ORSDCE

NEWSLETTER 1 OF EWG ORSDCE
DECEMBER 2010

ORSDCE - The OR in Sustainable Development and Civil Engineering Working Group of EURO
http://www.orsdce.vgtu.lt/

Content of the issue

Words of chair

Dear Members of EWG-ORSDCE, dear Friends,

It is a great pleasure to address you some introductory words and present the results of scientific cooperation between the European academic centers. In details the results of scientific collaboration between German-Lithuanian-Polish scientific triangle were presented in article (Tamosaitiene, Bartkiene and Vilutiene, 2010). Despite this, several words about the achievements of last two years have to be presented.

Last year was rich in conferences were members of EWG-ORSDCE have participated as organizers. The 10th International Conference "Modern Building Materials, Structures and Techniques" was organized by members and held on May 19-21, 2010 in Vilnius, Lithuania. It is resulted with the issue of proceedings with more than 200 articles. More than 150 articles were presented in the 6th International Conference "Business and Management – 2010", that was organized by EWG-ORSDCE members and held on May 13-14, 2010 in Vilnius, Lithuania. Selected papers were published in conference proceedings.

We would like to express the gratitude to colleagues contributed to the organization of the stream of invited sessions in the field "*OR for Development and Developing Countries*" in the 24th European Conference on Operational Research (EURO XXIV), which was held in Lisbon, Portugal, on July 11-14, 2010. Special thanks to Jana Šelih from Liubliana Universlity and Marija Burinskienė from Vilnius Gediminas Technical University for chairing the sessions of stream. The 11 articles presented in this stream covered the issues of sustainable development in construction, civil engineering and urban development and will be published next year in second issue of scientific journal "*Technological and Economic Development of Economy. Baltic Journal on Sustainability*".

This year was signified by appearance of new optimization method – *An Additive Ratio Assessment method* (ARAS) that has a promising future in the construction engineering field, because offers a highly methodological basis for decision support.

The invention of research team of EWG-ORSDCE members "Electronic information search method and system" in Lithuania has been recognized as the best invention of August, 2010.

In period of 2009-2010 eight dissertations have been defended in fields of construction and sustainable development. The Newsletter presents the short summaries of defended dissertations.

Recent publications of several members of EWG-ORSDCE were recognized as Fast breaking papers and several are in list of Top 10 cited papers. The number of published articles and proceedings during 2007–2010 are approximately 196 papers. Three papers in 2009–2010 were nominated by ScienceWatch.com as papers, which had the highest percentage increase in citations in Essential Science IndicatorsSM of Thomson Reuters (http://sciencewatch.com):

- In June 2009 as Fast Breaking Paper in the field of Economics & Business the paper prepared by Turskis (2008) was selected (http://sciencewatch.com/dr/fbp/2009/09junfbp/);
- In January 2010 as Hot Paper in the field of Economics & Business the paper prepared by Ginevičius *et al.* (2008b) was selected (http://sciencewatch.com/dr/nhp/2010/10jannhp/) and
- In January 2010 as Hot Paper in the field of Engineering the paper prepared by Zavadskas *et al.* (2008f) was selected (http://sciencewatch.com/dr/nhp/2010/10jannhp/10jannhpZavaET/).

The extracts from the interviews with the authors presented here.

This issue of Newsletter presents also the forthcoming events, were the EWG-ORSDCE members are participating as organizers or scientific committees' members.

With my best wishes, Yours sincerely,
Edmundas Kazimieras Zavadskas, Chair of EWG-ORSDCE

Forthcoming Events

8th International Conference "Environmental Engineering" Vilnius, Lithuania, May 19–20, 2011

The Conference will be hosted by Vilnius Gediminas Technical University; Lithuanian Academy of Sciences; Academy of Sustainable Development; Federation of European Heating and Air-Conditioning Associations (REHVA); International Federation of Surveyors (FIG); Baltic Road Association; International Academy of Ecological and Life Protection Science; Lithuanian Water Suppliers Association; European Spatial Planning Observation Network.
The conference will have 6 sections:

- Environmental Protection. Chairman – Prof. Dr. Habil. P. Baltrėnas
- Water Engineering. Chairman – Prof. Dr. V. Šaulys
- Sustainable Urban Development. Chairman – Prof. Dr. M. Burinskienė
- Roads and Railways. Chairman – Prof. Dr. A. Laurinavičius
- Geodesy and Cadastre Technology. Chairman – Assoc. Prof. Dr. C. V. Aksamitauskas
- Energy for Buildings. Chairman – Prof. Dr. Habil. V. Martinaitis

Important dates:

- Full registration, before 21 January 2011
- Acceptance of abstract will be conformed on 29 October 2010.
- All participants shall send completed articles to the Section Chairman by 21 of January 2011.
- Proceedings will be announced to corresponding author by the beginning of April, 2011.

After the Conference the selected qualitative presentations can be published also in the Journals of ours University:

- *Baltic Journal of Road and Bridge Engineering* (abstracted in databases: Science Citation Index ExpandedTM (Web of Science), INSPEC, EBSCO, TRIS/TRIS Online, VINITI, CSA's ERD, CSA/ASCE (CSA's TRD), SCOPUS (Elsevier Database)
- *Journal of environmental engineering and landscape management* · (abstracted in databases: Science Citation Index ExpandedTM (Web of Science), Index Copernicus, Compendex, CSA Materials Research Database with METADEX (Cambridge Scientific Abstracts), Current Abstracts since 2005 (EBSCO publishing), Environment Complete since 2005 (EBSCO publishing), Environment Index since 2005 (EBSCO publishing), Garden, Landscape and Horticulture Index since 2005 (EBSCO publishing), TOC Premier since 2005 (EBSCO publishing), SCOPUS (Elsiever), ICONDA (IRBdirect), VINITI)
- *Geodesy & Cartography* (abstracted in databases: ElsevierDefinitive Bibliographic Database for Engineering Literature (COMPENDEX), CambridgeScientific Abstracts (CSA), Publishing Bibliographic and Full Text Database(EBSCO), Literature Database Geodesy, Photogrammetry and Cartography (GEOPHOKA), ElsevierAbstract and citation database of research literature and quality web sources (SCOPUS))

Website: enviro.vgtu.l**t**

13th German-Lithuanian-Polish Colloquium and International conference "Construction Projects' Engineering" Augustow, Poland October 9-12, 2011

The Conference is aimed at presentation of scientific achievements, exchange of experience, discussing on the results of both industrial and academic research which has recently been carried out on preparation of construction projects, manufacturing of building materials and constructions, modern construction techniques, management of construction processes, construction costs' engineering, facilities management, planning of construction phases, modernization of construction projects, modern construction machinery and equipment, robotics in construction, quality management, quality management systems, work safety in construction, etc.

Organizers
The Conference will be hosted by Bialystok University of Technology.

After the Conference the selected qualitative presentations can be published in the Journals of Bialystok Technical University and Vilnius Gediminas Technical University:

Budownictwo i Inżynieria Środowiska / Civil and Environmental Engineering

Journal of Civil Engineering and Management (abstracted in databases: Science Citation Index ExpandedTM (ISI Web of Science, since 2008), Journal Citation Reports/Science Edition (ISI Web of Science, since 2008), COMPENDEX (Engineering Information database), GALE (Cengage Learning), INSPEC (database of Institution of Engineering and Technology), Cambridge Scientific Abstracts (Civil Engineering Abstracts, Engineered Materials Abstracts, Corrosion Abstracts, Mechanical and Transportation Engineering Abstracts, METADEX, Aerospace & High Technology Database, Computer and Information Systems Abstracts, Electronics and Communications Abstracts, Aluminium Industry Abstracts, Ceramic Abstracts, Copper Data Center Database, Advanced Polymers Abstracts, Composite Industry Abstracts, Materials Business File), EBSCO Publishing (Academic Search Complete, Current Abstracts), SCOPUS (Elsevier database), IRBdirect and ICONDA (the CIB international construction database), VINITI Abstracts Journal (Referativnyi Zhurnal –RZh), Ulrichsweb™, IndexCopernicus).

Important dates:
Deadline for registration and abstract submission: January 31, 2011
Notification of abstract acceptance: March 31, 2011
Deadline for full paper submission: April 30, 2011
Notification of reviewed paper acceptance: May 31, 2011
Conference programme: September 15, 2011

Invited Short Note

The history of EWG-ORSDCE activities

by Jolanta Tamošaitienė, Lina Bartkienė ir Tatjana Vilutienė

Active collaboration between German - Lithuanian - Polish scientific triangle caused the new development trend of research. The research areas till 2009 were limited to Operational Research (OR) and Civil Engineering. Prof. E. K. Zavadskas raised the idea to analyze Operational Research and Civil Engineering in the aspect of sustainability. These issues were analyzed in the 12th colloquium. As the consequence of new trend of research development the EURO Working Group OR in Sustainable Development and Civil Engineering (EWG-ORSDCE) was established.

Main aspects of research development

The fields of the research concentrate in three broad fields: Operational Research, Civil Engineering and Sustainable Development. The broad fields might be divided to narrow groups applying decision tree method and considering the research object (Fig. 1).

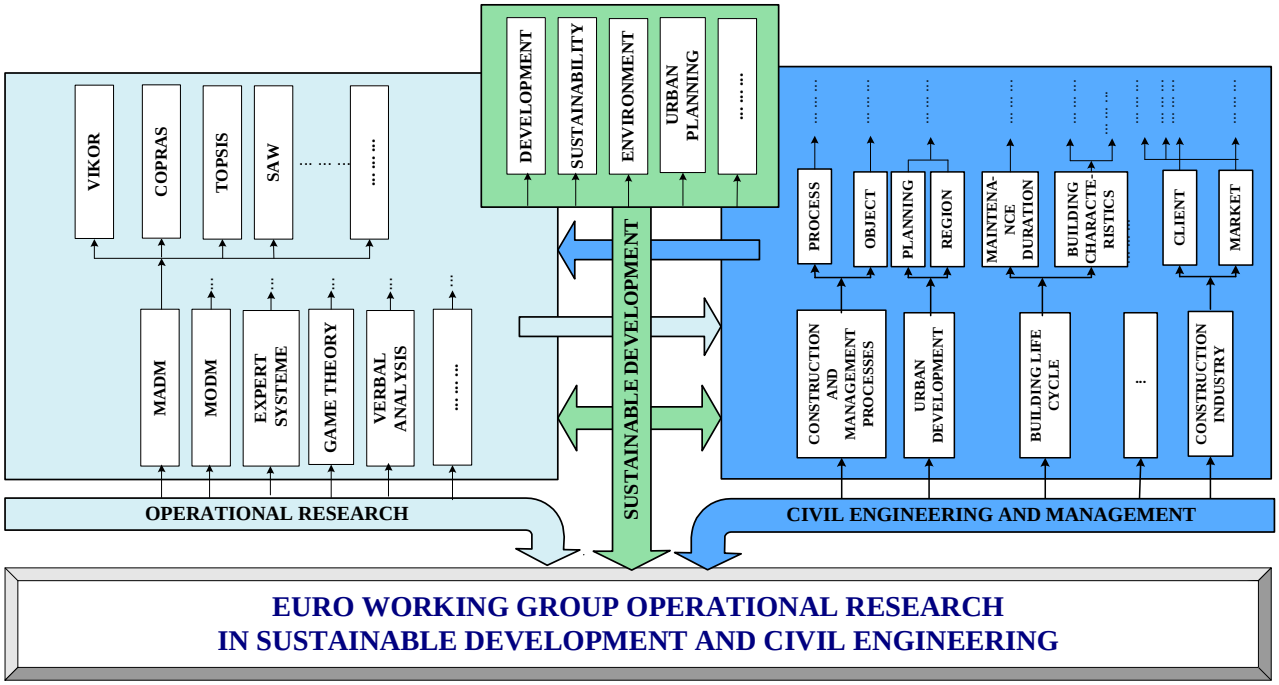


Fig.1. The general topics for the establishing the new working group OR in Sustainable Development and Civil Engineering

The fields of the research are:

1. Operational Research: operations research theory, MCDM, MADM methods, statistics, optimization, strategies, game theory, intelligent support system and etc.;
2. Civil Engineering: building life-cycle, urban development, construction and management, maintenance, approaches for construction problems', effectiveness' assessment, automation in construction;
3. Sustainable Development: developing of alternative construction processes, economic and other aspects, sustainable development challenges for business and management in construction enterprises, political influence dimensions of sustainability, technological change, innovation and sustainability, sustainable building design, environmental impact processes.

