

Self Leveling Machines

Large Scale On-Site Machining

Providing engineering, fabrication, and execution of highly-specialized machining solutions for large-scale equipment or operations worldwide

Company Profile

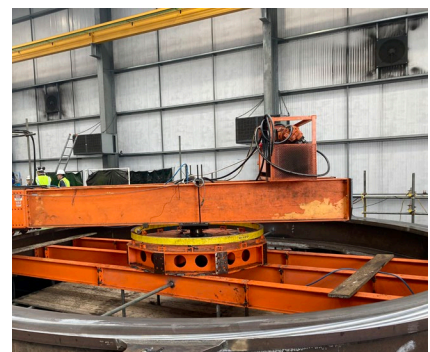
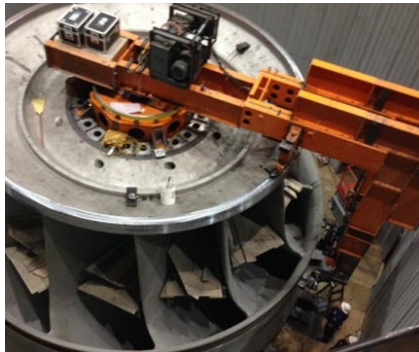
In 2011, TEAM expanded its global on-site machining capabilities through the acquisition of Self Leveling Machines Pty Ltd. and Self Leveling Machines, Inc. (collectively "SLM"). The TEAM Self Leveling Machines (SLM) technology specializes in machining very large circular and irregularly shaped surfaces.

Our patented designs enable us to machine diameters up to 150ft (45M) and rectangular faces up to 32ft (9.7m) x 100ft (30.5m) in a single set up.

The SLM initial designs were first utilized to machine foundation faces on guided missile launch systems on Navy frigates in 1989 in Australia. Immediate market expansion began in the mining sector machining slew ring surfaces and dragline rack and roller paths. Power Generation soon followed with the machining of steam turbine casing horizontal half joints in a single setup. Since then we have expanded to cover a wider range of applications in the Mining, Offshore Oil and Gas, Power Generation, Fabrication, Steel, and Process Industries.



TEAM delivers asset-centric solutions across a wide range of industries and applications. Since our founding, TEAM has set the standard for asset performance optimization and integrity assurance including SLM technology.



Industry Application

Power Generation

- + Turbine Casing
Horizontal split joints
- + Machinery Foundations

Hydro Electric Power

- + Turbine Covers
- + Distribution Plate Surfaces
- + Guide Vane Gate Surfaces

Manufacturing

- + Test Beds
- + Forges
- + Die Caster
- + Presses
- + Pattern

Steel Industry

- + Mill Stand Refurbishment
- + Blast Furnace Lip Rings
- + BOF Flanges
- + Slew Ring Bearing Surfaces

Nuclear Power

- + Reactor Head Flanges
- + Turbine Casing
Horizontal Joints
- + Equipment Foundations

Offshore Oil Production

- + Turret Mooring Systems
- + Crane Bases up to 7,000 tons
- + Calm Buoys
- + FPSO Turret Systems

Mining

- + Draglines
- + Stackers
- + Reclaimers
- + Dredgers
- + Crushers
- + Car Dumpers
- + SAG and Ball Mills
- + Stacker Reclaimers

Military Defense

- + Weapons Mounting Foundations
- + Rocket and Missile Launches
- + Sonar and Radar Revolving Dome Surfaces
- + Submarine Hull Protrusions

Petrochemical Refining

- + Equipment Foundations
- + Reactors
- + Presses
- + Onshore and Offshore Cranes
- + Compressor Casing Horizontal Joints

Equipment Technical Description

Our machines follow a reference plane electronically. Utilizing the strength of the item being machined for support, we can minimize the structural strength and weight of our equipment. This eliminates the need for a self-supporting rigid portable machine that requires considerable time and engineering effort for installation.

