Simplified production and transport by using air bearings. Page 4

SOLVING NEWS 07

SOLVING CUSTOMER MAGAZINE 2007

www.solving.com

Prize awarded

to Solving by Finland's President.

Page 2.

Upgrading

AGVs at SCA paper mill.

Page 3

Courtesy of Wärtsilä

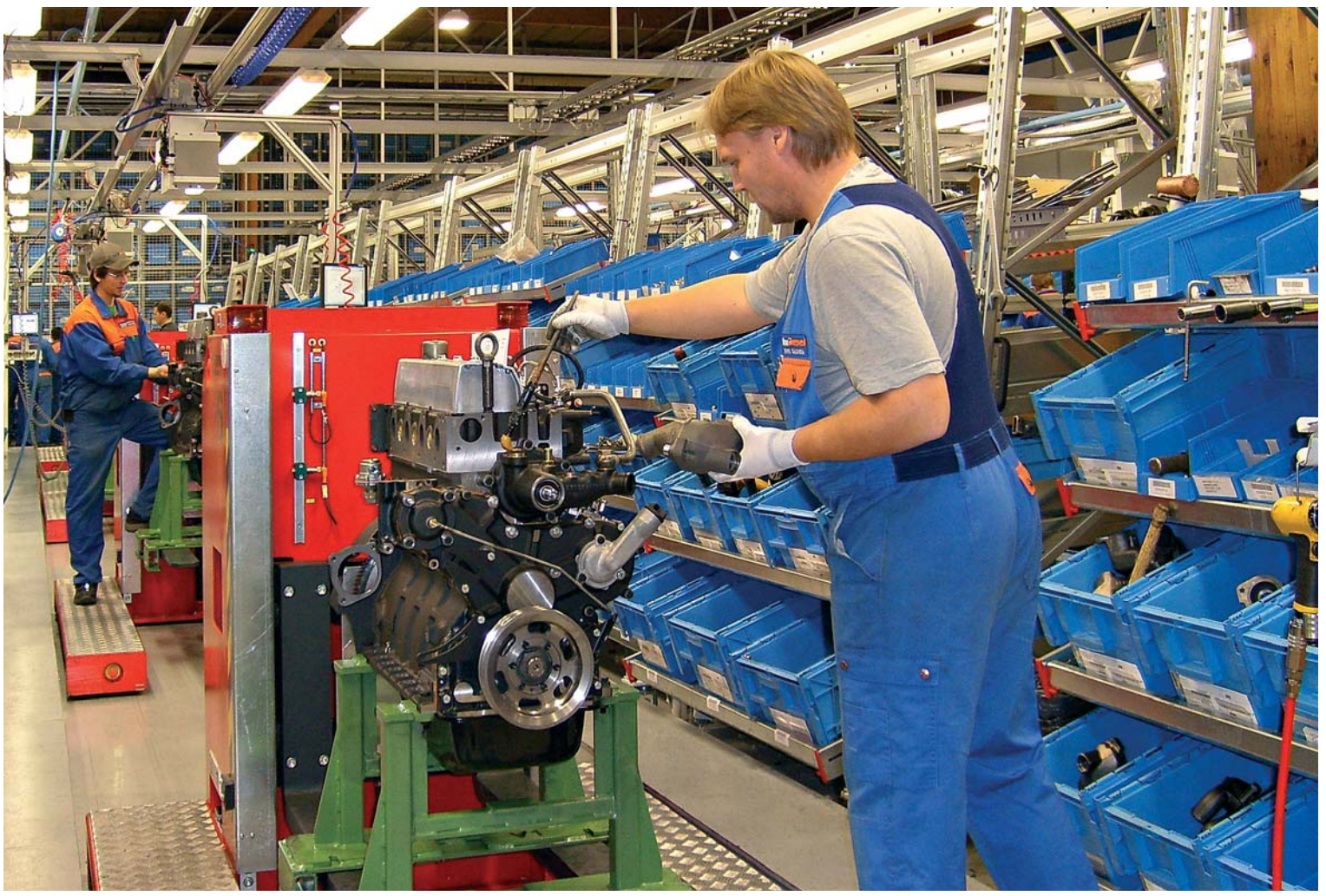
Assembly line

on air bearings for Wärtsilä's diesel engines

Page 2

Automated assembly

Solving AGVs contribute to an increase in production at Sisu-Diesel



Ten AGVs are used in the final assembly of diesel engines at Sisu Diesel, Finland. **Page 3.**

The latest generation of Movers for power transformers

■ High voltage power transformers are amongst the largest and heaviest production items found anywhere in the world.

