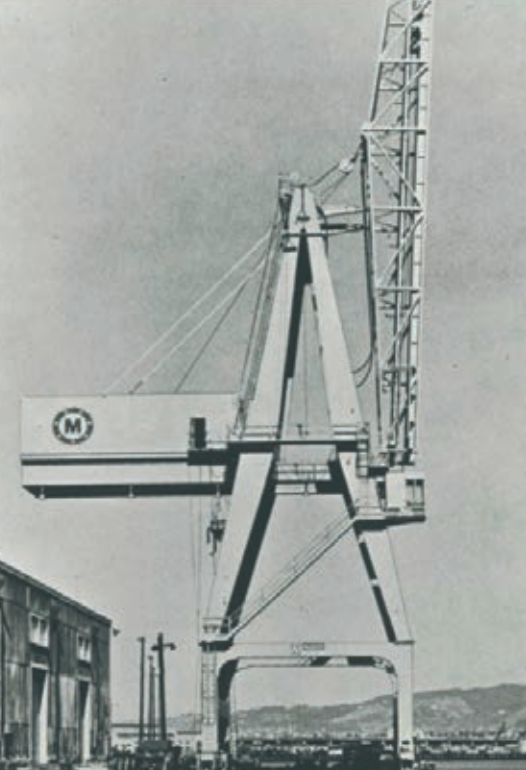




MITSUI
**CRANES
&
SYSTEMS**



MITSUBI

Established and Reliable Technology Supporting the Worldwide Logistics.

Since the 1930s, Mitsui E&S Machinery Co., Ltd.

(Formerly known as Mitsui Engineering & Shipbuilding Co., Ltd.) has started to produce cranes.

We have been a key player in Container Crane supply business since the 1960s.

We have delivered more than 1,600 units of cranes to ports of all over the world since the first delivery of container crane to Kobe port, Japan in 1967.

We are not only a crane hardware supplier but also a software supplier. While we supply various cranes, we also provide the container terminal management system. Our wide range of products contributes to the various aspects of our customer's demand.



Mitsui E&S Machinery Co., Ltd



CRANES



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& SYSTEMS

History of MITSUI-PACECO® Cranes

MITSUI-PACECO® Cranes have been developing in the long history with various types of Cranes utilizing the Shipbuilding Technologies.

Entered into Technical License Agreement with PACECO® Inc.



Delivery of First Transtainer®



1961

1967

1968

1994

Delivery of First Portainer®



Demonstrative experiment of automated container terminal (AGV, Remote Controlled Transtainer® and Portainer®)



First Portainer® equipped with Earthquake Seismic Isolation Device delivered to Tokyo Port



Delivery of Shuttle Crane



2001 2003

2014 2017

and more

Start of manufacturing in Oita Factory (Transferred from Tamano Factory in Okayama)



Delivery of 300th Portainer®





Tokyo | Japan

Rated Load	61.0t	Hoist Speed	90/180m/min
Outreach	58.0m	Trolley Speed	240m/min
Lifting Height	48.6m	Gantry Speed	45m/min
Span	30.5m	Vessel Size	21 Rows 9 Stocks
SPREADER	Twin-20ft Lift		

Feature : Articulated Boom



Kobe | Japan

Rated Load	65t	Hoist Speed	90/180m/min
Outreach	63.1m	Trolley Speed	240m/min
Lifting Height	44m	Gantry Speed	60m/min
Span	30.5m	Vessel Size	22 Rows 8 Stocks
SPREADER	Twin-20ft Lift		

Feature : Earthquake Seismic Isolation Device



Yatsushiro | Japan

Rated Load	30.5t	Hoist Speed	60/150m/min
Outreach	36.5m	Trolley Speed	180m/min
Lifting Height	32.5m	Gantry Speed	45m/min
Span	16m	Vessel Size	13 Rows 5 Stocks
SPREADER	Single Lift		

Feature : Earthquake Seismic Isolation Device



Tokyo | Japan

Rated Load	65.0t	Hoist Speed	90/180m/min
Outreach	63.0m	Trolley Speed	240m/min
Lifting Height	40.0m	Gantry Speed	45m/min
Span	43.5m	Vessel Size	22 Rows
SPREADER	Twin-20ft Lift		

Feature : Earthquake Seismic Isolation Device

Portainer®



Klang | Malaysia

Rated Load	65.0t	Hoist Speed	90/180m/min
Outreach	67.0m	Trolley Speed	240m/min
Lifting Height	52.0m	Gantry Speed	46m/min
Span	30.48m	Vessel Size	24 Rows 8 Stocks
SPREADER	Twin-20ft Lift		



Mombasa | Kenya

Rated Load	65.0t	Hoist Speed	80/180m/min
Outreach	50.0m	Trolley Speed	240m/min
Lifting Height	38.0m	Gantry Speed	45m/min
Span	30.5m	Vessel Size	17 Rows 6 Stocks
SPREADER	Twin-20ft Lift		



Gebze | Turkey

Rated Load	61.0t	Hoist Speed	80/180m/min
Outreach	63.5m	Trolley Speed	240m/min
Lifting Height	43.5m	Gantry Speed	45m/min
Span	30.0m	Vessel Size	22 Rows 7 Stocks
SPREADER	Twin-20ft Lift		

Feature : Hatch Cover Stand



Tanjung Priok | Indonesia

Rated Load	65.0t	Hoist Speed	90/180m/min
Outreach	65.0m	Trolley Speed	240m/min
Lifting Height	46.0m	Gantry Speed	45m/min
Span	30.48m	Vessel Size	23 Rows 8 Stocks
SPREADER	Twin-20ft Lift		

Portainer®

Feature 01 Large Scale Crane, High Efficiency of Cargo Handling

The market demands larger size of Portainer® (Ship-to-Shore) cranes to accommodate the increased volume of containers and the enlargement of container vessels.
 The largest Portainer® we manufactured has 67m outreach, 52m lifting height, and in-house manufactured Twin-20ft Lift spreader.