Broad fields as well as narrow groups compose the goal of EWG-ORSDCE.

Activities in publication in journals and proceedings

The research papers during 2007-2010 year were published in 29 scientific journals in different research fields. The contribution of each country considering fields of research is presented in Figure 2 and 3.

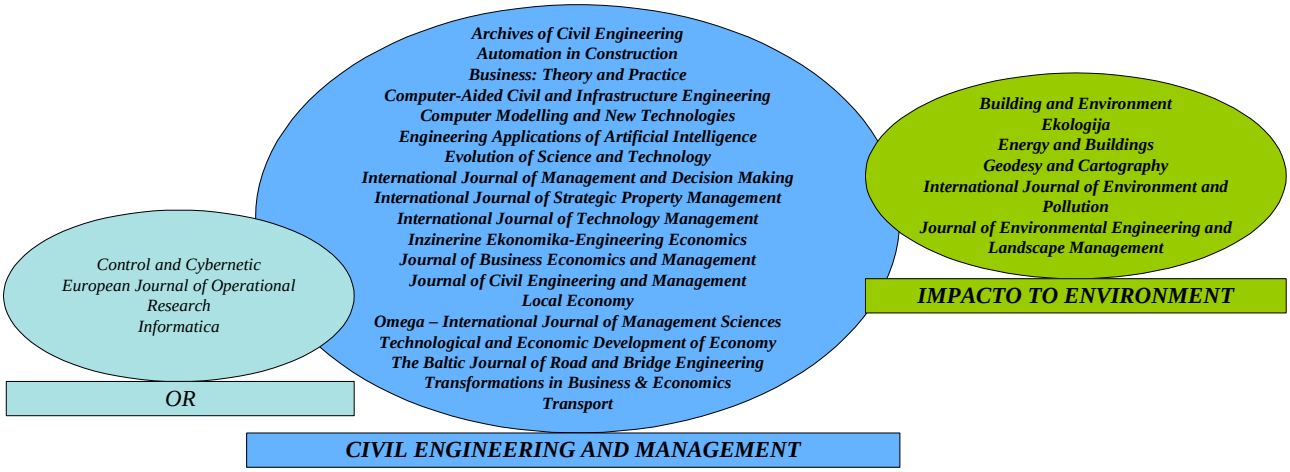


Fig. 2. Scientific publication in journals and proceedings of each country and journals title during 2007-2009 year

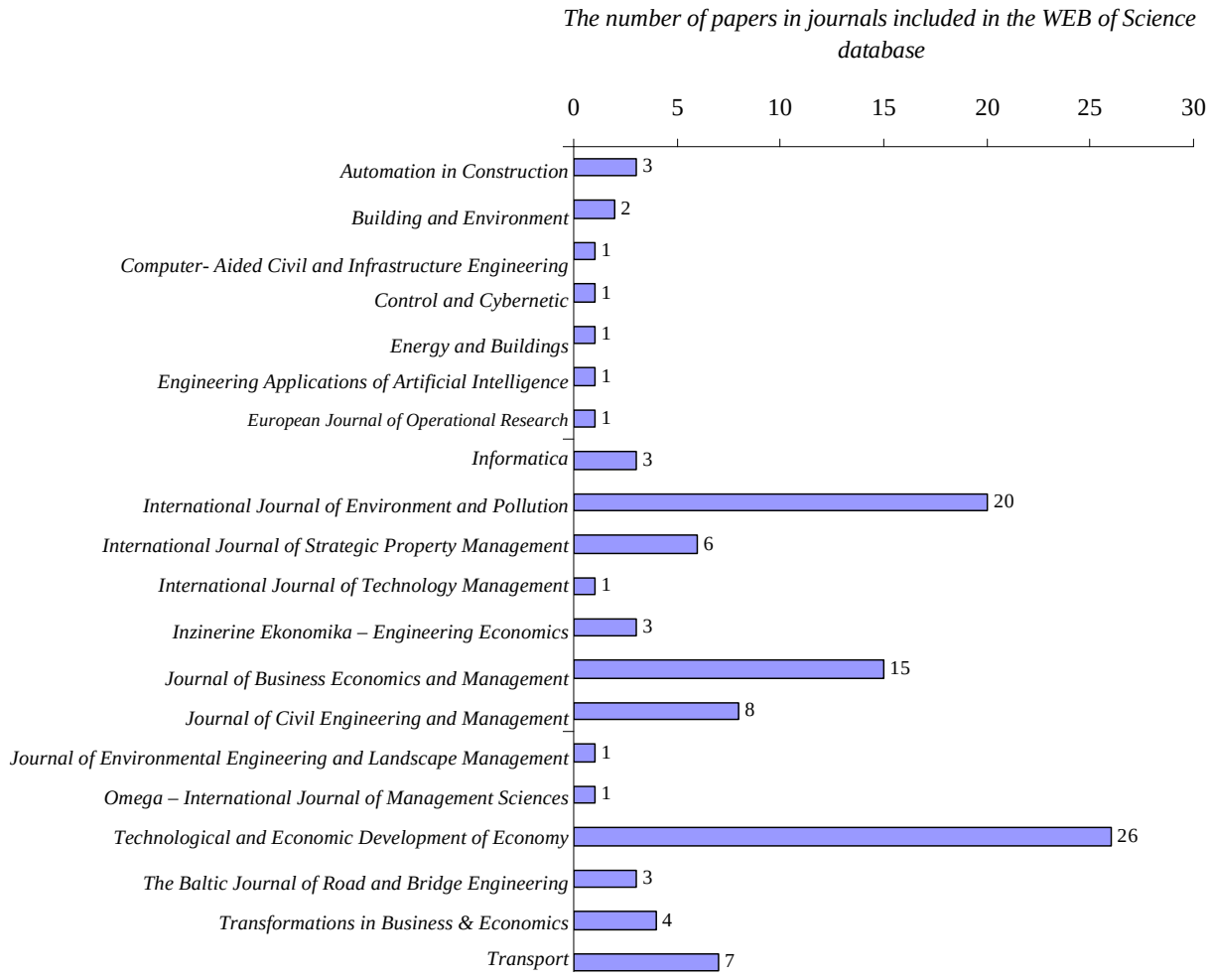


Fig. 3. Scientific publication in journals included in the WEB of science data base.

The published articles and proceedings during 2007-2009 are approximately 196 papers. Three papers in 2009-2010 years were nominated by ScienceWatch.com. It has tracked the following

papers which had the highest percentage increase in citations in Essential Science Indicators[SM] of Thomson Reuters (http://sciencewatch.com):

- In June 2009 Fast Breaking Paper in the field of Economics & Business was selected paper by Turskis (2008);
- In January 2010 New Hot Papers in the field of Economics & Business was selected paper by Ginevičius *et al.* (2008b) and in the field of Engineering was selected paper by Zavadskas *et al.* (2008f).

The authors of surveyed scientific publications are not necessarily the participant of this of aforementioned colloquiums but they actively work in achieving the goals of EWG-ORSDCE. These high achievements in publishing articles become the foundation of the establishment of EWG-ORSDCE.

Organization of International Conferences

During 2007-2009 year 7 international conferences were organized by members of EWG-ORSDCE. The 5 of them was organized in Vilnius Gediminas Technical University (Zavadskas 2008f):

– The 9th International Conference „Modern building materials, structures and techniques" (May 16–18, 2007, Vilnius, Lithuania) (Skibniewski *et al.* 2007). On the basis of this conference special Issue of the The Baltic Journal of Road and Bridge Engineering was published.
– The 11th Lithuanian-German-Polish Colloquium "Planning instruments in construction management" (October 23–25, 2007, Kolobrzeg, Poland) (Kapliński 2007, 2008d).
– The 20th International Conference, EURO Mini Conference "Continuous Optimization and Knowledge-Based Technologies" (EurOPT-2008) (May 20-23, 2008, Neringa, Lithuania). The Proceeding book (Sakalauskas *et al.* 2008) of selected papers as well as the special issues in the journals Informatica (Dzemyda and Sakalauskas 2009) and Technological and Economic Development of Economy (Sakalauskas and Zavadskas 2009) have been published.
– The 25th International Symposium on Automation and Robotics in Construction ISARC - 2008 (June 26–29, 2008, Vilnius, Lithuania). The Proceeding book of selected papers was published (Zavadskas *et al.* 2008c). The Special Issue of expanded papers on the basis of this Symposium has been published in scienfic journal Automation in Construction (Kaklauskas *et al.* 2010; Popov *et al.* 2010; Ustinovichius *et al.* 2010; Zavadskas 2010a, b).
– Reliability and Statistics in Transportation and Communication (RelStat'08) (October15–18, 2008, Riga, Latvia) (Kabashkin and Yatskiv 2008).
– The 12th Lithuanian-German-Polish Colloquium "Sustainable Development in Civil Engineering and Multi-Attribute Decision Making" (May 20-24, 2009 Vilnius, Lithuania) (Vilutiene 2009).
– The XIII[th] International Conference "Applied Stochastic Models and Data Analysis" ASMDA-2009 (June 30-July 3, 2009, Vilnius, Lithuania). The Proceeding book has been published (Sakalauskas *et al.* 2009).
– 5th International Conference EURO mini conference "Knowledge-Based Technologies and OR Methodologies for Strategic Decisions of Sustainable Development" KORSD-2009 (September 30-October 3, 2009, Vilnius, Lithuania). Proceedings of selected papers have been published (Grasserbauer *et al.* 2009). In addition Special Issue of the Technological and Economic Development of Economy containing expanded versions of the selected papers will be published.
– The 10th International Conference „Modern building materials, structures and techniques" (May 19–21, 2010, Vilnius, Lithuania). On the basis of this conference the proceedings of conference were published.
– The stream of invited sessions in the field "*OR for Development and Developing Countries*" in the 24[th] European Conference on Operational Research (EURO XXIV), which was held in Lisbon, Portugal, on July 11-14, 2010. The 11 articles presented in this stream will be published next year (2011) in second issue of scientific journal "Technological and Economic Development of Economy. Baltic Journal on Sustainability".

References:

Turskis, Z. 2008. Multi-attribute contractors ranking method by applying Ordering of feasible alternatives of solutions in terms of preferability technique, *Technological and Economic Development of Economy* 14(2):224-239.

Ginevičius, R.; Podvezko, V.; Bruzgė, Š. 2008b. Evaluating the effect of state aid to business by multicriteria methods, *Journal of Business Economics and Management* 9(3): 167-180.

Zavadskas, E. K.; Kaklauskas, A.; Turskis, Z.; Tamošaitienė, J. 2008f. Selection of the effective dwelling house walls by applying attributes values determined at intervals, *Journal of Civil Engineering and Management* 14(2): 85-93.

Skibniewski, M. J.; Vainiūnas, P.; Zavadskas, E. K. (Eds.) 2007. *9th International Conference "Modern Buildings, Materials, Structures and Techniques"*. Selected Papers, Vol. 1-3. May 16-18, 2007, Vilnius. Vilnius: Technika, 1226 p. ISBN 978-9955-28-201-3.

