Ikt.: 128-DRTT/2007 — Irt.: 2007/10/8

29th October, 2007, Dunaújváros

PROFESSIONAL REPORT

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Name of Project: DURATT

Registration number: RET-09/2006

Number of spell: 1

Date of reporting obligation:

22nd December, 2006. – 30th November, 2007.

Members of the Consortium:

College of Dunaújváros (Dunaújvárosi Főiskola),

ISD DUNAFERR Inc.,

Paks Nuclear Power Plant Ltd. (Paksi Atomerőmű Zrt.),

ALCOA-KÖFÉM Ltd.,

Hungarian Bus Ltd.,

Robert Bosch Elektronika Ltd.,

Project leader: College of Dunaújváros

Website: http://duratt.duf.hu

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1. Mission statement and the overall objectives of the Dunaújváros RET

The fundamental objective of DURATT is to develop and implement a penetrating momentous Research and Development (R&D) infrastructure that has been long missing from local practice. Then conduct a planned series of researches, providing audit and experimental solutions for a number of scientific current industrial issues.

We need to emphasize the progressive vision of the future and the positive scenario, according to which the central element of the "DURATT vision", the installation of the Gleeble 3800 physical simulator and the creation of a 21st century technical-scientific school and workshop for the College of Dunaújváros within the framework of DURATT – creating the right environment and allowing R&D activity – will open up a new and attractive perspective for the young generation of engineers in the region. This combines the current mathematical and physical modeling, allowing combined material information and thermo-mechanic simulation for the molding, shaping, annealing, welding, surface treatment, etc. of irons and non-iron metals to work out technologies for the production of better quality products with the less use of energy and lightened environmental strain.

The installation of the thermo-mechanic simulator and the formation of the research environment will retroactively influence the primary pillar of education: it projects the possibility of new thesis and PhD topics that may be immediately put to use by the industry. This device, and the critical mass of the complex research team expanding around it, will be the base of such a new "virtual industrial school", which will be able to join the international R&D activity and will be able to serve the science of material research and the technological development within the region.

Similarly to the logic of approach mentioned above, the second central element of the "DURATT vision" needs to be emphasized too, which is the organization of research, analyses, evaluation, treatment and control of error formation processes and phenomena into a synergic system. The planned activity will cover the inquisition of surface integrity and technological factors, complex relationship analyses of impairment resulting requisitions, lesion behavior prognosis, as well as performance of favorable lesion behavior for machine parts and tools with great energy density during shape and quality and forced parameter surface-planning.

Primary targets include pipelines and pressure-holding systems and system-elements in critical conditions, working platforms and volumetric pieces used in extreme conditions, as well as parts with special functions in the following areas: material extraction, shape formation, parameter inset and enforcement, binding technology, maintenance, material choice and technology for mounting production, corrosion, cavitations, erosion, vibration, tension and heat-shock, aging, radiation lesion, abrasion, fatigue, life-span, rupture and rupture-stability, fracture, and errors leading to breach.

The concentration of infrastructure and the collection of practice of the field – in line with the simulation environment – will have a progressive effect on the practice of education and the quality of training.

2. Executive summary

The premise and external framework of the government funded R&D project is on the one hand backed by the decision of the president of the National Office for Research and Technology with the following partners

- the Agency for Research Fund Management and Research Exploitation (KPI), as Supporter
- the College of Dunaújváros, as Beneficiary and the Head of Consortium
- the DUNAFERR Ltd, as additional Beneficiary
- the Paks Nuclear Power Plant Inc., as additional Beneficiary
- the ALOCA-KÖFÉM Ltd., as additional Beneficiary and
- the Hungarian Bus Ltd., as additional Beneficiary

and bind by the "SUBVENTION CONTRACT" (RET-09/2006) in relation to the R&D co-financed tender aimed at the formation of the "Dunaújváros Regional Knowledge Center" signed by all partners on the 22nd December 2006. On the other hand the framework of this contractual R&D knowledge-transfer cooperation is backed by the "CONSORTIUM AGREEMENT" complementary to this contract and signed at the same time by the listed beneficiary legal bodies in terms of harmonizing their prior activities supported by government funding.

The coordinating body of this R&D activity, the Dunaújváros Regional Material Science and Technology Knowledge Center – operating as a separate financial institution within the institutional framework of the College of Dunaújváros – is an institution operating in the budgetary financial management system defined by point 4. §. (3) of the 2003. Research and Technology Innovation Fund XC. enactment. The research activity defined by point 12.§ b-d.) of the 2003. XC. enactment is SZJ 73.10 (technological research and development).

The subject of the government funded R&D project is

- on the one hand installation and system implementation of a thermo-mechanic simulation (physical and mathematical realization) infrastructure, thus creating a specialized technological-scientific workshop and school that was missing nationwide, allowing for complex technological R&D projects supporting innovation,
- metal, alloy and composite research as well as applied technology and technological research based on this,
- on the other hand abrasion and lesion examination, as well as applying surface-engineering technologies for life-span management, structural and surface integrity research, applied-technology and technological analyses and engineering
- further complex technology and knowledge transfer
- as well as the support of development of training subsystems within the higher educational framework of the College of Dunaújváros.

The planned R&D area of the first working phase of the project – in line with the annual practice of the knowledge centers – was a technical-scientific preparatory activity, which had the following definite goals:

- physical modeling of congelation, hot and cold formation, annealing, welding and surface treatment processes at the necessary temperature defined by the industry, recovering the possibilities of application of equipment with flowing electricity and high-speed hydraulic forming devices under varying shape changing cycles and speed in industrial and nuclear power plants, based on prior experiences and results in scientific literature.
- complying experimental and analytical plans.

The Robert Bosch Electronic Ltd. (RBHH) company situated in Hatvan, Hungary **joined the DURATT project in the middle of this working year**, and since it did not win a share of the project research funding, **takes part relying merely on its own R&D resources**.

RBHH and DURATT made a separate contract lying down the main areas of the common R&D activity: abrasion and lesion research, structural and surface integrity research, life-span engineering, as well as applied technology and technological scientific examinations. As a result of the life-span research, the security, reliability, quality and competitiveness of the products must increase and the responsibility of RHHB in terms of product warranty and credit risk must decrease accordingly.

The first working phase involving the research of literature schedules on the systematic approach of the problem group, in which the strategic concept of quality management, the treatment of customer complaints and the processing system of the tiring requisition results plays the central part. The question of uniform data management of the measured and gathered information also plays a key part in the researched area. The research plan was compiled with such pretension, that the differences of the new and old testing methods can be exposed and presented, and the connection and the strength of the connection between the test requisitions and the customer complaints can be made clear.

The results are made clear in section 7.2.

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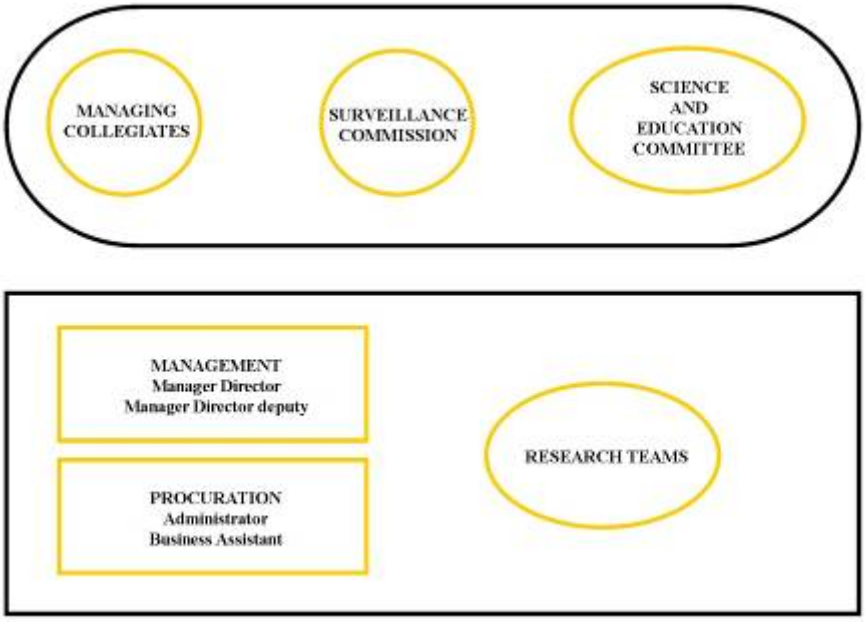
3. The organization structure of DURATT



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4. Introduction of industrial partners

ISD DUNAFERR Inc.

The ironworks situated in Dunaújváros – a member of the DONBASS company group – is a determinative enterprise in the Hungarian steal industry to the present day and one of the largest production companies in the country. The company group – reaching back to half a century – with its continuous expansion has managed to increase the level of production and is now near to 2000 kilotons.

The company employs about 8000 people and realizes its revenue mainly on the foreign markets, and has a determining role in the Hungarian export volume in terms of sold quantity. Most important partners are the European Union countries, among them Germany and Italy. The further development of immediate supplier relationships and cooperation play an important part in the trading policy of the company.

Today Dunaújváros and the region is strongly influenced by the business activity, productivity, employment policy and partake in public life of the DUNAFERR Ltd. across all levels of life. Its strong relationship with the town and the surrounding areas determines its regional responsibilities too. The factory has been supporting the initiatives that may promote the economical advance of Dunaújváros and the region for years. Its activity and economical success is crucial for the overall success and productivity of the Hungarian economy and the development of Dunaújváros and its surrounding region.

Paks Nuclear Power Plant Inc.

The Paks Nuclear Power Plant Inc. was founded in 1976, and it exists as a public limited corporation since 1992. On the nuclear plant park in the heart of Hungary, 5 km away from the city *Paks* four VVER-440/213 type nuclear plant sections are in operation with more than 1860 MW built-in capacity. Nearly 40% of the electric power in Hungary is produced in Paks. The development strategy focuses on the technical-scientific question of increasing the life-span as well as the question of security.

The Hungarian nuclear power plant was the first one founded in the former eastern block, that satisfied all modern international security instructions at the time of its foundation. According to the evaluations made during the controls the nuclear characteristics of the security of the power plant, the technical condition of the establishment, the know-how of the staff, as well as the commitment of the staff towards security are repeatedly judged as good. The training of the operating staff plays a key role in the nuclear power plant. An important tool for this is the block-simulator developed by a Hungarian- Finnish cooperation, as well as the maintaining training center realized with the support of the International Nuclear Power Agency. The equipment set up in the training center is identical with the original devices in the operating section giving a unique chance to train the staff, as well as to configure different technical developments, analytical and correctional technologies, and practice the realization of certain special tasks.

The nuclear power plant of Paks supports training, research and higher education with high priority. As the first one in the history of Hungarian education in 1986 it founded a technical high-school supported by a foundation since 2001. As an example of cooperation between the industry and higher education energetic engineers were trained in Paks between 1987-2003, at the stationary department of the BME Mechanical Engineering Faculty. Nowadays according to the agreement with the College of Dunaújváros correspondence courses are provided.

The Paks Nuclear Power Plant Inc. has been awarded among the first ones with the *Kármán Tódor*-price by the Ministry of Education in 2001, that is deserved by companies and persons who play an outstanding role in Hungarian education, adult education, and scientific research.

ALCOA-KÖFÉM Ltd.

Alcoa Ltd. is the world's leading company of aluminum production. The global company is present in every range of aluminum industry, such as bauxite mining, alum earth production, aluminum metallurgy, production of stock and end products, and recycling of aluminum refuse. Successively widening its circle of activities it gained a footing in packaging-, car and construction industry, and further on the market of consumer goods as well as in the spacecraft industry.

The company employs 129.000 workers in 42 countries. It is present in Europe since 1920, and it has more than 100 factories in 15 countries in 14 branches with 25 000 employees. In Hungary it has 5 factories, four in county *Fejér* and one in county *Veszprém*. All together Alcoa invested more than 370 million dollars in Hungary, and so it is the 12th biggest investor with 6000 employees. The complete revenue of the Hungarian companies of Alcoa is over 550 million dollars, and its export is over 500 million dollars. As the latest Hungarian investment ALCOA created its European standard financial-administrative center. The new unit, called European Administrative Center employs 150 highly trained, multilingual colleagues.

The company took a significant part in the support of development of higher education countrywide, so the technical universities in Budapest, Veszprém, Miskolc, as well as the University of Economics, and the University of Polity in Budapest received significant subsidy. In the recent years together with the Foundation for Hungarian Higher-education and Research they supported the jointly founded the *Szilárd Leo* professorial scholarship, that supports the research work of three outstanding scientists every year.

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Hungarian Bus Ltd.

Hungarian Bus Inc. was founded in December 2003. The company's main aim is to develop new busses based on the traditional production of *Ikarus*-type busses. The Hungarian Bus Inc. is a new, dynamically developing company that combines the experiences of the traditional Hungarian production of busses and vehicle machine parts.

Its parent company, the *Műszertechnika Rt.* (Instrument Technology Inc.) has been operating its Hungarian and Rumanian factories successfully for years producing car electronics and vehicle machine parts and reaching significant success in international cooperation as well as the field of export of know-how. The company has close connections with national and international developers and producers in the car industry.

For the company customer demands are of highest priority. On top of production the company is involved with the transport of KD busses. The customers who purchase their busses in KD system, receive the chance to develop their own national industry as well as to acquire the technology of bus-construction, and can employ their own workers at the same time. A division of special professionals was formed in the Ltd., responsible for the planning, production, and transportation of the manufacturing tools and devices that are necessary for KD transport.

