ENGINEERING A RELIABLE FUTURE

Mitsubishi Heavy Industries Engineering offers reliable technologies gained from engineering synergies realized within the Mitsubishi Heavy Industries (MHI) Group. We contribute to the development of society by supplying numerous EPC (Engineering, Procurement, Construction) projects covering large-scale infrastructure, such as chemical plants, environmental plants, and transportation systems, in many countries and regions around the world.

Our engineering capabilities, accumulated from the MHI Group's wide range of global infrastructure projects and products, and our project management abilities, garnered from an abundant record of successful project achievements, are skillfully integrated by highly experienced personnel working in an outstanding system and supported by a powerful network. Applying our extensive capabilities, we readily meet diversified customer expectations by undertaking all phases from project planning to basic design, detailed design, procurement, manufacturing, construction, commissioning, after-sales services, and O&M (Operation & Maintenance). In this way, we continue to contribute to the creation of comfortable lifestyles and an enriched society. Mitsubishi Heavy Industries Engineering seeks to bring about a reliable future through engineering.

Mission
To create comfortable lives and enrich society through pursuing the best engineering solutions.

Vision
To achieve sustained business growth by proactively seeking new opportunities to develop, improve, and launch customer and social value.

Values
• Sincerity
Dedicated to our customers and mutually beneficial relationships with partner communities.

• Pragmatic Solutions
Continually approaching new challenges in the most effective way.

• Purpose Driven
Determined in our commitment to building a stable society while achieving our goals.

• Incremental Innovation
Always evolving with emerging technology; our pursuit of value for customers moves us forward.

EPC (Engineering, Procurement, Construction)
Mitsubishi Heavy Industries Engineering (MHIENG) organizes optimal, highly experienced teams led by project managers who comprehensively understand and manage the entirety and details of every phase, from planning to completion and maintenance, of EPC projects. QCD (Quality, Cost, Delivery) and project risks are strictly managed to implement optimum operation so that customer demands are met. We strive to further strengthen our performance, such as timely monitoring and early response to project risks, by using project management capabilities developed through our extensive experience gained through numerous EPC projects, highly experienced human resources who organize the projects, and our excellent systems and strong networks. Quality management is continuously implemented through our independent quality control system and through objective inspections, ensuring the reliability of MHIENG’s projects. To promote environmental conservation, which is indispensable to the sustained growth of society and humankind, HSE (Health, Safety, Environment) management is positioned as one of the most critical aspects of our business and is conducted in accordance with global demands and standards.

O&M (Operation & Maintenance)
We provide a wide range of after-sales services, such as LTSA (Long-Term Service Agreements), O&M services, and revamps (to improve availability, increase capacity, improve efficiency, etc.), to help ensure that the plants and transportation systems we deliver continue running safely and efficiently without any problems. Furthermore, we are actively incorporating new areas which will provide even greater added-value to customers; specifically, we are utilizing cutting-edge IoT and remote monitoring technology-driven data analysis to enable us to perform predictive diagnostics and maintenance cycle optimization.

Business Investment
We invest in highly profitable businesses, such as chemical product manufacturing. We have a wealth of expertise in EPC and O&M through our core business, and work to further strengthen this by feeding back the insights we glean from being involved in projects from the initial stage, which is critical for business profitability as it improves operational rate reliability, and by pursuing greater involvement in O&M as investors.
Transportation

MHIENG has been manufacturing conventional railway vehicles, including 244 steam locomotives and 100 electric locomotives, since 1910, when we received orders for passenger carriages from the Railway Board and streetcars from Tosa Electric Railway.

Starting in the 1970s, we began the development of diverse transportation systems, notably new transit systems such as the rubber-tired Automated Guideway Transit (AGT) system. We have received orders for and delivered more than 500 AGT vehicles domestically and overseas.

AGT

- Tokyo Yurikamome
- Saikama New Urban Transit “New Shuttle”
- Nippori-Toneri Liner
- Hiroshima New Rapid Transit Astram Line
- Macau LRT
- Singapore Serangoon-Punggol LRT
- Tampa International Airport APM
- Orlando International Airport APM

Railway Systems (High-Speed Railways / Overseas Metro Systems)

- Taiwan High-Speed Rail
- Dubai Metro

Monorail

- Susukino Monorail
- Shinkansen Maintenance Vehicle

Maintenance Vehicle

Air Brake Systems

- Brake Control Unit
- Pneumatic Brake Caliper
- Air Compressor (Oil-Free Scroll Type)
Chemical Plants

In the chemical plant business, MHIENG has received high praise as a plant construction expert from our customers for delivering many different plants globally since delivering our first plant in 1958, including fertilizer plants, methanol plants, and petrochemical plants using natural gas as a raw material.

Our advanced technology and project management skills cultivated by our extensive experience enable us to provide customers with highly safe and reliable plants that meet diverse needs for industrial infrastructure.

