



The Newsletter of FKI Rotating Machines Division

PART OF THE  FKI GROUP OF COMPANIES

# FKI Enhances Large Machine Capability with Acquisition of Škoda Electrical Machines

On 9th March 2001 FKI plc announced that it had agreed to buy Škoda Electrical Machines (SEM) from Škoda Holdings of the Czech Republic. Subject to final asset transfers and inventory valuations, the acquisition is expected to complete in April.

Škoda has a long and enviable reputation in the manufacture of large electrical machines, with particular strengths in larger air cooled and hydrogen/water cooled turbogenerators, and slow speed generators for hydro power applications. These capabilities provide an excellent strategic fit with existing FKI Rotating Machines Division turbogenerator companies Brush Electrical Machines of the UK and HMA Power Systems of the Netherlands. With the huge demand for generators for gas turbine driven power generation plant currently being experienced, the addition of the

capacity of SEM will significantly improve FKI's ability to respond to customers' needs.

Reg Gott, Managing Director of FKI Rotating Machines Division, commented. "The acquisition of SEM will significantly enhance our capacity for delivering machines of 50MW and above. We have been working with SEM for some time now, and are very pleased with the quality and timeliness of their production. The quality of the people, plant and infrastructure is already very high. Through a process of technology and experience transfer we expect to build on this platform to further enhance SEM's performance. In addition, SEM brings experience of hydrogen cooled machines which increases FKI's design and manufacturing capabilities to 750MW and above."

A realignment has been announced that brings



An aerial view of the Škoda factory in Plzeň

together BEM, HMA and SEM as a unified large machine business under the Brush brand. Following completion of the acquisition SEM will be re-named Brush SEM s.r.o.. Further details of the reorganisation are included inside this newsletter

For those interested in statistics, SEM has over 500,000 square feet of factory space and employs about 850 people. The factory is in Plzeň, about 100km south of Prague in the Czech Republic. The company has current designs that include air cooled turbogenerators from 10 to 150 MW, hydrogen cooled generators from 50 to 300MW and hydrogen/water cooled machines from 200 to 750MW. In addition SEM have manufactured 1000 MW nuclear generators, though we do not propose to pursue this sector. They manufacture hydro generators from 10 to 300MW, with up to 50 poles. SEM also has other ranges for slow speed diesel generators to 30MW and an extensive capability in synchronous and asynchronous AC motors. Their reference list includes more than 250 turbogenerators of 50MW and above, including more than 50 units larger than 300MW.



# FKI Opens Manufacturing Facility in Malaysia



Above: The FKI building near Kuala Lumpur  
Right: The FKI Engineering (Malaysia) team



This edition we would like to welcome our newest manufacturing unit to the "@rmd" newsletter. FKI Engineering (Malaysia) Sdn. Bhd. has been set up to manufacture FKI products in Malaysia, initially producing Marelli LV generators. Offering both standard and customised solutions to meet customer demands, it represents the only generator manufacturer in Malaysia. The factory is based in Shah Alam, just outside Kuala Lumpur, and will act as the regional centre for the entire Asia Pacific region.

There has also been continued growth in local markets such as:

- More than 15 Palm oil

mills currently use our LV generators above 1MW.

- The new light rail system in Kuala Lumpur has FKI 2.5MW generators installed.

- Local schools, hospitals and universities have already installed over 150 of our generators.

- The majority of local gen-sets packagers have now standardised on our generators for their production.

Having a substantial regional presence helped sales to grow 25% last year, including customers in Japan, China, Taiwan and Korea. With the improved service we will be able to offer customers as a result of our new facility, we are now focused on expanding further into all regional markets and seeing a considerable growth in turnover from this region.

## Drives

### Fki Drives *Optimise* Precision Mixing To *Improve* Plant Reliability & *Save Energy*

The installation of two FID 3000 flux vector inverters from FKI Industrial Drives is enabling Reiter Automotive to benefit from substantial savings in chemicals as a result of optimising the precision of a chemical mixing process to within +/- 1%. The FKI drives have also overcome reliability problems on the mixing plant by reducing downtime to near zero. Finally, as an added bonus, Reiter Automotive is benefiting from savings of £1000 per year on its electricity bill.

The package comprised two 15kW FID 3000 Flux Vector inverters with two Marelli 4 pole squirrel cage induction motors. It was installed and commissioned by Reiter's own engineers.

The FID 3000 drives operate in closed loop and communicate with the host computer via a 4-20mA control signal. This arrangement provides greater control of the mixing process than was previously possible. Previously the best that could be achieved in the mixing process was an accuracy of +/-16%. With the FID 3000 drives in place this figure was reduced immediately to +/-1%, a figure that provides the company with substantial savings on the amount of chemicals it uses.

