

A magazine from the Sapa group • # 1 2004

Shape

**BUILDING SYSTEMS
REDEVELOPING**

**NEED FOR COOLING IN
TELECOMS HEATS UP**

**INCREASE COLLABORATION
WITH SUPPLIERS**

Masters of masts

**SAPA SUPPLIES THE WORLD'S
BIGGEST MAST MAKER**

sapa:

Thanks to everyone

I am writing these lines as April turns to May when we have recently published our first quarter figures. Gratifyingly enough, we are able to report an increase in sales of no less than 26 percent compared with the first quarter of 2003.

A large part of this comes from the acquisition of RCA but our organic growth was also good and here both our own sterling efforts and an improved European economy have had their effect. After a long period of poor growth in Europe, it seems as if we are in a period of obviously increased economic activity. This is increasing demands on us as a supplier to maintain a high level of service, to be able to deal with bottlenecks and to be able to work on our internal efficiency and productivity despite the fact that our focus is gradually shifting to dealing with the consequences of a rapid growth in volumes.

On 1 June I will be leaving the post of CEO after five demanding and eventful years in which Sapa has undergone important changes and the volume of business in both profiles and building systems and heat transfer has doubled.

It is thus time for me to thank our customers, employees, shareholders and other interested parties for a wonderful time together. I am proud of what our organisation has been able to achieve. We have advanced our market positions so that a once mainly North European oriented company today has substantial businesses in the USA, Asia and Eastern and Southern Europe. We have expanded our profile based manufacture and strengthened our brand as one of the leading companies in our industries.

The stock market has appreciated what we have done and our quoted market value has increased by just over 80 percent to 770 million euros – another proof that streamlining and expansion were the right things to do.

On behalf of all our employees, I should like to say that the Sapa group has become a more exciting company in which the opportunities for development have increased and where the original corporate culture characterised by individual acceptance of responsibility and decentralisation has been an excellent model even now that the company has grown into an internationally significant player. Many thanks, and I wish Sapa the best of luck in the future. I know that developments will continue in the same positive direction.

Staffan Boman
Sapa's Group Chairman and CEO



6-8



10



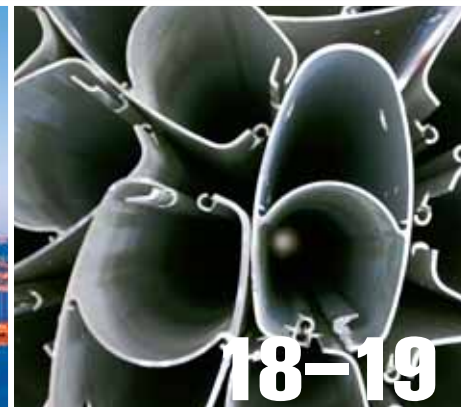
16-17



14



12-13



18-19

Sapa is growing in building systems

Will become best at design, quality and service6-8

Partnership increases competitiveness

Valeo wins out from close cooperation with Sapa9

Sunny weather increases sales

Gåsdal Byggningsindustri is creating shade11

Smarter choice in bridge building

If the Golden Gate Bridge was built of aluminium12-13

Ingenious crumple zone in racing car

Engineering students will win racer competition15

Long experience of telecoms

Interview with Sapa's Lars-Inge Arwidson16-17

Stringent requirements for yacht masts

Safety is number one at Seldén Mast18-19

Artist goes for brightly coloured metal

María Börjesson is seduced by aluminium23

sapa

We are **shaping** the future

Shape is the Sapa group's customer magazine, which comes out in eight languages twice a year for readers including customers, shareholders, analysts, journalists and employees. Shape is also

available on the Internet at www.sapagroup.com

Publisher: Eva Ekselius.

Production: OTW Publishing.

Changes of address: Customers should inform

SUMMARY

Kåre Wetterberg, Sapa's new CEO



After just over five years as CEO, Staffan Bohman retired last May. He is being replaced by Kåre Wetterberg, 55, who was previously the Vice CEO.

"It is very satisfying that we have been able to appoint an experienced Sapa staff member of many years standing as Staffan Bohman's successor", says the Deputy Chairman of the Board, Ole Enger.

Kåre Wetterberg has occupied a series of posts within the Sapa group since 1974 including being the head of subsidiaries in Germany and Sweden. Since 2002 he has been the Vice CEO and Staffan Bohman's deputy.

Staffan Bohman is being proposed for re-election as a member of the board and will be available to the Chairman part-time as an advisor.



The frame is made of extruded aluminium that is both bent and welded. Special measurement tools are used so that the quality requirements can be satisfied.

Light prams for modern parents



The Teutonia brand of prams, owned by the British company Britax Childcare, will make the future easier for parents. The steel design of their prams is now being changed to aluminium profiles and other aluminium fittings in order to reduce weight (see picture). Sapa in Poland are supplying Teutonia with the aluminium components. The value of the order will exceed 600,000 euros annually. 2,000 prams a month are being made in 2004 but it is estimated that in 2005 production will increase to 2,000 a week.



A revolutionary grill for sailors.

The grill goes on board

The BBQTER [barbecuter] grill, from the Danish company Danmoll International is the answer to every boat-owner's dreams. Sailors no longer need to go ashore to have a barbecue; instead, BBQTER comes on board the boat. It is all aluminium and as portable as a laptop computer with various practical accessories such as a carrying bag. The grill is also easy to assemble, thanks to the design of our aluminium profiles. The aluminium means that the grill stands up to wear and corrosion, which is particularly important at sea. Danmoll International intends to develop the grill with new accessories.

Decorative fronts for personal computers

The appearance of personal computers is becoming ever more important. Schäfer IT Systems, part of the German Schäfer Group, has taken this as its starting point and is therefore manufacturing designer computer cases and ready-assembled personal computers for a number of household name suppliers.

Schäfer IT Systems has commissioned Sapa Vertrieb to manufacture

decorative front panels for personal computers. The planned annual sales are approximately 50,000 units a year. In the work before manufacturing at Sapa's Offenburg factory, a decorative profile solution was developed jointly with Schäfer IT Systems. Besides coming up to standard, the challenge in developing this component was the short, flexible delivery times that the Offenburg factory provides.

their contact at Sapa, shareholders should contact the institution that handles their account, employees their payroll department and others the information section on +46 (0) 8 459 59 00.

Sapa is an international industrial group that develops, manufactures and markets sophisticated aluminium profiles, profile-based components and systems together with aluminium heat exchanger

strip. Sapa turns over approximately SEK 14 billion and the company has around 7,800 employees across the whole of Europe as well as the USA and China.

Contributors to this issue: Mats Lundström, Ulrika Hotopp, Helena Trus, Susanne Johansson, Ulrika Eriksson Brandt, Kristian Borglund and Charlotta Zingmark.

SUMMARY



Aluminium bodied buses are running on the roads of every Nordic country.

Light, environmentally friendly bus bodies

The Finnish bus company Lahden Autokori Oy Aluminium is unique in Finland in manufacturing bus bodies in aluminium. Two years ago, Sapa started supplying aluminium profiles to the company, which exports to all the Nordic countries.

Lahden has been building aluminium bus bodies since the 1960s. Aluminium is a fine material from the environmental point of view, reckons Risto Rantanen of Lahden.

"Aluminium spares nature since it can be recycled efficiently", says Risto Rantanen. "What is more, it is a light material in comparison with steel bodies, which means that operating costs are less with lower fuel consumption and less tyre wear."

Another advantage of aluminium that Risto Rantanen emphasises is that aluminium profile technology provides additional qualities and shapes.

Sapa Finland supplies Lahden with aluminium

profiles of many different lengths and in some instances finishes them by anodising and painting.

What are the profiles from Sapa used for?

"They are used for the roof and sides. On the exterior of the sides we use wide profiles instead of sheet steel. On the inside we use aluminium profiles for air ducts", says Risto Rantanen.

Aluminium bodies do not require as much maintenance, which is quite important in a bodywork context.

"You don't need to powder coat or paint them, since they resist corrosion better than steel", says Pertti Fri of Sapa. "The material is somewhat more expensive, but on the other hand it has a longer life."

