

EHITUSTEADUSKONNA EHITUSTOOTLUSE INSTITUUDI TEADUS- JA ARENDUSTEGEVUSE AASTAARUANNE 2011

1. Instituudi struktuur

Instituudi direktor Irene Lill

- Ehitusmaterjalide õppetool, Chair of Building Materials, Lembi-Merike Raado
- Ehitustehnoloogia õppetool, Chair of Building Technology, Irene Lill
- Ehitusökonoomika ja -juhtimise õppetool, Chair of Construction Economics and Management, Roode Liias
- Ehitusmaterjalide teadus- ja katselaboratoorium, Laboratory of Building Materials, Rosenberg Margit

2. Instituudi teadus- ja arendustegevuse (edaspidi T&A) iseloomustus

(NB! punktid 2.1- 2.6 täidab struktuuriüksus)

2.1 struktuuriüksuse koosseisu kuuluvate uurimisgruppide

2.1.1 teadustöö kirjeldus (*inglise keeles*);

The main research focus in the **Chair of Building Technology** is simulation modelling of construction information and knowledge (management strategies, integration of design-construction-operation information, engineering education and lifelong learning, BIM, socio-technological interfaces, etc.).

Chair of Construction Economics and Management coordinates research in the area of housing management and energy saving renovation of buildings (building life-cycle studies, surveys on technical conditions of housing, development of standards, construction maintenance etc.).

Research focus of the **Chair of Building Materials** is on the technologies of complex use and utilization of oil shale ash in the production of building materials. Their research is tightly connected with the **Laboratory of Building Materials**, which is accredited in the field of building materials since 1997. The accreditation certificate L004 issued by the Estonian Accreditation Centre (EAC) certifies that the laboratory has competence according to EN/ISO/IEC 17025:2005 to conduct testing of building materials. The Lab passes annually the accreditation inspection in order to evaluate the competence according to the scope and conditions specified in the annex of accreditation certificate L004 issued by EAC.

The Laboratory performs academic and standard testing in the field of building cements, mortars, building dry mixes, sand, gravel, crushed stone, concrete, concrete mixes, natural stone, manufactured stone, thermal insulating products and other building materials to determine various physical, mechanical and chemical properties and also conducts research work in the same fields.

2.1.2 aruandeaastal saadud tähtsamad teadustulemused (*inglise keeles*).

Chair of Building Technology

One international project has come to the end successfully:

- **BELLCURVE - Built Environment Lifelong Learning Challenging University Responses to Vocational Education.** The mismatch between graduate skills and labour market requirements has been identified as one of the main factors behind graduate unemployment and employer dissatisfaction, particularly in the Built Environment, as reported by EU labour force survey 2008. The project developed a framework for higher educational institutions (HEI) to capture and respond construction labour market skill needs for HEIs through lifelong University concept.

Two new international projects were started:

- **Central Baltic Interreg IV A project DigiEduET - Digital Processes for Education and Management of Construction.** The project contributes to research and competence development in civil engineering higher education and practice, by improvement of teaching methodology and curriculum development through implementing contemporary digital methods. The DigiEduEt project raises the level of building know-how in regard to the building standards followed in the programme area, harmonizes prevailing technology and quality demands, as well as enhances the use of common building terminology.
- **LARGE - Learning Augmented Reality Global Environment.** The project is designed to create a new type of learning environment that supports the educational institutions in delivering their curriculum in the most attractive and effective way. Aim of the project is to build a global environment, based on AG (augmented reality) technology.

Chair of Construction Economics and Management

Continuing cooperation with Tartu University when developing the Estonian spatial planning curricula (acronym: EPA):

- **Development of Estonian spatial planning curricula (EPA) sector co-operation for establishing joint courses, practice and training system.** The project is aimed to develop an unified study-programme in spacial planning for Estonian universities. In parallel to this it is scheduled to start up the training courses keeping in mind the lack of spacial planning professionalism in the field in Estonia. Also involvement of practitioners in academic lecturing is foreseen. The project if fully following the guidelines set up in Estonian development plan when assuring the quality of education.