Robert Bosch Elektronika Ltd.

The Hungarian company residing in *Hatvan,* joined the DURATT-project in the middle of this working year and since it did not win a share of the project funding, takes part relying on its own R&D resources.

The Bosch group is the international producer of cars and industrial technologies, customer products and construction-technologies. In the financial year 2006 it had 43,7 billion Euros income with 260.000 employees. Founded by Robert Bosch (1861-1942) in 1886 in Stuttgart, growing out of a precision mechanical and electro-technical workshop the Bosch group today colligates the net of production, trade and customer service in 140 countries with its nearly 280 affiliated firms and approximately 13.000 Bosch services.

The special structure of the ownership in the Bosch group of companies guaranties the financial independence and the free business opportunities. This allows the company to realize significant investments in order to guarantee its existence in the future, and further to take an adequate social backseat that harmonizes with the founder's testament. 92% of the stock of the Robert Bosch Ltd. belongs to the Robert Bosch Foundation. The ownership's rights are practiced by Robert Bosch Industrietreuhand KG (Robert Bosch Industry Trust Limited Partnership).

Bosch has been present in Hungary since 1899. Re-founded in 1991, the regional trading Ltd. evolved into a significant group of companies, and at the same time became the second biggest foreign industrial employee of Hungary. Today 13 companies produce and trade the Bosch-products on the Hungarian market. In the last three years Bosch invested more than 300 million Euros, and the number of workers increased to more than 7000 by 2007. The activities of Hungarian Bosch-employees range from development through production to trading in Hungary, Serbia, Croatia, Bosnia, and Slovenia. In 2006 the Bosch group's revenue exceeded 1 billion Euros.

The Robert Bosch car-electronic branch planned to extend its production capacity of electronic control units on its park in Hatvan (Hungary), and to concentrate a part of its electronic expertise there, in order to improve its competitive ability. As a result of this, today the park in Hatvan produces dashboards and control units for automatic gear-boxes and ABS-systems.

The turnover in 2001 was about 19 million Euros (29.3 billion HUF). Until the end of 2005 as a result of a multistage production extension, the number of employees increased to 1500 persons.

Gears for automatic control as well as devices for wheel- and personal security, such as electronic machine-operators for different car and vehicle industries are produced here. The locations for production and storage were built up progressively, devices for the production were transplanted from various factories of the branch to Hatvan, and respectively further investments have been carried out. The financial turnover of the factory has tripled by 2005.

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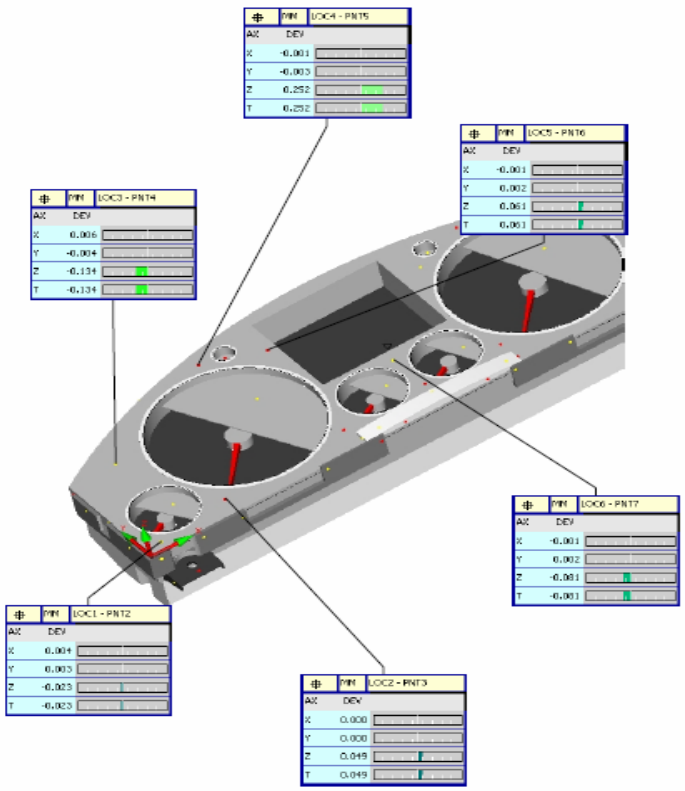
As a result of further developments, *Figyelő* - the leading Hungarian magazine for economics - awarded the Robert Bosch Electronika Ltd. Hatvan the price *„Top 200"* in the category of „The most innovative company in Hungary 2007" at the ceremony in the *Museum of Fine Arts* in Budapest. The price was adopted by bursar Thomas Schöneberg, and technical director Dr. Sven Ost. The Robert Bosch Electronic Ltd. Hatvan is considered the largest car-electronic factory in Hungary and Central-Europe with 3200 employees and over 120.000 high-tech products manufactured daily in 4 different plant-halls.



5. Report on the creation of conditions for organization structure and performance

- The Center's governing and controlling bodies were institutionalized
- The Center's party rules came into force after presentation and acceptation by the Governing Body. This is Appendix 1 titled "Memorandum and articles of association".
- According to the propositions of the Memorandum and articles of association, – with the appropriate mandates – the management, the procurator organization and order of the Center was formed.

The operational legislations, and the "Memorandum and articles of association" declaring the competencies and responsibilities, can be reached by IT members and their emissaries, as well as members with procurator competencies – according to their data-access rights – **on the Center's website under the "Documents" tab.**

6. Report on the procurement and relating contracts for research infrastructure, together with the preparation and signing of R & D projects mutual assistance contracts

- After pretreatment the **"Consortium Agreement"** between the "Beneficiaries" was signed – See: Appendix 2.
- After pretreatment the **bilateral contracts** between the College of Dunaújváros as the "Head of Consortium" and the "Beneficiary" members of the consortium were signed – See: Appendix 3.
- After pretreatment the **"Procurement Agreement"** was signed so that the public procurement process for the **"Gleeble 3800" thermo-mechanic simulator** can be conducted, according to tender project, defined and outlined in the subvention contract's financial appendix and the contract listed in the previous points.
- According to the public procurement process
- The Center and Dynamic Systems Inc. (NY 12140 USA) signed a **conveyance contract for the "Gleeble 3800" device**. The onset is planned for the first week of 2008.
- The pretreatments and signings of the contracts for the installation, transportation, moving, architectural, electric and engineering works are on the way.

TIMETABLE for signing of contracts

– Subvention contract	2006. 12. 22.
– Consortium Agreement	2007. 03. 23.
– DURATT-DUNAFERR Inc.	2007. 03. 23.
– DURATT-Hungarian Bus Ltd.	2007. 03. 26.
– DURATT- Paks Nuclear Power Plant Ltd.	2007. 04. 17.
– DURATT-ALCOA-KÖFÉM Ltd.	2007. 06. 04.
– Procurement Agreement	2007. 04. 17.
– DURATT-DSI (USA)	2007. 06. 15.

The texts of the contracts, and the scanned pages with signatures, can be reached by IT members and their emissaries, as well as members with procurator competencies – according to their data-access rights – **on the Center's website under the "Documents" tab.**

7. Report on the research programs

7.1. Identifying technical-scientific R&D tasks

7.1.1. Planned Assignments for the subvention period

In order to carry the project to effect, the members of the consortium – in accordance with the action plan and financial schedule of the tender, the Consortium Agreement between the Beneficiaries, and the appropriate sections of the bilateral contracts between the Head of Consortium the College of Dunaújváros and the beneficiary members – will execute the following assignments according to plan.

The R&D activity of the Head of Consortium (the College and the Knowledge Center) and the partner consortium member group is displayed in the following schematic table – with the appropriate combination of A, B, C, and D task-indicators – identifying partners individually.

		Name of organization	Status of the partner organization	Tasks
1.	Head of Consortium	**DF / DURATT**	Head of Consortium	(1-5)(A+B+C+D)
2.	Beneficiary	**ISD DUNAFERR Inc.**	member	2(A+B+C+D)
3.	Beneficiary	**Paks Nuclear Power Plant Inc.**	member	3(B+C)
4.	Beneficiary	**ALCOA-KÖFÉM Ltd.**	member	4(A+B+C)
5.	Beneficiary	**Hungarian Bus Ltd.**	member	5(B+C+D)
6.	Co-operate	**ME / MLR-RET***	synergistic	**

* University of Miskolc / Mechatronic and Logistic Regional University Knowledge Center appointed by the supporting government body

** Based on agreement

A. Objective in terms of applied research for the installation and system setup of the Gleeble 3800 thermo-mechanic simulator (referred to as Gleeble 3800 TMS) laboratory for physical modeling of congelation, hot and cold formation, annealing, welding and surface treatment processes at the necessary temperature defined by the industry, recovering the possibilities of application of equipment with flowing electricity and high-speed hydraulic forming devices under varying shape changing cycles and speed, focusing on the support of technological, innovative, lesion, breakdown and error formation and applied-technology and technological R & D tasks.

Objective in terms of developing technologies that reduce the material, energy, cost and environmental strain, increasing production safety and producing more valuable products in the areas of continuous molding, the thermo-mechanic simulation of hot and cold formation, casting technology development for steals and metal alloys, and defining technological frames

for optimal production. A technical-scientific objective and a logical R & D step is to combine the current mathematical modeling with physical modeling, which results in continuous molding and hot and cold formation procedures using less energy than currently – thus reducing larger and smaller environmental strain – producing more valuable products with more valuable qualities.

A high-priority objective and a logical R & D step is the complex simulation of hot- and cold-rolling to develop modern multiphase materials, which due to their unique properties, allow for greater value added, environmental friendly products. By using multiphase materials, structures with the same bearing capacity can be produced by using less basic commodities, thus reducing environmental strain during the manufacture of basic materials, and with the use of the product the reduction of energy consumption is made possible due to the use of less weight.

B. The use of abrasion- and lesion analytical laboratory technologies for complex analyses of impairment behavior and the use of experimental models for the surface integrity relationship of machine parts and tools. To reach analytical definitions and analytical models based on the impairment behavior experiments and to identify lesion prognosis scenarios as well as to conduct model experiments and control for analytical models in terms of concrete machine parts or facsimiles derived from counterpart models.

Lesion, breakdown, error-formation process and phenomena research, investigation, analyses, evaluation and treatment, with special regard to surface integrity, technological factors and the complex investigation of impairment resulting requisition relationships, the prognosis of lesion behavior, as well as configuring the positive impairment performance of the parameter-forced, high energy shape- and quality determining fashioning of machine parts and tools. Primary targets include: the problematic surface and integrity questions, treatment and technical-scientific solutions of pipelines and pressure-holding systems and system-elements in critical conditions, working platforms and volumetric pieces used in extreme conditions, Other targets include questions around: material extraction, shape formation, parameter inset and enforcement, binding technology, maintenance, material choice and technology for mounting production, corrosion, cavitations, erosion, vibration, tension and heat-shock, aging, radiation lesion, abrasion, fatigue, life-span, rupture and rupture-sensitivity, stability, fracture, and errors leading to breach.

C. Complex technology- and knowldege transfer.

D. Providing preparatory and generative-expanding support and technical-scientific, industrial background for master trainings and PhD programs as well as providing workshop possibilities for R&D activities within the higher educational framework of the Colege of Dunaújváros.

7.1.2. The specific R&D tasks of working phase 1.

7.1.2.1. DF / DURATT

The installation and system implementation of a thermo-mechanic simulation laboratory (realizing physical and mathematical modeling) in order to support technological R&D, and the complex preparation of metal, alloy and composite research as well as applied technology and technological research based on this. The professional conduct and procuration of the Gleeble 3800 investment project in accordance with the European public acquisition procedure for this goal.

7.1.2.2. R&D tasks: DF / DURATT – ISD DUNAFERR Inc.

Metal and metal-alloy research, as well as preparatory procedures for applied-technology and technological experiments.

Research into background literature and the composition of a study about the application of the Gleeble simulator applied to iron based metal alloy technology-development, with special regards to vertical production lines of billet bands and sheets.

Planning of experiments, preparing own sample materials, material and material-structure analyses for the Gleeble 3800 device put in operation and later installed in the DURATT framework and for the system setup of the following R&D program phases.

Complex mill and laboratory experimental program planning for the next working phase of systematic thermo-mechanic simulation processes of aluminum and iron-based matter sorts, which aim at defining technological frames for optimal production, minimalizing and optimizing test-manufacturing, reducing matter, energy, expense and environmental-strain and increasing production safety as well as developing technologies producing more valuable products.

7.1.2.3. R&D tasks: DF / DURATT – Paks Nuclear Power Plant Inc.

Structural- and surface integrity and engineering: research and applied-technology and technological investigation based on the following directives:

Material-structural research with the use of 15H2MFA type reactor-bunker samples for the life-span expansion of the reactor blocks of the Paks Nuclear Power Plant Inc.

Complex material-structure-analyses on different types of samples with varying basic conditions and kept under industrial circumstances for expanding time periods originating from varying depths and conditions.

Material-structure quality analyses of samples and the examination of thermic requisition effects using the following methods.

Rigidity measurement with varying loads, metallographic analyses with metal and sweep electron microscope, breakage surface analyses and examination of secession.

The Paks Nuclear Power Plant Inc. offers the following technical-scientific services for the above.