When connections are assembled and cooling oil is added prior to test, the transformers become too large and heavy for most cranes. Using Solving's latest air-film based Mover system these can now be moved after final assembly without cranes.

Areva T&D in Stafford, UK, has installed two 230-tonne radio-controlled Movers together with an 80-tonne auxiliary beam. These can be used individually for smaller transformers or combined as a 540-tonne system, controlled from a single radio-control console.

Once the air bearings have been activated the transformer can be driven in any direction. Areva has found that the Solving system provides them with maximum efficiency in the test department and enables all assembly processes to take place in the production areas.

Fully-assembled transformers weighing up to 540 tonnes are moved into the test department using an Air Film Mover system.

30 years of creative solutions
– an idea that continues to thrive

It all started 30 years ago during a business trip to Sweden when I saw a 50-tonne container being moved smoothly on air. My interest in air film technology was born! I brought the idea of air bearings back home to Finland and established 'Solving' together with my brothers Paul and Rune.

The air film idea developed slowly. Initially the Finnish customers were rather sceptical and hard to convince, but after almost a year of industrious sales work the first order was successfully obtained: an air film transporter to a Finnish printing house, Keskipohjanmaan Kirjapaino, to handle paper rolls from storage to a printing machine. The transporter was paid for by printing brochures for Solving!

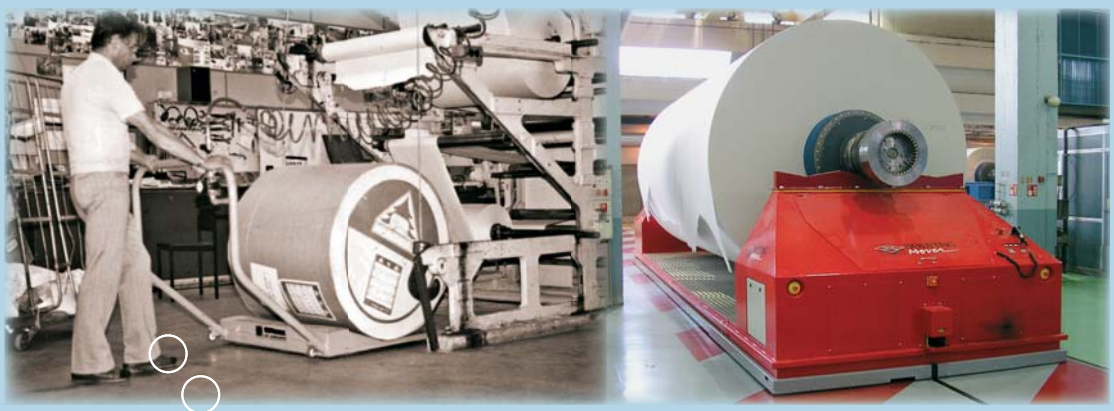
Our present customers can still be found in the printing and paper industries, but also in heavy electrical, motor, workshop and steel industries, and our products are used to handle a huge variety of loads.

During the first ten years in business Solving was active only on the Finnish market. The first international steps were then taken into the other Nordic countries followed by the rest of Europe. Today Solving operates all over the world and about 80 % of our customers come from outside Finland.

During the 30 years that have passed since we started our existing products have been continuously developed, new more automated products have been added to our portfolio, subsidiaries have been formed and a network of agents and suppliers created. All this together with an enthusiastic staff has enabled us to run the worldwide business Solving represents today.

In many respects our present business differs greatly from that of 30 years ago, but the air bearings that started everything continue to thrive.

