije.

V okviru disertacije je predstavljen simbolno-numerični pristop k optimizaciji oblike konstrukcij v mejnem stanju nosilnosti. Pristop omogoča uporabo optimizacijskega algoritma kot orodja za projektiranje konstrukcij. Oblika konstrukcije je parametrizirana simbolno s pomočjo sistema za splošno računalniško algebro, ki s pomočjo neposrednega odvajanja omogoča analitičen izračun polja začetnih občutljivosti. Posledično je možno izvesti natančen izračun občutljivosti odziva, kar je ključnega pomena, saj so točne občutljivosti pogoj za uspešno uporabo gradientnih metod optimizacije oblike.

Kadar obravnavamo konstrukcije, občutljive na spremembo začetne geometrije, se izkaže, da ima izbira oblike in velikosti začetnih nepopolnosti velik vpliv na odziv konstrukcije in njeno mejno stanje. Poleg tega uporaba idealne oblike konstrukcije lahko privede do nestabilnosti optimizacijskih algoritmov ali do neoptimalnih rezultatov. Začetne nepopolnosti niso znane vnaprej, zato je bila v okviru disertacije razvita metoda za določitev najbolj neugodne začetne nepopolnosti v smislu mejnega stanja konstrukcij. Metoda je implementirana kot ugnezden optimizacijski algoritem v okviru globalne optimizacije oblike.

Prikazani primeri prikazujejo uporabnost metode in nakazujejo, da uporaba simbolno numeričnega okolja za gradientno optimizacijo oblike v povezavi z metodo določitve najbolj neugodnih začetnih nepopolnosti predstavlja napredno alternativo klasičnemu projektiranju konstrukcij.

Doctoral Thesis

LIMIT STATE DESIGN USING EXACT SENSITIVITY ANALYSIS AND SHAPE OPTIMIZATION

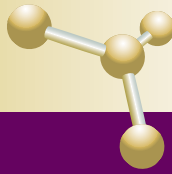
Mentor: Prof. Dr. Jože Korelc
University of Ljubljana, Faculty of Civil and Geodetic Engineering

Optimization has become an important tool in engineering activities because it represents a systematic method to improve design with respect to certain criteria.

Within the thesis a numeric-symbolic approach to 'limit load shape optimization' is studied which enables the use of an optimization algorithm as an ultimate state design tool. Shape is parameterized symbolically using a general computer algebra system. The design velocity can be computed analytically and an exact sensitivity analysis carried out. Accurate sensitivity information is of crucial importance for proper gradient shape optimization.

When analyzing imperfection sensitive structures it turns out that the choice of shape and size of initial imperfections have a major influence on the response of the structure and its ultimate state. Further on, shape optimization, applied as the perfect mathematical model, can lead to non-optimal results, e.g. a very light structure, but very sensitive to buckling. While imperfections are not known in advance, a method for direct determination of the most unfavourable imperfection of structures, by means of ultimate limit states, was developed. The method is implemented as an internal and separate optimization algorithm within the global shape optimization process.

Full geometrical and material non-linearity is considered throughout the global optimization process consistently, resulting in an efficient and robust, ultimate limit, load structure design algorithm. The numerical examples indicate that the use of a symbolic-numeric system for gradient shape optimization, combined with the use of the most unfavourable imperfections, can represent a superior alternative to the conventional ultimate limit state design.



Doktorska disertacija

DUKILNOST IN NOSILNOST VIJAČENIH SPOJEV V KONSTRUKCIJAH, NAREJENIH IZ JEKEL VISOKE TRDNOSTI

Mentor: prof. dr. Darko Beg
Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

Jekla z napetostjo tečenja večjo od ali enako 420 MPa uvrščamo med jekla visoke trdnosti. V smislu inženirskih meril duktilnosti imajo ta jekla nedvomno manjšo duktilnost kot običajna mehka konstrukcijska jekla.

Težava je v tem, da veliko nominalno elastičnih kontrol nosilnosti jeklenih konstrukcij v sebi skriva neelastično obnašanje, in je zato potrebno zagotoviti zadostno duktilnost. V ospredje so postavljeni konstrukcijski elementi z luknjami, podvrženi natezni obremenitvi, in natezni preklonni spoji z vijaki v strigu. Pri spojih je lokalna duktilnost v smislu plastičnih deformacij potrebna, da se obremenitev prenese na vse vijake.

