



TALLINNA TEHNIKAKÕRGKOOI  
UNIVERSITY OF APPLIED SCIENCES

# TALLINNA TEHNIKAKÕRGKOOI TOIMETISED NR 6

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## **TEADUSE RAKENDUSLIKKE PROBLEEME**

Vello Rekkaro

### **Summary**

*Knowledge and Common Sense – Problems of Application in Science*

Keywords: objectivity or attempt at truthfulness, science and common sense, heretics and dissidents and power, scientific treatment, reclaim the property, restitution of ownership, mysticism and euphemism of the restitution of property, the justice crime, human rights, the property of the Orthodox congregations, Estonian ownership reform, conspiracy with stench of corruption, the lack of scientific approach, ethical duty of the scientists.

The content requirements on scientific work primarily include originality, objectivity, tolerance, provability-controllability etc. In the list of scientific treatment criteria, the second place behind the main characteristic of science – originality, is objectivity or the attempt at truthfulness. When paired together with objectivity, the question is about the relationship between science and common sense. The common sense is the person's intuitive skill to form opinions about everything around him. Science grows on the soil of common sense, but is liberated from its influence the closer it gets to perfection. Science can only start to fulfil its special function in the society when it is capable of saying things that the human with mere common sense could not say. Common sense adapts wonderfully to science and allows to be trained quite easily itself. The common sense of the person who has understood the scientific explanation is already working in a different way.

The tale of the development of the Earth's and the mankind's understanding is suitable for characterizing the way the relationships between knowledge and science and common sense change through time. There are many incidences in history where only water and fire, the guillotine and exile could solve the problem of heretics and dissidents and power relied on common sense. The authority in power, whether based on religion or money, can always allow itself to make decisions based on common sense, avoiding the scientific treatment.

Returning from the Middle Ages to the present day, to the more modern times, it is appropriate to note that, for a hundred years, the European cultural and thus also the legal space has considered it clear, even on the basis of mere common sense, that it is not possible to reclaim the property from yesterday, last year, especially from half a century ago. Talking about restitution the ownership from the 1940s – the land, the forest, the buildings etc belongs in the realm of mysticism. In reality, it is not possible and so the persons who have received restituted property in Estonia after the regaining of independence have received some kind of modern property. So what has been going on behind the euphemism of the restitution of property?

Law scientists have stated that this activity lacks legal logic which stems from the purpose of the laws and which had sadly been neglected and the initial cause of the situation is the failure to heed the legal requirements which in turn is one of the phases in the sequence of illegal acts by the municipal officials. A mystifying term that has been an almost defining characteristic during the first years of the so-called restitution of property, has been the phrase in the previous, individualized form which also lacks the legal scientific content and explanation. Some of the more remarkable examples include the forcible expropriation-confiscation of the Tallinn House of Engineers to the so-called former owner, the justice crime of so-called restitution to the Baltic Germans, since the persons who left Estonia on the basis of the contracts signed with the

state of Germany are, according to the law, not even the rightful ownership reform subjects of the buildings and property in Estonia that they used to own. Somewhat delicate is also the acquisition of the property of the Orthodox congregations by the EAÕK's so-called Stockholm Sinod with the assistance of the state officials and the transfer of this property to the main church in Constantinople, stripping the Estonian Orthodox Church of the Moscow Patriarchate of this property.

However, the socially most noteworthy incidents were the breaches of law that occurred in the expropriation of residential space during the property privatization, which started with restricting the constitutional rights of some of the citizens by removing their right to privatize their legally acquired habitat and ended with the discrimination of their right to a home and the admission of human rights infringement by the Riigikogu on March 13, 1996 when making reservations in Act of Ratification of Protection of Human Rights and Fundamental Freedoms Convention. The breach of laws concerned 100 000 people and the direct damages are estimated at 10 billion croons.

A number of scientists (Academicians A. Raukas and U. Mereste, prof. M. Hint, assist. lecturer P. Kask, V. Pohla etc) have dedicated their writings to the failed Estonian ownership reform or conspiracy with the stench of corruption, to those cheated and ridiculed people with no money, knowledge or skills to protect their fair claims from the officials of the state and local administrations and the courts which may have been caused by the deficient knowledge and the lack of scientific approach. Since the politicians cannot or do not wish to ask the scientists about where mistakes were made and how to correct them, it is the ethical duty of the scientists to tell the society how to analyse the problems and to give suggestions about improving the situation.