Peter Björk, MD



CREATING | MOVEMENT

Innofinland Prize goes to Solving

As one of five Finnish companies among 222 candidates Solving was awarded the 'Innofinland Prize 2006'. The purpose of this annual prize is to promote creativity, skill, entrepreneurial spirit and co-operation, and President of the Republic of Finland, Tarja Halonen, is the patron of the project. Solving was awarded the prize for its customised handling solutions and related services. We are very proud of the award and see it as an acknowledgement of all the development work we have carried out through the years to be able to provide our customers with the high quality handling systems that best suit their needs.

TASAVALLAN PRESIDENTIN INNOSUOMI-PALKINTO 2006

NEW ORDERS

Hyundai Heavy Industries, Korea

■ An Air Film Mover will be installed at the Hyundai factory to handle large crankshafts placed on racks between assembly stations during production. The total weight of the racks amounts to 160 tonnes.

SSAB, Sweden

■ The Swedish coil manufacturer has ordered three laser guided AGVs for handling coils from the production lines to the warehouse and vice versa.
Two rail mounted coil cars will also be installed for handling coils weighing up to 28 tonnes between various buildings.

Teknos, Finland

■ One of Scandinavia's leading suppliers of industrial coatings, Teknos, has ordered three laser-guided AGV systems to move pallets from their production area to storage.

Norske Skog, Norway

■ Norske Skog, producer of newsprint and magazine paper, has invested in an electric stand-on truck for handling paper reels weighing up to 10 000 kg. The truck is capable of handling reels with diameters varying between 1250 and 1500 mm.

Tangshan Locomotive and Rolling Stock Works, China

■ Two pairs of Air Film Movers, each with a capacity of 60 tonnes, will be installed to handle railway carriages along an assembly line. In addition to a radio remote control the Movers use an infrared guidance system for improved manoeuvrability in narrow areas. The Movers run on both air bearings and rail-going wheels.
Two door assembly carriers will also be installed to handle doors and windows during railcar assembly.