Lahden sells aluminium bodies to customers including the Finnish bus companies Pohjolan Liikenne, Connex Finland and Väinö Paunu Oy as well as to Arriva Sverige, KR-Trafiken and Bussslink in Sweden.

Profiles part of bus structural members

Sapa Vertrieb has obtained an order for aluminium profiles for heater elements for buses from the German company UWE Deutschland, a subsidiary of UWE-verken AB in Norrköping. Production is taking place at Sapa's factory in Offenburg, Germany.

UWE is a household name manufacturer of vehicle heaters. Their hot water systems with convectors are characterised by a high level of heating comfort with very little air movement.

A casing for the radiators was developed in consultation with Sapa Vertrieb. The casing is an extruded profile whose high stability and good appearance make it suitable for this area of application. Sapa's Offenburg factory stamps the extruded profiles and they are delivered anodised to UWE Deutschland in Oettingen, Bavaria, in lengths of up to 6 metres. From there, the ready assembled parts are delivered daily direct to the assembly line of a famous German bus manufacturer.

Discussions are going on at present about new complementary products for UWE, some of which are already at the initial preparation stage.



Sapa supplies aluminium profile casings for bus heaters.

Why did you choose aluminium profiles for your design?



Jacco Zwart, Armada Outdoor: "Two main reasons: you can create nifty solutions using aluminium profiles, especially where joints are involved. And aluminium

is outstandingly suitable for outdoor applications where there are stiff demands on strength and corrosion resistance. What is more, anti-graffiti paint contributes to a long aesthetic life."



Jari Anttila, Manager Hull Design and Manufacture, Kvaerner Masa-Yards, Turku Shipyard:

"The biggest gain for us from the FSW (Friction Stir Welding) technology is that the panels are appreciably flatter and straighter than fusion welded profiles and have closer tolerances. As a result, we get more efficient production."



Lennart Lindeberg, Proton Caretec, (about the company's homecare bed, the E-bed):

"Sapa supplies a product that is ready for assembly. We can slim down our organisation, we get increased flexibility, greater production resources and access to unique skills."

Lighter wings

Increasing demands from the aircraft industry are now putting pressure on subcontractors to develop new materials and techniques for reducing weight.

Aluminium is at the leading edge in this area. Using a new alloy and improved heat treatment and drawing, Boeing's supplier has succeeded in making the wings of the Boeing 777 lighter while retaining their load bearing properties. This reduction in weight makes it possible to increase the range.

(source: Advanced Materials & Processes)



With better technology, new models of aircraft can be made lighter.



Smart stand with colourful occupant.

Aluminium flower boxes

Sapa Profiler AS has entered into a three-year contract with Plantagen to supply 6,000 flower stands in four versions to shops in Norway, Sweden and Finland. The order is worth 17 million Norwegian kroner.

"Plantagen were having problems with their supplier. I contacted a buyer at Plantagen and they accepted the price we offered per stand", says Thor Kortgaard, district manager at Sapa Profiler in Norway.

Contact having been established with Sapa, the deal has developed favourably. Production began at the turn of the year 2003/04 and Sapa has already delivered goods worth several million

Norwegian kroner. Sapa Profiler is to supply around 2,000 stands a year. The project involves 13 profiles that are processed by sawing, stamping and welding, together with drilling and assembly and come with a variety of accessories. The flower stands are installed in the shops by Plantagen.

"It is a very big and complicated order since it involves total supply of everything from stand tops to screws. We have had similar orders before but not in this industry", says Thor Kortgaard.

Plantagen is Scandinavia's leading chain in the garden products segment with 19 shops in Sweden, 25 in Norway and 3 in Finland.

Stable profiles for Volkswagen and Audi

In collaboration with Sapa Technology, Sapa RC Profiles, formerly Remi Claeys Aluminium, has developed a profile for the Volkswagen Golf 5 platform, which will also form the basis of the new Passat platform from 2005.

The new profile is being used as a stabiliser in the rear suspension on which the Golf ForMotion is built.

Deliveries of the profile began last year and it was initially used on the Audi A3 Quattro. Next year a good many changes will probably be made to its design of the profile – to create more room between it and the body of the car.

By 2006, the profile will also be found in Audi's TT sports car.



The profile that stabilises the Golf and Passat.



More aluminium profiles. Because of the collaboration between Sapa and Volkswagen, cars are getting lighter and lighter.

Pharmaceutical company offices with sunshade panels

Country: Belgium.

Location: Lessines.

Purpose: New offices for the Baxter pharmaceutical company.

Architect: Patrick van der Straeten, Sigma 3.

Building system: Sunshade panels from Sapa RC System.

After years of inadequate comfort and a poor working environment, Baxter took the bull by the horns. The factory needed new office premises. The instructions to the architects, Sigma 3, were to plan the construction of 4,500 square metres of offices within ten months using a prefabricated design with concrete pillars. Baxter wanted a flexible building and chose a modular solution that was easy to change as needed.

Sunshade panels of corrugated aluminium sheet from Sapa RC System are mounted around the whole of the facade. They enhance the harmony between the facade and the entrance. What is more, they provide protection not only against the sun and heat but also against vertigo.

“The sunshade panels provide a feeling of security. Previously there were many people who did not dare go right up to the windows because they got dizzy. Now there is hardly anyone who has a problem with that”, architect van der Straeten relates.

Under its contract with the builders, Sigma 3 had to choose between three different suppliers of aluminium profiles. The choice went to Sapa RC System since they met the requirements for design, heat conductivity and function.



Sapa is restructuring in Europe

The acquisition of Remi Claeys Aluminium in Belgium made Sapa Building System the third biggest producer of building systems in Europe. Its new head Francois Coëffic is not afraid of his task – “We will be the best in design, quality and service.”

Shut out cold, heat and unwelcome visitors. Withstand years of harsh weather conditions and appeal to both discriminating architects and cost conscious building contractors. The requirements are many and arduous for a supplier of building systems. However, the most difficult aspect of the construction industry is its sensitivity to the economy.

Now that Sapa is the third biggest supplier of building systems in Europe, this means an important reverse in the trend. Consequently, the independent building system companies

that make up the group in Europe are now being organised as a single unit: Sapa Building System.

In 1970, Sapa took its first step into the building systems market by beginning to supply aluminium profiles for windows and doors.

Today, Sapa Building System furnishes the European construction industry with everything from simple profile systems for windows and doors in dwelling houses to advanced facade systems for commercial premises such as banks, exhibition halls and shopping centres.



FRANCOIS COËFFIC, who was previously responsible for Sapa Profiles in Europe, is the newly appointed general manager of Sapa Building System.

“For a long time I have been advocating that Building System should be a core business within Sapa and the acquisition of Remi Claeys Aluminium meant that we were sufficiently big to be able to make our own deals. Personally I am looking forward to closer contact with customers and the market.”

In June he will be moving from Sapa’s head office in Stockholm to set himself up in Sapa Building System’s new head office in Lichtervelde, Belgium. The move is a consequence of the fact that, as from June 2004,



New European Championship stadium in Portugal

Country: Portugal.

Location: Aveiro.

Purpose: New European championship stadium constructed for the 2004 European football championship, Euro 2004.

Capacity: 30,000 spectators.

Architecture: Tomás Taveira.

Builder: Seveime.

Profiles: "Mirage" from Sapa Portugal's Arkial series.

12 June was the kick-off of the European football championship. One of the new arenas built to host the championship is the Aveiro Stadium in Portugal. Armelin Hipólito is the CEO of Seveime in Portugal and was responsible for the construction of the Aveiro Stadium. He reckons that the building was a challenge since the architect wished to give the arena an undulating and partly asymmetric character.

"Construction was extremely complex. In order to create a special impression, the architect used asymmetric angles and slopes in the facade and floor", explains Armelin Hipólito.

In order to emphasise its character, the stadium's profiles were coloured using a special powder paint in bright colours. According to Seveime's CEO, the collaboration with Sapa made it possible to have an arena that will mean a great deal to the region around Aveiro even when the European football championship has finished.

Apropos the European championship, Armelin Hipólito has a not entirely unexpected favourite for the title of European Champion 2004.

