




Saudi Arabian Engineering Co. Ltd.
الشركة العربية السعودية للهندسة المحدودة



MEMBER OF **AAA** REZAYAT GROUP

Table of Contents

3		Our Mission <i>Committed to meet the ever changing needs of our customers</i>
5		Gas Turbines Division <i>A complete range of component repair packages for industrial gas turbines</i>
7		Valves Division <i>High quality services for all types & makes of valves & actuators</i>
9		Projects & Field Services <i>Turbine rehabilitation, revamping, and other projects</i>
13		Bearings Division <i>All the required expertise and facilities to refurbish various types of bearings</i>
14		Rotating Equipment <i>A complete service package on all rotating equipment</i>
15		Machining & Fabrication <i>Well established facility offering comprehensive services</i>
17		Calibration Laboratory <i>State of the art calibration facility</i>
19		Diesel Engines & Accessories <i>Overhaul for all types of Industrial and marine diesel engines</i>
20		Quality Policy <i>Policy document and business associates</i>

Our Mission

We are committed to continuously develop and improve our resources, services and capabilities to meet the ever-changing needs and demands of our customers in the industrial market.

Introduction

Saudi Arabian Engineering Company Limited (SAECO) - a member of the Rezayat Group - offers comprehensive, cost-effective and high quality solutions for the power generation operations and maintenance, oil & gas, utilities and petrochemical sectors.

SAECO is engaged in: rehabilitation, revamping, retrofitting, repair, refurbishment and relocation of power plants, process plants and other industries.

Founded over 35 years ago, SAECO operates through multiple location facilities, offering the end users one-stop shop with unmatched reliability and outstanding value.

With an expanding infrastructure, technical partnership arrangements and strategic alliance with leading multinational companies, SAECO's personnel thrive in tackling new and challenging technical problems. While each day brings forth yet another challenge, SAECO's customer focused approach continues to be its strength.

SAECO's team of experienced engineers, qualified supervisors and highly skilled technicians work in harmony with both clients and end users to meet their varying requirements and provide comprehensive solutions to their problems.



SAECO scope of services cover:

Mechanical services workshop

- Gas turbine component repairs
- Valves and actuators overhaul, repair and testing
- Rotating equipment overhaul and repairs
- Bearing rebabbiting
- Machining and fabrication services
- Diesel engine and accessories overhaul & repair
- Spare parts support

Projects division



Covering

- DCS, system control package, AVR's, protection relays and SCADA
- Gas turbine, steam turbine and generator major inspections and overhauls
- Pre-commissioning, commissioning and start-up
- Hydro testing and site calibration
- Plant shutdowns and annual inspections & maintenance

Instrumentation laboratory

- Third party calibration
 - Test & measuring instruments
 - Process control instruments
- Repair, overhaul and proving of flow meters
- Fabrication and repair of remote seal assemblies
- Instrumentation solutions

Gas Turbines Division

SAECO's Gas Turbines Division has an exclusive facility fully equipped for the repairing and refurbishing of GE gas turbine components as well as Westinghouse, Fiat and MHI makes. This division was established in 1990 in collaboration with the former John Brown Engineering Co. of the United Kingdom.

SAECO offers a complete range of component repair packages for industrial gas turbines. Repair and refurbishment services are provided according to the latest OEM specifications and standards. Our services include the following items:

General Electric (Fr.5, Fr.6 & Fr.7)

- Nozzles: all stages
- Combustion liners
- Transition pieces
- Nozzle support ring
- Shroud blocks
- Fuel nozzle swirlers
- Flow sleeves
- Cross fire tubes
- Bull horn brackets
- Turbine and generator bearings

Westinghouse, Fiat & Mitsubishi

- Vane segments: all stages
- Combustion baskets
- Transition pieces
- Clamshells
- Fuel nozzles
- Cross fire tubes
- TP seals
- Bearing
- Bearing oil & air seals
- Bearing seals & deflectors

Over the last 18 years, SAECO has built up a large reference list for repair of gas turbine components and has won appreciation for its quality services, delivery and timely response.

