



## Engineering excellence

**RWE Power International**

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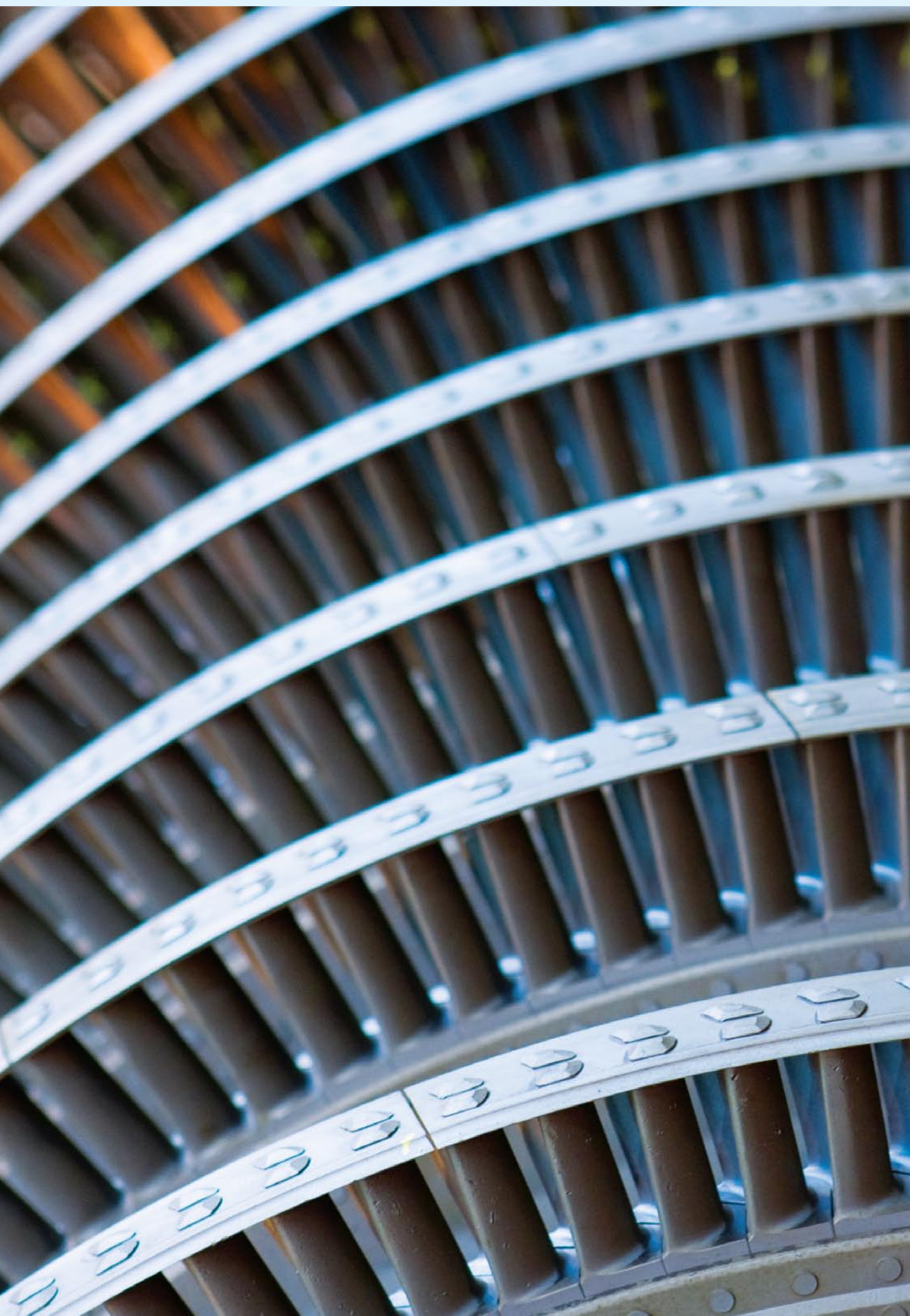
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## Engineering excellence

RWE Power International's specialist services cover every aspect of owning and operating power plant, from construction, commissioning, operations and maintenance, to eventual decommissioning. Our mining expertise covers minerals and solid fuels and spans exploration, development, operations and rehabilitation.

RWE Power International is a collaboration between two companies within the RWE Group, RWE Npower plc and RWE Power's consulting subsidiary, RE GmbH. With clients in more than 70 countries around the world, our expertise spans the full range of electricity generation technologies, fuel sources including hard coal, lignite, oil, gas, nuclear, and mining methods. We offer engineering support, specialist operations services and consultancy advice to clients operating in different market conditions.

Our Technical Support Group (TSG), based at Ferrybridge is synonymous with engineering excellence and our experience was gained through refurbishing, maintaining, modifying and providing emergency support for the UK's major power and industrial plants. Our modern technology ensures we provide the correct engineering solutions which are right first time.

