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Centrul de cercetari pentru mecanica materialelor si siguranta structurilor
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RESEARCH CENTRE FOR MECHANICS OF MATERIALS AND STRUCTURES SAFETY – *CEMSIG*

GENERAL PRESENTATION

CEMSIG research centre was founded in 1999, and was accredited in 2001 by the National University Research Council (CNCSIS) as Centre of Excellence. In 2006 it was reaccredited as Centre of Excellence, being the only such centre at the "Politehnica" University of Timisoara and one of the two excellence centres accredited in the field of engineering in Romania. Significant achievements in past years included participation to the IC15-CT96-0201/1997 European project COPERNICUS (FP4) "RECOS" - "Reliability of Moment Resistant Connections of Steel Building Frames in Seismic Areas", and the World Banc/CNCSIS project C16 "Reliability of Buildings Located in Strong Seismic Areas in Romania". Currently, the FP6 project "Earthquake protection of historical buildings by reversible mixed technologies", CEEX MATNANTECH "Structural systems and advanced technologies for structures from high-performance steels for buildings located in high-seismicity areas - STOPRISC" and EUREKA "SEFIE" projects are underway. The master course "New technologies and structures for construction" is closely connected to the CEMSIG research centre. Members of the research centre are actively involved in teaching and tutoring of master student research.

OBJECTIVES

CEMSIG research centre pursues development of the structure, competence and acting capability necessary to promote new technologies, research services, expertise, technical assistance and training of qualified specialists in the field of materials used in engineering structures, especially from the point of view of their mechanical characteristics that affect structural response and safety under static and dynamic loading. Research competence and capabilities are to be strengthened through national and international partnership, especially through cooperation with universities in the frame of European Union Programmes. CEMSIG offers research services and technology transfer for industry partners, and aims to support doctoral and master activities by integrating them into research activities and providing the necessary financial and material support.

Developing and diversifying of consulting activity and industry oriented research in partnership with national and international private companies.

MAIN RESEARCH FIELDS

- ***Performance of steel, timber and composite steel-concrete structures and characterisation of their response under exceptional actions***

Keywords: steel, composite, structural systems, seismic, performance-based design, moment-resisting frames, eccentrically braced frames, connections, ductile materials, high-performance steel

- ***Light gauge steel structures***

keywords: thin-walled cold-formed elements, stability, shear walls, numerical simulations, connections, lightweight pitched roof portal frames

Researches in *PERFORMANCE OF STEEL, TIMBER AND COMPOSITE STEEL-CONCRETE STRUCTURES AND CHARACTERISATION OF THEIR RESPONSE UNDER EXCEPTIONAL ACTIONS*

FIELD DESCRIPTION

Performance of steel and composite steel-concrete structures is regarded in terms of strength, stiffness, and ductility at global and local levels, including material behaviour. Exceptional actions refer to earthquakes and fire. Earthquake resistant design of structures improves continuously as a result of experimental and analytical research, as well as experience and observations gained after new earthquakes. One of the latest trends in seismic design of structures is the Performance-Based Design, which requires assurance of a set of controlled performance levels under a corresponding set of earthquake intensities. Performance-Based Design aims at reducing both structural and non-structural damage under multiple performance objectives. Strengthening of historical buildings in seismic areas using reversible mixed technologies, mainly based on metal devices is a new research area addressed by the CEMSIG team. Analytical and experimental investigations on high-performance steel for use in earthquake-resistant structures are underway.

ACTIVITIES

- Use of high-performance steel for earthquake-resistant multistorey steel structures.
- Strengthening of existing masonry and reinforced concrete buildings with steel-based reversible mixed technologies.
- Fire resistance of steel and composite steel-concrete structures.
- Drafting of SR EN 1994-1.2 (Fire design of composite structures)
- Drafting of National Annexes of SR EN 1993-1.2 (Fire design of steel structures), SR EN1993-1.8 (Joints in steel structures).
- Contribution to drafting of Romanian seismic design provisions P100-1 and P100-3.
- Numerical and experimental study on the connecting systems between steel and concrete for buildings with composite structure in seismic areas.
- Seismic performance of steel eccentrically braced frames with removable dissipative elements.

RESEARCH TEAM

- Prof. Dan Dubina, PhD., Dr.HC., FIStructE (Steel and composite steel-concrete structures and characterisation of their response under exceptional actions)
- Prof. Daniel Grecea, PhD (Performance-Based Design, beam-column joints in moment-resisting frames, rehabilitation of existing buildings))
- Assoc. prof. Raul Zaharia, PhD (Fire design, High-Performance Steel)
- Sen. lect. Florea Dinu, PhD (Performance-Based Design, High-Performance Steel)
- Sen. lect. Aurel Stratan, PhD (Earthquake-resistant steel structures, dual structures, eccentrically braced frames)
- Sen. lect. Adrian Ciutina, PhD (Steel and composite structures)
- Sen. lect. Ludovic Fulop, PhD (Steel and timber shear walls)
- PhD student Adrian Dogariu (Strengthening of masonry and reinforced concrete structures with steel materials)
- PhD student Radu Heput (Rotation capacity of beam-column joints)
- PhD student Sorin Bordea (Strengthening of masonry and reinforced concrete structures with steel materials)
- PhD student. Nicolae Muntean (Welded and bolted connections realised using high-strength steel)

RESEARCH OFFERS

- Monotonic and cyclic testing of materials and structural subassemblies
- Advanced static and dynamic analysis of structural systems
- Consulting and design
- Technical expertise for seismic strengthening of existing building structures

RESULTS

RESEARCH PROJECTS

1. FP6 INCO-CT-2004-509119 / 2004-2007 *Earthquake protection of historical buildings by reversible mixed technologies*, Financing authority/Beneficiary: European Union, Value: 26,385 EUR
2. 29/10.10.2005, 2005-2008 CEEX MATNANTECH: *Structural systems and advanced technologies for structures from high- performance steels for buildings located in high-seismicity areas - STOPRISC*, Financing authority: Ministry of Research and Education, Value: 929,250 RON
3. 3153/13.10.2005: 2005-2007 CEEX-ET, *Numerical and experimental study on the connecting systems between steel and concrete for buildings with composite structure in seismic areas*, Financing authority: Ministry of Research and Education, Value: 70,000 RON
4. 1434/27.04.2006: 2006-2008 CEEX-ET, *Dual steel structures with removable dissipative elements for buildings located in seismic areas*, Financing authority: Ministry of Research and Education, Value:39,775
5. 04/15.09.2006., 2006-2008 *Advanced training and research interdisciplinary platform "Centre for advanced studies and research in material and structural engineering"*. Financing authority / Beneficiary: Ministry of Education and Research. Value: 413,000 RON
6. 420/21.03.2006. *Translation of EN 1994-1-2 "Design of Composite Steel Concrete Structures – Structural Fire Design"*. Financing authority / Beneficiary: ASRO (Romanian Standards Association), Value: 4,011 RON
7. 293/2005-2006, *Translation of EN 1993-1-2 "Design of Steel Structures – Structural Fire Design" and EN 1993-1-8 "Design of steel structures. Design of joints"*. Financing authority / Beneficiary: ASRO (Romanian Standards Association), Value: 92,292 RON
8. 304/28.07.2005-2006. *Contributions to P100/3. Code for evaluation and seismic rehabilitation of existing structures. Vol.1 - Evaluation. Vol.2. Rehabilitation.* Beneficiary: Technical University of Civil Engineering Bucharest, Value: 8,900 RON
9. 305/28.07.2005-2006. *Contributions to P100/1. Code for seismic design of structures. Vol. 2. Commentaries and design examples.*

Beneficiary: Technical University of Civil Engineering Bucharest, Value: 7,100 RON

10. 515/2006. *Fire design of structural elements of the Bucharest Tower Center*. Financing authority / Beneficiary: SC SIGUR Construct Bucharest, Value: 10,500 RON
11. 581/2006. *Fire design of the columns elements of "Sema Parc – Office Buildings" Bucharest*. Financing authority / Beneficiary: SC RIVER INVEST Bucharest, Value: 12,000 RON
12. 73/2006 CEEX – PROMETECH. *Activities promotion, increase of visibility and harmonization of Romanian research and development teams engaged in activities concerning technology transfer and development of European norms for steel structures in seismic areas.* Financing authority / Beneficiary: CNCSIS, Value 78,000 RON
13. A1/GR181/19.05.2006 CNCSIS no. 17 theme 167. *Strengthening and rehabilitation of buildings in seismic zones by structural solutions based on steel use.* Financing authority / Beneficiary: Ministry of Research and Education. Value 35,000 RON
14. 384/2005-2006, *Structural Analysis of the I. Buteanu School building in Gura Hont*. Financing authority/Beneficiary: Gura Hont Town Hall. Value: 12,240 RON
15. 385/2005-2006, *Structural Analysis of the Minis School building*, Financing authority / Beneficiary: Ghioroc Town Hall. Value: 12,240 RON
16. 550/9.11.2006, *Technical expertise of the steel industrial hall of the steel works in Copsa Mica.* Financing authority/Beneficiary: SC Mercea Consulting SRL. Value: 1,000 RON
17. EUREKA E3034 - SEFIE-RO, 30.07.2004, 2004-2006, *Steelbiz as an E-forum for the implementation of the eurocodes for steel construction*, Financing authority / Beneficiary: European Union, Value: 6,000 RON (total value: Eureka + private funds 443,500 RON)

BOOKS PUBLISHED

1. Dubina, D. and Ungureanu V. (editors). *Steel – a New and Traditional Material for Building* (Proceedings of the International Conference in Metal Structures, Poiana Braşov, Romania, 20-22 September 2006), Taylor & Francis Group / Balkema, London, UK, 2006, ISBN (10)0-415-40817-2, ISBN (13)0-415-40817-2), 648 pages
2. Dubina, D., Ungureanu, V., and Dinu F., (editors): *Stability and Ductility of Steel Structures - Recent Developments* (published in Romanian), Mirton Publishing House, Timişoara, 2006, ISBN (10)973-661-977.X (ISBN (13)978-973-661-977.9), 196 pages
3. Dinu, F.: *Nonlinear analysis methods for steel frames under earthquake action*, (Published in Romanian), Orizonturi Universitare Publishing House, Timisoara, ISBN 10-973-638-282-6, 170 pages

PUBLISHED PAPERS

1. Ciutina, A., Dubina, D., *Seismic Behaviour of Steel Beam-to-Column Joints with Column Web Stiffening.* Steel and Composite Structures International Journal. Vol. 6, No. 6, December 2006, pp. 493-513. ISSN 1229-9367
2. Fajfar, P., Dolsek, M., Marusic D., Stratan, A., *Pre- and post-test mathematical modeling of a plan-asymmetric reinforced concrete frame building*. Earthquake Eng. Struct. Dyn., 2006, 35: pp. 1359–1379
3. Ciutina A, Stratan A., Dogariu A., *Behaviour of different type of connectors under monotonic loading*, INDIS 2006 Proceedings of Planning, Construction and Renewal in the Construction Industry, Novi-Sad, 22-24 Nov 2006, pp. 153-163
4. Ciutina, A., *Behaviour of Moment Resisting Composite Frames under Romanian Earthquakes*, SDSS 2006 Int. Colloquium on Stability and Ductility of Steel Structures, 6-8 Sept. 2006, IST Press, pp. 911-919
5. Cristutiu, I.M., Dubina, D., *Numerical simulations and experimental program in order to assess performance of beam-column joints in portal frames* (in Romanian), Stability and Ductility of Steel Structures - Recent Developments, ISBN (13)978-973-661-977-9, Mirton Publishing House, Timişoara, 2006, pp. 105-114
6. Dubina, D., Dinu, F., Stratan, A., Ciutina, A., *Analysis and design considerations regarding the project of Bucharest Tower Centre steel structure*, Proc. International Conference in Metal Structures, Poiana Brasov, Romania, September 20-22, 2006, Steel – a new and Traditional Material for Building, Dubina and Ungureanu (eds.), Taylor and Francis Group, London, ISBN 0-415-40817-2, pp. 601-608
7. Dubina, D., Dinu, F., Stratan, A., Marcu, A., Marcu, D., Coman, M., *Design of a high-rise steel structure according to P100/2004 and comparison with P100/92. Part II: Study case - Bucharest Tower Center building*, (in Romanian), AICPS Bulletin, Nr. 2/2006, pp. 135-148
8. Dubina, D., Dinu, F., Stratan, A., *Bracing solutions for the Tower Center building in*

Bucharest, (in Romanian), Stability and Ductility of Steel Structures - Recent Developments, ISBN (13)978-973-661-977-9, Mirton Publishing House, Timişoara, 2006, pp. 127-140

