

Taming Turbine Internal Alignment Challenges

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ACQUIP Uses Laser Tracker Technology to Provide Industry-Leading Alignment Solutions

You might say that what Henry Ford did for the automobile, GE, Siemens, and Mitsubishi have done for the gas and steam turbine industry. Naturally, the tools and technicians of both sectors have had to evolve right along with the challenges of new technology and the ever-increasing demands for improved accuracy and efficiency.

“What used to take anywhere from 12 to 24 hours is now done in three to five.”

Damian Josefsberg, Founder **ACQUIP**



If you work in a facility that looks something like this.

The efficiency of today’s higher-rated turbines depends on precision alignment of components, and everything counts—nozzles, seals, bearings, and packing are all of critical importance.

Precision alignment and other challenges can only be addressed through a combination of insight and experience, and for that reason, ACQUIP was born in 2003. ACQUIP, headquartered in Miami Beach, Florida, is an industry leader for rotating equipment solutions, specializing in laser alignment services for the power generation, oil and gas, and petrochemical industries.



You are probably familiar with machines that look like this.

If you’re familiar with steam turbines like the one above, then you certainly understand the fundamental challenges posed when they require internal alignment in the course of a maintenance event or a major outage.

Whether planned or unplanned, outages require a quick turnaround with no hiccups at start-up. In the power-generation industry, minimizing downtime is paramount because downtime can affect customers, revenues, and/or have regulatory implications. To provide quick, efficient, and precise alignment services to their clients, ACQUIP utilizes the Vantage Laser Tracker system from FARO® Technologies of Lake Mary, Florida. The FARO Vantage Laser Tracker allows the data-gathering process to proceed while other work is being performed on the turbine deck. This is possible because the line of sight of the laser beam can be broken and re-established at any time without affecting the measuring accuracy, hence optimizing the outage-resolution process.

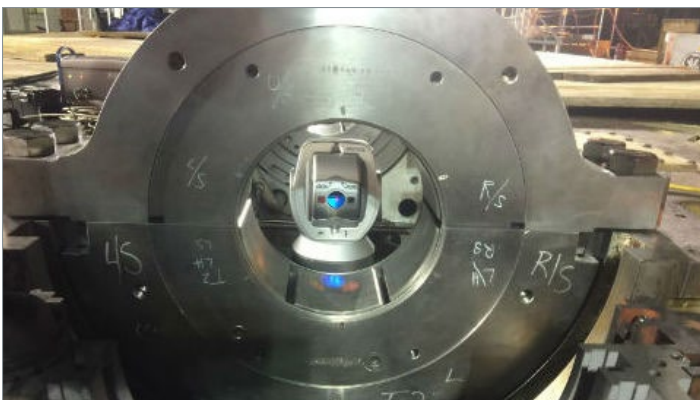


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For some major steam turbine outages, ACQUIP can perform an Express Alignment Service. This is a theoretical tops-on alignment, which allows for short downtime during the steam turbine internal alignment. Express Alignment alters the traditional alignment process by not having to put on and take off the top of the turbine cylinder. This saves a significant amount of time and money for the client.



“Express Alignment is an alternative to the tops-on/tops-off alignment,” explains Damian Josefsberg, founder of ACQUIP. “With the turbine top off, the turbine diaphragm position, packing rubs, out-of-roundness, and turbine shell deviations are measured and recorded. These measurements are used to calculate the theoretical turbine tops-on position without actually putting in the labor hours required to measure a turbine in the tops-on position.”



“The Express Alignment process takes laser-alignment readings for all internal components, which are then combined with horizontal-joint deviation and out-of-roundness readings. When all of the turbine components are assembled, they are placed into the ideal calculated position.”

The components of a steam turbine are extremely large, complex and heavy. With a Laser Tracker alignment system, there is significant reduction in both staff hours spent and overhead-lifting risk when employing the Express Alignment method. Naturally, this method requires advanced technology and tools, which is where FARO comes into the picture.

“Traditionally, the way we gathered that information was with a leveling laser, a two-dimensional laser, inside micrometers, and even a tape measure,” says Josefsberg. “That’s four tools, each with its own error margin and also deviations between operators, and only then is the data put into a spreadsheet.”



“With the FARO Laser Tracker, once we set it up, we are able to measure the horizontal joint and all the internal components with one tool and all at the same time – and we get it in 3D: horizontal, vertical, and axial,” continues Josefsberg. “With the form data that comes from that, we get the out-of-roundness data.” Pursuant to the reduction in tools used, better usability and increased accuracy naturally follow.

“The longer something takes and the more people involved, the more an opportunity for error is introduced,” says Josefsberg. “So, the quicker you can make it, the more automated and computer-based you can make it, the more you can reduce human error.”

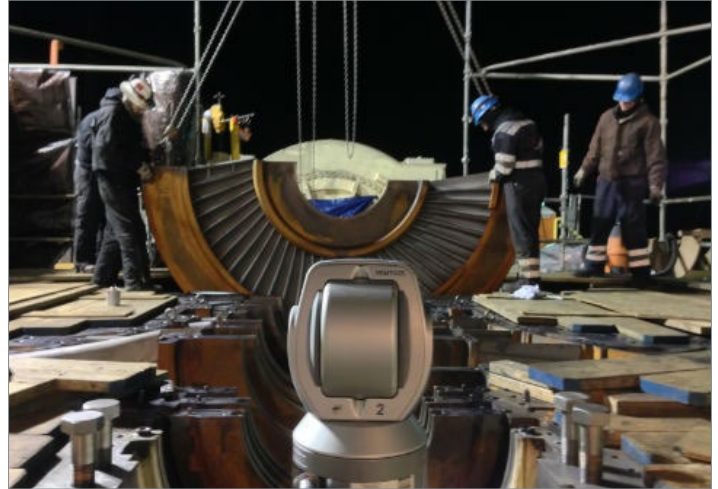
The improved workflow has a predictably pleasant side effect – the time savings are nothing short of amazing. “Beyond the accuracy of the Vantage Laser Tracker is the speed,” says Josefsberg. “When a client is working on an outage, whatever task they have to wait on before doing the next task is called the ‘critical path.’”

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Before using the Vantage, outage tasks would stop and the crew would have to wait on us to take our readings before anything else could be done. That made us the critical path! Using the Laser Tracker changed all that. What used to take anywhere from 12 to 24 hours is now done in three to five.”

Another critical component of the FARO system is the software. “We use the FARO CAM2® Measure 10 software,” says Josefsberg. “This allows us to record features in three dimensions and see the form data instantly. All the data is automatically gathered into this single piece of software, and the visual graphics generated make a big difference. Seeing is believing, so when you can see a graphical representation of what’s going on, it makes it a lot easier to interpret the data as opposed to relying solely on the spreadsheet.”

When all is said and done, the concepts of alignment remain constant, and ACQUIP possesses a deep experiential knowledge in the field. But a tool is not always just a tool, and knowing how to couple those concepts and tools is critical. This is where the capabilities of FARO’s technology and strength of their support enhance ACQUIP’s ability to meet the demands of their customers’ very rigorous metrology and alignment projects.



The logic of using state-of-the-art laser equipment and appropriate software is sound and proven: Fast and meticulous alignment facilitates faster turnaround and an increase in turbine efficiency – which improve the life of the unit as well as its owner’s profit margin.

Mobile App to
Control Vantage^S
or Vantage^E



Click above to watch a video on the FARO Vantage^S with RemoteControls™ workflow.

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live web demo of the Vantage^S

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