Kapliński, O. 2008d. Planning instruments in construction management, *Technological and Economic Development of Economy* 14(4): 449-451.

Kapliński, O. (Ed.). 2007. *Metody i modele badań w inżynierii przedsięwzięć budowlanych* [Methods and models of research in construction project engineering]. PAN, KILiW, IPPT, Seria Studia z Zakresu Inżynierii Nr 57. Warszawa. (In Polish)

Sakalauskas, L.; Weber, G. W.; Zavadskas, E. K. (Eds.) 2008. *The 20th International Conference EURO Mini Conference "Continuous Optimization and Knowledge-Based Technologies" (EurOPT 2008)*. Selected papers, May 20-23, 2008, Neringa, Lithuania. Vilnius: VGTU Publishing House "Technika", 490 p. ISBN 978-9955-28-283-9.

Dzemyda, G.; Sakalauskas, L. 2009. Optimization and Knowledge-Based Technologies, *Informatica* 20(2): 165-172.

Sakalauskas, L.; Zavadskas, E. K. 2009. Optimization and intelligent decisions, *Technological and Economic Development of Economy* 15(2): 189-196.

Zavadskas, E.K.; Kaklauskas, A. 2008c. Editorial. Special issue on external and internal housing environments: technological and facilities approach, *International Journal of Environment and Pollution* 35(2/3/4): 153-157.

Kaklauskas, A.; Zavadskas, E. K.; Naimavičienė, J.; Krutinis, M.; Plakys, V.; Venskus, D. 2010. Model for a complex analysis of intelligent built environment, *Automation in Construction* 19: 326-340.

Popov, V.; Juocevicius, V.; Migilinskas, D.; Ustinovichius, L.; Mikalauskas, S. 2010. The use of a virtual building design and construction model for developing an effective project concept in 5D environment, *Automation in Construction* 19(3): 357-367.

Ustinovichius, L.; Shevchenko, G.; Barvidas, A.; Ashikhmin, I. V.; Kochin, D. 2010. Feasibility of verbal analysis application to solving the problems of investment in construction, *Automation in Construction* 19(3): 375-384.

Zavadskas, E.K. 2010a. 25th international symposium on Automation and Robotic in Construction, *Automation in Construction* 19: 285.

Zavadskas, E.K. 2010b. 25th Automation and Robotics in Construction: international research and achievments, *Automation in Construction* 19: 286-290.

Kabashkin, I. V.; Yatskiv, J. (Eds.) 2008. *The 8th International Conference "Reliability and Statistics in Transportation and Communication" (RelStat`08)*. October 15-18, 2008, Riga, Latvia. Transport and Telecommunication Institute, p. 375. ISBN 978-9984-818-11-5.

Sakalauskas, L.; Skiadas, C.; Zavadskas, E. K. (Eds.) 2009. *The 13th International Conference "Applied Stochastic Models and Data Analysis" ASMDA-2009*. Selected papers, June 30-July 3, 2009, Vilnius, Lithuania. VGTU Press "Technika", 535 p. ISBN 978-9955-28-463-5.

Grasserbauer, M.; Sakalauskas, L.; Zavadskas, E. K. (Eds.) 2009. *5th International Vilnius Conference EURO-Mini Conference "Knowledge - based Technologies and OR Methodologies for Strategic Decisions of Sustainable Development (KORSD-2009)*. September 30 - October 3, 2009, Vilnius, Lithuania, Vilnius: Technika, 549 p. ISBN 978-9955-28-482-6.ISBN 9789955284826.

Vilutienė, T. (Eds.). 12th German-Lithuanian-Polish colloquium "Sustainable development in civil engineering and multi-attribute decision making" Abstracts: 20-24 May, 2009, Vilnius, Lithuania / edited by T. Vilutienė. Vilnius : Technika, 2009. 61 p. ISBN 9789955284390.

Presented material is extract from paper:
Tamošaitienė, J.; Bartkienė, L.; Vilutienė, T. The new development trend of operational research in civil engineering and sustainable development as a result of collaboration between German-Lithuanian-Polish scientific triangle. *Journal of Business Economics and Management*. Stralsund: North-German Academy of Informatology (Stralsund). ISSN 1611-1699. Vol. 11, no. 2 (2010), p. 316–340.
The full paper you can find here

Recent Publications (Fast breaking papers and Top 10 cited)
Fast breaking papers

Zavadskas, Edmundas Kazimieras; Kaklauskas, Artūras; Turskis, Zenonas; Tamošaitienė, Jolanta. Selection of the effective dwelling house walls by applying attributes values determined at intervals. *Journal of civil engineering and management: international research and achievements*. Vilnius : Technika. ISSN 1392-3730. Vol. 14, no. 2 (2008), p. 85-93. Prieiga per internetą: http://www.jcem.vgtu.lt/upload/civil_zurn/zavadskas%20et%20al.pdf.

Edmundas Kazimieras Zavadskas, Artūras Kaklauskas, Zenonas Turskis and Jolanta Tamošaitienė:

"*To design and achieve the effective life cycle of a project, a complex analysis of its proposed stages, as well as an evaluation of the interested parties, along with their aims and potentialities, is needed. The effect of micro and macro environmental factors should also be taken into account. Besides economic, political and legal/regulatory decisions, other aspects, e.g., social, cultural, ethical, psychological, educational, environmental, provisional, technological, organizational, and managerial, can be analyzed using the COPRAS method.*
A formalized presentation of research shows just how various changes in the environment and the extent to which the goals pursued by various interested parties are satisfied, causing corresponding changes in the value and degree of utility in the life cycle of a project. With this in mind, is it possible to solve the problem of optimization concerning the satisfaction of requirements at reasonable expenditures? This requires the analysis of a project life cycle's versions, allowing the discovery of an optimal combination of goals pursued and available finances."

"*We intend to further develop and improve the methodology and its application by using new multi-attribute decision making (MADM) techniques, in intelligent and biometric systems. We will expand this potential to apply developed methods for the solution of problems within different fields of real-world applications.*"

Fast breaking papers (continued)

Zavadskas, Edmundas Kazimieras; Zakarevičius, Algimantas; Antuchevičienė, Jurgita. Evaluation of ranking accuracy in multi-criteria decisions. *Informatica*. Vilnius : Matematikos ir informatikos institutas. ISSN 0868-4952. Vol. 17, no. 4 (2006), p. 601-618.

Edmundas Kazimieras Zavadskas, Algimantas Zakarevičius, Jurgita Antuchevičienė:

„*Multiple criteria decision-making (MCDM) methods are widely analyzed in scientific literature as well as being applied to decisions in real life situations. In our research evaluation of the credibility of ranking, results in multiple criteria optimization problems were analyzed. This question is a familiar one for users of MCDM methods, but has still not been widely explored and published.*“

“*Our research provides a possibility to define the credibility of multiple criteria compromise solutions that are obtained using formal numerical criteria.*”

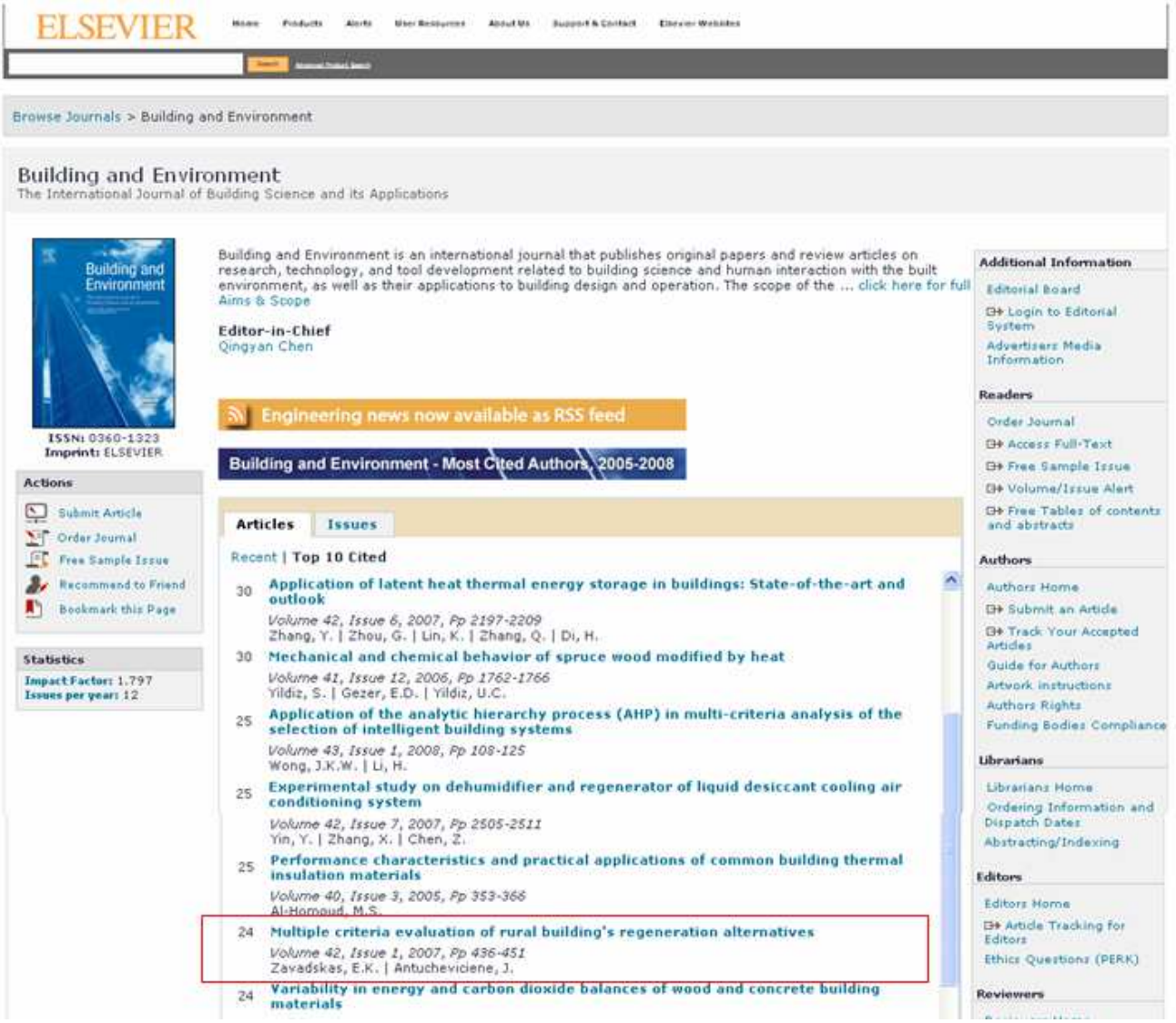
“*We intend to further develop and improve the methodology and its application by making a synthesis of MCDM and other communicating sciences. We will expand the possibilities of application of the methodology as well as its effectiveness in multiple criteria decisions by using principals of system approach and system analysis.*”

„*The developed methodology could be applied to solving problems and determining rational solutions in the field of sustainable development which takes priority in scientific and political decisions at present. The methodology could help to define the credibility of solutions when a lot of conflicting and hardly commensurable criteria are involved.*“

Top 10 cited (continued)

We are also proud to announce that members of our working group were already recognized as most cited authors and several of their articles were ranked as top 10 cited in last five years.