>> **Point 01** Meet the enlargement of container vessels

>> **Point 02** In-house manufacturing of Twin-20ft Lift Spreader



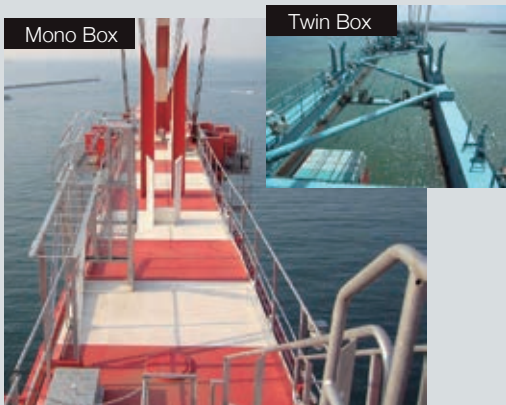
Point 01



Point 02

Feature 02 Mono Box Boom

Lighter dead weight makes higher rigidity.
 Less wind receiving area makes lighter wheel load.
 Makes wider walkway



Mono Box

Twin Box

Feature 03 Self Propelled Trolley

Self propelled trolley design system does not require wire ropes for trolley traverse and reduces future maintenance costs. In addition, the self propelled trolley enables the quick control response of traversing.



Feature 04 Unit Drive System

Simple unit drive design makes maintenance and replacement works much easier. The unit drive system eliminates the open gears to improve efficiency of maintenance works.



Feature 06 Walk-in Type Control Panel

Walk-in type control panel improves the efficiency of all electrical system checks. Our design provides wider work space for easy access.



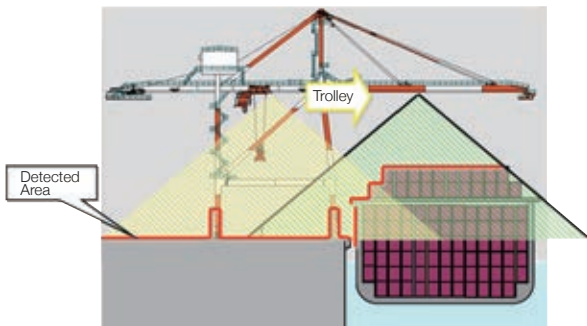
Feature 05 Centralization of Devises for Easy Maintenance

With the centralization of devises at the end of girder, our Portainer® facilitates easy access and enhances maintenance efficiency.



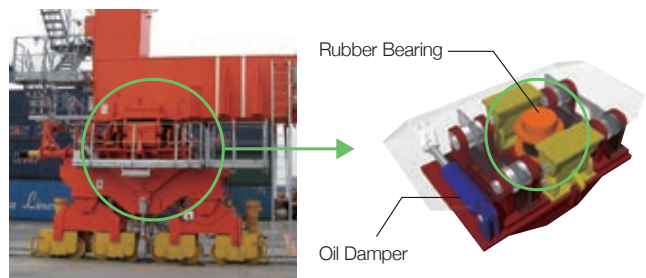
Option 01 Operation Assist System (Ship Profiling System)

Detections of objection by 2-D laser sensors make less damage to the crane and improve the efficiency of cargo handling.



Option 02 Earthquake Seismic Isolation Device

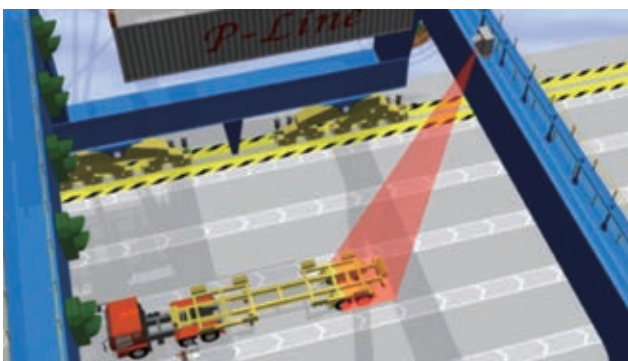
The earthquake seismic isolation device (rubber bearing type) minimizes the damage by an earthquake.



