



brushstrokes

The Newsletter of Brush Turbogenerators

PART OF THE  FKI GROUP OF COMPANIES

Summer 2001

Brush turbogenerator operations brought together



BEM, Loughborough, England



HMA, Ridderkerk, Netherlands



SEM, Plzen, Czech Republic

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

With effect from 1st May 2001, a single sales and support organisation has provided a unified market presence, irrespective of the type of machine required. There is also a co-ordinated management of the product development process, with a single engineering organisation, geographically spread between the three sites. The three factories have retained individual operations management in order to optimise production to the capabilities and capacities of each site.

The combined operation offers utility scale electric generators from 10 to 1000MVA, with air, hydrogen and hydrogen/water cooling technologies available at two, four and multipole speeds, plus bespoke machines for hydro power generation applications.

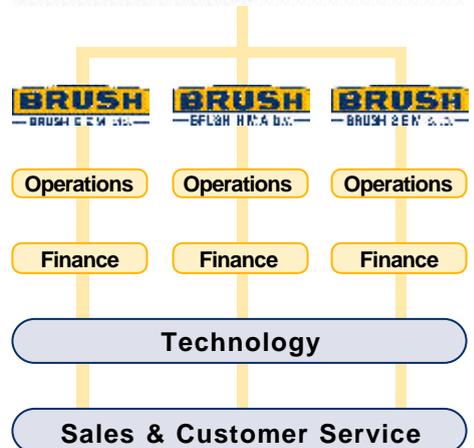


Speaking about the new structure, Brush Managing Director, Dr Tony Saia commented:

“The combined Brush organisation has been formed in order to ensure that all 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.

Our viewpoint is embodied in this latest issue of Brushstrokes, which will be the first to be distributed to a wider audience than previously, following the inclusion of customers of sister companies, Brush HMA and Brush SEM. The acquisition by FKI Energy Technology of the former Skoda generator factory in Plzen, Czech Republic in March 2001 has given the newly formed Brush turbogenerator operations a large increase in manufacturing capacity and a wider range of products. In conjunction with the ability

to access markets traditionally served by Eastern European companies, this addition will assist Brush to meet the growing demand for turbogenerators worldwide and provide valuable resources and expertise to keep Brush at the forefront of turbogenerator technology.”



Technical Focus

A "Pressing" Matter



Views of the new Press Shop moved from Windmill Road to the former Transformers 20 Shop

In order to streamline production, Brush Electrical Machines' press shop was recently moved from its satellite location 2 miles away, to an existing building in the middle of FKI's 85 acre Falcon Works site at Loughborough.

This marked a return to the main site after more than 35 years absence, during which time the press shop had moved to Ashton-under-Lyne (UK) and back, and had been developed into a self contained production unit manufacturing all varieties of lamination types and occupying some 5200m² of leasehold property.

The project started in August 1999 when a decision on the product split between the various FKI companies was taken and allowed BEM to focus on the increased market potential for DAX turbogenerators.

The press shop move, costing in excess of £750 000, was the final phase of the BEM reorganisation strategy of shop movements, designed to rationalise DAX generator production by streamlining manufacturing facilities and work movement activities.

The move presented the ideal opportunity to apply this rationale to DAX lamination production, and has resulted in a dedicated facility with a layout for optimal material flow from raw material to finished product, but occupying only 30% of the area of the old press shop.

The layout for the DAX lamination presses and equipment was agreed, and civil engineering work commenced on the foundation bases in November 1999.

Due to the close proximity of accurate tool-room machinery that was to be moved alongside the press shop, several of the large press foundations were of an isolated design that required special construction.

The civil work took almost 5 months to complete and the installation of electrical supplies and other services a further two months but, by the beginning of June 2000, the shop was ready to start transferring the presses and equipment.

Seven presses, ranging in capacity from 30 to 250 tonnes, together with associated press shop plant and equipment were systematically moved from the existing Windmill Road, Loughborough site to their positions within the newly formed Press Shop.

The rational approach taken ensured that throughout the 3 month period it took to complete the press and machinery movement, disruption was kept to a minimum, and DAX lamination production was able to continue at the high level required to meet production schedules.

The press shop reorganisation allowed several initiatives to improve production methods and the working environment to be taken. The waste material off-cuts produced by the presses are now removed on conveyor systems direct to external waste skips, and a large acoustic enclosure was installed on the Schuler/Grabener 250T Automated Press Line, reducing the overall shop noise level.