http://www.elsevier.com/wps/find/journaldescription.cws_home/296/description

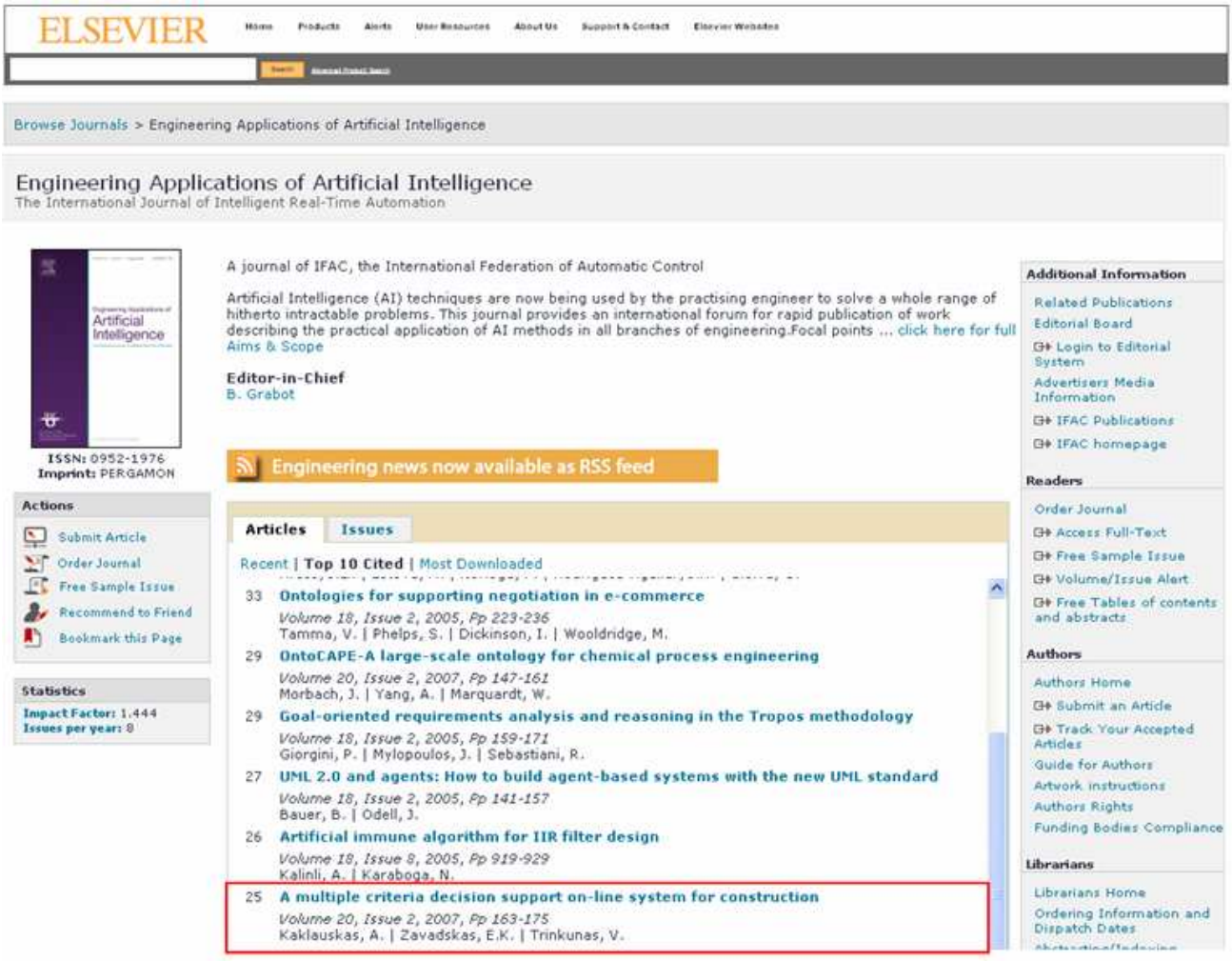


Zavadskas, Edmundas Kazimieras; Antuchevičienė, Jurgita. Multiple criteria evaluation of rural building's regeneration alternatives. *Building and environment* : Elsevier. ISSN 0360-1323. Vol. 42, iss. 1 (2007), p. 436-451.

Short summary. This paper deals with the problem of the re-use of derelict buildings. The main objective of the research is to rank the available building's regeneration alternatives from the multiple-criteria sustainability approach, by combining the economic benefits of the regeneration of buildings with the environmental potential as well as the social interest. A case study relating to the problems of regeneration of derelict and mismanaged buildings in Lithuanian rural areas are analysed by means of multi-criterion decision-making techniques. The criteria are based on sustainability indicators and represent three typological groups in sustainable decision-making, include the current state of abandoned buildings and their environment, regeneration possibilities and the environmental impact of the implementation of a particular redevelopment alternative. The information about the analyzed problem is incomplete and inconsistent; therefore the authors suggest a fuzzy method of multiple-criteria complex proportional evaluation of the projects.

Top 10 cited (continued)

http://www.elsevier.com/wps/find/journaldescription.cws_home/975/description#description

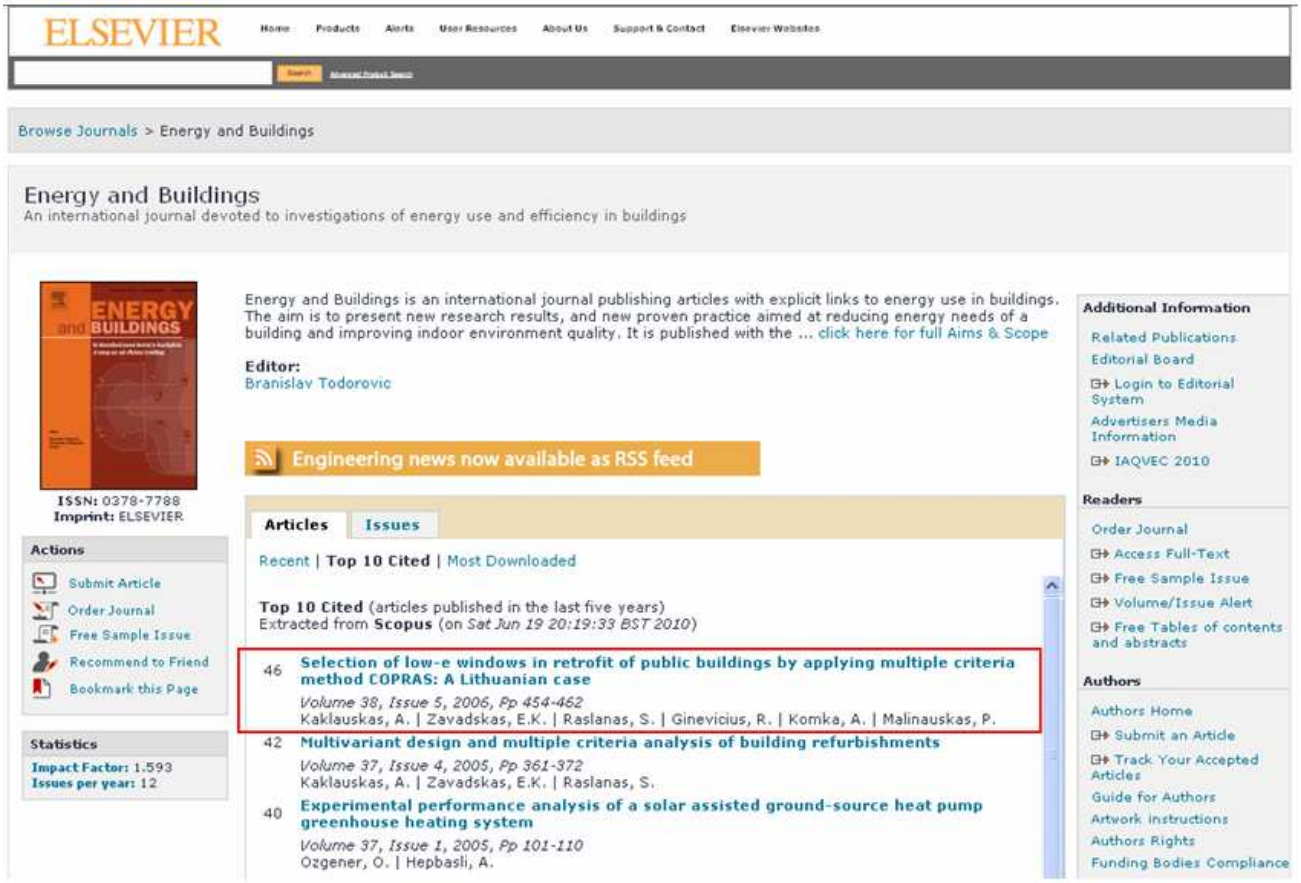


Kaklauskas, Artūras; Zavadskas, Edmundas Kazimieras; Trinkūnas, Vaidotas. A multiple criteria decision support on-line system for construction. *Engineering applications of artificial intelligence* : Elsevier. ISSN 0952-1976. Vol. 20, iss. 2 (2007), p. 163-175.

Short summary. Based on an analysis of the construction on-line systems the authors of paper developed multiple criteria decision support on-line system for construction. The OLSC developed by the authors differs from other new multiple criteria analysis methods (method of complex determination of the weight of the criteria; method of multiple criteria complex proportional evaluation of the alternatives; method of determining the utility degree and market value of alternatives; the method for presentation of recommendations). A database of construction alternatives was developed and provides a comprehensive assessment of alternative versions from economic, technical, technological, qualitative and other perspectives. Based on the above database, the developed Multiple Criteria Decision Support On-Line System for Construction enables the user to analyze alternatives quantitatively (i.e. a system and subsystems of criteria, units of measure, values and weights) and conceptually (i.e. the text, formula, schemes, graphs, diagrams and videotapes).

Top 10 cited (continued)

http://www.elsevier.com/wps/find/journaldescription.cws_home/504083/description#description

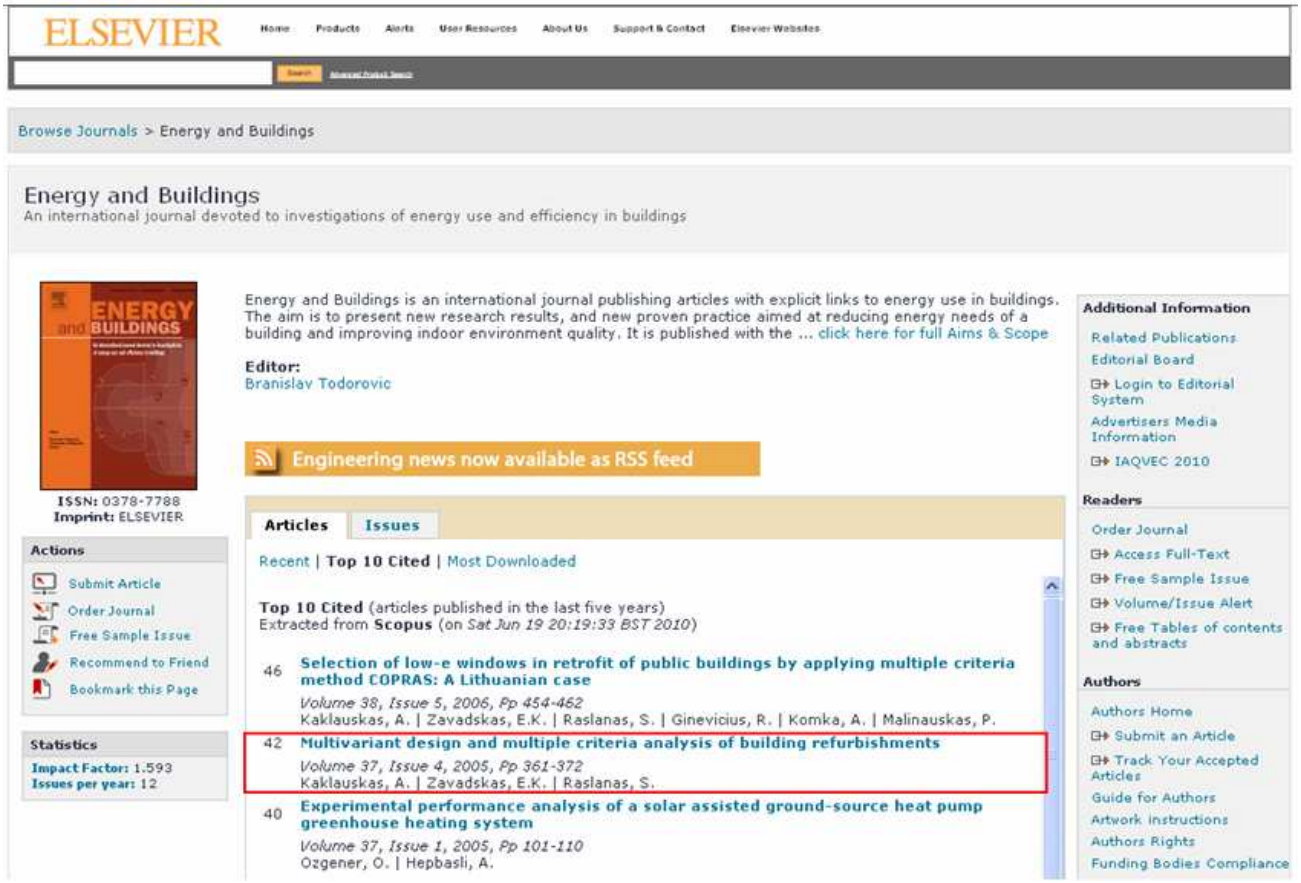


Kaklauskas, Artūras; Zavadskas, Edmundas Kazimieras; Raslanas, Saulius. Multivariant design and multiple criteria analysis of building refurbishments. *Energy and Buildings* : an international journal devoted to investigations of energy use and efficiency in buildings. Lausanne : Elsevier Science. ISSN 0378-7788. Vol. 37, Issue 4 (2005), p. 361-372.