Earthquake Seismic Isolation Device (Rubber Bearing Type)

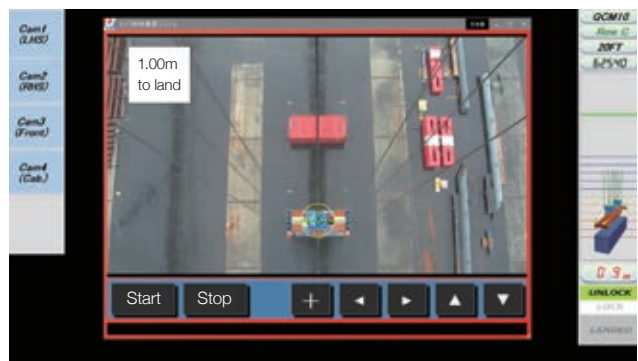
Option 03 Container Positioning System

Detects the position of chassis to support truck drivers to stop at the correct position.



Option 04 Operation Assist Monitor

Detects central position of the spreader and container to support correct positioning of spreader during container handlings





Tokyo | Japan

Rated Load	40.6t	Hoist Speed	23/52m/min
Span	23.2m	Gantry Speed	90m/min
Lifting Height	18m	Model	RT4023-8I-5HL



Hakata | Japan

Rated Load	40.6t	Hoist Speed	23/52m/min
Span	29.45m	Gantry Speed	90/135m/min
Lifting Height	15.24m	Model	RT4023-16I-4ED



Shimizu | Japan

Rated Load	40.6t	Hoist Speed	23/52m/min
Span	23.47m	Gantry Speed	90/135m/min
Lifting Height	15.24m	Model	RT4023-8I-4EC



Yokohama | Japan

Rated Load	50.8t	Hoist Speed	23/52m/min
Span	23.47m	Gantry Speed	90/135m/min
Lifting Height	18m	Model	RT5023-8I-5HL

Model RT(A)(B)-(C)I -(D)

Rated Load (LT)/(A)	40/50			Hoist Speed (m/min)	Rated Load (B)	20	23	26
Wheel No. (C)	8/16				Empty Spreader	45	52	58
Lifting Height (D)	15.24m	18m	21m	Trolley Speed (m/min)	70			
Span	23.47m			Gantry Speed (m/min)	90/135			

Transtainer®



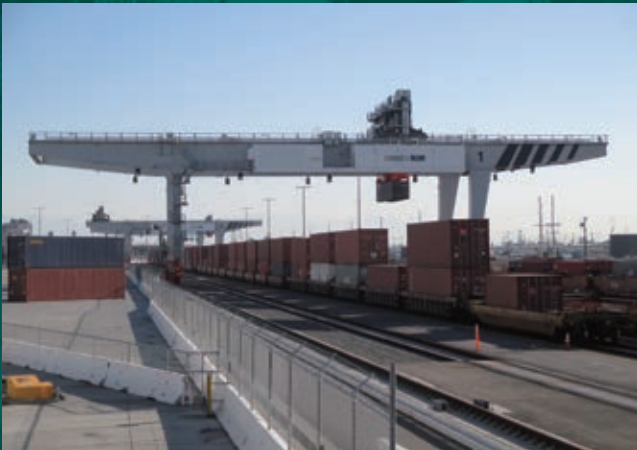
Ho Chi Minh City | Vietnam

Rated Load	40.6t	Hoist Speed	23/52m/min
Span	23.65m	Gantry Speed	90/135m/min
Lifting Height	18m	Model	RT4023-8I-5EC



Klang | Malaysia

Rated Load	40.6t	Hoist Speed	23/52m/min
Span	23.47m	Gantry Speed	90/135m/min
Lifting Height	18m	Model	RT4023-8I-5V



Los Angeles | United States

Rated Load	40.6t	Hoist Speed	30/60m/min
Span	41.453m	Gantry Speed	100-150m/min
Lifting Height	14.1m	Trolley Speed	120m/min



Long Beach | United States

Rated Load	40.6t	Hoist Speed	23/52m/min
Span	22.56m	Gantry Speed	90/135m/min
Lifting Height	21m	Model	RT4023-8I-6HL

Subject	Standard	Option
Power Supply	Cable Chain	Festoon
Spreader	20/40 Electrical Telescopic Type 2 sets of Fixed Guide Flipper (at Cabin Side)	20/40/45 Electrical Telescopic Type Movable Guide Flipper
Anti-Sway	Torque Motored	V Roping

Type HL:Hybrid ED: Bus-bar EC:Cable Reel V:EVSC (Engine Variable Speed Control)

Transtainer[®]

Feature 01 Many varieties of products to meet customer's demand

01 Cable Reel on Board



02 Bus-bar



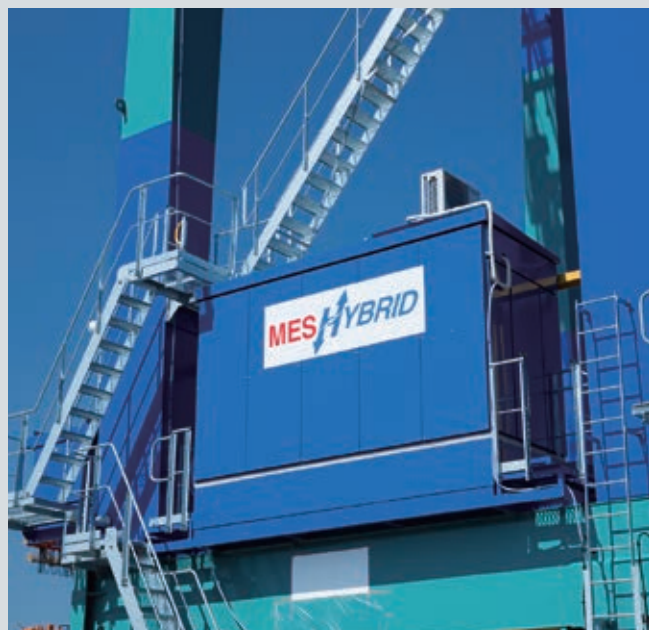
03 Cable Reel on Carrier (patent pending)



