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HISTORY AND TRENDS OF DEVELOPMENT OF COLLOQUY

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During the period of Lithuania's incorporation into the Soviet Union, scientific cooperation with foreign higher education institutions was lying dormant practically in the state of lethargy. It was regulated from Moscow. Closer cooperation among individual scientists and scientific groups could only be established in the cases when some lucky ones managed to get a chance of going abroad to work on probation for a longer period of time.

On the initiative of Prof A. Čyras, former principal of the Vilnius Civil Engineering Institute, one of the co-authors of this Article (E. K. Zavadskas) in 1980-81 worked on probation in the Leipzig Higher Technical School (Democratic Republic of Germany). During the period of probation the School was managed by its former principal Prof K. Fiedler.

The cooperation did not cease after the probation. Close relations have been established with Friedel Peldschus, teacher of the School.

In 1986 joint research work was prepared and issued by a publishing house of the School. The research work provided the basis for arranging a scientific colloquium with the participation of representative of higher schools and construction enterprises of the Democratic Republic of Germany. All the three co-authors of the publication read their respective reports at the colloquium.

In 1989 a decision was made to arrange a second colloquium with the invitation of representatives from Poland. Professors K. Fiedler, J. Ester, O. Kaplinski, Ch. Wagner participated in the colloquium. 8 publications have been issued.

The third colloquium, 1991, took place in Vilnius in the premises of the Civil Engineering Institute that had already been reorganized into the Vilnius Technical University. The event took place in the independent Lithuania. Among participants there were representatives of the already reunited Germany represented by three higher schools – Leipzig Higher Technical School, Rhein-Westphalia Higher Technical School (RWTHT) (Aachen) and Weimar Higher School of Architecture and Engineering. There were also representatives of the Poznan Technical University (PTU) invited who had already participated in the second colloquium. Representatives of Moscow and Leningrad Civil Engineering Institutes (now renamed in Technical Universities) and Bratislava Technical University (BTU) sent their reports to the colloquium. A report was also sent by representatives of the Danish Aalborg University. There were a large number of scientists participating on behalf of the hosting Vilnius Technical University.

Organizers of the fourth colloquium were a group of scientists from Poznan Technical University directed by Prof O. Kaplinski. The colloquium took place in 1993 with the participation of researchers from Germany, Poland and Lithuania. A report was also received from scientists of the Bratislava Technical University.

The initiative of organizing the fifth colloquium in 1995 belonged to Prof Peldschus – Chancellor of the Leipzig Higher Technical, Economic and Cultural School (HTWK) (former Leipzig Higher Technical School) and his team of scientists. This time the VTU had a numerous representation. Among the participants were Professors B. Melnikas, J. Staškevičius, J. Parasonis, E. Zavadskas, Assoc Professors A. Kaklauskas, R. Ginevičius, S. Raslanas, L. Ustinovičius. German representatives included Prof F. Peldschus and Prof R. Seeling. Among participants there were also representatives of the Poznan Technical University, although they did not present reports for publishing.

The sixth joint Lithuanian-German-Polish colloquium took place in the Vilnius Technical University,

Lithuania. Reports were read by scientists from Leipzig Prof F. Peldschus, Prof S. Raeder, Prof H. Müller, representatives of the Poznan Technical University Prof O. Kaplinski and others as well as scientists of the VTU.