"I would rather see Portugal and Sweden in the final, obviously with Portugal ending up the winner."

Sapa Building System will be a core business on its own and not – as previously – part of Sapa Profiles.

Francois Coëffic is convinced that the new organisation of Sapa Building System will bring about substantial competitive advantages – particularly when it comes to big European jobs. The strategy will be to concentrate on key areas such as product development, service, logistics and marketing.

"The new organisation provides us with the opportunity to combine the strengths of the various companies, take advantage of each others' knowledge and become more efficient. The amalgamation makes us a genuinely strong European player", he observes.

For Sapa it is Eastern Europe in particular that will be the next major growth area.

"We have great potential in Eastern Europe, but France, the United Kingdom and »

Relationships make the deal

Relationships are the cornerstone of deals in the construction sector. Depending on what type of project is to be carried out, there are a host of people who have a say in what products will ultimately end up in a building.

"The challenge of working with building systems is to create interest at many levels," says Mattias Jansson, who is responsible for market support for Sapa Byggsystem in the Nordic and Baltic countries.

"The architects must feel that our system has an exciting and innovative design, the designers make high demands of functionality and the building contractors are looking at the overall economics. We must be able to

satisfy all their requirements", says Mattias Jansson.

In buildings of a commercial nature, the architects have a decisive influence on what profile system is chosen. Therefore, Sapa puts considerable resources into creating and maintaining good relationships with the architectural profession. This is done by personal visits to architects' offices, briefing meetings and printed matter in the form of design and profile manuals.

"We must show the whole time that we are good at design and that we make it easier for the architects to be innovative", concludes Mattias Jansson.



Mixed periods at school

Country: Belgium.
Location: Mons.
Purpose: Redevelopment of the European School in Uccle.
Architect: Pierre Farla.
Building system: Aluminium profile system from Sapa RC System.

For over ten years, Pierre Farla's architects bureau has been devoting itself to the redevelopment of the European School and it has had Sapa RC System at its side the whole time. The project is a challenge. The character of the area must not be lost and the new buildings must not affect the pupils' ability to move between the various units.

On the site where the former European School stood, we now encounter buildings from every period. At present, the architects are supervising the work on a vaulted building that is to house classrooms (see picture).

The carcass is made of reinforced concrete and the roof contains fabricated elements that initiate the vaulted design. During this phase the people responsible for the building turned to Sapa RC System for assistance with aluminium profile systems.

"This is a system that we are very happy with", says Özcan Kandemir of Pierre Farla's architects bureau. "Besides the competitive price and high quality, it was above all Sapa RC System's response and interest that made the difference for us."

» Benelux are also growth areas", says Francois Coëffic.

The big challenge will be to make Sapa's decentralised and local building system companies into a European player that is strong enough to take on the European competition. The first stage will be to create an organisation that is centralised in the areas where this is profitable but that continues to be local where necessary. Areas in which there are obvious synergies include product development, purchasing and logistics.

"Sales, marketing and technical support require a presence. On the other

hand, it is unnecessary to put a lot of resources into developing a system in Portugal that already exists in Belgium."

RIGHT NOW, A MAJOR SURVEY of the various companies' strengths and weaknesses is in progress. By comparing the different companies, we will see what techniques and ways of working have been successful. The good examples and assembled skills will then form the basis of the new company.

"Throughout Europe, we will be just as good as the best local companies are in their own countries."

» The amalgamation makes us a really strong European player «



Facts • New decorative programme

With the help of White Design AB, Sapa Byggsystem in Sweden has developed a new concept for exterior decorative profiles for glass facades. The profiles are divided into three families that can be combined: Add, Expressive and Optima.

Add is a flexible load-bearing bracket system designed for attaching sunshade screens, lightning conductors, signs and lighting to the facade.

Expressive is made up of decorative profiles that stick out more than traditional ones. This makes it possible for the architect to create a sharper impression in the facade by creating contrasts and tension by means of light and shadow.

Optima is a discreet profile as part of the facade and provides the latter with a very smooth surface together with a long life without silicone joints or specially sealed glazing.



The collaboration between Sapa and Valeo is a successful and outstanding example of partnership in practice.

ILLUSTRATION: INGRID FLYGARE

Let the supplier find the solutions

Industries gain from working more closely with the suppliers. With increased involvement in the decision-making processes, suppliers find brilliant solutions more easily.

In his capacity as head of materials development at Valeo in France, the world's biggest manufacturer of car cooling systems, José Garcia has no doubts: "Our partnership-like relationship with Sapa makes us more competitive. With today's ever tougher competition, more companies in manufacturing industry are seeing the value of deeper and more effective forms of collaboration with their suppliers."

This is a development that Sapa appreciates.

"The more involved in the project our customers let us become, the more we contribute to short product development times", says Bengt Markbo, marketing manager for the Sapa Heat Transfer business area, currently one of the world's leading suppliers of heat transfer components to the motor industry. Shorter development times are worth their

weight in gold to Valeo, which supplies radiators and air conditioning systems to car companies such as Renault, Volkswagen, Audi, Volvo, Saab and Ford.

It is a matter of being one stage of development ahead of the competition all the time. When Shape talked to José Garcia, he had just come home from his own company's research centre outside Detroit in the USA where they were analysing the first tests on the development of a new lighter radiator with thinner tubes. It was natural to take Sapa along to the analysis meeting.

"It is important that they get an insight. Then they see for themselves what needs to be done and can react at once", says José Garcia.

THE SAPA HEAT TRANSFER participant was Torkel Stenqvist, an engineer from Sapa who works on product development and technical service.

"When we discussed the test results, it was obvious to me that they should test another material that we have developed at Sapa Heat Transfer and a new alloy that I think will handle their corrosion test better", says Torkel Stenqvist.

José Garcia says that no other of his suppliers can demonstrate such speed on the development side – and a major explanation is

presumably the close collaboration.

"This is obviously the best way of working. There is no doubt on Sapa's part about what we need; they understand our future needs", he continues.

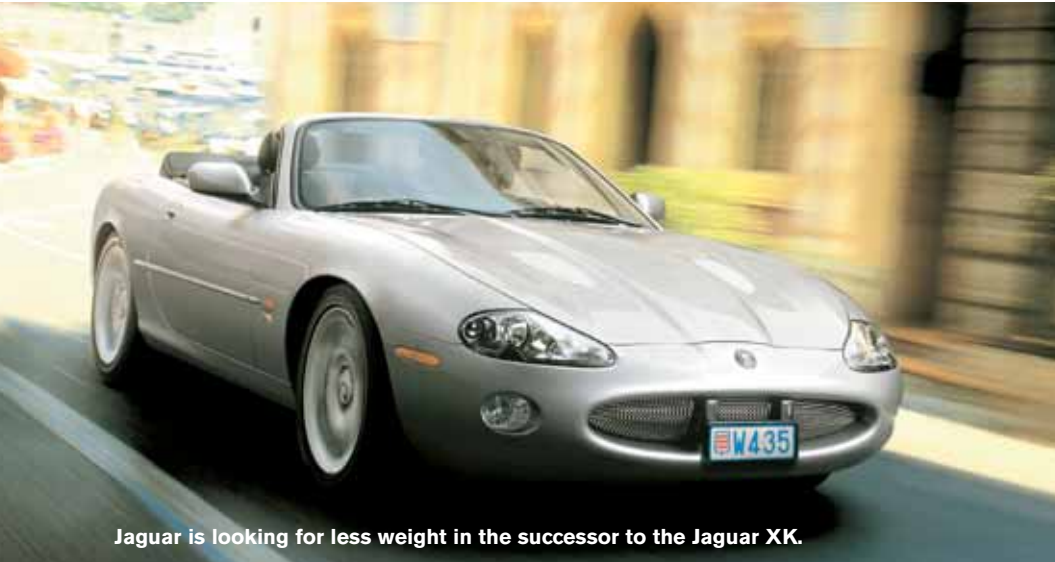
Just as with many industrial companies, one of those needs is reliable deliveries. "We work just-in-time; we have very little in stock. If production stops, we have to pay our customers high penalty charges. Sapa has worked hard to increase capacity and over the last six months we have not had any interruptions", says José Garcia.

