



Annual report 2008

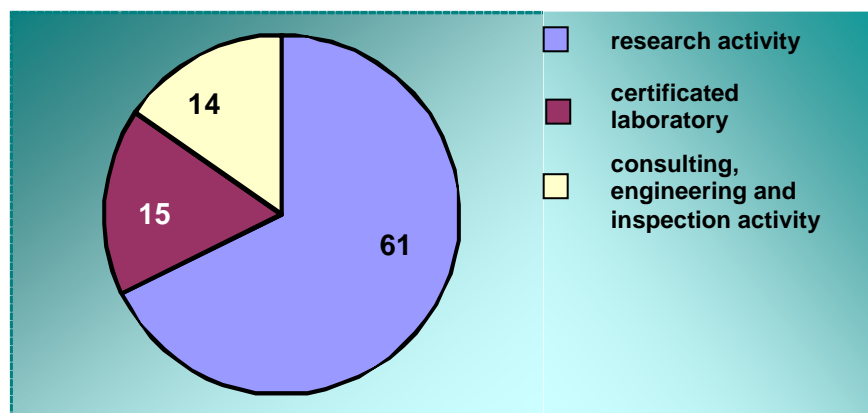
Activities of company

SVUOM Ltd., a private company pursues research, development, consulting, testing, expert reports, inclusive environmental ones, and other activities according to the demands of its clients. SVUOM Ltd. was founded in 1999 and it continues in research, testing, consulting and inspection activities of State Research Institute of Protection of Materials (1952 -1994).

The SVUOM Ltd. creates and implements research results within the fields of materials, process, products and production technologies from point of view of degradation, corrosion and corrosion protection. The international collaboration takes place with other institutes, universities, academia or companies where the EU programmes dominate.

SVUOM revenues come from a number of different sources:

- ▶ commercial activities - R&D activity for industry, testing, laboratory assessment, expertising, inspection, etc.. SVUOM Ltd. has many customers, a clear majority of them are small and medium-sized companies which cannot perform their own research resources.
- ▶ testing of climatic and corrosion resistance and physic-mechanical properties of materials and coatings in laboratory accredited according to standard EN ISO/IEC 17 025
- ▶ technical standardization, publication and lecturing,
- ▶ national projects – publicly financed long-term basic and applied research, primary initiated by the Ministry of Education, Ministry of industry, Czech Science Foundation, etc.,
- ▶ EU projects - R&D commissions for which financing is shared between the EU, industry and other research institutes.



Turnover per subsidiary - 2008

Projects and programmes

The national programmes represent around 55 per cent of activities of SVUOM Ltd. There are major multi-year programmes initiated mainly by the Czech Science Foundation, Ministry of Education, Ministry of Industry, etc., which concerns long-term basic and applied research and provide contacts between institutes, universities and industry.

The information of projects can be found on e.g. www.atmofix.cz, www.bestproduct.cz or www.svuom.cz.

VZ MŠMT 2579478701 Study of methods for specification of prediction of service life of metallic materials and their protective coatings in respect to effect of pollute compounds for environment (2004 - 2010)

Research is concern to quantification of the new effect on corrosion and degradation processes of materials and their protective coatings. The one aim of project is study of mechanisms of corrosion and corrosion-mechanical processes of materials in water environments or water solutions of salts, acids, alkalis and other chemical compounds. Other field of study is mechanisms and trends of atmospheric corrosion of metallic materials and protective coatings in multi-pollutant atmospheric environments. Combination of accelerated tests and field tests will

give the basis for prediction of service life of structural material and their protective coatings.



GA ČR 104/07/1637 Study of factors affecting properties and degradation mechanisms of organic coatings (2007- 2009)

The aim of project is studying of the selected degradation mechanisms of coatings, verification of testing methods and possibilities of using such components of coatings which could eliminate these degradation processes. The other task of the project is the elaboration of laboratory test methods to eliminate non-suitable types of high-solid coatings which could be degraded by diffusion high boiling compounds into atmosphere.

The special vacuum equipment had been assembled and samples of high-solid coatings tested in this method.