– In order for DURATT to carry out the experiments, it provides 3x4 pieces of probe samples from those test sample-bodies of the control sample festoons, that have not been exposed to neutron-radiation, but only to thermic impact.

– The typical mechanical analyses of the samples has been conducted earlier by the Paks Nuclear Power Plant Inc. The results of these experiments are handed over to DURATT for fully comprehensive evaluation.

Research into scientific literature and the compilation of a study for the possible use of the Gleeble simulator in nuclear environment: defining the possibilities of application of the Gleeble simulator in the tasks of life-span management, aging-treatment, and prolonging plant running time in the Paks Nuclear Power Plant. As a technical-scientific service, the Paks Nuclear Power Plant Inc. provides continuous professional consultancy for this matter.

7.1.2.4. R&D tasks: DF / DURATT – ALCOA-KÖFÉM Ltd.

Preparation for the analyses of metal- and alloy-experiments, as well as preparation for the applied-technology and technological tests.

Research into scientific literature and the compilation of an evaluation study about the technology-development application of the Gleeble simulator in terms of aluminum-based alloys, with special regards to vertical production lines of billet bands and sheets.

Planning of experiments, preparing own sample materials, material and material-structure analyses for the Gleeble 3800 device put in operation and later installed in the DURATT framework and for the system setup of the following R&D program phases.

Complex mill and laboratory experimental program planning for the next working phase of systematic thermo-mechanic simulation processes of aluminum-based matter sorts, which aim at defining technological frames for optimal production, reducing and optimizing test-manufacturing, reducing matter, energy, expense and environmental-strain and increasing production safety as well as developing technologies producing more valuable products.

7.1.2.5. R&D tasks: DF / DURATT – Hungarian Bus Ltd.

Research into scientific literature and the compilation of an evaluation study about the construction of autobus trusses based on customer needs. Providing an overview about the present and possible productive and constructional capacities and technical correspondences, defining technological procedures for optimal production, reducing and optimizing test-manufacturing, reducing matter, energy, expense and environmental-strain and increasing production safety.

– Screening parallelisms and defining the directions of development
– Creating the study on the specialty of production, transfer and installation.
– The installation of a ProE platform on the HBus parameters.
– Providing an overview about the technological correspondences of constructions and truss elements chosen for development and if found adequate, the manufacturing of these elements on the ProE platform.

– Providing an overview about the present binding modes, with regards to construction idiosyncrasies. The R&D tasks outlined in point 4.1 of the bilateral R&D cooperation contract are already on the way.

Planning of experiments: experimentation with truss destruction-tests on existing IKARUS type buses, by which the correctness of the results provided by the final component analyses can be verified. The production of the necessary 3D models for the analyses and the conduct of necessary technological tests (weldableness, tensile strength, etc.)

Metal and metal-alloy research, as well as preparatory procedures for applied-technology and technological experiments.

7.1.2.6. R&D tasks: DF / DURATT – RBHH

The Robert Bosch Electronic Ltd. (RBHH) company situated in Hatvan, Hungary **joined the DURATT project in the middle of this working year**, and since it did not win a share of the project research funding, **takes part relying merely on its own R&D resources**.

RBHH and DURATT made a separate contract lying down the main areas of the common R&D activity: abrasion and lesion research, structural and surface integrity research, life-span engineering, as well as applied-technology and technological scientific examinations. As a result of the life-span research, the security, reliability, quality and competitiveness of the products must increase and the responsibility of RHHB in terms of product warranty and credit risk must decrease accordingly.

To reach the goals listed above, in terms of manufacturing technology of existing or new products defined or presented by DURATT and RBHH, RBHH will examine the following:

– Research, analyses, evaluation, treatment and control of error formation processes and phenomena with special focus on the products (e.g. mechanical, electronic basic parts and units) and the carrier surface integrity, technological factors, complex relationship analyses of impairment resulting requisitions, and lesion behavior prognosis.
– Applying laboratory technologies to lesion and break-down investigations.
– Applied-technology and technological experiments.
– Compiling complex experimental-analytical plans for each working phase for the above.

The first working phase involving the research of literature schedules on the systematic approach of the problem group, in which the strategic concept of quality management, the treatment of customer complaints and the processing system of the tiring requisition results plays the central part. The question of uniform data management of the measured and gathered information also plays a key part in the researched area. The research plan was compiled with such pretension, that the differences of the new and old testing methods can be exposed and presented, and the connection and the strength of the connection between the test requisitions and the customer complaints can be made clear.

7.2. The results of the 1st working phase

7.2.1. The technical-scientific specialty of the working phase

The R&D activity of the Head of Consortium (the College and the Knowledge Center) and the partner consortium member group is displayed in the schematic table under point 6.1.1 – with the appropriate combination of A, B, C, and D task-indicators – identifying partners individually.

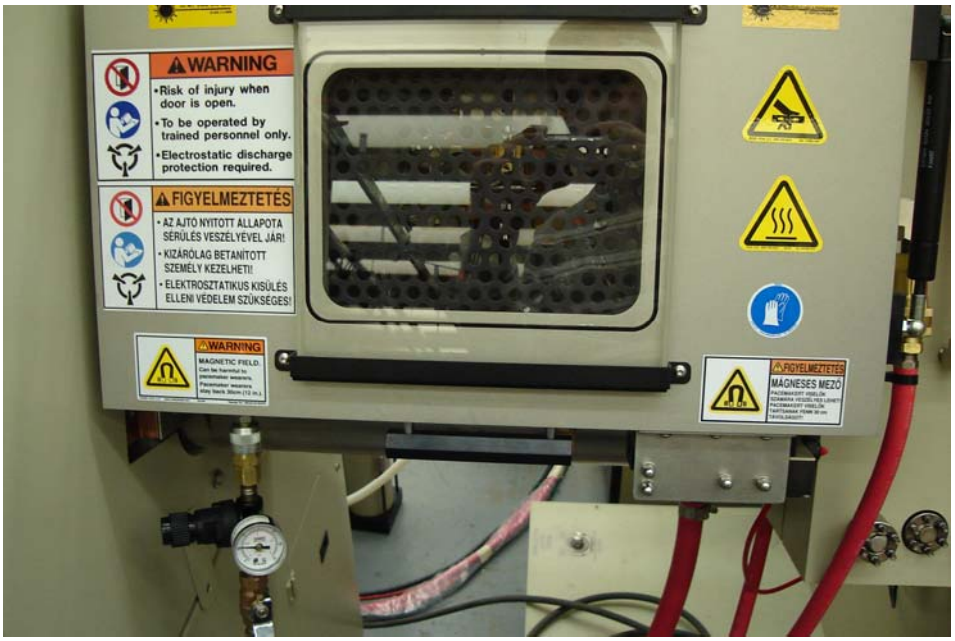
Similarly to the startup procedure of other local Knowledge-Centers in the region, the first work-phase of DURATT shows a preparatory aspect: the startup of professional operations and movement – the acquisition of the R&D infrastructure and the configuration of conditions for system installation – the technical-scientific preparation of R&D programs.

7.2.2. The technical-scientific results of the 1st working phase

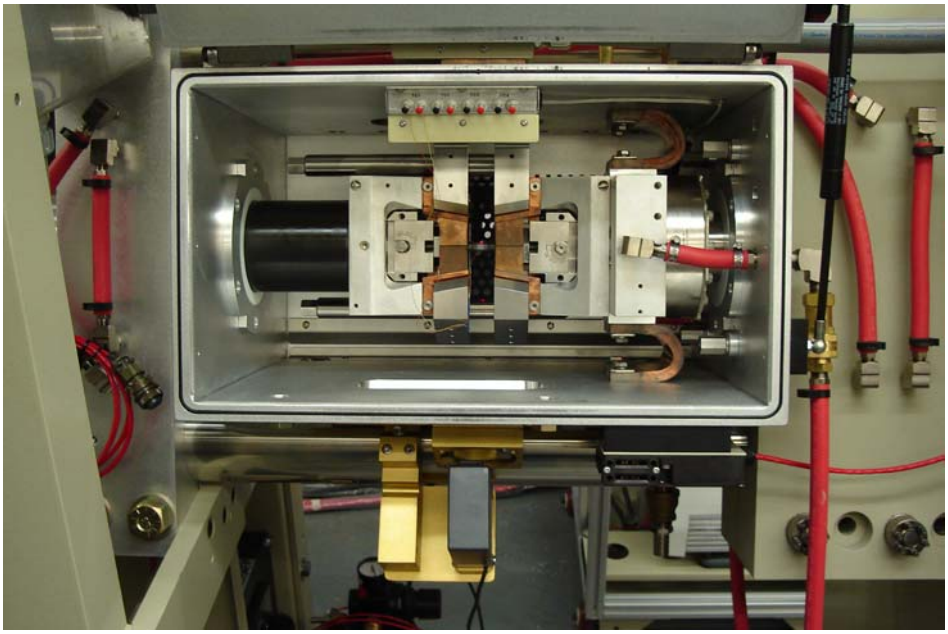
7.2.2.1. DF / DURATT

The complex technical-scientific firmament of the acquisition of the "Gleeble 3800" – the central infrastructural element of DURATT – and the entire supporting procuration advocacy can be evaluated as successful (see appropriate paragraphs).

The Gleeble 3800 equipment of the Regional Knowledge Centre of Dunaújváros at DSI in New York prepared for acceptance test – October 2007



The work chamber of Gleeble 3800 equipment of DURATT – New York, October 2007



The chamber of the Gleeble 3800 equipment of DURATT with the cooling workpiece in the middle – New York, October 2007

PROFESSIONAL REPORT
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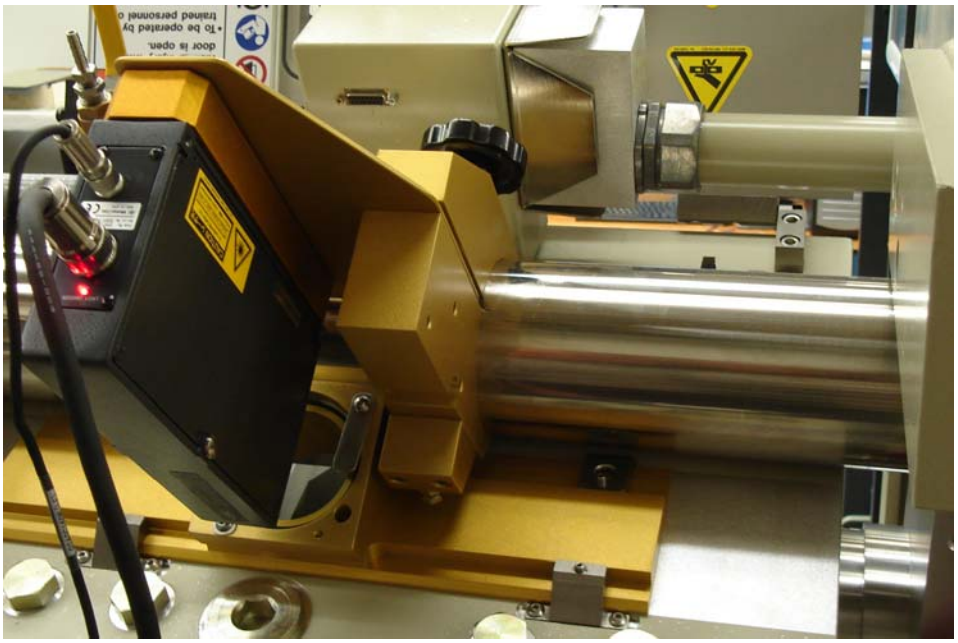
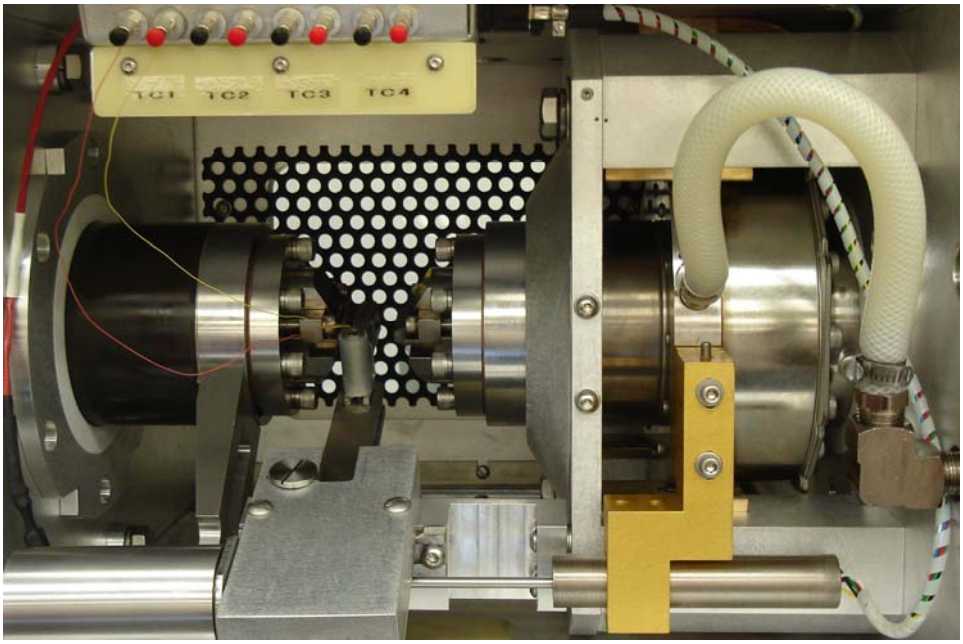
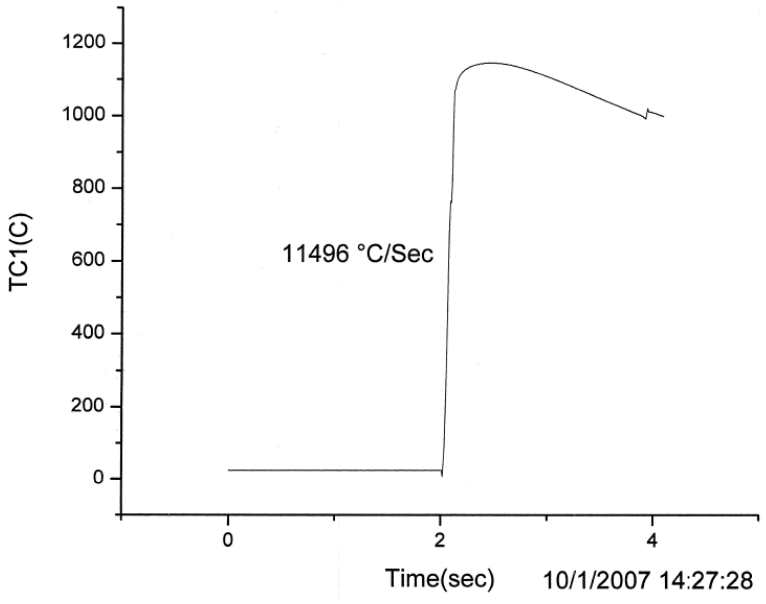


