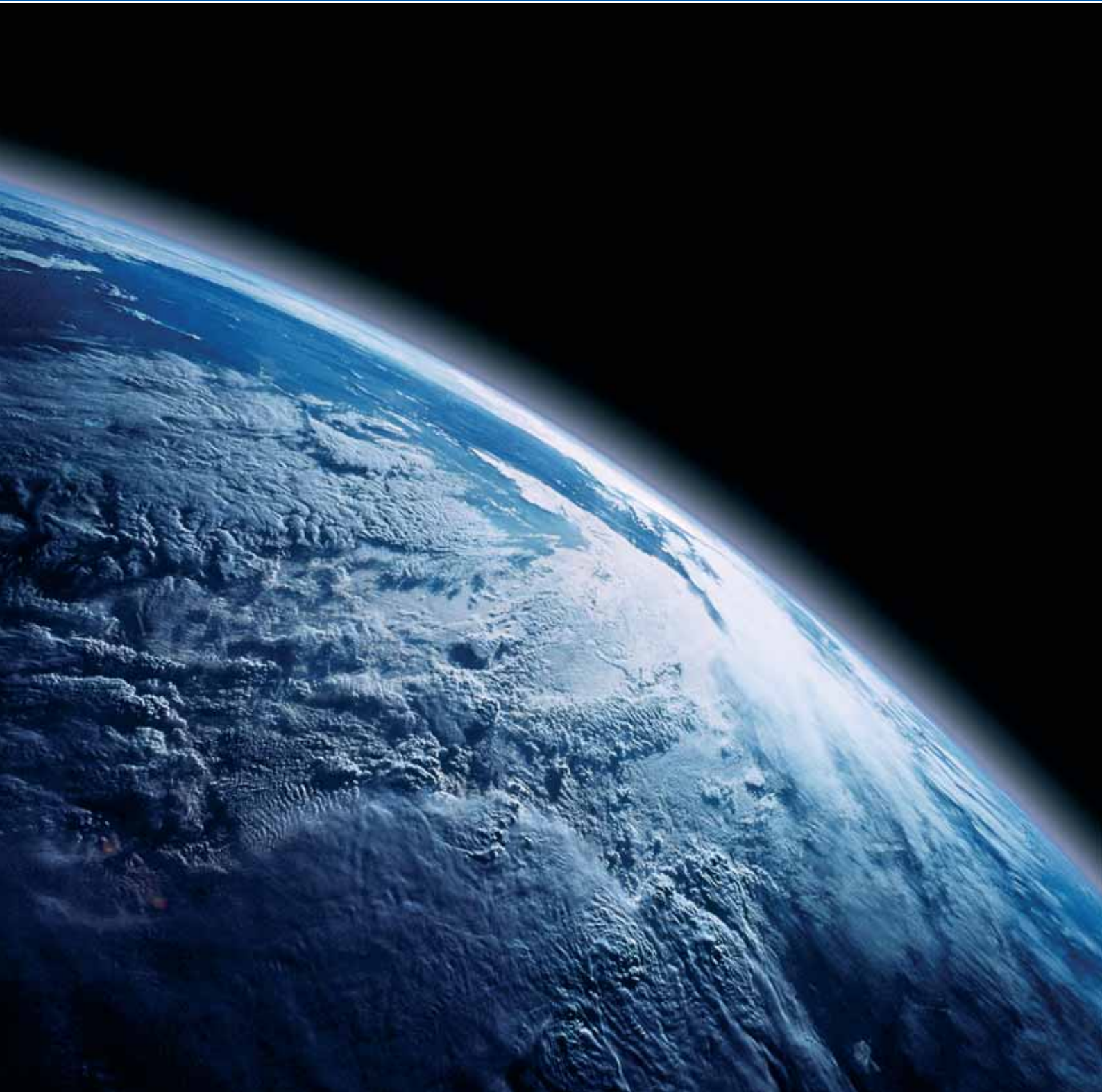




Annual Report | **2007**



The Year in Brief

New CEO installed

Maria Khorsand took over as SP's new Chief Executive Officer on 1st October, when Claes Bankvall retired. With a number of other management posts behind her, primarily within Ericsson, Maria Khorsand's most recent post was as managing director of Dell Sweden.

Improved profits

Group turnover increased from SEK 749 million to SEK 760 million, due mainly to new large projects and centres of excellence. Profit after financial charges amounts to SEK 13.9 million, an improvement of SEK 1.8 million over the previous year. Return on capital amounts to 2.7 %, as against the target of 4.0 %. This shortfall is due entirely to problems in SP's subsidiary company, SIK, which made a loss of SEK 13.0 million. During the autumn, SIK has started an extensive programme of corrective actions.

I-centres up to speed

Our three new Institute Excellence Centres – CODIRECT (Controlled release of active substances) at YKI, EcoBuild (eco-efficient and durable wood-based materials) at SP Träteck, and Waste Refinery (energy recovery from waste) at SP Energy Technology – have started their work. The aim is to create internationally recognised research environments in areas important for the future competitiveness of Swedish industry.

Closer links with universities

We are working actively in about 15 of the centres of excellence operating at Swedish universities, such as BIOMATCELL (Sahlgrenska Academy at the University of Gothenburg), Chase, Charmant and Supramolecular Biomaterials (Chalmers University of Technology), VINNEX iPack Centre (the Royal Institute of Technology) and EXCELENT (the University of Stockholm). They provide significant enhancement of our research environments. New cooperation agreements have been reached during the year with Chalmers Energicentrum, Växjö University and Lund Institute of Technology.

Innovation in small companies

We have further developed our services to small and medium-sized companies, mainly in the field of innovative products and processes. Contacts are established through our technology brokers and

links with various regional development organisations. We have initiated, and participate in, a number of feasibility studies and projects within the Vinnova 'Research & Grow' programme.

New name and new web site

SP changed its name at the beginning of the year, accompanied by a new logotype and new graphic profile, in order to mark the changes that the group has undergone in recent years. It represented the start of active communication incentives to strengthen the SP trade mark. This was followed in the spring by the launch of our new web site, www.sp.se which, during its first six months, received almost half a million visits.

A new subsidiary in the group

On 8th January 2008, SP and the CBI Foundation transferred their respective activities in the field of cement, concrete, ballast and natural rock to a new jointly owned company, CBI Betonginstitutet AB. SP owns 60 % of the new company, and the Foundation owns 40 %. CBI's and SP's activities complement each other well, to produce an institute having international competitiveness. The new company has about 60 employees, in Stockholm, Borås and Lund.

A new institute sector takes shape

There is now broad agreement on the financing of Sweden's research institutes, and the role that they play in the innovation system. The government has published its action plan for a new institute sector in the IDA Group report No. Ds 2007:39. The necessary conditions for bringing SP within the remit of the new holding company will be investigated during the rest of the year, with the aim of making the change on 1st January 2009.

Key figures

	2007	2006
Net revenue (SEK million)	760	749
Profit after financial items (SEK million)	13,9	12,1 ¹⁾
Number of whole-year employees	779	780
Return on shareholders equity (%)	2,7	2,0
Investments (SEK million)	44,5	50,2

¹⁾Excluding the sale of SIK Fastighetsbolag AB.

◀ Cover photograph: Since 2007, SP Measurement Technology has participated in a Vinnova-financed project to investigate climate change by measuring water vapour in the atmosphere by satellite-based methods.

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CEO's Statement

An exciting start

I took over as Chief Executive Officer (CEO) of SP in October after Claes Bankvall, who reached retirement age. My first three months at SP have been remarkably stimulating and interesting. I have tried to devote as much time as possible to meeting members of staff, customers and research financiers. SP is highly rated – our customers and clients rely on us, and believe our services are of high quality. Among our staff, I have met at the first hand great competence and engagement that runs through every part of SP. All this has confirmed my view of the SP Group as an extremely strong company. We have many strengths, on which we shall continue to build upon in order to become even better and stronger.

One of these strengths is competence. We possess a unique collection of knowledge – of international leading-edge quality in many areas – from which our customers benefit as a result of the interaction between research, technical development and testing. By consciously continuing to develop our competence and knowledge on the basis of our customers' needs, and by developing our own staff and our services, we shall become an even better partner in the innovation process.

Another strength is presented by our technical span, which is unique among the Swedish research institutes. We have a number of profile working areas in order to meet the needs of business and of the wider society – profile areas in which we bring together knowledge from various parts of SP and create very strong research environments. They are, in turn, controlled and developed by the signals we receive from the market and from our customers. We are also developing our links with other institutes and universities.

SP's 9000 customers, too, are a major source of our strength. We see relationships with our customers as long-term. We work to understand their needs and constantly to be one step ahead. It is here that our various sector councils and interest groups play an important part. In addition, we see our large customers, having international activities of their own, as offering a major potential for expansion. An example of this is given by our work with Japan, which has been developed during the past year, bringing together SP Tråtek's cooperation with universities, regional organisations and industry in northern Sweden. In 2007, our export invoicing accounted for 19 % of our revenue: a high figure for a research institute, but one that we intend to make even higher.

Another subsidiary company

Just before the end of the year, agreement was reached on a merger between SP's activities in the field of concrete and CBI, to form the new CBI Betonginstitutet AB, which will be a new, strong part of the SP Group. This is a logical move, for two already strong parties in the cement and concrete field to come together to create a broader customer base and a wider range of services. The result will be even better value for our customers and others with whom we work in the academic field. In addition, the merger further boosts our presence on Campus KTH (Campus Royal Institute of Technology), through SP Tråtek, YKI and now CBI – a total of about 130 of the group's 868 staff.

New institute structure

As far as SP is concerned, the new institute structure that is taking shape through mergers of institutes, and the move towards a new state-owned holding company that is expected to take over ownership of SP from 2009, means that we should be even better placed



to maintain and consolidate our leading-edge competence. The changes should also strengthen our international competitiveness through placing us in a wider context.