Successful finalising of two research projects for the Estonian Ministry of Finance:

- **Developing normative standards for maintenance services provided on the facilities built-up by the state.** Basic aim of this quality standard is to define different quality standards for maintenance and guidelines to assess these; incl. clear defining of the criteria for different quality classes/levels providing the concept of how the quality of these services can be defined, compared and analysed support professional communication improving the facilities management related processes and providing a tool to give the best decisions related to real estate.
- **Developing normative standards for the buildings developed and owned built-up by the state.** Basic aim of this quality standard is to define different quality standards for buildings and guidelines to assess these: clearly define the criteria for different quality classes/levels provide a clear concept how the quality of buildings can be defined, compared and analysed supporting

professional communication when developing, maintaining and using the buildings, improving the facilities management related processes when keeping in mind sustainability provide a tool to give the best decisions related to developing of real estate.

Important national project:

- **Surveying the technical condition of apartment buildings commissioned during 1990-2010 in different regions of Estonia.** The project is aimed to carry out the condition survey of extremely different dwellings commissioned during 1990-2010 in different regions of Estonia. During the surveys the technical condition of the structures and the attitude of the residents are to be studied.

In cooperation with Tallinn University of Applied Sciences and Estonian Group of Lean Construction a two-days international workshop was carried out: 13th meeting of European Group of Lean Construction

Chair of Building Materials

The main national projects were focused on improving of fluidized bed burnt oil shale ash puzzolanic character used as main constituent of Portland cement and resulting substantial impact on concrete properties:

- **Burnt oil shale of fluidized bed combustion as constituent of new type of Portland cement.** It studies impact of various constituents of burnt oil shale on concrete properties as frost-, sulfate, water resistance etc. in purpose to develop composite cement composition for high durability concrete.
- **Basics of new utilization processes for oil shale combustion solid wastes.** The basics of new oil shale ash utilization processes (binder in aggregates and filler in polymeric compounds, soil conditioner) including solutions for supporting the abatement of CO₂ emissions and enhancing mining efficiency will be worked out.

2.2 Uurimisgrupi kuni 5 olulisemat publikatsiooni läinud aastal

Sutt, J. (2011). Manual of construction Project Management : for Owners and Clients . UK: Blackwell Publishers

Witt, E.; Liias, R. (2011). Comparing Risk Transfers under Different Procurement Arrangements. International Journal of Strategic Property Management, 15(2), 173 - 188.

Raado, L.-M.; Tuisk, T.; Rosenberg, M.; Hain, T. (2011). Durability behavior of Portland burnt oil shale cement concrete. Oil Shale, 28(4), 507 - 515.

Kalamees, T.; Arumägi, E.; Just, A.; Kallavus, U.; Mikli, L.; Thalfeldt, M.; Klõšeiko, P.; Agasild, T.; Liho, E.; Haug, P.; Tuurmann, K.; **Liias, R.**; Õiger, K.; Langeproon, P.; Orro, O.; Välja, L.; Suits, M.; Kodi, G.; Ilomets, S.; Alev, Ü.; Kurik, L. (2011). Eesti eluasemefondi puidust korterelamute ehitustehniline seisukord ning prognoositav eluiga. Tallinn Technical University Press

2.4 Loetelu struktuuriüksuse töötajatest, kes on välisakadeemiate või muude oluliste T&A-ga seotud välisorganisatsioonide liikmed.

CIB (International Council for Research and Innovation in Building and Construction) erinevate töögruppide liikmed: Roode Liias, Irene Lill, Lembi-Merike Raado, Jüri Sutt, Ljudmilla Drõkina, Tiina Nuuter .

2.5 Aruandeaasta tähtsamad T&A finantseerimise allikad.

- Euroopa komisjon
- Rahandusministeerium
- Kunda Nordic Tsement
- EACEA (Education, Audiovisual and Culture Executive Agency)
- SA Archimedes

2.6 Soovi korral lisada aruandeaastal saadud T&A-ga seotud tunnustusi (va punktis 2.3 toodud tunnustused), ülevaate teaduskorralduslikust tegevusest, teadlasmobiilsusest ning anda hinnang oma teadustulemustele.