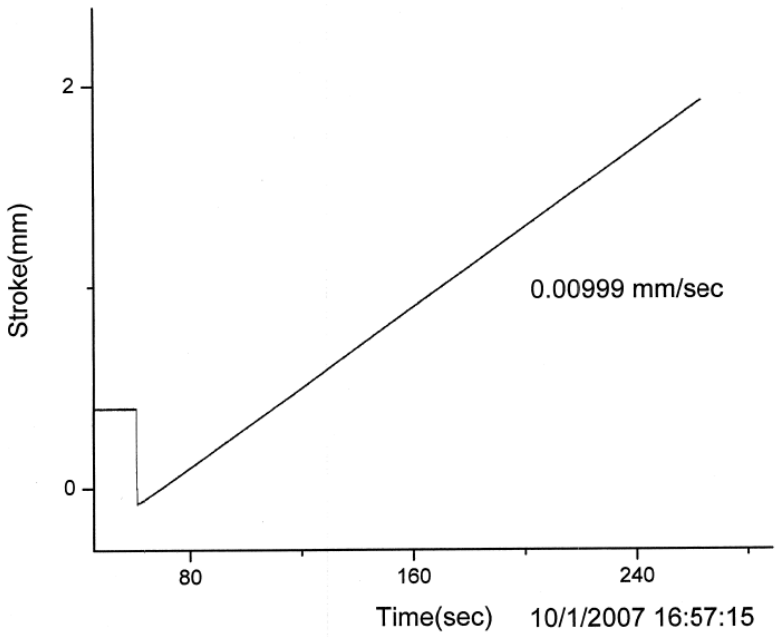
Laser dilatometric measurement in the Gleeble 3800 equipment
of DURATT - New York, October 2007



Multi-step deformation with the Hydrawedge system in the
Gleeble 3800 equipment - New York, October 2007



Determination of the maximal cooling rate in the Gleeble 3800 equipment of DURATT
(New York, October 2007)



Investigation of the evenness of the forming rate at 0.01 mm/s programmed cooling rate
(New York, October 2007)

7.2.2.2. DF / DURATT – ISD DUNAFERR Inc.

The accomplishment package was conducted as the 1st working phase task described in point 4.1 and 7. of the R&D activity contract between the Dunaújváros Regional Material Science and Technology Knowledge Center – operating within the framework of the College of Dunaújváros – and the ISD DUNAFERR Inc. and can be considered completed.

The goal of the work was to uncover and outline the possible applications of the Gleeble 3800 physical simulator, to be acquired within the framework of DURATT, in the metal industry and to compile an experimental-analytical plan, with special regards to the current technology and proposed technical developments of the ISD DUNAFERR Inc.

The thermic simulator – due to the partial continuance of the acquisition – will be installed and put in operation for R&D system purposes in the first month of 2008. The start and conduct of the planned and scheduled experimental and analytical research is task due in the next periods of the project.

The acceptance tests to be conducted on the Gleeble 3800 device, planned for the park of Dynamics Systems situated in Albany, include the material- and structure-analyses of sample items listed by the Inc. The technical-scientific evaluation and compilation of a R&D report about the analytical results of these treatments and structural changes and will be made possible in the next working phase (end of the given year or the beginning of the next year).

The R&D product identifies and presents the technical-scientific experimental and analytical categories, which are to be "inevitably revealed" for the establishment of metal industry development, and at the same time by installing the given research infrastructure and technical-scientific workshop it makes them accessible and systematically researchable.

According to the appropriate section of the bilateral R&D cooperation contract, the identified partial report was compiled by the Knowledge Center and submitted to the Inc. on time under the title: "Physical modeling of congelation, hot and cold formation, annealing, welding and surface treatment processes at the necessary temperature defined by the industry, recovering the possibilities of application of equipment with flowing electricity and high-speed hydraulic forming devices under varying shape changing cycles and speed in the metal industry and the ISD DUNAFERR Inc, - based on scientific literature".

The partial report can be reached by IT members and members with procurator competencies – according to their data-access rights – **on the Center's website under the "Documents" tab.**

To conclude the technical-scientific goal of the working phase – the installation of the Gleeble 3800 physical simulator for R&D system purposes within the framework of DURATT and to reveal the possible applications in the metal industry with special regards to the current technology and proposed technical developments of the ISD DUNAFERR Inc.

The analytical work concludes the following:

- By the acquisition of the Dynamic System Inc. Gleeble 3800 type thermo-mechanic simulator and its put in operation, completely new technical opportunities are made possible for metallurgy research development, especially on those areas, where heat and mechanical effects prevail simultaneously.
- By fulfilling the apparatus conditions of physical simulation, all four elements of the technical material science will rise to the level of international standards in the country.
- The installation of the thermo-mechanic simulator will give a boost to scientific research groups working in the areas of mathematical simulation of metallurgy processes. The results of the physical simulation are only made comprehensible in proper depth, when the processes effecting the probe sample in the simulator are supplemented with mathematical descriptions too.
- The application scope of the Gleeble 3800 type thermo-mechanic simulator covers a large spectrum. This is presented well by the publication list that can be accessed on the DSI webpage.

Based on the publications about the continuous casting of steel, the following application possibilities can be emphasized:

- Definition of casemaps (temperature, size of shape change, speed, etc.) for depletion of malleability (crack formation) with regards to the ruling conditions inside the crust of the ingot during continuous molding.
- Definition of null-solidity and null-shape changing capability parameters with respect to the composition of continuously molded steal.
- Using input data, derived from determining parameters of one or two staged SICO-analyses (SICO – strain induced crack opening) conducted on relatively small and relatively large diameter probe samples, for the computer modeling of the casting procedure.

The results defined by the thermo-mechanic simulator during hot-rolling technology development can be used in the following areas:

- Definition of constitutive material law constants by a small number of experiments;
- Analyses of metallic processes during particular technological steps based on the interpretation of real voltage and real shape changing diagram and the detailed metallographic analyses of frozen probe sample;
- Development of temperature conduction and thrust plan during multistage hot-rolling processes and the revision of current applied technologies;
- Development of annealing technologies.

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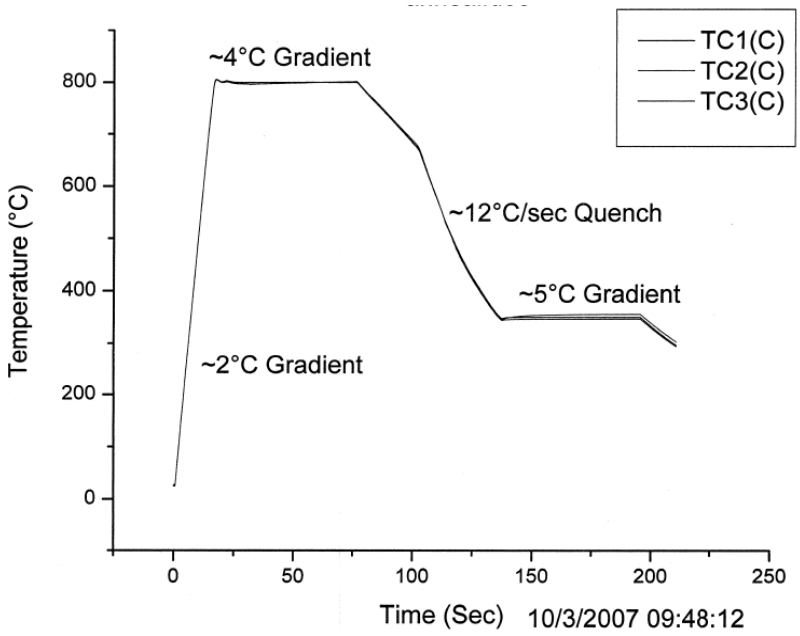
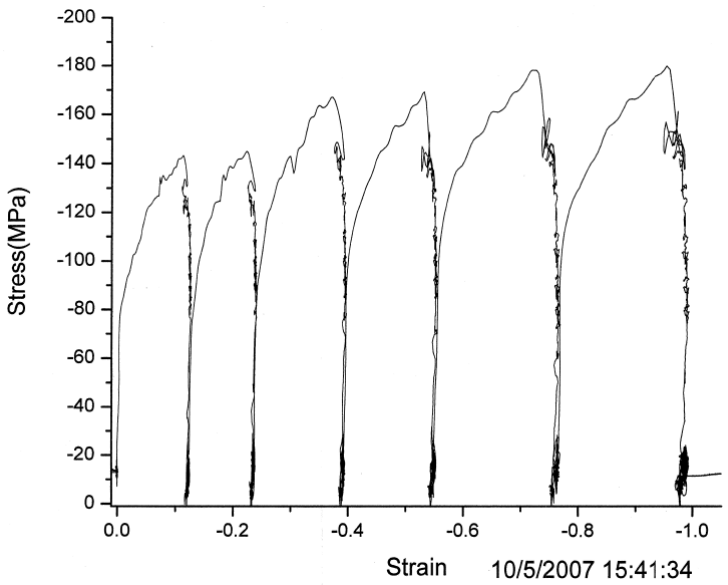


Determination of the correctness of settings at characteristic temperatures of a steel plate
(New York, October 2007)



Determination of the true stress - true strain diagram of a multi-step deformation
(New York, October 2007)

7.2.2.3. DF / DURATT – Paks Nuclear Power Plant Inc.

The accomplishment package was conducted as the 1st working phase task described in Appendix 1 point 1. and 2. of the R&D activity contract between the Dunaújváros Regional Material Science and Technology Knowledge Center (DURATT) – operating within the framework of the College of Dunaújváros – and the Paks Nuclear Power Plant Inc. and can be considered completed.

The goal of the work was to uncover and outline the possible applications of the Gleeble 3800 physical simulator, to be acquired within the framework of DURATT, in the metal industry and to compile an experimental-analytical plan, with special regards to the current technology and proposed technical developments of the Paks Nuclear Power Plant Inc.

With regard to the thermic simulator – due to the partial continuance of the acquisition – installed and put in operation for R&D system purposes in the first month of 2008. The start and conduct of the planned and scheduled experimental and analytical research is task due in the next periods of the project.

According to the logic exposed previously, the acceptance tests to be conducted on the Gleeble 3800 device, planned for the park of Dynamics Systems situated in Albany, include the material- and structure-analyses of sample items listed by the Inc. The technical-scientific evaluation and compilation of a R&D report about the analytical results of these treatments and structural changes and will be made possible in the next working phase (end of the given year or the beginning of the next year).

Accordingly the R&D product-packet – in accordance with the relating task definition – on the one hand identifies and presents those technical-scientific experimental and investigational topics, that can be accessed and systematically researched – for the firmament of development – with the entry of the physical simulator, stopping a decade long gap in the local innovational practice. On the second hand, it outlines the working plan of the relating experimental and investigational research.

According to point 6.1 and Appendix 2. of the bilateral R&D cooperation contract, the partial report was compiled by the Knowledge Center and submitted to the Paks Nuclear Power Plant Inc. as fulfillment in advance, under the title: “Quick shape-changing test application on the physical modeling of bunker and welding materials used in the power-plant - based on scientific literature, and application possibilities in the Paks Nuclear Power Plant Inc.”.

The partial report can be reached by IT members and members with procurator competencies – according to their data-access rights – **on the Center’s website under the “Documents” tab.**

The themes covered by the processed scientific literature are listed in the separate appendix of the partial report.

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The analytical-evaluative study – in accordance with the relating 1st working phase task definition – on the one part identifies and presents those technical-scientific experimental and investigational topics, that can be accessed and systematically researched – for the firmament of development and the solution of maintenance questions – with the entry of the physical simulator, stopping a decade long gap in the local innovational practice. On the second hand, it outlines the working-plan of the relating experimental and investigational research.