If Estonia wants to resemble Northern and Western Europe then we must first stop the ownership reform that has gone into conflict with the human rights and then rectify the wrongs. In this case the scientists can help, the politicians only have to know how to respect their country, their people and their scientists.

## **GLOBALISEERUMINE JA LOGISTIKA PARADIGMAD**

Enno Lend, Valev Reinhold

### **Kokkuvõte**

Üha suuremat uurijate tähelepanu maailmas köidab globaliseerumine (eesti k. üleilmastumine) kui teatud võimalusi/ohtusid pakkuv protsess. Globaliseerumine on kultuuriliselt, kognitiivselt, ontoloogiliselt, institutsiooniliselt, topograafiliselt, algoritmiliselt jne kompleksne nähtus, mille mõistmine eeldab ühelt poolt multidistsiplinaarset ettevalmistust, teiselt poolt epistemoloogilist ja ontoloogilist vaatenurka. Globaliseerumise protsessis avanevad uued võimalused ja riskid nii indiviidile, organisatsioonile kui ka riigile.

Logistika on ilmselt nii globaliseerumise üheks põhjuseks kui ka tagajärjeks. Globaallogistikas tuleb näha ka võimaluste realiseerimise vahendit so kui rahvusvahelises äritegevuses lähtutakse integratsiooni paradigmast.

Artikkel käsitleb globaliseerumise erinevaid kontseptsioone, logistika rolli majandustegevuses, epistemoloogia ja ontoloogia mõningaid aspekte ning logistika paradigmasid.

### **Summary**

#### *Globalization and Paradigms of Logistics*

Globalization, as a process offering certain opportunities/threats, attracts more and more attention of researchers all over the world. Culturally, cognitively, ontologically, institutionally, topographically, algorithmically etc. globalization is a complex phenomenon, which can be understood only by being multidisciplinary prepared and having an epistemological and ontological point of view. New opportunities and threats will be opened for individual, organization and state during the globalization process

Logistics is obviously both a reason and a result of the globalization. In global logistics you must see a way to realize the opportunities as in international business they are issuing from paradigms of integration.

This article considers different conceptions of globalization, the role of logistics in economical activities, some aspects of epistemology and ontology and paradigms of logistics.

## **KES SA OLED, INSENER, EHK KUIDAS TEHA MASINAEHITAJAT?**

Tiit Tiidemann

### **Sissejuhatus**

Et uurimis-arendustöid kavandada ja inseneriharidust edendada tuleb teada arengutendentse tööstuses ja ühiskonnas. Insenerihariduse kavandamisel tuleb võimalikult täpselt ette kujutada nõudeid insenerile tulevikuühiskonnas. Selleks on tehtud uurimistöid ja kirjutatud põhjapanevaid artikleid. Uurimuste põhjal on välja töötatud majandusarengu ja innovatsiooni juhtimise riiklikke strateegiaid. Mehaanikainseneri väljaõpetamise trendid ja nõuded on olnud tihti fookuses rahvusvahelistel mitmesugustel erialalistel teaduskonverentsidel. Tähelepanuväärsematest seisukohtadest ja ka meie uurimis-arendustöödest kokkuvõtvalt siis alljärgnevas, et fokuseerida õpetamise raskuspunkte mehaanikainseneri koolitamise näitel.

### **Summary**

*Who are You, Engineer, or How to Make a Machine Builder?*

Engineering strategies and business trends have changed a lot in last decades. According to these circumstances some aspects teaching of mechanical engineering design and creativity are discussed. The possibilities of getting principally new ideas are actual. Invention solutions at the conceptual design stage by using CAD AI tools together with TRIZ principles and machine element knowledge base are described.

## TALLINNA EHITUSPAESTIKU LÄBILÕIGE PALDISKIS

Rein Einasto

### Kokkuvõte

Esmakordselt esitatakse kogu uuritud paeläbilõike skaneeritud tekstuuripilt Tallinna ehituspaestiku Paldiski näitel, selgitatakse selle eripärasid, mis seisnevad väiksemas üldpaksuses, katkestuspindade ja minitsükliilise ehituse suuremas selguses, intensiivses bioturbatsioonis. Sama järku minitsükliitide arv uuritud paestikus ulatub 20-ni, nende paksus kõigub 10-30 cm vahel. Esitatakse ettepanek süsteemsema paekivi-nimetuste kohta kivimi koostise erinevuste alusel.