The climate on the agenda

The big matter of importance for society during 2007 has been the climate question. New technologies and new attitudes will be needed in order to start to bring about the move towards a sustainable society.

SP is working in a broad field, with many projects linked to future climate developments: everything from the use of new materials to reduce the fuel consumption of shipping to research and development of energy-efficient buildings, more electrically-efficient products, heat pump technologies, and climate-neutral solutions such as new motor fuels and biofuels. They may be small steps and projects, but by their sheer numbers they will together contribute to the solution.

Strong finances give strength to the future

Most parts of the group have had a good year, with profits in line with expectations. Revenue has maintained a good level, and we have a stronger order book than ever before. With our good finances, together with opportunities and potentials for new, exciting and boundary-extending working areas, we are well placed to meet the future with all its opportunities and challenges.

Maria Khorsand
Chief Executive Officer (CEO)

Vision, Mission and Strategy

Vision

SP is a leading international institute that promotes interdisciplinary innovation of importance to industry and society. SP technologies drive increased industrial competitiveness, improve public safety, support environmental protection, and promote sustainable development.

Mission

SP applies its internationally leading competence to the development and evaluation of technologies, material, products, and processes to meet its customers needs and provide an effective link between research and commercialisation.

Strategy

Our strategy for realising our vision consists of the following elements:

- **We shall deliver more specialised services and knowledge to industry and society**

Our mission sees SP as being a resource for both industry and the wider society. We realise this through strong direct links with companies, sector organisations, public authorities, public bodies etc., often in what is known as a triple-helix relationship between all parties.

Our work is increasingly concentrated on the development phase of activities, in order to assist rapid and problem-free market introduction of products or services, and for the introduction of new technologies at an early stage. This means that our work is becoming not only more technically sophisticated, but also more complex and knowledge-intensive in character. Our services cover a full range from initial research, through development, testing, design verification and performance measurement, to quality assurance, certification and inspection.

We look to establish long-term relationships with our customers and create value for them. By engagement in, and understanding of, their businesses, we can deliver efficient solutions to their technical problems.

- **We shall strengthen our links with industry, with small and medium-sized companies as an important target group.**

We shall develop our already close links with business, represented not only by our industrial networks and special interest groups, but particularly by the thousands of tasks and projects that we perform for our business customers each year. An important part of this is the development of technical services for small and medium-sized companies, both nationally and internationally.

We shall be an attractive partner throughout the innovation process. Commissioned work is a very effective channel for the application and dissemination of knowledge. We shall increase the amount of our activities represented by seminars and participation in training schemes, working even more closely with companies and universities.

- **We shall establish strong research environments in conjunction with universities and other institutes**

Strong research environments are a prerequisite for a high profile, not least in order to be able to attract international companies and for participation in international projects.

We build strong environments, with the emphasis on research of high scientific quality determined by needs and results. Close cooperation with universities is an important component, partly in achieving environments of critical size, and partly for assuring the underlying scientific quality. In addition, such cooperation ensures effective use of expensive equipment and facilities.

A strong institute sector, as well as individually strong institutes, is needed if the innovation system is to operate properly. Industry and society need an institute sector with a high international profile, capable of tackling broad question fronts. It is for this reason that we are increasing our cooperation with other research institutes, not only through cooperation over projects but also through alliances and mergers.

- **Bridges between universities and industrial research**

Through our close cooperation with universities and good contacts with industry, SP is an efficient builder of bridges between academia and industrial research. In this way, we can become an ever-more important link in the innovation chain.

In their roles as lecturers at universities and as coordinators in joint projects, our scientists and trainee scientists obtain a good insight into industry's methods of working and needs, while at the same time benefiting from the universities' research results and methods of working. In the other direction, university staff involved in joint projects obtain impulses and ideas on current needs of, and insights into, industry and society.

Cooperation with universities will be expanded in various ways, such as by increasing the extent of shared services or by making it easier for trained scientists to move between academia and SP.

• **We shall increase our participation in international cooperation**
Increased participation in international cooperation is essential for a national institute in today's world of globalised industries and pressure for unrestricted cross-border trade. It provides access to new knowledge and valuable networks, and is an excellent platform for developing business relationships with international companies.

Our international cooperation is extensive and consists, not only of our commissioned work, but also of participation in international research, in such arenas as the European framework programmes, other international projects and membership of international sector organisations and standardisation bodies.

Long-term objectives

Our long-term objectives are defined at high level by SP's owner. As part of the new national institute structure, the objective for SP is to increase the body of knowledge and confidence needed for encouragement of innovations, growth and renewal of business and society. In the field of national metrology, our objective is to maintain reference standards of high quality, with sufficient coverage and relevance. SP's overall economic objective is that the group should maintain a profitability that facilitates investments and development as appropriate to a research institute operating on the international level.



Energy and environment

SP supports the development of sustainable energy solutions and new environmental technology. We conduct multi-disciplinary research and technical evaluation in such areas as more efficient use of energy in buildings and in industry. We develop more efficient technologies, with less environmental impact, in fields such as energy conversion, energy from waste and renewable energy. We participate in established skills and expertise centres, as well as operating information centres for the dissemination of new knowledge.

Markets and trends

It is becoming increasingly important to develop new environmental technology and more efficient energy solutions. Rising energy prices, together with increased awareness of climate effects, provide a strong incentive for the development of energy-efficient solutions with less climate impact. This can be clearly seen in areas such as heat pumping technology, the use of biofuels and low-energy buildings.

Multi-disciplinary approaches become increasingly important when industry develops new technologies, such as for use with energy from waste or biofuel-based motor fuels for the transport sector. At the same time, with strong growth in the environmental technology sector, quality assurance is becoming increasingly important in order to ensure the supply of products and services that achieve their intended physical lives and operate with few problems. Developments in Sweden's energy system are resulting in a growing market in applied metrology, security of supply and risk and reliability considerations. Improving the efficiency of energy use in buildings has attracted greater attention, both in Sweden and within the EU. This has a very favourable effect on the amount of commissioned work received by SP within the residential, commercial premises and industry sectors.

New types of biofuels are introduced on the market in response to growing demand. SP is involved in work aimed at tackling operational problems and higher emissions of health-hazardous substances that can occur.

Customers and work

• New biofuels

A growing proportion of bioenergy means that new biofuels, ranging very widely in quality, are being introduced to the market both for small-scale heating and for commercial CHP (Combined Heat and Power) production. Higher ash contents, including difficult substances, result in operational problems and higher emissions of health-hazardous particles. Together with industry and other research organisations, SP is participating in several projects aimed at finding cost-effective and environmentally efficient solutions, thus permitting widespread and increased utilisation of Sweden's largest renewable energy source – biofuels.

• Energy-efficient shopping centres and housing from the 'million new homes' era

Shopping centres are characterised by high energy usage and a substantial demand for cooling. A PhD project being carried out by a member of SP's staff, entitled 'Energy efficiency improvement in shopping centres', is aimed at the development of improved system designs for supplying shopping centres with heating, ventilation and air conditioning. The work is supported by several industrial and property interests.

The large stock of residential buildings constructed during the 1960s and 1970s as part of the 'million new homes' programme use excessive amounts of energy and are now also in need of substantial renovation. The EU Square project was started in 2007, with the aim of applying quality assurance in order to ensure energy efficiency and improved indoor environments in European housing built during this era and due for renovation and conversion. In Sweden, the Brogården residential area is included in the project.

• Reduced climate effect from the food industry

It is particularly important in the food industry to tackle production and environmental factors at the same time. In a project under the Swedish name of REELIV, SIK is working with a number of Swedish



food companies and with Chalmers University of Technology in a multi-disciplinary research group. Together with the industry and the retail sector, the project is developing and testing a new tool that combines environmental system analysis with simulation of production flows, with the aim of increasing productivity while reducing environmental impact.

- **After the storm**

During 2007, SP and SMP have evaluated motor-driven standby power units for detached houses on behalf of the Swedish Energy Agency. The choice and use of standby power is a complicated area in terms of operational security and reliability. Better information will enable individuals and organisations to make sound decisions.

- **Energy from waste**

Sweden's centre of expertise for energy recovery from biological waste, Waste Refinery, started up during 2007 under the management of SP. Waste streams are an important resource in a sustainable society, but they must be handled correctly. The overall objective of the work of Waste Refinery is to achieve optimum handling of waste in terms of both its environmental and economic effects on society. The work is concentrated on three areas: system analysis for optimum handling, thermal treatment, and biological treatment of waste. The centre is financed by leading industrial and facilities owners in the energy and recycling sector, together with the Swedish Energy Agency and the West Götaland development authority. Several other research institutes and universities are also involved in the work.

Prospects for 2008

Our services are in considerable demand from a large number of industrial customers, sector organisations, public authorities and research funding organisations. The energy and environmental technology sector is undergoing rapid growth as a result of increased awareness of the importance of climate effects. Demand

The Brogården area in Alingsås is included in the EU Square project, the objective of which is to ensure good energy efficiency and good indoor environment conditions in connection with renovating buildings from the 'million new homes' period.



for our services from established industries active in the European export market is growing rapidly.

We see increasing interest in energy-efficient buildings, coupled with good indoor environment conditions and moisture-resistant designs. SP is involved in research programmes and centres of expertise in such areas as resource-efficient buildings, refrigeration and heat pump technology, bioenergy, and waste refinery. In 2008 we will increase our participation in applied research, development and demonstration activities. At the same time, our activities regarding market driven innovative work in cooperation with our customers is expected to increase, as is our participation in international projects.



*John Rune Nielsen, Manager,
Energy and Environment*

The 'Energy efficiency in shopping centres' PhD project is developing improved energy solutions for exploiting potential synergies between electricity use, heating, cooling and refrigeration.



Building and Facility Management

Building and Facility Management

SP provides services along the entire chain from production of materials, design, construction and administration, to demolition and recycling of all types of buildings and civil engineering structures. We work with all parties in the sector: developers, designers, contractors, material manufacturers, facilities operators and users. Our research is carried out in the form of major projects, often in international environments. We possess leading-edge skills in structural mechanics, the use of concrete, steel and wood for construction, rock materials, fire, energy, building physics, the environment, recycling, the indoor environment and acoustics.