The results defined by the study of application possibilities of the thermo-mechanic simulator with nuclear power plant materials can be summarized as follows:

- The Gleeble 3800 thermo-mechanic simulator is a unique device for the physical simulation of alterations supervening in metallic materials due to heat and mechanical impact. This is demonstrated well by the widespread of this device and the high number of results reached with the use of Gleeble-devices publicized.
- The first Gleeble type device was released exactly 50 years ago. The first type was basically a welding simulator, which – in the interest of real life simulation of the welding process – was supplemented with a mechanical unit.
- To fulfill the demands of additional users, the larger versions of Gleeble-devices – on top of the regular application scope – are also able to simulate multistage congelation and heat-formation processes.
- Out of the R&D actions conducted for the Paks Nuclear Power Plant Inc. – based on our literature orientation – special emphasis is to be put on the clamber-test of base materials and the welding bonds created between them. As learned from the scientific literature, the accelerated clamber-test (ACT) is primarily suitable for setting up the order of possible base materials, which were welded together with different technologies and with different use of supplementary materials, in terms of clamber-resistance based on the results of relatively short term experiments.
- The main idea of ACT summarized is, that by consciously choosing the experimental temperature and the predefined speed of deformation applied to the probe sample – provided by the mechanical unit of the Gleeble-simulator – it is possible to create a similar textural-structure condition at the clamber rapture in the body of the probe sample, to the condition emerging immediately before rapture during a traditional clamber-test (CCT) or real-life industrial requisition.
- In addition to the accelerated clamber test, which is a special analytical method, the immediate observations derived from the Gleeble-simulator, can reveal a number of new application areas. The regional knowledge center will forecast appropriate funding for this type of work.

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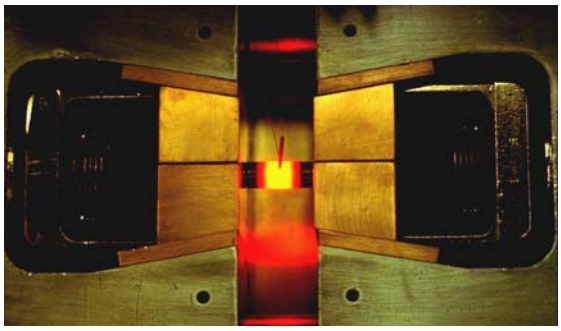
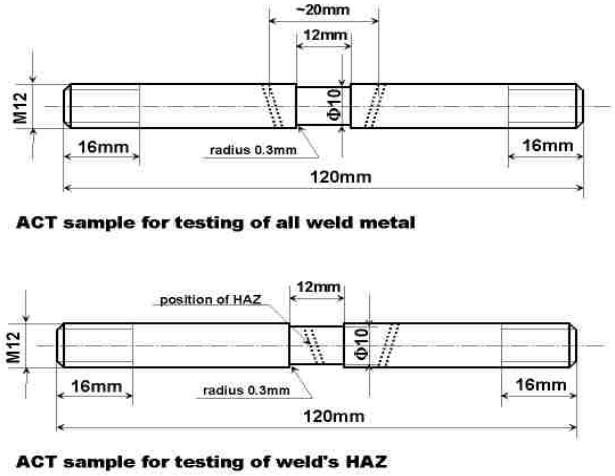


Evenly heated specimen in the Gleeble 3800 equipment



Specimens with entirely welded cross-section applied at accelerated creep tests

Image of the middle part of a specimen with entirely welded cross-section

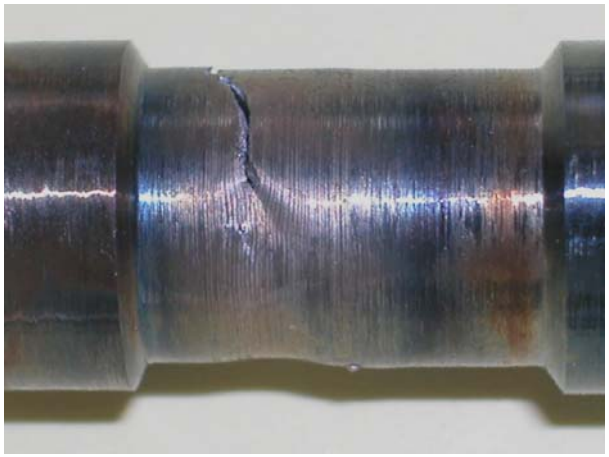


Image of the middle part of a specimen with entirely welded cross-section after accelerated creep test

7.2.2.4. DF / DURATT – ALCOA-KÖFÉM Ltd.

According to the project's order of organization, the accomplishment package was conducted as the 1st working phase task described in point 4.1 and 7. of the R&D activity contract between the Dunaújváros Regional Material Science and Technology Knowledge Center and the ALOCA-KÖFÉM Ltd..

The goal of the work was to uncover and outline the possible applications of the Gleeble 3800 physical simulator in the aluminum industry and to compile an experimental-analytical plan, with special regards to the current technology and proposed technical developments of the ALOCA-KÖFÉM Ltd.

With regard to the thermic simulator – due to the partial continuance of the acquisition – installed and put in operation for R&D system purposes in the first month of 2008. The start and conduct of the planned and scheduled experimental and analytical research – similarly to the other projects – is a task due in the next periods of the project.

According to the appropriate section of the bilateral R&D cooperation contract, the identified partial report was compiled by the Knowledge Center and submitted to the Inc. on time under the title: "Physical modeling of congelation, hot and cold formation, annealing, welding and surface treatment processes at the necessary temperature defined by the industry, recovering the possibilities of application of equipment with flowing electricity and high-speed hydraulic forming devices under varying shape changing cycles and speed in the aluminum industry and the ALOCA-KÖFÉM Inc., - based on scientific literature".

The partial report can be reached by IT members and members with procurator competencies – according to their data-access rights – **on the Center's website under the "Documents" tab.**

Similarly to the analogue conditions of the ISD DUNAFERR Inc., the technical-scientific goal of the working phase was to uncover and outline the possible applications of the Gleeble 3800 physical simulator in the aluminum industry and to compile an experimental-analytical plan, with special regards to the current technology and proposed technical developments of the ALOCA-KÖFÉM Ltd.

<u>The evaluations and conclusions of the analyses are as follows</u>

Observing the development history of Gleeble simulators, it can be seen that the device was developed as a welding simulator ca. 50 years ago. This was the first device capable of the physical simulation of steal welding processes including the simulation of forced shape-formations during the welding heat process.

Due to the first applied field of the Gleeble simulator, the simulation research related to aluminum and its alloys began much later, but such activities play a considerable part in Gleeble applications today. This is demonstrated well by the growing number of reports about aluminum alloys.

In the course of the analyses six technical-scientific publications were chosen as demonstrative examples of the possible applications of Gleeble simulators in the aluminum industry. These examples show that even basic experiments can be conducted with device 1500. But the good electric conductivity of aluminums and its alloys in terms of immediate resistance heating is not favorable. The greater electric capacity of type 3800 however can bridge this difficulty.

The analyzed works represent diverse professional themes. In the first study, the physical simulation was used for the verification of the computer model for the processes during annealing of aluminum alloys.

Three studies deal with the physical simulation of the processes taking place during multistep hot-rolling. Information regarding the interpretation of running curves are especially important, since it is only possible to determine the processes taking place during a given thrust (shape thermosetting, static and dynamic reformation and re-crystallization) with such investigations. Moreover the multistep simulation provides explanation for which level of tension the malleable shape-formation begins in the thrust following the all-time thrust. The time period between the thrusts play a crucial part in this respect.

The last two studies show that Gleeble simulators are capable of identifying new phenomena and providing data for the elaboration of new correspondences. The cognizance of stoichiometric and non-stoichiometric inter-metallic phases is of growing importance, since their crystal structure can hold unique qualities. Accordingly intensive research is being carried out regarding iron-aluminum inter-metallic phases.

The understanding of behavior of porous materials during formation is important from more than one aspect. The behavior of pores in alloy casts during formation in powder metallurgy products was recognized with the help of Gleeble simulator measurements. A similar investigation of requisition behavior of scales cannot be ruled out either.

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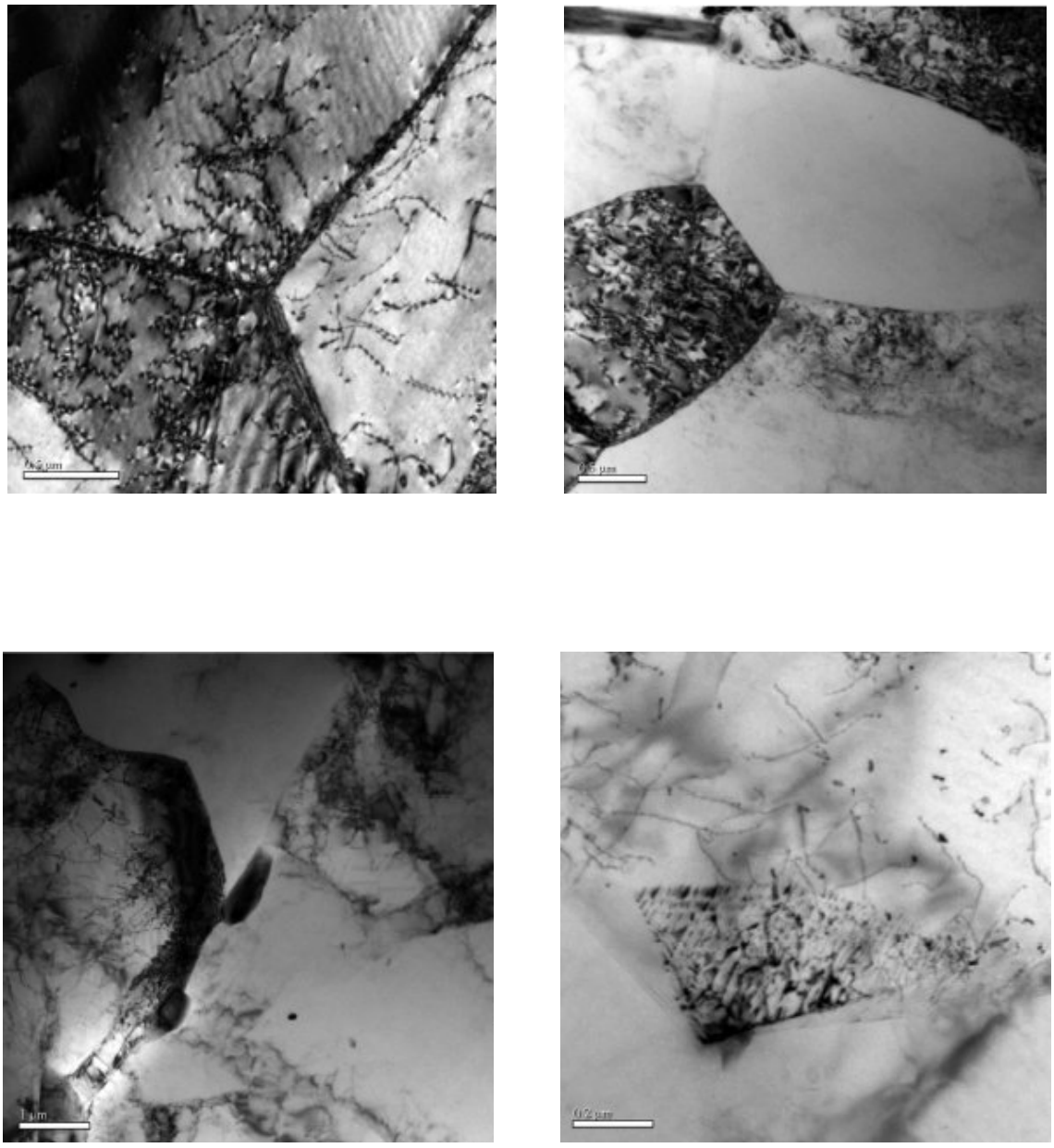


Characteristic transmission electron microscopic images
of samples treatedin Gleeble simulator

The experimental-analytical plans are as follows

Definition of ideal annealing parameters for the new LOI annealing furnace

- Development of annealing technology with minimal time cycle.
- Development of optimal annealing parameters so that the mechanical attributes match the EN 485-2 standard regulations.
- Development of annealing technologies for the following two material attributes:
  EN AW 1050A soft and H24 semisolid condition and
  EN AW 5754 H22 quarter-solid condition.
- Adequacy of mechanical attributes: EN-485-2
- The technological parameters (and possibilities) of the furnace must be fully taken into account during the definition of the annealing technology parameters.
- Other considerations include the R&R assumptions.

Optimizing the hot and cold-rolling thrust plan of aluminum

- Due to the new rolling-mill devices of Aloca Ltd. and the changed (product) size ranges, the rolling thrust plans need to be stabilized. This is also justified by the growing demands of the processing industry (e.g.: cleavage).
- The technological parameters of the hot-rolling line, the new cold-rolling line the annealing line, and the rending line must be taken into account when optimizing the new thrust plans.
- Alloy EN AW 1200 is used for the experiments, which has to match the EN 573-3 standard regulations. Mechanical attributes must match the EN 485-2 standard regulations.
- Vertical technological steps involved in the research program include:
  I. Hot-rolling from 520x1340x5200 mm to 8 mm thickness.
  II. Cold-rolling from 8 mm to 0,2 mm.
  III. Rendering alignment – (chemical) degreasing
  IV. Strip splitting to 54 mm width in 23 bands.
  V. Fluxing.