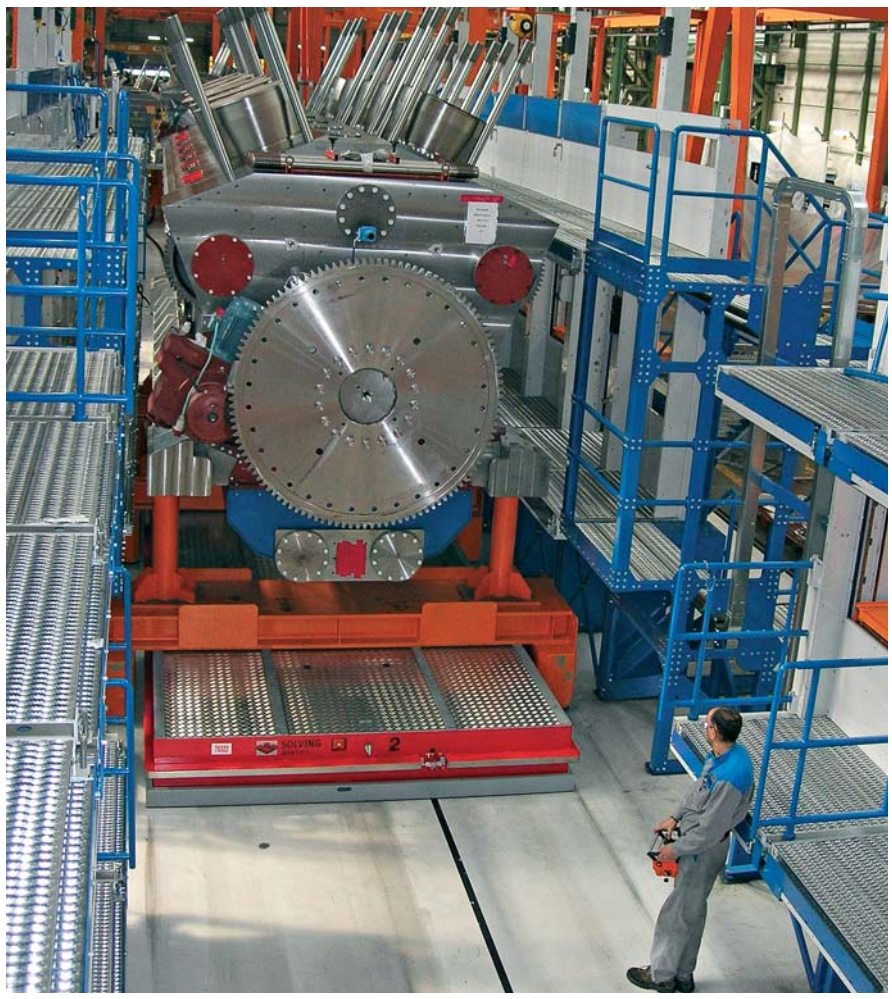
Movers for Wärtsilä's new project

Diesel engine manufacturer Wärtsilä has embarked on a new project, named '3000+', to increase their assembly and testing capacity at their factory in Trieste, Italy. They are investing 18 million EUR in the Trieste Delivery Centre to meet the strong level of market demand and to support the company's growth target. The scope of the 3000+ project is to considerably increase the production capacity

Several Solving Air Film Movers are already used in Trieste to handle motor blocks and diesel engines weighing between 2 and 600 tonnes. When deciding to invest in two new parallel five-station production lines within the scope of the 3000+ project Wärtsilä prioritised safety and convenience. Their preference was for a floor-bound solution and they chose another two Solving Air Film Movers, each having a capacity of 300 tonnes.

The Movers are designed for handling diesel engines along the two lines and into a test cell located in a separate building. The diesel engines are lifted by crane onto one of several steel pallets; the Mover then drives under the pallet, lifts the load and moves it along the line at a current rate of one station every two days, but with an aim to further reduce this rate.

The transportation between the stations is assisted by tape guidance and all functions of the Movers are remote-controlled.



Courtesy of Wärtsilä

Solving has installed two Air Film Movers within the scope of Wärtsilä's 3000+ project in Trieste.

Solving AGVs in diesel engine manufacture

As part of the AGCO group, Sisu Diesel's Linnavuori factory in Finland manufactures diesel engines for most of the tractors made by AGCO, such as Valtra and Massey-Ferguson, and also for the external market.

Large investments have been made at the Linnavuori engine factory to increase production capacity and Sisu Diesel aims to achieve an annual production of 38 000 diesel engines. As part of this development Sisu Diesel installed two new AGV systems in autumn 2006, one for the final assembly of diesel engines and another for the transport and intermediate storage of engines between the assembly and test run facilities.

The AGV system for final assembly consists of ten automated vehicles using inductive navigation. Placed on assembly and transport jigs, diesel engines weighing up to 1 200 kg are moved step by step through assembly using fork-lift Solving AGV Movers. The AGVs communicate with a PLC-based control system via radio and the indexing takes place by commands given by the operators.