Short summary. In order to design and realize an efficient building refurbishment, it is necessary to carry out an exhaustive investigation of all solutions that form it. The efficiency level of the considered building's refurbishment depends on a great many of factors. Solutions of an alternative character allow for a more rational and realistic assessment of conditions, traditions and for better satisfaction of customer requirements. The selection of a refurbishment version mostly depends on the needs and existing financial capability of tenants. Based on an analysis of the existing neural networks, information, expert and decision support systems and in order to determine the most efficient versions of building refurbishment, a Multiple Criteria Decision Support Web-Based System for Building Refurbishment (BRDSS) consisting of a database, database management system, model-base, model-base management system and a user interface was developed. The developed BR-DSS and its practical application are described in the paper.

Top 10 cited (continued)

http://www.elsevier.com/wps/find/journaldescription.cws_home/504083/description#description

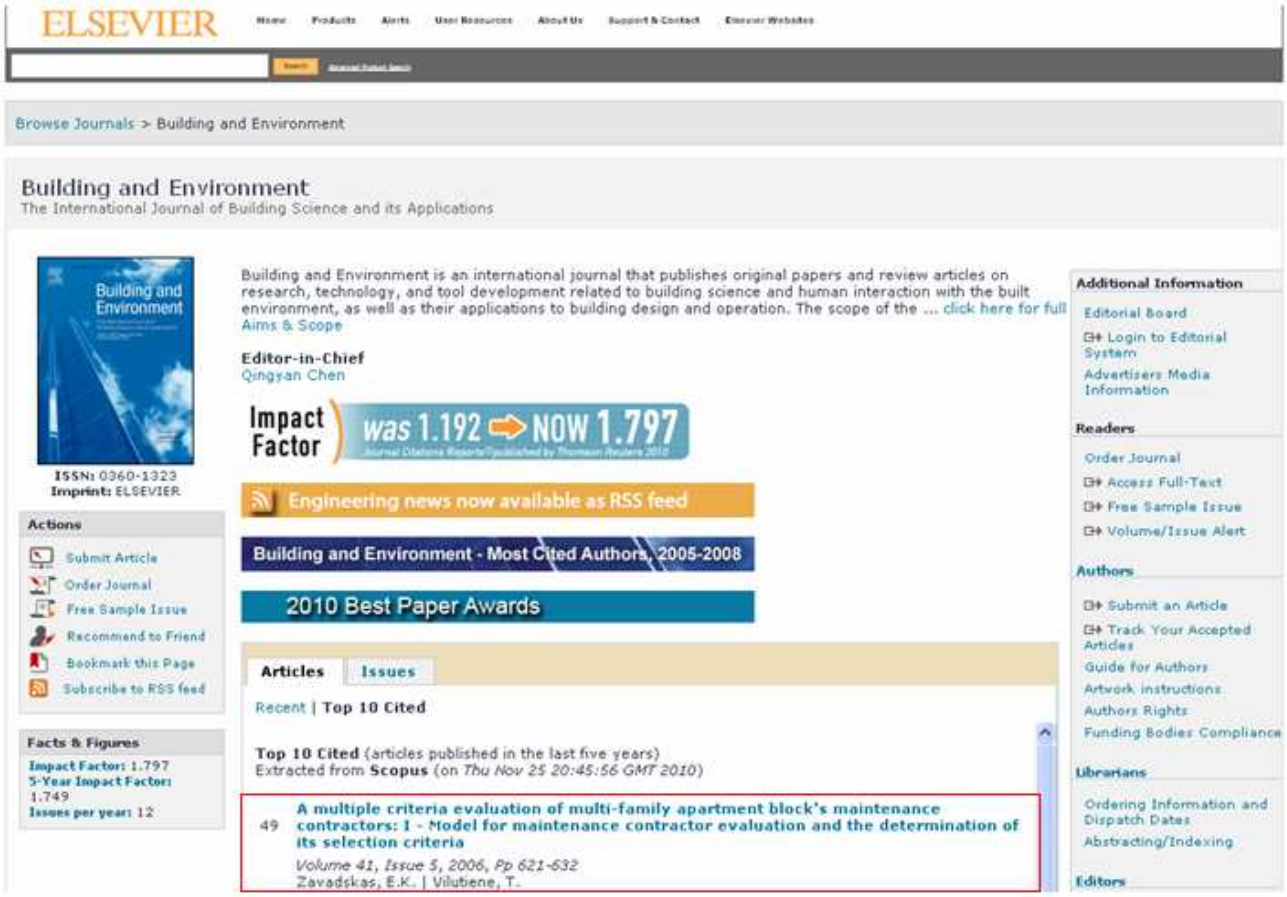


Kaklauskas, Artūras; Zavadskas, Edmundas Kazimieras; Raslanas, Saulius; Ginevičius, Romualdas; Komka, Arūnas; Malinauskas, Pranas. Selection of low-e windows in retrofit of public buildings by applying multiple criteria method COPRAS: A Lithuanian case. *Energy and buildings*. Lausanne : Elsevier Science. ISSN 0378-7788. Vol. 38, iss. 5 (2006), p. 454-462.

Short summary. Calculations of building retrofit effectiveness have shown that the replacement of original windows with new ones is not as effective in terms of heat energy saving as are the insulation of a roof, walls and other improvements because the investments are large and take a long time to be repaid. However, in addition to energy saving, window replacement improves the indoor climate of the building, its interior and architectural appearance as well as its market value. The sequence of building operations determines when the replacement of windows should be done. When financial resources are limited, managers of public buildings often begin the renovation of a building's envelope with the replacement of windows. The client faces some problems in choosing among the great variety of windows to satisfy his/her needs, especially with respect to the cost-quality relationship. The method of multiple criteria complex proportional assessment (COPRAS) developed by the authors aims at solving the above-mentioned problems. The solutions based on multicriteria analysis allow for a more rational and realistic assessment of customer's needs as well as cutting down window renewal costs. In this paper, practical example (key-case) of selecting a contractor for the replacement of windows in the main building of Vilnius Gediminas Technical University (VGTU) is presented as a part of its retrofit multivariant design.

Top 10 cited (continued)

http://www.elsevier.com/wps/find/journaldescription.cws_home/296/description



Zavadskas, Edmundas Kazimieras; Vilutienė, Tatjana. A multiple criteria evaluation of multi-family apartment block's maintenance contractors : I—Model for maintenance contractor evaluation and the determination of its selection criteria. *Building and environment*. Oxford: Pergamon-Elsevier Science. ISSN 0360-1323. Vol. 41, iss. 5 (2006), p. 621-632.

Short summary. The paper presents a model that describes the process of selecting dwelling maintenance contractors. The model is based on a multi-criteria evaluation of maintenance contractors, the determination of their utility level for the building's users and a bid price in negotiations that are made according to the results of the multiple criteria analysis. The proposed model could further be applied to plan dwelling maintenance operations. The criteria of maintenance contractor evaluation are selected by taking into consideration the interests and goals of the building's users as well as factors that influence the process of maintenance's efficiency. The correlation of the criteria characterizing maintenance contractors from various perspectives was determined.

The complete list of publications you can find on the WEB site of EWG-ORSDCE:
http://www.orsdce.vgtu.lt/

The invention

The invention of Vilnius Gediminas Technical University scientists was recognized as the best invention of the month in Lithuania

The invention of Vilnius Gediminas Technical University research team consisting of prof. A.Kaklauskas, prof. E.K.Zavadskas, M.Seniut, prof. P.Vainiunas, M.Krutinis and L.Tupėnaitė, "Electronic information search method and system" in Lithuania has been recognized as the best invention of August (2010).

The essence of the invention is the new way of electronic information search in the selected documents in databases (libraries). This search system covers the input of search criteria, their significances, and input of search restrictions. System extracts the information, processes and indexes it according to the criteria and their significances, displays the search results and marks the composite parts of analyzing document (paragraphs, chapters and other parts), finally forms the alternatives. The final search results are presenting after the multi-criteria analysis of the alternatives.

Systems makes possible to select electronic information both by field and scope, therefore the search becomes more flexible and informative.

The multiple criteria analysis of the components of analyzed documents covers the complex determination of the criteria significances taking into account their quantitative and qualitative characteristics, the complex proportionality assessment of the texts, and the determination of the utility degree and determination of market value of components of analyzed documents.

The proposed analytical search method allows the user to select the rational information of scope. When system designs the alternative options system enables the user to add and / or adjust the criteria which have already been entered giving the opportunity to intervene to a search and redirect it according to the consumer's priorities and the current situation.

New Optimization Method

An Additive Ratio Assessment **(ARAS) method in multiple criteria decision-making (**Zavadskas and Turskis 2010)

Prof. dr. habil. Edmundas Kazimieras Zavadskas

Prof. dr. habil. Zenonas Turskis

Sustainable development and environment can be influenced by major accidents (Vaidogas and Juocevicius, 2008a; 2008b). Many constructional processes are carried out by machines working together and forming technological systems. For process design purposes most important are the effectiveness ratios relating to the profits and losses stemming from system use (Schabowicz and Hola, 2008). In order to rank alternatives and select the best alternative a new ARAS method will be used. The typical MCDM problem is concerned with the task of ranking a finite number of decision alternatives, each of which is explicitly described in terms of different decision criteria which have to be taken into account simultaneously (Zavadskas and Vaidogas, 2009; Vaidogas and Juocevicius, 2009; Zavadskas *et al*, 2010).

ARAS technique is based on the argument that phenomena of complicated world could to be understood by using simple relative comparisons. It is argued that the ratio of the sum of normalized and weighted values of criteria, which describe alternative under consideration, to the sum of the values of normalized and weighted criteria, which describes the optimal alternative, is degree of optimality, which is reached by the alternative under comparison.

According to the ARAS method, a utility function value determining the complex relative efficiency of a feasible alternative is directly proportional to the relative effect of values and weights of the main criteria considered in a project.