Feature 02 Lithium Ion Hybrid

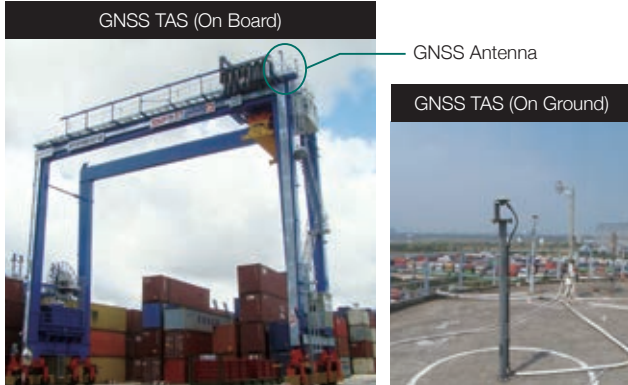


Applying both the large size battery and the engine valuable speed control system improves efficiency by 60%. The smaller engine needed for the lithium ion hybrid Transtainer[®] also reduces the the cost of maintenance as well.



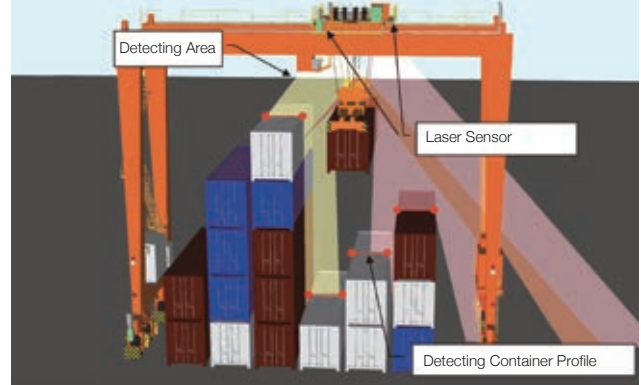
Option 01 GNSS TAS

Detects crane positions and directions by GNSS



Option 02 Stacking Profile Detecting Device

Detects container profile by laser sensor for safety improvement



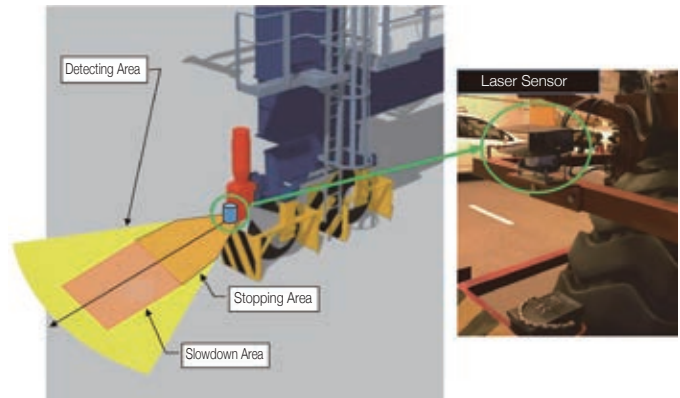
Option 03 Monitoring Camera for Truck Lift Prevention

Monitoring containers lifted up



Option 04 Anti-Collision System

Detects the obstacles on the rail way for safety improvement



Option 05 CMS (Crane Management System)

Monitoring the crane status in the real time



Option 06 Flipper

Many varieties of flippers





3000T/H Unloader



2000T/H Unloader



1500T/H Unloader

Industrial Cra



Cranes for Product Shipping



Grab Bucket



Rubber-Tyred Pipe Handling Crane



Double Link Jib Crane



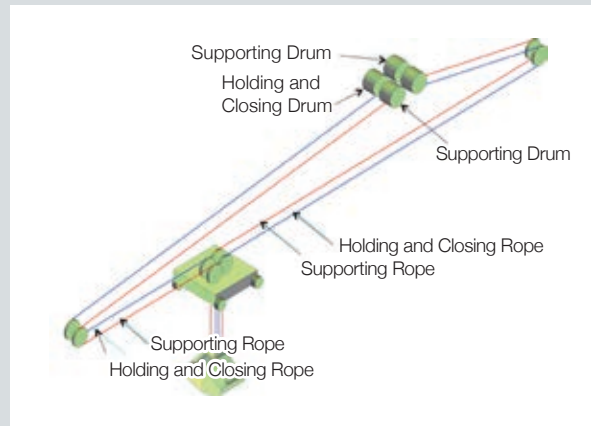
Goliath Crane

Industrial Crane

Feature 01 4 Drum type rope trolley system

Instead of the complex conventional rope trolley system, we adapted simple 4 drum type rope trolley which facilitates wire rope replacement. This system is advantageous as follows:

- >> **Point 01** Saving maintenance cost by reduced quantity of the wire rope
- >> **Point 02** Reducing out-of-service hours of Unloader for rope replacement work
- >> **Point 03** Simple structure and light-in-weight and minimum maintenance time



Feature 02 Durable and Light-in-weight Bucket

We have partnership with Bucket's maker with extensive experience in delivering durable and light-in-weight buckets.