Our traditional business, machining and fitting, has evolved into an integrated service capable of providing turbo-generator outages, on-site machining, technical engineering and development support.

TSG Ferrybridge has ISO9001:2000 quality certification and we provide services to the electricity generation, steel, petro-chemical and many other manufacturing and process industries.

We provide a broad spectrum of engineering services which are available all year round, seven days a week and include:

- workshop services and support for plant refurbishment, including overhaul, repair or modification of existing plant and machinery, manufacturing of new components, spare parts and assemblies
- outage management and delivery
- on-site machining
- engineering solutions for plant problems
- gas turbine (GT) services
- Non Destructive Evaluation (NDE).



Commencement of machining work on LP rotor

## Workshop

Our workshop facility consists of three large shops with an extensive range of machine tools capable of handling components up to 120 tonnes.

Highly skilled and experienced staff are available to work 24/7 to provide a range of services using the following facilities:

- heavy machine shop of 5,000 m<sup>2</sup> equipped with 120 tonne and 75 tonne capacity cranes
- light machine shop of 1,400 m<sup>2</sup> equipped with a 5 tonne overhead crane
- fitting and assembly area of 2,000 m<sup>2</sup> equipped with welding, heat treatment and 300 tonne press facilities, all serviced by a 25 tonne overhead crane
- gas turbine facilities including rotor de-stacking up to 85 tonnes.

### Machining

Our comprehensive range of workshop machine tools is capable of handling components as a one off or a batch and 24-hour working can be offered to ensure minimum response times for maximum plant availability.



Programming components on CNC Union borer

Our significant investment in new equipment, including the latest CNC machine tools, means we can manufacture components to the highest standards and exacting customer requirements.

### Spare parts

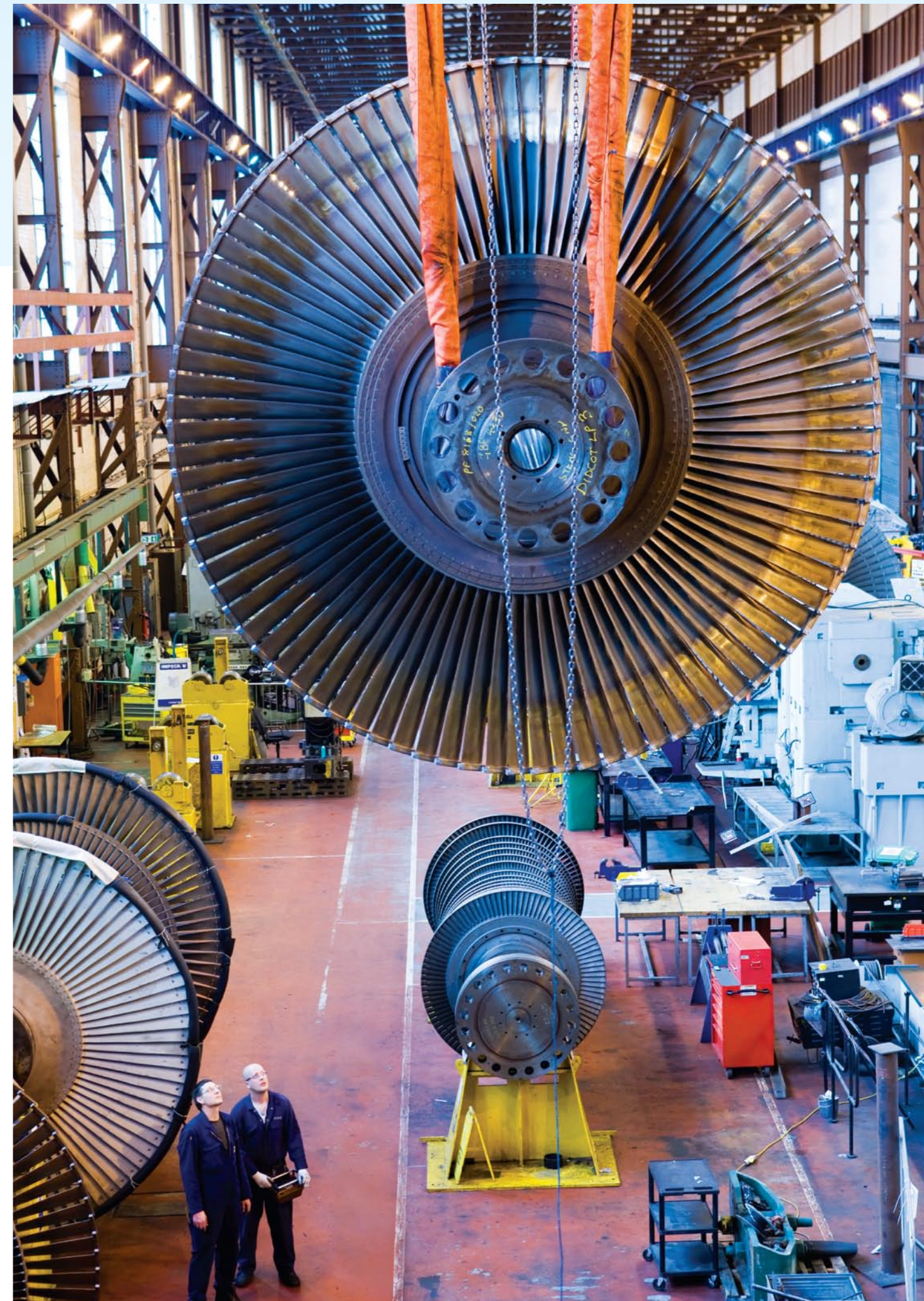
Spare parts can be manufactured and supplied to customers' drawings or, where detailed manufacturing information is not available, we can re-engineer components, capturing the required information from samples using the latest fixed and portable CMM tools.

