

Expanding into the Middle East

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Having been awarded a large contract from the Gulf Region for the repair and specialized coating of gas turbine parts, Hickham Industries, Inc., a subsidiary of Sulzer Turbomachinery Services, is entering the Middle Eastern power generation market. Hickham has therefore almost tripled the size of its component repair facility at La Porte, Texas, investing in newest technology.

Hickham Industries, Inc. has begun full-scale gas turbine repair services for one of the largest electric utility companies in the world. This Middle Eastern power company has nine power plants with a power production capacity of around 5 GW. Hickham was awarded a three-year contract for the repair and specialized coating of thousands of hot-path gas turbine parts.

Hickham's expertise and experience with industrial gas turbine equipment from major manufacturers such as General Electric (GE), Westinghouse, ABB Alstom, Hitachi, and AEG was a critical factor in securing this contract. Taking on a contract of this magnitude requires state-of-the-art technology, proper facilities and equipment, as well as competent personnel.

REPAIR FACILITY ALMOST TRIPLED

Upon notification of the successful award of the contract, Hickham secured funding to almost triple

the size of its component repair facility to over 2000 m² (Fig. 1[■]). The expansion has a size of approximately 1300 m². The total time to complete this movement and expansion was under three months. It is also important to note that during the move, all normal production and also the processing of the initial eleven ship containers of parts from the Middle East to be repaired continued uninterrupted – an amazing logistical accomplishment.

Along with the new facility, the contract required that new equipment be purchased to properly repair these critical components. This equipment can now also be used for other repair orders. For individual blade tip machining, a new CNC mill was acquired so that the complex geometry profiles could be maintained to the closest tolerances and accuracy. A new scanning electron microscope with

¹ ■ *Due to a contract from the Middle East, Hickham Industries expanded its component repair facilities. The expansion, having a size of 1300 m², is shown left in the figure, the older part is on the right.*





2[■] *New equipment purchased for the contract in the Middle East ensures a qualitatively high standing repair. For instance, a scanning electron microscope with EDAX (Energy Dispersive X-Ray Spectroscopy) capability analyzes the properties of every component and helps also in evaluating the best repair method for them.*

EDAX (Energy Dispersive X-Ray Spectroscopy) capabilities (Fig. 2[■]) assures that all components are thoroughly analyzed for properties such as fatigue, creep, and remaining life assessment through various destructive and non-destructive evaluation techniques. It is also critical in evaluating the best repair method and heat treatments required for each individual part since the operating history of these units is not always available.

“TEXAS INITIATIVE” FOR TRANSITION PIECES

Hickham was due for an upgrading of its chemical stripping capabilities and is currently in the process of constructing a new facility adja-

cent to the coatings division which will allow quicker and more precise coating removal, particularly on blading which has internal coating that cannot be removed mechanically. Because transition pieces are often shipped without the nozzles to verify against, the critical dimensions required can not be verified. Due to that circumstance

Hickham has invented a special device called “Texas initiative” (Fig. 3[■]). This device produces required fixturing which simulates fitting of each style individual transition into the nozzle of each turbine so Hickham can guarantee that every transition piece really fits into its nozzle without having the nozzles to be shipped.



3[■] *A device called “Texas initiative” shown in the background was invented by Hickham to simulate fitting of transition pieces into the nozzle because transition pieces are often sent without the nozzles to verify against.*

Another considerable improvement in the new facility was the installation of environmentally protective “downdraft” welding tables at each welding station (Fig. 4[■]). For the client, the advantages of these tables is that any dust, debris and foreign matter in the environment is extracted during the welding process, which eliminates the potential of these particles getting into the welds and

contaminating the repair. The tables also dramatically reduce particles in the air throughout the shop facility, which improves the quality of life for the co-workers and protects the environment at the same time.