Markets and trends

The construction and civil engineering industry is enjoying a long-lasting boom, with construction activities in Sweden almost up to the previous peaks around 1970 and 1990. This is expected to continue during 2008, although possibly slowed by a lack of resources.

Market surveillance in the building sector started in 2007, which means that samples of CE-marked products are taken from distributors/retailers for inspection to ensure that they meet the specified requirements. SP is the only Swedish laboratory that has a contract with the National Board of Housing, Building and Planning to carry out the necessary tests in association with market surveillance inspection.

Customers and work

The international market opens up for bridge bearings

We have carried out a major project concerning bridge bearings for the Norwegian Spenneteknikk AS. Bridge bearings are required to withstand very high vertical loads, without transferring excessive moment forces to their supports in the event of an earthquake. Testing involves extremely high forces, up to 2000 tonne,

which are applied while simultaneously measuring movements and temperatures. The work was completed successfully, which means that bridge bearings can now be CE-marked, so that the European market is open to them.

• Leading-edge competence assists rock materials company

MinBaS II is a three-year research programme for the industrial minerals, aggregate and natural rock industries, which started in 2007 and has a budget of SEK 55 million. The programme covers everything from production, process and product development, to application technology, together with consideration of environment aspects and knowledge transfer. Our leading-edge competence concerning the importance of the micro-structure of rock for the function and performance of the end product will be valuable in optimising utilisation of resources and production technologies.

• Information and research for improved moisture resistance

Questions concerning the protection of structures against moisture damage have received considerable attention during the year, in such ways as in connection with internally undrained rendered facades and the moisture safety of certain wet-room designs. In addition, we have also noted an increased interest in moisture-safe designs and in testing the mould resistance of building materials. SP is actively involved with seminars, lectures, training courses and articles to spread the results of our research and to improve the construction sector's awareness of this problem area. As an example of this, a diploma course for training specialised inspectors has been started in conjunction with Lund Institute of Technology.

• Help in selecting fasteners

In order to assist consumers and companies to choose the correct quality of corrosion protection on fasteners, such as screws, a system of classification of surface treatment of such items has been started



Testing bridge support bearings involves extremely high forces, up to 2000 tonne, applied while simultaneously measuring movements and temperatures.

by SP in conjunction with the sector and with SITAC. The classification indicates the corrosion environment for which the product is suitable, and is clearly shown on the marking on the packaging. Type-approval testing is carried out by SITAC. A growing number of producers and distributors is choosing this system for quality marking.

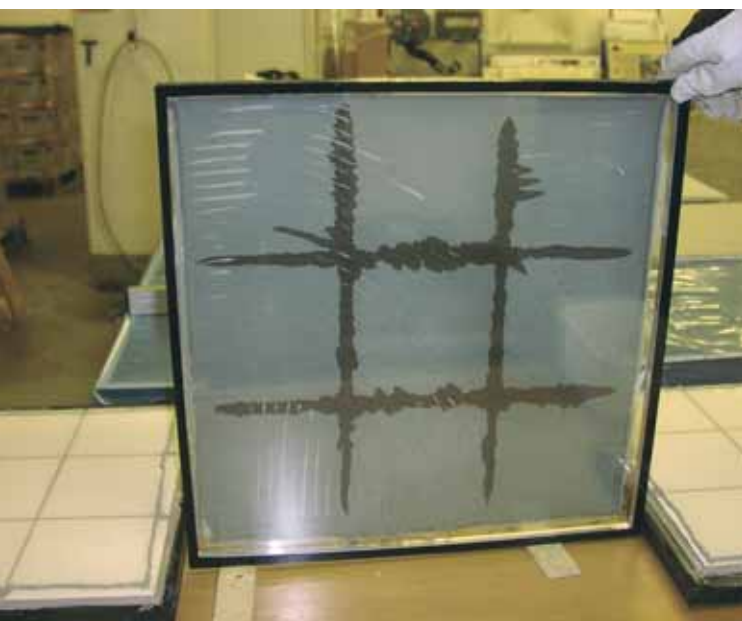
• Fire tests for safer doors

The investigation into a fatal fire in a hotel in Borgholm in 2004 recommended that requirements should be introduced concerning the smoke-tightness of doors. We have therefore invested in an electrically heated furnace capable of testing the smoke-tightness of doors up to a size of 3.4 by 3.4 m, in accordance with EN 1634-3. Several manufacturers have submitted their products for testing in 2007, and the first type-approved doors with a smoke resistance classification are now available on the Swedish market.

Prospects for 2008

The boom in the construction sector is expected to continue, but will be accompanied by new challenges, the most important of which is global warming. If we are to tackle this successfully, it is necessary to take appropriate actions now and for many years into the future. The construction sector is affected in several ways. It is itself responsible for much of the environmental impact, and can also be affected by the effects of climate change such as flooding, storms and greater quantities of snow. These are problems that the industry will be forced to face, to a greater extent than it has done hitherto. This will require the development of low-energy buildings and eco-efficient building materials, modification of standards etc. The whole climate question is a threat, although also an exciting

During the year, SP has investigated the moisture resistance of certain wet-room structures. The picture shows water penetration behind a tiled wall after spraying it with water for two minutes.

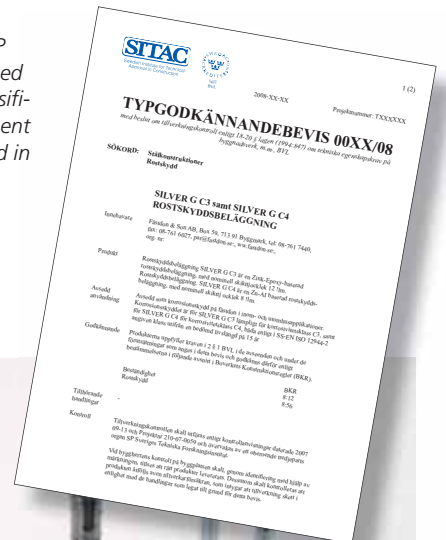


challenge that can result in competitive benefits for the Swedish construction industry on the international market. SP is well positioned to support such a development.



*Per-Erik Petersson, Manager,
Building and Facility Management*

In conjunction with the construction industry, SP and SITAC have developed a quality system for classification of surface treatment of various fasteners used in the building sector.



Wood Technology and Wood Construction

Wood technology and wood construction

We are involved in the entire processing chain of industrial uses of wood. For sawmills, for example, we develop technology and production methods to improve process economy and quality. Important working areas are process control and measurement methods, in which we are a world leader, together with drying, adhesive bonding and logistics. We are also involved in improving the properties of wood, in such ways as improving durability by chemical modification of the material, while also carrying out research into surface treatment and new types of composite materials. An important part of our work is concentrated on removing obstacles to the use of wood in all types of structures, not least multi-storey buildings and bridges. Other focus areas are moisture resistance, stability and fire resistance, where we are among the world leaders, together with acoustics and vibration.

Markets and trends

These are good times for much of the wood mechanics industry, which is our main market, as a result of the construction industry sector boom and a good demand on export markets. There is considerable interest in greater use of wood in construction. In addition, one of the national sector research programmes is concentrated on the forest products and timber industry. We have had considerable successes under this programme, such as with the 'Energy efficiency and healthy wooden buildings' project, having a total budget approaching SEK 25 million. Other important sources of research funding include TräCentrum Norr in Skellefteå, together with the recently established Centre for Wood-based Construction and Living in Växjö. They bring together industrial partners and SP, together with Luleå Technical University and the University of Växjö respectively, in various development projects.

Quality grading of timber with the help of radiography. As logs pass through the sensing frame, the equipment produces two X-ray pictures. The information in the pictures is then used by picture analysis and PLS analysis to sort the timber into different property groups, such as high strength and/or high heartwood proportion.



Customers and work

• WoodBuild – increasing the life of wood

WoodBuild, with a budget of SEK 50 million, is included in the forestry and wood industry sector research programme. Its objective is to increase knowledge of the use of wood, and to transfer expertise on protection against moisture and sustainable wood construction to the building industry. The life of wood should be amenable to calculation in the same way as for other materials. A number of specific targets include the development of methodology for determining the life of wooden structures, and the development of appropriate testing methods. WoodBuild brings together SP's knowledge of the use of wood in construction, durability and building physics with the Lund Institute of Technology, together with partners from the wood and construction industries, in order to meet the target.

• Links with Japanese company to improve earthquake safety

A two-year development project has been entered into with Sumitomo Forestry, a large Japanese company having its own development resources. The company has developed a very special wooden building core system, somewhat reminiscent of IKEA's flat-packs, based on wooden components and assembly fittings. The structural core system withstands seismic loads in buildings up to three storeys high, but is felt to be able to be developed for even higher buildings. Sumitomo Forestry has placed its development managers with SP in Skellefteå to work on further development of the system, enabling it also to meet requirements in respect of noise and vibration performance, as well as to match it to Swedish and European requirements.

• Quality control of structural timber

Technical development of processes and equipment for sorting timber has taken off, while at the same time a new standard has been introduced that permits CE-marking of strength-graded timber. One of our largest customers, Dynalyse AB, has introduced a new sorting machine, the Precigrader, which has been tested by us so that it will soon be approved for use in most of Europe. During the year, we signed contracts with about ten new customers for certification and manufacturing inspection of mechanically graded structural timber. In the recently started European Gradewood project, we are working with companies and scientists from seven countries on improving grading methods for structural timber.