### Repairs and refurbishment

Quality repair and refurbishment of equipment is of paramount importance. Our workshops are superbly equipped to deal with a wide range of components and provide quality repairs and refurbishment of engineering equipment.



Refurbishment of large LP steam turbine  
Right: Heavy machine shop





## Workshop cont...

### Low speed balancing and test facilities

Three Schenck dynamic balancing machines are installed in the workshops, which can handle rotors up to 120 tonnes, 4.8m diameter and 8.4m long. Facilities are installed for the response testing and setting of turbine mechanical governors and overspeed heads, together with special purpose test rigs for the proof testing and setting of turbine control valves and relays.

### Fitting, assembly and overhaul facilities

We have facilities for the manufacture of new components and the overhaul, repair and refurbishment of all types of mechanical and rotating plant and equipment.

These range from coal and ash handling and crushing plants, through to fixed and rotating turbine blade replacement, repair and specialist overhaul and the testing of key plant, including governors and hydraulic servo systems.

The excellent facilities and skilled workforce allow newly manufactured items to be pre-assembled and despatched to customer's sites in sub-assemblies, reducing downtime and site activities.

### Welding and fabrication

Facilities are available for MMA, MAGS and TAGS welding of most alloys with complementary heat treatment. Submerged arc welding is also available to repair larger components such as rotor journals, discs and shaft diameters. Work undertaken includes the reclamation of turbine blades, large impellers and diaphragms, repair and reclamation of worn plant parts, spiral welding of hub bores and repairs and refurbishment of pressure parts.

### Support services

The workshop has a purpose built grit blast facility capable of handling components up to 50 tonnes and 4.6m diameter. Facilities include steam cleaning, wet or dry abrasive blast cleaning and sponge blasting which can also be carried out on-site.



Low speed dynamic balancing  
Left: Light machine shop



Blast cleaning using latest sponge blast technology

## Outage management and site projects

Our outage management and site projects teams provide comprehensive outage and maintenance services to power plant operators and major industrial clients. Our main priority is to deliver projects safely, to time, quality and cost.

We have the capability to provide a one-stop-shop for all outage related work requirements including the unexpected emergency or short notice repair and our teams provide rapid response 24/7 emergency cover.

We work to strict ISO9001:2000 quality standards and provide all resources necessary to carry out large refurbishment projects. We have experience of all types of generation plant, including steam, gas turbines, hydro and wind as well as plant and equipment in the steel and other process related industries. Our competitive position in the market place is reinforced by our in-house site services capability and extensive workshop and manufacturing facilities.

Our experience includes overhaul and repair of:

- steam and gas turbo-generator units up to 660MW
- small industrial generation units

- general rotating and industrial plant
- hydro generation plant overhauls.

Our services include:

- total outage project management
- provision of mechanical, electrical and C&I expertise
- QA, planning, supervisory and management personnel
- information systems support for effective management and communication
- field engineering support for both in-service and outage requirements.

TSG Ferrybridge has 24 hour access to RWE's specialist engineering services that provide inspection, plant assessment and remedial action recommendation to get the best out of your plant.



Turbine bearing check



Overhaul of Didcot steam turbine

Right: CCGT rotor blade inspections prior to lowering rotor into turbine casing





## On-site machining

On-site machining can offer a cost effective and highly accurate way of machining components that are too big or fragile to move economically. These include new or prototype components where it is not feasible to commission prior to construction.

A high quality, flexible, solution-finding service is available to perform a wide range of machining techniques on your site, either via planned outages, major shutdowns or during breakdowns. Our machines, fully equipped vehicles and dedicated craftsmen provide a service capable of responding to emergency breakdowns on a 24/7 basis.