3 benefits:

José Garcia of Valeo lists three benefits from close relationships with the supplier:

1. "We get detailed knowledge of the materials and their limitations, which is needed for optimum fulfilment of our customer's specifications."
2. "Joint evaluations right from the initial stage of a new project makes it easier to take rapid action as needed"
3. "Our closeness allows us to exchange ideas on further development both in our business and in theirs."

Jaguar with a feeling for form



Jaguar is looking for less weight in the successor to the Jaguar XK.

When Jaguar launches the successor to the XK sport car, it will include a hydroformed beam in the front, developed in a close collaboration between Sapa and Jaguar.

The hydroforming technique means that the aluminium beam can meet the flexibility and detailed shaping requirements imposed by the successor to the Jaguar XK.

Sapa Automotive together with Sapa's hydroforming skills centre are responsible for developing the beam and supplying it to Jaguar.

Up to now, the successor to the XK, which is for a large part built of aluminium, has not been shown in public. It is estimated that the first cars will be on the market in late 2005 to early 2006. But the first deliveries of the hydroformed beam will be going to Jaguar before summer 2004, confides Håkan Muhr, Sales & Project Engineer of Sapa Automotive.

JONAS BJUHR, WHO IS MANAGING the project at Sapa, thinks that the advantage of a hydroformed beam is that it has such good conformity of shape. Everything from the radiator to the front lights will be mounted on the beam and the attachments for gas filled dampers, windscreen-washer bottle and the bodywork will be welded on.

"For the beam to be able to perform all of these functions, it must have a complicated shape", says Jonas. "There is a shortage of space in this part of the car, so a technology

that gives close tolerances of the shape is an advantage and hydroforming produces really good shape conformity."

Hydroforming means that the cross-section of the beam can vary and it can have very different designs locally. In combination with the good conformity, this facilitates the downstream processes such as welding and assembly.

For Jaguar's part, it is obviously an advantage that the beam is in aluminium and not, for example, steel.

"Jaguar are looking for light weight in all their cars, especially at the front, and this beam contributes to keeping the weight down", says Jonas.

What is needed for you to supply this beam? Have you made any new investments?

"We have, mainly for machining the beam. But the investment in the hydroforming installation is not just tied to the beam but is something in our armoury for the future. The investment means that we are automating a large part of this manufacturing operation", says Jonas.

THIS IS SAPA AUTOMOTIVE'S first big deal with Jaguar to involve hydroforming. Sapa won the order by offering a total solution that is competitive in both cost and design. Sapa Pressweld, which was acquired in 2002, already

had a long-term collaboration with Jaguar. Around 70 percent of Sapa Pressweld's sales are to prestige makes in the motor industry, including Jaguar. The rest go to kitchen fittings, gaming machines and the heating sector.

"It is obvious that it means a great deal to us to be a direct supplier to Jaguar", says Chris Harvey, who is an account manager at Sapa Automotive in England. "The fact that it is a hydroformed part makes it particularly interesting, since that means we can also offer our customers this type of advanced profile solution."

It is estimated that the project will go on for at least five years and turn over approximately 1.9 million euros.

The hydroformed beam for Jaguar is Sapa's second series production of hydroformed parts for the motor industry. The first example of series production is an air intake manifold pipe for Volvo Cars.

Example of hydroforming: an air intake manifold pipe to the turbo on some Volvo cars.



Hydroforming: how it works

The starting point for hydroforming is an extruded aluminium tube that is shaped in three dimensions.

The tube is placed in a hydroforming press. It is then filled with water and subjected to high pressure. The process forces the material to expand under the pressure and it is shaped to the outer contours of the tool.

In 2002, Sapa Profiler invested in a hydroforming press. The press can make parts up to 1.8 metres long and between 20–130 millimetres in diameter. The product can be both painted and anodised. The press also has adjacent to it a bending machine that will bend profiles up to 6 meters long with a circumscribed circle of 130 millimetres.

THE CUSTOMER

Gåsdal Bygningsindustri manufactures sun blind products and its sales increase with the number of hours of sunshine. But it is not just the weather that has made this part of the Velux group what it is today.

Shade as a business idea

An attractive environment in a room with roof lights needs Venetian blinds from Gåsdal Bygningsindustri.



Development manager Kristian Jensen reports that the company's founder could see business opportunities in the need for sun blinds for the characteristic roof-lights that are normally incorporated in slanting walls.

"Gravity would make an ordinary curtain just hang down vertically and it would therefore not be a great deal of use."

Since then things have progressed and today the range consists of around 200 different designs divided among products such as blackout curtains, normal roller blinds, sun blinds, Venetian blinds, insect nets, pleated curtains and shutters.

Technical development has been very important in Gåsdal's product development in recent years. Today many of its products have built-in technology, as Kristian Jensen relates: "For example, we have a shutter with solar cells that collects the energy required to operate itself and we have just developed an interior Venetian blind without strings but with an open/close function that can be operated with just two fingers," he says.

The company recently won a prize for the Venetian blind at the Formland Fair in

Herning. The prize is awarded "to promote initiative and creativity in Scandinavian design".

"Our product development can be compared with what goes on in the motor industry. Today, electric windows and central locking are everyday things that everyone wants. It is the same with our products – they must be easy to operate and work every time", the development manager stresses.

VELUX'S SUCCESS can thus partly be explained by the company's product development abilities but there is no doubt that virtues like good commercial skills also play their part.

"When we are choosing suppliers, we concentrate on three parameters: quality, punctual deliveries and price", says the buyer for the company, Lillian Ehlers Nielsen, who is the person at Velux with whom Sapa Denmark works directly.

"People expect a Velux product to work and hence quality is the most important thing. But we obviously need our components to be delivered at the right time at the right price."

Velux has been buying aluminium products from Sapa since 1981 and today the lat-

ter supplies many profiles in different versions, for example untreated profiles, anodised profiles, painted profiles and machined profiles.

"We don't just buy goods from Sapa. We also have a close collaboration on product development with Sapa's engineers and we regard Sapa as a tremendously serious collaborative partner that fits in well with our attitude on how to run a business", maintains Lillian Ehlers Nielsen.

Facts • Velux

Gåsdal Bygningsindustri is a Velux Group company. Its founder, Villum Kann Rasmussen, started up his business in Skjern in West Jutland in 1970. He began production of sun blind products in a Gåsdal school, a little village schoolhouse. In the old gym and two of the classrooms they began making roller blinds, Venetian blinds and sun blinds for Velux windows. However, the facilities were shortly expanded. Today, Velux has several thousand square metres under its roof in Skjern.

If the Golden Gate Bridge was made of aluminium...



The Golden Gate Bridge, one of the world's longest suspension bridges, is approximately 2.7 kilometres long, including approaches. The main span is 1,280 meters long and the suspension towers rise 227 meters above water level. Including the anchorages and approaches, the bridge weighs 887,000 tonnes.

Aluminium bridge: if the Golden Gate Bridge was built of aluminium, large parts of it would be considerable lighter. The load on the anchorages would thereby be reduced considerably and they too could be smaller and lighter.

When the bridge was built from 1933–37, the 91 centimetre thick main cables were spun in situ because they were so heavy that no crane could lift them. This method of construction was a great challenge at the time.

Aluminium bridge: today we would go about things in the same way but if the material of the beam structure and roadway were aluminium profiles, and hence lighter, the main cables could be manufactured with less steel. In this way material would be saved and construction time reduced.

The choice of colour was important. It had to be a colour that would stand up to the strong winds and corrosive salty air at the entrance to San Francisco Bay.

Colours were tested for over a year and it emerged that carbon black, steel grey and orange were the three colours that stood up to the rigours of the weather. Most people wanted the bridge to

be black, grey or silver, but Irving Morrow, the architect who was to choose the colour, plumped for orange.

Aluminium bridge: would not need to be painted at all since aluminium is not affected by salty winds and the colour could be the material's own classic silver grey.

The mighty Golden Gate Bridge is the world's best-known suspension bridge. If its designer Joseph B Strauss had been able to build it of aluminium instead of steel, its famous orange silhouette would have been silver grey. Construction time would probably have been reduced. The bridge would have been lighter and, furthermore, virtually maintenance free.



