


SVÚOM PRAHA

Annual report 2007

Activities of company

SVUOM Ltd., a private company pursues research, development, consulting, testing, expert accounts, 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:

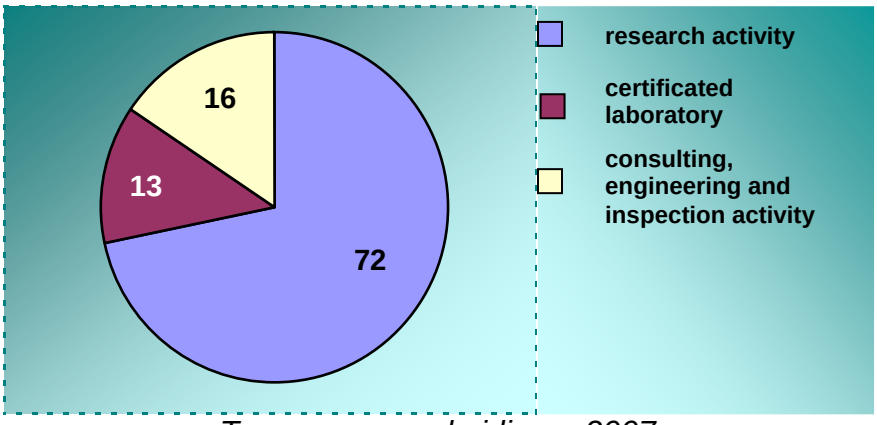
- commercial activities - R&D activity for industry, testing, laboratory assessment, expertising, inspection, etc.. SVÚOM Ltd. has many customers, a clear majority of them are small and medium-sized companies which cannot perform their own research resources.

- testing of climatic and corrosion resistance and physic-mechanical properties of materials and coatings in laboratory accredited according to 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. In each year SVUOM Ltd. spent ca 200 – 250 thousands CZK on own research to open the new problems in corrosion and corrosion protection.



Turnover per subsidiary - 2007

Projects and programmes

The national programmes represent around 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.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.

MPO FT-TA/047 Optimalization of material selection and application of corrosion protection principles for technological equipments and products (2004-2007)

The research of corrosion properties of materials and optimalization their selection, the proposal of service control system and methods of surface protection testing, the technology research of selected sorts of surface protection of metal intermediate products and samples of corrosion protection on selected significant sectors of economy. In the project 10 participants from industry and technical universities co-operated with SVUOM. The project solved actual problems of industry.

The copper sheet corrosion

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.

Damage of rubber coating on buried pipe

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.

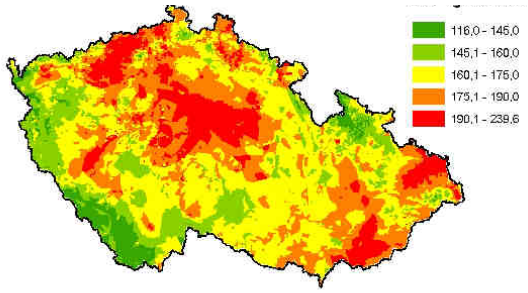
The international programmes, primarily within the European collaborative venture, give SVÚOM specialists the opportunity to share the latest progress in the field of corrosion and corrosion protection research – new materials, technologies, methods of evaluation, etc. This also applies to international standardisation contexts where SVÚOM 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 which 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 2007 the database from previous exposures had been statistical treated to improve the dose/response functions for calculation of corrosion rate of structural metals. The trend in atmospheric corrosivity had been estimated for Czech republic´s area.

Map of yearly corrosion rate of carbon steel (g.m^{-2})



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)

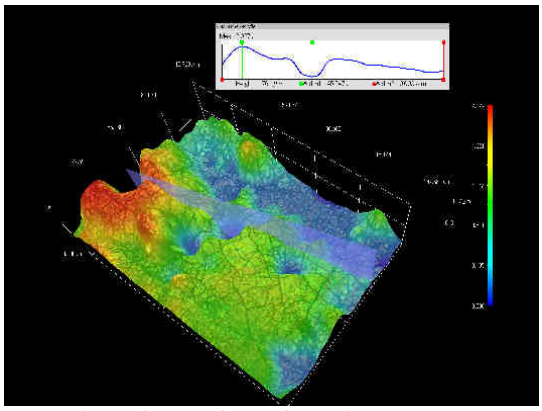
The project aims onto study of degradation of metallic museum artefacts and their protective systems including indoor atmospheric corrosivity. The project was in the Czech Republic realized with co-operation of National Museum, department of Prehistory, and concerned on copper and bronze museum artefacts.

The exposure of bronze samples in National Museum Depositary had been performed and protective coatings for bronze had been tested by real and accelerated exposures. The results had been presented on international conference in Cairo.

BESTPRODUCT - TENEEST 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 centre in which information and know-how can be shared.

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. In 2007 one of solved problem was the corrosion behaviour of alloy electrodeposited zinc-nickel coating.



Defects in ZnNi coating after exposure at corrosion tests – cracks and pits

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. SVÚOM 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 lectors 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.

