

UPGRADES

**MORE UPTIME
LESS MAINTENANCE**

As facility operators challenge traditional maintenance and turnaround strategies by extending runtimes between planned outages and reducing outage durations, Mitsubishi Heavy Industries Compressor International Corporation (MCO-I) helps customers achieve these goals through critical turbomachinery upgrades.

MCO-I offers more than 50 proven, pre-engineered upgrades, ranging from material enhancements and advanced designs that extend runtime between outages to specialized tooling and outage-reduction strategies. Beyond these established solutions, our engineering team works directly with customers to help develop custom modifications and one-off upgrade solutions tailored to specific operational needs.

MATERIAL UPGRADES AND SURFACE HARDENING

- ▶ Abradable Thermoplastic Seals
- ▶ Stainless Diaphragms & Inserts
- ▶ Titanium Alloy Blades
- ▶ Borided Nozzles
- ▶ Titanium Nitride Coated Blades

MACHINE COMPONENT MODIFICATIONS

- ▶ Turbine Abradable Seals
- ▶ Externally Mountable Grounding Straps
- ▶ Integrally Flanged Compressor Heads
- ▶ Overhung Vibration Damper

COATINGS AND OVERLAYS

- ▶ Laser Welding
- ▶ Anti-Foulant Coatings
- ▶ HVOF Wear-Resistant Coatings
- ▶ Erosion-Resistant Stellite Overlays
- ▶ Epoxy-Coated Probe Tracks

CUSTOM AND ADVANCED TOOLING

- ▶ Diaphragm Racks
- ▶ Lifting Bars
- ▶ Integrated Governor Valve Lifting Tool
- ▶ Compressor OneRotor Tool

UPGRADED AUXILIARIES

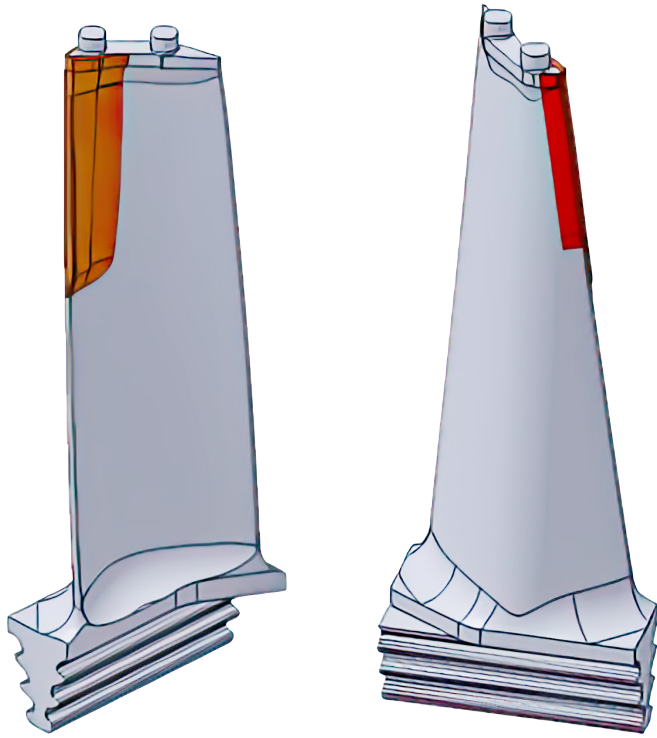
- ▶ Linkage-less Governor System
- ▶ TTV Torque Limiter
- ▶ Auto-Engage Turning Gear
- ▶ Turbine Online Water Wash System
- ▶ Compressor Circumferential Wash Oil Injection

FOR MORE INFORMATION

To learn more about our steam turbine maintenance and use of PAUT, visit our website: <https://www.mhi.com/group/mcoi/>

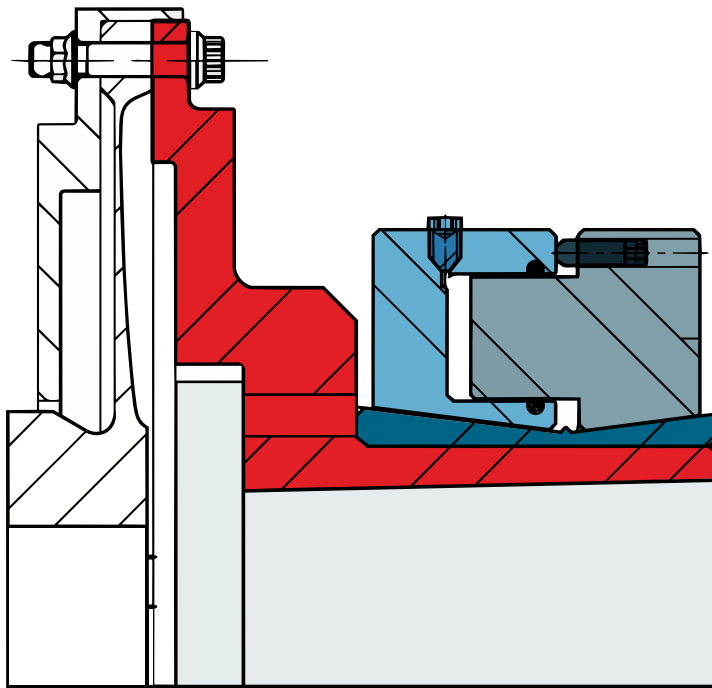
Scan or click the QR code below for access to our full catalog of information on our products and services.