The first stage is decision-making matrix (DMM) forming. In the MCDM of the discrete optimization problem any problem to be solved is represented by the following DMM of preferences for *m* feasible alternatives (rows) rated on *n* signfull criteria (columns):

$$X = \begin{bmatrix} x_{01} & \cdots & x_{0j} & \cdots & x_{0n} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ x_{i1} & \cdots & x_{ij} & \cdots & x_{in} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ x_{m1} & \cdots & x_{mj} & \cdots & x_{mn} \end{bmatrix}; \qquad i = \overline{0, m};\ j = \overline{1, n}, \tag{1}$$

where *m* – number of alternatives, *n* – number of criteria describing each alternative, x_{ij} – value representing the performance value of the *i* alternative in terms of the *j* criterion, x_{0j} – optimal value of *j* criterion.

If optimal value of *j* criterion is unknown, then

$$\begin{aligned} x_{0j} &= \max_i x_{ij}, && \text{if } \max_i x_{ij} \text{ is preferable, and} \\ x_{0j} &= \min_i x_{ij}^*, && \text{if } \min_i x_{ij}^* \text{ is preferable .} \end{aligned} \tag{2}$$

Usually, the performance values x_{ij} and the criteria weights w_j are viewed as the entries of a DMM. The system of criteria as well as the values and initial weights of criteria are determined by

experts. The information can be corrected by the interested parties by taking into account their goals and opportunities.

Then the determination of the priorities of alternatives is carried out in several stages.

Usually, the criteria have different dimensions. The purpose of the next stage is to receive dimensionless weighted values from the comparative criteria. In order to avoid the difficulties caused by different dimensions of the criteria, the ratio to the optimal value is used. There are various theories describing the ratio to the optimal value. However, the values are mapped either on the interval [0; 1] or the interval $[0;\infty]$ by applying the normalization of a DMM.

In the second stage the initial values of all the criteria are normalized – defining values $\bar{x}_{ij}$ of normalised decision-making matrix $\bar{X}$:

$$\bar{X} = \begin{bmatrix} \bar{x}_{01} & \cdots & \bar{x}_{0j} & \cdots & \bar{x}_{0n} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \bar{x}_{i1} & \cdots & \bar{x}_{ij} & \cdots & \bar{x}_{in} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \bar{x}_{m1} & \cdots & \bar{x}_{mj} & \cdots & \bar{x}_{mn} \end{bmatrix}; \qquad i = \overline{0, m};\ j = \overline{1, n}. \tag{3}$$

The criteria, whose preferable values are maxima, are normalized as follows:

$$\bar{x}_{ij} = \frac{x_{ij}}{\sum_{i=0}^{m} x_{ij}}. \tag{4}$$

The criteria, whose preferable values are minima, are normalized by applying two-stage procedure:

$$x_{ij} = \frac{1}{x_{ij}^{*}}; \qquad \bar{x}_{ij} = \frac{x_{ij}}{\sum_{i=0}^{m} x_{ij}}. \tag{5}$$

When the dimensionless values of the criteria are known, all the criteria, originally having different dimensions, can be compared.

The third stage is defining normalized-weighted matrix - $\hat{X}$. It is possible to evaluate the criteria with weights $0 < w_j < 1$. Only well-founded weights should be used because weights are always subjective and influence the solution. The values of weight w_j are usually determined by the expert evaluation method. The sum of weights w_j would be limited as follows:

$$\sum_{j=1}^{n} w_j = 1. \tag{6}$$

$$\hat{X} = \begin{bmatrix} \hat{x}_{01} & \cdots & \hat{x}_{0j} & \cdots & \hat{x}_{0n} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \hat{x}_{i1} & \cdots & \hat{x}_{ij} & \cdots & \hat{x}_{in} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ \hat{x}_{m1} & \cdots & \hat{x}_{mj} & \cdots & \hat{x}_{mn} \end{bmatrix}; \qquad i = \overline{0, m};\ j = \overline{1, n}. \tag{7}$$

Normalized-weighted values of all the criteria are calculated as follows:

$$\hat{x}_{ij} = \bar{x}_{ij} w_j; \qquad i = \overline{0, m}, \tag{8}$$

where w_j is the weight (importance) of the j criterion and $\bar{x}_{ij}$ is the normalized rating of the j criterion.

The following task is determining values of optimality function:

$$S_i = \sum_{j=1}^{n} \hat{x}_{ij}; \qquad i = \overline{0, m}, \tag{9}$$

where S_i is the value of optimality function of i alternative.

The biggest value is the best, and the least one is the worst. Taking into account the calculation process, the optimality function S_i has a direct and proportional relationship with the values x_{ij} and weights w_j of the investigated criteria and their relative influence on the final result. Therefore, the greater the value of the optimality function S_i, the more effective the alternative. The priorities of alternatives can be determined according to the value S_i. Consequently, it is convenient to evaluate and rank decision alternatives when this method is used.

The degree of the alternative utility is determined by a comparison of the variant, which is analysed, with the ideally best one S_0. The equation used for the calculation of the utility degree K_i of an alternative a_i is given below:

$$K_i = \frac{S_i}{S_0}; \qquad i = \overline{0, m}, \tag{10}$$

where S_i and S_0 are the optimality criterion values, obtained from Eq. (9).

It is clear, that the calculated values K_i are in the interval [0, 1] and can be ordered in an increasing sequence, which is the wanted order of precedence. The complex relative efficiency of the feasible alternative can be determined according to the utility function values.

Traditional optimization, statistical and econometric analysis approaches used within the engineering context are often based on the assumption that the considered problem is well formulated and decision-makers usually consider the existence of a single objective, evaluation criterion or point of view that underlies the conducted analysis. In such a case the solution of engineering problems is easy to obtain.

But in reality, the modelling of engineering problems is based on a different kind of logic taking into consideration the existence of multiple criteria, the conflicting aims of decision maker, the complex, subjective and different nature of the evaluation process, and the participation of several decision makers. Recently operation researchers have started to embrace the complexity of decision making process and foresee the innovative perspective, which overcomes the restrictive nature of optimization.

Therefore, MCDM contributes in engineering context through the identification of the best alternatives according to the problematic chosen, the satisfactory solution of the conflicts between the criteria, the determination of the relative importance of the criteria in the decision making process, and the revealing of the preferences and system of values.

Overall, the main advantages that the MCDM provides in decision making, could be summarized in the following aspects: the possibility to analyze complex problems; the possibility to aggregate both quantitative and qualitative criteria in the evaluation process; the possibility of good evidence of decisions; the possibility for decision-maker to participate actively in the decision-making process; and the application of flexible scientific methods in the decision making process.

According to the newly proposed ARAS method, the utility function value determining the complex efficiency of a feasible alternative is directly proportional to the relative effect of values and weights of the main criteria considered in a project.

The priorities of alternatives can be determined according to the utility function value. Consequently, it is convenient to evaluate and rank decision alternatives when this method is used.

The degree of the alternative utility is determined by a comparison of the variant, which is analysed, with the ideally best one.

It can be stated that the ratio with an optimal alternative may be used in cases when it is seeking to rank alternatives and find ways of improving alternative projects.

In conclusion, ARAS method has a promising future in the construction engineering field, because he offers a highly methodological basis for decision support. Nevertheless, his success in practice depends heavily on the development of computerized multiple criteria decision support systems.

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2. Vaidogas E. R., Juocevicius V. Sustainable development and major industrial accidents: the beneficial role of risk-oriented structural engineering, *Technological and Economic Development of Economy*, Vol. 14, No. 4, 2008a, pp. 612–627.
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5. Zavadskas E. K., Vaidogas E. R. Multiattribute selection from alternative designs of infrastructure components for accidental situations, *Computer-aided civil and infrastructure engineering*, Vol. 24, No. 5, 2009, pp. 346–358.
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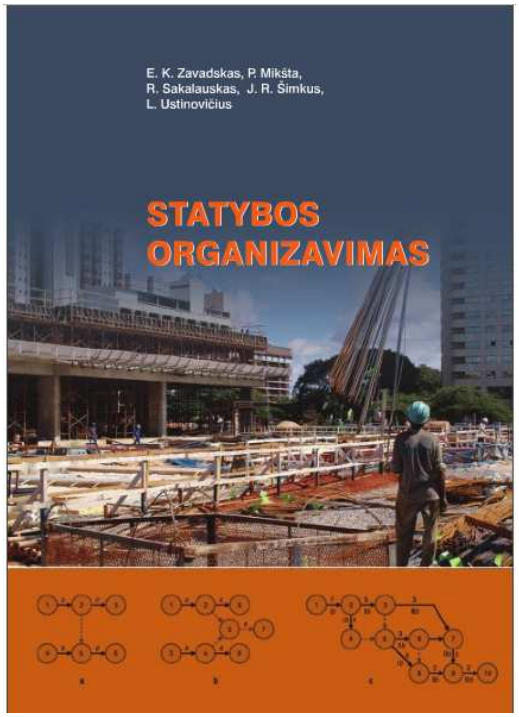
7. Zavadskas, E.K., Turskis, Z., Vilutiene, T. Multiple criteria analysis of foundation instalment alternatives by applying Additive Ratio Assessment (ARAS) method. *Archives of Civil and Mechanical Engineering.* Wroclaw : Wroclaw University Technology. ISSN 1644-9665. 2010, Vol. 10, no. 3, p. 123-141.

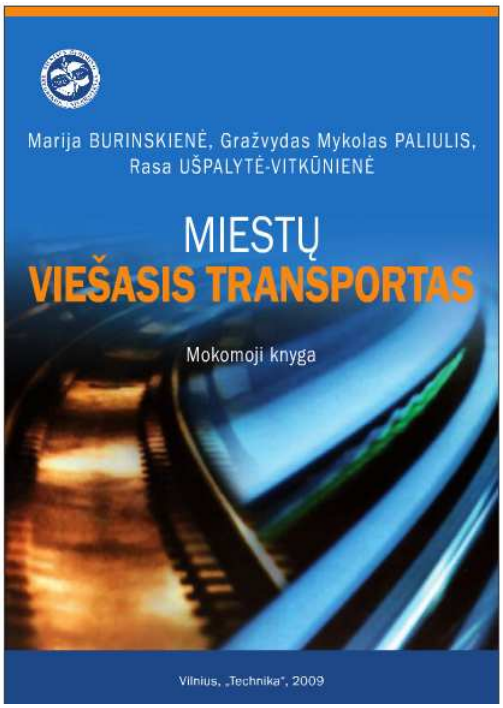
Books published 2009-2010



The organization of construction
2nd revised edition,
Vilnius "Technika"2009, 272 p.

E.K.Zavadskas, P.Mikšta, R.Sakalauskas, J.R.Šimkus, L.Ustinovičius

The first edition of textbook "The organization of construction" was published in 2001. Eight years after the release of the first textbook, the changes in the legal acts in construction, the changes in the international quality management and construction management procedures and standards apper and arose the need to prepare a second revised and supplemented edition that better meet the requirements of modern construction organization. The book may be useful for the construction and business professionals who want to deepen their knowledge.



Public transport in urban areas
Vilnius "Technika"2009, 192 p.

M. Burinskienė, G. M. Paliulis, R. Ušpalytė-Vitkūnienė

The book provides an overview of the public transport, the specifics of passengers' transport organization in cities of European Union and Lithuania. Book introduces the research of public transport systems, population mobility, vehicles ' performance rates, the design of routes, ticketing systems. The forecasting and modeling of public transport in urban areas also presented. Book presents the Lithuanian innovations in urban public transport system.