Tunnustused

- Kaitseministeeriumi Hõberinnamärk, prof Lembi-Merike Raado, tulemusrikka teadustegevuse eest riigikaitse hüvanguks seoses Vabadussõja võidusambaga.
- Aasta parim õppejõud ehitusteaduskonnas, Lektor Tanel Tuisk
- 2011.a teadustööde konkursil magistri kategoorias tehnikateadustes: II-koht Siim Töld, juhendaja ehitusökonomika ja –juhtimise õppetooli teadur/em.prof. J.Sutt

Ülevaade teaduskorralduslikust tegevusest

Prof. Lembi-Merike Raado

retsensent rahvusvaheliste teadusajakirjades:

- Journal of Civil Engineering and Management (Taylor and Francis),
- Baltic Journal of Road and Bridge Engineering,
- Oil Shale (Estonian Academy of Science)
- Journal of Materials and Structures, (Springer)

Prof. Irene Lill

retsensent rahvusvaheliste teadusajakirjades:

- "Land Use policy" (Elsevier),
- "Automation in construction" (Elsevier)
- "Journal of Civil Engineering and Management" (Taylor and Francis),
- "International Journal of Strategic Property Management" (Taylor and Francis),
- "International Journal of Disaster Prevention and Management " (Emerald),
- "Technological and Economic Development of Economy" (Taylor and Francis)
- Archives of Civil and Mechanical Engineering" (Wroclaw University of technology)

Prof. Roode Liias

retsensent rahvusvaheliste teadusajakirjades:

- Journal of Civil Engineering and Management (Taylor&Francis)
- International Journal of Strategic Property Management (Taylor&Francis);
- Technological and Economic Development of Economy (Taylor&Francis);
- Construction Economics and Management; (Taylor&Francis),
- Journal of Facilities Management (Emerald)

Teadlasmobiilsus

- I.Lill; E.Soekov 14.02.2011, Central Baltic INTERREG IVA uurimisprojekt DigiEduET töökoosolek (Kouvola, Soome)

- I.Lill; E.Soekov 16.03.2011, Central Baltic INTERREG IVA uurimisprojekt DigiEduET töökoosolek (Helsingi, Soome)
- R.Liias 31.03-10.04, Qingdao University of Science and Technology (Hiina)
- I.Lill; T.Nuuter; E.Soekov- 26.-30.mai 2011, ettekanded konverentsil International Conference on Social Science, Social Economy and Digital Convergence (IC-SSSE-DC'11)
- I.Lill; 07.04-10.04, Tecnic University of Lodz, Campus Europae töökoosolek (Poola)
- R.Liias; 22.05-25.05, Viini Tehnikaülikool, European Facilities Management Conference; osalemine ja sektiooni juhtimine (Viin, Austria)
- I.Lill; R.Liias; 12.06-17.06, Haifa Tehnikaülikool, Technion BIM Education Workshop; osalemine esinemine ja korraldamine
- R.Liias; 22.08-24.08, Amsterdami Ülikool; Delfti Tehnikaülikool; Holland; ruumilise planeerimisalane õppereis
- R.Liias; 22.09-23.09, Chalmers University of Technology, osalemine, esinemine International Visurf Colloquium, (Göteborg, Rootsi)
- I.Lill; 11.10-17.10, projektikoosolek, Salfordi Ülikool, Münceni Tehnikaülikool, (UK, Saksamaa)
- R.Liias Berliin HTW (jaanuar, november, detsember 2011); loengute lugemine
- I.Lill; E.Soekov 21.11.2011, Central Baltic INTERREG IVA uurimisprojekt DigiEduET töökoosolek (Helsingi, Soome)
- I.Lill; E.Witt 6.12.2011, uurimisprojekt LARGE avakoosolek (Sofia, Bulgaaria)

Hinnang teadustulemustele

Positiivseks tuleks lugeda see, et instituudi töötajatel on head rahvusvahelised sidemed ja tehakse koostööd teiste ülikoolidega nii kodu- kui ka välismaal. Professorid on leitud rahastamisvõimalusi nii erinevatest Euroopa Liidu programmidest kui ka uurimistellimusi ettevõtelt ja ministeeriumitelt.