The installation of the FKI drives has also proved to be a positive one in terms of improved plant reliability. Since the first FID 3000 drives were installed, in August of 1999, there has not been a single breakdown. This level of performance has resulted in Reiter Automotive installing another identical system. This too has performed to all expectations and the company are so pleased that they are planning to install a third system this summer.



Reiter automotive products are used in the Jaguar XK8

## Turbogenerators

### HMA Power Systems 2-pole DAX *production up, running and gaining speed*



DAX generator being assembled for test

Since the acquisition of HMA by FKI in March 2000, HMA has been busy scaling up the production of BEM design 2-pole DAX7 290 generators. This has been necessary to enable FKI to meet the high demand for these machines, especially from the USA.

The first DAX was approved and delivered to the customer, GE Aero Energy Products (formerly SSEP) from Houston, Texas, U.S.A., in September 2000, after an intensive 7 months of technology transfer, training of personnel, investment in new machines, tooling and people and of course production. This was performed in close collaboration with sister company Brush Electrical

Machines (BEM), who provided support throughout the process. Delivery of the first machine successfully in such a short timescale was a tremendous achievement, which was only realisable thanks to the full commitment and enthusiasm of all the people involved in this project.

Having solved all the initial start-up problems, and with the positive effect of repeatability, the production tempo has since accelerated - the photo shows DAX machine number 9 being assembled on the test bay. At time of writing, plans are being considered to further increase the production rate of these 2-pole machines, in addition to HMA's planned 4-pole production.

# Marelli Motori Continued Marine Success

# Marelli and LSE Launch 400 frame TEFC "Marconi" motor



Vertical IP55 motors with air-water coolers at the Marelli factory.

Marelli Motori has just delivered to Kawasaki, Japan the 500th marine motor for bow thruster application. The C3G400LA10 motor is one of the well proven C3M series utilised for this particularly arduous and critical marine service.

The C3M series is a low voltage, drip proof, air cooled, heavy duty, marine (400-2000kW) motor. It is a very robust and compact design which is ideal for space constrained shipboard installation. Marelli Motori is one of the few manufacturers who can offer this type of equipment for this specialised service.

Each shipbuilder and thruster manufacturer typically requires a dedicated design solution. Adaptability, versatility and completeness of the motor range is fundamental to their design requirements. To meet this growing demand Marelli Motori has extended the capability of this bow thruster series to include IP55 protection, various heat exchange solutions (air-

air, air-water, direct water) as well as medium voltage and multiple (4-12 poles) speed options.

Below are two common types of bow thruster designs utilised by shipbuilders:

**Tunnel (transverse) Thrusters** are located either in the bow or in the stern. The thruster is mounted inside a flow pipe which traverses the hull and applies thrust in that direction.

**Azimuth (compass) Thrusters** have the possibility to rotate 360° when plunged and placed into operation. Aside from manoeuvrability of the ship they can even be utilised for slow propulsion of the vessel in particular situations.

The Design Engineering Group of Marelli Motori is very proud of the development of this C3M marine range. However it still wants to do more so that Marelli Motori can continue to improve and maintain its "Marine Leadership".

After the great success of the Marconi 355 frame TEFC motors introduced last year, Marelli Motori and Laurence, Scott and Electromotors design engineers have just completed the joint development of the 400 frame. The new, more powerful, more efficient, quieter 400 series will be officially launched at the Hannover Fair in April.

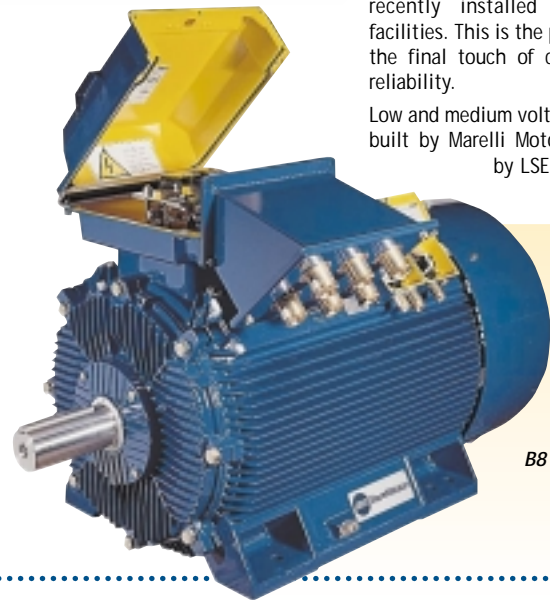
This new Marconi series utilises the most modern manufacturing tools and techniques as well as the most advanced software programs for electromagnetic performance optimisation. The result is a competitive price for a high

performance, quality motor.

The 400 Marconi series can be operated as a motor or an asynchronous generator, and is available in both horizontal and vertical configuration. Standard protection is IP55 which can be upgraded to IP56.