Durable and light-in-weight bucket enables the maximum lifting load, with deduced power consumption and lighter dead weight of the crane. These merits also contribute to minimization of the investment for civil construction.

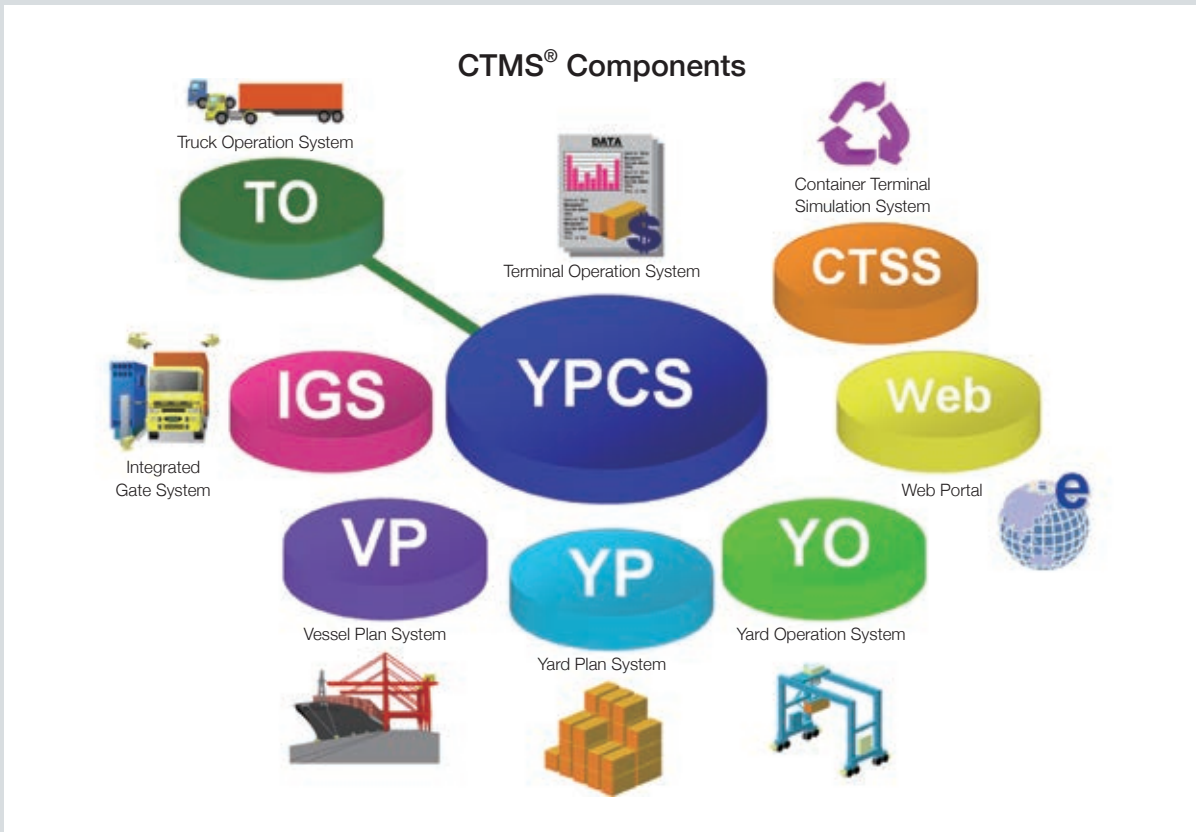


CTMS[®]

Container Terminal Management System

Our total solution with the combination of software and hardware realizes the optimization of the container terminal operation and the related business procedures

- >> **Point 01** We provide the most optimum system by combining the proven software package based on ourthe extensive long experience and the state of the art hardware design.
- >> **Point 02** The drastic reduction in operation costs can be achieved by rich functions for operational efficiency and the user-friendly interface of our CTMS[®]
- >> **Point 03** The customer service is improved based on the various proven and reliable CTMS[®] functions such as information disclosure on Internet, etc.
- >> **Point 04** The reliable and safety system operation can be realized based on the finest support service by us



OITA FACTORY

Our Oita Factory has annual manufacturing capacity of 36 Portainer® and 70 Transtainer®. To ensure the quality of our products, we perform all the works in Oita Factory, from design, manufacture, assembly and commissioning in Oita Factory then deliver the completed product to the customers. At Oita Factory, we have the mission statement "contribution to the realization of sustainable society in harmony with the environment". In 2003, in recognition of our efforts in achieving this mission statement, we were granted Certification to the ISO 14000 and 9001 manufacturing standards. We established Transtainer® for Automated Development/Demonstration as well as experimental area in Oita Factory to meet customer's demand for automations.