### Summary

#### *Cross Section of Quarry Limestone near Tallinn in Paldiski*

This paper for the first time presents the scanned textural image of the whole studied section of Tallinn building limestone in Paldiski. Its peculiarities are explained - smaller total thickness, more clearly expressed discontinuity surfaces and mini-cyclic structure, and intense bioturbation. The number of minicycles of the same range in the studied limestone section reaches 20. The Tallinn building limestone section in Paldiski is 4 m thick and it is divided into up to 20 low-range bedscale cycles, which are 10-30 cm thick. They suit well for the low-range Milankovitch cycles with a duration of 20 000 years (Einasto and Kalam). These, when grouped, would form cycles of higher range with a duration of ca 100 000 (Einsele et al., 1991). The above-said allows us to conclude that the section of Tallinn building limestone (Väo Formation, Pae and Kostivere members) formed during ca 500 000 years, which coincides well with the most recent absolute age datings carried out within IGCP Project no 410 - ca 461 Ma, in the second half of the Middle Ordovician.

The authors suggest terminologically more systematically to distinguish between the sediments marl (mergel in Estonian) and dolomite mud (dolomuda), and the respective rocks: marlstone (Mergelstein. merkivi) and dolomarlstone (Dolo-mergelstein, domekivi).

From the standpoint of utilisation, it is important that in Paldiski the section of the Tallinn building limestone is about 1/3 thinner than in the type area of the Lasnamägi Stage in the surroundings of Tallinn. Firstly, this is due to the decrease in the thickness or complete wedging out of argillaceous beds. Also, the average content of argillaceous component in the rock is smaller, i.e. in Paldiski thicker monolithic blocks can be cut, where a couple of extraction beds are joined and the quality of the building stone is higher.

# MAAPINNA KÖRGUSTE ALTERNATIIVSE ARVUTAMISE VÕIMALUSI

Karin Kollo

## Kokkuvõte

Esimese testala asukohaks oli valitud Eesti kirdeosa, kus geoidil on lihtne ja lineaarne kuju. Tabeli 1 andmetest selgub, et keskmise ruutvea väärtus oli seal 3,5 cm. Selles regioonis on tulemused kergesti aimatavad tänu geoidi lihtsale ja lineaarsele kujule. Võib oletada, et tulemused oleksid veelgi paremad kolmnurga lühemate küljepikkuste (näiteks 10 km) puhul.

Teine testala asus Lõuna-Eestis, kus geoidi muutus on intensiivsem. Keskmise ruutvea väärtus kolmnurga küljepikkusel 60 km oli 14 cm (tabel 1). Tulemustest võib järeldada, et antud algoritmi kasutamine kiire geoidi muutusega alal ei ole otstarbekohane, kuna lineaarselt ei ole võimalik arvesse võtta maapinna topograafia ja geoidi kuju muutusi.

Kolmas testala oli valitud piirkonnas, kus geoid muutub väga ebaregulaarselt. Keskmise ruutvea väärtused olid vastavalt 40 km kolmnurga küljepikkuse puhul – 9 cm, 80 km kolmnurga küljepikkuse puhul – 16 cm ja 110 km kolmnurga küljepikkuse puhul – 15 cm (tabel 1). Tulemuste hindamisel näeme, et lühem kolmnurga küljepikkus annab paremaid tulemusi, kuid tulemuste keskmised erinevad küllaltki palju oodatavast väärtusest. Seega niisugust lineaarset transformatsioonimudelit võiks kasutada lühemate pikkuste ja piirkonna sobivuse korral.

Vigade teooria seaduste kohaselt peaks olema nii, et vead kasvavad koos küljepikkuste suurenemisega. Kuid läbi viidud testidest selgub näiteks, et kolmandal testalal RMSE väheneb 9 mm kui kolmnurga küljepikkus suureneb 30 km võrra. Selle nähtuse selgitamiseks oleks vaja kindlasti läbi viia täiendavaid arvutusi selles piirkonnas.

Lõpetuseks võiks öelda, et kui ei ole võimalik kasutada sobivaid geoidi mudeleid piirkonna kohta, siis võiks kasutada pakutud transformatsiooni algoritmi juhul kui kolmnurkade küljepikkused jäävad soovitatavalt alla 40 km ja geoidi muutus piirkonnas allub lineaarsetele seaduspärasustele.