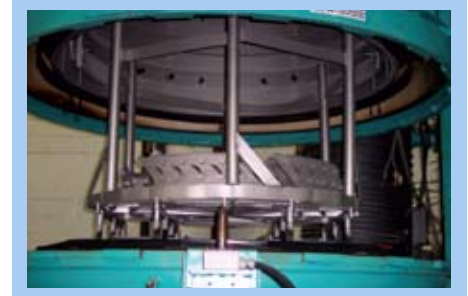
With exemplary design and engineering capabilities, SAECO's services also include the manufacturing of engineered products to meet specific needs by reverse engineering. High-end machining services are provided at shop and on site.

For all repair replacements and materials parts, SAECO has established supply-chains in Europe, USA and Asian countries. Furthermore, SAECO maintains adequate supply of replacement parts in its warehouses to carry out any immediate repairs.



SAECO's facilities include:

- Vacuum heat treatment and brazing furnace
- Computer controlled heat treatment furnace
- Thermal barrier coating by plasma spray
- Specialized welding equipment (Arc, TIG & MIG)
- Spot welding M/Cs
- NDT facility
- Special fixtures for inspection and repair
- Integrated quality control system to OEM standards
- Computerized drafting facilities for reverse engineering of drawings
- Surface preparation facilities
- Grit blasting / shot blasting
- Degreasing tank with trichloro ethylene cleaning
- Dehydrogenation tank
- Machining & surface finishing facility



Valves Division

SAECO's Valves Division provides high quality services for all types & makes of gate, globe, check, ball, plug, butterfly, control, safety relief valves & actuators covering electric, hydraulic, gas over oil & pneumatic types.

SAECO's Valves Division has been authorized by the following OEMs as service agents:

- PIBIVIESSE: Ball Valves – Italy
- FISHER: Control Valves – USA
- ORION: Gate, Globe, Check Valves – Italy
- VALVITALIA: Gate, Globe, Check & Ball Valves – Italy
- E.I.M: Electric Actuators – USA



The Valves Division has been serving all major gas, petrochemical, power and desalination companies in Saudi Arabia. Our major clients include Saudi Aramco, SEC, SWCC and SABIC.

Valve repair facilities include:

- Test benches: state of the art facility designed to perform air & hydro tests on all types & sizes of valves
- High torque equipment: Up to 30,000 NM that can be developed for tightening of bolts and nuts of different sizes
- Welding & machining: hard face materials for seat areas like Stellite, Cr Alloys and corrosion resistance materials for body & seat areas like Inconel and SS
- Control valves: OEM trained technicians carry out calibration & diagnostic bench testing for various control valves
- Safety relief valves: overhaul & test as per Saudi Aramco standards and international standards by OEM trained technicians



Actuator repairs:

- Repair & testing of different makes of actuators like EIM, Rotork, Biffi, Bettis, AUMA and others are performed by trained technicians for electric, hydraulic, gas over oil, and pneumatic types.
- Simulation & calibration of actuators are performed in a separate well-equipped cell with the necessary test facility.



Field services:

- 40 ft. mobile workshop for testing, calibration & overhaul of safety relief valves and control valves on site. Different sizes of test benches, lapping M/cs, lathe, are housed inside the mobile workshop for versatile operations on site.
- Injection of sealant & lubricant in ball & plug valves on site by high pressure grease pump which builds up to 15,000 psig
- Commissioning & troubleshooting of various types and makes of actuators on site
- In-situ lapping of valves for body and seat areas of gate, globe & check valves are performed using the advanced site lapping equipment.
- Field hydro testing of various types & sizes of valves using mobile test skid, quick filling high pressure pumps, mobile compressors

Projects & Field Services

Projects Division undertakes lump sum turnkey projects, such as turbine rehabilitation projects, turbine revamping projects, turbine inspection/overhauling projects, control systems retrofitting/upgrading projects.

Projects Division is well equipped with its own resources, expertise and technology partners to carry out the following activities:

- Site survey
- Field engineering
- Design & engineering
- Construction work
- Third party Instruments calibration services
- Loop check and pre-commissioning activities
- Commissioning & start up activities

SAECO technology partners include:

- GE – Energy: turbine control system, turbine excitation & AVR systems and DCS
- GE – Bentley Nevada: vibration monitoring systems
- GE – Fanuc: PLC systems
- Basler Electric: AVR & protection relay systems
- KPS (Korea Plant Service and engineering): overhauls & rehabilitation-technical advisory support

Projects Division's resources include a highly skilled workforce having relevant experience, and making use of sophisticated tools and equipment. Engineering, planning and quality support is available during all the stages of project implementation. Projects Division handles mechanical maintenance projects as well as instrumentation & control projects.