GA ČR 106/08/1789 Degradation mechanism of cold worked stainless steels in aggressive environments (2008-2010)

Increase of mechanical characteristics of austenitic stainless steels by cold deformation with possibility of application to high stress has a result in degradation by corrosion damage of those materials in more or less aggressive environments. Structural changes in dependence on degree of deformation with eventual martensitic transformation can induce susceptibility to initiation of local defects. In environments containing halide ions, sulphur compounds etc., metallurgical effects can participate in increased susceptibility of those materials to pitting corrosion and stress corrosion cracking. Due to localisation of corrosion attack all those processes and the studies of their mechanisms have a great significance for life and safety of high load bearing

constructions, including steel ropes, implants etc.

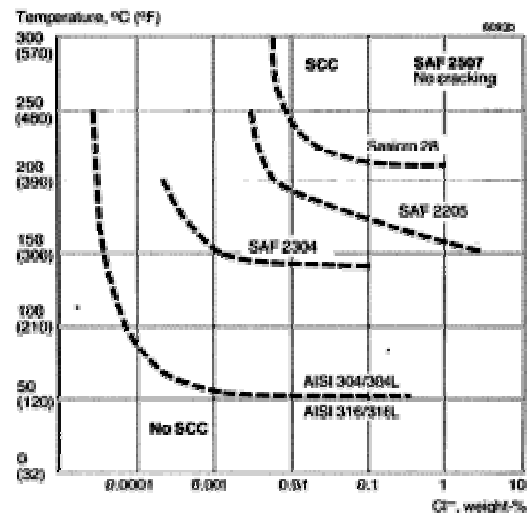
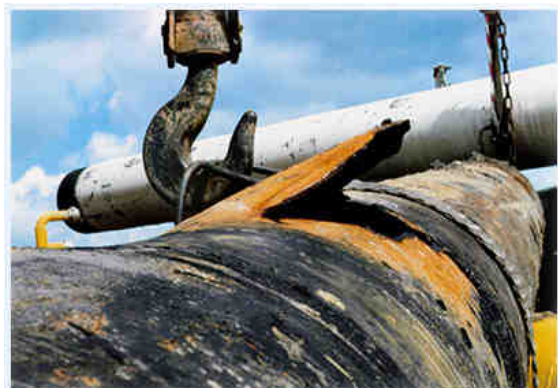


Figure 10 SCC resistance in oxygen-bearing (abt. 8 ppm) neutral chloride solutions. Testing time 1000 hours. Applied stress equal to yield strength of testing temperature.

MPO FT-TA4/095 Changes of rubber lining quality and monitoring methods due to service-life (2007 - 2009)

Research, of rubber coatings used for corrosion protection of industry technology under the destructive environment, monitoring of parameters which have describe changing of properties, during these lifetime and the suggest of process leading to improve on prediction of lifetime on the base of laboratory and industry operation (in-situ) measurement under different condition of destructive impact and cut back users expense. The database of investigating rubbers coatings will be realize with consideration on suitable application

for specific conditions of industry technology, including prediction of lifetime data.



MPO FT-TA5/076 Study of existing and newly developed weathering steels in respect to their usage for steel structures (2008 - 2010)

The project aim is the analysis of the stage of the existing steel structures made from weathering steels exposed for long-period in various environments and evaluation of the specific corrosion stress in areas which may affect service life of structures, microclimatic parameters of structures and defect and failure causes. The forming of protective patina layer, initial corrosion rate and other characteristics of weathering steels are analysed in significantly changed conditions of atmospheric environment in the Czech Republic. The output of project will create the base for actualisation of

technical standards, elaboration of software and maps for prediction of service life of weathering steels for new built and for existing structures.



MD 1F45B/024/120 Method of Measurement of Reinforcement Embedded Steel Corrosion Rate (2004-2008)

The well-known and usually adapted potential mapping technique measuring half-cell potentials on concrete surface leads to some misinterpretation especially in structures placed in wet environment. In order to avoid these problems additional polarization technique can be used. The method of polarization resistance measurement called galvanostatic pulse technique is usable in field conditions such as concrete bridge decks. The results of these measurements can be performed, when the half-cell potential are difficult to interpret. For good practical exploitation get past detailed

investigation of factors that have can results distorted and suggest of steps, that would distortion of results in comparison with real state eliminate or reduce.





The international programmes, primarily within the European collaborative venture, give SVUOM specialists the opportunity to share the latest progress in the field of corrosion and corrosion protection research – new materials, technologies, methods of evaluation, etc. This also applies to international standardisation contexts where SVUOM is an active participant.