Narejena je bila obsežna eksperimentalna preiskava pločevin z luknjami in preklonnih spojev v nategu z namenom določitve največje nosilnosti in duktilnosti. Za izdelavo preizkušancev je bilo uporabljeno jeklo S690. Zanesljivost evrokodovih projektnih nosilnosti oslabljenih prereзов je bila ocenjena s statistično analizo. Ta je bila dodatno podkrepljena z rezultati preiskav na nateznih preklonnih spojih iz jekel visoke trdnosti iz literature.

Preiskave preklonnih spojev so bile numerično simulirane z namenom določiti in preiskati napetostno-deformacijsko stanje. Pri tem so rezultati testov služili kot smernica za oceno pravilnosti numeričnih simulacij. Z numeričnim orodjem je bila narejena obsežna parametrična študija nateznih preklonnih spojev. Prav tako so bili numerično simulirani testi nateznih preklonnih spojev iz literature. V določenih primerih evrokodova projektna nosilnost na bočni pritisk podaja neustrezne rezultate. Zato je v disertaciji predlagana nova metoda za izračun projektne vrednosti bočnega pritiska na vijak, ki je enostavna za uporabo.

Doctoral Thesis

DUCTILITY AND RESISTANCE OF BOLTED CONNECTIONS IN STRUCTURES MADE OF HIGH STRENGTH STEELS

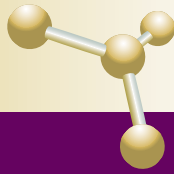
Mentor: Prof. Dr. Darko Beg
University of Ljubljana, Faculty of Civil and Geodetic Engineering

Structural steel grades with yield strength higher than 420 MPa are considered as high-strength steels. They undoubtedly have lower ductility than mild steels in terms of engineering measures of ductility, such as ultimate-to-yield strength ratio, uniform strain, and elongation at fracture.

The problem is that in-elastic behaviour is hidden in numerous, nominally elastic, resistance-checks of steel structures, and therefore sufficient local ductility has to be assured. The focus is set on structural elements with holes subjected to tension and to tension splices with bolts in shear. Local ductility, in terms of plastic deformation, has to be sufficient in order to assure bolt-hole elongation, so the loading transfers through all the bolts.

An extensive experimental research of plates with holes and tension splices, made of steel grade S690, was conducted to determine maximum resistance and ductility. The reliability of the Eurocode design rules for net cross-section resistance to was statistically evaluated. The statistical analysis was substantiated by additional test results on net cross-section failure of high strength steel members available in literature.

The experiments were numerically simulated to look inside the stress state. The test results served as a guideline for the accuracy of numerical simulations. A comprehensive numerical parametrical study of tension splices and, in addition, numerical analyses of tests on tension splices found in literature, were performed. In certain cases, the Eurocode design bearing resistance formula gives inadequate results. Therefore, a new, simple design bearing resistance formula is proposed.



Doktorska disertacija

DEJAVNIKI IZSTOPA PODJETIJ S TRGA NA PRIMERU SLOVENIJE

Mentor: prof. dr. Maks Tajnikar
Univerza v Ljubljani, Ekonomska fakulteta

Osrednji cilj te doktorske disertacije je izoblikovati mikroekonomski model izstopa podjetij s trga, s katerim je mogoče celovito pojasniti dejavnike izstopa podjetij s trga. Temeljna domneva, ki jo je avtorica poizkušala preveriti na primeru podjetij v Sloveniji v obdobjih 1995-2000 in 2000-2005, je, da je mogoče opredeliti štiri skupine dejavnikov izstopa podjetij s trga: notranje, zunanje, demografske in okoljske.

V doktorski disertaciji je avtorica potrdila temeljno hipotezo. Pri tem je ugotovila, da lahko izstop podjetij s trga v obeh obdobjih proučevanja najboljše pojasni z modelom, ki zajema mere učinkovitosti kot dolgoročne notranje dejavnike in kazalnike dobičkonosnosti in gospodarnosti kot dolgoročne mere zunanjih dejavnikov. Idealni model vključuje še kazalnike poslovanja z obratnimi sredstvi kot mere kratkoročnih notranjih dejavnikov, likvidnost kot kratkoročni zunanji dejavnik, kazalnik solventnosti ter absolutno in relativno velikost podjetja kot demografske dejavnike ter spremenljivke panoge in regije kot okoljske dejavnike.