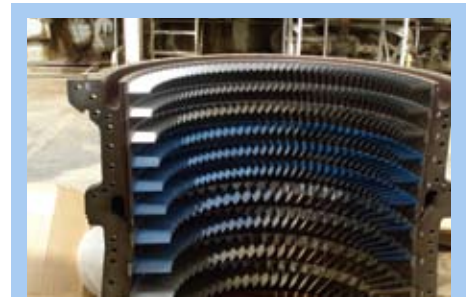


A. Mechanical maintenance projects:

- Turbine rehabilitation projects, both gas & steam
- Turbine / generator major overhaul projects
- Shut down and annual inspection services for power (both gas & steam) & petrochemical plants

References include:

- Complete overhaul for 2 units (electrical, instrumentation & mechanical) – boiler, turbine, intake & auxiliaries.
Customer: PEMCO (Alstom)
Location: Shoaiba PP
- Rehabilitation of 9 units: Hitachi & GE frame 5 gas turbines.
Customer: SEC - SOA
Location: Jazan PP
- Major overhaul of GE gas turbine units.
Customer: SEC - WOA
Location: various power plants-Western Region
- Major Overhaul of ABB gas turbine units.
Customer: SEC - WOA
Location: various power plants-Western Region





B. Instrumentation & control projects:

- Generator AVR & protection system upgrade projects
- Turbine control system upgrade projects
- DCS upgrade projects
- Fuel treatment control system upgrade projects
- Field instrument upgrade projects

References include:

- Installation & commissioning of instruments for oil & water wells
Customer: Saudi Aramco
- Dismantle, service, calibrate & re-install all the field instruments
Customer: SABIC – Al Bayroni
- Upgrade of control system & DCIS on four 625 MW MHI steam turbines
Customer: Honeywell / SEC - EOA
Location: Qurayyah PP
- Replacement of automatic voltage regulator (AVR) for Westinghouse gas turbine units
Customer: SEC - COA
Location: Qassim & Buraidah PP
- Gas turbine controls retrofit for 2 Rolls Royce units
Customer: GE – Energy / MODA
Location: Jeddah





- Replacement of control systems for 2 GE frame 5 gas turbine units

Customer: SEC - COA

Location: PP# 4 – Riyadh

- Replacement of automatic voltage regulators for 2 ABB units

Customer: SEC - COA

Location: PP# 8 (1) – Riyadh

- Revamping of 10 GE frame 5 gas turbines & commissioning and start up

Customer: SNC-LAVALIN-SAIPEM / Saudi Aramco

Location: Uthmaniyah & Hawiyah WIP

- Upgrade & replacement of unit control & excitation/AVR systems for ABB Gas Turbine model 9D & 11D

Customer: SEC - SOA

Location: Bisha PP

- Rehabilitation of 9 GT Hitachi & GE frame 5 units (Control system / Excitation retrofit and upgrade)

Customer: SEC - SOA

Location: Jazan PP

- Replacement of protection relays for generator type 7A3 & 7A6.

Customer: SEC - COA

Location: PP# 7 – Riyadh

- Upgrade GE control system to Mark VIe

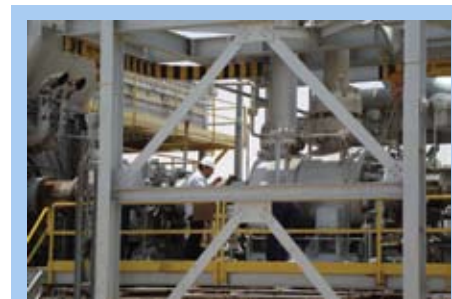
Customer: SABIC- Ibn Sina

Location: Jubail

- Upgrading & replacing the unit control, excitation/AVR systems of GE frame 5 & 7 units

Customer: SEC - SOA

Location: Jazan & Asir PPs



Bearings Division

SAECO possesses all the required expertise and facilities to refurbish various types of bearings including turbine and generator bearings.