The organizer of the seventh colloquium in 1999 was Prof R. Seeling from the Rhein-Westphalia Higher Technical School. Among the participants there were large groups of scientists from Poland and Lithuania, three professors from Leipzig and several scientists from Aachen. Representatives of the Leipzig Higher Technical, Economic and Cultural School took the initiative of publishing the research works of the colloquium. The publication was issued in 2000. Not all the reports have been published due to the lack of space. Therefore, the Vilnius Gediminas Technical University (former VTU) alongside commemorating the 15th anniversary of co-operation between the interrelated departments of the VGTU and Poznan TU, decided to issue the special-purposed edition of the "Civil Engineering" journal and publish therein reports of other authors, including articles covering research work results achieved by groups of scientists of the VGTU and Poznan TU during the period between the last two colloquiums. Altogether some 105 lecturers took part in all (seven) colloquiums. 90 articles have been published. 57 scientists representing seven countries (Democratic Republic of Germany, Federal Republic of Germany, USSR, Czech Republic, Poland, Denmark, Lithuania) participated in the colloquiums. Initiators of the series of colloquium Prof F. Peldschus and Prof E. Zavadskas participated in all seven colloquiums, Prof D. Kaplinski, Prof R. Seeling, Prof A. Kaklauskas participated in five colloquiums, Dr M. Celinska – Myslaw, Dr L. Ustinovičius participated in four colloquiums, and Prof R. Ginevičius, Prof K. Fiedler, Dr T. Thiel, Dr A. Banaitis participated in three colloquiums.

The 2001 colloquium took place in Vilnius and it was the eighth colloquium over the period of 15 years that witnessed such political events as the downfall of the Soviet Union, restoration of Lithuania's independence, reunification of the Democratic Republic of Germany and Federal Republic of Germany, accession of Poland to NATO and splitting of Czechoslovakia into two independent states, Czech Republic and Slovakia.

The Vilnius Civil Engineering Institute headed by one of the co-authors of this article E. K. Zavadskas saw the reorganization of the Institute into the Vilnius Technical University (VTU) in 1990. On 17 October 1996, the Lithuanian Parliament (Seimas) granted the name of Lithuanian Great Duke Gediminas to the University, thus renaming it into the Vilnius Gediminas Technical University (VGTU). The Leipzig Higher Technical School has been reorganized into the Leipzig Higher Technical, Economic and Cultural School and Leipzig University of Applied Sciences. Moscow's and Leningrad's Civil Engineering Institutes have become Moscow and St Petersburg Construction Universities (MSU and SPSU) respectively.

In spite of all those changes the colloquiums have been held on a regular basis. Participants cooperated, read reports, published articles, defended theses, participated themselves and invited others to participate in the theses defending procedures.

This article gives a brief summary of the research results achieved by the colloquium participants. It is now hardly possible to trace back headings of all the reports delivered during the period of 15 years and find their authors. Not all the articles have been published in the press, although the majority of them have been issued. The article analyzes only the colloquium material published in science journals. Besides, efforts have been made to gather information on Habilitations and Doctoral theses defended by the colloquium participants as well as their science books written on the colloquium issues. Although we can hardly say that every possible piece of information has been found, nevertheless the bibliographical materials we managed to collect is quite copious and worth summarizing and publishing. Publication of the collected data will facilitate the work of other authors who are interested in problems related to decision-making in the sphere of civil engineering (construction). The article did not analyze the material of the eighth colloquium that took place in Vilnius because the preparatory work for the article went on prior to the commencement of this colloquium. The next, ie ninth colloquium will be held in the Poznan Technical University in 2003 and the tenth colloquium will take place in Leipzig in 2005.

17 Professors or Doctors Habil have participated in the work of the colloquiums, 7 of them in 1986–

2000 defended Habilitations: F. Peldschus (1986, Leipzig), E. Zavadskas (1987, Moscow), G. Badjin and K. Shreiber (1991, Leningrad), V. Teličenko (1994, Moscow), R. Ginevičius (1997, Vilnius), A. Kaklauskas (1999, Vilnius). 15 Doctors of science or Associate Professors have taken part in the colloquiums. Among other participants are research fellows, assistants or persons maintaining Doctoral theses. Among them the following have defended their Doctoral theses:

J. Omran (1988, Leipzig), W. Meszek (1989, Poznan), L. Ustinovič (1989, Dnepropetrovsk), M. Celinska (1990, Poznan), A. Kaklauskas (1990, Dnepropetrovsk), R. Tamošaitis (1991, Dnepropetrovsk), T. Dėjus, S. Mitkus (1992, Vilnius), Z. Turskis, E. Bejder, V. Kutut (1994, Vilnius), G. Ambrasas, S. Raeder (1997, Vilnius), T. Thiel (1997, Poznan), A. Banaitis, S. Jakučionis, V. Šarka, N.Kvederytė, V. Malienė (2000, Vilnius). Besides, theses were defended in Vilnius by A. Astrauka and P. Malinauskas, in Weimar by L. Rupprecht, in Moscow by S. Sušinskas, Ali Machmud Šarif and V. Bajetov, in Kaunas by R. Janušaitis, in Minsk by T. Gutorova. Although the above-mentioned persons did not participate directly in the work of the colloquium, nevertheless they maintained very close relations with its participants, held consultations and issued joint publications. The majority of the colloquium participants opposed the theses presented by colleagues from their own or foreign countries, participated in Doctoral Degree Committees and tutored doctoral theses. In Vilnius Doctoral theses have been defended by the German citizen S. Raeder and Danish citizen E. Bejder.

Fig 1 describes relations among universities and higher schools.

Fig 2 gives the number of published reports and their authors.

Fig 1 provides a chronology of colloquiums as well as the number of lecturers and reports published by individual states. It can be seen from the provided material that Lithuanian representatives have published 40 articles, German representatives – 31 articles, Polish representatives – 19 articles, Russian representatives – 4 articles, Czech representatives – 2 articles and Danish representatives – 1 article.

Fig 2 provides information about the number of colloquium participants, their theses defended and books written. Among colloquium participants were 19 scientists from Lithuania, 18 from Germany, 11 from Poland, 5 from Russia, 3 from Czech Republic and 1 from Denmark. They prepared and defended 7 Habilitations and 30 Doctoral theses. These scientists have published 23 books. Lithuanian scientists have participated in the preparation of 18 books, German scientists 5 books, Polish scientists 2 books, Russian scientists 3 books, Danish scientists 2 books. As one can see, quite a lot of books have been compiled by international groups of scientists. In Leningrad the study guide of G. Badjin, F. Peldschus and E. Zavadskas has been published. In Vilnius the study guide of F. Peldschus and E. Zavadskas, in Leningrad the monograph of E. Zavadskas and in Denmark the book of E. Zavadskas and A. Kaklauskas as well as the book prepared by the two latter co-authors together with Dane E. Bejder have been issued. The book of these authors has been published in Vilnius too. Vilnius saw the publication of the monograph prepared by E. Zavadskas, F. Peldschus and A. Kaklauskas followed by the monograph of E. Zavadskas, O. Kaplinski, A. Kaklauskas and J. Brzezinski issued next year. In Vilnius the monograph "Matrix Games in Building Technology and Management" by E. Zavadskas and F. Peldschus has been published. In 2000 E. Zavadskas' monograph "Mehrkriterielle Entscheidungen im Bauwesen" was published in Vilnius, which was edited and prefaced by F. Peldschus. K. Shreiber and T. Caj as well as other scientists have used research works of E. Zavadskas as a basis for compiling their books concerning theoretical principles of development of the decision support systems. O. Kaplinski in the book issued by the Polish Academy of Sciences reviews research works of the majority of colloquium participants.

Colloquium participants discussed a wide range of rational decision-making problems within the field of construction technology and organization. These problems can be joined into the following groups.

1. Creation of decision support systems intended for designing rational technological processes.

Theoretical principles of the decision support systems have been created in the research works of E. Zavadskas. Persons working for Doctor's degree under his guidance have created the following decision support systems: L. Ustinovičius – erection of reinforced

