

Visit to the Swedish research institute in materials science and engineering (SWEREA)

CEREM have arranged a visit to Swerea, a Swedish research institute in materials science and engineering, to explore the possibility of research collaboration between them. Swerea is an R&D institute that provides advanced services to the international market within the sector of materials, process, products, and production technology. The Swerea vision is to create business growth as well as public good, by developing new knowledge in collaboration with universities and industry. R&D within the Swerea Group is carried out by four separate business units: **IVF** (Production Engineering, Fibres, Polymers and Ceramics), **KIMAB** (Corrosion and Metals), **SICOMP** (Composites) and **SWECAST** (Foundry). In 2007, total turnover was approx. SEK375m (~ M€45). The Group employs approximately 350 people. Swedish industry is deeply involved in the Institutes, both as customers and as owners. 600 Swedish companies, ranging from small and medium sized enterprises to the largest industrial groups in the country, are represented in Swerea. For the time being, the Swedish government is the majority shareholder (49 %) acting through its holding company IRECO. The research institutes are located throughout the country, mainly in and around Stockholm, Göteborg, Jönköping och Piteå; smaller units are located in Brest, France and Kaunas, Lithuania.

IVF (Production Engineering, Fibres, Polymers and Ceramics):

The role of IVF is to survey areas of interest and keep an ongoing dialogue with its industrial partners to identify current R&D needs. The projects initiated usually have a mixed funding and a partnership with industrial partners as well as other R&D actors. Swerea IVF stands for integration. By utilizing a variety of global research results and integrating these with current experience, one can create solutions that improve the competitive strength of their customers. Key areas are product development, production systems and process optimization within manufacturing. Each project aims at improved economy, enhanced performance, shorter lead-times and better sustainability. Swerea IVF's overall research objective is to empower industry to an early use of new opportunities.

KIMAB (Corrosion and Metals):

Research and development work takes place in close collaboration with Swedish and international companies within the steel, metals, electronics, engineering, paper, vehicle, manufacturing, plastics and power industries. Area of research includes High-resolution FEG-TEM equipped with EDS and EELS, Analytical FEG-SEM equipped with EDS and WDS, High-resolution FEG-SEM equipped with EDS and EBSD, and state-of-the-art systems for Scanning Probe Microscopy, spectroscopy and nano-manipulation Combined FIB/ FEG-SEM equipped with EDS and EBSD and tools for micro-manipulation.

SICOMP (Composites)

Swerea SICOMP focused on manufacturing and design of composite materials. They have resources and competence in both Piteå and Mölndal to conduct research, product development and training. The laboratory is well equipped with full scale production and testing equipment. Both chemical and mechanical testing is available. Processes include LCM - Liquid Composite Moulding (RTM, Vacuum bag infusion etc.), Filament winding and Compression moulding. For cutting of reinforcement we have invested in a computer controlled Gerber cutting machine. Swerea SICOMP participates in several national and European research programs where they provide leading edge competence in the composite field. Their extended network of research organisations and composite companies throughout Europe is a valuable resource when finding new partners. Examples of current projects are:

European projects:

- VITAL, Environmentally friendly aero engine
- Nanofun-Poly, NoE for nanocomposite materials
- Noesis, nanocomposite materials
- CESAR, Cost Effective Small Aircraft
- DE-LIGHT – Development of Lightweight Modules for Transport

National projects

- Natural based fibre composites
- Light-weight design and materials
- Network projects
- National Aerospace program
- National Vehicle Research program

SWECAST (Foundry)

SweCast, Swedish Institute of Casting Technology, is the R&D and training institute of the Swedish casting industry. SweCast and Jönköping Technical University maintain a close cooperation within CIC, Casting Innovation Centre. CIC constitutes the largest single group of researchers in Europe working with foundry technology and related topics. The Swedish Foundry Association, SFA, is the Swedish casting industry's trade organization and has approximately 180 member companies. The SFA has more than 40 employees working in close cooperation with the member companies and their customers. Among these we can mention Volvo, Scania, Alteams, Husqvarna, Hydro, SKF, Finnveden, ITT Flygt, Vestas, Keycast, Metso, Sandvik and many others.

Discussions for possible collaboration between Swerea and Cerem especially in developing ways and means on how to work more closely with industrial problems and the industry itself where focus will be related to the Excellence Centre and activities regarding applications involving metallography, casting technology, and composites in a broad sense.

Earlier discussions were concerned about how to start up an institute and the following tasks are required:

1. Market analysis.

Interview phase to identify the need for applied research of selected industries through contacts with the Management of these companies.

2. Analysis of the competence of the University.

Mapping phase of competences at the University which can support the Institute/Center with educated staff and equipment.

3. Selection of Strategic Research Areas of the Institute/Centre

Based on the results of 1 and 2 a Vision and Strategy of the Institute/Centre will be formulated with focus on selection of Strategic Research Areas.

4. Selection of Legal status of Institute/Centre

A step wise process starting with Project phase inside University is the fastest way to get started. Finally an Institute organization outside the University might be selected in the long term.

5. Formulation of joint Research programs of Institute/Centre and selected industries.

Possibility of international cooperation. Formulation of technical targets, contents of programs and time plans.

6. Financing of Programmes,

7. Formulating organisation of Institute/Centre

8. Recruiting management of Institute/Centre.

9 Management of Institute/Centre and start up of Programmes.