International projects in process

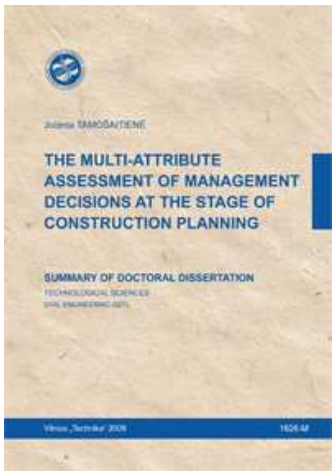
No.	Programme	Project	Short code	Date from - to	Responsible person
1	Other (scientific)	Qualification, Innovation, Cooperation and Keybusness for Small and Medium Enterprises in Baltic Sea Region	BSR QUICK	2009-2012	Prof. Dr Habil. Romualdas Ginevičius
2	Framework 7	Performance Indicators for Health, Comfort and Safety of the Indoor Environment	PERFECTION	2010-2011	Assoc Prof Dr Vaidotas Šarka
3	Other (scientific)	Visions of Residental Futures: Housing in Transformation 2008-2011	VISURF	2008-2011	Assoc Prof Dr Natalija Lepkova
4	Cost	Urban Habitat Constractions Under Catastrophic Events	COST C26	2006-2010	Prof Dr Habil Gintaris Kaklauskas
5	Framework 7	Sustainable Zero Carbon ECO-Town Developments Improving Quality of Life across EU - ECO-Life	ECO-Life	2010-2014	Assoc Prof Dr Tatjana Vilutienė

PhD Dissertations defended during 2009-2010

Name of doctoral student	Title of dissertation	Year	Scientific supervisor
Jolanta Tamošaitienė	The multi-attribute assessment of management decisions at the stage of construction planning	2009	Edmundas Kazimieras Zavadskas
Darius Kalibatas	The multi - attribute asessment of environmental factors influencing on dwelling - houses	2009	Edmundas Kazimieras Zavadskas
Vita Urbanavičienė	The housing quality and price equilibrium: The negotiation model and the system	2009	Artūras Kaklauskas
Laura Tupėnaitė	Multiple criteria assesment of the built and human environment renovation projects	2010	Edmundas Kazimieras Zavadskas
Loreta Kanapeckienė	Development of a knowledge management model and a recommender system for construction projects	2010	Artūras Kaklauskas
Arūnas Barvidas	Construction management mode selection to ensure more efficiency and quality	2010	Leonas Ustinovičius
Darius Migilinskas	Solutions for technological and economic problems of construction in the case of uncertainty	2010	Leonas Ustinovičius
Edita Šarkienė	Model of solutions of rational investments to single family dwelling-housing	2010	Leonas Ustinovičius

Short presentations of defended dissertations are presented below.

Short review of defended dissertations



The multi-attribute assessment of management decisions at the stage of construction planning

Jolanta Tamošaitienė

Summary of Doctoral Dissertation

Technological Sciences, Civil Engineering (02T).

Vilnius: Technika, 2009. 20 p.

Research object. The dissertation proposes the rational, based on multi-attribute assessment methods with index meanings, determined by interval, management decisions making model that can be used at the stage of construction planning. According to the interval system theory, a new multi-attribute assessment method COPRAS-G was created and applied to solve the tasks with index meanings, defined by intervals.

Research methodology. Carrying out the research there were used interval system methods theory, multi-attribute assessment methods, the Game Theory, synthesis, comparison of results, modelling and expert assessment. Research methodologies are based on analysis of publications by Lithuanian and foreign scientists in the field of renovation. Questionnaire surveys, expert analysis, multiple criteria analysis, comparative analysis, logics and synthesis methods are applied in the performed research. Case studies were used to demonstrate the applicability and the effectiveness of the proposed approach.

The scope of the scientific work. The doctoral thesis includes an introduction, fifth chapters, general conclusions, and the list of literature. Also 6 annexes included. The volume of the thesis is 164 pages, including appendixes, 59 numbered formulas are used, 50 pictures and 30 tables. Thesis prepared basing on 241 references.

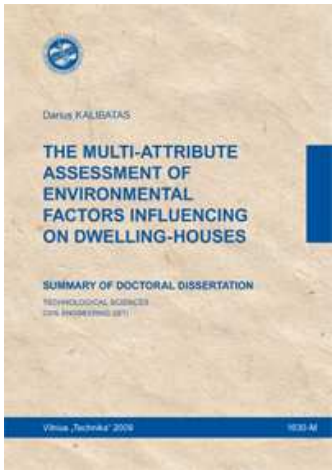
In the introductory chapter there are discussed the actuality of the problem, the aim and tasks formulated, novelty described, the author's reports presented and the structure of the dissertation.

The first chapter gives the survey of the literature and has been of the construction management problems that are being solved.

The second chapter gives traditional, new and created multi-attribute assessment methods derivation algorithms and mathematical description.

The third, fourth and fifth chapters present the solution of management tasks at the stage of construction planning. Third chapter analyzes construction objects risk evaluation; the fourth – the choice of a construction contractor and projects' manager, as well as contractor's risk assessment; the fifth chapter gives of the assessment of planned technical and construction building solutions.

Approval of the thesis. The main statements of the thesis were discussed during seven international and three national scientific conferences. The most important results of the thesis were published in thirteen scientific publications, three of them in reviewed scientific journals.



The multi-attribute assessment of environmental factors influencing on dwelling-houses

Darius Kalibatas

Summary of Doctoral Dissertation

Technological Sciences, Civil Engineering (02T).

Vilnius: Technika, 2009. 23 p.

Research object. The object of the research is indoor environment and its compliance with the Lithuanian Hygiene Norm and the people's needs; determining efficiency of indoor renovation.

Aim of the work. The aim of the dissertation is to expand quality assessment methods of comfortable environment by proposing the multi-attribute assessment of environmental factors influencing dwelling-houses.

Research methodology. Methods of logical induction, generalization of concepts and conceptual modelling are used to generalize methods and develop multi-attribute aggregation method for assesment of indoor environment.

A new assessment method is proposed, which, according to the selected attributes, allows assessment of indoor environment by means of several multi-attribute methods and to process their results by means multi-attribute aggregation method.

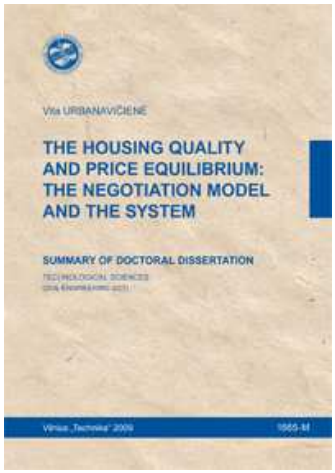
The scope of the scientific work. The dissertation consists of the introduction, three chapters, general conclusions, references, list of author's publications on the topic of dissertation and three annexes. The total scope of the dissertation is 110 pages, 48 pictures and 26 tables.

In the first chapter, the concepts of indoor environment and microclimate are analysed; an impact of indoor environment and microclimate on a workplace and dwelling place is reviewed; how renovation influences on indoor environment and microclimate and how it is suggested to assess indoor environment, a description of the importance of microclimate to a man‘s being and working quality are reviewed. There is also an analysis of the influence of construction and exploitation of a building on microclimate and energy consumption.

In the second chapter, the analysis of the concept of multiattribute decision-making, examination of multi-attribute decision-making methods, their classification and evolution is presented.

In the third chapter, the importance levels of attributes for dwelling houses and offices is determined, the multi-attribute assessment method is proposed and research methodology of indoor environment and thermovision is described.

Approval of the thesis. The main statements of the thesis were discussed during four international and one national scientific conference. The most important results of the thesis were published in nine scientific publications, four of them in reviewed scientific journals.



The housing quality and price equilibrium: The negotiation model and the system

Vita Urbanavičienė

Summary of Doctoral Dissertation

Technological Sciences, Civil Engineering (02T).

Vilnius: Technika, 2009. 22 p.

Research object covers the process of construction and housing negotiations, the participating of stakeholders with specific goals and the entire micro and macro-level environment which affects the efficiency of negotiations.

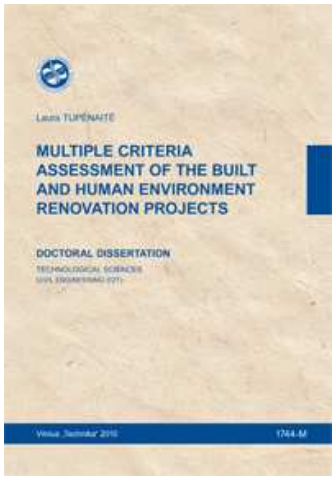
Aim of the work. The research aims to create the conceptual model for multiple criteria analysis of the housing quality and price equilibrium negotiation and to develop a web-based decision support system based on the model in which multi-criteria analysis and multi-criteria alternative methods are used as well voice stress analysis.

Research methodology. In order to perform a thorough analysis of the research object, the multiple criteria analysis methods developed by E.K.Zavadskas and A.Kaklauskas are used as a basis for integrated assessment of economic, technical, qualitative, technological, social, psychological, ethical, managerial, legal, infrastructure and other aspects and the voice stress analysis technology. The research included questionnaire surveys, expert analysis and voice stress analysis of home sellers. The dissertation is based on scientific publications, ancyclopaedic reference works, statistical data, other scientific and informative publications and sources. Information technologies, analogy principles, comparative analysis, logics and synthesis methods are applied in the performed research.

The scope of the scientific work. The dissertation includes an introduction, four chapters, general conclusions and suggestions, a list of literature (248 sources) and two annexes (in the form of digital media); there are 33 figures, 11 tables, and 13 formulas. There are 168 pages in the dissertation.

Practical value. Research results were implemented in ES ERABUILD programme project “Construction and Real Estate – Developing Indicators for Transparency (CREDIT)”.

Approval of the thesis. The main statements of the thesis were discussed during four international and national scientific conferences and seminars. The material presented in the thesis was published in seven scientific articles, three of them in peer reviewed scientific journals.



Multiple criteria assessment of the built and human environment renovation projects

Laura Tumėnaitė

Summary of Doctoral Dissertation

Technological Sciences, Civil Engineering (02T).

Vilnius: Technika, 2010. 129 p.

Research object. The dissertation investigates the issues of the efficiency improvement of the built and human environment renovation from holistic perspective by using multiple criteria decision support methods and information technologies.

Aim of the work. The aim of the thesis is the evaluation and enhancement of the effectiveness of built and human environment renovation through the application of the established Conceptual Model for the Integrated Analysis of Built and Human Environment Renovation, multiple criteria evaluation methods and the developed Computer-Aided Decision Support System for Built and Human Environment Renovation.

Research methodology. Research methodologies are based on analysis of publications by Lithuanian and foreign scientists in the field of renovation. Questionnaire surveys, expert analysis, multiple criteria analysis, comparative analysis, logics and synthesis methods are applied in the performed research.

The scope of the scientific work. The dissertation consists of Introduction, 4 Chapters, Conclusions, References, List of Publications and 3 Annexes.

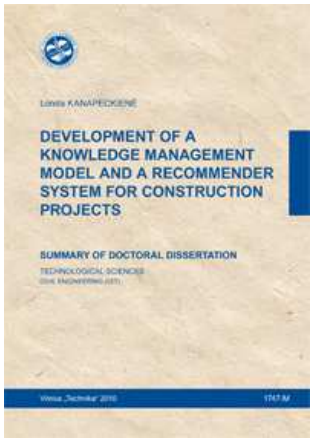
Chapter 1 revises scientific literature. Scope and definition of built and human environment is presented, a survey of research investigated in the field of built and human environment renovation, developed renovation models as well as computer-based systems performed.

Chapter 2 presents the Conceptual Model for the Integrated Analysis of Built and Human Environment Renovation (IABHER) developed by author.

In Chapter 3 the developed model and multiple criteria decision-making methods are applied for assessment of the Cultural Heritage Renovation Projects in Bulgaria supported to EEA and Norway Grants. The hierarchically structured system of evaluation criteria is developed, weights of criteria determined, assessment and calculations of the projects‘ attributes as well as multiple criteria evaluation performed by traditional methods SAW, TOPSIS and COPRAS as well as the newly developed method ARAS in order to select the best project alternatives for granting.

Chapter 4 presents the developed Computer-Aided Decision Support System for Built and Human Environment Renovation (DSS-BHER) and detailed description of its components. The working principles with the system are explained and solutions to practical tasks provided.