A steel structure like the Golden Gate Bridge requires continuous maintenance. Today a hardy band of 17 steel erectors and 38 painters struggle to repair and paint rusty steel through wind and fog, often high above the bridge.

Aluminium bridge: if the bridge had been made of aluminium, it would have been virtually maintenance free since aluminium can cope with harsh weather conditions without being affected.

From the environmental point of view, a painted steel bridge has major disadvantages compared with an unpainted aluminium one. The colour the bridge is painted in, especially older ones, often contain heavy metals that can end up in the water when scraping or blasting.

Aluminium bridge: at the end of an aluminium bridge's life, it is possible to recycle the metal to its original quality.

Economics is an important factor when you are choosing the material for a bridge structure. Which is most cost effective, steel or aluminium?

Aluminium bridge: the materials cost of aluminium is higher but given the gains that come from the choice of aluminium, such as fewer labour hours during construction and the fact that the bridge does not need to be maintained, aluminium probably comes out as the most cost effective choice in the long term.

SOURCES: PETER BENSON, SAPA. TORSTEN HÖGLUND, EMERITUS PROFESSOR OF STEEL CONSTRUCTION AT THE KTH ROYAL INSTITUTE OF TECHNOLOGY, STOCKHOLM



PHOTO: MICHAEL VAN OOSTEN (M.VAN OOSTEN@CHELLO.NL)

The external lines of Living Tomorrow are soft. Inside, the traditional clearly delimited rooms are gone. Instead surfaces are flexible and open with areas for living and working.

Living Tomorrow is not an ordinary house but rather a futuristic exhibition. Sapa is a partner in this international project.

These things affect the home:

- Changes in working life.
- Changes in the makeup of the family.
- More leisure.
- Many people work from home.
- Increased information flow via the Internet.
- Greater need for flexibility.
- Old people are living at home for longer.

Future features of the home:

- Living Tomorrow shows off new technology to make housework easier.
- Whites stay white because a sensor in the washing machine recognises garments that can discolour them.
 - The larder reminds you automatically when you have run out of something.
 - The Robomow lawnmower maintains the lawns automatically.

The home of the future now

The Ice Skate, the Wood Plane and the Vacuum Cleaner. The Living Tomorrow house of the future has been given many names while it has been in Amsterdam.

It opened its doors to the public at the end of last year. More than 200,000 visitors a year are expected over the five years it will be on show.

The futuristic building was developed by architects, engineers and scientists with the aim of showing how we will live and work in the future. Leading edge companies explain how social and technical developments will affect our lifestyle, homes and thinking.

Of the solutions on show, 80 percent are ready for the market, while 20 percent are still visions. The aim of the exhibition is also to provoke discussions with the public to

find out what they think would be important for their future homes.

SAPA'S CONTRIBUTION INCLUDES aluminium partitions for the six-storey complex. In total the show building takes up 3,500 square metres. "Aluminium has been used because of the strength and ease of maintenance of the material and its ability to cover large areas", says An van Hemeldonck, Marketing Coordinator RC System, a Sapa Building System company.

A distinctive part of the house of the future is the fact that the huge gable at the front is built without connecting glazing bars in the glass – this means that the profiles are not visible from outside the glass facade. The gable system from RC System consists of aluminium

profiles with stainless steel frames, which means that the bars of a steel partition wall disappear. With an eye to the sunny south-western aspect, there are adjustable aluminium slats mounted on the rear side of the block.

"We want to show in this way that mounting sun shielding does not have to be very difficult – not even because of a round gable", relates An van Hemeldonck.

She goes on to explain that being part of Living Tomorrow was obvious to RC System with its innovative way of working. Architects, aluminium designers and students are continually coming to be invited to learn more about aluminium gable, window and door systems.

"We feel that knowledge transfer is important", observes An van Hemeldonck.

Crash safe racing car a winner

A shunt isn't part of the plan. But it is precisely crash safety that is to bring Stockholm engineering students victory in an international racing car competition in England.

On 8–11 July, 52 universities meet in Leicester in a prestigious competition for self designed and built single-seat formula cars.

Their brilliant crumple zone is one of the KTH Royal Institute of Technology gang's trump cards in the competition.

"The car now actually meets the tough Formula 1 requirements under which the driver must be decelerated at a maximum force of 40 g. Our car gives a deceleration of 33 g if it runs straight into a rock face", says Olle Skrinjar, a postgraduate student in strength of materials at KTH in Stockholm.

The idea was that the crumple zone should impress the jury; in this competition, being fastest is not the only thing being taken into account.

"The aim of the competition is to stimulate the world's engineers to learn how to develop their knowledge", says Hannes Raudsepp, project manager of the chassis group of the 78 man KTH racing team.

THE CARS MUST, ON THE ONE HAND, do as many laps of a track as possible in twenty minutes and, on the other, give evidence of good road-holding on a circular track, be economical to build, be nicely presented and ingeniously designed.

"Our first aim is to get through every section of the competition", admits Hannes Raudsepp.

He says of the similar competition in Detroit a year ago: "Half of the 140 cars taking part either fell to pieces or began to burn.

"From concept to finished car has taken us only five months, and that is an extremely short time. But I think we can get a long way. We have a stable organisation that has done a good job up to now. And we have almost simulated ourselves to death."

The simulations are done on the computer network at KTH and are an important part of



PHOTO: KRISTOFER HEDLUND

Vroom, vroom. Pär Ljustell, Eva Ahl, Niklas Melin and Olle Skrinjar demonstrate the still incomplete racing car. On the right is the crumple zone with its aluminium tubes.



What the racing car will look like on the starting grid in Leicester in Great Britain.

the process – particularly in the design of the crumple zone.

"The only requirement by the people running the competition is that you have a crumple zone. After that, it doesn't matter if you fill it with marshmallows. I don't think that anyone else did as much calculation on it as we did."

But why aluminium profiles in the crumple zone?

"We could also have made it of sheet steel but then the dimensions would have had to be larger. Aluminium has a fantastic ability to absorb energy. It can be stretched a great deal without breaking. The tube we got from Sapa was cold-rolled and welded. It was then aged in an oven for some hours to get the right temper."

Who is going to drive the car?

"We are picking four drivers – the ones who produce the best lap chart from a go-cart track in the neighbourhood..." says Hannes Raudsepp.

Facts • Crumple zones

Fifteen tubes of millimetre-thin aluminium help to absorb an impact. The tube was specially ordered from Sapa.

Mathematical calculations by KTH's strength of materials group show what a good idea it is to have three different lengths of tube. This is how it works: the longest tubes, 25 centimetres long, are there to absorb the initial impact and take the brunt of the energy. After the motion reaches the 20-centimetre tubes, and finally the 16-centimetre tubes, the original energy has been diminished and it is easier to deal with the force."

The crumple zone group arrived at this solution after running a large number of mathematical models on a network of fast RISC computers (see picture below). The group used the Abaqus finite-element modeling program and it took approximately sixty hours to get a result for every model tested.



Cool business idea in an industry that is heating up



Under Lars-Inge Arwidson's management, Sapa has

Solid knowledge of telecoms behind the successes

After a guest star appearance in the advertising industry, Lars-Inge Arwidson came back to Sapa in the mid-1990s to expand the Telecoms product area. Today this area accounts for approximately 10 percent of Sapa Profiler AB's turnover and its growth is steady.

On the way to the interview the mobile phone rings. The call is routed via a base station that can handle thousands of calls simultaneously. The heat in the station's circuitry increases and hence good thermal dissipation, something in which Sapa is expert, is needed.

For almost forty years, Sapa has been supplying machined aluminium profiles for such things as base stations and heat sinks, particularly for the telecommunications giant Ericsson.

With his twelve staff, Lars-Inge Arwidson is responsible for sales of the company's products to the telecoms industry in Europe.

"But what we are selling is more than finished aluminium components", stresses Lars-Inge.

"We are selling forty years' experience and understanding of the needs to the telecoms industry, for example the right kind of cooling. This experience gives us a special position in the industry."