## Abstract

### *Possibilities of Alternative Calculation of Ground Altitudes*

Height information from levelling will not always be available. This is due the fact that levelling is time and money consuming work. More often there are available ellipsoidal heights, which come from GPS measurements. On the other hand, for many countries there are available precise geoid models, from which the user can get geoidal heights. Within the knowledge about connection between geoidal, ellipsoidal and absolute (i.e. normal or orthometric) heights, the user can compute the needed one, if two of previously mentioned is known. But with knowledge of absolute heights given for points in certain area, one can compute missing height values by using some transformation approach.

The main idea of the test was to study the possibility of using the affine or bilinear interpolation technique for normal/orthometric heights (or more precisely, for the geoidal heights that allow their determination with the GPS technique). Affine transformation is a linear approach, but the geoid usually is not represented by a simple linear mathematical formula. In this approach I assumed, that the geoid surface is smooth and it changes linearly, i.e., I have not considered the complexities of a non-linear geoid surface. Another idea was to test, how long could be the distance between the corner points in a triangle until one can no longer get the desired accuracy for computation.

**Keywords:** triangulated bilinear transformation.



## **SILBET PLOKKHOONETE EKSPLOATATSIOONILISED PUUDUSED JA RENOVEERIMISE ETTEPANEKUD**

Jelena Mironova

### **Summary**

#### *Operational Shortcomings of Silbet Block Buildings and Renovation Proposals*

Since 1960s a lot of oil-shale ash or Silbet block buildings were built in Estonia. For today damages have formed on many of these buildings. The most conspicuous is decaying façade finishing, next come decayed balcony panels; moisture and mould that have formed because of cold bridges; old and treaded inserted ceiling insulation in the loft; insufficient ventilation and faulty insulation of walls. The cause of the damages is excessive moisture that has formed because of poor ventilation of rooms. This starts, because excess pressure that have formed in the room, to move through railings towards lower pressure, causing that the railing become damp. While freezing, water swells and decomposes the external railing. The same is the case with balcony panels. Only in these cases the fact that the panels become moist is caused by precipitation, not condensation water.

In order to improve the situation the interior climate conditions have also to be improved – to guarantee sufficient ventilation, raise the thermal resistance of railings. With the insulation of railing also the problems of cold bridges will be solved.

In carrying out repair work the building should be seen as one whole. The results will not be achieved if only gable walls will be insulated or sufficient ventilation will be guaranteed in a few flats. In order to improve the outer appearance and interior climate of the house and save energy, all the residents must co-operate, as a succeeded result depends to a great extent on a human factor.

## **GOFREERITUD PLAATIDE ARVUTUSEST**

Jaan Rohusaar

### **Summary**

#### *Calculations for Corrugated Steel Plates*

Corrugated steel plates are used in roofing loadbearing structures in most modern buildings where light lining is implemented. A considerable deflection is allowed for plates functioning based on shear load principle. When bearing points are attached to horizontal installations normal stress is observed in addition to bending stress. A calculation method to determine the optimal installations and horizontal bearing reactions in the balanced state of a deformed steel plate is laid out in this paper. The calculations show, that our solution for installations turns out roughly one and a half times smaller than compared to traditional loadbearing structures.

## **TERMOPIHUSTATUD BARJÄÄRPINDED**

Toomas Pihl

### **Kokkuvõte ja järeldused**

Barjäärpindeid ja pindmaterjalide kasutamine laieneb võimalusega tõsta materjalide töötemperatuure, seoses sellega võimsust ning vähendada soojuskadusid.

Käesolev uuring on keskendatud gaasileekpihustusele, mis on odavam kui plasmapihustus ja märgatavalt paindlikum kasutamiseks üksikdetailide puhul. Kõrgendatud temperatuuridel saab määravaks aluskihi materjali koostis, selle soojuspaisumise tegur ja ka adhesioon barjäärpinde materjaliga. Laboratooriumi katsetused näitasid, et paremini käituvad ZrO<sub>2</sub>/20Y<sub>2</sub>O<sub>3</sub> pinded, mis taluvad termolööke paremini.

### **Summary**

#### *Flame Sprayed Thermal Barrier Coatings*

Thermal barrier coatings were flame sprayed onto samples for investigation of different materials for evaluating the thermal shock and thermal fatigue behaviour.

The Ni- Al bond coat may be used up to 800 °C without any failure. Above 800 °C a crack has been detected at the boundary of Ni-Al.

Thermal barrier coatings were sprayed onto the components of engines (top of pistons, head of engines, exhaust collectors) which are tested in exploitation. Barrier coatings can be effectively used in the areas where thermal shock requirements emphasized.