Med najpomembnejšimi ugotovitvami doktorske disertacije je spoznanje, da se lahko dejavniki izstopa podjetij s trga ločijo na tiste, na katere poslovodstvo podjetja lahko vpliva, in tiste, na katere ne more vplivati. S tega vidika se je pokazalo, da je za izstop podjetij s trga ključno poslovanje podjetja, saj s trga prej izstopijo podjetja, ki niso tehnično in stroškovno učinkovita, ter podjetja, katerih poslovodstvo ni uspešno pri doseganju nadpovprečnih akumulacijskih stopenj, četudi ob tem dosega jo nadpovprečne mezdne stopnje.

Doctoral Thesis

DETERMINANTS OF FIRM MARKET EXIT IN THE CASE OF SLOVENIA

Mentor: Prof. Dr. Maks Tajnikar
University of Ljubljana, Faculty of Economics

The main objective of this doctoral thesis is to create a micro-economic model for firm market exit, which will provide an integral explanation of determinants leading to market exit. The main hypothesis, which has been tested on the basis of a firm in Slovenia, in the periods 1995-2000 and 2000-2005, is that it is possible to define four groups of determinants for company market exit: internal, external, demographic and environmental factors.

The doctoral thesis confirmed the basic hypothesis. The author arrived at the conclusion that company market exit in Slovenia, during the period 1995 to 2000, and during the period 2000 to 2005, can be the best explained with the model which includes efficiency measures as long-term internal indicators and measures of long-term external profit and effectiveness factors as measures of long-term external factors, and not the company's income position.

One of the most important conclusions of the dissertation is that managerial effects on the firm market exit from determinants which cannot be influenced by managers can be separated. Results indicate that management is a key determinant of market exit as technically and cost inefficient firms are more likely to exit the market than technically, and cost efficient, firms. It is necessary to point out that firms are more likely to exit the market if their management is not successful in achieving above average accumulation rates, even if they manage to reach above the average wage rates.

Doktorska disertacija

VPLIV PLINSKE MEŠANICE NA LASTNOSTI LASERSKO VARJENIH SPOJEV IZ DUPLEX NERJAVEČEGA JEKLA

Mentor: prof. dr. Zoran Kožuh
Univerza v Mostarju, Fakulteta za strojništvo in računalništvo

V uvodnem delu, ki temelji na že objavljenih spoznanjih, so obdelane fizikalne osnove in tehnologija laserskega varjenja. Analizirani so pomembni vplivi na proces varjenja oziroma na kvaliteto zavarjenega spoja ter metode kontrole kvalitete pri laserskem varjenju.

V eksperimentalnem delu je bila varjena duplex jeklena pločevina W.Nr.1.4462, katere debelina je znašala 2 mm. Varjeni so stikajoči spoji. Varjenje je bilo opravljano s pomočjo cw Nd: YAG laserja srednje moči 2000W, z vodenjem snopa s pomočjo optičnega vlakna premera 600 μm in fokusne optike 120/120 mm, ki omogoča fokusiranje snopa na točko premera 0,6 mm.

Zaščitne plinske mešanice so potekale skozi koaksialno šobo premera 5 mm. Relativno gibanje je bilo izvedeno s pomočjo robota "IGM limat RT 280-6". Naravnana moč je znašala 1800W z gostoto $6,4 \cdot 10^5 \text{ W/cm}^2$.

Vari so bili analizirani z vizualno in radiografsko metodo, merjene so bile geometrijske in mehanske lastnosti zavarjenega spoja ter odpornost na korozijo.

Opravljena je bila statična obdelava rezultatov meritev in matematično moduliranje z metodo odzivnih površin. Opravljeno je bilo ocenjevanje kvalitete zavarjenih spojev skladno s standardom HRN EN ISO 13919-1.

Dobljeni so bili vari visoke kvalitete brez razpok. Ugotovljen je bil velik vpliv zaščitnih plinskih mešanic in vnosa toplote na geometrijsko obliko zavarjenega spoja, mehanske lastnosti ter odpornost na korozijo.

Doctoral Thesis

INFLUENCE OF THE SHIELDING GAS MIXTURE ON THE PROPERTIES OF DUPLEX STAINLESS STEELS LASER WELDED JOINTS

Mentor: Prof. Dr. Zoran Kožuh
University of Mostar, Faculty of Mechanical Engineering and Computer Science

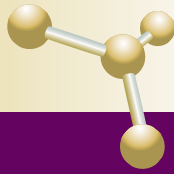
This thesis studies the effects of the type of shielding gas mixtures upon the geometry, mechanical properties, and corrosion resistance, of welded joints.