Circular Machines 5ft 7in - 30ft (1.7m x 9m) diameter (CSLM, LP-CSLM and V-CSLM)

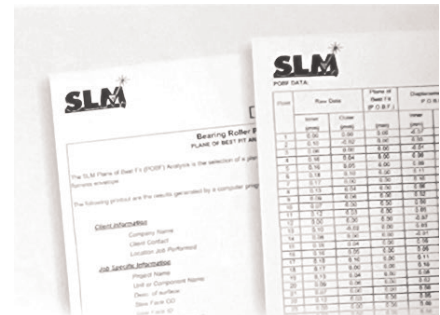
The CSLM is specifically designed for machining horizontal, vertical and irregular surfaces within 1.8m-15m diameter range.

The CSLM consists of a rigid box supported on wheels which travel upon the face to be machined. This box is extended to the center with structural beams connected to a central pivoting system (CPS). An adjustable hydraulic milling cutter is mounted in the box and machines the circular surface, and any related surfaces as the assembly rotates around the central pivot.

A precision ground datum ring is mounted around the central pivot point, this is used as an independent reference plane. This datum ring is mechanically adjusted parallel to the desired plane to be machined.

Electronic probes attached to the supporting beams are in contact with the datum ring, as the machine rotates the probes detect the position of the beam height relative to the datum ring.

The control system automatically and continuously adjusts the travel wheel height maintaining the height between the beams and the datum ring as the wheels travel through the peaks and valleys on the surface being machined.



Circular Machines 20ft to 150ft (6m to 45m) diameter (XL-CSLM)

Large diameters are machined using a scanning laser plane to replace the datum ring. The laser is mounted on the central pivot and adjusted to scan parallel to the desired machining plane.

The machine operates similarly to the smaller datum ring design. The datum ring followers are replaced by laser targets, which interface to the scanning laser plane and control wheel height to maintain the milling cutter position parallel to the laser plane.

A key advantage of this machine is that the machining diameter is limited only by the target's ability to interface with the laser source. This allows diameters to be machined beyond 150ft.

Rectangular or Irregular shaped surfaces up to 38ft x 38ft (11.6m x 11.6m) (LSLM)

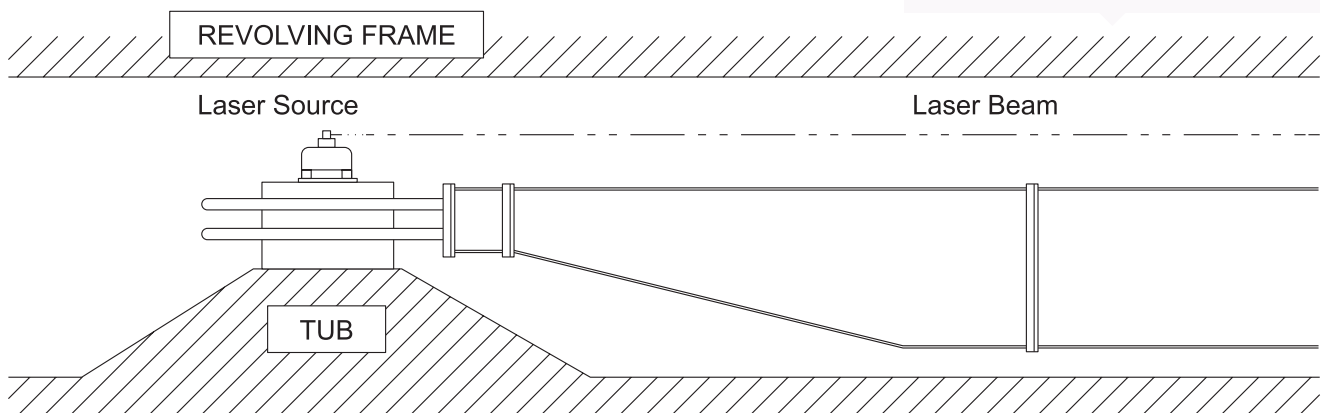
A scanning laser is used to scan the workpiece and is parallel to the desired machining plane. The milling machine consists of two fixed beds, which straddle the work piece. A cross bed can be driven along the two fitted beds. Our milling head, located on a saddle plate can travel along the cross bed. This allows us to move the milling cutter to any location on an X-Y axis over the work piece.