Overview



Crane Assembling Facility



Construction & Assemble



Jib Crane

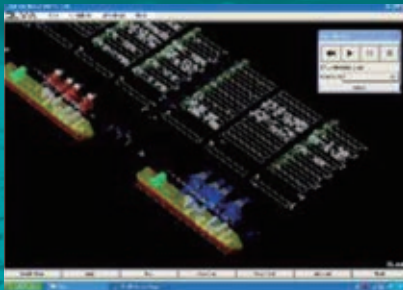
Factory

Development of Automated Container Terminal

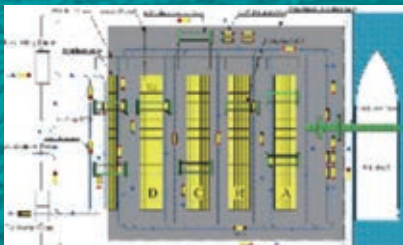
We are promoting the technology development in our own style in accordance with rapid prevail of automated cargo handling equipment. In 2018, Oita Factory installed Transtainer® for Automated Development/Demonstration and plenty varieties of technologies. We arrange the Simulator and Terminal Lay out and propose good solution to meet customer's demand.



Transtainer® for Automated Development / Demonstration



Computer Simulation



Planning Terminal Lay out



Remote Operating Console

Technology and Innovation

Research & Development

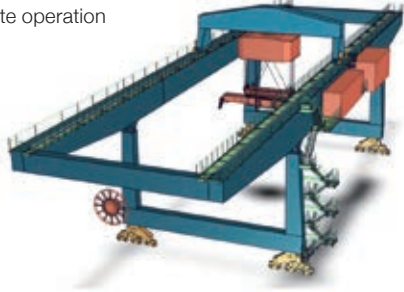
We endeavor to develop new technologies for a variety of products, especially in the container crane market to meet the customer needs. In cooperation with PACECO® CORP., we have been introducing new technology for the container logistics industry in the areas of high productivity, high technology, environment and safety.



Semiautomated Double Trolley Portainer® for high efficiency of cargo handling in the automated container terminal

- Supertainer®
- BufferStation®
- Large size Portainer®
- Yard Chassis Dynamic Assignment System

Rail-mounted Transtainer® for rail terminal with automated / remote operation



- RailShuttle®
- Automated Transtainer®
- Operation Assist System
- Automated Terminal Operation Management System

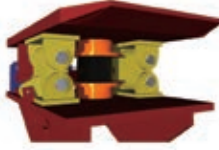



“NZE (Near Zero Emission) Transtainer® will achieve zero emission by the replacement of power supplies with hydrogen fuel cells to adapt the coming hydrogen economy.”

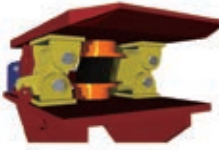
- Hybrid Transtainer®
- Electrical Transtainer® with Auto Plug-in/out
- Sun Shield Device for Reefer Container
- Transtainer® Automatic Arrangement System

Seismic isolated device cope with massive earthquake with easy maintenance.

Normally



After Earthquake



- Earthquake Seismic Isolation Device
- Anti Collision Sensor
- Chassis Hanging Prevention
- Remote Crane Management System