In the introduction physical bases and laser welding technology is discussed. Factors affecting the welding process and the quality of welded joints are studied. Also the methods used in quality control during laser welding are mentioned.

In the experimental part, duplex stainless steel is welded. Sheets 2 mm thick are used. Joint configuration is of butt design, and welding is by applying cw Nd: YAG laser unit rated at 2000 W of mean power, with laser beam guidance by means of optic fiber of 0.6 mm in diameter, applying focusing optics 120/120 mm that allows beam focusing to 0.6 mm spot. Shielding mixtures were supplied through 5 mm dia. coaxial nozzle. The relative movement of the welding head was performed by "IGM limat RT 280-6" robot. The rated power was set at 1800 W level, at power density of $6.4 \cdot 10^5 \text{ W/cm}^2$.

The welded joints were inspected visually and tested by radiography. The geometric features of the joint were measured. Mechanical properties and corrosion resistance were also tested. The data obtained was statistically processed, and mathematical modeling, using the method of response surfaces, was carried out. The quality of the welded joints was assessed by applying the HRN EN ISO 13919-1 standard.

The welds produced were high quality, without occurrence of cracks. The analysis revealed significant impact by the shielding gas mixtures and the heat input upon the geometric shape of the joint, mechanical properties, and corrosion resistance.



PETER TRKMAN

Doktorska disertacija

OPTIMIZACIJA PROCESA ENODIMENZIONALNEGA RAZREZA V ZAPOREDNIH ČASOVNIH OBDOBJIH

Mentor: prof. dr. Miro Gradišar
Univerza v Ljubljani, Ekonomska fakulteta

V doktorski disertaciji se avtor ukvarja s splošnim problemom enodimenzionalnega razreza, kjer so lahko vse palice različnih dolžin. Poleg zmanjševanja izgube pokaže tudi na pomanjkljivosti večine obstoječih metod, ki obravnavajo samo razrez v danem trenutku. To je le približna slika realnosti, saj v večini podjetij želijo izpolnjevanje ciljev za skupek vseh obdobjih. Lokalni optimumi ne vodijo nujno do dobrega načrta razreza za celotno obdobje.

Učinkovit razrez lahko h konkurenčnosti največ prispeva, če je ustrezno vključen v druge procese v podjetju, predvsem v proces preskrbe z materialom. Avtor v disertaciji najprej predstavi vlogo razreza kot enega od (pod)procesov v podjetju. Na koncu identificira ključne probleme in neodgovorjena raziskovalna vprašanja pri problemu razreza.

Avtor se ukvarja s pristopi za optimizacijo razreza v več zaporednih časovnih obdobjih. Išče torej dobro rešitev za daljše obdobje namesto trenutnih, lokalnih optimumov. Obstoječo metodo ustrezno prilagodi tako, da je primerna tudi za kontinuiran razrez. Razvite pristope obsežno eksperimentalno testira.

Disertacija tako predstavlja pomemben znanstveni napredek pri razvoju novih metod, ki vodijo do nižjih izgub, nekatere pa omogočajo tudi upoštevanje dodatnih kriterijev. Pomemben prispevek k temu področju pa je tudi inovativno obravnavanje razreza kot kontinuiranega poslovnega procesa v podjetju.

Doctoral Thesis

CUTTING STOCK PROCESS OPTIMIZATION IN CONSECUTIVE TIME PERIODS

Mentor: Prof. Dr. Miro Gradišar
University of Ljubljana Faculty of Economics

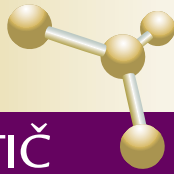
A one-dimensional cutting-stock problem often arises in practice. The usual problem is to use the material in stock to cut a requested number of ordered lengths. The most frequent goal is a reduction of trim loss, while other goals may also exist. This thesis deals with a general one-dimensional cutting-stock problem (G1D-CSP) where all stock lengths can differ.

Cutting makes the biggest contribution to a company's competitiveness if it is connected to other processes, especially the procurement process. This thesis firstly analyses the role of cutting stock as one of the (sub)processes. The main problems and new research questions are identified.

Previously developed methods for optimising cutting stock are then thoroughly reviewed. The version of the cutting-stock problem studied, is defined. Integer linear programming is used to develop an exact method. The method is tested to determine the approximate problem size for which it is suitable. Decision trees are used to develop a new approach to selecting the appropriate method for each size of problem.

Finally, the focus shifts to optimisation over consecutive time periods. The problems of several existing methods that only offer good results for a given moment in time are pointed out. The existing method is properly adapted to make it suitable for continuous cutting.