SVÚOM 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).

In 1.- 4.10.2007 SVUOM Ltd. hold 1st International Conference Corrosion and Material Protection in Prague (EFC event No. 294). The program consisted of plenary and keynote lectures, oral presentations and poster contributions. Ca 150 participants from 26 countries took part in this conference and ca 50 papers had been presented. Some of papers were covered the topic of application of modern analytical methods for study of corrosion processes and efficiency of corrosion protection. The part of conference was the poster session with 35 posters. The cultural programme of conference included the Prague sight-seeing trip and trip to Kutna Hora.



The commercial activity of SVUOM Ltd. had been presented on trade fair For Surface, 11. – 13. 4.2007, Prague – Letnany. Total number of exhibitors was 223. The trade fair was important opportunity to show the services which SVUOM Ltd. offer – certificated laboratory testing, expertises, inspections, etc. The event had been visited by more than 8 000 visitors mainly from industry.

Publications

In 2007 SVUOM´s specialists presented results of their research on many national and international conferences and in national and international journals, e.g.:

- D. Knotkova, K. Kreislova, B.Kreibichova, I.Kudlacek, Indoor corrosivity in the National Museum Depositary, proceedings from International Conference on Conservation Strategies for Saving Indoor Metallic Collection, 25 February – 1 March 2007, Cairo, ISBN 978-960-87753-7-4, str. 64-71

- C. Degrigny, V. Argyropoulos, P. Pouli, M. Grech, K. Kreislova, M. Harith, F. Mirambet, A. Karydas, A. Arafat, Z. Al Saad, E. Angelini, G. Ingo, P. Vassiliou, E. Cano, N. Hajjaji, A. Almansour, P. Letardi, The methodology for the PROMET project to develop/test new non-toxic corrosion inhibitors and coatings for iron and copper alloy objects housed in Mediterranean museums, METAL'07, 17 - 21 September, 2007, Amsterdam, the Netherland

- Kreislová K., Eremiáš B., Kopecký L., The effect of various corrosion factors on behaviour of zinc-nickel alloy coating, 1th International Symposium ETE'2007, Brussel, Belgium

- B. Eremiáš D. Převorovský , V. Janík, J. Faltus, Chemical composition of new copper alloys for machining and its effect on their susceptibility to corrosion cracking, Materials and Corrosion, Vol 58, No 9 , pp 671 – 748, October 2007

- Kucera V., Tidblad J., Kreislova K., Knotkova D., Faller M., Reiss D., Snethlage R., Yates T., Henriksen J., Schreiner M, Melcher M, Ferm M, Lefèvre R.A., Kobus J. UN/ECE ICP Materials Dose-response Functions for the Multi-pollutant Situation, Water, Air, & Soil Pollution: Focus, Vol. 7, No. 1-3, March 2007, ISSN 1567-7230, pp. 249-258

- D.Knotkova, K.Kreislova, Changes in corrosion rates in atmospheres with changing corrosivity, proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

- V.Číhal, Z.Krhutová, J.Mika, E.Kalabisová, S.Lasek, M.Blahetová, M.Beránková, Metallic Answeres for FGD Systems, proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

- B.Eremiáš, V.Číhal, E.Kalabisová, V.Janík, Kinetics Parameters of Pits Nucleation for High-Alloyed Stainless Steels and Alloys in the Environments Modelling Waste Water Treatment of Flue Gas Desulphurization Plants, proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

- J.Racek, E.Kalabisová, M.Hubišková, Importance of Oxygen and Carbon Groups in Rubber Linings Service Lifetime, proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

- M.Blahetová, S.Lasek, V.Číhal, R.Blaheta, Computer Modeling of Stress Corrosion Cracking during Drop Evaporation Test (DET), proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

- V.Číhal, M.Blahetová, E.Kalabisová, Z.Krhutová, S.Lasek, Electrochemical Polarization Reactivation Method – EPR Test Evaluation, proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

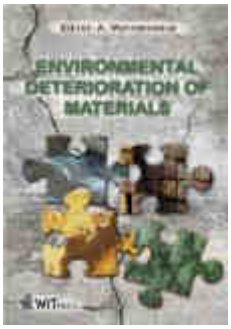
- M.Poddaná, V.Číhal, E.Kalabisová, Corrosion of Stainless Steel in Fluoride Environment, proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

- T.Kubatík, D.Vojtěch, E.Kalabisová, V.Číhal, Influence of Fluoride on Stability of Ti-Al-Si Layers, proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

- H.Geiplová, K.Kreislová, R.Wasserbauer, The effect of Biological Sediment on the Durability of Paint Systems, proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

- J.Benešová, M.Svoboda, M.Paráková, M.Zakucia, Possibility of Prediction of Paint Systems Efficiency Based on the Laboratory Test Results, proceeding 1st international conference Corrosion and material protection, ISBN 978-80-903933-0-1, 1.- 4.10.2007, Praha

- K. Kreislová, D. Knotková, J. Benešová, M. Zakucia, Atmospheric corrosion and corrosion protection of aluminium, proceeding 5th international conference Aluminium 2007, ISSN 1335-2334, 10 – 12.10.2007, Doksy – Staré Splavy, str. 212-219



In 2007 the book *Environmental Deterioration Of Materials* had been published by WIT PRESS, UK (ISBN 978-1-84564-032-3).