Approval of the thesis. 13 articles focusing on the subject of the discussed dissertation are published: two articles – in the Thomson ISI Web of Science register, one article – in reviewed scientific journal, four articles – in the proceedings in Thomson ISI data base, three articles – in material reviewed during international conferences and three articles during national conferences. 10 presentations on the subject have been given in conferences at national and international level.



Development of a knowledge management model and a recommender system for construction projects

Loreta Kanapeckienė

Summary of Doctoral Dissertation

Technological Sciences, Civil Engineering (02T).

Vilnius: Technika, 2010. 24 p.

Research object. The research object of dissertation is the process of efficiency improvement in the management of construction projects through use of explicit and tacit knowledge management systems, stakeholders' groups with specific aims and external environment as a whole.

Aim of the work. The research aims to develop a model of explicit and tacit knowledge management in construction projects and to use this model as a basis in development of the Recommender System of Explicit and Tacit Knowledge Management in Construction Projects.

Research methodology. The multiple criteria project analysis and multi-variant design methods developed by Zavadskas and Kaklauskas were adjusted and extended for the research; such methods as comparative analysis, expert evaluation and logics and synthesis were used as well.

The scope of the scientific work. The scientific work consists of the general characteristic of the dissertation, 5 chapters, conclusions, list of literature, list of publications and addenda.

Chapter 1 is dedicated to a review of science literature. Knowledge management models and systems used in construction are analysed. The chapter ends with conclusions and a detailed presentation of the thesis' objectives.

Chapter 2 presents created the Model of Explicit and Tacit Knowledge Management in Construction Projects and details its main components, discussed their reciprocity.

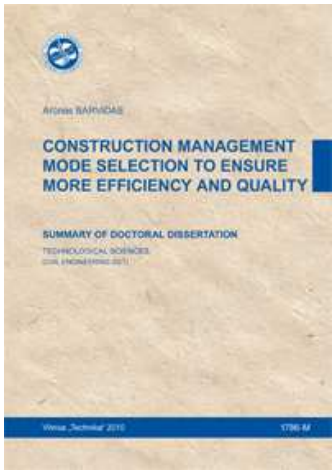
Chapter 3 presents performed multi-variant design and multiple criteria analysis of construction projects management, summarises the process of initial data preparation for multiple criteria analysis, describes the proposed multi-variant design and multiple criteria analysis model of construction project management, and presents the steps and the formulas of the analysis.

Chapter 4 describes the Recommender System of Explicit and Tacit Knowledge in Construction Projects Management based on the proposed model and the components of this system. The principle of system's operation is presented as well.

Chapter 5 analyses and evaluates construction and reconstruction projects supported to the EEA/Norwegian Grants.

Practical value. The developed original Recommender System of Explicit and Tacit Knowledge Management in Construction Projects can be employed to make effective decisions related to the management of construction projects. Diverse stakeholders – project initiators, clients, contractors, construction project managers, designers, consumers and others – can use the functions of this system. The theoretical research findings were used in the international project CREDIT within the programme ERABUILD (Construction and Real Estate – Developing Indicators for Transparency).

Approval of the thesis. 12 articles focusing on the subject of the discussed dissertation are published: one article – in the Thomson ISI Web of Science register, five articles – in reviewed scientific journal, three articles – in the proceedings in Thomson ISI data base, three articles – in material reviewed during during national conferences. 8 presentations on the subject have been given in conferences at national and international level.



Construction management mode selection to ensure more efficiency and quality

Arūnas Barvidas

Summary of Doctoral Dissertation

Technological Sciences, Civil Engineering (02T).

Vilnius: Technika, 2010. 22 p.

Research object. Selection of rational manner for construction management applying newly created verbal method UniComBOS for decision making.

Aim of the work. The main purpose of scientific work is to create a new system of solution to select efficient construction management mode by using quantitative and qualitative indicators as well as practically adopt the solution method proposed by the author.

Research methodology. In the analytical part of the work, performing analysis of construction management manners reference was made to studies of similar field executed by Lithuanian and foreign scientists. The application of verbal method theory to practice was proposed in the work.

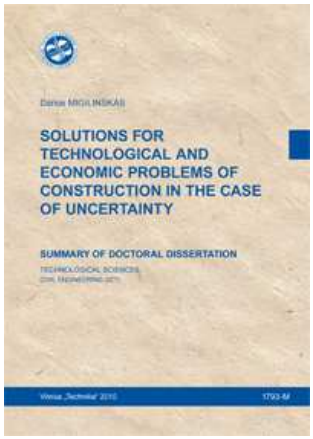
The scope of the scientific work. The dissertation comprises of introduction, four chapters and conclusions of the results. The scope of the work is 124 pages, 19 numbered formulas, 36 figures and 15 tables were used in the text.

Upon examination of construction outsourcing contracts according to FIDIC and upon analysis of contractor selection in Lithuania and abroad on the basis of verbal method UniComBOS a new solution method, which is adopted to select the manner of construction management, is created.

The author with co-authors has created a new verbal method *UniComBOS*. This method allows efficiently exercising SPA survey and neatly discloses appearing contradictions. The proposed verbal method can be applied to establish efficient contracts and construction projects. Upon solution of the tasks of analyzed project it is established that the most suitable is to apply the contract of actual expense and the type of the project model oriented towards management.

Practical value. Results can be used when employer selects appropriate contractor for effective construction management. Verbal method UniComBOS can be applicable in public procurement in Lithuania when the best variant out of many tenders of contractors is selected.

Approval of the thesis. The results of the research performed in dissertation were published in six scientific conferences in Lithuania and abroad. 11 scientific articles are publish on the topic of dissertation: two articles – in scientific journal included in ISI *Web of Science* list, one article – in the journal included in *ISI Master Journal* List, two articles – in scientific magazines included in *IRBdirect* and *ICONDA* databases.



Solutions for technological and economic problems of construction in the case of uncertainty

Darius Migilinskas

Summary of Doctoral Dissertation

Technological Sciences, Civil Engineering (02T).

Vilnius: Technika, 2010. 24 p.

Research object. The object of the research is a set of factors that affect the construction process, its stages and participants, causing uncertainties in dealing with technological and economic construction problems.

Aim of the work. The main aim of this work is to develop a model and methodology of automated management for construction project, which would allow to collect and correct data in the project' stages, to analyse probable alternatives for reduction of impact from uncertainties and risk factors on the final solution and result of the project.

Research methodology. The data for the research and its conclusions was obtained by means of expert and comparative methods as well as the analysis of the collected research data (scientific publications, textbooks and monographs of Lithuanian and foreign scientists). The thesis assesses and applies the methods of determination of optimal solution and normalisation; it also takes advantage of the major propositions of game theory.

The scope of the scientific work. The thesis consists of the following parts: introduction, 4 chapters, conclusions and proposals, references and annexes. The scope of the dissertation accounts for 160 pages.

Chapter I gives a general review of global literature on the topic of the thesis and theoretical concepts of uncertainties. Technological and economic problems of construction and the issues of their solution under the conditions of uncertainty are described as the research object of the thesis.

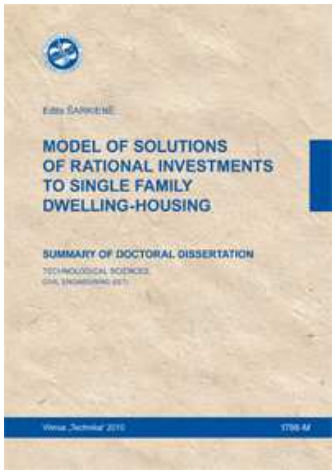
Chapter II provides the analysis of the impact of uncertainties on a construction process and the need for their management.

Chapter III discusses the means designed for the management of uncertainties in the process of construction. The methodology designed for the solution of technological and economic problems of construction in the case of uncertainty is provided. The implementation stages are presented in great detail.

Chapter IV gives a practical example of uncertainty management; it identifies the differences acquired in the comparison of estimate calculations conducted by means of a usual manual way and by means of automated design.

Practical value. The research data was used in the international educational *Leonardo da Vinci* project.

Approval of the thesis. The research results of the thesis were published in fifteen scientific conferences in Lithuania, Poland, Latvia, Estonia and Spain. 22 scientific articles were published on the topic of the dissertation: one article was published in scientific journals included into the *Thomson ISI Master Journal List*; two articles were published in *Thomson ISI Proceedings*; four – in scientific journals cited in *ISI Proceedings* and *IRBdirect*, *ICONDA* databases; six articles were published on the international databases approved by the Research Council of Lithuania.



Model of solutions of rational investments to single family dwelling-housing

Edita Šarkienė

Summary of Doctoral Dissertation

Technological Sciences, Civil Engineering (02T).

Vilnius: Technika, 2010. 22 p.

Research object. The thesis analyses the construction projects and processes of single-family housing. This field of construction is to a large extent related to architectural solutions and is directly dependent on them.

Aim of the work. The major aim of this dissertation is to develop a model, which would enable the selection of a rational solution of investment to a single-family housing by assessing the impact of architectural solutions on the meeting of goals and needs of participants in the processes of investment, design, construction, use and operation in respect of the entire life cycle of a building.

Research methodology. The thesis employs research methods based on the analysis of research studies conducted by the Lithuanian and foreign scientists in this field. The methods of project multi-criteria synthesis analysis developed by Prof. Dr. Habil. E. K. Zavadskas and Assoc. Prof. Dr. Vaidotas Šarka were applied to the research. There were applied different decision support systems, methods of experimental assessment and mathematical modelling. To develop a system of assessment criteria, the integrated criteria formation methodology has been proposed. Criteria values of alternatives are determined by the methods of statistics, calculation and analogy, whereas the weights of criteria are decided by expert methods. The dissertation took advantage of scientific publications of Lithuanian and foreign authors, scientific and informative publications of scientific institutions.

The scope of the scientific work. The thesis consists of the introduction, four chapters and conclusions, 4 annexes were attached.

Practical value. The model for the selection of a rational project of single-family housing, which assesses the impact of architectural solutions, has been developed for the selection of the best investment variants. Individual elements of the model were applied to the development of the concept of Birštonas ECO City. The research data and individual elements of the model were used in the development of application for the international research project FP7 ECO-life, also at the project R&D activities. The methodology, results, conclusions and proposals of the thesis have been applied to the real-life task of drafting the investment project for the construction of a dwelling house in Vilnius City.

Approval of the thesis. The main statements of the thesis were discussed during three international and four national scientific conferences. The most important results of the thesis were published in twelve scientific publications, five of them in reviewed scientific journals.

Editor's comments

Dear EWG-ORSDCE members, dear fiends,
This issue is not very large. It presents the results of cooperation of our colleagues and friends.
This issue includes a section entitled "New Optimization Methods" with a presentation of the new developed multiple criteria decision making method ARAS. We are thankful to Prof. Zenonas Turskis who has kindly provided us with the information. For the next issues, other proposals with descriptions of new optimization methods are welcome.
This year was rich in conferences were members of EWG-ORSDCE have participated as organizers. I would like to express the gratitude to colleagues contributed to the organization of all those conferences, especially Jurgita Antuchevičienė, Jolanta Tamošaitienė, Jana Šelih, Marija Burinskienė.
We invite all participants to participate in next colloquium of EWG-ORSDCE, which will held on October 9-12, 2011 in Augustow, Poland and also in EURO XXV 2012 "OR – Connecting Sciences", which will held on July 8-11, 2012 in Vilnius, Lithuania.

On behalf of the Editorial Board of EWG-ORSDCE Newsletter, Tatjana Vilutienė

EWG-ORSDCE Newsletter
Editorial Board: Tatjana Vilutienė, Edmundas Kazimieras Zavadskas
Co-workers: Jolanta Tamošaitienė, Zenonas Turskis