CRANE ADVANCED REMOTE MONITORING SYSTEM

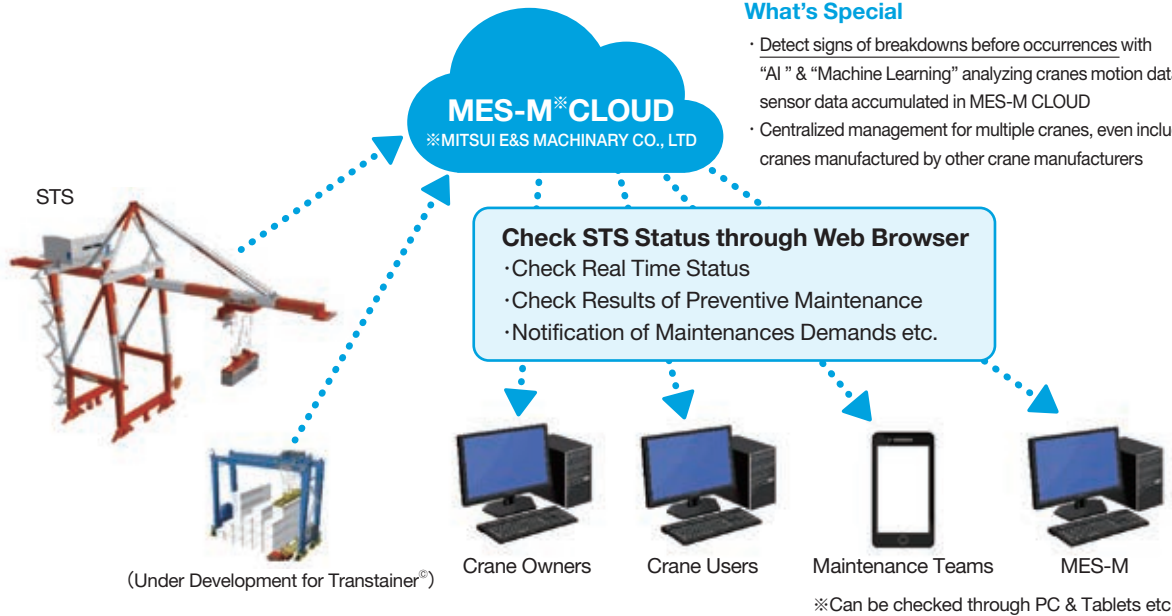


What's New

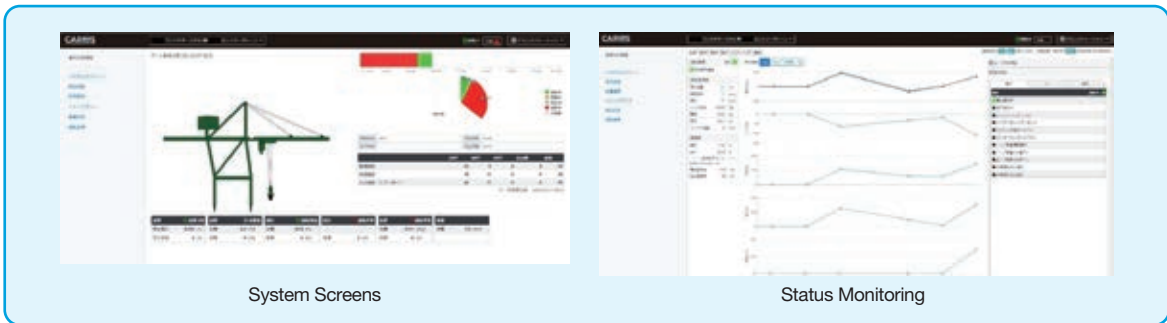
“Anytime” & “Anywhere” together with STS
Preventive Maintenance with “AI” & “Machine Learning”
Remote Troubleshooting

What's Special

- Detect signs of breakdowns before occurrences with “AI” & “Machine Learning” analyzing cranes motion data and sensor data accumulated in MES-M CLOUD
- Centralized management for multiple cranes, even including cranes manufactured by other crane manufacturers



Screen Images (ILLUSTRATIVE PURPOSE ONLY)



Preventive Maintenance

["AI" & "Machine Learning"] × [Over 50 Years Experiences & Knowledge as a Cranes Manufacturer]

enable us to provide you with the high standard of Preventive Maintenance with data analysis.

Items

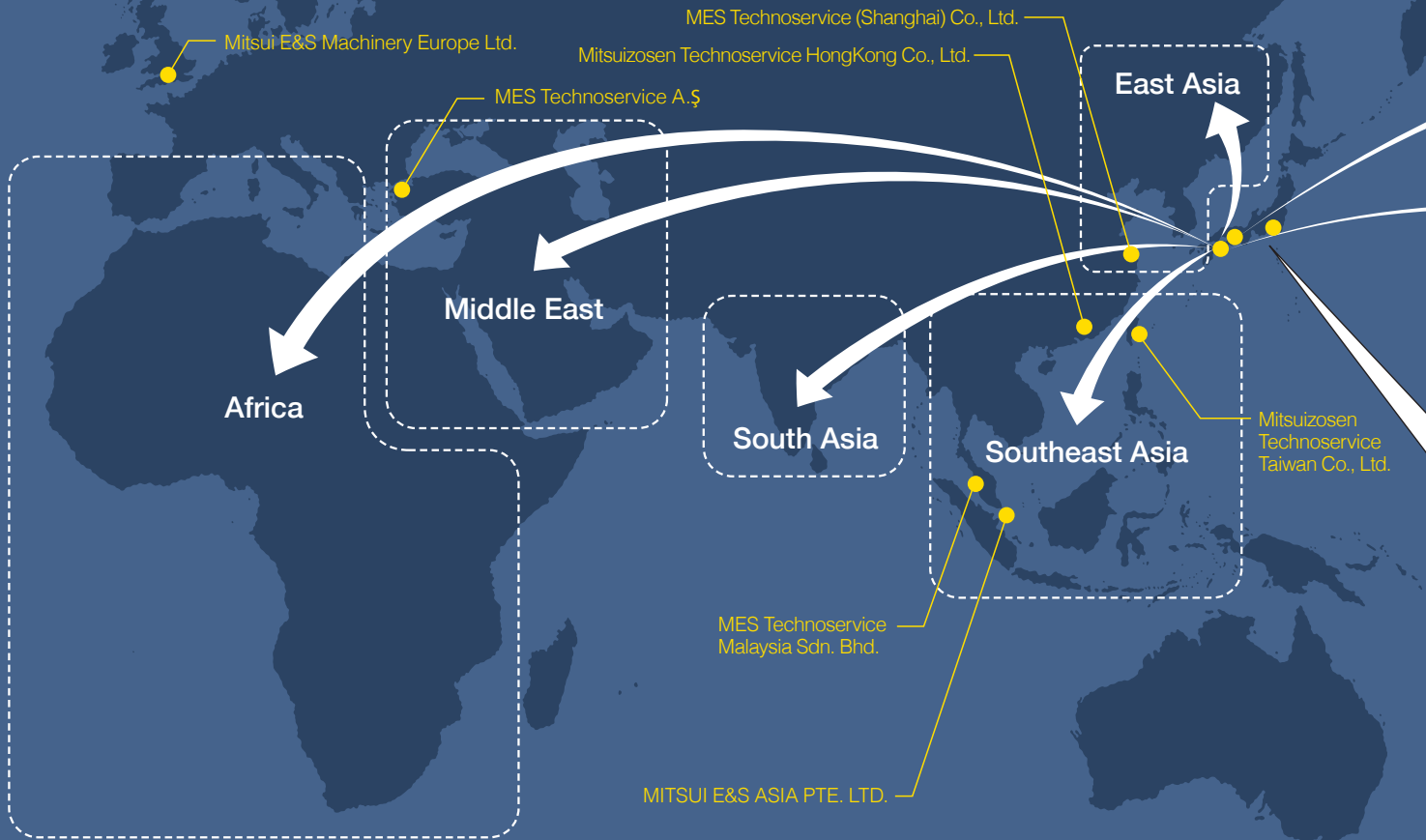
- Inverters
- Gear Reducers
- Motors
- Wire Ropes
- Trolley Rails
- Structures
- Remaining Life Assessment
- Drone Inspections