The type of work undertaken includes journal turning, flange facing, stud removal, hydrogen seal machining, valve seat facing, milling on all planes, line boring and rotor bore honing, all carried out in-situ.

Our latest on-site machine tools have been specially designed and manufactured to our exacting standards, ensuring customers benefit from high accuracy and versatility. All our machines are capable of operating in limited access areas and are either pneumatically or electro-hydraulically driven.

In addition our services include:

- project management
- pre and post inspection reports
- dismantling, assembly and commissioning
- spares, repairs and refurbishment
- workshop support
- engineering solutions and modifications
- NDE inspection and blast cleaning facilities.



On-site machining of a flange face



On-site machining of a wind turbine generator tower joint face

Left: On-site machining of preheater connection pipe after weld repair

## Engineering solutions

TSG Ferrybridge has the right people and equipment to provide a full range of technical and developmental solutions for power generation and other heavy engineering industries.

Our teams can diagnose a range of engineering problems and provide solutions by directly supporting customers on specific plant issues. This can be on-site or at our workshops.

Our technical services include:

- advice on maintenance and improvement regimes
- problem solving of specific plant issues
- extensive plant knowledge and technical support
- tender preparation and project management.

We provide solutions to plant problems by working with clients across different technologies in a wide range of industries, specialising in the power industry.

TSG Ferrybridge delivers total solutions to plant problems, starting with initial discussions and leading through the investigation and diagnostic process, redesign, manufacture/modification, commissioning and report stages.

Our development services include:

- focused advice and delivery of solutions for the resolution of engineering issues and prevention of failure across a wide range of plant types
- expert trouble-shooting and 'forensic' investigation service on plant operation and refurbishment/repair
- provision of high value technical advice and judgements plus client representation in negotiations with plant suppliers on technical standards.



Gas Turbine engineering assessment



Carrying out a surface finish assessment

## Gas turbine services

As an operator of gas turbine plant, we recognise the importance of issues that are unique to the management of gas turbines.

Our team of specialists are dedicated to providing a range of gas turbine services covering the whole plant.

Our approach to the effective support of plant is comprehensive and includes the provision of labour, technical skills, project management and workshop facilities for complete outages and overhauls. This is the way we deal with our own plant and we adopt the same approach for the support of your units.

We provide more freedom of choice and independence from OEMs, along with the opportunity to make informed decisions about business risk relative to refurbishments.

The elements of this cost effective whole plant service include:

- outage management
- refurbishment
- re-engineered components
- full warranty cover
- impartial repair/replacement advice
- engineering, inspection and diagnostics
- project management
- online information and remote monitoring
- maintenance support.



Refurbishment of compressor sections improving gas turbine efficiency



Didcot B – RWE's 1,360MW CCGT power station, UK

## Non Destructive Evaluation (NDE) specialist services

Specialised NDE inspections provide significant contributions to structural integrity and are necessary to gain essential knowledge of safety critical plant. Inspection Management provides an independent market leading service with over 50 years experience, focusing on the power generation industry.

### Advanced NDE technologies

RWE Power International is a leader in the development and implementation of advanced NDE technologies utilising the latest technologies such as Phased Array, Time Of Flight Diffraction (TOFD), Eddy Current Array and Creeping wave.

Our unique understanding of market demands means we have developed advanced NDE inspections specifically for high cost engineering equipment.

### Computerised auto inspections

Minimising operator errors, we deliver auditable inspections covering:

### Rotating plant

- generator end rings, wedge bars and fan rivets
- turbine blade roots, fixings and bores.

### Steam raising plant

- steam pipe work and steam chests
- boiler corrosion mapping
- remote visual inspections.

### Outage management

Our NDE outage management specialists coordinate all your scheduled inspection requirements.

### Development

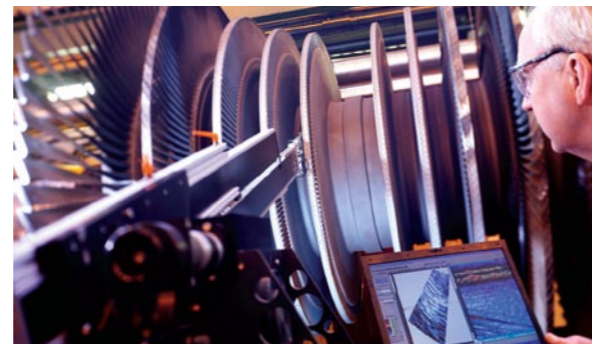
We are dedicated to improving established inspections in order to offer better detection sensitivity. Our goals are to increase efficiency and throughput, providing hard-copy audit trails, designed to save time and money.

### Consultancy

Level III NDE consultancy services range from training through to audit and failure investigations.



Automated rotor bore inspection using array Eddy Current and UT imaging technology



Current and UT imaging technology