7.2.2.5. DF / DURATT – Hungarian Bus Ltd.

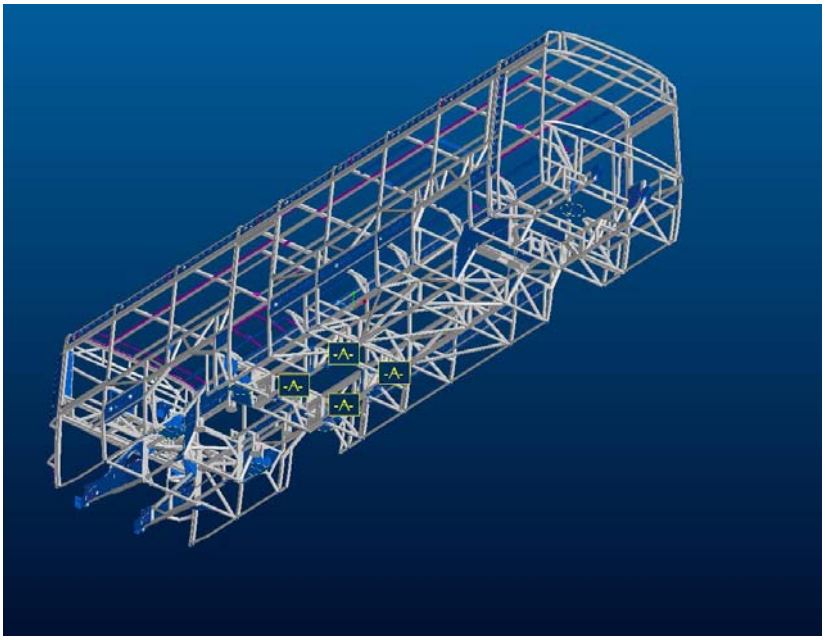
During the 1st working phase the Hungarian Bus Ltd. In cooperation with DURATT established the appropriate planning environment in order to be able to model the mechanical and material statics inquiries for the autobuses to be produced. By using these models and calculative methods analyses were prepared, which will be compared with the real break tests in the next working phase. The trusses were fabricated, which will be used in the next pay-off period

so that the non-welded bandages experimented on models can be tested in real life.

The experimental products and results completed in this period can be listed as follows:

- 3D model of a 12 meter long suburban autobus truss
- Construction of a finite unit net with 12800 net units per analytical segment
- Production of analytical segments: apron segment, spandrel segment, double door and window frame segment
- 12 méteres elővárosi autóbusz vázszerkezetének 3D-s modellje
- End unit analyses for segments
- AUTOKUT quasi-static experiment measures and measurement records
- The manufacturing of analytical truss structures of 12 and 18 meter long autobus trusses for the bandage tests due in the next period
- Professional presentation for the staging of investigational methods

The results of the experiments and investigations will strongly influence the observations of the Hungarian autobus production, justly known world-wide for its experience, and will favorably determine the cost of transfer to other countries, where until now the transportation of incomplete autobus trusses was not worth it due to the high cost of transfer.



7.2.2.6. DF / DURATT – RBHH

The finalization of the first phase of the R&D employment and the fulfillment of the contractual obligations are on the way.

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8. Lecturers and researchers, administration - working hours expenditure

Kutatók			
Meghatározó személy	**Konzorcium tag**	**Feladatok (sorszám, munkaterv szerint)**	**Ráfordított idő**
név, minősítés	**(sorszám)**		**(nap)**
Dr. Csepeli Zsolt	ISD DUNAFERR Zrt.	témavezető I. „DUNAFERR alprogram"	71
Szabados Ottó	ISD DUNAFERR Zrt.	I. „DUNAFERR alprogram"	65
Szabó Andrea	ISD DUNAFERR Zrt.	I. „DUNAFERR alprogram"	45
Kardos Ibolya	ISD DUNAFERR Zrt.	I. „DUNAFERR alprogram"	64
Egyéb	ISD DUNAFERR Zrt.		62
Dr. Zsámbók Dénes	DF	I-III. alprogram	60
Dr. Jenei István	DF	témavezető, III. "PAKS alprogram", élettartam alprogram	65
Dr. Verő Balázs	DF	anyagtudományi szimulációs projektvezető	147
Valenta László	DF	IV. "Hbus" alprogram, élettartam alprogram	54
Ladányi Gábor	DF	élettartam alprogram	35
Madarász Péter	DF	élettartam alprogram	42
Dr. Farkas Péter	DF	témavezető, II. "ALCOA alprogram"	35
Egyéb	DF		87
Németh Csaba	Hungarian Bus Kft.	témavezető IV. "Hbus" alprogram	32
Brachmann László	Hungarian Bus Kft.	IV. "Hbus" alprogram	85
Rétfalvi Zoltán	Hungarian Bus Kft.	IV. "Hbus" alprogram	45
Egyéb	Hungarian Bus Kft.		120
		ÖSSZESEN	**1114**
		Teljes munkaidőre átszámított kutatói létszám	**5 fő**

Menedzsment			
Meghatározó személy	**Konzorcium tag**	**Feladatok**	**Ráfordított idő**
név, minősítés	**(sorszám)**	**(sorszám, munkaterv szerint)**	**(nap)**
Szabados Ottó	ISD DUNAFERR Zrt.	I. „DUNAFERR alprogram"	5
Szabó Júlianna	ISD DUNAFERR Zrt	I. „DUNAFERR alprogram"	18
Csepeli Zsolt	ISD DUNAFERR Zrt.	témavezető I. „DUNAFERR alprogram"	11
Dr. Zsámbók Dénes	DF	menedzser-igazgató	62
Valenta László	DF	menedzser-igazgató-helyettes	35
Kovácsné Melkvi Erika	DF	adminisztrátor	41
Németh Csaba	Hungarian Bus Kft.	témavezető IV. "Hbus" alprogram	4
		ÖSSZESEN	**176**
		Teljes munkaidőre átszámított létszám	**1 fő**

9. List of Publications

PROGRAM – Materials Science, Simulation

I. *Dr.Zsámbók Dénes; Dr.Csepeli Zsolt; Dr.Kadocsa László és Valenta László*
A Dunaújvárosi regionális Anyagtudományi és Technológiai Tudásközpont bemutatása
(Dunaújváros, MTA Anyagtudományi és Technológiai Bizottság Gyártási Rendszerek Albizottsága ülése, 2007.01.23.)

II. *Dr.Zsámbók Dénes; Dr.Csepeli Zsolt; Dr.Kadocsa László és Valenta László*
A Dunaújvárosi regionális Anyagtudományi és Technológiai Tudásközpont bemutatása
(Dunaújváros, Karbantartók és Javítók Országos Konferenciája, 2007.01.25)

III. *Dr.Mandziej, Stan T.*
Termikus-mechanikus szimuláció alkalmazása Al-alapú ötvözetek szerkezetének és tulajdonságainak optimalizálására
(Székesfehérvár, ALCOA Képzési Központ, workshop, 2007.04.11.)

IV. *Dr.Mandziej, Stan T.*
Gleeble-szimulátor felhasználása atomerőműi anyagok kérdés- és problémakörében
(Paksi Atomerőmű Zrt., Tanácsterem, workshop, 2007.04.12

V. *Dr. Verő Balázs*
A fizikai szimuláció helye és szerepe a műszaki anyagtudományban
(Dunaújváros, Tudomány Napja, 2007.11.12.)

VI. *Dr.Csepeli Zsolt; Dr.Verő Balázs és Dr.Zsámbók Dénes*
A Gleeble 3800 termomechanikus szimulátor acélipari alkalmazásai
(Dunaújváros, Tudomány Napja, 2007.11.12.)

VII. *Dr.Jenei István és Valenta László*
A Gleeble 3800 berendezés műszaki paraméterei és technikai háttere
(Dunaújváros, Tudomány Napja, 2007.11.12.)

VIII. *Németh Csaba*
IKARUS típusok háromdimenziós vázmodelljének végeselem analízise és az eredmények összehasonlítása fizikai törésvizsgálatokkal
(Dunaújváros, Tudomány Napja, 2007.11.12.)

PROGRAM – Lifetime Management

IX. *Dr.Molnár László; Madarász Péte; Valenta László és Volosin Tibor*
A fékezés és az üzemi gumimelegedés termikus hatása az öntött és préskovácsolt alumínium és acél felnire
(Dunaújváros, Tudomány Napja, 2007.11.12.)

X. *Ladányi Gábor; Madarász Péter; Halas János; Valenta László és Zahola Tamás*
Alumínium prés fődarabok szilárdsági ellenőrzése
(Dunaújváros, Tudomány Napja, 2007.11.12.)

XI. *Dr.Jenei István; Dr.Pór Gábor és Valenta László*
Élettartam kutatás a Robert Bosch Elektronika Kft. részére
(Dunaújváros, Tudomány Napja, 2007.11.12.)

XII. *Ladányi Gábor:*
A rugalmas-képlékeny peridinamikus anyagmodell vizsgálata, Tudomány Hete rendezvénysorozat, DURATT szekció,
2007. november 12., Dunaújváros

XIII. *Ladányi Gábor:*
A rugalmas-képlékeny peridinamikus anyagmodell vizsgálata, Tudomány Hete rendezvénysorozat,
OAK, 2007. október 9., Siófok

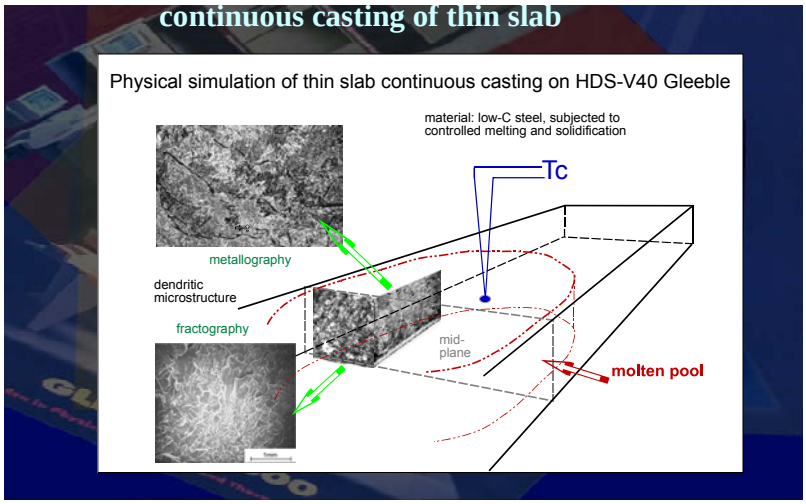
XIV. *Madarász Péter és Ladányi Gábor*
Feltöltőhegesztéssel javított gépalkatrészek lehűlésének szimulációja végeselem módszer segítségével
(Hegesztéstechnika, 2007. 3. szám)

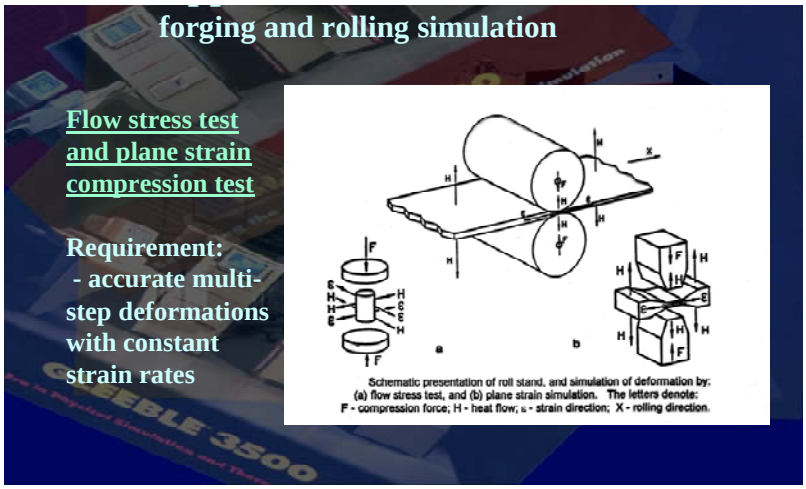
10. Technical-scientific R+D forums and events, external and internal communication

In the first part of the year DURATT organised two extremely detailed and successful professional forums in Dunaújváros, Székesfehérvár and Paks and organised a separate section during the „Science Day” in Dunaújváros.