SAECO repairs bearings for wide applications involving steam and gas turbines and auxiliaries, including pad bearings, journal bearings with thrust face, tilting pad bearings, and other types.

SAECO has experience of repairing bearings of all the OEMs including General Electric, Hitachi, AEG, ABB, Westinghouse, MHI, Fiat, Siemens, Ansaldo and others.

Highlights of facilities at SAECO include:

- PLC based, state of the art furnace
- Surface preparation facilities: grit blasting / shot blasting
- Degreasing tank with Trichloro Ethylene cleaning
- Dehydrogenation tank
- White metal static casting facility with controlled cooling for defect free babbit casting
- Machining & surface finishing facilities



Rotating Equipment

SAECO offers a complete service package on all rotating equipment: pumps, compressors, fans, blowers, gear boxes, torque convertors and small general purpose steam turbine of various makes and models.

A computer-controlled dynamic balancing facility is available for precision dynamic balancing of rotors, impellers, shafts and other rotating parts to the highest standards.

Comprehensive pump and compressor services

Years of experience in pump and compressor repair services:

- Inspection
- Complete overhaul
- Shaft replacement
- Seal replacement
- Component part replacement
- Anti-erosion and anti-corrosion coating
- Upgrades and modifications (impellers, diaphragms, etc.)
- Balancing and alignment of rotating components

SAECO offers a complete service package on all rotating equipment. Our services cover the following:

Pumps

Centrifugal, vertical, horizontal, submersible, split case, boiler feed water pumps

Compressors

Centrifugal, Screw, Reciprocating and blower type compressors

Gear box and torque converter

Right angle, accessory, reduction and cooling tower gear boxes, hydraulic torque converter



Machining & Fabrication

SAECO has a well established machining and fabrication facility offering comprehensive services such as design and manufacturing of engineered products.

SAECO's machine shops are equipped with a wide array of specialized machine tools such as vertical lathe machines, horizontal lathe machines, heavy duty radial drilling machines, universal milling machines, surface grinding machines, shaper machines, boring machines and pneumatic portable flange facing & keyway milling machine.

SAECO's fabrication shop is equipped with:

- Plasma cutting machine
- Arc & TIG welding machines
- Hard facing and overlay welding facility
- Computer controlled furnace capable of a maximum operating temp. of 1,200 ° C

SAECO also has metal deposition, welding, fabrication and engineering facilities. Its wide experience in the field empowers SAECO to offer optimum technical solutions to any specific client problem at shop as well as on site.

SAECO regularly carries out machining and fabrication works like:

- Machining of large components (sizes up to 3,000 mm diameter and 2500 mm long)
- Fabrication of spare parts and components for various types of machinery and equipment
- Repair & fabrication of shafts and rotors including their balancing
- Machining and fabrication of pump and valve components like valve stem, gates, seat discs, adaptors, drive nuts, spools, test flanges, shafts impellers, etc.





SAECO also conducts field services with highly specialized, qualified and experienced personnel to carry out machining and maintenance activities at customer sites.

Quality control and inspection facilities include:

- Dye penetrant
- Zyglo (fluorescent)
- Electronic thickness measurement of complicated profiles
- Hardness measuring equipment
- Other NDT tests including magnetic particle, radiography and ultrasonic are carried out through third party approved agencies



Calibration Laboratory

SAECO's Calibration Laboratory provides high quality, state of the art calibration and customised documentation that satisfy individual industry, regulatory and audit requirements.

Our calibration quality system meets the requirements of

- ISO 9001:2000
- ISO 17025:2005
- ISO 100012-1
- ANSI/NCSL Z540-1
- ARAMCO

We are ISO 9001:2000 certified and Aramco approved.

SAECO has developed core calibration expertise in a number of specialized areas that require significant investments in experienced, skilled personnel and specialized equipment. These areas include:

- Electronics and electrical
- Temperature & humidity
- Pressure
- Flow
- Level
- Sound
- Mass, force & torque
- Physical dimensional measurement
- Analytical
- Repair of remote seal assemblies

Salient features

- Fast turnaround
- Instrument pick-up & delivery
- Onsite calibration
- Mobile laboratory
- Repair services
- Annual maintenance & calibration contracts
- Instruments installation and pre-commissioning activities
- Supply of new testing, measuring & calibration equipment
- Professional manpower supply
- Total instrumentation solutions





Flow meter proving

This facility is unique in the Kingdom of Saudi Arabia for commercial calibration of flow meters used for custody transfer and industrial applications.