9. Dubina, D., Dinu, F., Stratan, A., *Design of a high-rise steel structure according to P100/2004 and comparison with P100/92. Part I: Comparative synthesis of provisions from P100/2004 and P100/1992 regarding multi-storey steel structures*, (in Romanian), AICPS Bulletin, Nr. 2/2006, pp. 127-135
10. Dubina, D., Dinu, F., Zaharia, R., Ungureanu, V., Grecea, D., *Opportunity and effectiveness of using high strength steel in seismic resistant building frames*, Proceedings International Conference in Metal Structures: Steel – A New and Traditional Material for Building, Poiana Brasov, Romania, September 20-22, 2006, Eds. D. Dubina & V. Ungureanu, Taylor & Francis Group / Balkema, ISBN (10)0-415-40817-2, pp. 501-510
11. Dubina, D., Dinu, F., Zaharia, R., Ungureanu, V., Grecea, D., *Structures for high rise buildings in seismic areas realised from high-strength steel*, (in Romanian), Stability and Ductility of Steel Structures - Recent Developments. ISBN (13)978-973-661-977-9, Mirton Publishing House, Timişoara, 2006, pp. 141-154
12. Dubina, D., Ungureanu, V., Dogariu, A., Marin, M., *Sport and Engineering*, (in Romanian), Revista Construcţiilor, year II, nr. 14, April 2006, pp. 54-62
13. Georgescu, M., *Refurbishment of a multistorey welded steel structure located in a seismic area*, Proceedings International Colloquium on Stability and Ductility of Steel Structures – SDSS 2006, Lisbon, Portugal, September 6-8, 2006, Volume 2, pp. 985-992
14. Stratan, A., Ciutina. A., Dogariu, A., *Seismic-resistant steel structures with removable dissipative elements*, Proc. 10th Nat. and 4th Int. conf. "Planning, design, construction and the construction industry". Editors R. Folic, V. Radonjanin, M. Trivunic. Novi Sad, November 22 - 24, 2006, pp. 559-566
15. Zaharia, R., Dubina, D., *Fire design of steel and composite structures using the Eurocodes*, (in Romanian), AICPS Bulletin, Nr. 2/2006, pp. 148-160
16. Zaharia, R., Dubina, D., *Fire design of steel and composite structures using the Eurocodes*, IVth International Scientific Meeting INDIS 2006, Novi-Sad, 22-24 Nov. 2006, Serbia, ISBN 86-7892-016-5. pp. 619-627
17. Zaharia, R., Taucer, F., Pinto, A., Molina, J., Vidal, V., Coelho, E., Candeias, P., *Earthquake Testing of a Full-scale RC Flat Slab Building Structure*, European Commission Publication, EUR 22192 EN, Joint Research Centre ELSA, Italy, 2006, 133 pages

ONGOING PhD THESES

- Adrian Dogariu: *Solutions for consolidation and rehabilitation of masonry and reinforced concrete buildings placed in seismic areas using metallic materials*, PhD supervisor Prof. Dan Dubina
- Radu Hepuţ: *Plastic rotation capacity of MRF connections, loaded monotonically and cyclically, located in seismic areas*, PhD supervisor Prof. Dan Dubina
- Sorin Bordea: *Dual frame systems with buckling-restrained braces*, PhD supervisor Prof. Dan Dubina
- Mihai Muţiu: *Structural configurations, functional and technical-economical parameters of steel-framed buildings*, PhD supervisor Prof. Dan Dubina
- Nicolae Muntean: *Behaviour of connections of realised from high-strength steel subjected to seismic loading*, PhD supervisor Prof. Dan Dubina
- Valentin-Marius Zbagan: *Effects of fabrication and erection imperfections on structures realised from welded plates*, PhD supervisor Prof. Dan Dubina

OTHER RESULTS

- Organisation of the International Conference in Metal Structures: *Steel – A New and Traditional Material for Building*, Poiana Braşov, Romania, 20-22 September 2006
- Membership in the European Programme COST C25: *Sustainability of Constructions - Integrated Approach to Life-time Structural Engineering*, Two members of the CEMSIG research center (Dan Dubina and Viorel Ungureanu) are members in the management committee of the COST C26 programme.
- Membership in the European Programme COST C26: *Urban Habitat Constructions under Catastrophic Events*. Two members of the CEMSIG research center (Dan Dubina and Florea Dinu) are members in the management committee of the COST C26 programme.
- Bilateral Romanian-Greek research program (2006-2007): *Strengthening and rehabilitation of historical buildings by reversible technologies (UPT coordinator: sen. lect.*

Aurel Stratan), Financing authority / Beneficiary: Ministry of Research and Education

- Bilateral Romanian-Slovenian research program (2006-2007): *Qualification criteria for the joints of moment resistant steel frames of multi-storey buildings in seismic areas. (UPT coordinator: prof. Daniel Grecea)*, Financing authority / Beneficiary: Ministry of Research and Education.
- Bilateral Romanian-Hungarian research program (2006-2007): *Sustainable building and bridge technologies based on light metal, composite materials and structural connections*, (UPT coordinator: sen. lect. Ludovic Fulop), Financing authority / Beneficiary: Ministry of Research and Education
- The CEMSIG research centre was reaccredited in 2006 as Centre of Excellence by the National University Research Council (CNCSIS).
- Three ERASMUS programmes promoting student and teaching staff mobility with INSA-Rennes, University Blaise Pascal of Clermont-Ferrand and Naples.
- Dan Dubina hold Presidency of the European Convention for Constructional Steelwork (ECCS) in 2006.
- Organisation of the meeting of European Convention for Constructional Steelwork (ECCS) Technical Committee 10 - Structural Connections.
- Dan Dubina - member of PhD jury of Nati Pastor Torrente, from Universitat Politecnica de Catalunya, Barcelona. Title of the PhD thesis: "Numerical modelling of the seismic behaviour of cold-formed steel structures".
- Dan Dubina: "Radu Agent" Award by "Radu Agent" Foundation & Association of Structural Design Engineers, AICPS, 2006, for contributions to development of Higher Education and Research in Civil Engineering in Romania.

FURTHER DEVELOPMENTS

- Performance-based design of braced frames
- Dissipative systems for strengthening of masonry and reinforced concrete buildings with metallic systems
- Development of analytical procedures for prediction of rotation capacity beam-column joints in moment-resisting frames
- Earthquake performance of steel structures realised from high-performance steel

CONTACT PERSONS

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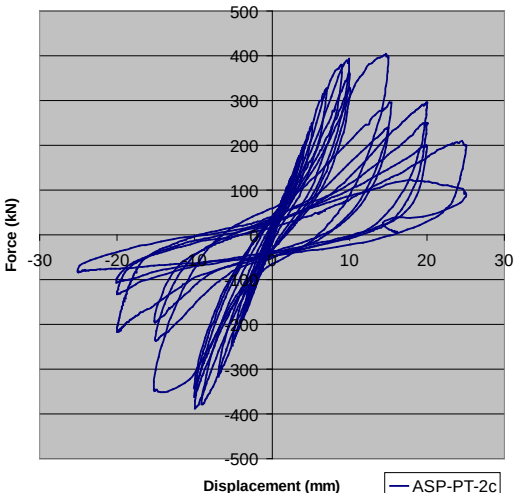
EXAMPLES

1. PROHITECH project: *Earthquake protection of historical buildings by reversible mixed technologies.* Experimental activity on steel based solutions for retrofitting masonry shear walls.

Experimental setup of a masonry panel strengthened with aluminium plates

In the frame of FP6 PROHITECH project, innovative solutions for seismic consolidation of historical masonry buildings were proposed and developed. These solutions were developed in order to accomplish two major demands: first to be easily removable and second to use mixed technologies.



Time - displacement characteristic

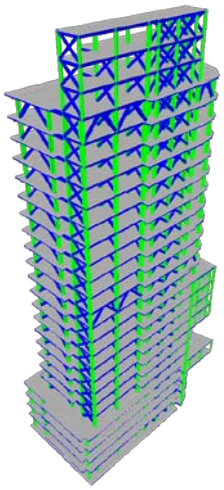
Three different systems were tested. Two of them were based on steel shear plates and aluminium shear plates connected with chemical anchors and prestressed ties. The third one employed steel wire mesh (stainless steel) glued with epoxy resin to the masonry panel.

The experimental program was divided in two parts: first part on small specimens (500 x 500 mm) and second part on large specimens (1500 x 1500 mm) tested on monotonic and cyclic load.

2. CEEX MATNANTECH project: *Structural systems and advanced technologies for structures from high- performance steels for buildings located in high-seismicity areas - STOPRISC.*

The major objectives of the "STOPRISC" project (Contract 29/2005 CEEX MATNANTECH) is to investigate, develop and validate technical solutions for application of high-performance steels in multi-storey structures located in areas of medium and high seismicity. These objectives are to be realised by performing experimental investigations on materials, welded connections, T-stub macro-components and beam-to-column joints. The experimental program is accompanied by numerical investigations on beam to column joints and frames. Moment resisting frames as well as dual frames are considered.

In 2006, the research focused on parametric studies for moment resisting frames and dual frames with moment resisting spans and braced spans using concentric or eccentric braces. It was showed that the use of high strength steel in seismic resistant building structure can be really effective when combined with conventional steels. A "Mixed Steel Building Technology" can be applied on the base of principle: high strength steel for high elastic strength demand and conventional steel for low yield strength and high ductility.



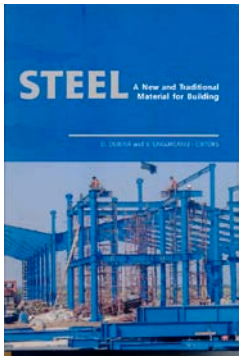
The structural model of the Bucharest Tower Center building

Combined use of high-strength and low-strength steel grades for improved seismic performance was applied at the design of the Bucharest Tower Center

Fig. 2 The Bucharest Tower Center building in construction

3. Organisation of the International Conference in Metal Structures: Steel – A New and Traditional Material for Building. Poiana Braşov, Romania, 20-22 September 2006.

Conference proceedings (ISI) were published Taylor & Francis Group / Balkema, London, UK.



Researches in *LIGHT GAUGE STEEL STRUCTURES*

FIELD DESCRIPTION

Light-gauge steel profiles are class 3 and 4 welded sections and cold-formed members and sheeting. Beside the classical structural problems characterising hot-rolled profiles, light-gauge steel sections are prone to local instability phenomena, involving reduction in section strength, poor post-elastic capacity and ductility, and high sensivity to geometrical imperfections. However, these materials have important technical and economical advantages, and the sector of light-gauge steel structures is one of the most dynamic in the field. In order to promote light-gauge steel structures, instability problems and connecting technology and performance have to be carefully managed. These problems are even more important in case of structures located in seismic areas, such as Romania.

The research activity on light-gauge profiles is focused in three main directions: (1) buckling of members under compression and/or bending; (2) performances of structures made of light-gauge profiles under earthquake loading and (3) the promotion of new structural solutions where the advantages of light-gauge profiles can be fully exploited.

ACTIVITIES

- Seismic performance of pitched-roof portal frames with elements of class 3 and 4 cross-sections.
- Full-scale tests on pitched-roof portal frames with cold-formed built-up members
- FE modelling of the buckling phenomenon for compression and bending members
- FE investigations on the seismic performance of light-gauge steel houses
- Evaluation of post-elastic strength and ductility of cold-formed steel members and joints.

RESEARCH TEAM

- Prof. Dan Dubina, PhD., Dr.HC., FIStructE (Light gauge steel structures)
- Assoc.prof. Mircea Georgescu, PhD (Stability of cold-formed steel members)
- Assoc.prof. Raul Zaharia, PhD (Connections in cold-formed steel structures)
- Sen.lect. Ludovic Fülöp, PhD (Steel framed houses)
- Sen.lect. Daniel-Viorel Ungureanu, PhD (Buckling of thin-walled cold-formed members)
- Assist. Ionel-Mircea Cristutiu (Lightweight steel portal frames)
- PhD. student. Daniel Ticle (Post-elastic capacity of Z purlins with overlapped joints)
- PhD student. Bogdan Neagoie (Built-up cold-formed steel beams with corrugated web)
- PhD student. Agnes Ruff (Behaviour of thin walled overlapped purlins, Shear walls from cold-formed steel cassettes)
- PhD student. Nicolae Muntean (Post-elastic capacity of Z purlins with overlapped joints)

RESEARCH OFFERS

- Advanced stability and nonlinear static and dynamic analysis of thin-walled steel members and structures
- Buckling and material testing
- Testing of structural subassemblies and connections

RESULTS

RESEARCH PROJECTS

1. 58GR/19.05.2006 CNCSIS Grant Td (2006) theme 87. *Design methodology of pitched roof portal frames, based on performance criteria, made from elements of class 3 and 4 cross sections, located in seismic areas*. Financing authority / Beneficiary: CNCSIS. Value 12,000 RON

2. EUREKA E3034 - SEFIE-RO, 30.07.2004. 2004-2006. *Steelbiz as an E-forum for the implementation of the Eurocodes for steel construction*, Financing authority / Beneficiary: European Union, Value: 6,000 RON (total value: Eureka + private funds 443,500 RON)

BOOKS PUBLISHED

1. Dubina, D., Ungureanu V. (editors), *Steel – a New and Traditional Material for Building (Proceedings of the International Conference in Metal Structures, Poiana Braşov, Romania, 20-22 September 2006)*, Taylor & Francis Group / Balkema, London, UK, 2006, ISBN 10:0-415-40817-2, ISBN 13: 0-415-40817-2, 648 pages

2. Ungureanu, D.-V., *Light-gauge cold-formed steel structures*, (in Romanian), Orizonturi Universitare Publishing House, Timisoara, ISBN 10-973-638-279-6, 159 pages

3. Cristutiu, I.M., *Stability and ductility of pitched-roof portal frames used for lightweight industrial steel buildings made from variable element of class 3 and 4 cross sections*, (in Romanian), "Politehnica" Publishing House, Timisoara, ISBN (13)978-973-625-388-1, 278 pages

PUBLISHED PAPERS

1. Dubina, D., *Behaviour and performance of Cold-formed Steel framed Houses under Seismic Actions (Invited Lecture)*, Proceedings

of the International Colloquium on Stability and Ductility of Steel Structures – SDSS2000, Lisbon, Portugal, 6-8 September 2006, Volume 1, pp. 121-143