PROFESSIONAL REPORT
– PHASE 1. / 2007 / –

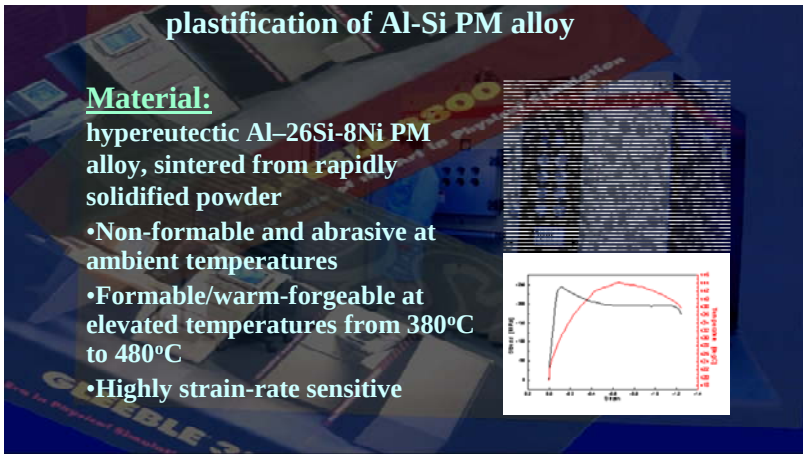
Application of termomechanical simulation for the optimalisation of microstructure and properties of iron alloys – Dunaújváros

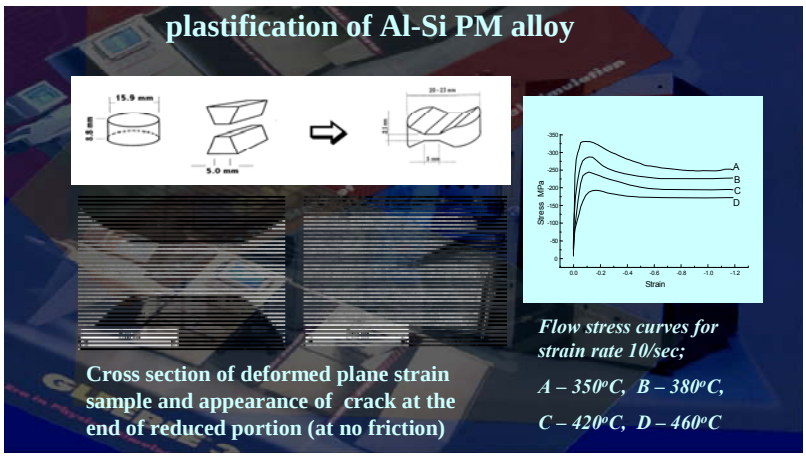


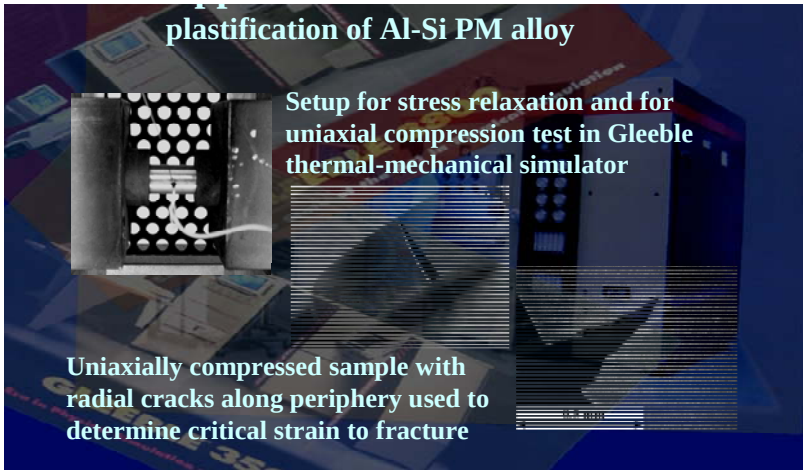


PROFESSIONAL REPORT
– PHASE 1. / 2007 / –

Application of termomechanical simulation for the optimalisation of microstructure and properties of aluminium alloys - Székesfehérvár

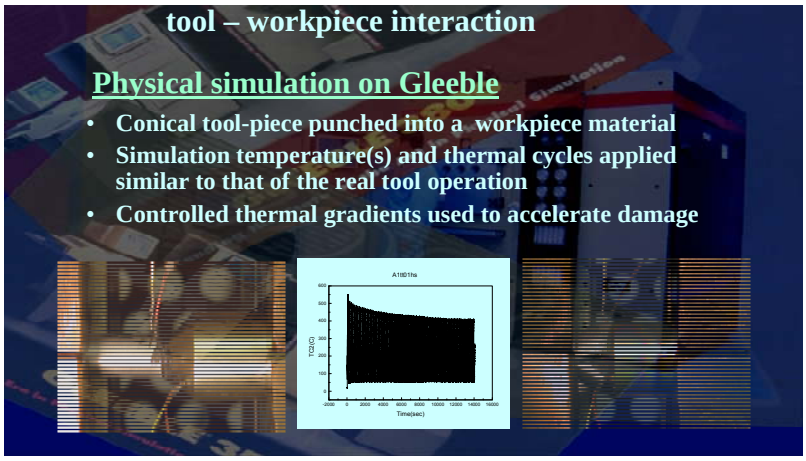


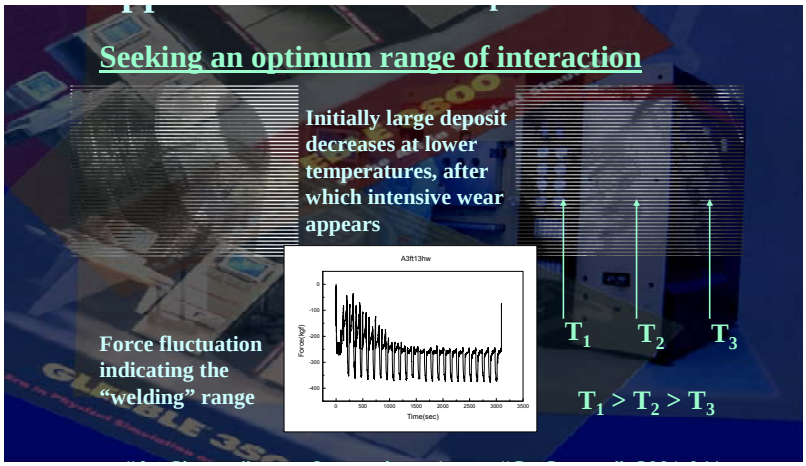


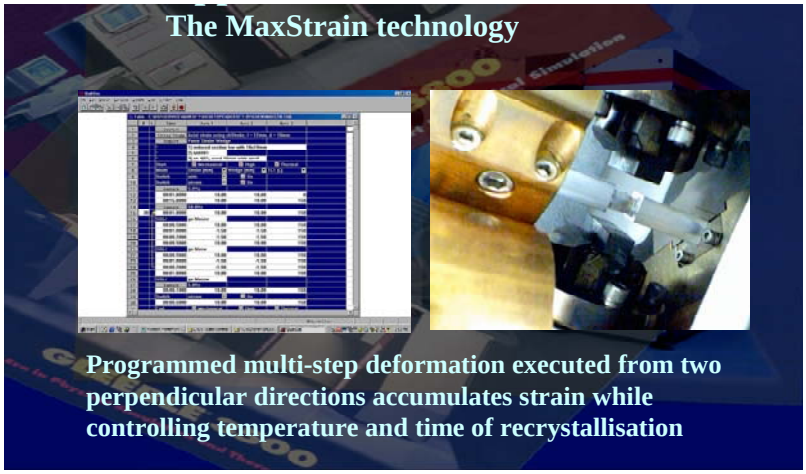


PROFESSIONAL REPORT
– PHASE 1. / 2007 / –

Application of Gleeble simulator on nuclear energy plant materials - Paks

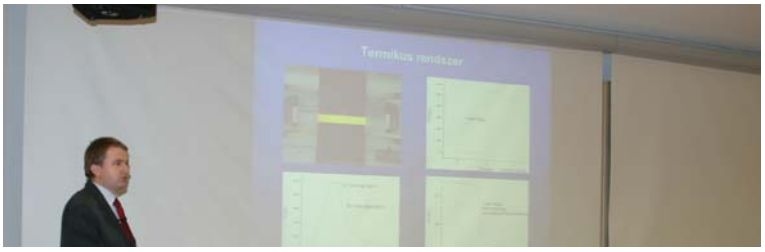






PROFESSIONAL REPORT
– PHASE 1. / 2007 / –

Science Day" 2007 – Dunaújváros



PROFESSIONAL REPORT
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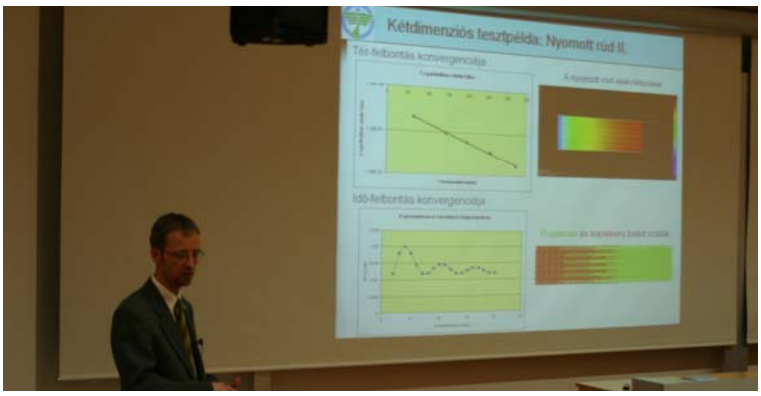

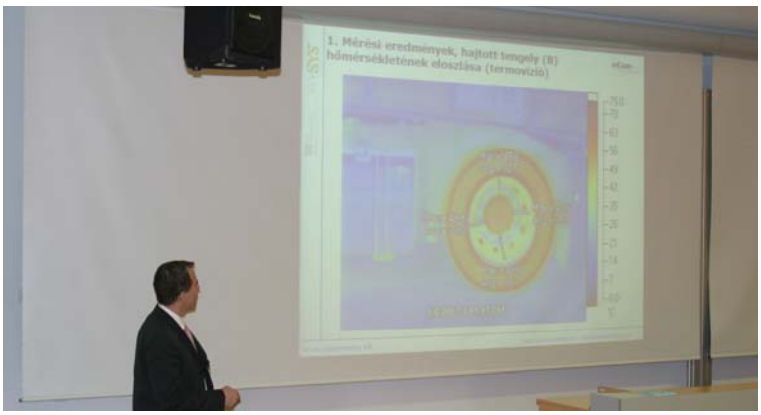

PROFESSIONAL REPORT
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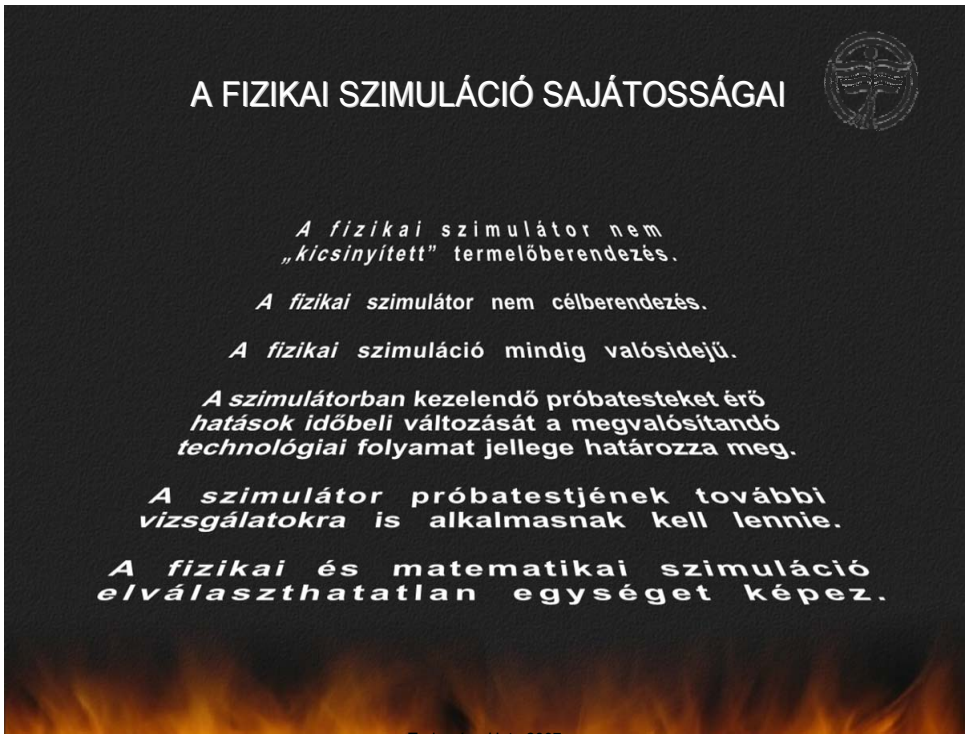
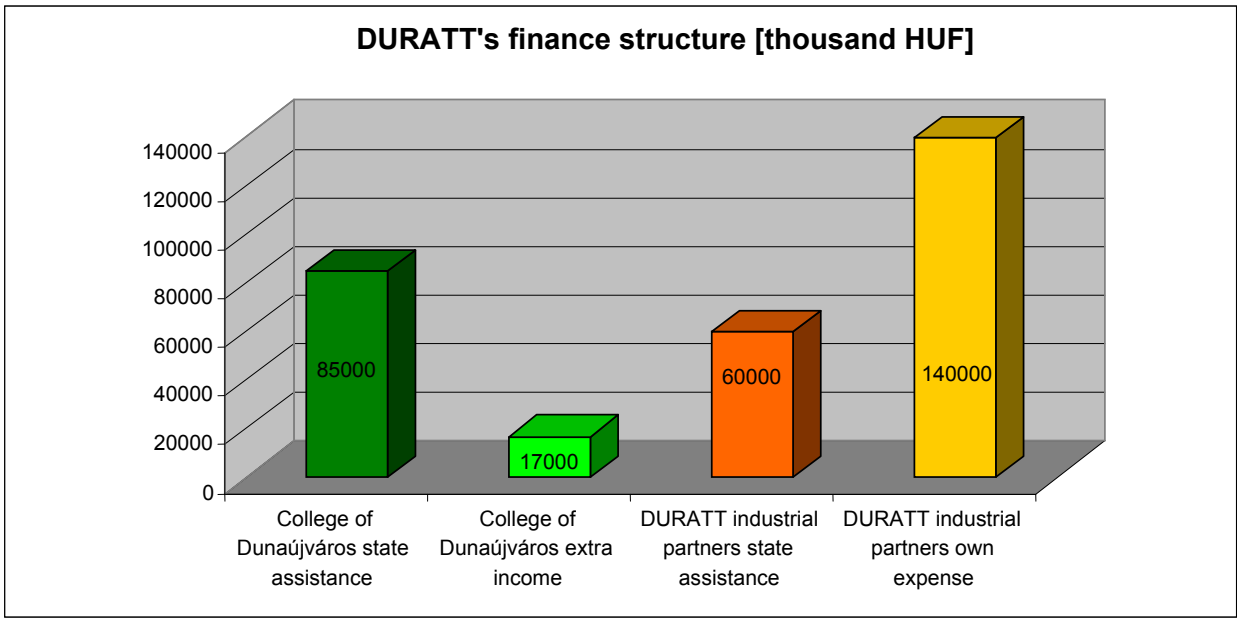
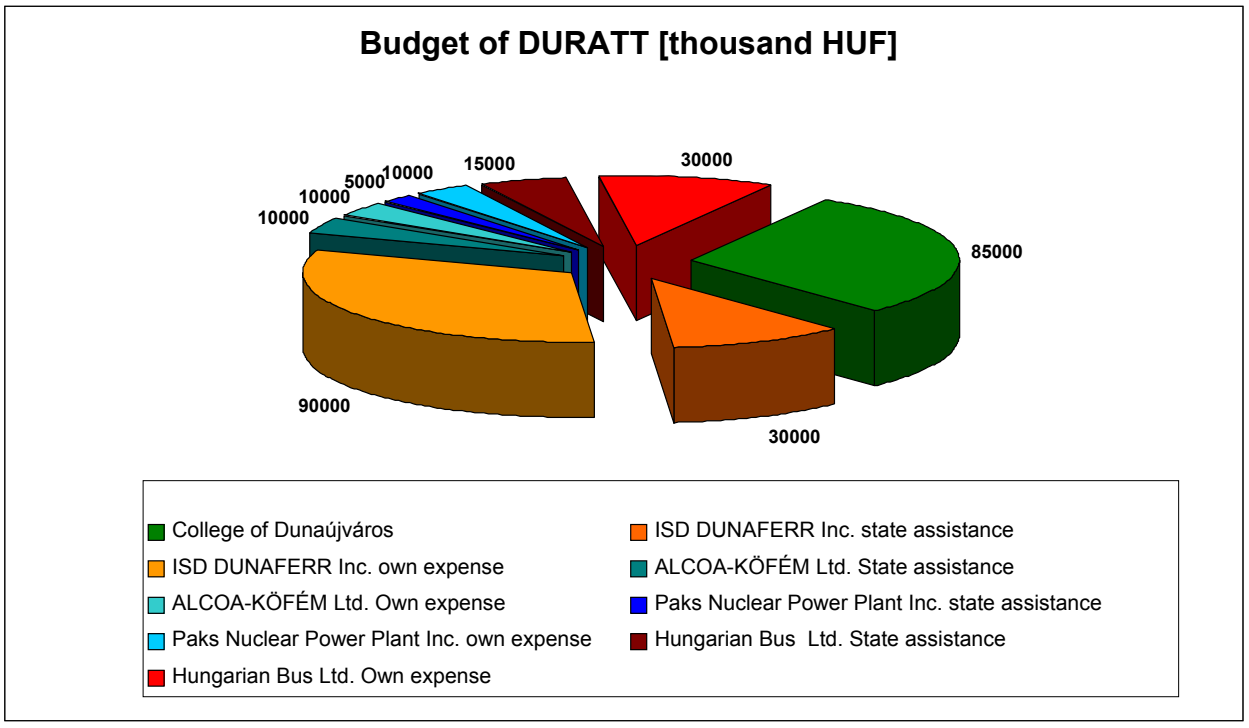