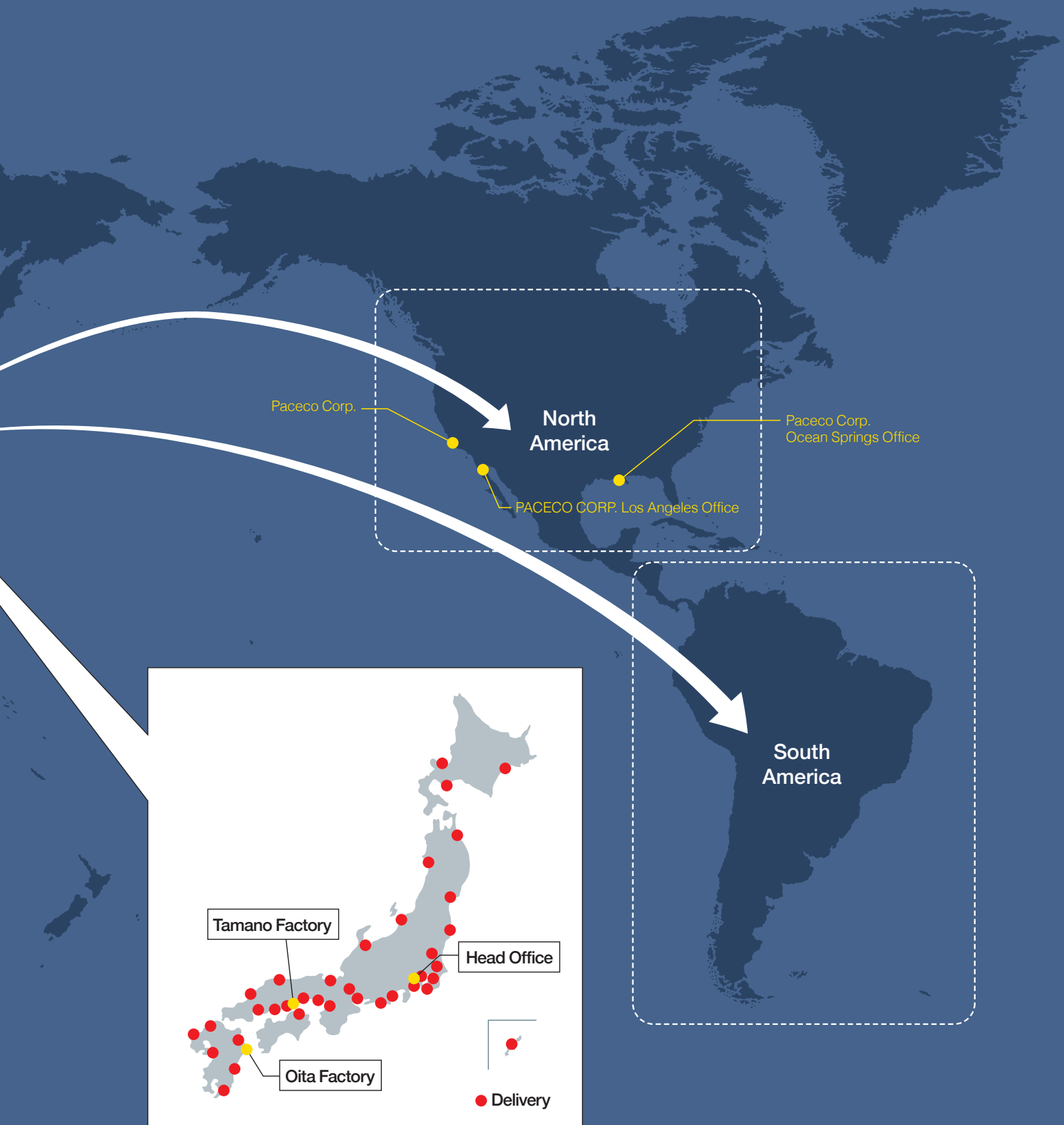
Please share your “TROUBLES” or “REQUESTS” with us and let us assist you to realize your efficient operations.

After Sales Service and Delivery Records

We have delivered to the ports in the world over 300 units of Portainer® and 1300 units of Transtainer®. Not only by improving the technology and quality of our products, we also offer prompt After Sales Service. Our products have been supported by our many customers for long time. To provide the best product quality and service, Mitsui E&S Machinery Co., Ltd. as a whole group will continue our commitment to support our customers with quality products and by providing prompt repair, maintenance and engineering services.



● Branches and Subsidiaries





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Please check out MES-M Oita Factory
Introductory Movie on YouTube!