2. Zaharia, R., Dubina, D., *Stiffness of joints in bolted connected cold-formed steel trusses*, Journal of Constructional Steel Research, Vol 62, No.3, March, 2006, pp. 240
3. Fulop, L., Dubina, D., *Design Criteria for Seam and Sheeting-to-Framing Connections of Cold- Formed Steel Shear Panels*, Journal of Structural Engineering, Vol. 132, No. 4, April 2006, pp. 582-590, American Society of Civil Engineers - ASCE
4. Cristutiu, I.M, Dogariu, A., Nagy, Zs., *Technical-economical performance of standardised steel halls*, (in Romanian), Stability and Ductility of Steel Structures - Recent Developments, ISBN (13)978-973-661-977-9, Mirton Publishing House, Timisoara, 2006, pp. 93-104
5. Cristutiu, I.M., Grecea D., Dubina D., *Performance based design for low dissipative steel structures*, International Colloquium on Stability and Ductility of Steel Structures, SDSS'06, Lisbon, Portugal, September 6-8, 2006. pp. 927-934
6. Cristutiu, M., Dubina, D., Stratan, A., Grecea, D., *Moment-rotation characteristics of bolted beam-to-column connections of pitched-roof portal frames with class 3 and 4 sections*. Proceedings 5th International Conference on Behaviour of Steel Structures in seismic areas - STESSA 2006, August 14-17, 2006, Yokohama, Japan, Taylor&Francis / Balkema, London, 2006, (Eds. F.M. Mazzolani, A. Wada), pp. 291-298
7. Dubina, D., Fulop, L., Aldea, A., Demeteriu, S., Nagy, Zs., *Seimic performance of Cold-formed Steel Framed Houses*, Proceedings 5th International Conference on Behaviour of Steel Structures in seismic areas - STESSA 2006, 14-17 August 2006, Yokohama, Japan, Taylor&Francis / Balkema, London, 2006, (Eds. F.M. Mazzolani, A. Wada), pp. 429-435
8. Dubina, D., Nagy, Zs., Stratan, A., Fulop, L., Ungureanu, V., *Design assisted by testing of cold-formed steel frame structures*, Proc. 10th Nat. and 4th Int. Conf. "Planning, design, construction and the construction industry", Editors R. Folic, V. Radonjanin, M. Trivunic, Novi Sad, November 22-24, 2006, pp. 203-212
9. Dubina, D., Ungureanu, V., Ticle, D., Neagoie, B., *Implementation of Local Plastic Mechanism Approach in the General Method of Eurocode3 – Part 1–1 Applied to Lateral-Torsional Buckling of Thin-Walled Cold-Formed Beams.* Proceedings of the International Colloquium on Stability and Ductility of Steel Structures – SDSS2000, Lisabona, Portugalia, 6-8 September 2006, Volume 2, pp. 647-654
10. Georgescu, M., *Distortional behaviour of Z purlins continuously connected to sandwich panels roofs.* Proceedings of the International Conference in Metal Structures: Steel – A New and Traditional Material for Building. Poiana Brasov, Romania, September 20-22, 2006, Eds. D. Dubina & V. Ungureanu, Taylor & Francis Group / Balkema, ISBN (10)0-415-40817-2, ISBN (13)0-415-40817-2, pp. 143-148
11. Georgescu, M., *Distortional behaviour of Z purlins with continuous connection to sandwich panels roofs*, (in Romanian), Stability and Ductility of Steel Structures - Recent Developments, ISBN (13)978-973-661-977-9, Mirton Publishing House, Timisoara, 2006, pp. 33-42
12. Nagy, Zs., Stratan, A., Dubina, D., *Application of Component Method for Bolted Cod-formed Steel Joints.* Proceedings Int Conference in Metal Structures: Steel – A New and Traditional Material for Building, Poiana Brasov, Romania, September 20-22, 2006, Eds. D. Dubina & V. Ungureanu, Taylor & Francis Group / Balkema, ISBN (10)0-415-40817-2, ISBN (13)0-415-40817-2, pp. 207-210
13. Neagoie, B., Ungureanu, V., Dubina, D., *Beams from cold-formed profiles and corrugated steel sheets*, Stability and Ductility of Steel Structures - Recent Developments, ISBN (13)978-973-661-977-9, Mirton Publishing House, Timisoara, 2006, pp. 57-70
14. Ruff, Á., Ungureanu, V., Muntean, N., *Numerical procedure for Strength and stability check of a new series of liner trays*, Stability and Ductility of Steel Structures - Recent Developments, ISBN (13)978-973-661-977-9, Mirton Publishing House, Timisoara, 2006, pp. 71-78
15. Stratan, A., Nagy, Zs., Dubina, D., *Cold-formed steel pitched-roof portal frames of back-to-back plain channel sections and bolted joints*, Proc. 18th Int. Specialty Conf. "Recent research and developments in cold-formed steel design and construction", Orlando, Florida, USA, Oct. 26-27, Univ. of Missouri-Rolla, Ed. R.A. LaBoube, W-W. Yu, pp. 351-365
16. Ungureanu, V., Bambach, M., *Plastic strength of thin-walled I-section members subjected to minor axis bending*, Proceedings International Conference in Metal Structures: Steel – A New

and Traditional Material for Building, Poiana Brasov, Romania, September 20-22, 2006, Eds. D. Dubina & V. Ungureanu, Taylor & Francis Group / Balkema, ISBN (10)0-415-40817-2, ISBN (13)0-415-40817-2, pp 251-256

ONGOING PhD THESIS

- Agnes Ruff: *Influence of connections on the behaviour of thin walled purlins overlapped on supports*, PhD supervisor Prof. Dan Dubina
- Daniel Ţicle: *Behaviour of cold-formed steel structural elements in post-elastic domain*, PhD supervisor Prof. Dan Dubina
- Bogdan Neagoie: *Structural detailing of steel girders with flanges made of cold-formed sections and corrugated sheet web*, PhD supervisor Prof. Dan Dubina

COMPLETED PhD THESES

- Cristutiu, I.-M.: *Stability and ductility of pitched-roof portal frames used for lightweight industrial steel buildings made from variable element of class 3 and 4 cross sections*, PhD supervisor Prof. Dan Dubina. Date sustained: December 9, 2006. An international PhD jury was organised, including professor Luis Simoes da Silva from University of Coimbra, Portugal and Jean-Pierre Jaspart from University of Liege, Belgium
- Nagy, Zs.: *Structural configuration and performance of steel industrial halls from light-gauge cold-formed profiles*, PhD supervisor Prof. Dan Dubina. Date sustained: December 9, 2006. An international PhD jury was organised, including professor Rafaelle Landolfo from the University Federico II of Naples, Italy.

OTHER RESULTS

- Organisation of the International Conference in Metal Structures: *Steel – A New and Traditional Material for Building*. Poiana Braşov, Romania, 20-22 September 2006
- Member of the CEMSIG research center, L.A. Fulop, performed a research stage at VTT – the Technical Research Centre of Finland within a Marie Curie scholarship.

FURTHER DEVELOPMENTS

- Influence of residual stresses on the ultimate capacity of cold-formed steel members
- Strength and ductility of thin-walled steel sections and structural systems under monotonic and cyclic loading
- Built-up cold-formed steel beams with corrugated web
- Post-elastic capacity of Z purlins with overlapped joints
- Shear walls from cold-formed steel cassettes

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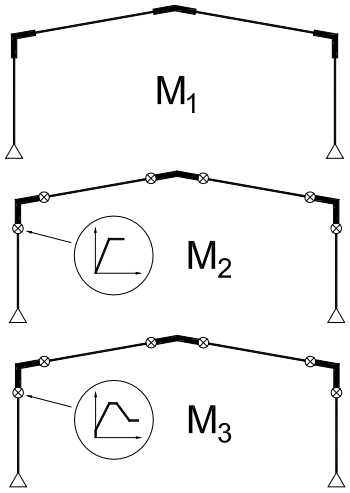
EXAMPLES

1. Full–scale testing of cold-formed steel pitched-roof portal frames of back-to-back channel sections and bolted joints

The experimental program was carried out in order to evaluate performance of pitched roof cold-formed steel portal frames of back-to-back channel sections and bolted joints. Three different configurations of ridge and eaves joints were tested. The behaviour and failure mechanisms of joints were observed in order to evaluate their stiffness, strength and ductility. Joints between cold-formed members with bolts in the web only result in reduction of joint moment capacity and premature web buckling.



Numerical models

The component method was applied in order to characterise joint stiffness and moment capacity on the purpose of frame analysis and design. Influence of joints characteristics on global frame response under lateral (seismic) loads was analysed by considering three connection models. Full-scale tests were performed cold-formed pitched-roof portal frames.

Experimental test

RESEARCH TEAM: STEEL STRUCTURES AND BRIDGES

GENERAL PRESENTATION

The main function of a bridge is to carry vehicular or other traffic over a crossing, safety and economically. Rehabilitation and maintenance of existing steel bridges is one of the most important actual problems. The majority of railway existing steel bridges that have been built at the turn of the last century are riveted structures. Many of these bridges are still in operation after damages, several phases of repair and strengthening. The problem of these structures is the assessment of the present safety for modern traffic loads and the remaining service life. Replacement with new structures raises financial, technical and political problems. Along with the classical method of damage accumulation, a new approach based on the fracture mechanics principles is proposed.

In the last 10- 15 years an increased number of composite railway bridges have been built on the Romanian Railway Network. The principal advantages of these bridges are: a better functional response, reduction of maintenance costs, minimization of noise and environmental problems. These structures have been adopted on the new railway lines, or for replacing the existing old bridges. For small spans (L = 5 – 20 m) slabs with included steel (embedded) profiles are used; for spans between 6 – 32 m plate girder bridges are preferred. For large spans L = 30 – 80 m cross sections formed by two composite truss girders gives very suitable solutions in terms of economy and maintenance.

OBJECTIVES

The main objectives of the research team are the design and maintenance of steel structures, especially bridges. One of the main tasks in present is the assessment of the remaining safety of existing steel structures and bridges.

A fracture mechanics concept for the safety of existing steel structures was developed.

The team is also involved in collaboration with ISIM (National Institute for Welding and Testing of Materials) in the direction of the courses for International Welding Engineering and in the field of material choice for welded structures based on fracture mechanics criteria.

A special field of collaboration is the introduction of the new proceeding of friction stir welding in the case of steel bridges.

MAIN RESEARCH FIELDS

- ***Safety in Operation and Rehabilitation of Existing Steel Bridges***

Keywords: existing steel structures, verification, safety in operation, rehabilitation, fracture mechanics.

- ***New Welding Technologies – Friction Stir Welding***

Keywords: friction stir welding, aluminium alloys, state of the art, fatigue.

- ***Composite bridges - Structures with embedded girders***

Keywords: concrete deck, steel girders, embedded girders, railway, examples, projects.

Researches in *SAFETY IN OPERATION AND REHABILITATION OF EXISTING STEEL BRIDGES*

FIELD DESCRIPTION

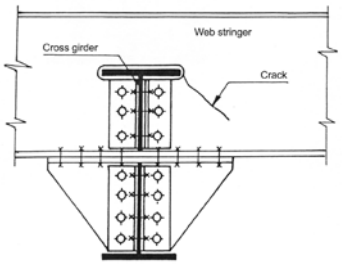
Rehabilitation and maintenance of existing steel bridges is one of the most important actual problems. The infrastructure in Romania and in other East – European countries has an average age of about seventy to ninety years. Many of these structures, particularly railway bridges, have already achieved an age of ninety, hundred or even more years and are still in operation after damages, several phases of repair and strengthening. To maintain these structures is one of the most important tasks of our society. Today, the budget of the administration and the owners (i.e. the railways and highway companies) get smaller. In consequence it is necessary to invest the available money where there will be the greatest benefit. Therefore, those responsible for the decisions need information about the safety of the structure, the remaining life, the costs for maintenance etc. Nobody will take the responsibility for failure of a structure as a result of budget restrictions. During service, bridges are subject to wear. In the last decades the initial volume of traffic has increased.

The present tendency to raise the speed on the main lines to a level of $v \leq 160$ km / h (European corridors) must be emphasised.

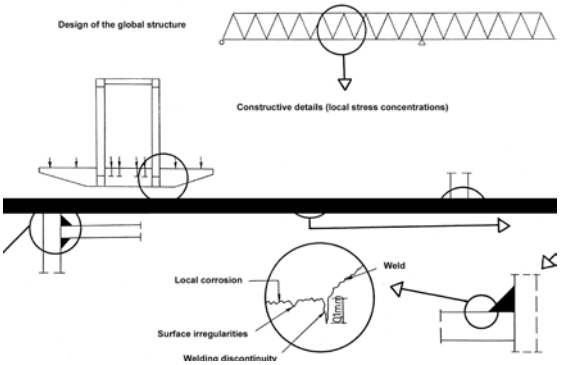
There is a big variety of structural types. Most of the bridges are simple supported girders (rarely continuous); depending on the cross section there are deck or trough bridges. The majority of them are plate or truss girder bridges; other constructive systems like twin girders or embedded girders can also be noticed.

Therefore many bridges require an inspection. The examination should consider the age of the bridge and all repairs, the extent and location of any defects etc. A continuous maintenance, which generally must increase in time, is important in order to assure the safety in operation of the existing structures. The classical fatigue concept is based on the assumption that a constructive element has no defects or cracks. However, discontinuities and cracks in the components of structures are unavoidable, basically because of the material fabrication and the erection of structures. It is very clear that the kind of fatigue cracks, which are initiated by structural non-homogeneity (possible non-metallic inclusions or other impurities), surface defects (including corrosion) and the stress factor, are present in the old riveted structures.

However, from the overall examination of a large number of bridges many defects can be pointed out. The defects are widespread, having a heterogeneous character from the point of view of location, development and development tendency; their amplification was also due to the climate and polluting factors that caused the reduction of the cross section due to corrosion. Statistically, in 283 from among 1090 welded bridges cracks were detected and repaired.



Crack in continuous stringer



Influence of constructive details

The presence of cracks in structural elements modifies essentially their fracture behavior. Fracture, assimilated in this case as crack dimensions growth process under external loadings, will be strongly influenced by the deformation capacity of material. The FM approach has acceleration in damage increase; with increasing damage a smaller stress range contribute to the damage increase. Along with the classical method of damage accumulation, a new approach based on the fracture mechanics principles is proposed.

ACTIVITIES

- Processing of experimental crack growth rate for welded details.
- Fracture mechanics approach based on FM experimental tests in order to establish the crack growth rate.
- Procedure to assess the safety in operation of existing steel bridges – riveted and welded bridges.