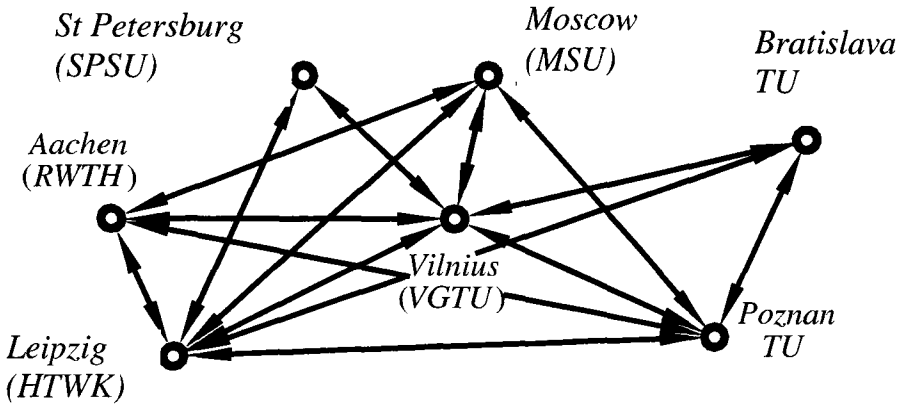

Fig 1. Relations between universities and higher schools

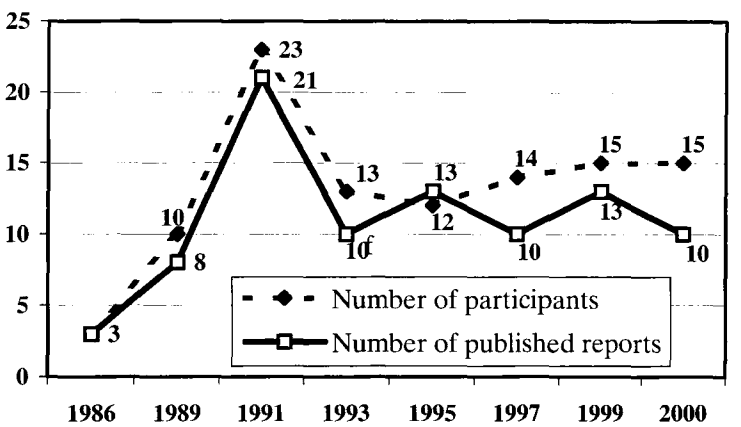

Fig 2. Number of reports and lecturers participated in the colloquiums

Table 1. Number of published papers during different colloquiums

Colloquium	Year	City	Number of published papers						
			Lithuania	Germany		Poland	Czech	Denmark	Russia
				DRG	FRG				
1	1986	Leipzig	1/1	2/2	–	–	–	–	–
2	1989	Leipzig	2/1	7/7	–	1/2	–	–	–
3	1991	Vilnius	12/8	6/7		1/1	1/1	1/1	4/5
4	1993	Poznan	4/4	1/1		5/6	1/2	–	–
5	1995	Leipzig	7/8	5/4		–	–	–	–
6	1997	Vilnius	4/7	3/3		4/4	–	–	–
7	1999	Aachen	3/5	7/9		3/3	–	–	–
7*			7/10	–		5/5			
		Σ	**40/44**	**31/33**		**19/21**	**2/3**	**1/1**	**4/5**

Note: 7* – Aachen colloquium reports published by the VGTU in 2000

Table 2. Number of participants, books, defended Habilitations (Dr Sc) and Doctoral theses

	Total	Country					
		Lithuania	Germany	Poland	Russia	Czech	Denmark
Number of participants	57	19	18	11	5	3	1
Number of books	23	18	7	2	3	-	2
Habilitations of Dr Sc theses defended	7	3	1	-	3	-	-
Doctoral theses defended	30	16	4	3	6	-	1

Table 3. Number of participants, publications and tutored Doctors

No	Colloquium participant	Number of participants	Number of publications		Number of tutored Doctors	
			Articles	Books	Direction	Participation
1.	E. Bejder	1	1	2	–	–
2.	R. Ginevičius	3	3	4	–	3
3.	M. Celinska	4	4	–	–	–
4.	K. Fiedler	3	3	1	1	-
5.	A. Kaklauskas	5	10	7	2	5
6.	O. Kaplinski	5	7	2	3	3
7.	R. Seeling	5	5	2		–
8.	F. Peldschus	7	12	4	1	8
9.	J. Paslawski	3	3	–	–	–
10.	L. Ustinovičius	4	4		–	2
11.	T. Thiel	3	3	–	–	–
12.	J. Brzezinski	1	1	1	–	–
13.	E. Zavadskas	7	20	13	16	12

concrete constructions of single-storey industrial buildings, A. Kaklauskas – farm buildings erected from three-joint frames, R. Tamošaitis – erection of multi-storey skeleton-type buildings, S. Mitkus – automated designing of the construction master plan, T. Dėjus – erection of farm-purposed/agricultural buildings, Z. Turskis – construction of one-storey single-family dwelling houses, G. Ambrasas – refurbishment of dwelling houses. Theoretical principles of the decision support systems have been applied to the design of reconstruction of dwelling houses by K. Shreiber; G. Badjin adapted these methods to the designing of erection technology of pile footings.