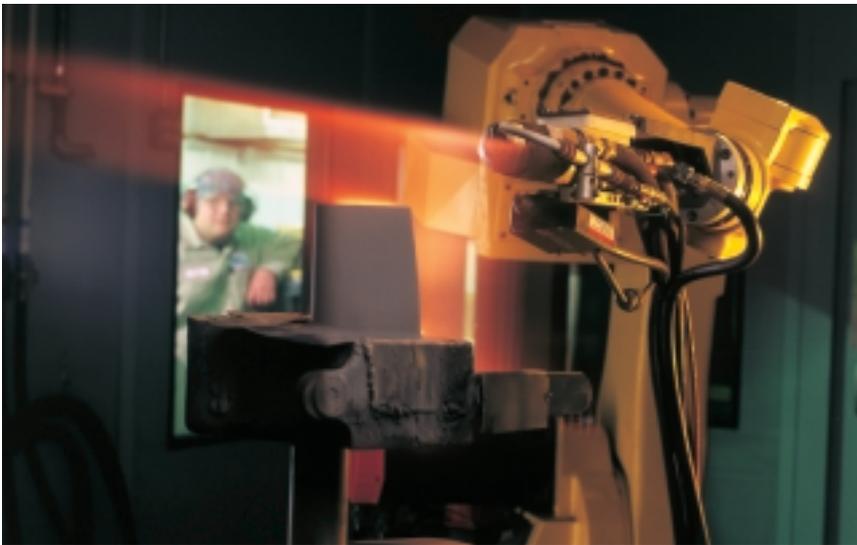
SULZER METCO COATINGS

After the majority of the components are repaired, Hickham is also responsible for applying coat-

ings of various types. All are applied utilizing two 8-axis robotics from Sulzer Metco (Fig. 5[■]). Both plasma and HVOF (High Velocity Oxy-Fuel) coatings are applied to the most stringent industry standards. The new client from the Middle East particularly appreciated the specialized coatings Hickham developed for particular problems that are encountered in the hot, humid, sandy conditions in the Gulf Region. Plasma coatings are applied for thermal-barrier-type coatings to primarily combustion components such as liners, baskets and transition pieces. Hickham has also applied it to stationary nozzles in various thicknesses to combat the extreme conditions found in the desert. HVOF is used for the coating of turbine hot-section rotating blading and buckets. The combination of having both the repair and the coating facility all in one complex is for the client’s benefit from both a logistical and a quality control aspect. Because production



4[■] Special environmentally protective filters at welding stations allow to remove dust, debris, and foreign material in the environment, which reduces contaminations in the repair and also improves the quality of life for the co-worker.



5 ■ A gas turbine blade receives HVOF coating. Hickham uses two robotics from Sulzer Metco.

schedules can be optimized and there is no internal shipping cost, clients can profit from very competitive contracts.

Presently, there have been more than 70 orders through the Hickham component repair facility. Over 3500 individual components including blades, nozzles, vane segments, combustion liners and transition pieces have been processed in the past nine months.

GETTING THE CONTRACT

During the bid selection process for the contract in the Gulf Region, several competitors were scrutinized thoroughly by representatives of the gas turbine owner. A highly technical proposal was submitted by Hickham outlining characteristics like technology, facilities, equipment and person-

nel. The proposal was followed by multiple qualification visits by client's personnel to the Hickham facility to evaluate all aspects of the operation from Senior Management, through the quality control process (Hickham has ISO 9001 quality certificate), engineering capabilities and then on to the facility itself. One critical aspect of the Hickham bid was that it was the only company to quote on all of the potential repair items. This is a testimony to the flexibility that the organization has in that they had previous experience in the repair of GE, Westinghouse, ABB Alstom, Hitachi, and AEG gas turbine components. None of the others could make the same claim. To be in closer contact with the client of this first project in the Middle East and also with power compa-

nies in other countries of the Persian Gulf Region, a satellite office was opened by Hickham in Dubai, United Arab Emirates. Ω

FOR MORE DETAILS

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