RESEARCH TEAM

- Prof.dr.eng. Radu Băncilă, *Steel and composite steel-concrete structures and verification of existing steel structures*
- Lect.dr.eng. Edward Petzek, *Steel and composite bridge structures and assessment of safety in operation of existing steel structures based on FM principles*
- Lect.dr.eng. Dorel Bolduş, *Verification and Rehabilitation of Steel bridge structures*
- PhD student eng. Anca Gido

RESEARCH OFFERS

- Verification of existing steel structures based on modern methods.
- Estimation of the present safety of existing steel railway and highway steel bridges based on fracture mechanics principles.
- Critical details – fracture mechanics models, remaining service life analysis.
- Consulting and rehabilitation of steel bridges.

RESEARCH PROJECTS

1. Grant AT CNCSIS, *Procedure guide for the application of fracture mechanics principles to the assessment of safety in operation and remaining fatigue life of existing steel bridges*; Director: Sen. lect. dr. eng. Edward Petzek

Fatigue tests on double T welded girders

2. *The rehabilitation of highway steel bridge in Savarsin (1897) – technical project.*

Director: Prof.dr.eng. Radu Bancila;
Team: Sen.lect.dr.eng. Dorel Boldus
Sen.lect.dr.eng. Edward Petzek
Assoc.prof.dr.eng. Attila Földvary
PhD student Ramona Gabor
PhD student Anca Gido

Sand blasting of the structure

Riveting of the new strengthening steel elements

BOOKS

Petzek, Edward, *Elaborarea de instrucţiuni pentru aplicarea principiilor mecanicii ruperii la stabilirea siguranţei în exploatare şi a duratei de viaţă rămase a podurilor metalice existente*, Orizonturi Universitare Publishing House, ISBN (10)973-729-091-7, ISBN (13)978-973-729-091-5, Timisoara, 2006

PUBLISHED PAPERS

1. Băncilă, R., Petzek, E., Boldus, D., *Extended life for old highway bridges from the western part of Romania*, Steel – a New an Traditional Material for Building, Ed. Taylor & Francis Group, London, ISBN 0-415-40817-2, pp. 583-593, 2006
2. Petzek, E., Băncilă, R., *Methodology for the assessment of remaining fatigue life for existing welded railway bridges*, Steel – a New an Traditional Material for Building, Ed. Taylor & Francis Group, London, ISBN 0-415-40817-2, pp. 627-633, 2006
3. Băncilă, R., Petzek, E., Gabor, R., *General Concepts Regarding the Rehabilitation of Old Steel Highway Bridges*, INDISS'06, ISBN 86-7892-016-5, Novi Sad, 22 Nov. 2006
4. Băncilă, R., Petzek, E., Teodorescu, D., *The history and development of welded structures in particular bridges in Romania*, South-East European Welding Congress, pp. 63-75, ISBN (10)973-8359-41-4, 2006
5. Boldus, D., Petzek, Băncilă, R., *Fatigue assessment of welded highway bridges*, South-East European Welding Congress, pp. 158-168, ISBN (10)973-8359-41-4, 2006
6. Petzek, E., Băncilă, R., Boldus, D., *Extinderea duratei de viaţă a podurilor metalice de şosea cu durată mare de exploatare din vestul ţării*, Congresul Naţional de Drumuri şi Poduri, Ed. a X-a, Bucharest, Sept. 2006, published on CD
7. Petzek, E., Băncilă, R., *Criteria for the assessment of existing highway bridges*, Scientific Bulletin of the Technical University Gh. Asachi from Iaşi (in press)

FURTHER DEVELOPMENTS

- Proposal for actualization of the present Romanian Code.

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Researches in NEW WELDING TECHNOLOGIES – FRICTION STIR WELDING

FIELD DESCRIPTION

Friction Stir Welding - FSW was invented and patented in 1991. The researches are focused on the application of this new proceeding in the field of bridges. Some typical details and their behavior on fatigue will be studied.

ACTIVITIES

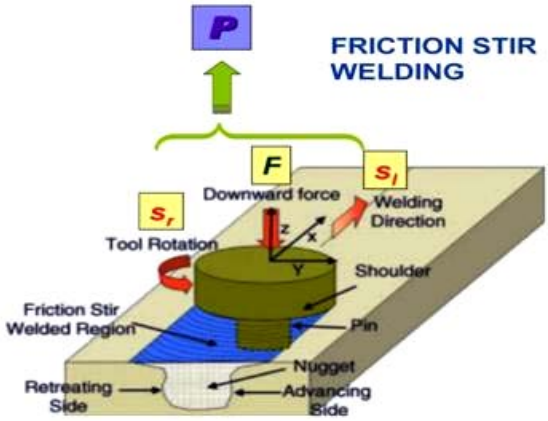
- State of the art in the field of FSW.
- Lectures at the International Welding Engineer courses organised by the Welding Institute Timişoara.
- Choice of some FSW typical details for bridges.

RESEARCH TEAM

- Prof.dr.eng. Radu Băncilă, *steel welded structures*
- Lect.dr.eng. Dorel Bolduş, *steel welded structures*
- Lect.dr.eng. Edward Petzek, *fracture mechanics and choice of materials*
- PhD student Ramona Gabor, *Friction Stir Welding*

RESEARCH OFFERS

- Welds analysis.
- Design of welded steel structures especially steel bridges.



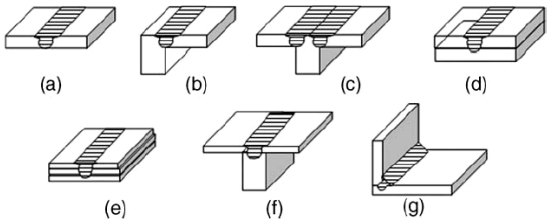
RESULTS

RESEARCH PROJECTS

CEEX Project P-CD 66/2006 - MATNANTECH, TIMPAV, (2006-2008), *Innovative and Ecological Technologies for Processing Advanced Materials*

FURTHER DEVELOPMENTS

- Design of an experimental program for studies of typical connections with FSW for bridge structures, especially bridge plates.



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Researches in *COMPOSITE BRIDGES - STRUCTURES WITH EMBEDDED GIRDERS*

FIELD DESCRIPTION

In the last 10- 15 years an increased number of composite railway and highway bridges have been built. The principal advantages of these bridges are: a better functional response, reduction of maintenance costs, minimization of noise and environmental problems. These structures have been adopted on the new railway lines, or for replacing the existing old bridges. For small spans (L = 5 – 20 m) slabs with included steel (embedded) profiles are used; for spans between 6 – 32 m plate girder bridges are preferred. For large spans L = 30 – 80 m cross sections formed by two composite truss girders gives very suitable solutions in terms of economy and maintenance.

ACTIVITIES

- Design guide for bridges with embedded girders.

RESEARCH TEAM

- Prof.dr.eng. Radu Băncilă, *composite structures and bridges*
- Lect.dr.eng. Edward Petzek, *composite bridges*
- PhD Stud. Ramona Gabor.

RESEARCH OFFERS

- Design guide
- Technical solution and projects.
- Consulting.
- Design examples for typical bridges.

RESULTS

BOOKS

Petzek, E., Băncilă, R., *Alcătuirea şi calculul podurilor cu grinzi metalice înglobate în beton*, Ed. Orizonturi Universitare, Timişoara, 2006, ISBN 10-973-638-283-4, ISBN 13-978-973-638-283-3

FURTHER DEVELOPMENTS

- Design examples for composite structures and bridges according to Eurocodes and DIN Fachbericht 101, 102, 103 and 104.

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NATIONAL RESEARCH CENTRE IN CIVIL ENGINEERING AND FATIGUE – *CNCCO*

GENERAL PRESENTATION

CNCCO - This research centre has been created in 2002, as a consequence of a grant co-financed by the Romanian Government and the World Bank. It is a multi-user research centre. We are in relations of partnership with the Technical University of Civil Engineering Bucharest, Technical University of Iaşi, Technical University of Cluj-Napoca, "Eftimie Murgu" University of Reşiţa, "Lucian Blaga" University of Sibiu, University of Petroşani.

OBJECTIVES

CNCCO - The main objective of the centre is the developing of highly qualified human resources for higher education and scientific research.
Special attention is given to youth training, by attracting students to major research programs performed by our experienced team, in which they are making use of our high-performance research infrastructure,

CNCCO - offers research, expertise, consulting design and testing services for structures and materials used in civil and mechanical engineering.

MAIN RESEARCH FIELDS

- ***Nonlinear analysis of structures***

Keywords: nonlinear, static, dynamics, stability, rigid, semi-rigid connections

- ***Computational Methods, Computer Aided Design, Computer Aided Engineering***

Keywords: finite elements, boundary elements, design, CAD, CAE, training center

- ***Earthquake Engineering***

Keywords: multistory steel frames, earthquake, global performance, ductility, beam-to-column

connections, reliability, bearing capacity, safety, damaged elements, seismic events, maintenance

- ***Fatigue and fracture of materials***

Keywords: fatigue, fracture

Researches in *NONLINEAR ANALYSIS OF STRUCTURES*

FIELD DESCRIPTION

Nonlinear elastic and elastic-plastic analysis of structures under static and dynamic loads is treated. The influence of beam-to-column joint flexibility on the structural behaviour is evaluated. Post critical analysis is performed. Several connection types are taken in consideration. An optimum response of the entire structure is the final goal.

ACTIVITIES

- Intensive numerical and experimental investigations were performed on the behaviour of steel frames, plane plates and shells in both pre and post-buckling domains
- Experimental tests were performed in order to find the mechanical characteristics of materials

RESEARCH TEAM

- Prof.dr.eng. Marin IVAN
- Prof.dr.eng. Mircea IEREMIA
- Assoc.prof.dr.eng. Adrian IVAN
- Assist.eng. Dumitru FLORESCU
- PhD student eng. Viorel POPA-ALBU
- PhD student eng. Teodor LEŢ
- PhD student eng. Dănuţ CĂLUGĂR
- PhD student eng. Vinicius PRECUPAŞ

RESEARCH OFFERS

- Advanced static and dynamic finite element analysis of civil engineering structures
- Expertise, consulting, design checking services
- Design activities for steel, concrete and timber structures
- Experimental testing services

RESULTS

RESEARCH PROJECTS

1. Contract no. 276/2006: *Technical expertise of the web and lower flange of the 160 kN runway of the overhead travelling crane from the machine room of Iron Gates I*, Beneficiary: Hidroconstrucţia S.A. Bucharest, Porţile de Fier Subsidiary, Value: 10,000 RON

PUBLISHED PAPERS

Let T., Ivan M., Botici Al., *Interaction curves for circular cylinders subjected to combined loads*, International Conference on Metal Structures, CIMS 2006, Taylor&Francis/Balkema Publishing House, Brasov, 2006, 8 pages, ISBN (13)978-0-415-40817-2

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Researches in *COMPUTATIONAL METHODS, COMPUTER AIDED DESIGN, COMPUTER AIDED ENGINEERING*

FIELD DESCRIPTION

Finite element models together with CAD tools are highly required in order to obtain optimal structural solutions. The problem is important for both civil and mechanical engineering. The next step in this domain consists in the development of some expert systems for design and expertise.

ACTIVITIES

- Developing of small computer programs dedicated to specific civil engineering problems
- Creating interfaces between large specialized computer programs and the ones previously mentioned
- Testing of the new versions of complex computer programs for accuracy
- Developing numerical procedures to evaluate the bearing capacity of the damaged structures

RESEARCH TEAM

- Assoc.prof.dr.eng. Adrian IVAN
- Assist.eng. Dumitru FLORESCU
- Assist.eng. Eugen DOGARIU
- PhD student eng. Dănuţ CĂLUGĂR
- Assist.eng. Dan COSMA

RESEARCH OFFERS

- Consulting, design, training services
- CAD/CAE services
- Finite element analysis software checking

RESEARCH PROJECTS

Contract no. 438/2006, *Design projects for the steel structures of the waste water treatment plant of HOCHLAND*, Beneficiary: S.C. SIMONT S.A., Sibiu, Value: 27,250 RON

FURTHER DEVELOPMENTS

- Testing of the new versions of complex computer programs for accuracy
- Developing numerical procedures to evaluate the bearing capacity of the damaged structures

CONTACT PERSON

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Researches in *EARTHQUAKE ENGINEERING*

FIELD DESCRIPTION

The main objectives of the range are: keeping the safety of the new civil engineering works through designing, cladding and maintenance, assessment of the residual bearing capacity of damaged elements of a structure, recovering the initial bearing capacity of the damaged structures to resist to the new seismic events, new resistant systems for the high-raised steel buildings.

ACTIVITIES

- Linear and non-linear dynamic response analysis of civil engineering structures subjected to seismic loads
- New seismic protection solutions for structures (base isolation, dampers)
- Evaluation of the bearing capacity of the strengthened structures

RESEARCH TEAM

- Prof.dr.eng. Marin IVAN
- Prof.dr.eng. Mircea IEREMIA
- Prof.dr.eng. Iuliu DIMOIU
- Prof.dr.eng. Zoe REGEP
- Assoc.prof.dr.eng. Adrian IVAN
- PhD student eng. Octavian MOCIAN

RESEARCH OFFERS

- Non-linear dynamic response analysis of civil engineering structures subjected to seismic loads
- Expertise, consulting, design checking services

PUBLISHED PAPERS

I. Dimoiu, G. Brandas, O. Mocian, *Inelastic seismic behaviour of a steel frame on different type of soil*, International Conference on Metal Structures, CIMS 2006, Taylor&Francis/Balkema Publishing House, Brasov, 2006, 8 pages, ISBN (13)978-0-415-40817-2

CONTACT PERSONS

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RESEARCH CENTRE FOR MATERIALS AND STRUCTURES *CES-MAST*

GENERAL PRESENTATION

The research centre for materials and structures was founded in 2000. Significant achievements of the centre researches are obtained in the field of new materials, structural design and rehabilitation of different constructions types: reinforced and prestressed concrete, masonry, wooden, composite steel-concrete.
Researches are in close relation with practice and the present and future needs of construction industry.