Theoretical principles of creation of the decision support systems recommended in the research of E. Zavadskas have been applied by the following scientists:

L. Rupprecht – for comparison of erection variants of the atomic electric wall constructions, Ali Machmud Sharif – for designing rational variants of the monolithic houses, V. Bajetov – for improvement of the construction preparation level, R. Janušaitis – for optimization of the heat insulation processes of exterior walls of the built dwelling houses, A. Astrauka – for designing the clay floor thickening/condensing technology, V. Kutut – for solving old-town regeneration tasks, T. Gutorova – for selection of the rational barrier-type constructions of the single-storey farm buildings, S. Sušinskas – for designing rational pile-column plunging technology, A. Banaitis – for creation of the Lithuanian rational construction building model, S. Jakučionis – for motivating the rational financing variant of the old-town buildings' renovation, V. Šarka – for creation of synthesis methods of the solution support system in construction, P. Malinauskas – for selection of the rational technology of the buildings from monolithic reinforced concrete.

2. Creation, improvement and application of the multiple criteria decision-making methods.

F. Peldschus has carried out a lot of scientific

research with the aim of adapting methods of the game theory for solving construction technology and organization tasks. J. Omran and F. Peldschus have applied the in-determined set theory for the search of rational solutions in construction. R. Seeling has applied the efficiency/utility analysis for the economic comparison of construction variants.

T. Thiel has used the ELECTRE methods for motivating the rational construction variants, S. Mitkus has applied the lexicographical method, T. Dėjus has defined/named the multiple criteria variants by using different methods. E. Zavadskas and A. Kaklauskas and L. Ustinovičius have applied the whole set of multiple criteria optimization methods for solving various construction technology and organization problems. New methods for performing multiple criteria analysis of the project have been developed by E. Zavadskas and A. Kaklauskas: a method of complex determination of the significances of the criteria taking into account their quantitative and qualitative characteristics; a method of multiple criteria complex proportional evaluation of the projects; a method for defining the utility and market value of an object; a method for multiple criteria multivariant design of a building life cycle; methods of multicriteria decision synthesis.

3. Issues of the construction process harmonization, optimization and reliability have been discussed.

The largest amount of work in this sphere has been done by a group of scientists headed by O. Kaplinski. Scientists from Germany, Lithuania, Denmark, Czech Republic and Russia presented their reports on theses issues.

4. Problems related with the application of construction expert methods and the created expert systems.

Research works of R. Ginevičius, H. Hajdasz, A. Marlewski, E. Zavadskas, A. Kaklauskas and A. Banaitis are intended for improving the expert investigation methods. Ch. Wagner has developed expert systems. The largest amount of work in this sphere of activity has been done by a group of scientists headed by O. Kaplinski. A joint monograph prepared by the Vilnius and Poznan Technical Universities is dealing with problems of the expert systems application in construction.

5. Creation of the building life-cycle process models.

Principles of creating such models have been formulated in the Habilitation and monograph written by E. K. Zavadskas. Further investigation in this field has been continued by A. Kaklauskas and N. Kvederytė. A new monograph compiled by the latter co-authors is being prepared for publication.

6. The rational dwelling house construction selection model has been created.

O. Kaplinski, T. Thiel, E. Zavadskas, R. Ginevičius, A. Banaitis, A. Kaklauskas and S. Raslanas worked in the field of selection, analysis and forecasting of rational methods of dwelling construction.

Various ministries have financed colloquiums held in Germany and Poland, whereas colloquiums arranged in Lithuania have not been sponsored by any financial means. However, we are pleased to see that participants of the colloquium do their work creatively and efficiently. We hope that the same spirit of creativity and proficiency in future will not disappear and the number of participants will increase.