- jätkus koostöö TTÜ Sertifitseerimisasutusega
- jätkati instituudi infrastruktuuri arendamist
- edukalt lõppesid välisleping BELLCURVE ja siseriiklikud lepingud LEP9054, LMIN10100 ja LMIN10101
- jätkub koostöö Tartu Ülikooliga ühisõppekavade väljatöötamisel
- jätkub koostöö Vilniuse Gediminase Ülikooli ja Salfordi Ülikooliga

Eesmärgid 2012.aastaks:

- jätkuvalt leida noori teadussuutlikke ja pedagoogiliste eeldustega inimesi õppe- ja teadustöö jätkamiseks
- aktiveerida publitseerimist
- jätkata instituudi infrastruktuuride arendamist
- oluliselt intensiivistada tööd doktorantidega

Üldine hinnang - hea

2.7 Instituudi teadus- ja arendustegevuse teemade ja projektide nimetused (*Eesti Teadusinfosüsteemi, edaspidi ETIS, andmetel*)

Siseriiklikud lepingud:

- Lep9054, Keevkihituha kasutamine uue tsemendiliigi tootmiseks, (**Lembi-Merike Raado**)
- LMIN10100, Riigi hoonestatud kinnisvara kasutusnormatiivide korrashoiuteenuste kvaliteedinormi väljatöötamine. (**Roode Liias**)
(Leping pikenes Rahandusministeeriumi poolt kuni sept.2011 ETISes parandamata)

- LMIN10101, Riigi hoonestatud kinnisvara kasutusnormatiivide ehitise kvaliteedinormi väljatöötamine. (**Roode Liias**)
(Leping pikenes Rahandusministeeriumi poolt kuni sept.2011 ETISes parandamata)
- LEP10067, Eesti erinevates piirkondades aastatel 1990-2010 kasutusele võetud korterelamute kaardistamine. (**Roode Liias** – teaduskonna leping)

Välisriiklikud lepingud:

- VIR506, Digital Processes for Education and Management of Construction, (**Irene Lill**)
- VER535, Learning Augmented Reality Global Environment –LARGE, (**Irene Lill**)
- VERT448, BELLCURVE - Built Environment Lifelong Learning Challenging University Responses to Vocational Education, (**Irene Lill**).

2.8 Struktuuriüksuse töötajate poolt avaldatud sihtfinantseeritava teadusteema taotlemisel arvestatavad eelretsenseeritavad teaduspublikatsioonid (*ETIS klassifikaatori alusel 1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.2, 3.3, 4.1 ja 5.1*).

1.1

Witt, E.; Liias, R. (2011). Comparing Risk Transfers under Different Procurement Arrangements. International Journal of Strategic Property Management, 15(2), 173 - 188.

Raado, L.-M.; Tuisk, T.; Rosenberg, M.; Hain, T. (2011). Durability behavior of Portland burnt oil shale cement concrete. Oil Shale, 28(4), 507 - 515.

2.2

Sutt, J. (2011). Manual of construction Project Management : for Owners and Clients . UK: Blackwell Publishers

Kalamees, T.; Arumägi, E.; Just, A.; Kallavus, U.; Mikli, L.; Thalfeldt, M.; Klõšeiko, P.; Agasild, T.; Liho, E.; Haug, P.; Tuurmann, K.; **Liias, R.**; Õiger, K.; Langeproon, P.; Orro, O.; Välja, L.; Suits, M.; Kodi, G.; Ilomets, S.; Alev, Ü.; Kurik, L. (2011). Eesti eluasemefondi puidust korterelamute ehitustehniline seisukord ning prognoositav eluiga. Tallinn Technical University Press

3.1

Nuuter, T.; Lill, I. (2011). Can We Blame Housing Boom for Causing the Economic Recession in Estonia. In: Recent Researches in Social Science, Digital Convergence, Manufacturing and Tourism: International Conference on Social Science, Social Economy and Digital Convergence (IC-SSSE-DC'11), Lanzarote, Canary Islands, Spain, May 27-29, 2011 . (Toim.) V. Vasek, Y. Schimaliy; D. TRek; N. Kobayashi; R. Choras; Z. Klos. WSEAS, 2011, 75 - 80.