MAIN RESEARCH FIELDS

- **New construction materials**

Keywords: high performance concrete, additives, fly-ash, phosphogypsum, self-compacting concrete, experimental tests

- **Rehabilitation of reinforced concrete and masonry structures by using CFRP**

Keywords: reinforced concrete, masonry, modern rehabilitation solutions, CFRP, tests

- **Behaviour and rehabilitation of masonry shear walls at seismic actions**

Keywords: masonry shear walls, reinforced masonry, experimental tests, rehabilitation solutions

- **New alternative methods for design of reinforced concrete structural elements**

Keywords: reinforced concrete, shear walls, strut-and-tie method design, experimental tests

- **Optimisation of composite steel-concrete building structures in seismic area**

Keywords: composite steel concrete elements, structural design, rehabilitation, experimental test

CONTACT

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Researches in *NEW CONSTRUCTION MATERIALS*

FIELD DESCRIPTION

New construction materials are tested for finding out the physical and mechanical characteristics in order to be used according to their quality.

ACTIVITIES AND RESULTS

The laboratory tests provide: mechanical strengths, shrinkage, creep, permeability, freezing resistance, abrasion resistance, etc., for materials including fly-ash, lime, phosphogypsum and microsilica. The results are used for the confirmation of the products as: materials with high mechanical performances as well as with insulating properties.

RESEARCH TEAM

- Prof.dr.eng. Iosif BUCHMAN
- Prof.dr.eng. Corneliu BOB
- Assoc.prof.dr.eng. Eugen JEBELEANU
- Assist.dr.eng. Cătălin BADEA
- Assist.eng. Liana IUREŞ

RESEARCH OFFERS

New construction materials, physical and mechanical tests for different materials

Researches in *REHABILITATION OF REINFORCED CONCRETE AND MASONRY STRUCTURES BY USING CFRP*

FIELD DESCRIPTION

Reinforced concrete structures and masonry structures damaged by different actions, or subjected to functional modifications, must be examined and rehabilitated. Efficient structural rehabilitation are studied and experimentally tested for reinforced concrete structures and masonry structures. The main aspects are related with the use of CFRP - carbon fibre reinforced polymers at rehabilitation of reinforced concrete frames and shear walls and masonry structures.

ACTIVITIES

Activities provided: technical examination of existing constructions, inspection by non-destructive and destructive methods, theoretical studies and experimental tests on the behaviour of different structure types - masonry shear walls, reinforced concrete frames and shear walls, strengthening by using CFRP different types, rehabilitation projects.

RESEARCH TEAM

- Prof.dr.eng. Valeriu STOIAN
- Prof.dr.eng. Corneliu BOB
- Assist.dr.eng. Tamas NAGY-GYORGY
- Lect.dr.eng. Sorin DAN
- Lect.dr.eng. Daniel DAN
- Eng. Cosmin DĂESCU
- Eng. Dan DIACONU
- Eng. Codruț FLORUȚ
- Eng. I. DEMETER

RESEARCH OFFERS

Efficient structural rehabilitation solutions, design tools, experimental tests.

Researches in *BEHAVIOUR AND REHABILITATION OF MASONRY SHEAR WALLS AT SEISMIC ACTIONS*

FIELD DESCRIPTION

Studies on the behaviour of reinforced masonry shear walls at seismic actions are performed in order to provide new technical structural solutions. Existing masonry structures damaged by different actions, or subjected to functional modifications, must be examined and repairing solutions have to be indicated.

ACTIVITIES

Activities provided: studies related to the behavior of masonry shear walls, technical examination of existing constructions, inspection by non-destructive and destructive methods, rehabilitation solutions according to the norms.

RESEARCH TEAM

- Prof.dr.eng. Dan TUDOR
- Prof.dr.eng. Sevastean IANCA
- Prof.dr.eng. Valeriu STOIAN
- Lect.dr.eng. Daniel DAN
- Eng. Dan DIACONU
- Eng. Codruț FLORUȚ

RESEARCH OFFERS

Experimental tests, design, technical examinations of existing masonry structure.

Researches in *NEW ALTERNATIVE METHODS FOR DESIGN OF REINFORCED CONCRETE STRUCTURAL ELEMENTS*

FIELD DESCRIPTION

Efficient structures realised using reinforced concrete are the main purpose of theoretical and experimental studies. The main aspects are related with the use of the optimal design of reinforced concrete elements for

civil buildings and bridges, non-linear analysis of reinforced concrete shear walls.

ACTIVITIES

Activities provided: studies related to behavior of different reinforced concrete structural types like shear walls, short cantilever, coupling beams, design procedure by the strut-and-tie method for the reinforced concrete elements.

RESEARCH TEAM

- Prof.dr.eng. Tudor CLIPII
- Prof.dr.eng. Alexandru TOMA
- Prof.dr.eng. Valeriu STOIAN
- Prof.dr.eng. Sevastean IANCA
- Lect.dr.eng. Sorin DAN
- Lect.dr.eng. Daniel DAN
- Assist.eng. Marina LUTE
- Assist.dr.eng. Tamas NAGY-GYORGY

RESEARCH OFFERS

Efficient structural solutions, design tools, experimental tests.

Researches in *OPTIMISATION OF COMPOSITE STEEL-CONCRETE BUILDING STRUCTURES IN SEISMIC AREA*

FIELD DESCRIPTION

Building construction industry is in development in the last decade. The specific developments consists of new construction materials, new structural solutions with high performance parameters, new technologies. These tendencies characterises the recent successful construction works. In this respect the studies concerning the structural solutions realised with steel concrete elements becomes a necessity, being highly motivated for the structures placed in seismic areas.

ACTIVITIES

- research activity in the field of the steel concrete structures, mainly for those placed in seismic area
- technical instructions for the design of the steel concrete elements
- refurbishment methodology using steel concrete elements
- dedicated software for structural non-linear analysis of the steel concrete elements

RESEARCH TEAM

- Prof.dr.eng. Valeriu STOIAN
- Assoc.prof.dr.eng. Agneta TUDOR
- Lect.dr.eng. Daniel DAN
- Assist.eng. Marina LUTE

RESEARCH OFFERS

Mechanical tests for composite elements

RESEARCH PROJECTS

1. COST International Project: *Sustainability of Constructions. Integrated Approach to Life-time Structural Engineering*, Director: Prof. dr. eng. Valeriu STOIAN
2. CEEX National Project: *Innovative Solution for Optimisation of Self-Compacting Concrete Composition for Performance Using at Prefabricated Concrete Elements - SICOBET*, Director: Prof. dr. eng. Corneliu BOB, Value: 20,000 RON
3. CEEX National Project: *Multifunctional Nanocomposites Based on Supramolecular Architectures Having Optoelectronic, Photochemical, Electrochemical and Biologic Properties – Precursors for Advanced Materials - MAVOPTEL*, Director: Assoc. prof. dr. eng. Gheorghe FĂGĂDAR-COSMA, Value: 16,000 RON
4. CEEX National Project: *Advanced Systems for Strengthening Reinforced Concrete Structural Elements as Beams, Columns, Walls and Slabs Using Fibre Reinforced Polymer Composite Materials*, Director: Assist. prof. dr. eng. Tamas NAGY-GYORGY, Value: 45,000 RON
5. CNCSIS National Grant: *Strengthening Reinforced Concrete Structural Walls and Slabs with Cut-Out Openings Using Fiber Reinforced Polymer Composites*, Director: Prof dr. eng. Valeriu STOIAN, Value: 67,000 RON
6. CNCSIS National Grant: *Evaluation of Masonry Walls Stiffness Rehabilitated Using Different Procedures*, Director: Prof dr. eng. Sevastean IANCA, Value: 15,500 RON
7. CNCSIS National Grant: *Modern and Efficient Solutions for Strengthening of Reinforced Concrete and Masonry Structures*, Director: Lect. dr. eng. Sorin DAN, Value: 35,000 RON
8. CNCSIS National Grant: *Theoretical and Experimental Study Upon the Ductility of RC Columns Rehabilitated Using Composite Materials*, Director: PhD student eng. Cosmin DĂESCU, Value: 15,000 RON

PUBLICATIONS

BOOKS

1. Sevastean Ianca, *Architecture Elements*, "Politehnica" Publishing House, Timişoara, ISBN 973-625-333-3, 308 pages
2. Cornel Furdui, *Wooden Constructions. Materials and Design*, "Politehnica" Publishing House, Timişoara, ISBN 973-625-211-6, 388 pages
3. Dana Vlascici, Eugenia Fagădăr-Cosma, Otilia Bizerea, A. Chiriac, Gheorghe Făgădar-Cosma, *Aspects Regarding Porphyrins Theory*

and Applications, West University Publishing House, Timişoara, ISBN 973-125-008-5, 135 pages

4. Traian Oneţ, Tudor Clipii, Aurel Ciucureanu, *Structural Concrete*, Academic Society Matei-Teiu Botez Publishing House, Iaşi, ISBN 973-7962-85-0, 180 pages

5. Traian Berar, Dan Tudor, I. Maliţa, *Constructions and Elements of Forest Roads*, Orizonturi Universitare Publishing House, Timişoara, ISBN 973-638-278-9, 360 pages

PUBLISHED PAPERS

1. Jiva, C., Niţă, D., *Solutions for Crossing the Railway Bucharest-Arad on DN 7 at Arad*, International Symposium INDIS 2006 - Planning, Design, Construction and Renewal in the Construction Industry, Novi Sad, Nov. 2006, ISBN 86-7892-016-5

2. Jiva, C., Pavelescu, L., *The Consolidation of an Existing Reinforced Concrete Bridge*, International Symposium INDIS 2006 - Planning, Design, Construction and Renewal in the Construction Industry, Novi Sad, Nov. 2006, ISBN 86-7892-016-5

3. Jiva, C., Simion, H., Zglimbea, P., *Technical Evaluation of Existing Bridges from DRDP Timisoara*, The XII-th Romanian National Congress on Roads and Bridges, Sept. 2006 (published in Romanian)

4. Jiva, C., Jebelean, E., *Study Regarding the Time Behaviour of Bridge Structures, ,* The XII-th Romanian National Congress on Roads and Bridges, Sept. 2006 (published in Romanian)

5. Lute, M., *Non Destructive Assessment Method of Structural Integrity for Reinforced Concrete Elements,* The XI-th International Conference "Man in the Knowledge Based Organization", ISBN 973-7809-51-3

6. Lute, M., Tudor, A., *Behaviour of Composite Beams, Part of Composite Steel Concrete Frames Placed in Seismic Areas. Experimental Models*, The XI-th International Conference "Man in the Knowledge Based Organization", ISBN 973-7809-51-3

7. Făgădar-Cosma, E., Laichici, M., Făgădar-Cosma, G., Vlascici, D., *Synthesis, Characterization and Correlative Biological Effects in Wheat of a Benzoxaza- and a Diaza-Phosphorus(V) Heterocycles*, Journal of the Serbian Chemical Society, 71(10), 2006, ISSN 0352-5139, pp. 1031-1038

8. Făgădar-Cosma, E., Badea, V., Vlascici, D., Făgădar-Cosma, Gh., Bizerea, O., *The Characterization Of Some Para-Substituted Meso-Tetrakis-Phenylporphyrins By Electron Impact Mass Spectrometry*, Revue Roumaine de Chimie, 2006, ISSN 0035-3930

9. Făgădar-Cosma, E., Mărănescu, B., Enache, C., Savii, C., Făgădar-Cosma, Gh., *Alternatives for Obtaining of 5, 10, 15, 20 - Tetrakis (4-Hydroxyphenyl) - 21H, 23H - Porphine. Physico-chemical characterization*, Revista de Chimie, 57(110), 2006, ISSN 0034-7752, pp. 1144-1147

10. Făgădar-Cosma, E., Savii, C., Enache, C., Ionescu, C., Radu, R., Făgădar-Cosma, Gh., Fărcaş, S., *Advanced Silica-Matrix Materials Entrapping a Hydroxy-Substituted Porphyrin Compound. Synthesis and Characterization*, Journal of Optoelectronics and Advanced Materials, ISSN 1454-4164

11. Făgădar-Cosma, E., Costişor, O., Vlascici, D., Făgădar-Cosma, Gh., Marcela, B., Armeanu, I., *Metalloporphyrins Useful in Design of Thiocyanate Potentiometric Sensors - Functioning as Neutral carriers. Comparative Characterization*, 13th Symposium on Analytical and Environmental Problems, SZAB - Szeged, Hungary, Sept. 2006, ISBN 963-06-1205-4, pp. 84-87

12. Făgădar-Cosma, Gh., Badea, V., Vlascici, D., Făgădar-Cosma, E., Simon, M., *Analysis of Some Derivatives of Tetraphenylporphyrin by FT-IR and Mass Spectrometry*, 13th Symposium on Analytical and Environmental Problems, SZAB - Szeged, Hungary, Sept. 2006, ISBN 963-06-1205-4, pp. 88-91

13. Făgădar-Cosma, E., Costişor, O., Cseh, L., Făgădar-Cosma, Gh., Mărănescu, B., Tudose, R., Badea, V. , Csunderlik, C., *One Step Multicomponent Reaction for Simultaneously Obtaining of Mixed Unsymmetrically Hydroxy and Dimethoxy-phenyl Substituted Porphyrins*, 3rd International Conference on Multi-Component Reactions and Related Chemistry, Amsterdam, Netherlands (MCR 2006), July 2006, Abstract Book, Ed. University of Amsterdam, 2006, pp 21

14. Făgădar-Cosma, E., Savii, C., Enache, C., Ionescu, C., Radu, R., Făgădar-Cosma, Gh., Fărcaş, S., *Advanced Silica-Matrix Materials Entrapping a Hydroxy-Substituted Porphyrin Compound. Synthesis and Characterization*, MATEHN 2006, Sept. 2006, Cluj-Napoca, ISBN 973-751-300-2, pp. 128

15. Făgădar-Cosma, E., Enache, C., Savii, C., Făgădar-Cosma, Gh., *Design of Hybrid Nanomaterials Based on Silica-porphyrin Dye-sensitizer with Application to Photoelectrical Devices*, 1st International

