



TOPLESS ALIGNMENT® SERVICES

ABOUT TOPLESS ALIGNMENT® SERVICES:

MD&A's Topless Alignment® Service eliminates the time consuming and expensive process of reassembling a steam turbine for "Tops-On" alignment measurements, saving hundreds of man-hours labor per turbine section. Most centerline alignment activities are moved off the critical path, reducing outage duration by days.



How is Topless Laser Alignment Performed?

- *MD&A takes measurements immediately after rotors are removed, during slack time, while the stationary components are waiting for rotors to be blast cleaned*
- *Using custom laser and measurement equipment, MD&A measures turbine shell deflections and centerline bore positions*
- *Ideal steampath bore positions are then calculated and recommended moves are made as a non-critical activity*
- *Final alignment is verified and corrected if necessary, after component inspection and repairs are completed*

Why Choose the MD&A "Topless Alignment®" Method?

- *Stationary component alignment is done off the critical path*
- **Increased Safety !** *A 50% reduction in heavy rigging of upper half shells and casings (No Tops-On measurements)*
- *Bearing shim changes and pad contact checks done off critical path*
- *Improved turbine efficiency*
- *Customer focused*
- *When combined with the new Guardian™ packing from MD&A, the packing can be custom machined to compensate for out-of-round bores, further improving efficiency*

Alignment Experience Makes a Difference

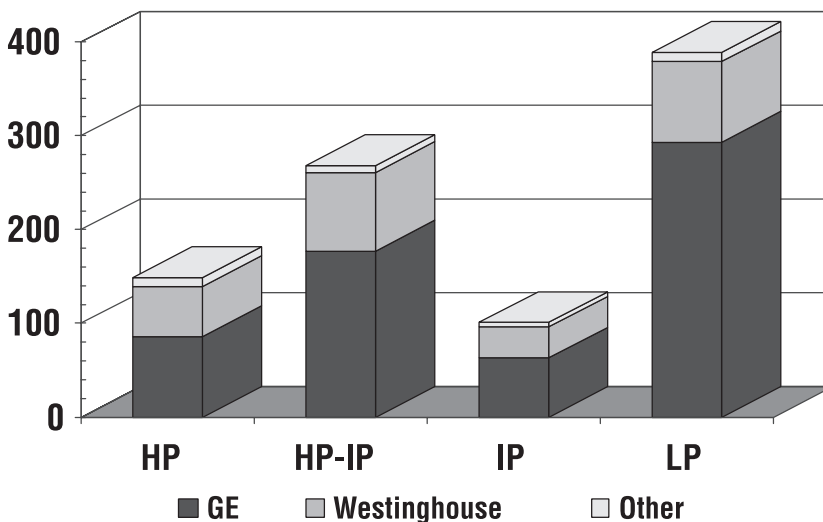
MD&A provides turbine owners with the greatest depth of Topless Alignment® experience in the power generation industry. Our alignment process is a proven technology accompanied by an outstanding record of successful applications on nearly all makes and models of machine. MD&A engineers have successfully aligned over 873 steam turbine sections using the MD&A Topless Alignment® method. Our projects have a remarkable record for "lack of rubbing." We believe this historical track record of successes is an important fact that differentiates our service from those available elsewhere in the industry.

MD&A Alignment Engineers bring both a depth and breadth of experience to the turbine deck. Each of our Alignment Engineers performs between 10 and 20 turbine section alignments per year. This depth of experience allows our engineers to constantly sharpen their skill sets and apply some of the most modern techniques available. Each engineer's broad base of experiences contributes to the overall value we provide as your alignment contractor. You can expect dependable and accurate results every time you hire MD&A to align your turbine.

Our experience-base includes successful projects dating back more than 15 years. During this time our engineers have aligned units all over the world, include those manufactured by the following OEMs:

- General Electric
- Alstom
- Mitsubishi
- Westinghouse
- MAN
- Dresser-Rand
- Hitachi
- Parsons
- Worthington
- Allis-Chalmers
- Siemens

MD&A Topless Alignment® Experience 873 Turbine Sections Aligned since 1991



MD&A's Topless Alignment® Guarantee
If MD&A tells you to put the Tops on – Our alignment is FREE!

For more information on Topless Alignment® Services please contact MD&A at 518-399-3616.



Mechanical Dynamics & Analysis
19 British American Blvd.
Latham, NY 12110

Phone: 518-399-3616
Fax: 518-399-3929
www.MDAturbines.com