THE EUROPE TELECOMMUNICATIONS industry has been going through a wobbly period since the millennium. Despite this, Sapa's telecoms business has grown steadily since it



An example of Sapa's most important product for the telecoms industry, the heat sink.

became its own product area in 1998.

"It was only 2001 that was tough for us", says Lars-Inge Arwidson. "But, thanks to backing the right products, we have experienced good growth since then. We are now opening a new production plant in Shanghai which will give us much needed proximity to the telecoms industry's second biggest market – Asia.

According to Lars-Inge Arwidson, the new factory is part of Sapa's strategy of following its customers into an ever more global market. The factory, which employs around thirty people, has already begun deliveries. It was formally opened on 25 May.

Lars-Inge Arwidson has been at Sapa since

1980 with the exception of a few years' guest star appearance in the advertising industry at the end of the 1980s. In the mid-90s he saw a need to gather the company's skills in the telecoms industry together in a product area of their own. He then established an informal Ericsson group within the company. In 1998, telecoms became a product area of its own.

"But actually it began right back in 1967 when Sapa started collaborating with Ericsson", relates Lars-Inge Arwidson. "Then, Ericsson needed a partner who could help them supply parts for cabinets.

"Ericsson had begun to concentrate more and more on their own core business. This did not include the mechanical bits and Sapa came into the picture. The collaboration has been going on since then and we have had the privilege of developing along with the industry."

THE COLLABORATION WITH ERICSSON is an important explanation of Sapa's position as a leading supplier of highly refined aluminium parts to the communication industry, reckons Lars-Inge Arwidson. Following the development of the industry from the inside for so



become the leading supplier of the right type of cooling to the telecoms industry.

many years has given Sapa a great knowledge of the needs and terms of business of the system suppliers.

Over the years the industry has changed from landlines to mobiles, from analogue to digital. The big players are investing more and more in streamlining their businesses and concentrating on their core activity – software design. The design of the surrounding mechanical parts such as cooling is given over to subcontractors.

“The industry demands that we come up with a total solution. We continue to develop our products jointly with the end user but these days we must be able to put forward a total solution that is then usually bought and assembled by a ‘contract manufacturer’.

“With some products, Sapa can also be a contract manufacturer – ‘a first tier supplier’. This means that we need to know the customer’s needs and situation in greater depth than previously.”

Lars-Inge points out that the business

demands a great deal of his department and that its success would not have been possible without the specific knowledge and commitment of his various staff.

THE BUSINESS MODEL FOR SELLING ITEMS to the telecoms industry is complex. Sapa’s end users continue to be systems suppliers such as Ericsson, Nokia and Alcatel, but procurement and final assembly of the end products are then handled by contract manufacturers – for example Sanmina-SCI, Flextronics, Solectron and APW.

“We must thus, on the one hand, have a very good knowledge of the final application and the needs of the end user and, on the other, deal with the contract manufacturers’ need for quick deliveries, the right price and global service.

“The initial contact is between us and the system supplier. That’s when we find out what requirements there are. From the specifications of requirements we then produce

a proposal for a profile design that suits the customer”, relates Lars-Inge Arwidson.

“The end users decide what profile solution they want to use but the final deal is done between us and the company contracted to build the system in question. This means long lead times. We will only be seeing the results of what we are doing today in two or three years.”

TODAY, SAPA IS ONE OF THE LEADING suppliers of aluminium extrusions to the telecoms industry. Product development of heat sinks for the telecoms industry is done at Sapa’s Cooling Competence Centre in Finspång where they work at developing new materials and products and testing and analysis.

The results of the development include Sapa today being able to cope with pressing profiles with greater thermal dissipation capacity than any of its competitors. Lars-Inge Arwidson leans forward over the desk and it is like a run up: “We supply added value in the form of knowledge – knowledge that ultimately leads to better overall economics for our customers.

“But, the most important thing of all is our reliability – always keeping to our promises in terms of both quality and delivery.”

Fakts • Telecom



Telecoms products are divided into four main groups: cabinets, radiators, peripheral equipment and antennae. The largest

groups are cabinets and radiators, known in the industry as “enclosures” and “heat-sinks”, which make up just over 70 percent of sales.

The two other groups are “site materials” – peripheral equipment for base stations – and “antennae”. In terms of turnover, antennae are a small group while site materials account for just over 20 percent of sales.

Today, the greatest growth potential is in the heat-sink group. These are also the products that are technically nearest the leading edge. Thanks to a special alloy and reliable processes, Sapa is able to produce heat-sinks with extremely thin fins. This, combined with the ability to deal with large customised volumes very flexibly, puts Sapa in a leading position in aluminium profiles for the telecoms industry.



» We have had the privilege of developing along with the industry. «



Sailing yacht masts are a product where safety requirements are extremely stringent. Sapa supplies high quality profiles to the world's most important mast makers.



"We only make products we would like to have on our own boats. Quality control is important to guarantee that the material comes up to scratch", says Peter Rönbeck, CEO of Seldén

Masts f

Sailors know that conditions out at sea can change rapidly. That is precisely why it is important to be able to rely on your equipment. Sapa supplies aluminium profiles to some of the world's biggest mast makers.

Aluminium has proved to be a first rate material for sailing yacht masts. It is strong and light and in comparison with carbon fibre, which is used for some yacht masts, it is a considerably cheaper option.

Sapa supplies aluminium profiles to the three biggest makers of masts for sailing yachts of up to 70 feet – the French companies Z-spar and Spar Craft and the Seldén Group. Within this product group, Seldén is Sapa's biggest customer in terms of both aluminium usage and finishing of profiles.

Seldén Mast began making masts out of

aluminium profiles in 1965 just when manufacturing masts for boats had become generally accepted. The Seldén Group had been established five years earlier in Långedrag outside Gothenburg in Sweden. Today, Seldén Mast is the biggest player in its market niche.

WHEN WE VISITED SELDÉN'S PARENT COMPANY outside Gothenburg in Sweden, work in progress included building an 18 metre long mast for a Bavaria 49 for a customer in Germany.

"Seldén works rather like a small car factory", explains Peter Rönnbeck, CEO of Seldén. "We have specialists who make the components for us but we do the assembly ourselves so as to get custom products." But, in contrast to car manufacturing, a mast is not put together on a production line. It is more of a piece of craftsmanship in which the mast maker is personally responsible for the mast. All the company's key personnel are themselves experienced sailors.



» A mast looks roughly like a Christmas tree. The decorations consist of various fittings and ropes and the fairy on the top is the masthead light. «

nents for masts, booms and spreaders, it is a matter of paying painstaking attention to detail. Seldén gets around 450 parts out of a total of 7,000 different ones from Sapa. All of these are used in the manufacture of rig systems.

No one mast is the same as any other, not even ones intended for the very same type of boat, since not only the boat's technical characteristics but also the personal desires of the customer have to be taken into account.

SAPA SUPPLIES SELDÉN WITH AROUND 10,000 aluminium profiles a year. The requirements for the profiles are strict in terms of both tole-

as must the masthead fitting, forestay and backstay tangs and sheave boxes for the spinaker and Furlex. This is also where masts that need lengthening are put together by joining the sections with an aluminium sleeve.

ABOVE THE MASTS THERE RUNS A KIND OF tool holder on a track on the ceiling. The holder hangs at a convenient height and is easy to push along as the mast maker works his way up the mast profile. Alongside an 18 metre profile for a Bavaria 49 there lies a considerably longer version. This is a 24 metres long and belongs to an HR 62 class boat - but even this is not the longest mast to have haunted Seldén's premises.

"The longest mast we have made up to now is 35 metres", says Peter.

Peter tells us that, on average, they make ten masts a day in the Gothenburg factory, depending on how long they are. Obviously a longer mast takes longer to build. Sailing yachts exist in a highly corrosive environment since they are perpetually exposed to wind and sea. Nothing must go wrong, emphasises Peter, since it may have catastrophic consequences. All masts and rig systems are quality marked with the company's own symbol.

or all weathers

Seldén's development and manufacturing of rig systems covers masts, booms, standing and running rigging and the Furlex furling headsail system. Furlex was launched in 1983 and was Seldén's breakthrough into the international market.