IUPAC Conference on Green-Sustainable Chemistry, Dresda, Germany, Sept. 2006, ISBN 3-936028-41-9, pp. 428

16. Badea, C., Bob, C., *Building Materials Realized with Fly Ash and Silica Fume*, VII-th International Symposium Youngs and the Multidiciplinary Reserch, 2006, ISBN 973-8359-39-2, 7 pages
17. Badea, C., Bob, C., Buchman, I., Dan, S., *Self-Compacting Concrete (SCC) – Present and Future*, VII-th International Symposium Youngs and the Multidiciplinary Reserch, 2006, ISBN 973-8359-39-2, 6 pages
18. Badea, C., Bob, C., Buchman, I., *Building Materials with Industrial Waste*, International Interdisciplinary Symposium Universitaria SIMPRO 2006, Petroşani, Oct. 2006, ISSN 1842-4449, 6 pages
19. Bob, C., Dan, S., Badea, C., Iureş, L., *Reinforced Concrete Structures Rehabilitation by Using CFRP*, International Interdisciplinary Symposium Universitaria SIMPRO 2006, Petroşani, Oct. 2006, ISSN 1842-4449, 4 pages
20. Dan, S., Bob, C., Badea, C., Gruin, A., *Classic and Modern Technologies for Rehabilitation of Old Masonry Buildings*, International Interdisciplinary Symposium Universitaria SIMPRO 2006, Petroşani, Oct. 2006, ISSN 1842-4449, 4 pages
21. Dan, S., Bob, C., Badea, C., Gruin, A., *Strengthening of RC Framed Structures by Using CFRP*, International Interdisciplinary Symposium Universitaria SIMPRO 2006, Petroşani, Oct. 2006, ISSN 1842-4449, 4 pages
22. Bob, C., Dan, S., Badea, C., Gruin, A., *Life Assessment and Demolition of a RC Framed Structure*, 2nd FIB Congress, Naples, Italy, June 2006, ISBN 88-88972-06-8, pp 728-729
23. Dan, S., Bob, C., Iureş, L., *Assessment and Redesign of RC Existing Structures in Seismic Regions*, 2nd FIB Congress, Naples, Italy, June 2006, ISBN 88-88972-06-8, pp. 606-608
24. Bob, C., Dan, S., Badea, C., Gruin, A., *Refurbishment of Old Building by Classic and Modern Technologies*, IABSE Symposium, Responding to Tomorrow's Challenges in Structural Engineering, Budapest, Sept. 2006, ISBN 3-85748-114-5, pp. 130-131
25. Dan, S., Bob, C., Badea, C., Gruin, A., *Stregthening of Reinforced Concrete Framed Structures in Seismic Zones by Using CFRP*, National Symposium Structural Rehabilitation Solutions and Systems Using FRP Composites, Iaşi, 2006, ISBN 973-7962-88-5, pp. 195-202
26. Bob, C., Dan, S., Badea, C., Gruin, A., *Rehabilitation of Masonry Buildings by Classic and Modern Technologies*, National Symposium Structural Rehabilitation Solutions and Systems Using FRP Composites, Iaşi, 2006, ISBN 973-7962-88-5
27. Bob, C., Dan, S., Badea, C., Gruin, A., Iureş, L., *Rehabilitation of Reinforced Concrete Structures Subjected to Extreme Actions by Using CFRP*, National Symposium Structural Rehabilitation Solutions and Systems Using FRP Composites, Iaşi, 2006, ISBN 973-7962-88-5
28. Dan, D., Stoian, V., Nagy-Gyorgy, T., *Theoretical and Experimental Studies Concerning the Load Bearing Capacity of Steel and Composite Joints*, International Conference in Metal Structures – Steel, A New and Traditional Material for Building, Brasov, Sept. 2006, Ed. Taylor & Francis / Balkema, ISBN 0-415-40817-2
29. Dan, D., Stoian, V., Nagy-Gyorgy, T., *Experimental Tests Concerning the Behaviour of the Steel and the Composite Joints*, Scientific Bulletin of the Technical University Ghe. Asachi Iaşi, Tom LII (LVI), fasc 1-2/2006, ISSN 1224-3884
30. Nagy-Gyorgy, T., Stoian, V., Dan, D., Diaconu, D., Dăescu, D., *In Plan Shear Retrofit of Masonry Walls with FRP Composites – Experimental Investigations*, Scientific Bulletin of the Technical University Ghe. Asachi Iaşi, Tom LII (LVI), fasc 1-2/2006, ISSN 1224-3884
31. Stoian, V., Nagy-Gyorgy, T., Dan, D., Dăescu, C., Moşoarcă, M., Diaconu, D., *Polymeric Composites for Seismic Rehabilitations - Studies and Research*, INDIS 2006 - Planning, Design, Construction and Renewal in the construction industry, Novi Sad, Serbia, ISBN 86-7892-016-5
32. Dan, D., Stoian, V., Nagy-Gyorgy, T., *Numerical Analysis on Composite Connection Bridges with Small and Medium Spans*, INDIS 2006 - Planning, Design, Construction and Renewal in the construction industry, Novi Sad, Serbia, ISBN 86-7892-016-5
33. Stoian, V., Nagy-György, T., Dan D., *Experimental Test on Masonry Walls Retrofited with FRP*, National Symposium Symposium Structural Rehabilitation Solutions and Systems Using FRP Composites, Iaşi, 2006, ISBN 973-7962-88-5

34. Stoian, V., Nagy-György, T., Dăescu, C, Diaconu, D, *Theoretical and Experimental Study of Prestressed Concrete Beam Support Zone Strengthened with Composite Materials*, The 2-nd FIB Congress, Naples, Italy, June 2006, ISBN 88-88972-06-8

35. Nagy-György, T., Stoian, V., Gergely, J., Dan, D., *High Performance Materials Used in Retrofitting Structural Masonry Walls*, IABSE Symposium, Responding to Tomorrow's Challenges in Structural Engineering, Budapest, Sept. 2006, ISBN 3-85748-114-5

PhD THESIS

1. Ovidiu Abri, *Aspects Regarding Reinforcement Corrosion in Reinforced Concrete Structures*
2. Mihai Mișcă, *Studies of Workmanship Norms Regarding Dividing and Finishing Gypsum Walls for Constructions Made of Concrete and Other Types of Materials*

CERTIFIED LABORATORIES

REINFORCED CONCRETE LABORATORY

- Tests concerning behaviour of the reinforced concrete and prestressed elements and structures under service loads
- Tests concerning durability of concrete and/or prestressed elements.

MATERIALS LABORATORY

- Tests concerning mechanical, physical and chemical characteristics of building materials (building stone, sand and aggregates, mineral binders, mortars and concretes, bricks and tiles, building timber)
- Non-destructive tests concerning concrete resistances.

BUILDINGS LABORATORY

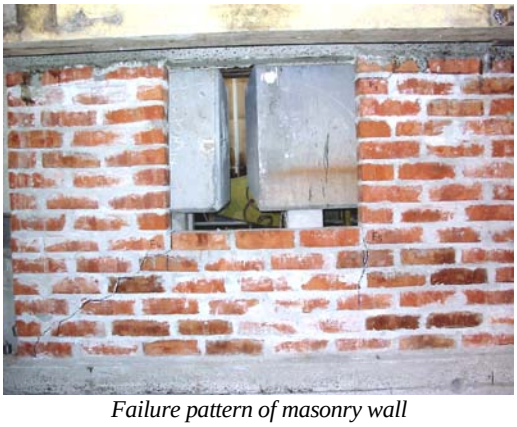
- Tests concerning the thermal conductivity of building materials and thermal insulation materials.

FURTHER DEVELOPMENTS

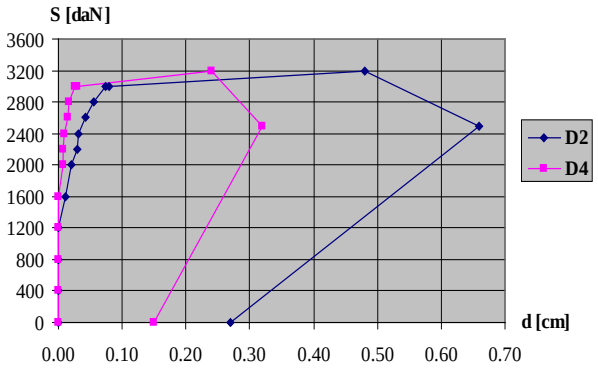
- In the field of construction materials will be developed new materials like high performance concrete, high performance concrete additives, fly-ash, phosphogypsum, self-compacting concrete, etc.
- In the field of structural rehabilitation of reinforced concrete and masonry structures new modern and efficient solutions are studied, tested and used in practice
- Behaviour and rehabilitation of masonry shear walls at seismic actions will be developed and new solutions will be studied
- New alternative methods for design of reinforced concrete structural elements are developed and proposed for different reinforced concrete structural elements
- Futher optimisation of composite steel-concrete building structures in seismic area will be performed

REMARKABLE ACHIEVEMENTS

1. **Strengthening of masonry walls** by using of near-surface technology by: Profiled Steel Bars, Brutt Helical Systems



Failure pattern of masonry wall



Horizontal displacements versus horizontal load

2. Study of the retrofitting solutions for brick masonry walls using different coating materials, as concrete reinforced with welded wire mesh, steel wire mesh, steel shear plates, respectivelly bonding composite materials (with carbon or glass fibres)

Brick masonry walls - baseline specimens

Wall retrofitted with composites

Wall retrofitted with welded wire mesh

Wall retrofitted with steel wire mesh

Wall retrofitted with steel shear plates

3. **Evaluation of Beams Stiffness from Composite Steel–Concrete Frames in Seismic Regions.** Experimental program purpose consists in evaluation of reinforced concrete slab contribution to the stiffness of the composite steel-concrete beam.

Experimental composite steel-concrete frames

Experimental frames tested at horizontal loads

RESEARCH CENTRE FOR BUILDING SERVICES

GENERAL PRESENTATION

In the Department of Building Services is functioning the Research Center for Building Services (CCIC), approved by CNCSIS in the year 2001 (certify with the number 57/CC-C) and the National Building Services Laboratory, abilities by MLPAT (authorization number 1019.04.08/2006) to effect technical agreements for products, proceeds and equipments for building services.

The Research Center for Building Services is structured in three compartments: *Sanitary Installations and Gases* (coordinator Prof.dr.eng. Adrian Retezan), *Thermal Installations* (coordinator Prof.dr.eng.eur.eng. Ioan Sârbu), *Electrical Installations and Automation* (coordinator Prof.dr.eng. Ioan Borza).

OBJECTIVES

The objectives of CCIC are the improvement of the complex specialization activities for building services, contributing with the obtained results to their perfection/modernization, efficiencies, renewing and to raise the qualification level of their members.

MAIN RESEARCH FIELDS

- **ambient comfort**

Keywords: comfort, heating, ventilation, water supply, electrical energy, temperature, humidity, air velocity

- **buildings energy**

Keywords: energy economy, energy management, heat transfer, buildings envelop, installations systems, energetically audit, energetically certificate, thermal rehabilitation

- **reducing energetically consumptions and looses in the transport and distribution systems of water and thermal energy**

Keywords: pipes, networks, hydraulic analysis, dimensioning, optimization, numerical modeling and simulation, recovery systems

- **utilization of renewable energy resources**

Keywords: unconventional energies, solar energy, thermal energy

- **computational methods, computer assisted design**

Keywords: numerical simulation, dimensioning, computer programs, planning methods, energetically analysis's

- **technical agreements for installations**

Keywords: heating and air conditioning systems, cooling systems, lightening, water distribution, components, technical agreement,

ACTIVITIES

- Tests and proofs for sanitary, heating, ventilation, conditioning, cooling and electrical installations, based on collaboration contracts with firms in this domain
- Tests and elaborate of documentation in order to obtain the technical agreements for products and equipments for installations
- Initialization and sustaining a program for preparing specialists to by authorized auditors in buildings energy
- Organizing the conference with international participation "Building Services and Ambient Comfort"
- Participation to national and international scientific manifestations

RESULTS

RESEARCH PROJECTS/CONTRACTS

1. Contract no. 466 / 2006, *Calculus methodology for buildings energetically performances, Part I – Buildings envelope* Beneficiary: UTC Bucureşti, Value: 4,560 RON
2. Contract no. 467 / 2006, *Calculus methodology for buildings energetically performances, Part II – Thermal installations* Beneficiary: UTC Bucureşti, Value: 4,560 RON
3. Contract no. 468 / 2006, *Calculus methodology for buildings energetically performances, Part III – Energetically audit* Beneficiary: UTC Bucureşti, Value: 4,059 RON
4. Contract no. 560 / 2006, *Thermo-energetically expertise, energetically audit and energetically certificate for 6 bloc of flats built in Resita* , Beneficiary: Town hall Reşiţa, Value: 147,560 RON
5. Contract no. 563 / 2006, *Elaboration of thermo-energetically expertise, audit and energetically certificate for 8 multistoried buildings in the town Salonta* Beneficiary: Town hall of Salonta, Value: 110,000 RON
6. Contract no. 9494 / 2006, *The produce of sturgeons in a super intensive system, in the conditions of a sustainable management for aquatic resources*, Beneficiary: U.S.A.M.V.B. Timişoara, Value: 20,000 RON
7. Contract no. 109 / 2004, *Studies and documents elaboration in order to obtain the technical agreement for water filters*, Beneficiary: INCERC Timişoara, Value: 2,100 RON

8. Contract no. 511 / 2006, *Proofing and specialty consultancies for heating, sanitary and gaze installations*, Beneficiary SC INSTGAT Timişoara, Value: 4,800 RON
9. Contract no. 406 / 2003 - 2006, *Professional perfecting program of engineer for building services, in order to obtain the certification as energetically auditor in buildings*, Beneficiary AIIR Timişoara, Value: 6,400 RON