The milling head is fitted with targets and servo drives. The targets interface the scanning laser beam and a control circuit adjusts the servo drive to maintain the milling cutter parallel to the laser plane regardless of the errors which affect the saddle plate position.

The large sizes involved normally require very heavy beams to minimize deflection with thermal errors remaining. By following a laser plane, our design eliminates thermal effects and the need for massive structures. This covers large areas in a single setup.

The same scanning laser can also monitor cuts and complete surveys during and after the machining operation.

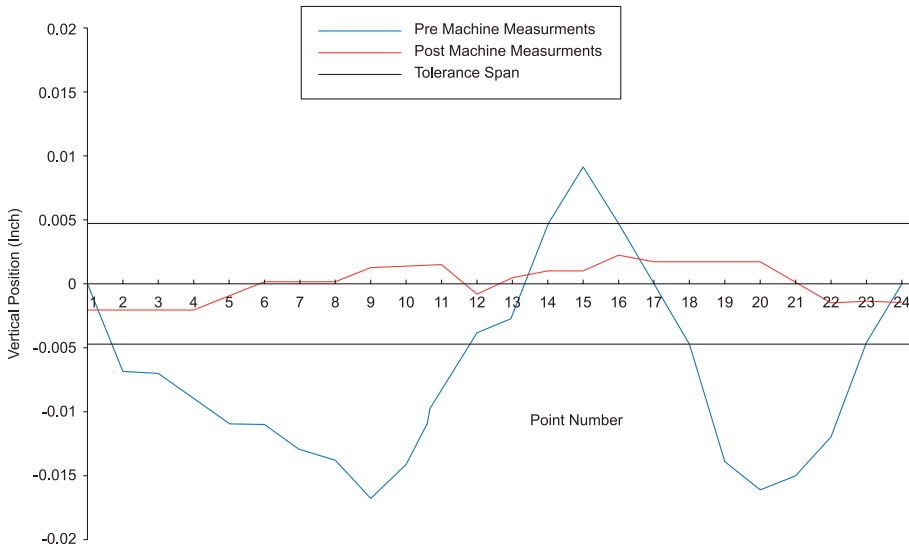
XL-CSLM setup on a dragline.
The revolving frame is jacked up to allow the XLCSLM to be set between the two rail path faces. Machining can then be completed in one setup.



Quality Assurance

POBF Report No: POBF-SLM-104

Turret Mooring Project - Machining of Bearing Seating Face Surface Profile



All measurement data collected is computer processed. Produced reports ensure the highest quality standards.

TEAM SLM objectives

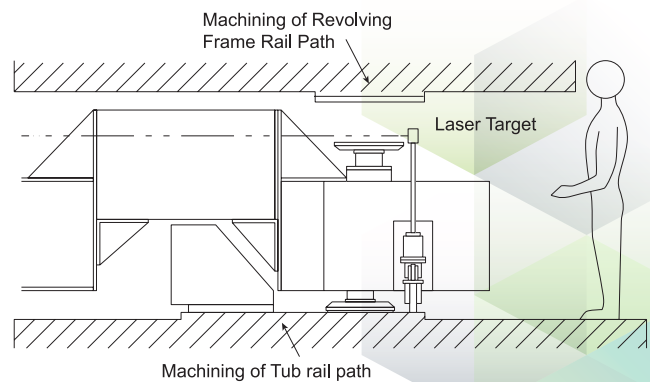
- Provide quality services and products by striving to exceed the changing needs and expectations of our customers.
- To meet the requirements of the International Standards ISO 9001 to foster continuous process improvement and problem prevention instead of problem detection.
- Maintain a team approach emphasizing increased productivity and mutual respect, with professionalism and positive attitudes.
- Provide training and assign individual responsibilities for quality and accountability to encourage every employee to work towards their full potential.