• New opportunities for sawmills

Two projects – the large EU Indisputable Key project that we are coordinating, and the Continuous Automatic Test Sawing project, financed by the North Swedish Timber Centre – have concentrated on methods of ensuring traceability of timber. The drying of timber is central to the sawmill industry, and this is an area in which we are attempting to increase our contribution. An example of this is presented by the further development of Torksim which, in addition to simulating traditional Scandinavian time-based drying regimes, can now also simulate moisture ratio-based drying regimes. Radiography of timber is an example of how new measurement methods open entirely new potentials, and is now being used by an increasing number of sawmills. In 2007, scientists at SP and LTU in Skellefteå received the Schweighofer Prize for development of the process.

At eight storeys high, this building (below) in Växjö is Sweden's hitherto highest modern timber-framed building. In conjunction with Växjö University, SP is monitoring various functions in and of the building during the construction process and in the completed building.



Prospects for 2008

Prospects are regarded as excellent, as a result of a continued high level of activity in the wood sector, two large national projects and several new projects in the European WoodWisdomNet project.



*Carl-Johan Johansson, Manager,
Wood Technology and Wood Construction*

Sweden is operating the EcoBuild I-centre, the objectives of which include development of entirely bio-based products. This chair is made entirely from bio based plastics and wood.



Electronics and ICT

Electronics and ICT

Electronics and ICT (information and communication technology) at SP is concerned with the development of this technology area for safety, reliability and suitability for use in severe environments. During the year, our large-scale EMC laboratories – which constitute one of northern Europe's strongest resources in this field – have been complemented by a further laboratory. SP's wide electronic expertise also includes software, product safety, environmental immunity and measurement, radio and antenna technology.

Markets and trends

Swedish industry includes many companies that incorporate electronics in the form of embedded systems in their products. There are also several large companies that develop and manufacture telecommunication products. The market for technical evaluation services is becoming increasingly international. With our extensive experience and expertise, we can provide a wide range of services for complex products having high function requirements. The use of embedded systems is expected to grow substantially at both national and European level, and it is in this connection that SP has an important part to play.

Our skills and knowledge in the electronics sector are constantly expanding through the strategic research areas of communication technology, reliable systems and robust integrated systems.

SP has one of the most comprehensive EMC resources in Europe. During the year, we have added another laboratory, employing the very latest technology in order to reduce delivery times and improve performance for our customers.

Customers and work

• Antenna systems

SeeMe is a product that uses radio technology to sense when children wearing radio buttons are in the vicinity. It can be used to control traffic lights at pedestrian crossings, thus improving safety in traffic. SP has developed not only the necessary antennae, but also other special applications. Cooperation with InventechEurope on development of an antenna system for lifejackets is another example.

Modern antennas are becoming increasingly complex, often containing several antenna elements with associated signal processing in order to deal, for example, with the difficult radio environment conditions in a car driving through an urban environment. Together with Sony Ericsson, we are developing new test methodologies to simulate these environments under laboratory conditions.

• Light-emitting diodes

New applications are constantly being found for energy-efficient LEDs, with many factors indicating that they will become the light sources of the future in a wide range of applications. They can be used, for example, for greenhouse lighting: by optimising the wavelength, the light can be tailor-made to suit the plant's requirements. This idea is the property of Heliospectra, which is working with SP to resolve the measurement difficulties for characterising LEDs and measuring the fluorescence of plants.

• Moisture and electronics

Moisture and condensation are among the most serious threats to all forms of electronics. A mobile telephone left in a wet raincoat



pocket or in a sweaty pocket can be destroyed. Moisture is ever-present, and is difficult to counter by design means. A project is therefore in progress, in conjunction with Swedish industrial partners, to develop methods of simulating and measuring the effects of moisture and condensation. The objective of the project is to be able to simulate and forecast such effects right from the initial design stage.

- **Risk analysis at the opera**

An opera stage has moveable scenery, trapdoors in the floor and tight timetables. SP is performing a risk analysis of such conditions on behalf of the Gothenburg Opera and the company Novoscen, with the aim of identifying sources of risk in stage machinery and methods of working, to check what has been done to minimise the risks. We have interviewed personnel, inspected equipment and evaluated risks. An area of particular concern has been to see how programmable stage control systems can affect personal safety.

- **Protection against ESD damage**

ESD training (electrostatic discharge) for suppliers of antistatic products and equipment, and for ESD protection personnel in electronics production, is an example of training courses run by SP in the field of electronics. A considerable proportion of faults in electronic products is due to damage caused by electrostatic discharge. Latent damage sometimes does not occur until the product has been put on the market. Two such courses were held in 2007, with the aim of providing better insight into ESD problems, with a strong concentration on active teaching in the form of a balanced mix of theory and laboratory exercises.

Prospects for 2008

Strategic research cooperation will be supported by links with universities to form centres of excellence concentrating on microwave technology, antenna technology, embedded systems, automotive technology, personal electronics and materials technology. During the year, we will increase the number of PhD students working on electronic projects

We will be performing projects in conjunction with industry dealing with technical evaluation of radio technology, environmental durability, function safety and product safety. Our services in the form of testing, evaluation and training are constantly developed in order to meet the latest requirements. At the same time, our high levels of expertise and broad coverage support efficient product development right from the initial concept stage.

The Swedish research institutes are undergoing a phase of restructuring. Electronics and ICT are employed in several areas, which means that it is important to develop cooperation between institutes in order to coordinate applied electronics research.



*Peter Leisner, Manager
Electronics and ICT*

During the year, SP has started work with the Gothenburg Opera to identify sources of risk in stage machinery and methods of working. Particular attention has been paid to investigating how the programmable systems that control the stage effects affect safety.

We have contributed measurement expertise in a project aimed at optimising artificial lighting in greenhouses using LED technology.



Mechanics and Automotive Industry

Mechanical engineering and the automotive industry

We work with large and small companies and organisations in the mechanical engineering industry, the automotive industry, the shipping and offshore industry, the railway industry, power producers, component manufacturers and material manufacturers. Important working areas include robust design, product and component safety, materials technology, fire technology, vehicle and traffic safety and metrology.

Markets and trends

Manufacturing industry (including the automotive industry) is an important part of Sweden's industry, accounting for over half of Sweden's export of goods and generating revenue of over SEK 700 000 million. The 3000 member companies of the sector organisation, Teknikföretagen, employ 300 000 persons.

SP's work for the mechanical manufacturing industry is concentrated on the maritime and offshore industry, railways, heavy vehicles, power plant, product and component manufacturers, machine manufacturers and materials manufacturers. Sweden has an extensive automotive industry, with four major vehicle manufacturers and a large number of subcontractors. There are also a number of manufacturers of special vehicles such as forestry machinery, earthmoving machinery and tracked vehicles. All told, this makes up an important industrial group that provides work for all parts of the SP Group.

The trend towards internationalisation of the automotive industry has been clear for some time, and is expected to continue in future years. Another important trend is that of growing environmental awareness. In particular, the pressure for reduced CO₂ emissions is clear, and will affect all parts of the automotive industry. Vehicle purchasers, public authorities, vehicle manufacturers and subcontractors are all calling for the development of new drivelines and new fuels.

Customers and work

• Electrical safety in hybrid vehicles

Use of electric motors for powering road vehicles requires a higher voltage in the vehicle's power supply, which means that the electrical system must be designed so that it is safe during production, service, use and in the event of accidents. SP is working with Swedish vehicle manufacturers on the 'Green Car 2' project for greater electrical safety in vehicles incorporating high-voltage systems.

• Lightweight structures at sea

The 'Lightweight Structures at Sea' project is aimed at developing technical solutions for the design of four different types of vessels incorporating greater or lesser quantities of aluminium and sandwich composite lightweight materials. The consortium consists of representatives from the Swedish shipbuilding industry, the Swedish

Fires in road vehicles can have serious results, particularly if they occur in tunnels. The picture shows a full-scale fire test, investigating the progress of a fire in a coach.



recreational craft industry, Swedish material manufacturers, Swedish universities and research institutes, and public authorities and classification societies.

• Fatigue in rubber components

Fatigue in mechanical equipment is a constant problem, and many mechanical failures can be traced to it. The RUBFAT project is investigating fatigue phenomena in rubber materials. The work is being carried out by SP in conjunction with IFP, on behalf of the Swedish automotive industry. It concentrates on experimental and calculation-based methods for fatigue-resistant design of rubber components.

• Track stability

Tensile and compression stresses in railway tracks can cause problems such as lateral buckling during hot weather, or tensile failure during cold weather. It is therefore important to be able to measure the forces in rails. On behalf of the National Rail Administration, SP has investigated non-destructive measurement methods and developed appropriate methodologies and software.

Prospects for 2008

New active safety systems are now finding their way into road vehicles for stability control, obstacle detection, adaptive speed control, lateral positioning etc. The established methods of collecting accident data and evaluating safety levels by means of crash testing are no longer sufficient for these active systems.

Test methods for active safety systems, communication test chambers and field operational testing are under development.

Particularly high safety requirements apply to components and structures in exposed environments. During the year, SP has tested components for the offshore industry, applying loads of up to 20 MN (equivalent to 2000 tonne).



During 2008, SP will be involved in European research programmes and, at national level, in Test Site Sweden and SAFER (Chalmers Traffic Safety and Vehicle Research Centres).

SP is also involved in the 'Heavy vehicles' group of companies in the Växjö/Ljungby region. This work will continue during 2008, with the aim of starting larger projects. A cooperation agreement has been signed with the University of Växjö.

Through its research into new lightweight materials at sea, SP has come into contact with, and established joint research activities with, several major EU projects. 2008 will also see the start of European defence project cooperation into the use of lightweight materials in navy vessels, in which SP will participate.



*Jan Jacobson, Manager,
Mechanics and Automotive Industry*

During the year, EMC tests were carried out on a hybrid car having a hydrogen-fuelled engine in combination with electric motors, in order to test the interference immunity of the electronic equipment. This engine technology gives very low emissions, and is a step along the road towards carbon dioxide-free driving.