BOOKS

1. Retezan, A., Sârbu, I., Borza, I., Cinca, M. (ed.) Proceedings of the International Conference "*Building Equipment and Ambient Comfort*", "Politehnica" Publishing House, Timişoara, 2006, ISBN 973-625-305-8, 618 pages

PUBLISHED PAPERS

1. Sârbu, I., Ceausescu, I., *Assurance of indoor climate in industrial buildings*, Conference "Building Equipments and Ambient Comfort" Timişoara, 2006, ISBN 973-625-305-8, pp. 273-283
2. Iosif, A., Sârbu, I., *Numerical simulation of axisymetric motion in Francis reversible runner*, Int. Conference on Hydroscience and Engineering, Philadelphia, USA, 2006, pp. 261-269
3. Iosif, A., Sârbu, I., *Simulation of liquid motion in Francis reversible runner using boundary element method*, Int. Symposium on Hydraulic Structures, Ciudad Guayana, Venezuela, 2006, pp. 322-327
4. Cinca, M., *Mechanical smokextractioning system for industrial buildings*, Journal: Plumber, Bucharest, no. 1-2, 2006, ISSN 1223-7418, pp. 44-47
5. Retezan, A., Retezan, R., *Regarding the specific water consumption*, Conference "Building Equipments and Ambient Comfort", Timişoara, 2006, ISBN 973-625-305-8, pp. 353-358
6. Retezan, A., Retezan, R., *Energetically aspects of water looses*, National Conference for Installations, Sinaia, 2006, ISBN 973-755-096-X, pp. 290-299
7. Retezan, A., Szabo, N. P., *Radon in buildings*, Conf. "Building Installations and Energy Economy", Iaşi, 2006, ISBN 973-667-189-5, pp. 76-83
8. Brata, S., Jura, C., *Optimization of fluid distribution network by constructive and functional ring balance*, Conference „Building Equipment and Ambient Comfort", Timişoara, 2006, ISBN 973-625-305-8, pp. 107-115
9. Brata, S., Jura, C., *Elaboration and application of analytically methods for optimizing electrical energy distribution networks*, Journal: Building Equipment Technique, Târgu Mureş, no. 7, 2006, ISSN 1582-6244, pp. 10-12
10. Brata, S., Jura, C. *Optimizing problems of networks structure for medium gas pressure distribution*, Conf. "Building Installations and Energy Economy", Iaşi, 2006, ISBN 973-667-189-5, pp. 85-293
11. Popescu, D., Borza, I., *The approximate models of objects transfer function with time delay and tuning of controllers*, Journal: Periodical Polytechnic Budapest, no. 50/2, 2006, ISSN 0324-6051, pp. 76-83
12. Popescu, D., Borza, I., *On-off control algorithms with inverted hysteresis for electric heating*, Journal: Debreceni Közlemények, no. 2, 2006, ISSN 1587-9801, pp. 145-153
13. Terzi, P., Borza, I., *Aspects regarding thermal plants optimizing*, Journal: Plumber, Bucharest, no. 4, 2006, ISSN 1223-7418, pp. 52-56
14. Cuziac, D., Banica, O., Borza, I., *Structural health monitoring with distributed wireless sensor networks*, Conference "Building Equipments and Ambient Comfort" Timişoara, 2006, ISBN 973-625-305-8, pp. 164-170
15. Bancea, O., *New concepts in the technique of building services*, Conference "Building Equipments and Ambient Comfort" Timişoara, 2006, ISBN 973-625-305-8, pp. 63-70

CERTIFIED LABORATORY

National Building Services Laboratory, abilities by MLPTL (authorization number 1019.04.08/2006)

PhD RESEARCH ACTIVITIES

1. *Prof.dr.eng.eur.eng. Ioan SÂRBU*, supervisor in the field of *Civil Engineering*

PhD students:

- Oana POPINA: *Modeling and optimization of thermal systems in civil buildings in order to reduce energy consumption*
- Horea BURA: *Study, research an optimizing of installations using heat pumps for energetically efficient buildings*

2. *Prof.dr.eng. Ioan BORZA*, supervisor in the field of *Civil Engineering*

PhD students:

- Florin LĂCĂTUŞ: *Optimizations of energetically consumption for building services with high comfort degree*

- Remus FILIP: *Contributions to the studies for the utilization of renewable energies in building installations*

3. *Prof.dr.eng. Adrian RETEZAN*, supervisor in the field of *Civil Engineering*

PhD students:
- Simona BĂDĂLUȚĂ: *Contributions for estimating water quality evolution in the water supply systems*
- Mariana GAVRIȘ: *Contributions for the study and optimizing hydraulic installations viability for the urban sewerage systems*

FURTHER DEVELOPMENTS

- to continue solving some research and designing themes, as well as with national research institutions and through collaborations with companies from our country
- realization of the research program "Annual energetically consumptions of heating, cooling and warm water supply in buildings" included in the professional – scientific collaboration program with U.T.E. Budapest
- creation of informatics system of type Internet at surrounding level and of some expert systems in the domain of installations for buildings, that will allow to promote specific information's for Romania and for countries that use already this systems development, complete and modernizing of the research base in order to achieve increased perform ability and competitively.

RESEARCH TEAM

- Prof.dr.eng. Adrian Retezan: *Ambient com-fort, Water treatment, Environment protection*
- Prof.dr.eng.eur.eng. Ioan Sârbu: *Buildings energy, Energy economy, Optimization, modeling and numerical simulations*
- Prof.dr.eng. Ioan Borza: *Electrical installations, Lightening systems, Energy economy*
- Prof.dr.eng. Dumitru Podrumar: *Thermal comfort, Energetically balances, Unconventional energies*
- Assoc.prof.dr.eng. Olga Bancea: *Thermal comfort, Modern air conditioning systems, Unconventional energies*
- Assoc.prof.dr.eng. Silviana Brata: *Thermo-technique for installations and buildings, Buildings energy, Hydraulic for thermal network*
- Assoc.prof.dr.eng. Mihai Cinca: *Thermal comfort, Heat recovering in industrial processes, Applications for informatically calculus*
- Lecturer dr.eng. Anton Iosif: *Hydraulic, Air and water pollution reducing systems, Numerical modeling and simulation*
- Lecturer dr.eng. Barbu Nicoară: *Electrotechnics, Electrical machines, Automatization in building services*
- Assist.eng. Ladislau Kardos: *Water and heat supply of buildings, Water treatment, Environment protection*
- Assist.eng. Gabriel Ostafe: I*nstallations and buildings thermotechnic , Energy economy*
- Prep.eng. Cristian Păcurar: *Optimization of heating systems, Energy management in buildings*
- Prep.eng. Florin Lăcătuș: *Electrical installations, Lightening systems*

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RESEARCH TEAM: GEOTECHNICAL ENGINEERING

GENERAL PRESENTATION

MAIN RESEARCH FIELDS

- **Studies and research regarding investigation of ground in laboratory and site**

Keywords: laboratory device, data processing, geotechnical investigation

- **Studies and research concerning isolation and protection solutions for buildings against vibrations transmitted by the soil**

Keywords: isolation, buildings, vibration, soil

- **Studies regarding slipping processes of soil massifs and consolidation solutions**

Keywords: instability, site investigation, consolidation methods

- **Execution technologies of foundation works based on vibration technique, horizontal drilling**

Keywords: under-crossing, drilling, vibration technique

MAIN ACTIVITIES

- Investigation of the foundation ground and verification of the fills compaction
- Exploitation of some industrial wastes in constructions.

Researches in *INVESTIGATION OF THE FOUNDATION GROUND AND VERIFICATION OF THE FILLS COMPACTION*

FIELD DESCRIPTION

Except studies and laboratory tests, for geotechnical investigation works, there have been applied some efficient techniques of "in situ" investigations like: dynamic penetration, cone penetration, load plate tests and so on.

ACTIVITIES

- Geotechnical investigations were carried out for establishing the foundation conditions for constructions on difficult soils
- Verification of the quality of the compaction for fills under floors
- Construction and rehabilitation of the roads

RESEARCH TEAM

- Prof.dr.eng. Virgil HAIDA: *Foundations in special conditions*
- Prof.dr.eng. Agneta GRUIA: *Laboratory and field geotechnical tests*
- Assoc.prof.dr.eng. Petru PANTEA: *Laboratory and field geotechnical tests*
- Assoc.prof.dr.eng. Petru MIHU: *Geotechnical tests for roads*

Researches in *EXPLOITATION OF SOME INDUSTRIAL WASTES IN CONSTRUCTIONS*

FIELD DESCRIPTION

The research theme from above pursued the study and determination of the physical and mechanical characteristics of the fly ashes for reducing the pollution of the environment and for using this kind of material in the embankment works.

ACTIVITIES

The laboratory tests carried out on fly ash samples, prepared using different formulas regarding water: fly ash ratio, respectively water; fly ash-clay ratio showed greater resistances of the tested samples. In this manner, the use of these wastes is recommended that have a special efficiency for different construction works, especially for roads.

RESEARCH TEAM

- Assoc.prof.dr.eng. Ion Bogdan: *Improvement of weak foundation soils*
- Assoc.prof.dr.eng. Ioan Petru Boldurean: *Foundations in special conditions*
- Assist. eng. Alexandra Boldurean: *Laboratory and field geotechnical tests*

RESEARCH PROJECTS

1. *Verifying of the quality of the embankments at the Voislava shed, Caras Severin*, Beneficiary: S.C. DRUMCO S.A., Value: 19,500 RON, Director: Assoc.prof.dr.eng. Petru Pantea
2. *Field and laboratory tests for S.C. Noul Comtim S.A. setting*, Beneficiary S.C. CARA S.R.L. Bucharest, Value: 6,000 RON, Director: Assoc.prof.dr.eng. Ion Bogdan
3. *Theoretical studies and experimental tests for the elaboration of an improvement technology for foundation soil built from soft clays*, Beneficiary: S.C. Crummock Ltd, Value: 63,000 RON, Team: Assoc.prof.dr.eng. Ioan Petru Boldureanu, Assist.eng. Alexandra Ciopec, Assoc.prof.dr.eng. Ion Bogdan
4. *Geotechnical studies for bituminous asphalt coating on DC 14 , road consolidation on DN 7 and DN 57B*, Beneficiary: S.C. Search Corporation Bucuresti, Value: 11,000 RON, Team: Assoc.prof.dr.eng. Petru Mihu, Assoc. prof.dr.eng. Mihu Tamara, Prof.dr.eng. Virgil Haida, Assist.dr.eng. Monica Mirea
5. *Geotechnical study for the arrangement of Mures Street, Birzava Street, Gr. Alexandrescu Street*, Beneficiary: S.C. Search Corporation Bucuresti, Value: 5,600 RON, Team: Assoc. prof.dr.eng. Petru Mihu, Assoc.prof.dr.eng. Tamara Mihu, Prof.dr.eng. Virgil Haida
6. *Geotechnical study for the rehabilitation of earth streets from Gradiste, Micalaca, Subcetate, quarters*, Beneficiary: S.C. Search Corporation Bucuresti, Value: 30,000 RON, Team: Assoc.prof.dr.eng. Petru Mihu, Assoc. prof.dr.eng. Tamara Mihu
7. *Geotechnical studies for rehabilitation of DJ593 and modernization of DC46*, Beneficiary: S.C. Search Corporation Bucuresti, Value: 15,000 RON, Team: Assoc. prof.dr.eng. Petru Mihu, Assoc.prof.dr.eng. Tamara Mihu
8. *Laboratory tests for geotechnical study for DN792B, DJ682 and hippodrome Timisoara*, Value: 3,000 RON, Team: Assoc.prof.dr.eng. Petru Mihu, Assist.dr.eng. Monica Mirea
9. *Geotechnical study for the modernization streets in Ineu–Arad*, Beneficiary: VIA-VITA

S.R.L., Timisoara, Value: 4,500 RON, Assoc.prof.dr.eng. Petru Mihu

10. *Geotechnical study for embankments consolidation on DC44*, Beneficiary: VIA-VITA S.R.L., Timisoara, Value: 4,000 RON, Team: Assoc.prof.dr.eng. Petru Mihu, Assoc. prof.dr.eng. Tamara Mihu
11. *Geotechnical investigations and researches for the establishment of the causes of a land slide and the embankments consolidation solution on DJ675C*, Beneficiary: S.C. Triskele S.R.L., Timisoara, Value: 3,300 RON, Team: Prof.dr. eng. Virgil Haida, Lect.dr.eng. Cristina Voicu, Assist.eng. Ciprian Costescu
12. *Technical expertise for consolidation on DN57l*, Beneficiary: S.C. Consilier Construct S.R.L., Timisoara, Value: 2,150 RON, Team: Prof.dr.eng. Virgil Haida, Lect.dr.eng. Cristina Voicu
13. *Technical assistance at the execution of geotechnical research of the foundation soils*, Beneficiary: S.C. Atelier A S.R.L., Arad, Value: 4,000 RON, Team: Prof.dr.eng. Virgil Haida, Lect.dr.eng. Cristina Voicu

PUBLICATIONS

PUBLISHED PAPERS

1. Mirea, Monica, *Experimental study concerning the emphasizing of the deformed area and the improving of the foundation ground around a semi sphere foundation model realized in bulb punched hole,* Scientific Bulletin, 2/2004, pp. 73-81
2. Mirea, Monica, Voicu, Cristina, *Calculation of the bearing capacity of truncated cone and semi sphere foundations realized in punched holes,* Scientific Bulletin, 2/2004, pp. 63-73
3. Mirea, Monica, Mihu, Petru, *Tests for vertical compression loadings on foundations piles on a hotel in Timişoara,* Hydrotechnical Scientific Bulletin, vol. 51(65), fasc. 1-2, pp. 52-55
4. Mirea, Monica, *Research concerning the influence of the prefabricated foundations shape and the modality of introducing them into the ground upon their bearing capacity using FEM,* Hydrotechnical Scientific Bulletin, vol. 51 (65), fasc. 1-2, pp. 61-64
5. Haida, Virgil, Ciopec, Alexandra, Piesz, Luiza, *The consolidation of the road complex for PETROM gas station using geogriles,* 2006, CD, 6 pages
6. Boldurean, I.P., Bodan, I., Ciopec, Alexandra, *Field investigation works and stabilization solution for sliding slope on DJ 609,* 12th National Congres for Roads and Bridges 2006, CD, 5 pages
7. Costescu, C., Voicu, Cristina, Ciopec, Alexandra, *Causes and solution for the consolidation of a landslide produced on the country road DJ 605,* Scientific Bulletin, vol. 49 (63), pp. 19-27
8. Ciopec, Alexandra, Costescu, C., *The foundation solution study for a crane of 270 tf,* Scientific Bulletin, vol. 49 (63), pp. 5-11