The Marconi series electrical machines have cast iron body and endshields, a power range of 160 to 1,500 kW, is available in 2-pole to 8-pole speeds at 50 and 60 Hz, and up to 15kV. Low noise and vibration are standard, and the motors can be used for inverter (variable speed) applications. Both stators and rotors are fully VPI (vacuum pressure impregnated) using recently installed state-of-the-art facilities. This is the process that adds the final touch of consistency and reliability.

Low and medium voltage machines are built by Marelli Motori, high voltage by LSE.



The new 400 frame Marconi: see these motors at Hannover Messe stand B8 in Hall 11.

## Organisation

### New Brush organisation to focus FKI large generator operations around customer needs

With the acquisition of Škoda Electrical Machines, FKI Rotating Machines Division now has three businesses delivering solutions to the power generation industry. In order to provide an organisation focussed on customer requirements the management of Brush Electrical Machines (BEM), Škoda and HMA Power Systems (HMA) are being unified under the Brush name.

With effect from 1st May there will be a single sales and support organisation to provide a unified market presence irrespective of the

type of machine required. There will also be co-ordinated management of the product development process with a single engineering organisation geographically spread between the three sites. The three factories will retain individual operations management to optimise production to the capabilities and capacities of each site.

The combined operation offers utility scale electric generators from 10 to 1000 MVA, with air, hydrogen, and hydrogen/water cooling technologies available at

two, four and multi pole speeds, plus bespoke machines for hydro power generation applications.

Brush Managing Director, Tony Saia commented:

"The combined Brush organisation has been formed in order to ensure that our customers continue to have their requirements met in terms of pricing, delivery times, product performance and quality, together with high standards of customer service. Customers will benefit from a unified sales approach and integrated after sales service."



# Speedway Engine Development Inc

Providing the *leading power plant* for Indy-Car racing teams

SEDI are an OEM builder for Oldsmobile's Indianapolis Racing League Aurora 3.5 litre V8 engine. Internal components are individually selected for each engine, and build tolerances are chosen by SEDI engineers to achieve maximum performance and reliability. The workshop in Gasoline Alley, Indianapolis has a fully instrumented engine test facility with a Froude F249 hydraulic dynamometer to absorb the engine load.

SEDI have provided their services to the US racer industry since 1996, with customers such as Hemelgarn Racing, Panther Racing and PDM Racing.



## Exhibitions

See FKI Rotating Machines Division companies at these exhibitions

Hannover Messe	Hannover	April 23-28
Offshore Technology	Houston	April 30 – 1 May
Cruise & Ferry 2001	London	May 8-10
PowerGen Europe 2001	Brussels	May 29-31
INTEL 2001	Paris	May 23-27
Offshore Europe	Aberdeen	September 4-7
PowerGen Asia	Kuala Lumpur	September 19-21
Power Gen USA	Orlando	December 11-13

## FKI Engineering Website Updated

[www.fki-eng.com](http://www.fki-eng.com)

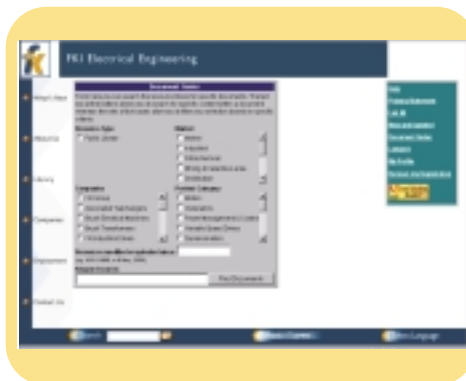
A new section – the "Library" - has been added to our website at [www.fki-eng.com](http://www.fki-eng.com) that makes available our brochures, manuals and technical articles for download. Currently about a hundred files are available, and more are being added on a regular basis. To access the Library you need to register, which is a simple process done on-line by going to the site and clicking on Library, then simply following the instructions.

Once in the Library there are a number of ways to find the documents that you are interested in: the most powerful is the "Document Finder" shown on the screen image on the right. Using this you can specify your subject by product category, application and/or FKI company. Multiple parameters can be selected, and results are then

presented with those that best meet your criteria at the top. You can also find relevant articles by using the text search, and limit any search to articles updated after a certain date.

Once you have identified an article that is of interest it can be downloaded immediately via your Internet browser. Alternatively you can choose to have it e-mailed to you as an attachment: this is especially useful for larger files so that you can collect them at your convenience from your mail box, rather than tying up your browser while the file is downloaded.

Our Webmaster always appreciates feedback from users of the site: send your comments to him at [webmaster@fki-eng.com](mailto:webmaster@fki-eng.com). He is particularly interested to know what further information you would like to see in the Library.



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