Soekov, E.; Lill, I. (2011). Effect of Subcontracting on Construction Scheduling. In: Recent Researches in Social Science, Digital Convergence, Manufacturing and Tourism: International Conference on Social Science, Social Economy and Digital Convergence (IC-SSSE-DC'11), Lanzarote, Canary Islands, Spain, May 27-29, 2011 . (Toim.) V. Vasek, Y. Schimaliy; D. TRek; N. Kobayashi; R. Choras; Z. Klos. WSEAS, 2011, 105 - 110.

Witt, E.; Lill, I. (2011). Learner Perceptions of Construction Industry Knowledge and Skills Requirements. In: Recent Researches in Social Science, Digital Convergence, Manufacturing and Tourism: International Conference on Social Science, Social Economy and Digital Convergence (IC-SSSE-DC'11), Lanzarote, Canary Islands, Spain, May 27-29, 2011 . (Toim.) V. Vasek, Y. Schimaliy; D. TRek; N. Kobayashi; R. Choras; Z. Klos. WSEAS, 2011, 93 - 98.

3.2

Vorobiova, A.; **Witt, E.; Lill, I.** (2011). Multilingual and multicultural education in construction. C. Egbu, M. Sutrisna, J. Underwood, M. Arif, Z. Aziz (Toim.). 10th International Postgraduate Research Conference (IPGRC) (547 - 554). UK: University of Salford

Ilomets, S.; Kalamees, T.; Agasild, T.; Õiger, K.; **Raado, L.-M.** (2011). Durability of concrete and brick facades of apartment buildings built between 1960-90 in Estonia . In: XII DBMC International Conference on Durability of Building Materials and Components, Proceedings: XII DBMC International Conference on Durability of Building Materials and Components, Portugal, Porto, 2011. , 2011, 1171 - 1178.

Arumägi, E.; Ilomets, S.; Kalamees, T.; **Tuisk, T.** (2011). Field Study of Hygrothermal Performance of Log Wall with Internal Thermal Insulation. In: International Conference on Durability of Building Materials and Components. Proceedings: XII DBMC. International Conference on Durability of Building Materials and Components, Porto, Portugal, 2011. FEUP Edicoes, 2011, 811 - 819.

Kalamees, T.; Õiger, K.; Kõiv, T.-A.; **Liias, R.**; Kallavus, U.; Mikli, L.; Lehtla, A.; Kõdi, G.; Arumägi, E. (2011). Technical condition of Prefabricated Concrete Large Panel Apartment Buildings in Estonia. In: XII International Conference on Durability of Building Materials and Components, Proceedings: XII International Conference on Durability of Building Materials and Components; Portugal, Porto, April 2011.: Porto, Portugal:, 2011, 973 - 981.

3.3

Sutt, J. (2011). Bibliograafia. Tallinn University of Technology Press

2.9 Struktuuriüksuses kaitstud doktoriväitekirjade loetelu (*NB! struktuuriüksus lisab struktuuriüksuse töötaja juhendamisel mujal kaitstud doktoriväitekirjade loetelu*) -0

2.10 Struktuuriüksuses järel doktorina T&A-s osalenud isikute loetelu (*ETIS-e kaudu esitatud taotluste alusel*) – 0

2.11 Struktuuriüksuses loodud tööstusomandi loetelu – 0

3. Struktuuriüksuse infrastruktuuri uuendamise loetelu

- Leekfotomeeter M410+kompressor, 30.05.2011, 5 095 €