PHD STUDENTS

Scientific coordinator: Prof.dr.eng. Virgil Haida

1. *Eng. Liviu Droasca* presented the thesis in December 2006: *Contributions to the study of the stability and resistance conditions for railways earthworks*
2. *Eng. Sorin Herban* presented the thesis in September 2006: *Contributions regarding the survey methods to the study and surveillance of the buildings and ground displacements*
3. *Eng. Carmen Peptan*: *Contributions regarding the study of some efficient foundation systems for special constructions*
4. *Eng. Alexandra Boldurean*: *Contributions regarding the study of soil slopes stabilization*
5. *Eng. Marian Daniel Gaina*: *Contributions regarding the study of some efficient technologies of execution for embankments of land communication ways*
6. *Eng. Valeria Smaranda*: *Contributions regarding the study of roads stability and resistance in Gorj county*
7. *Eng. Aurelian Bordos*: *Contributions regarding the study of behavior in exploitation of slopes on difficult soils*
8. *Eng. Ciprian Costescu*: *Contributions regarding the study of some influence factors upon technical state of roads in Banat area*
9. *Eng. Mihaela Cecilia* Chezan: *Contributions regarding the efficiency of cadastral works in construction field*
10. *Eng. Adrian Ciprian* Mayer: *Contributions regarding the behavior in time of railway embankments*
11. *Eng. Valentin Sorin* Vladasel: *Contributions regarding the study of some consolidation solutions for foundations and foundation ground*
12. *Eng. Luiza* Piesz: *Contributions regarding the study of geo-synthetics reinforced embankments stability*

13. *Eng. Marius* Lucaciu: *Contributions regarding the study of some realization solutions for road structures on difficult soils*
14. *Eng. Nicolae Ion* Babauca: *Contributions regarding the efficiency of survey works in constructions field*

Scientific coordinator: Prof.dr.eng. Marin Marin

1. *Eng. Cosmin Muşat* presented the thesis in January 2006: *Contributions regarding the establishing of the soil settlement and building deformations using modern survey – geodesic methods and techniques*
2. *Eng. Octavian* Roman

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RESEARCH TEAM: ROADS AND RAILWAYS

GENERAL PRESENTATION

MAIN RESEARCH FIELDS

- **Study and research concerning the use of local materials in building and maintenance of roads**

Keywords: maintenance of roads, building roads, local materials, road structures.

- **Study of the operational behaviour of road structures and determination of certain reinforcements or rehabilitation solutions**

Keywords: road structures, road investigation, technical condition, index for the technical condition, bearing capacity, dimensioning

MAIN ACTIVITIES

Investigation of technical condition on the rehabilitated national road sections for assessing the operational behaviour and for determining the possible intervention solutions

Laboratory tests on different road materials used in building and the maintenance of roads

Researches in *INVESTIGATION OF THE TECHNICAL CONDITION ON THE REHABILITATED NATIONAL ROAD SECTIONS FOR ASSESSING THE OPERATIONAL BEHAVIOUR AND FOR DETERMINING THE POSSIBLE INTERVENTION SOLUTIONS*

FIELD DESCRIPTION

The field description follows the determination of the technical condition indices on the investigated sections and of the causes which produced the possible degradations. These data are quantified to determine the efficient intervention solutions.

ACTIVITIES AND RESULTS

The activity of assessing the condition indices is realized every year and the results lead to the evaluation of time interval when the maintenance intervention should be applied.

RESEARCH TEAM

- Prof.dr.eng. Ion Costescu: *road materials, realization technologies*
- Prof.dr.eng. Gheorghe Lucaci: *road structures, asphalt mixtures, road maintenance*
- Prof.dr.eng. Florin Belc: *road materials, road structures, operation behaviour*
- Chemist dr. Ileana Stelea: *asphalt mixtures, road investigations, operation behaviour*

LABORATORY TESTS ON DIFFERENT ROAD MATERIALS USED IN BUILDING AND THE MAINTENANCE OF ROADS

FIELD DESCRIPTION

Laboratory tests are realized on different road materials (natural aggregates, binders, asphalt mixtures, cement concrete, cement stabilized aggregates) at the request of road contractors.

ACTIVITIES AND RESULTS

The results are offered to the beneficiaries through test reports and sometimes technical assistance is supplied for improving the site works.

RESEARCH TEAM

- Prof.dr.eng. Ion Costescu: *tests on asphalt mixtures and bituminous binders*
- Prof.dr.eng. Florin Belc: *tests on natural aggregates and stabilized materials*
- Lecturer dr.eng. Cornel Bancea: *tests on stabilized soils and compaction on site*

RESEARCH PROJECTS

1. *Elaboration of the Technical solution for the quality improvement of the bituminous asphalts; Analysis of the pit aggregates quality and their behavior versus the improved asphalts*, Beneficiary: Amtrans Bucuresti, Value: 180,000 RON, Team: Prof.dr.eng. Florin Belc
2. *Laboratory tests on asphalt mixtures produced by RADM Arad*, Beneficiary: RADM Atad, Value: 14,400 RON, Team: Prof.dr.eng. Florin Belc
3. *Technical assistance and observation of the experimental sector behaviour executed on the rehabilitated roads by DRDP Timisoara*, Beneficiary: Cestrin Bucuresti, Value: 11,000 RON, Team: Prof.dr.eng. Florin Belc, Chem. dr.eng. Ileana Stelea
4. *Technical assistance and observation of the experimental sector behaviour executed on the rehabilitated roads by DRDP Craiova*, Beneficiary: Cestrin Bucuresti, Value: 8,800 RON, Team: Prof.dr.eng. Florin Belc, Chem. dr.eng. Ileana Stelea
5. *Verifying and correlation of the results obtain through different Romanians dimensioning methods of the roads complex stiffening*, Beneficiary: CESTRIN Bucuresti, Team: Prof. dr.eng. Florin Belc, Assist.eng. Ciprian Costescu, Chem.dr.eng. Ileana Stelea, Value: 65,000 RON
6. *Warm asphalt mixture in thin courses on rigid pavements damaged*, Beneficiary: CESTRIN Bucuresti, Team: Prof.dr.eng. Florin Belc, Value: 10,000 RON
7. *Translation adaptation and publishing of the "Road Security Manual"*, Beneficiary: CESTRIN Bucuresti, Team: Prof.dr.eng. Florin Belc, Prof.dr.eng. Gheorghe Lucaci, Value: 20,000 RON
8. *Technical survey for concrete platform in the interior of Texila Lugoj*, Beneficiary: S.C. Textila Lugoj, Team: Prof.dr.eng. Ion Costescu, Value: 6,000 RON
9. *Geotechnical studies for Liviu Rebreanu and Dambovita boulevards*, Beneficiary: APECC SRL, Beneficiary : S.C. Textila Lugoj, Team: Prof.dr.eng. Ion Costescu, Assist.eng. Ciprian Costescu, Value: 11,000 RON
10. *Studying of the materials and dosages elaboration for different types of asphalt mixtures*, Beneficiary: SC Drumuri Judetene Satu-Mare, Team: Lect.dr.eng. Cornel Bancea, Assist.eng. Ciprian Costescu, Tehn. Mihaela Abrudean, Value: 10,000 RON
11. *Physical mechanical laboratory tests for dosages determination for asphalt mixtures*, Beneficiary: Plan Trans SRL Satu-Mare, Team: Prof.dr.eng. Gheorghe Lucaci, Value: 5,000 RON
12. *Physical mechanical tests on natural aggregates, stabilized materials with binders, asphalt mixtures and the quality checking of the embankments for road works realised by Gero Farm Impex SRL*, Team: Prof.dr.eng. Gheorghe Lucaci
13. *Rehabilitation DJ 591 and DJ 681*, Beneficiary: SC Triskele SRL, Value: 4,000 RON, Team: Prof.dr.eng. Ion Costescu, Prof. dr.eng. Virgil Haida
14. *Geotechnical study for street modernizing in Dumbrava, Timis*, Beneficiary: APECC SRL, Value: 3,000 RON, Team: Prof.dr.eng. Ion Costescu

PUBLICATIONS

PUBLISHED PAPERS

1. F. Belc, *Tendencies in cold asphalt mixtures production*, "Roads and bridges" magazine, Nr. 102, 2006, pp. 25-29
2. F. Belc, *Particularities of the asphalt mixtures for urban ways*, National Conference of Urban Roads Timişoara, pp. 19-29
3. Gh. Lucaci, F. Belc, S. Lucaci, *Advantages of the appliance of the radical technical solution to the rehabilitation for public roads*, 12th National Congress for Roads and Bridges, 2006, CD, position 1.4.1
4. F. Belc, Gh. Lucaci, *Actual tendencies in applying of the recycling technologies of the old road layers*, 12th National Congress for Roads and Bridges, 2006, CD, position 4.3.4
5. M. Georgescu, F. Belc, C. Romanescu, H. Simion, *New types of additives for Romanian bituminous asphalts*, 12th National Congress for Roads and Bridges, 2006, CD, position 4.3.22

PHD STUDENTS

Scientific supervisor: Prof.dr.eng. Ion Costescu

Eng. Stefan Luca presented thesis in 2006: *Contributions to the study, research and realization of roads building and maintenance efficient technologies*

Eng. Horatiu Simion: *Contributions to the study and application of modern systems for road management and administration*

Eng. Marius Banica: *Contributions regarding the technical state improvement for the roads from Gorj County*

Eng. Mihaela Iovanov: *Contributions regarding usage of the efficient technologies for roads realization*
Eng. Romulus Komoz: *Contributions to the improvement of the urban roads management*
Eng. Liviu Tudor: *Contributions to the study and realizations of modern technologies for roads building*
Eng. Ionut Vesa: *Civil Engineering*

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RESEARCH TEAM: SURVEYING, CADASTRE

GENERAL PRESENTATION

MAIN RESEARCH FIELDS

- **Implementation of modern technologies in Surveying**

Keywords: surveying, modern technologies

- **Modernizing geodetic networks using Global Positioning System (GPS)**

Keywords: geodetic networks, GPS

- **Using Geographic and Land Information Systems (GIS, LIS) for urban development**

Keywords: GIS, LIS, urban

- **Informatization of Cadastral work**

Keywords: cadastre, data basis.

Researches in *DEVELOPMENT OF THE ROMANIAN GEODETIC CONTROL NETWORK USING PERMANENT GPS STATIONS*

FIELD DESCRIPTION

In order to have a better accuracy and a real evaluation of the geodetic measurements, there have been established a number of permanent GPS stations on different locations on Romanian territory; the one from Timisoara is placed on the roof of the Civil Engineering Faculty, providing accurate planimetric and altimetric informations; these informations are collected and processed together with other permanent stations from the country, leading to the improvement of the national control network.

ACTIVITIES

The measurements were performed in order to create the reference network for the permanent station using control points from Timisoara.

RESEARCH TEAM

- Assoc.prof.dr.eng. Carmen GRECEA
- Lecturer dr.eng. Mihaela STURZA
- Assist.eng. Viorica DAVID
- Assist.eng. Sorin HERBAN
- Assist.eng. Cosmin MUŞAT

PUBLISHED PAPERS

1. Grecea, Carmen, Musat, C., *Some aspects regarding the positioning of characteristic points for building evaluation, using geodetic methods*, International Symposium “GeoCAD ’2006”, University “1 Decembrie 1918” Alba Iulia, 5-6 May 2006, pp. 151-158
2. Grecea, Carmen, Musat, C., *The study and evaluation of displacements for the Sport Hall in Craiova*, Journal of Geodesy, Bucharest, vol. 15, pp. 12-20
3. Musat, C., Marin, M., *Cyclic monitoring program of the Sport Hall in Craiova city*, International Symposium “GeoCAD’2006”, University “1 Decembrie 1918” Alba Iulia, 5-6 May 2006, pp. 159-168
4. Herban, S., Sturza, Mihaela, Baciu, Anca., *Topographic measurements for errors evaluation in civil engineering*, International Symposium “GeoCAD’2006”, University “1 Decembrie 1918” Alba Iulia, 5-6 May 2006, pp. 177-184

5. Herban, S., Sturza, Mihaela, Baciu, Anca., *General characteristics and use of the digital model of the Terrain*, International Symposium "GeoCAD'2006", University "1 Decembrie 1918" Alba Iulia, 5-6 May 2006, pp. 185-188
6. Herban, S., Sturza, Mihaela, Baciu, Anca., *The influence of the landslidings on stability and resistance of constructions. Risk maps*, International Symposium "GeoCAD'2006", University "1 Decembrie 1918" Alba Iulia, 5-6 May 2006, pp. 189-196
7. Herban, S., *Actual tendencies of monitoring deformation in construction*, Hydrotechnical Scientific Bulletin, Vol. 51(65), Fasc. 1-2, 2006, pp. 56-60

BOOKS

1. Musat, C., *Practical works reference book: Surveying-geodesic measure conditioning theory*, "Politehnica" Publishing House
2. David, Viorica, *Practical works reference book: Geodesy*, "Politehnica" Publishing House
3. Herban, S., *Practical works reference book: Engineering surveying*, "Politehnica" Publishing House
4. Grecea, Carmen, Sturza, Mihaela, Muşat, C., David, Viorica, Herban, S., Baciu, Anca, *Workbook: Concepts of land measurements*, vol. I, II, "Politehnica" Publishing House

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