UN/ECE ICP on Effect on Materials Including Historic and Cultural Monuments (since 1987)

SVUOM participates as sub centre for structural metals and corrosivity trends. The work of the sub centre represents the periodical evaluation of the corrosion effects, statistical analyses for corrosion effects and environmental variables, trend analyses, quantitative evaluation of the effect of pollutants on the atmospheric corrosion of structural metals.

In 2008 the new exposure of structural metals and other basic materials had been started to study the trends in

changes of air pollution, atmospheric corrosivity and the effect on materials.

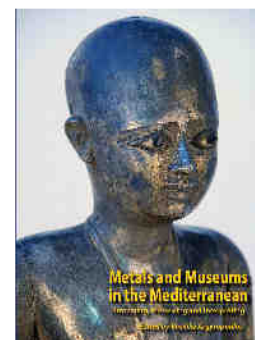
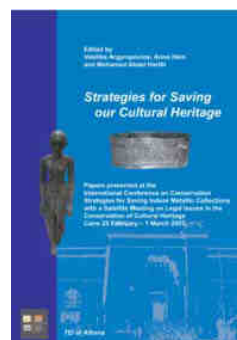


PROMET *Developing New Analytical Techniques and Materials for monitoring and protecting metal artefacts and monuments from the Mediterranean region* (6 RP EU INCO No 509126) (2005 - 2008)

The project aims onto study of degradation of metallic museum artefacts and their protective systems including indoor atmospheric corrosivity. The project was in the Czech Republic realized with co-operation of National Museum, department of Prehistory, and concerned on copper and bronze museum artefacts.

The results of project had been published in 2008 in the proceedings of the *International Conference on Conservation Strategies for Saving Indoor or Metallic Collections / Legal Issues in the Conservation of Cultural Heritage* and book *Metals and Museums in the Mediterranean* had

been published and distributed in participating countries. The results of SVUOM's research in this project had been incorporated mainly in Chapter 7 *The search for new and safe materials for protecting metal objects, pp. 179-235.*



BESTPRODUCT - TENEEEST Through a European Network on Environmental Engineering Sciences and Technologies (Σ! 3517 Eureka) (2007 - 2010)

This project aims to concentrate capacities, expertise and know-how by clustering researchers, engineers and industrialists involved in environmental engineering. This network will allow the creation of a virtual competence centre in which information and know-how can be shared so that environmental engineering especially in the life cycle prediction methods will improve and that new engineers and researchers can be trained in that technology.

In this project SVUOM Ltd. Participates with Czech Technical University, Faculty of Electro technology on study of various methods of accelerated tests, mechanisms of long-term degradation of materials and surface

treatments, etc. in various operating conditions. The results of some solved problems had been published in special guidelines.



Collaboration with colleges, universities and other bodies

A wide range of contacts has been built up since many projects involve collaboration with the academic world as well as industry. SVUOM Ltd., and/or its employees personally, take part in national and international networks with colleges, universities, institutes, companies, and other bodies in various fields of activity.

SVUOM's specialists co-operate with universities (e.g. VSCHT Prague, CVUT Prague, VŠB- TU Ostrava, TU Bratislava, VŠ Košice) in frame of research projects and as lecturers in various type of postgraduate and special courses. Some students of technical universities elaborated their diploma studies and papers under supervision by SVUOM's specialists.

SVUOM and its specialists are members of European Federation of Corrosion (EFC), NACE International (National Association of Corrosion Engineers), Association of Corrosion Engineers (AKI) Association of Museums' Specialists (AMG). In the field of corrosion problems and corrosion protection SVUOM's specialists co-operated with many associations (Czech Association for Galvanizing, Czech Society for Surface Treatments, Czech Association of Scientific and Technical Societies).

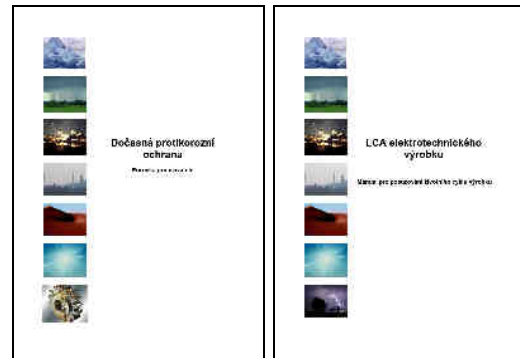
Publications

In 2008 SVUOM's specialists presented results of their research on many national and international conferences and in national and international journals, e.g.:

- V.Číhal, E.Kalabisová, R.Štefec, L.Turek, Corrosion Damage of Compressor Blades from Grade 14Cr17Ni2 Stainless Steels, 6th European Stainless Steel Conference Proceedings, ISBN 91-974131-9-4, pp. 157-163, Helsinki, Finland
- M.Melcher, M. Schreiner, K. Kreislova, Artificial weathering of model glasses with medieval compositions – an empirical study on the influence of particles, Phys. Chem. Glasses, Eur.J.Glass Sci. Technol. B., December 2008, 49 (6), 346-356
- T.Kubatík, D.Vojtěch, E.Kalabisová, V.Číhal, Effect of heat treatment on anodic behaviour of Ti-Al-Si layers in physiological solution with fluoride additions, proceedings of First Regional Symposium on Electrochemistry of South-East Europe, ISBN 978-953-6894-33-8, Croatia, 2008
- K.Kreislová, D.Knotková, Příčiny koroze titan-zinkových prvků stavebních objektů, Konstrukce, Vol. 7, No.1/2008, str. 20-23
- D.Knotková, K.Kreislová, I. Skořepová, Korozní agresivita atmosféry jako podklad pro odvození životnosti konstrukčních materiálů a povrchových úprav, X. konference OCELOVÝCH KONSTRUKCÍ 2008, 29. – 30. 4. 2008 Státní léčebné lázně Karlova Studánka
- J.Benešová, K.Kreislová, A.Lomozová, J.Kvapil, Korozní odolnost povrchových úprav proti působení chemických rozmrazujících látek, Sborník XI. konference AKI, 14.-16.10.2008, Harrachov
- K.Kreislová, H.Geiplová, Koroze a protikorozi ochrana ve stavebnictví, sborník příspěvků konference Zkoušení a jakost ve stavebnictví 2008, 20.-21.10.2008, Praha, str. 181-189, ISBN 978-80-01-04123-9
- K.Kreislová, J.Benešová, Porovnání režimů urychlených korozních zkoušek používaných v automobilovém průmyslu, sborník přednášek, 50. Mezinárodní galvanická konference, 3. – 4. června 2008, Smolenice, Slovenská republika
- K.Kreislova, B.Eremias, L.Kopecky, M. Smetana, The specific corrosion behaviour of zinc-nickel alloy coating used for vehicle components, Sborník přednášek konference EUROCORR 2008, 7-11.9.2008, Edinburg, UK
- K.Kreislova, M.Halama, D.Knotkova, J.Van Lesebetsens, Atmospheric corrosion of structural metals – methods of prediction of corrosion attack, Sborník přednášek konference EUROCORR 2008, 7-11.9.2008, Edinburg, UK

In 2008 SVUOM Ltd. published special guidelines for industrial praxes:

- Temporary corrosion protection (ISBN 978-80-903933-1-8),
- LCA of electrotechnical products - Manual for assessment of life cycle of products (ISBN 978-80-903933-2-5).



In co-operation with Czech Standard Institute (CSN) had been published special issues in 2008:

- Guidelines for selection of protection methods against atmospheric corrosion (ISBN 978-80-7283-252-1),
- Survey of methods for thickness measurement (ISBN 978-80-7283-251-4).



Structure of company

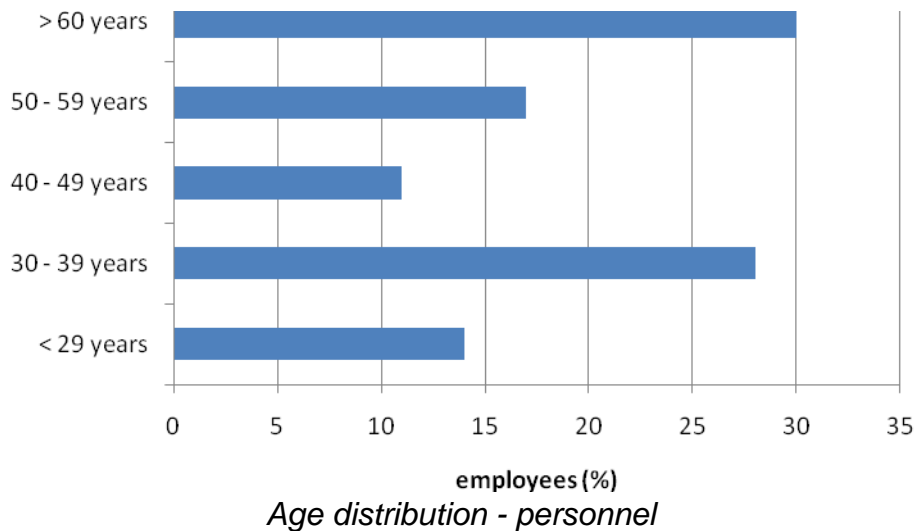
The commercial and research activities are solved in special divisions of company:

- division of atmospheric corrosion,
- division of corrosion engineering,
- division of organic coating,
- division of inspection,
- certificated laboratories.



Employees and competence

The most important asset of a knowledge-based institute like SVUOM is its intellectual capital. In 2008 the SVUOM Ltd. had a total of 35 employees from which 24 have university degree including 1 professor and 3 doctors. There is even distributing of the sexes (53 % of employees are women).



SVUOM's specialists are members of international and national TC of standardization organizations (ISO, CEN) and active participate on elaboration of technical standards in the field of corrosion and corrosion protection specification and testing.

SVUOM's specialists are certificated as corrosion engineers and corrosion technologists according to Std- 401 APC.

SVUOM specialists are nominated by Ministry of Industry and Ministry of Environment as members of EU TWG for preparation BREF documents in categories 2.6 *Installations for the surface treatment of metals and plastics using an electrolytic or chemical process where the volume of the treatment vats exceeds 30 m³* and 6.7 *Installations for the surface treatment of substances, objects or products using organic solvents with a consumption capacity of more than 150 kg per hour or more than 200 tonnes per year.*

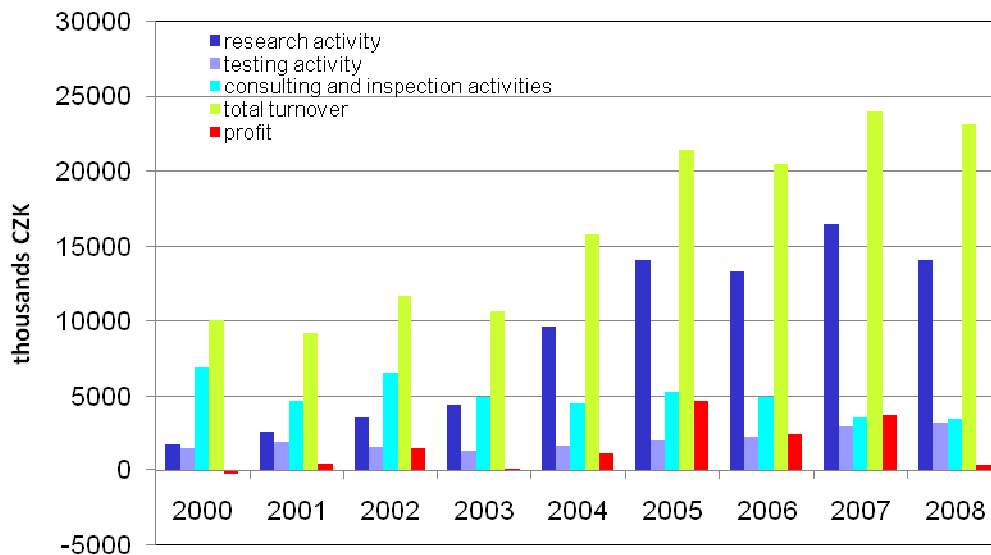
Economy

Survey of economy (in thousands of CZK)

Balance sheet	2005	2006	2007	2008
financial assets	9 032	10 857	16 857	16 790
tangible fixed assets	1 142	7 486	7 355	6 787
debtors due within one year	1 637	1 422	2 167	3 083
cash at bank	5 437	528	7 282	6 887
subscribed capital	5 197	6 568	9 044	400

During the autumn 2008 the downturn of Czech economy affected SVUOM's customers and the number of testing and inspection cases from industry decreased. It had a significant effect on SVUOM profit.

Long-term economy tendency



The SVUOM Ltd. does not distribute its profits, i.e. the financial results arising from the company business shall be re-invested in the company concerned. In 2008 the many new instruments and equipments had been purchased to improve the quality of corrosion and protective coatings measurement, e.g. new Gamry potestostat had been purchased for the electrochemical study of metallic materials for Corrosion Engineering Division.