Fire, Risk and Safety

Fire, risk and safety

The need for fire safety for individuals and industry is growing. We carry out research and performance evaluations over a wide range of areas, from furnishings to entire buildings. We evaluate the ability of materials and structures to withstand fire, and we investigate the ability of various products and systems to extinguish and control fires. SP also carries out risk analyses and evaluates the environmental effects of fires and other accidents.

Markets and trends

Fires and accidents cause major losses. In order to prevent this, industry, insurance companies and authorities specify requirements for materials and products. In addition, we need to protect the environment and our historical heritage. The increased risks represented by terrorist actions are also linked to fires and explosions.

The turnover of the European market for construction products is about EUR 200 000 million per year. This indicates the importance of harmonised regulations, and shows that even small changes in conditions can have major economic effects, particularly for smaller producers. Development of effective markets throughout the EU presupposes that the fire performance characteristics of products can be evaluated in a harmonised manner. SP is therefore working in many areas on developing common regulations and standards. We have long had a substantial international presence in order to be able to work in a larger geographical market and assist the competitiveness of our clients.

Customers and work

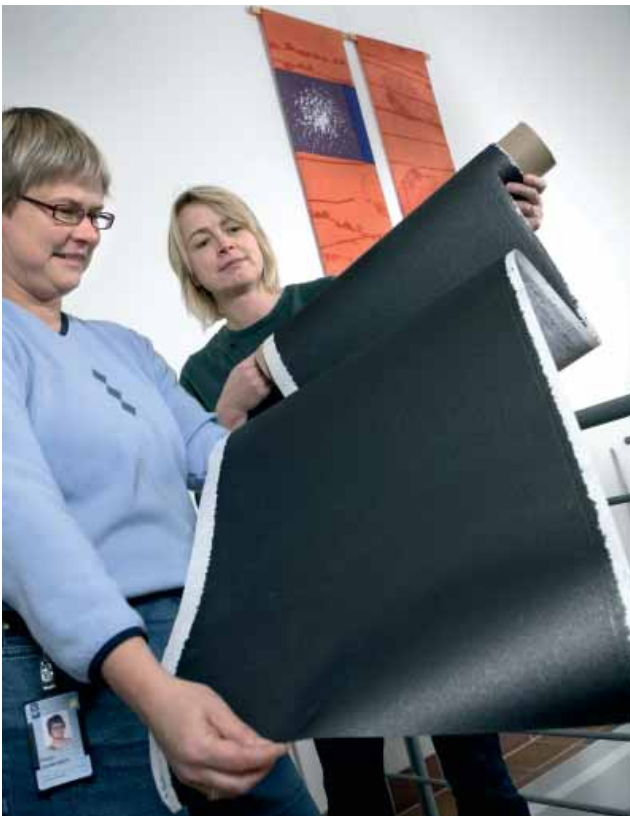
• New materials

New materials, and new applications for them, appear in a steady stream. One example of this is that of lightweight-based structures for ships and offshore applications. The driving forces of this is simplified production technology, reduced operating costs and lower emissions. However, new materials/applications also bring new fire risks, which means that knowing how to deal with them is a vital element in overall development potential. In 2007, we have participated in several projects supporting the use of lightweight materials for vehicles, ships and offshore applications. Commercial ship production is planned as a direct result of this work.

In the rather less mobile field, self-compacting concrete has many positive properties and is used for such applications as the construction of tunnels and high-rise buildings. However, it also has the negative propensity of spalling: bursting apart with explosive force when exposed to a severe fire, which means that it is necessary to protect it. This is a working area in which SP possesses unique competence.

High-technology textiles are being developed, with the aim of giving them special properties with respect to fire resistance, acoustics, bacteriological protection, electrostatic protection and protection against electromagnetic interference. We are participating in two EU-financed projects. Nils Wenne, the Managing Director of INCA, points out that these projects are important for many small Swedish companies, as they can open the way to new markets and new customers.

As part of the work of the EU FLEXIFUNBAR project (FLEXible multiFUNctional BARriers), the Swedish company INCA has used SP's services in the development of a high-technology textile having good fire protection properties.



• New fuels

New fuels and materials bring their own problems: the use of hydrogen for powering vehicles, E85, different types of biofuels and the use of waste as a fuel are some examples. Production systems for biofuels have been established in recent years, together with storage facilities and logistical systems for handling waste. Our work in 2007 has covered a wide range of aspects, such as the risks associated with the use of E85 and methods of extinguishing fires in pellets silos. This work has resulted in concrete actions and advice: our expertise, for example, was put to direct use in connection with a fire in a large pellets silo in 2007.

• Tunnels create risks

The smooth operation of society is increasingly dependent on problem-free operation of the infrastructure. Traffic problems in major urban areas are tackled by ring roads with many tunnels, underground railway networks are expanded in order to increase passenger capacity, and new railway tunnels are built in order to cut down transport times. The result is that the risks of accidents with potentially catastrophic results increases. SP has been conducting research into fires in tunnels for many years, including fires in

Self-compacting concrete is used in such structures as tunnels and high-rise buildings. If exposed to an intense fire, it can spall explosively. Therefore it must be protected. We have investigated the processes involved and established unique world-wide expertise in the area.



heavy goods vehicles, trains and other types of vehicles. We have also investigated the explosive spalling of concrete when exposed to high temperatures.

Prospects for 2008

We expect continued substantial interest in our activities. We are concentrating on our international commitments, and developing services for industry and public authorities. Continued work on lightweight structures is planned during the year, and we will be involved in a newly started joint European project investigating the use of composites in naval vessels.

In addition, future research projects will be investigating fire safety in mines, fire safety during the construction of tunnels, spalling of concrete and the effects of new types of fuels on risks in tunnels. We foresee continued good development of our leading-edge working areas in the fields of materials technology, chemical analyses, computer modelling and the analysis of fire progress.



*Ulf Wickström, Manager,
Fire, Risk and Safety*

The Swedish navy's Visby-class corvettes are built using lightweight design technology. During the year, we have participated in several projects aimed at acquiring knowledge on how best to protect lightweight-based shipping or offshore structures against fire.



Measurement Technology

Measurement Technology

We help industry to solve its measurement technology problems, calibrate measuring equipment and provide an extensive range of training programmes. Our starting point for this work is our role as a national metrology institute, responsible for the national standards of a number of quantities in the SI system. In this work, we draw upon the entire Group's knowledge and resources in the field of instrumentation and metrology.

Markets and trends

Every aspect of society relies upon measurements. For several years now, demand has been growing steadily for quality-assured measurement. It is no longer sufficient simply to generate a number of measured values: they need also to be accompanied by knowledge of their quality. In addition, the forms of measurement that are required are becoming increasingly complex.

The market for metrology/calibration is competitive on both national and international levels. SP concentrates on demand-led metrology, often at site, supported by an ambitious programme of knowledge transfer for metrology applications. This is a successful combination that has ensured that our activities have steadily increased over several years.

Customers and work

• A safer society with more stable time measurement

The availability of reliable and correct time data is important in many contexts, e.g. against the background of EU requirements for storage of traffic data, as well as for detecting attempts to hack data. At present, we are very dependent on satellite systems

such as GPS and, in future, Galileo for frequency synchronisation and time measurement, but these are systems that could easily be rendered unusable by jamming.

With financing from the National Post and Telecom Agency, we are developing a method based on passive listening for time comparisons using the existing optical fibre communication networks. During 2006, the method was tested between SP's time and frequency laboratory and the national node in Gothenburg over the Swedish GigaSUNET university data network. In 2007, measurement started over the new OptoSUNET between Borås and the STUPI time laboratory in Stockholm.

This work is expected to result, in a few years, in Sweden having a very robust frequency synchronisation and time system, of significant importance for both civil and military systems. On the international level, considerable interest has been aroused through information on the system presented at a large number of conferences.

• Metrology important for climate measurements

The scientists working on the GNSS (global satellite navigation system) at Chalmers Onsala Space Observatory and SP are one of the largest such groups in Europe. A number of joint projects have been carried out over the years. Among them, for example, are EU projects, feasibility studies for the coming Galileo navigation system and, since 2007, a Vinnova-financed project to investigate climate change by measuring water vapour concentrations in the atmosphere using satellite-based methods. This work shows how leading-edge competence in one area, time and frequency in combination with GNSS, finds applications in 'new' areas.



New methods of time and frequency synchronization are being developed, based on fibre-optic communication networks, in order to reduce dependence on radio-based methods.

• The electricity industry benefits from model analysis

There are several examples of how skills in one area can find applications in unexpected areas. We have carried out a sensitivity analysis of the network benefit model used by the Swedish Energy Agency's Electricity Markets Inspect to assess the tariffs charged by the electricity network companies (i.e. monopoly companies on the deregulated electricity market). The power utilities had claimed that the network benefit model was unstable, in that small changes in an input parameter could result in a major spread of the model's results. Our analysis was based on our expertise in analysis of measured data. The results, which did not display any surprising effects, have been accepted by all parties involved, and formed an important element of the legal negotiations that were carried out between the Swedish Energy Agency and the network companies.

• Think tanks for impossible measurements

There is also a need for quality-assured methods of measurement and of objective interpretation of measured results in areas where the actual measurement process consists of some form of subjective impression. Panels to assess the quality of a product, or of an indoor environment, are a couple of examples. The measured parameter could be, for example, that of how we experience or interpret a sign or some modern display, or perhaps a games programme. An EU project under the name of 'Measuring the Impossible Network' (MINET) has been in progress since 2007, with participation from several departments within SP. The network brings together a large number of participants from a range of sectors and countries, under the leadership of the Karolinska Institute. SP's duties include arranging various think tanks, where questions concerning quality assurance of the 'measurement situation' are a central theme.

SP is participating in a Vinnova-financed project investigating climate change by measuring water vapour concentrations in the atmosphere using satellite-based methods.



Prospects for 2008

Metrology will continue to be an important part of our society, tending towards steadily increasing complexity and the development of applications in new areas. Global warming, declining resources and associated required improvements in efficiency all make greater demands on metrology. With our unique range of technologies and knowledge, we are well placed to meet the growing demands.