11. Accoplishment-indicator

Accomplishment-indicator		
Eredmény	**Actual**	**Planned**
Utilizable result of the project [pcs]		
Application	1	1
Prototype	2	1
R&D activity [pcs]		
publication		
Hungarian	11	10
International	1	5
Report	5	4
Human resources [fő]		
PhD-students	2	2
	2	3
Economic utilization		
Participants in the main activity [pcs]		
Number of research centers	2	1
Number of enterprises	5	4
Turnover surplus (thousand HUF)		
Come off as the result of the project	17 MFt	0

12. Financing, cumulate financial indicators





PROFESSIONAL REPORT
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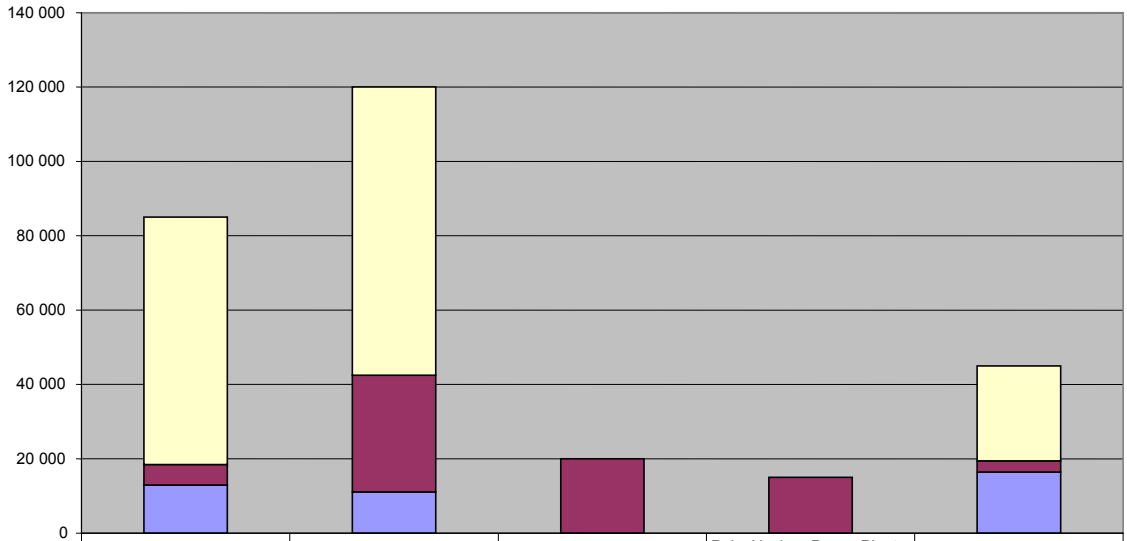
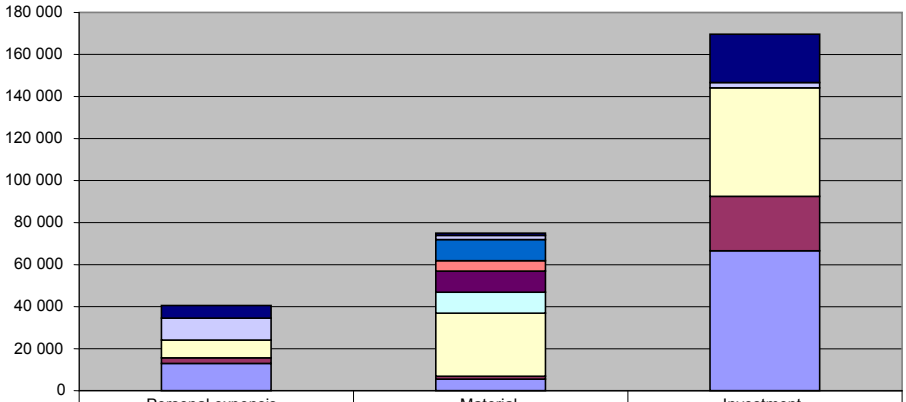
Utilization of resources per partners and cost types [thousand HUF]



	College of Dunaújváros	ISD DUNAFERR Inc.	ALOCA-KÖFÉM Ltd.	Paks Nuclear Power Plant Inc.	Hungarian Bus Ltd.
Investment	66 572	77 500	0	0	25 561
Material	5 472	31 410	20 000	15 000	2 997
Personal expensis	12 955	11 090	0	0	16 442

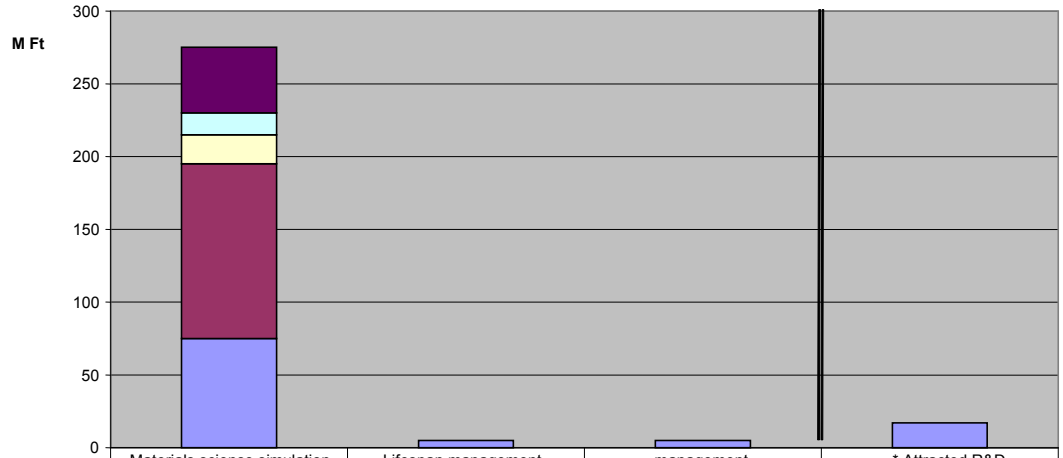
Utilization of resources per cost types and partners [thousand HUF]



	Personal expensis	Material	Investment
Hungarian Bus Ltd. own expense	6 020	980	23 000
Hungarian Bus Ltd. state assistance	10 422	2 017	2 561
Paks Nuclear Power Plant Inc. own expense	0	10 000	0
Paks Nuclear Power Plant Inc. state assistance	0	5 000	0
ALOCA-KÖFÉM Ltd. own expense	0	10 000	0
ALOCA-KÖFÉM Ltd. state assistance	0	10 000	0
ISD DUNAFERR Inc. own expense	8 400	30 000	51 600
ISD DUNAFERR Inc. state assistance	2 690	1 410	25 900
College of Dunaújváros	12 955	5 472	66 572

PROFESSIONAL REPORT
– PHASE 1. / 2007 / –

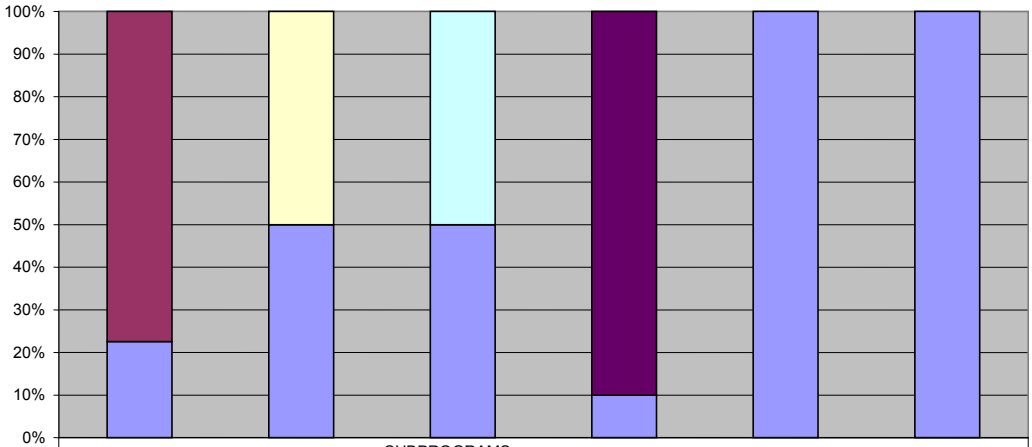
Distribution of project expenditure per activity per partner



	Materials sciense simulation	Lifespan management	management	* Attracted R&D
Hungarian Bus Ltd	45			
Paks NPP Inc..	15			
ALCOA-KÖFÉM Ltd.	20			
ISD DUNAFERR Inc.	120			
College of Dunaújváros	75	5	5	17

* Attracted R&D from the "RET additional financial resources" budget of ALCOA, RBHH and ISD DUNAFERR

Proportion of defrayal of consortion members



	SUBPROGRAMS					
	I. "DUNAFERR"	II. "ALCOA"	III. "PAKS"	IV. "Hbus"	Lifespan management	Management
Hungarian Bus Ltd.	0	0	0	45		
Paks NPP Inc.	0	0	15	0		
ALCOA-KÖFÉM Ltd.	0	20	0	0		
ISD DUNAFERR Inc.	120	0	0	0		
College of Dunaújváros	35	20	15	5	5	5

13. Abbreviations

DURATT	Dunaújvárosi Regionális Anyagtudományi és Technológiai Tudásközpont
ISD	Industrialnüj Szojuz Donbassa (Donbass Ipari Szövetség)
DF	Dunaújvárosi Főiskola
RBHH	Robert Bosch Elektronikai Kft.
DSI	Dynamic Syistems Inc.
ME/MLR-RET	Miskolci Egyetem/Mechanikai és Logisztikai Regionális Egyetemi Tudásközpont

14. Contact

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