Flow Prover and the automated software procured from Calibron Systems Inc, U.S.A allows incorporating compensation for temperature, pressure, liquid compressibility and density.

The prover covers a range of 5 to 5150 GPM with a displaced volume repeatability of better than 0.01% over the entire range. The set-up is capable of accommodating flow meters up to 12" size.

The meter prover meets the most stringent accuracy requirements for custody transfer. The primary features are the precision, smooth-bore cylinder and the measurement piston. The piston contains an integral bypass valve which minimizes disturbance of the flow stream.

The prover has equal upstream and downstream volumes, requires no adjustment for changes in line pressure, and contains no hydraulics or pneumatics. These features eliminate the possibility of operator error and assure superior and consistent proving results with repeatability equal to or greater than 0.01%.

The facility meets API, ANSI and NEC requirements and is suitable for proving all types of flow meters including PD, Turbine and Coriolis.



Diesel Engines & Accessories

SAECO has been in the field of diesel engine services for the past 35 years and possesses all the required expertise and facilities to overhaul all types of industrial and marine diesel engines of various makes up to 16 cylinders capacity.

Engines serviced by SAECO include many makes & types:

- Detroit Diesel
- John Deere
- Deutz
- Perkins
- Caterpillar
- Cummins
- Mitsubishi
- Daihatsu
- Isotta Fraschini
- MAN
- Wartsila
- ALCO



Accessories serviced by SAECO include:

- Turbochargers
- Transmissions
- Differential carriers
- Transfer cases
- Hydraulic cylinders
- Hydraulic pumps
- Steering assemblies
- Blowers
- Air starters
- Water pumps
- Governors
- Fuel injection pumps
- Engine cylinder heads



The facilities include a dynamometer for engine load testing up to 1,500 HP, fully equipped fuel room with injection testers and fuel pump calibration.

SAECO is an authorized service agent for

- Detroit Diesel
- John Deere





سياسة الجودة QUALITY POLICY

Saudi Arabian Engineering Company Ltd. strives to anticipate and fulfil the needs and expectation of our customers, by offering consistent quality products and services.

إن الشركة العربية السعودية للهندسة المحدودة تهذب تصارى جهدها للتعرف على احتياجات وتوقعات عملائها ومن ثم تقديم خدماتها بكفاءة وجودة عالية مستمرة ومنسجمة في جميع الأحوال .

Management and staff are committed to Continual improvement in services and overall performance. (Specially on Customer Satisfaction; Turnaround time; Reliability)

إن إدارة وموظفي الشركة ملتزمون بعمليات التطوير المستمر لخدماتهم وأدائهم العام . (بالأخص رضا العميل ، سرعة الانجاز والاعتمادية .)

We ensure that the quality policy and goals are clearly understood within the company and implemented.

ولذلك فإن إدارة الشركة تعمل على أن تكون سياسة الجودة وأهدافها معلومة لدى جميع العاملين في الشركة لضمان حسن التنفيذ.

And management conducts monthly meetings to establish, review and communicate our company's Quality system and Objectives.

والإدارة تعمل على إقامة اجتماعات دورية للتواصل مع العاملين وإطلاعهم على نظام الجودة وأهدافه والقضايا المستجدة بخصوص الجودة

We will provide an environment that fosters a spirit of pride in workmanship and teamwork among employees.

نحن في الشركة العربية السعودية للهندسة المحدودة نعمل على خلق بيئة عمل ترعى وتشجع إشاعة روح الإعتزاز بالعمل والأداء الجماعي بين جميع العاملين على اختلاف مستوياتهم .

م . محمود عياد الحميد هنداوي
Engr. Mahmoud A.Hendawi
المدير العام
General Manager



الشركة العربية السعودية للهندسة المحدودة
SAUDI ARABIAN ENGINEERING CO. LTD.
(أحد شركات مجموعة ريزايث)

BUSINESS ASSOCIATES





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