So how do you go about making a mast? "A mast looks roughly like a Christmas tree", says Peter by way of illustration. "The decorations consist of various fittings and ropes and the fairy on the top is the masthead light. You might say that there are different levels on a mast where we attach a structure. All the parts of that structure are bound up with one another and are equally important."

THE STRUCTURE THAT SELDÉN develops acts as a manual during manufacture and provides instructions on where holes and exits for the various components such as winches, wires and fittings are to be placed. But in order to produce this structure - or manual - the boat's righting moment must be calculated from various data such as its length, draft and displacement.

"All calculations are done to stand up to the worst possible scenario", says Peter. For the staff who put together all the compo-

rances and surface finish. A mast must also look good if the customer is to be happy with his overall purchase.

When the profiles arrive at Seldén from Sapa, they are already machined to some extent. The ones that are to be used for masts come in lengths of 12.4 metres. If the mast is to be longer than that, Seldén joins the profiles together.

Mast profiles look slightly different depending on whether they are intended for conventional masts or in-mast furling. They are anodised by Sapa who also taper some of them. When the structure of a mast has been worked out, a machine starts milling out holes for the components that are to be attached to the mast, all in accordance with the instructions in the manual. Nowadays this is automated.

"But only a year and a half ago it was still being done by hand", interjects Peter. After a mast has been processed in the milling machine it is time for the next stage: assembly of its associated components and jointing.

The long mast profiles lie in parallel rows. Standard rigging attachments, winch handle holders and other fittings have to be put on

Facts • Seldén Mast AB

Seldén Mast was established in 1960 in Sweden. Today it is an international group with manufacturing in England, the Netherlands, Denmark and the USA.

The Seldén Group consists of five wholly owned subsidiaries with development and manufacturing of custom rig systems for dinghies and sailing yachts of up to 70 feet together with Furlex furling headsail system, intended to furl and unfurl the headsail thereby simplifying sail handling.

In 2003 the company turned over SEK 300 million. It has approximately 700 retail outlets around the world. The parent company in Gothenburg employs around 110 people.

Its customers consist of boat builders and retailers throughout the world. Seldén's only manufacturing of carbon fibre masts is in England.

Build a sauna – no sweat

A finished sauna emerges from a flat pack within a few hours. Its frame consists of aluminium profiles from Sapa.

Bathroom improvements are something that homeowners put high on their list. The Swedish company Svedberg latched onto this and jointly with Sapa developed an easy to assemble bathroom sauna with a frame of aluminium profiles.

“The aluminium profiles were obvious given the moist environment and the do-it-yourself concept. Furthermore, we want to give our bathroom range a uniform design and this is where the profiles are important”, says Dan Pettersson, project manager at Svedberg.

He goes on to say that the sauna was developed to be easy to fit into the bathroom of a house. The sauna is available either as a corner model, in which case it is no bigger than a bubble bath, or as a recess model that can fit between, for example, the washing machine and the washbasin.

DESIGNER PETER GUSTAFSSON was mainly responsible for developing the bathroom sauna. “We set up a joint working group with Sapa to brainstorm and exchange ideas. Sapa know how to do this and the possibilities you can incorporate – screw pockets, solutions for corners and tracks for the sheets that

form the outer walls of the sauna”, he explains.

The bathroom sauna is supplied as a kit with all the parts including the heating unit and sauna accessories – as well as detailed instructions for putting it together. A normally handy person should be able to assemble the sauna in between two and four hours. However, the electrical installation requires an electrician.

ASSEMBLY TAKES PLACE DIRECTLY ON THE FLOOR; at the bottom there is a profile with adjustable feet that can be set to the slope of the floor. The wood panels on the inside are simply fastened to the aluminium structure and the wood of the benches is specially treated so as not to become too hot. On the outside of the sauna, wooden panels are pushed into the aluminium frame.

But why not use wooden battening?

“Not on a bathroom floor where there is a risk of pools of water that wooden battens can soak up. And how easy is it to get wooden battening square? It has to be possible to assemble the bathroom sauna as easily a piece of furniture from a big store”, says Peter Gustafsson.



From kit to sauna in three hours flat.

How to do it:



The parts of the sauna are supplied in plastic wrapped flatpacks.



The first thing that has to be done is to assemble the back walls.



In order to keep on top of the jigsaw puzzle, it is a good idea to take a frequent look at the instruction leaflet.



The aluminium profiles round the opening are put in position.



After about three hours work, it is time to screw on the door handle.



Finished! Soon the temperature reading on this thermometer will show boiling hot.



Sweden's SJ (Statens järnvägar – Swedish National Railways) have ordered new regional trains from Alstom LHB for which Sapa is a total supplier.

Ready made solutions for the rolling stock industry

Ready made solutions are more and more in demand by the rolling stock industry. Sapa Mass Transportation is matching these requirements and now supplies ready-to-assemble products and system solutions.

Over the last few years train makers have moved from designing and producing things themselves to entering into strategic partnerships with suppliers like Sapa.

"We reacted very quickly to the market. Customers want a supplier who can offer total solutions. We are now more of a partner than a supplier," explains Allan Pedersen, Sales Manager, Interior & Underframe, at Sapa Mass Transportation.

Whereas Sapa formerly supplied train makers with individual profiles, it is now delivering ready-to-assemble products and system solutions.

"People are going over more and more to complete outsourcing in which we also have a hand in development and design. All the skills for that kind of job are available within Sapa," Allan Pedersen continues.

SAPA MASS TRANSPORTATION has put together a team that works exclusively on ready-made solutions for both train interiors and exteriors. To help them they have Sapa Profiler AB's Technical Service, Sapa Technology and a network of handpicked subcontractors.

In 2003 a contract was concluded with the German train maker Alstom LHB GmbH to

supply luggage racks for the new regional trains for SJ. The contract included design and strength calculations together with the production and assembly of finished luggage racks including electrical parts such as loudspeakers.

The starting point for this task was a functional description and a number of international specifications of requirements.

"Thanks to our detailed understanding of the customer's requirements and expectations, Sapa Mass Transportation was able to come up with a competitive product," says Allan Pedersen.

Why a total supplier?

- One partner – short communication paths.
- A supplier who takes total responsibility.
- Fixed price.

Outstanding shelter for the loading bay



Easy to assemble, corrosion resistant and long-lived – Stertil's loading bay shelter has many benefits.

THE DUTCH COMPANY STERTIL BV, specialists in loading bay equipment, have developed a new type of loading bay shelter with integral aluminium frames.

The aim of a loading bay shelter is for the gap between the wagon and the building to be as small as possible so as to reduce the risk of accidents and damage when unloading.

According to Stertil, the advantages of aluminium frames for the shelter are many. The shelter is easy to assemble since it weighs much less than it would if made from steel, for example. Two people are enough and no cranes or trucks are needed. Furthermore, aluminium resists corrosion and will stand up to many years of use.

The erection of the loading bay shelter with its aluminium frames is done by first setting up the side and main frames. The curtains are then mounted in the aluminium profiles.

Stertil's product ranges are sold throughout the world and are available in all the countries of Europe together with Japan, China and several countries in the Middle East. Customers include Ikea, Royal Mail, Nippon Express and Philips.

The Profile School/ Decoration that saves money

Having provided a profile with all the functions you want, enhancing it with decorative features is a piece of cake. The profile thus becomes more aesthetically attractive, but you actually get other benefits as well.

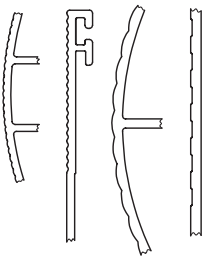


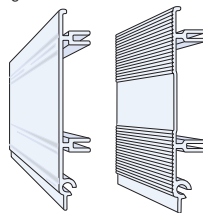
Fig. 1

Many companies provide all their profiles with decorative ribs with a unique overall pattern. Every experienced designer knows that the possibilities are infinite. Fig 1 shows a small selection of such ribs, which can be endlessly varied and

combined. It is a particularly good idea to break up large flat surfaces that can otherwise easily appear uninteresting (fig 2).

Even if the profile meets set dimensional and shape tolerances, any slight unevenness or surface defect can 'disappear' in a pattern. Polished anodised materials, in which the slightest irregularity is transparently obvious, are particularly sensitive in this respect. Then a few ribs do the trick.