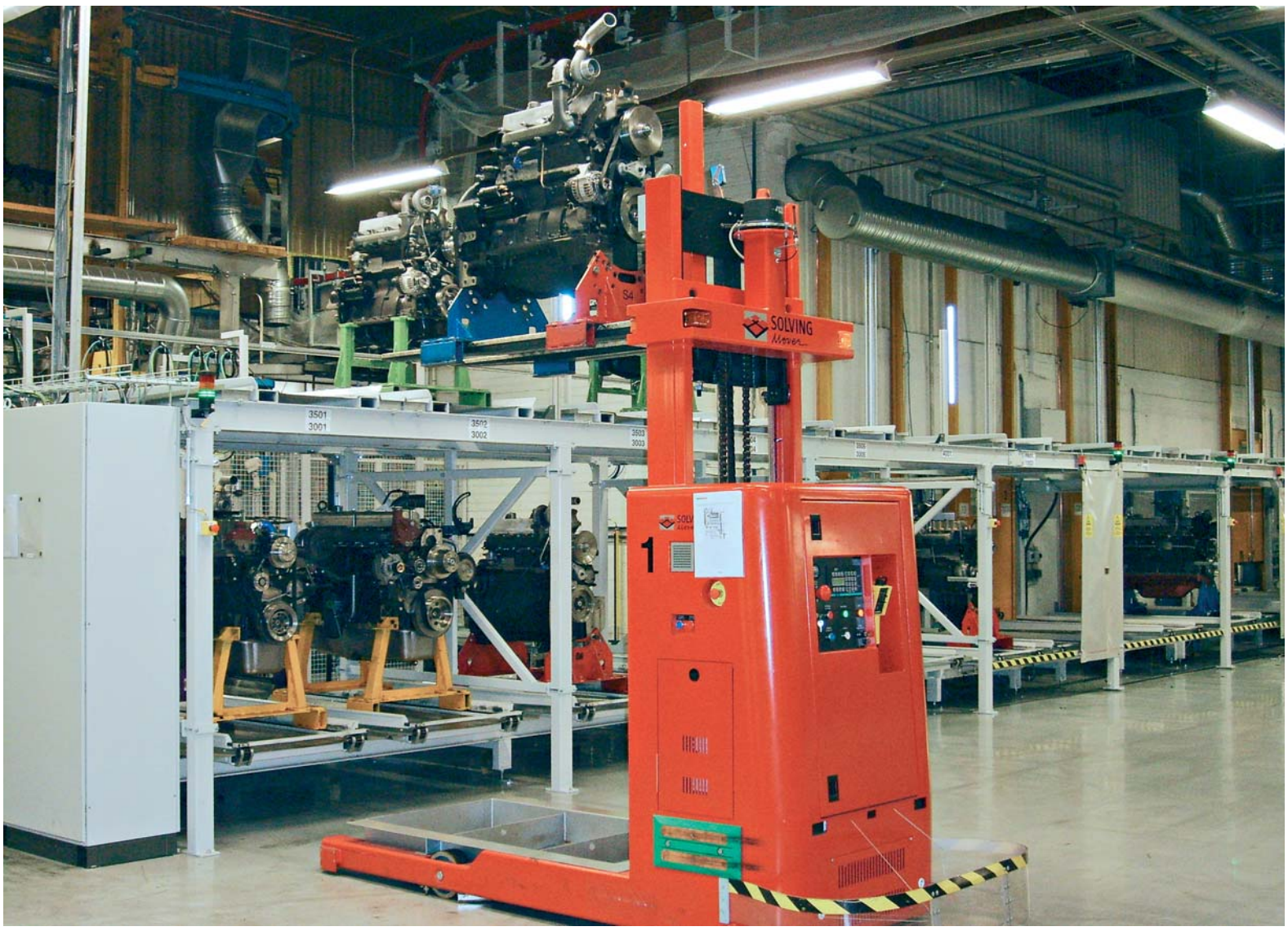
The AGV system for the test run facility consists of two automated fork-shaped Solving Movers with laser navigation used for stacking completed engines weighing up to 1 500 kg at a height up to 2,4 meters. Manoeuvering of the AGVs is integrated within the data system that follows the stream of manufactured engines through the intermediate storage, test run and other production areas. As a special feature the wagons are fitted with collecting vessels for liquids from the engines, and these are automatically discharged into a secure floor drain.

"Solving offered a complete custom-made system that suited us best considering the special requirements that handling of diesel engines set", says Production Development Engineer Harri Ruponen. "Installation and start-up of the systems took place according to the agreed schedule".

The automated assembly wagons also contribute to improved ergonomics and logistics at the final assembly stages.

"Using this automated system we have managed to keep the floor surfaces in the factory free for other traffic and pedestrians", says Project Engineer Petri Ruoho. "Despite all the programming required this automated system is very flexible for future changes in the layout compared to any competing technology".

The production of diesel engines is increasing and Sisu Diesel has already ordered another Solving unit to complement their existing AGV system for test run.



Laser guided forklift AGVs automatically move engines weighing up to 1 500 kg between assembly and test run facilities.

AGVs at SCA upgraded

SCA Hygiene Products AB in Lilla Edet, Sweden manufactures tissue products such as toilet paper and paper towels.

A Solving AGV system is used to handle the largest reels at SCA weighing up to 4000kg and this installation consists of new AGVs as well as some renovated units.