7. Total life analysis, modelling and forecasting construction in Lithuania

The research aim of E. Zavadskas, A. Kaklauskas and A. Banaitis was to produce an analytical model of the rational construction industry in Lithuania by undertaking a complex analysis of micro-, meso- and macroenvironment factors affecting it and to give recommendations on the increase of its competitive ability. The research was performed by studying the expertise of advanced industrial economies and by adapting it for Lithuania, taking into consideration specific history, development level, needs and traditions. Simulation was undertaken to provide insight into creating an effective environment for the construction industry by choosing rational micro-, meso- and macrofactors.

8. Efficiency increase in efficiency of e-commerce systems applying multiple criteria decision support systems.

At present the developed by E. K. Zavadskas, A. Kaklauskas, V. Trinkūnas, M. Gikys, A. Gulbinas multiple criteria e-commerce system allows the performance of functions as follows: search of alternatives, finding out of alternatives and making of comparative tables, alternatives evaluation, the after-purchase evaluation.

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KOLOKVIUMŲ ORGANIZAVIMO ISTORIJA IR TENDENCIJOS

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Santrauka

Per penkiolika metų įvyko aštuoni „Daugiakriterinių sprendimų priėmimo" kolokviumai. 2001 m. Vilniuje įvykęs kolokviumas yra aštuntasis.

Ankstesniuose septyniuose „Daugiakriterinių sprendimų priėmimo" kolokviumuose dalyvavo iš viso 105 pranešėjai. Paskelbta 90 straipsnių. Dalyvavo 57 mokslininkai iš septynių valstybių (buvusių VDR, VFR, SSSR, taip pat iš Čekijos, Lenkijos, Danijos, Lietuvos). Straipsnyje trumpai apžvelgiami visų aštuonių kolokviumų dalyvių darbų rezultatai daugiausia dėmesio skiriant mokslo žurnaluose skelbtai kolokviumų medžiagai. Be to, buvo bandyta surinkti informaciją apie kolokviumo dalyvių apgintas habilitacines ir daktaro disertacijas, jų parašytas mokslines knygas kolokviumo tematika, apibendrinti gautus rezultatus. Galbūt ne viską pavyko rasti, tačiau ir surinkta bibliografinė medžiaga yra gana turtinga, taigi verta ją apibendrinti ir paskelbti. Tai palengvins darbą tiems autoriams, kuriuos domina sprendimų priėmimo statyboje problematika. Kolokviumų darbe dalyvavo 17 profesorių arba habilituotų daktarų (iš jų 7 1986–2000 m. apgynė habilitacines disertacijas) ir 15 mokslo daktarų arba docentų. Kiti dalyviai – moksliniai bendradarbiai, asistentai arba doktorantai. Kolokviumų tematika 27 asmenys iš kolokviumuose dalyvaujančių institucijų apgynė daktaro disertacijas. Nors ne visi šie asmenys tiesiogiai dalyvavo kolokviumo darbe, tačiau jie labai glaudžiai bendradarbiavo su jo dalyviais, konsultavosi su jais, paskelbė bendrų publikacijų. Daugelis kolokviumo dalyvių oponavo savo šalies ir kolegų iš užsienio disertacijas, dalyvavo doktorantūros komitetuose, buvo daktaro disertacijų vadovai. Lietuvos atstovai paskelbė 40, Vokietijos – 31, Lenkijos – 19, Rusijos – 4, Čekijos – 2, Danijos – 1 straipsnius. Kolokviumuose dalyvavo 19 Lietuvos, 18 Vokietijos, 11 Lenkijos, 5 Rusijos, 3 Čekijos ir 1 Danijos mokslininkai. Parengtos 23 knygos. Lietuvos mokslininkai dalyvavo rengiant 18 knygų, Vokietijos mokslininkai – 5, Lenkijos – 2, Rusijos – 3, Danijos – 2. Nemaža knygų parengė tarptautiniai kolektyvai.

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