Work continues at the European level on greater cooperation in metrology, partly within a ERANETplus programme, and also with an eye to Article 169 cooperation.



*Håkan Nilsson, Manager
Measurement Technology*

During the year, we have carried out a sensitivity analysis of the network benefit model used by the Swedish Energy Agency to monitor the electricity network companies' tariffs.



Food, Pharmaceuticals and Biotechnology

Food, pharmaceuticals and biotechnology

Our work is concerned with essential products for life – food. Our knowledge, ideas and work are incorporated in products that pass our lips daily. We work closely and intensively with national and international scientists and industry, concentrating on application and development.

The basis of our work is founded on a unique, wide range of skills in, and knowledge of, food production, such as structure and material design, texture and aroma, microbiology, biotechnology and process and environmental technology.

Research at SIK is often carried out in national or international cooperative forms. This assists the creation of broad networks, bringing together universities, research institutes and industry.

Markets and trends

The Swedish food industry is the fourth largest manufacturing sector in the country, providing work for about 250 000 people and generating an annual turnover of SEK 140 000 million. The industry's products are as fundamental to society as they are important economically. There are demanding requirements for rapid product development, accompanied by equally demanding requirements in respect of safety, shelf stability, taste and, not least, health.

Households have less time for food preparation, health problems resulting from obesity are increasing, consumers' (mostly unjustified) worries about industrially manufactured food are mounting,

and food and climate are climbing ever higher up the international agenda. Together, these factors indicate a clear need for an industrially-associated knowledge partner in the food sector, a role which we attempt to fill.

In addition, there is a clear potential for applying the knowledge acquired by SIK together with national and international partners to other industrial sectors, such as hygiene or pharmaceuticals.

Customers and work

• Health

Health and food are becoming an increasingly clear focus area for us. One of the more important of the many projects that SIK is engaged in within this sector is being carried out in conjunction with Tetra Pak, Unilever and other partners. Together, we are developing methods and processes to produce vegetable-based ready-to-eat food products with retained nutrients, unaltered taste and meeting high hygiene standards.

• Functions

Another exciting example of the breadth of our activities is presented by the cooperation with Findus, Källbergs, Lyckeby Culinar and medical expertise at local universities. Together we are developing a knowledge platform from which companies can further develop food intended for consumers having difficulty in chewing or swallowing. The first products are already on the market.



A newly developed modelling tool for simulating bacteria concentrations in a production chain, such as in the dairy industry, now makes it possible to reduce microbiological risks.

- **Climate**

Awareness of climate problems is growing, and the food sector is no exception. ICA, a major grocery retail chain, is working closely with us in this area, producing data on the climate effects of about a hundred products. Similar projects are being carried out with several other companies, and interest in finding industrially applicable models for reducing the climate effect is steadily increasing.

- **Safety**

Concern over suspect food components is all too common. One such alarm in recent times concerned the presence of acrylamide in foods. SIK has worked with a number of companies on the mechanisms of acrylamide formation. We have been able to develop alternative process technologies that reduce acrylamide formation without adversely affecting other properties.

Microbiological problems are a priority within the foodstuffs industry. As part of a Nordic project, Company Risk Assessment, we have worked with Nordic dairy companies to achieve improved methods of microbiological risk analysis. We now have tools for assessing microbial risks, together with design tools for simulating bacteria concentrations along the production chain.

Prospects for 2008

The market for food research is expanding, with particular emphasis on knowledge-driven product and process development. Aspects such as health, taste and climate considerations are being studied synergistically with the more traditional areas such as nutrient content, purity and safety. This means that our wide knowledge in both established and new areas will provide a stronger platform upon which we can base industrial process, production and production development projects to assist the export performance and profitability of the Swedish food industry.



*Klas Hesselman,
CEO, SIK – the Swedish Institute
for Food and Biotechnology
and Manager of Food, Pharmaceuticals
and Biotechnicals*

SIK has worked with other parties to develop improved food for consumers having difficulty in chewing or swallowing.



The food industry affects our climate in the same way as any other industry. In conjunction with ICA and other parties, SIK has established data on climate effects in order to attempt to find lower-impact methods of producing food.



Materials Technology and Chemistry

Materials technology and chemistry

Our areas of particular strengths are chemical analysis, characterisation of materials and surface chemistry. Applications of these competencies cover most materials, such as polymers, biomaterials, functional materials and surface protection systems.

Materials science describes the properties and applications of various materials. Our research is multi-disciplinary, involving chemistry, physics, medicine, biology, environmental technology and geology. It includes biotechnology, the emphasis of which is on the development of advanced methods of analysis for biological systems, with microtechnology and nanotechnology playing important parts. The climate debate is placing greater emphasis on the importance of sustainable development. This is essential for all sectors of industry, working to achieve environmental targets. SP is carrying out a large number of research projects in this sector. See also pages 24-25, where SP's subsidiary, YKI, describes its activities.

Markets and trends

Sweden is dependent on its exports, with major revenues being derived from forest products, ores and metals, chemical products, pharmaceuticals, engineering industry products and telecom products. All are dependent on materials technology. Microtechnology and nanotechnology are attracting ever greater interest, and are relevant to virtually all technology areas. The use of renewable raw materials has continued to increase, and all industry sectors have a major need of assessing how their materials and processes affect the environment.

Customers and work

• Medical materials technology

Medical technology is an area of increasing world-wide importance, with Sweden having a strong industrial position centred around several world-leading companies. This is a multi-disciplinary working area, involving not only biology and medicine, but also areas relating to materials, sensor and visualisation technologies and electrical measurement technologies. A particular element of this working area is that of the regulatory public safety requirements applicable to medical products. Our extensive experience in medical materials technology is brought together in the MedTek centre of expertise, which assists companies with their product development, in such ways as advising on the choice of materials or their characterisation with respect to biological safety. In conjunction with the universities, we carry out research into new implant materials, non-invasive diagnostics and molecular imaging of biological cells and tissues.

• Biolab at SP

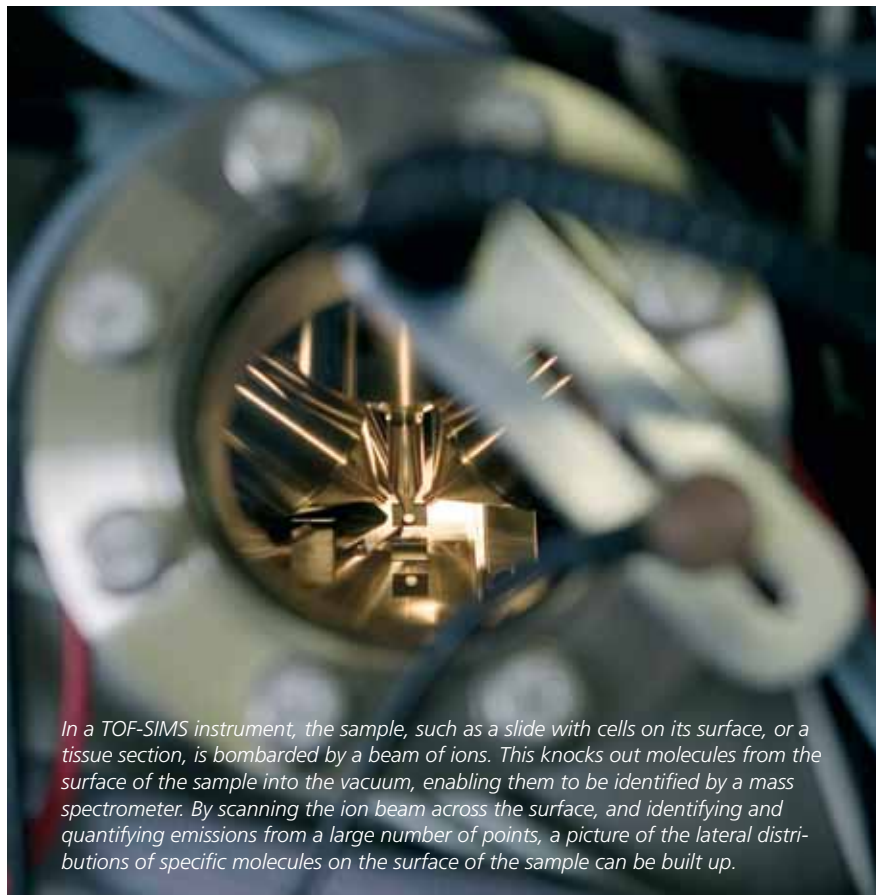
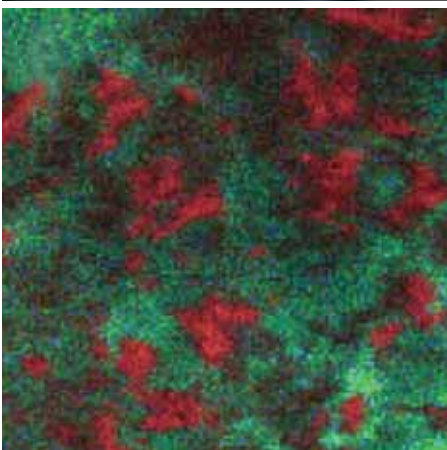
Enquiries from the paper industry concerning compostability, and from the cosmetics industry concerning biodegradability, have increased over the year, as has interest in certifying polymers under SP's Kappa-marking scheme. The aeronautical-industry is testing the mildew resistance of air conditioning units for new aircraft.

On the research side, projects are in progress with companies outside Sweden developing biodegradable plastics. We are also

In a joint project with the Karolinska Institute, SP is using a TOF-SIMS instrument to analyse different types of tissues from dialysis patients.

The picture below is a molecular image of various lipid molecules in fat tissue, showing the distribution of phosphatidylcholine (red) and unsaturated (green) and saturated (blue) tri-acyl-glycerol molecules in an area of 0.5 x 0.5 mm on the surface of a tissue slice.

This method may contribute to the development of better diagnosis and treatment methods in the future.