This book deals with the fundamental principles underlying environmental degradation of construction materials such as metals, stone, brick, concrete, timber, cast iron, steel, copper alloys and aluminium. It features information on the methods of deterioration, as well as general information on the economic impact of the damaging processes, and offers some suggested fundamental protection techniques for buildings, industrial and agricultural facilities, monuments and culturally important structures.

SVUOM´s specialists D.Knotkova and K.Kreislova prepared Chapter 3 and Chapter 4 - atmospheric corrosivity in general and corrosion behaviour of copper and bronze.

Structure of company

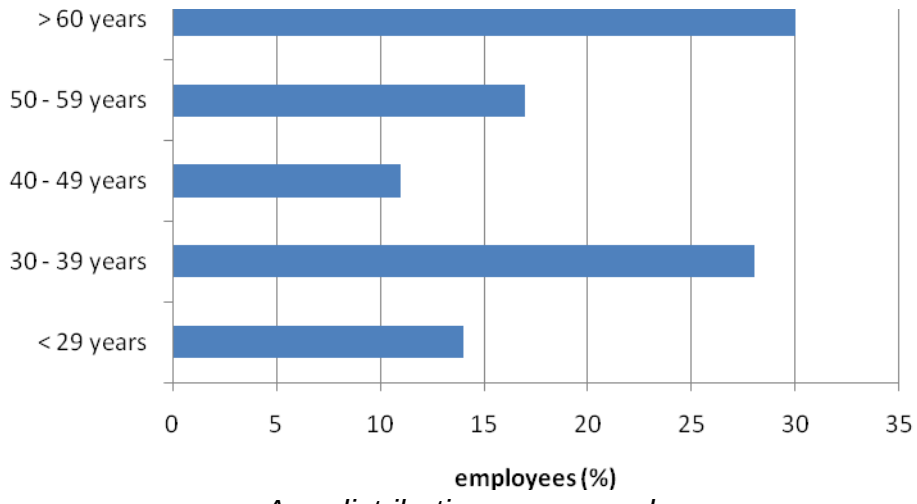
The commercial and research activities are solved in special divisions of company:

- 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 SVÚOM is its intellectual capital. In 2008 the SVÚOM had a total of 32 employees from which 24 have university degree including 1 professor and 2 doctors. There is even distributing of the sexes (53 % of employees are women).



Age distribution - personnel

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 m*^{3} 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.*

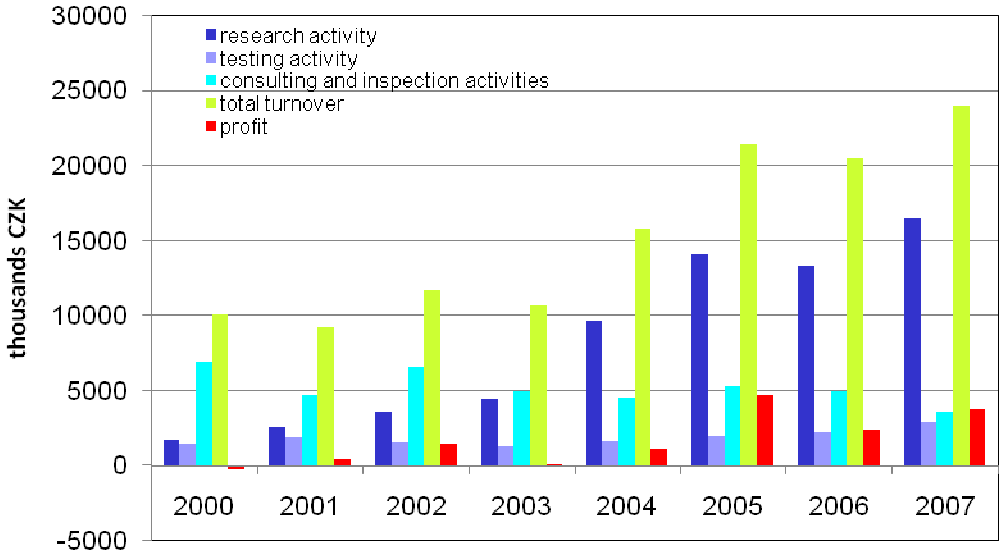
Economy

Survey of economy (in thousands of CZK)

Balance sheet	2004	2005	2006	2007
financial assets	793	9 032	10 857	16 857
tangible fixed assets	969	1 142	7 486	7 355
debtors due within one year	952	1 637	1 422	2 167
cash at bank	3 116	5 437	528	7 282
subscribed capital	2 016	5 197	6 568	9 044

During the autumn 2007 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 2007 the many new instruments and equipments had been purchased to improve the quality of corrosion and protective coatings measurement, e.g. new salt spray fog chamber and optical microscope had been purchased for the corrosion testing for Certificated Laboratory.