The thesis makes an important scientific contribution to the development of new methods that lead to lower losses and costs, while enabling the inclusion of other criteria and optimisation over a longer time period. Another significant contribution is the innovative analysis of cutting stock as one of continuous process.



Doktorska disertacija

INTELIGENTNA AVTOMATSKA IZBIRA REZALNEGA ORODJA ZA OPERACIJO STRUŽENJA S POMOČJO NEVRONSKIH MREŽ

Mentor: red. prof. dr. Jože Balič
Sommentor: red. prof. dr. Franci Čuš
Univerza v Mariboru, Fakulteta za strojništvo

Za avtomatsko izbiro rezalnega orodja so bili razviti številni sistemi, ki pa niso nikoli popolnoma nadomestili človeka. Dosedanji sistemi so klasični računalniški sistemi, ki uporabljajo tabele in drevesa odločanja. Pregledane raziskave so pokazale, da je uporaba takšnih sistemov nefleksibilna in neustrezna za ta namen.

V disertaciji je bil zasnovan inteligentni sistem, ki na osnovi 3D CAD modela in drugih pomembnih faktorjev izbire izbere najboljši komplet orodja. Pri reševanju kompleksnega klasifikacijskega problema je uporabljena metoda umetne inteligence - nevronske mreže, ki poskušajo simulirati oz. doseči paralelno obdelavo informacij, kakršno koristijo človeški možgani, kadar razmišljajo, se spominjajo in rešujejo probleme. Sistem na podlagi znanja, ki ga je pridobil med procesom učenja iskanja rezalnih orodij, na nove, nepoznane primere odgovarja na način, ki je najbližji izkušnjam, pridobljenim med učenjem.

Koncept je bil uporabljen pri najbolj razširjenem postopku odrezavanja - struženju. Ugotovljeno je bilo, da je integracija nevronske mreže v proces iskanja najustreznejših rezalnih orodij zelo dober pristop. Doseženi rezultati so bili v skladu s pričakovanji. Dosežena je bila zelo visoka stopnja klasifikacije.

Velika prednost predlaganega sistema se kaže v nenehnem povečevanju znanja, ki ga črpa iz rastoče podatkovne baze. Sistem je zaradi robustnosti in univerzalnosti primeren za klasificiranje rezalnih orodij tudi pri drugih postopkih odrezavanja. Dobljene rešitve so primerljive z rešitvami, ki jih podajajo strokovnjaki.

Doctoral Thesis

INTELLIGENT AUTOMATIC CUTTING TOOLS SELECTIONS FOR TURNING OPERATION BY NEURAL NETWORKS

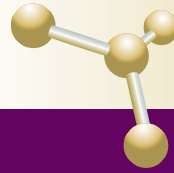
Mentor: Prof. Dr. Jože Balič
Co-mentor: Prof. Dr. Franci Čuš
University of Maribor, Faculty of Mechanical Engineering

Various systems of the automated selection of cutting tools have been developed, but they have not completely replaced people. The systems have been conventional computer systems using a decision table and decision trees. Controlled researches have shown that the use of such systems is inflexible and inadequate for such purposes.

Therefore, in the doctoral thesis, an intelligent system, selecting the best set of tools on the basis of the 3D CAD model and other relevant selection factors, has been conceived. For solving the complex classification problem the artificial intelligence method has been used; the neural networks, trying to simulate and/or reach parallel information processing as used by the human brain when thinking, remembering, and solving problems. On the basis of the knowledge acquired during the process of learning to search for the cutting tools, the system responds to the new unknown examples in the manner nearest to the experience acquired during learning.

This concept has been used for the most widespread cutting process, i.e. turning. It has been established that the integration of neural networks in the process of searching for the most adequate cutting tools is a very good approach. The results reached are conform with expectations. A high degree of classification has been reached.

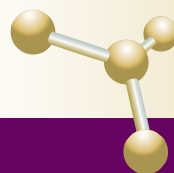
The constant increase of knowledge which the system takes from the growing data base, is considered to be a great benefit of the proposed system. Due to robustness and universality it is proper for also classifying cutting tools in other cutting processes. The resulting solutions are comparable with the solutions given by experts.



ABECEDNO KAZALO AVTORJEV

ALPHABETICAL LIST OF AUTHORS

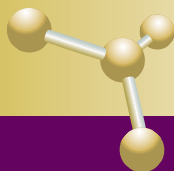
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