With the BEM press shop now fully operational, and reorganisation at the Loughborough site drawing to a close, preparations are already being made to carry out a similar reorganisation of the operations of Brush SEM at Pizen in the Czech Republic. This includes the relocation of their press shop into the west annex of the main building, and the introduction of some of the production techniques already successfully employed on the production of DAX laminations at BEM in Loughborough.

*Andy Lambert
Manufacturing Systems Engineer*

Exhibition Diary

Exhibition	Date
 Latin American Power & Gas, Rio, Brazil	28 - 30/8/01
 Offshore Europe, Aberdeen, UK	4 - 7/9/01
 Power Gen Asia, Kuala Lumpur, Malaysia	20 - 22/9/01
 MSV Engineering Fair, Brno, Czech Republic	24 - 28/9/01
 Power Gen International, Las Vegas, USA	11 - 13/12/01
 Electric Power 2002, St Louis, USA	19 - 21/3/02

Power to rent



GE Energy Rentals, a GE Power Systems business, is supplying 22 TM2500 (trailer-mounted) gas turbine-generator sets to be installed at temporary sites in Arizona, Utah and Washington. Each TM2500 "Power Plant on Wheels" is capable of producing 22.8 MW, enough power for roughly 20,000 households.

Ten of the TM2500 units have been rented by Pinnacle West Energy, with five each to be installed at their West Phoenix and Saguaro power stations in Arizona. Five units will be used by Pacific Corp; at the Gadsby Power Station in Salt Lake City, Utah, and an additional client in the Pacific Northwest is renting seven TM2500s.

The TM2500 is a four-trailer system consisting of a turbine-generator trailer, an inlet filter trailer, an exhaust trailer and an auxiliary trailer. It can operate using either natural gas or liquid fuel, for either 50-hertz or 60-hertz applications.

With water injection, the TM2500 can achieve NO_x levels as low as 42 ppm with liquid fuel and 25 ppm with natural gas. It can be easily transported by ship, rail or road and can be quickly reassembled on-site for applications such as temporary peak lopping, plant shutdowns, equipment maintenance or emergency power during natural disasters.

"With an output of nearly 23 MW, the TM2500 offers the largest single block of rental power available today," said Caroline Reda, president and general manager of GE Energy Rentals. "A single TM2500 can be assembled and ready for field testing within three days of arriving at a customer site with the necessary infrastructure in place".

The TM2500 program was announced in 1999. The first five units were installed at a Commonwealth Edison site in Chicago, to help the utility meet its peak demands during the summer of 2000. The five units were disassembled in September and shipped to Ireland, where they were installed at two sites operated by the Electricity Supply Board (ESB). From October 2000 through March 2001, they were ready to supply up to 110 MW of additional power as required by ESB. The versatile packages operated at 60 hertz and used natural gas in Chicago and then, in Ireland, they ran at 50 hertz on distillate fuel.

Selected for their smooth running and straightforward installation, the BDAX62.170ER turbogenerators used in the TM2500 genset are a lighter and narrower version of the machine normally supplied for use with the LM2500 gas turbine.

Marine keeps on cruising



Queen Mary 2

Brush DAX 2-pole and DG 4-pole turbogenerators are powering the world's new breed of luxury cruise liners with all the in-built and planned gas turbine powered cruise ships utilising Brush's turbogenerator technology.

The latest such ship to enter service is Royal Caribbean International's RADIANCE OF THE SEAS, the first of four VANTAGE class ships being built by Meyer Werft of Germany, which began her maiden voyage on March 10, 2001.

With a Gross Tonnage of over 90,000 tonnes and a passenger capacity of 2,501, RADIANCE OF THE SEAS cruises at 25 knots and will spend summers in Alaska and the Pacific North West whilst wintering in the Southern Caribbean.

Further cruise news is that Brush are selected to provide the turbogenerators for the prestigious QUEEN MARY 2 project, which is to be built by Chantiers de l'Atlantique in Saint-Nazaire, France, birthplace of the NORMANDIE. This project will require two BDAX7.193ERH turbogenerators which will provide 50 MW of the 100 MW+ power for the ship's propulsion and hotel loads. Once launched, QUEEN MARY 2 is intended to fly the British flag, with her homeport being Southampton, England. She is set to be in service in the fourth quarter of 2003, spending summers on the North Atlantic and in cruise service in the winters. She will be nearly 150,000 gross tons, 21 stories tall, and over 1130 feet long.