Fig. 3



big flat surface up, thereby protecting it effectively both during pressing and in subsequent handling.

Another difficulty that occurs with a thin-walled profile when a large build up of material, a screw pocket for example, is located on the other side of a visible surface is 'heat zones' as a result of uneven, unavoidable heat loss. They appear as



Fig. 2

shading of the visible surface but can be concealed by a few decorative borders (fig. 3).

Well thought out design

One reason for introducing decorative patterns is that you want to avoid

High quality

When the profile is pressed, the surface on which it comes out of the press is always susceptible to scratching. This is where a few projecting decorative ribs can raise a

harsh reflections of light from a flat aluminium surface, for example in lightshades.

Another occasion on which decoration can be of use is when you want to conceal the joint between two profiles (fig. 4).

When it comes to the design of parts with the small dimensions that are often involved, account must be taken of the diameter of the wire that spark erodes the extrusion die. What is more, special attention must be paid if the profile is to be painted as the grooves must not be too narrow or have too sharp corners.

Good economics

From experience the cost of these decorative elements does not increase the cost of the profile: the cost of the dies is practically never affected and material usage seldom increases (usually a wave pattern is laid with standard material as a

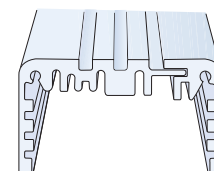


Fig. 4

centreline). On the contrary, the overall economics are often improved thanks to the assured quality and the enhanced aesthetic value.

Coloured aluminium seduces artist

Artist Maria Börjesson works with noble things. Aluminium is her latest love. It is the metal in which she creates her sublime jewellery for everyday wear and special occasions.



An example of how aluminium can be coloured. A unique quality compared with other metals.

Curiosity keeps on tempting goldsmith Maria Börjesson to look round for new materials. She decided on aluminium, a metal that she has recently begun to explore.

What makes aluminium so special?

“What is nice is the way I can control the way I want to colour the metal. Gold and silver have a limited colour range – white, yellow and sometimes grey. You can have aluminium in a host of exciting colours. It is like working in batik. I can coat, bleach and colour again – or use stamping techniques and screen-printing. The possibilities are immense.”

Maria likes using all the colours of the rainbow.

How is aluminium coloured?

“When you do the surface treatment, the anodising, the pores in the outer surface of

the metal open up. Then you can colour the metal and the open pores are filled with pigment.

When it reseals, the pores close up again and the pigment is locked in. It’s something like tattooing. It makes aluminium unique; other metals can be coloured by oxidation but there the colour forms a thin layer on the surface and disappears easily.”

What characterises your jewellery?

“Humour, joy and beauty. With aluminium I can let my hair down a bit more since the cost of the material is relatively low. The results are eye-catching. Many people are



The artist in person.

absolutely delighted by my jewellery.”

How does a piece of aluminium jewellery feel on the skin?

“Quite light. You feel it’s a warm metal.”

Functionality is another of Maria’s characteristics. Among other things she has worked with a tailor to create warming jewellery made of velvet and decorated with coloured aluminium plates. The collection also includes trousseaus for winter weddings and Maria recently had an enquiry about making ribbons for priests’ hoods adorned with aluminium.

This company is called Ädla Ting [Noble Things]. Does aluminium fit in here?

“I began with precious metals but I have no hang-ups about the base metals having a different worth. Today it is the design and the workmanship rather than the material that give a piece of jewellery its value. A piece of gold jewellery is no longer an investment for life. A lot of what is done is wear out and chuck out stuff like much else.”

According to Maria it is easy to keep on finding new application areas for aluminium and she bubbles over with creativity.

“I can’t do everything I want myself and I’m pleased to work with different companies – as a kind of shape expert.”

Her ideas are many and extend beyond jewellery. What do you say about downspouts in cheerful tones or brilliantly coloured balconies?

Facts • Maria Börjesson

- Maria Börjesson has been working as a goldsmith for twenty years.
- She was trained at the Goldsmiths’ School in Mjölby and has taken courses in setting precious stones in Copenhagen and in design at Linköping University. In addition she has taken a special course in anodised aluminium at the School of Jewellery in Birmingham.
- She has won several prizes, including the First European Jewellery Award 2000, FEJA, for one of her pieces of aluminium jewellery.
- Places where her jewellery can be seen include Galleri Metallum and Nutida svensk silver [Contemporary Swedish Silver] in Stockholm. Her studio is in Norrköping.
- Read more at www.mariaborjesson.nu

FINALLY...



The idea of a moving floor in litter boxes is taken from the needs of dog breeders.

Self-cleaning litter box

Dog breeders' problems with cleaning litter boxes made farmer Tommy Lindvall of Gotland, the big island in the Baltic, put his thinking cap on.

Together with Sapa, a litter box was designed with a moving floor that is kept clean the whole time. The design is based on aluminium profiles.

How did he arrive at the idea?

"Actually it's quite simple. It's a matter of imitating our home paddock where the animals wandered about freely," explains Tommy. "In nature bacterial growth is inhibited because the animals are moving about the whole time and leave their droppings in different places. Today they are fenced in and if we can't change the ground, we have to change the floor under them."

The first prototype has now been produced jointly with Sapa Byggsystem in Sweden. But the cages have already been tested, as designer Ulf Sköld relates:

"Two kennels have tested the product and been happy. Hopefully other people in the market think it's just as good a way of getting rid of the muck."

When the floor advances, it takes with it all the droppings through an opening in the short side of the box where they are scraped off.

"Cleaning is controlled by a computer on which you set the time at which you reckon the cage should be cleaned out," explains Tommy, "every three hours, for example. Then the floor moves extremely gently, around 30 centimetres a minute, at the time you have set. If there is a puppy in the area when it moves, the movement is interrupted and starts again when the animal has left the area."

And at Sapa, Styrbjörn Luning is enthusiastic:

"This concept is rather fun and shows how people think about things they themselves use at work. Then you know the idea is good right from the start. Without doubt this product has great potential. Dog breeding is popular the world over and this product is patented in every country."



When the sun is beating down, it can be nice to be able to shut out its rays.

French adjustable roof

The French company Sarl Jaffa II recently launched its Eclipse opening roof. At a simple press of a button you can control the amount of sun, light and shade you want the roof to let in at the same time as it protects you from rain. The roof is made out of extruded aluminium profiles and is based on an Australian patent with motorised slats that hook into one another and make the roof adjustable.

The profiles are corrosion resistant but are painted to provide colour. The roof is white but can be supplied in any colour you like.

Eclipse is suitable for both private verandas and public restaurants. For further information: www.eclipse-toit-ouvrant.com



The roof rack on an X70 is large and there is also a facility to climb up there on a ladder.

Roof rack for the Renault X70

Sapa Automotive has developed a new concept for the roof rack of Renault's X70 car. The roof racks are a total solution in aluminium profiles and it is estimated that the project will have sales of around 1,600,000 euros a year. The project inclu-

des both developing the concept of the racks and manufacturing them – everything from design, modelling, prototypes, testing, etc. The roof racks are being produced by Sapa in Poland.

Isolation booth for smokers in Holland

The Dutch can now continue to smoke at their workplaces despite a new law forbidding smoking indoors as from 1 January this year. The solution is called the Clear Air System and is a kind of indoor room or



Popular with smokers.

cabin designed by one of Sapa's customers, Voskamp Aluminium + Overkappingen BV, using aluminium profiles.

Several companies have already bought the system for their smoking employees.

"It is a very popular solution," says Karin van Dijk of Sapa Aluminium BV. "For example, many government authorities and hospitals are using the cabin."



Aluminium profiles are used in machines that crush kidney stones using sound waves.

More aluminium in the medical industry

In the medical industry people are now increasingly switching over from welded steel for fabrications to reap the benefits of aluminium profiles. For example, Bosch Rexroth (USA) has developed a load-bearing structure for a device produced by the American company ESWL. The machine is used to pulverise kidney stones using sound waves, a technique that gives greater relief than an operation. Bosch Rexroth's structure was chosen because it contained more aluminium profiles than its competitors! (Source: Appliance)