Solving AGVs collect the 4000 kg reels from the paper plant, transport them to the storage facility and then on to the processing machinery when requested.

The AGVs are equipped with inductive guidance based on the latest digital technology, radio-communication and laser-based safety devices. Fitted with batteries and automated battery charging at selected home positions the AGVs contribute to automated handling 24 hours a day and provide a high level of reliable service.

"One of the most important reasons behind our choice of supplier was Solving's flexible timetable enabling a smooth transition during on-going production", says Johanna Norling of SCA, responsible for the project. "Since the upgrading must not interfere with the production, it was impossible to assemble and start up any other system, such as overhead conveyors".

The new AGV system is more user-friendly for analysing and fault finding functions. Both the system guidance and the AGVs are equipped with user interfaces providing users and service personnel with the necessary feedback.

"The Solving project team has been very flexible and cooperative during the complicated assembly and start-up periods", concludes Johanna Norling.

4 000-kg heavy tissue rolls are handled automatically at SCA.

Floating squash court

■ Air film technology from Solving has given an uplift to one of seven new squash courts, installed at the British National Squash Centre, Sportcity, in Manchester, UK.

Using 16 Solving modules, the entire squash court complete with glass walls can be lifted and floated on a cushion of air into the athletics arena. Here, seating can be arranged around the court to allow spectators to view the game from all sides.

Solving's system will also be used at the 2008 World Squash Championships.

SOLVING GALLERY

Metso Minerals, USA

■ Mobile crushers weighing up to 50 tonnes are moved along a production line using an Air Film Mover from Solving.

Aker Kvaerner, Malaysia

■ A 60-tonne Air Film Mover is used to handle subsea pumps on load pallets in production facilities.

Barsebäck Kraft AB, Sweden

■ At this nuclear power plant lead waste containers weighing up to 10 tonnes are handled using an Air Film Mover with integral steering.

Myresjö Hus AB, Sweden

■ A wheeled four-way truck moves modules weighing up to 10 tonnes in the production of prefabricated houses.

ABB, China

■ 320-tonne transformers and 10-tonne windings are moved between various assembly stations using two Solving Air Film Movers.

Salamander, Germany

■ A 20-tonne radio-guided Air Film Mover assists in handling racks of window profiles in a storage area.

Floating Rolls-Royce propellers

Propellers weighing up to 40 tonnes are moved smoothly between production facilities using an Air Film Mover.

■ Rolls-Royce is a world-leading provider of power systems and services for use on land, at sea and in the air. Propulsion equipment such as Ulstein and Aquamaster, used for driving and controlling ships, is manufactured at their factory in Rauma, Finland.

When renovating the Rauma factory, Rolls-Royce aimed for simplified production and easier handling between different production facilities. As a result, Rolls-Royce installed a Solving Air Film Mover for the movement of azimuth thrusters from the assembly area to the final assembly area and then to a test zone in a different production facility. No cranes or other fixed installations are required for handling the thrusters. Another advantage of the Mover is the possibility of omnidirectional steering providing flexible manoeuvring in narrow production areas.

The thrusters are positioned on a load pallet during assembly and radio-controlled guidance gives the operator full control of the Solving Mover to enter the loaded pallet and pick it up in preparation for a move.

Low-profile, small and light Mover

A standard Mover from Solving can be used to handle a variety of loads.

■ Solving has introduced a standard Air Film Mover for general and various industrial applications. The new Mover is low-profile, small and light compared with its load capacity, which can be up to 15 tonnes, and the load can be placed either directly on the transporter or on a load pallet. Using a load pallet the Mover is driven on no-load wheels under the pallet, the air bearings are switched on, and the load is lifted and moved to the requested destination. No additional lifting devices are required, because the lifting height of the air bearings is enough to lift the loaded pallet. Fitted with built-in rotating drive units the Mover can be driven freely and positioned accurately.

The Mover is controlled directly from a handle on the control panel. A movable brush guard is fitted around the Mover to avoid injuries and also to prevent debris from getting under the Mover which might damage the air bearings.

This type of Air Film Mover has been installed at ATK in Germany to handle tools and at Barsebäck in Sweden to move lead containers in a nuclear power plant.

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