Brush HMA News

Services breaking new ground in the Middle East



Together with local partner Thomassen Service Gulf, in Abu Dhabi, Brush HMA Services closed a contract with the Water and Electricity utility in Qatar, located at Ras Abu Abud power station. The contract was for the replacement of rotor caps of a GEC built Frame 5 turbogenerator from 1972. The existing caps had badly cracked and it was no longer safe to continue operation.

However the rotor had to be repaired before the end of June 2001, before the peaks of the 'hot season', when everyone turns on their air-conditioning systems.

HMA Services made a proposal for a special programme to ensure that the generator rotor could be repaired by June and was awarded the contract.

As no detailed drawings were available of the caps these had to be removed and sent back to Ridderkerk. There they were measured on the 3D-measuring machine to allow them to be reconstructed. Earlier, new forgings had been ordered on the basis of rough measurements previously taken on site.

After removing the caps it became apparent that the end windings were completely solid due to ingress of moisture, sand and oil which had created a concrete layer between the windings. This had to be carefully removed without damaging the winding insulation, at an average temperature of 45°C. This was not such a simple task, but the Brush HMA team managed it without any problems.

In the mean time, the new forgings had been machined at Brush HMA, and were sent by airfreight to arrive on site on the 20th June. On the 23rd June the rotor was delivered to the customer (who assembled it himself into the stator), ready for service.

This was an excellent result for the end user, and via this newsletter we would like to pass on his thanks for an excellent job done by all involved.

This successful reference is of great importance to Brush HMA especially considering the expected expansion of work in the Middle East.

New coil forming machine commissioned



The first major capital investment by FKI, aimed at improving the production efficiency and giving more consistent product quality of the Brush HMA 4-pole range of generators, was successfully commissioned earlier this year. The new Schumann coil forming machine has been successfully installed in the coil shop, on the second floor of building Y8, and the first production coils have already been formed on this machine.

After initial calibration to achieve the correct form of coil specific to Brush HMA generators, the machine has proved to live up to expectations. Not only has the traditional hand forming of the coils on the machine with hammers been eliminated, but also the production times have been reduced. The physical burden on the operators due to the elimination of hammering has also been reduced.

It is expected that the results of the investment, namely improved process control, better qualitative results and lower costs will lead to the anticipated payback period on this expensive piece of equipment.

Brush worldwide contact points

Brush Electrical Machines Ltd
PO Box 18, Loughborough,
Leicestershire LE11 1HJ, England.



Tel: +44 (0)1509 611511
Fax: +44 (0)1509 610440
e-mail: sales@bem.fki-et.com

Brush HMA b.v.
Ringdijk 390B,
2983 GS Ridderkerk, Netherlands.



Tel: +31 180 445500
Fax: +31 180 445866
e-mail: general@hma.fki-et.com

Brush SEM s.r.o.
Edvarda Beneše 39
316 00 Plzeň, Czech Republic



Tel: +420 (19) 77 17777
Fax: +420 (19) 77 18214
e-mail: sales@sem.fki-et.com

FKI Rotating Machines Inc
Northchase Business Centre,
Suite 220,14503 Bammel North Houston Road,
Houston, Texas 77014, USA.



Tel: +1 281 5801314
Fax: +1 281 580 5801
e-mail: sales@houston.rm.fki-et.com

FKI Rotating Machines - Asia Pacific,
c/o FKI Asia Pacific Sdn Bhd, Lot 7,
Jalan Majistret U1/26, Hicom-Glenmarie Industrial Park,
40150 Shar Alam, Selangor D.E., Malaysia.



Tel: +60 3 705 3736
Fax: +60 3 703 9625
e-mail: fkiasia@po.jaring.my

FKI Rotating Machines - Middle East
c/o Modern Centre for Business Services,
PO Box 60, Mina Al Fahal, Postal Code: 116, Oman.



Tel: +968 692283
Fax: +968 602915
e-mail: janefki@omantel.net.om

FKI Electromaschinen & Antriebstechnik
Postfach 1242, 31002 Elze,
Germany.



Tel: +49 (0)5068 462400
Fax: +49 (0)5068 462409
e-mail: fki_ea@froudehofmann.de

FKI Rotating Machines - South Africa
PO Box 417, Corner Main Reef & Wigelspruit Roads,
Technikon, Roodeport, Gauteng 1724, South Africa.



Tel: +27 11 764 4673
Fax: +27 11 764 4687
e-mail: fki@iafrica.com

www.fki-et.com



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