In a TOF-SIMS instrument, the sample, such as a slide with cells on its surface, or a tissue section, is bombarded by a beam of ions. This knocks out molecules from the surface of the sample into the vacuum, enabling them to be identified by a mass spectrometer. By scanning the ion beam across the surface, and identifying and quantifying emissions from a large number of points, a picture of the lateral distributions of specific molecules on the surface of the sample can be built up.

continuing to participate in inter-laboratory tests of biodegradable polymers in conjunction with JBA in Japan. Our contribution to the Waste Refinery centre of excellence, where we are working in close conjunction with the University College of Borås, JTI and Borås Energi & Miljö, is concentrated on digestion of materials for biogas production. Biological tests of anti-fouling paint have been planned, through participation in the NiCe MARINORD project.

- **Solar energy**

PERFORMANCE is a major R&D project in the Sixth European Framework Programme, worth about EUR 12 million. The background to this is the rapidly increasing use of solar cells in Europe, running at present at about 30 % per year. The total installed capacity of solar cells in Europe is calculated as already amounting to about 600 MW. The EU objective is that this should have increased to no less than 200 000 MW by 2030. There are no reliable tests methods for determining the long-term performance of solar cells today. The objective of the PERFORMANCE project is therefore to carry out pre-normative research in the solar cells field, with the aim of contributing to reliable test methods for solar cell modules and entire solar cell systems, including those integrated into the structure of buildings.

- **Indoor air quality**

The composition of foreign substances in indoor air is dominated by emissions from building, furnishing and interior fittings materials. When responding to reports concerning allergies or ill-health, it is important to investigate the concentration of organic substances in the indoor air. At present, there are official regulations governing the permitted quantities only of formaldehyde: however, considerable work is being devoted in this respect to investigating primarily wood and wood-based materials.

SP is investigating how organic substances react with inorganic air pollutants in indoor air, such as ozone and/or NO_x, in a working

Large quantities of anti-fouling paint are used every year, with resulting environmental impact. SP is planning to conduct biological tests of anti-fouling paints through participation in the NiCe MARINORD project.



area known as indoor atmospheric chemistry. The work is being carried out in the form of national and international projects, with the European Commission having drawn attention to this aspect of indoor air quality. The EU EnVie project provides an overview of the concentrations of various substances in indoor air, and can trace substances back mainly to building and interior fittings products.

Prospects for 2008

Work on materials, to assist companies in their own development of products, is expected to continue to increase. Materials and products are becoming increasingly complex and sophisticated, while at the same time there is growing realisation of the importance of environmental aspects in addition to those of price and performance. This is a demand that we can meet due to our multi-disciplinary capabilities. There is a considerable need for cross-disciplinary research. SP's abilities, together with our well-established links with universities and with subsidiary companies SIK and YKI, mean that we are well placed to contribute to this development.



*Thomas Gevert, Manager,
Materials Technology and Chemistry*

The use of solar cells is growing rapidly in Europe, and the EU has set a target of total installed capacity of 200 000 MW by 2030. SP is participating in an EU project aimed at developing reliable methods of testing the long-term performance of solar cell modules and systems.



YKI, Institute for Surface Chemistry

This is YKI

YKI, Institute for Surface Chemistry, is the internationally leading industrial research institute in applied surface and colloid chemistry. Our customers come from a wide range of sectors – including materials, industrial chemicals, household and personal care products, pharmaceuticals, biotechnology, food, coatings, paint, engineering, paper, print and packaging. Our business model is to understand our customers' needs and to apply surface chemistry to solve industrial problems and facilitate the development of new products and processes. As the greater part of YKI's network of over 100 universities and research institutes sees us as a link to industry, there is also a strong inflow of ideas from these sources to YKI, where they contribute to the development of applications of commercial importance for our customers.

Markets and trends

YKI's international competitiveness is well shown by the Institute's ability to win contracts from leading multinational companies. At the same time, Swedish companies gain access to world-class innovations through YKI. The Institute's public financing supports fundamental research and the development of new areas of expertise. Our range of research is thus constantly updated so that, with suitable direction from industrial reference groups, the Institute's technology portfolio is constantly developed in order to maintain its relevance for industrial customers' needs and interests. Our scientific reputation and close links with industry made us an attractive partner in several successful applications for centres of

excellence during 2006. Among these centers which started-up mid 2007, we should particularly mention the CODIRECT Centre at YKI in partnership with the Royal Institute of Technology (KTH) and Stockholm University (SU) focussed on controlled delivery and release, which has received public funding from Vinnova, the Knowledge Foundation and the Swedish Foundation for Strategic Research (SSF); and the partnership with SU in a 'Berzelii Centre' called EXSELENT aimed at the creation of highly selective catalysts via nanostructured materials.

These two centers work synergistically and create the basis for many projects for client companies in a wide variety of sectors. Together, they are responsible for four doctoral students at YKI. COLINTECH, a basic research program aimed at understanding nanostructures from self assembly via surface chemistry forces ended in 2007. This cooperation among Lund, Chalmers, KTH and YKI was funded for 10 years by SSF and was the basis for 14 doctoral theses at YKI/KTH. Plans are being made by the partners to submit a new grant application to SSF in the area of synthesis and applications for mesoporous structured materials.

Nanostructured materials are the focus of application projects at YKI for clients in the paint, coatings, adhesives, composites, cosmetics, packaging, and food industries. New nanostructured metals and metal oxides created at YKI are even finding their way into projects in ECOBUILD, an excellence center in SP Träteknik aimed at protecting wood in exterior applications and expanding the range of use of wood as a building material.



YKI has a PhD candidate investigating biomimetics. The picture shows fine nanostructured materials from diatoms, tiny sea creatures that can occur in millions of different shapes in just the same way as snowflakes do.

Images of diatoms from Dr Leanne Armand, Research Fellow, Antarctic Climate and Ecosystem Cooperative Research Centre/CMAR.

YKI and SIK partnered in establishing SWECHOC, an excellence center devoted to research on the surface chemistry and manufacture of chocolate involving 13 companies from 7 countries.

We have begun work together with the Royal Institute of Technology in their excellence center iPack, a VINNEX centre at the Royal Institute of Technology, which is developing the application of electronic circuits to packaging by printing or other means, in order to produce intelligent packaging. The center is financing a post doc at YKI to work on conductive polymer inks. We have also started a VINNOVA financed four-year program together with the Digital Printing Center at Mid-Sweden University and industrial partners on next generation pigments in paper and paper coatings for inkjet printing. This new program is financing a doctoral student at YKI.

Customers and work

There has been a significant increase in the number, size and complexity of projects done for large multinational companies at YKI, and in 2007 a full two-thirds of our revenue from industry came from these companies. At the same time, 12 member companies are SMEs and YKI is striving to provide more support for incubating newly created companies. There is a natural synergy among SMEs and large enterprises at YKI since the latter can not only be a path to market for an SME, but can advise on issues such as scale-up and manufacturability, marketing, and even help with capitalization. Similarly, a large enterprise is often included in our EU Research for SMEs applications to bring credibility regarding prospects for commercialization and market projections.

Prospects for 2008

Abilities to perform surface analyses have been further advanced through the acquisition of new instruments. The recruitment of experts in the field of biosurfaces has further strengthened YKI's work

YKI is participating in a Vinnova-financed project aimed at the development of next-generation pigments and surface treatments for inkjet paper.



in the field of surface modification. SP and YKI are also planning to start a surface analysis centre.

Further developments can be expected with the addition of nanoparticles to optical coatings for anti-reflection and improved UV blocking, as well as improved optical properties for polymers such as increased refractive index that will permit thinner lens, and improved barrier properties for packaging, as well as improved surface treatments that are resistant to corrosion, high temperatures, fire and abrasion

Similar developments are expected in the formulation area such as particle-stabilized emulsions and foams, new ways of dissolving or delivering difficult-to-dissolve ingredients or drugs, and development of more effective methods for rapid formulation.



*Bruce Lyne,
CEO, YKI, Institute for Surface Chemistry*

YKI's new XPS instrument (also known as ESCA) is a world leader. XPS is an extremely sensitive method of surface investigation, revealing the chemical composition of the outermost 2-10 nanometres of a material, with quantified results in terms of both elements and various chemical bonds. The new instrument quickly produces quantitative chemical pictures showing the distribution of various components across a surface, with a lateral resolution in the μm range.



SMP Svensk Maskinprovning

SMP Svensk Maskinprovning

The main thrust of our work is concerned with safety of machinery and associated environmental aspects through certification, testing and inspection. With headquarters in Uppsala, we have laboratories outside Malmö and Umeå. SMP has a staff of about 45, of whom over 20 are regional inspection engineers.

SMP's inspection section inspects civil engineering and contractors' machinery, as well as lifting equipment. The certification unit inspects the safety of machinery and production lines, including inspection of associated technical documentation, often against CE-marking requirements. The laboratories in Umeå and Malmö perform various safety and capacity tests, and also evaluate the environmental performances of engines and oils. Cooperation with other parts of the SP Group also involve participation in research projects connected with safety and the environment.

Markets and trends

The continued boom in the construction industry has resulted in plenty of work for our inspection services, where we have a strong position for the inspection of mobile machinery. The market for our testing services increased somewhat during 2007, resulting in continued high utilisation of our laboratories, which is in turn favourable for our certification activities. During the year, the Government Offices of Sweden has started work on restructuring the country's vehicle inspection system and opening it to competition. In the longer term, this can present new opportunities for SMP's inspection services.

Customers and work

Strong demand for inspection services for civil engineering and contractors' plant, together with testing of products such as protective cabs, engines, forestry machinery, protective clothing and

Testing of protective clothing for users of saws is a major testing area for SMP. We have also been in the lead of developing testing standards for protective clothing for saw users.



consumer products such as cycles, lawn machinery and hand tools during 2007, helped SMP exceed its revenue targets for the year. We have acquired new customers in the field of testing consumer products.