Fertilizer Plants

- Ammonia and Methanol Co-Production Plant (Russia)
- Ammonia / Urea Plant (Malaysia)
- Ammonia / Urea Plant (Oman)
- Styron Solution Synthetic Rubber Plant (S-SBR) (Singapore)
- Acrylic Acid Plant (Russia)
- Methanol Plant (Brunei)
- Methanol Plant (Venezuela)
- Methanol Plant (Saudi Arabia)

Methanol Plants

Petrochemical Plants

- Polyethylene Plant (Mexico)
Even after a project is complete, MHIENG provides a variety of after-sales services to ensure trouble-free, safe, and efficient operation of the plant facilities and transportation systems we deliver. In addition to conventional O&M (Operation & Maintenance) services, various revamps (to improve availability, increase capacity, improve efficiency, etc.), and LTSA (Long-Term Service Agreements), we actively incorporate new areas of enhanced value for customers by using cutting-edge IoT and remote monitoring technology for data analysis-driven predictive diagnostics and maintenance cycle optimization.

### After-Sales Services for Chemical Plants and CO₂ Capture Plants

#### Facility Revamps
Provide a variety of revamps to improve availability, increase capacity, and improve efficiency, etc., of the plants we deliver.

### After-Sales Services for Transportation Systems

#### O&M Services
Work with affiliated companies both in Japan and overseas to provide a broad range of O&M services for completed systems, spanning from daily maintenance to overhauls.

#### System Upgrades
Perform various renovations of the systems we deliver, such as system capacity expansion, implementing system rehabilitation or improving passengers’ riding comfort.

### Chemical Applications / General Applications

- **CO₂ Capture & Storage**
- **Enhanced Oil Recovery (EOR)**

### Enhanced Oil Recovery (EOR)
This system captures CO₂ from flue gas in power generation and other facilities. Captured CO₂ will be injected into the oil reservoir of the oil fields to increase the recovery rate of crude oil.

### CO₂ Capture Plants

MHIENG, together with Kansai Electric Power Co., have already established and commercialized its own post combustion CO₂ capture technology, called the KM-CDR Process™. The KM-CDR Process™, with its own developed unique amine solvent (KS-1™), has been adopted by 13 commercial plants all over the world (as of Feb. 2019). Several of its outstanding features are as follows:

1. Can be applied to various types of flue gas sources
2. Advanced energy saving process - significant operation cost saving
3. Highly efficient proprietary solvent (KS-1™), with the lowest energy consumption and the least degradation

### Consulting Services

Draw upon our wealth of technological expertise to design solutions for customers' various operational challenges.

#### Concept of “CPAS CLOUD” Solution

- Monitoring of operational data for major equipment
- Problem prevention by using predictive sensors
- Development of facility improvement proposals based on long-term analysis

### Remote Status Monitoring Service

Utilize IoT to provide remote status monitoring services.
**Corporate Overview**

**Company Name**
Mitsubishi Heavy Industries Engineering, Ltd. (MHIENG)

**Establishment**
January 1, 2018

**Head Office**
3-1, Minatomirai 3-chome, Nishi-ku, Yokohama, Kanagawa 220-8401, Japan

**President and CEO**
Kenji Terasawa

**Business Scope**
Engineering, manufacturing, procurement, construction, marketing, and after-sales services of chemical plants, transportation systems and products, environmental products, etc., including ancillary businesses

**Capital**
20,000 million yen (As of January 1, 2018)

**Shareholder (Equity Stake)**
Mitsubishi Heavy Industries, Ltd. (100%)

**Website**
https://mhieng.mhi.com/

**Group Companies**

**Mitsubishi Heavy Industries Environmental & Chemical Engineering, Ltd. (MHIEC)**

**Business Scope**
Design, production, installation, and engineering of various types of environmental equipment, chemical plants, etc., as well as repair and renovation, part sales, inspections, engineering dispatch, consulting, guidance on installation and operation, and maintenance management

**Website**
https://mhiec.co.jp/en/

**Mitsubishi Heavy Industries Transportation Engineering & Construction Co., Ltd. (MHI-TC)**

**Business Scope**
Design, construction, commissioning, and after-sales service of transportation systems / Development, design, manufacture, and after-sales service of transportation equipment; general industrial machinery, and environmental chemical equipment; and electronic control systems / Design, construction, test operation, modification and after-sales service of various plants; screws, maintenance / Development, design, manufacture, and technical support of new products and test facilities / Contracted design, supervision and construction of civil engineering structures / Planning, design, supervision and construction of plant buildings, buildings and commercial facilities contract

**Mitsubishi Heavy Industries America, Inc. (MHIA)**

**Business Scope**
Market surveys, PR, material procurement, construction, sales, installation, after-sales services, and related operations for products of the MHI Group

**Website**
www.mhia.com/company/regions/america

**MHI Engineering and Industrial Projects India Private Limited (MEIP)**

**Business Scope**
EPCm (mini-EPC), after-sales services, and O&M related to environmental and chemical plants and transportation systems within India, and undertaking of the MHI Group’s design and procurement operations

**Website**
www.mheip.com/

**Crystal Mover Services, Inc. (CMS)**

**Business Scope**
DSM activities for AGT systems (APM system: Automated People Mover) supplied to U.S. airports by the MHI Group

**Website**
www.crystal-mover.com/
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MITSUBISHI HEAVY INDUSTRIES ENGINEERING, LTD.

https://mhieng.mhi.com/