Project Documentation

TEAM SLM will provide a report before machining any surface to determine the recommended machining procedure. We provide a written survey report of the post-machined result of all projects.

The Client is encouraged to witness the acquisition of survey data. The survey data results are computer analyzed to determine the minimum error envelope achieved.

Written reports display the original data, the error from the plane of best fit, and total flatness envelope.



SLM Products

CIRCULAR SELF LEVELING MILL (CSLM)

The CSLM performs the majority of circular applications required. With its relatively simple datum ring control, the CSLM can be installed and operational within 8 hours of job access.

The CSLM is highly adaptable allowing the machining of all faces from vertical to inverted. Applications include slew rig bearing faces, hydro turbines, blast furnaces, or circular faces requiring flatness and diameter control. Bolt crane mark out-out and drilling are all completed utilizing this machine.

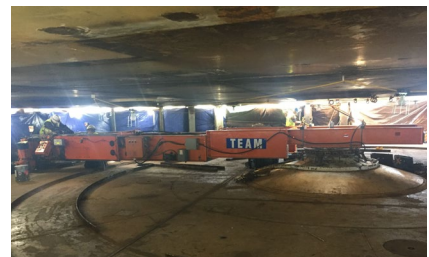
The general diameter range for the CSLM is typically 6ft to 49ft (1.8m - 15m)



EXTRA LARGE CIRCULAR SELF LEVELING MILL (XL-CSLM)

The XL-CSLM, with its laser control, as developed for the machining of large diameter items such as Draglines, Offshore floating structures, Radio Tele copes and Process Vessels.

General diameter range for the XLCSLM is 20ft to 150ft (6m to 45m).
Overall flatness achieved from 0.006in (0.15mm)



LOW PROFILE CIRCULAR SELF LEVELING MILL (LP-CSLM)

The LP-CSLM is specifically designed for maintenance on cranes or similar bearing slew ring surfaces. The crane body is jacked and separated from the pedestal to give a minimum of 12' (305mm), with the bearing removed.

This machine finds many applications for machining in tight spaces. Its small lightweight configuration has also enabled them to be air freighted worldwide for immediate use.

General diameter range for the LP-CSLM is 5ft 7in ID to 14ft 8in OD x 12in high (1.7m x 4.5m x 300mm)



LINEAR SELF LEVELING MILL (LSLM)

Laser-controlled machining of large horizontal areas in a single setup. Steam turbine horizontal joints, Test beds, Gas turbine kids, and Process equipment pads.

Grinding attachments can give a range of finishes and a control laser is used to survey cuts as they are made to ensure quality control.



X/Y MILLING

The X/Y Mill is an economical machining option for various shaped surfaces. It is ideal for repetitive machining setups either downhand, inverted, or at specific angles. The X/Y Mill can be relocated and mounted easily or it can also be used as a semi-permanent setup and items located in the X/Y Mill for machining. Different lengths and widths can easily be accommodated with adjustable cross beams.

Typically from small sized up to 38ft x 18ft. (11.5m x 5.5m). Flatness tolerance varies with mill size



SYMMETRICAL MILLS

Developed for machining Wear Plate Surfaces on Rolling Mill Stands used in the Steel and nonferrous industries for the production of plate and sheet material.

This is a new approach that allows a single setup. The time saving is so dramatic that a full mill stand can be machined in the time that was previously required to machine only two of the four surfaces. Attachments can be mounted on the cross bed to machine Mae West Block areas, keys, and edges. Design tolerances and all sizes of Mill Stands can be accommodated with this system.

Range is typically up to 19ft x 6ft (5.8m x 1.8m)





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