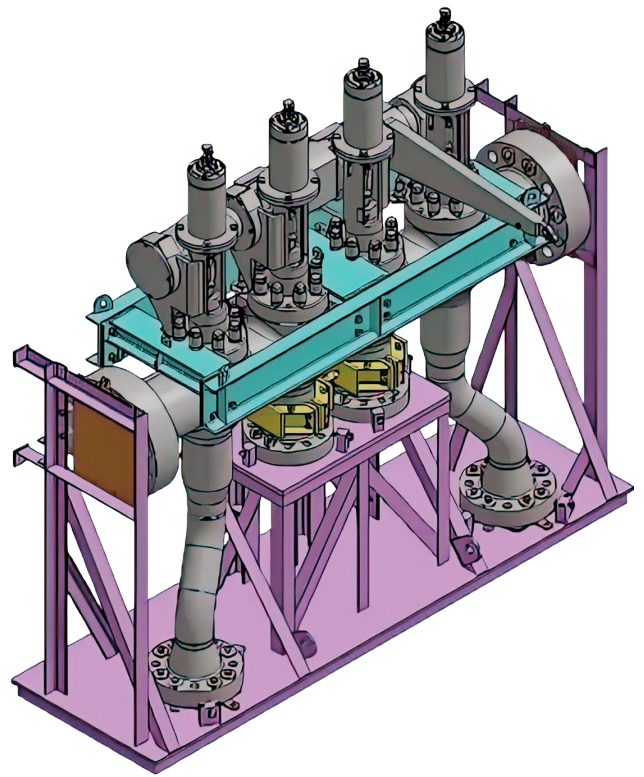
MATERIAL UPGRADES AND SURFACE HARDENING

- ▶ Up to 50 HRC for erosion resistance
- ▶ Increases blade life by up to 2x
- ▶ Reduces the total number of reblades over the life of the turbine



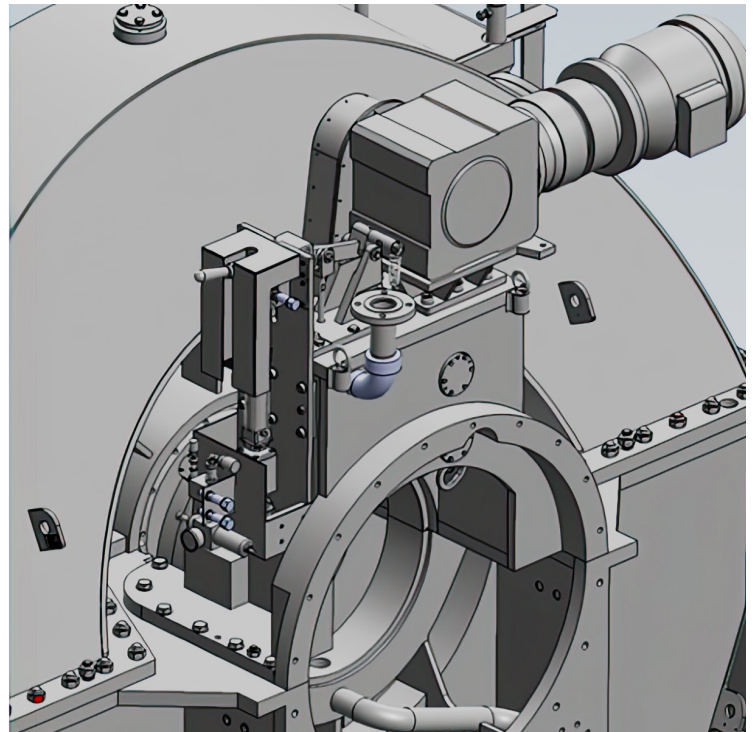
EXTERNALLY CLAMPED HYDRAULIC COUPLING HUB

- ▶ No hub dilation required
- ▶ Eliminates the risk of coupling hub seizure on shaft during maintenance
- ▶ Reduces installation & removal time by up to 70%



GOVERNOR VALVE LIFTING TOOL

- ▶ Remove, transport and install HP GV assemblies in the fully assembled configuration
- ▶ Disassemble and reassemble HP GV assembly in parallel with other turbine work
- ▶ Reduce outage duration by 3 to 4 shifts



AUTO-ENGAGE TURNING GEAR

- ▶ Eliminates worm gear design
- ▶ Automatically or manually engage and disengage the gear
- ▶ DCS, SIS or PLC-controlled to automatically engage at specified RPM
- ▶ Requires modification to gear on rotor