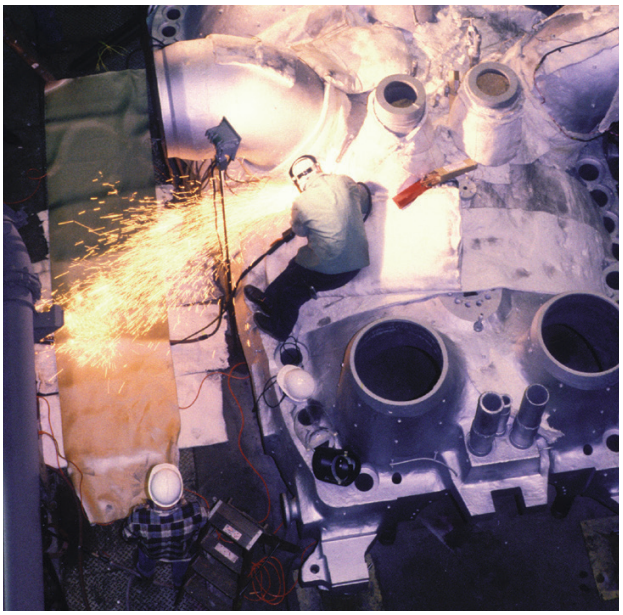
SERVICES

WELD & DISTORTION REPAIR SERVICES

MD&A Turbine-Generator Repair Facility

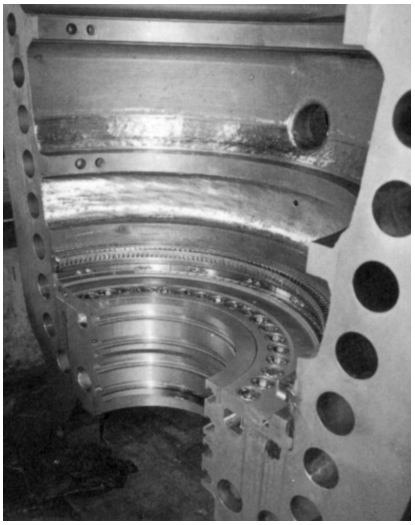
Weld Procedures



Cracked, eroded or distorted steam turbine casings can be reliably repaired at a small fraction of their replacement cost. Mechanical Dynamics & Analysis Repairs Division has developed proprietary weld and heat treating procedures to solve virtually all casing problems.

Working with many utility-sponsored organizations, metallurgists and welding specialists, MD&A Repairs Division has researched and developed numerous procedures to improve the technology of casing repairs. These improvements include the selection of welding filler materials, weld bead installation techniques, reduction in heat affected zone hardness, reduction in residual stress, prevention of cracking during heat treatment, control over any changes in critical dimensions and elimination of critical weld defects.

As a result, our weld procedures are extremely conservative and industry accepted—providing high quality repairs that can reliably extend a casing life up to 25 more years. All MD&A's weld procedures are performed in accordance with the ASME Boiler & Pressure Vessel Code and by ASME certified welders.



Distortion

The use of MD&A's rounding disks, in conjunction with thermal stress relief cycles, will restore your casing bores and joints to original design tolerances. Our proven and proprietary process considers casing geometry, material properties, extent of distortion and residual stress levels. MD&A's distortion repair usually eliminates the need for follow-up welding and machining. Critical bolting and blading are usually unaffected.

Erosion

Mechanical Dynamics & Analysis restores moisture eroded sealing surfaces with weld overlays that incorporate erosion resistant alloys which are highly resistant to future deterioration. This process assures complete restoration of sealing surfaces and turbine structural integrity. MD&A's high-tech laser measurements equipment verifies that final joint flatness meets or exceeds the original design. These repairs can be performed on-site or in one of our selected shops.

Quality Assurance And Control

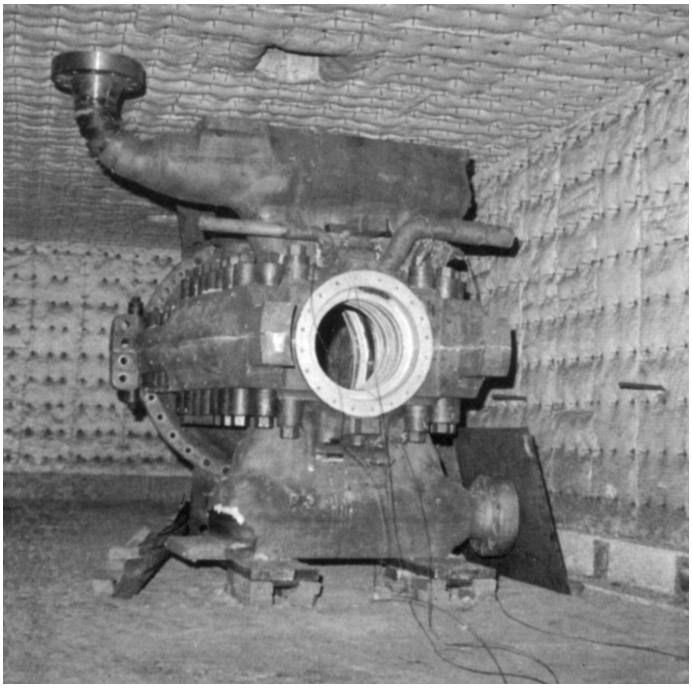
MD&A's extensive NDE and quality control procedures ensure defect free welds. During weld repairs, independent, certified NDE technicians monitor weld quality to eliminate defective welds. Additionally, MD&A's engineers and quality control inspectors continually monitor weld dimensions to assure that no undesirable changes occur at critical fits.

During repairs, MD&A's engineers utilize precision laser equipment to measure joint flatness and borescopes to inspect hard-to-reach control valves and steam ports. Computer modeling, finite element, heat transfer, stress analysis, and laboratory welding research are used to optimize and verify all weld procedures.

Stress Relief

To maximize casing life, MD&A uses stress relief processes that can be performed both on-site or in one of our repair shops. MD&A's stress relief heat treatment process reduces residual stresses and greatly improves the ductility of welds and their heat affected zones. The result is a crack-free life for all repair areas. Heat treat temperatures are controlled to prevent damage to critical heat treated parts such as bolting and blading.

Unlike most other contractors, MD&A stress relieves casings while assembled, and not in halves. This quality control step eliminates unacceptable distortion. Our computerized Finite Element Analysis is used to optimize stress relief cycles.



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For more information on this product or service please contact MD&A at 314-880-3000.