Prospects for 2008

For 2008, we foresee continued increasing interest from the civil engineering and contracting sector in electronic ordering and reporting of inspections. Our systems are capable of dealing with this demand. Continued good economic conditions in sectors such as the construction and forest industries should ensure new work for us in inspection, testing and certification.

During 2008, we expect to establish further links with other parts of the SP Group, with the aim of increasing our input to research projects in certain profile areas.



Mats Linder
CEO, SMP Svensk Maskinprovning

There has been a high demand during the year for inspection of civil engineering and contractors' machinery, coupled with greater use of electronic ordering of such tests and reception of their results.



Certification

Certification by SP and Sitac

SP Certification is the department within SP that certifies products and management systems. Sitac is a subsidiary company, which certifies products and persons in the construction sector.

The access to a wide range of specialised skills and expertise within the SP Group provides unique potentials for certification arrangements that can be tailored to customers' requirements.

Work is carried out with a high degree of rationality and efficiency. The SP Group's extensive contact services, both in Sweden and abroad, mean that certifications carried out by it have wide market acceptance.

Markets and trends

There is a need for certification that is internationally recognised. At the same time, there is a clear need for such services to be anchored in regional or sector-orientated markets.

As far as management systems are concerned, the international ISO 9001, ISO 14001 and OSHAS 18001 standards are very strongly entrenched at the international level. The substantial expansion in

Medical Devices is one of the working areas in which there is an increasing number of special standards. We are meeting these requirements by obtaining relevant accreditations and becoming a Notified Body. We have also started joint working with other certification bodies in this sector.



these general standards has declined somewhat in recent years, at least in Europe. They are being complemented by an increasing number of special standards tailored to the requirements of various sectors, such as foodstuffs, vehicles and medical devices. We are meeting this need by obtaining accreditations and becoming a Notified Body (for CE-marking) for many special areas. Another method of working is cooperation with other certification bodies, such as SFK Certification in the healthcare sector and the Danish DS Certificering in the field of construction products.

On the product side, there is a continued growing demand for CE-marking. As CE-marking sometimes – and particularly in the construction products sector – does not include performance requirements, but provides information only on the properties of materials or products, there has arisen a need for certifications that complement the information and cover requirements that are demanded by the market. This has meant that the use of SP's own quality symbol – the P-symbol – has increased substantially in the field of construction products. SP Certification and Sitac have pointed out that customers can choose P-marking when their present or previous type approvals expire.

Interest in certifying the skills of individuals has also increased: the latest example is that for energy experts, linked to energy declarations for buildings.



INSTA-CERT is a joint Nordic approval scheme between SP and other Nordic certification bodies, offering certification of plastic pipes and HVAC and sanitary products for the Nordic market.



Customers and work

SP Certification's status as a Notified Body for the Measurements Instrument Directive (MID) has meant that many customers have been able to CE-mark their products in 2007. This is an area in which SP has an exceptionally high level of expertise.

Within the Nordic countries, SP is part of a joint scheme (INSTA-CERT) covering plastic pipes and HVAC and sanitation products. Several customers have received certifications for their products, firmly based on the national approval schemes.

We are closely engaged in certification of small companies in group associations. This means that they have jointly developed their management systems, and that surveillance inspections can be performed in a rational manner. This provides an excellent opportunity for small companies to start systematic quality and environment work, which can also be extended to their work environments.

Certification of entire buildings for CE-marking is an extremely complicated project. As the only Swedish ETA body, Sitac has carried out a number of such projects during the year. Experts from several departments within SP have been involved in various special aspects.

Prospects for 2008

The rules governing emission trading have been revised, which means that there is a need within industry for relevant information. Training is a working area that will be expanded in 2008. Courses have already been held in internal quality auditing and on standards, and further subjects will be included in the range.

During 2008, we plan to launch new aids and services for companies wishing to analyse the efficacy of their work on quality, the external environment and their work environment. There is a need to provide further support for the continued improvements in these fields required of companies.

P-marking of construction products is expected to continue to expand. Several sectors, such as door and window manufacturers, are expressing greater interest in P-marking.



◀ Lennart Månsson,
Manager
SP Certification

Peter Bengtsson, ▶
CEO, SITAC



P-marking of construction products is an expanding working area. Door and window manufacturers are an example of sectors which have exhibited particularly strong growth.



Financial Overview

INCOME STATEMENT

(Thousand SEK)	Group		Parent Company	
	2007	2006	2007	2006
Revenues	768 101	806 531	566 395	541 003
Operating expenses	-759 125	-740 359	-550 102	-523 489
Operating income	8 976	66 172	16 293	17 514
Financial income and expenses	4 958	896	1 898	1 258
Income after financial items	13 934	67 068	18 191	18 772
Allocations	-	-	3 000	10 610
Taxes	-3 539	-10 190	-6 267	-8 623
Net income	10 395	56 878	14 924	20 759

BALANCE SHEET

(Thousand SEK)	Group		Parent Company	
	2007	2006	2007	2006
Assets				
Fixed assets	223 656	215 316	218 427	218 250
Current assets	413 607	434 854	254 164	259 199
Total assets	637 263	650 170	472 591	477 449
Shareholders' equity and liabilities				
Shareholders' equity	391 719	381 324	268 581	253 657
Untaxed reserves	-	-	30 170	33 170
Long-term liabilities	40 259	44 620	21 118	23 696
Current liabilities	205 285	224 226	152 722	166 926
Total shareholders' equity and liabilities	637 263	650 170	472 591	477 449

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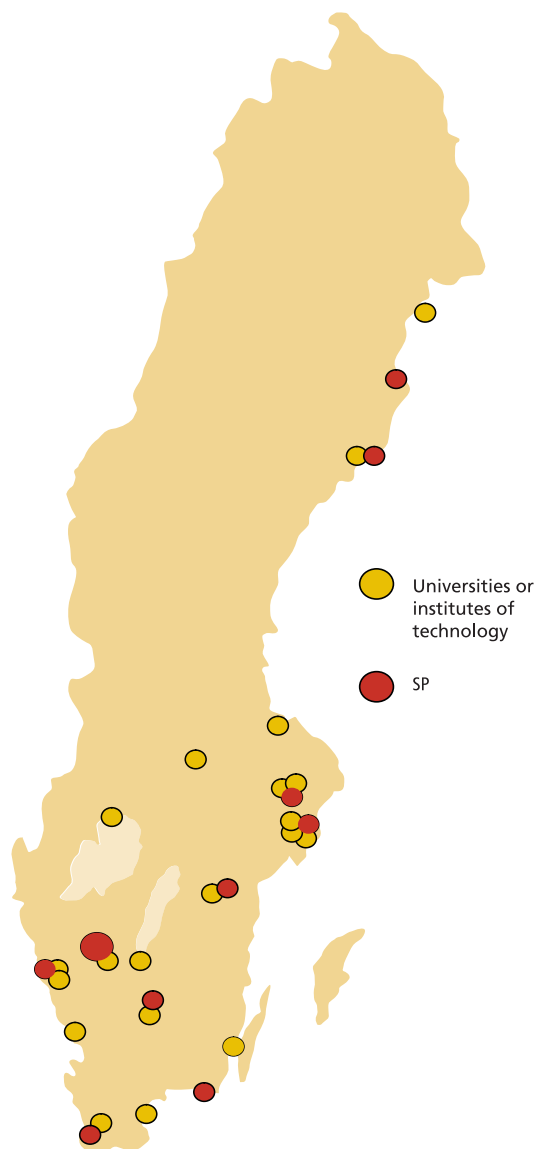
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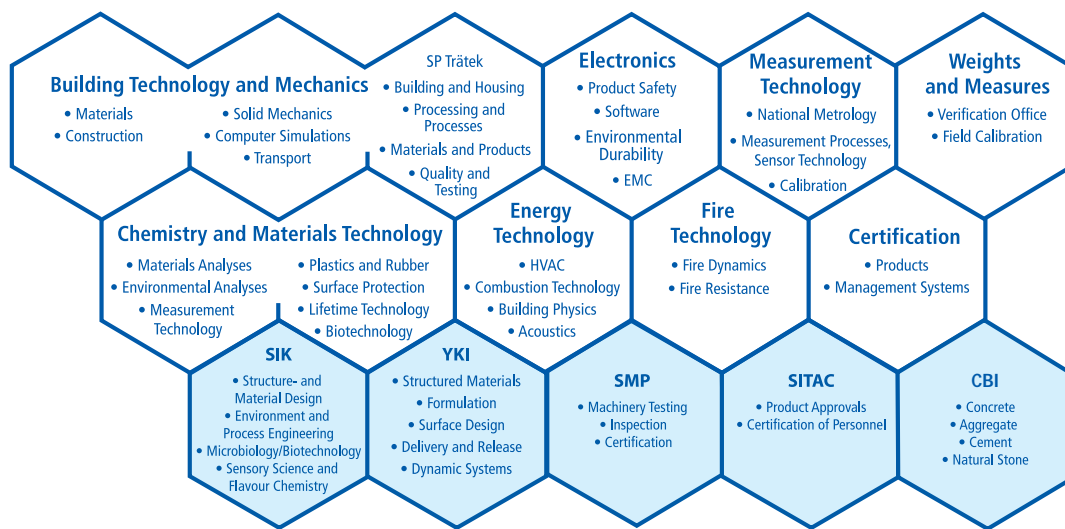
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SP is represented in most towns or cities with universities or institutes of technology. In total, we operate from over 20 sites throughout the country.

SP Technical Research Institute of Sweden develops and transfers technology for improving competitiveness and quality in industry, and for safety, conservation of resources and good environment in society as a whole. With Swedens widest and most sophisticated range of equipment and expertise for technical investigation, measurement, testing and certification, we perform research and development in close liaison with universities, institutes of technology and international partners.

SP is a EU-notified body and accredited test laboratory. Our headquarters are in Borås, in the west part of Sweden.



SP is organised into eight technology units and five subsidiaries



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