

**Receiving the 58th Shibusawa Award (Fiscal 2013)
Development of Overhead Catenary System (OCS) Inspection System,
CATENARY EYE**

Patent Nos. 4635657, 4779770, 4816567 “Trolley Abrasion Inspection System by Image Processing”

[Outlined Explanation of OCS Inspection System]

The inspection for OCS for electric railroad is required to avoid any accident like the breaking of an overhead catenary wire trolley so that electric power can be normally fed to electric cars under the condition that each pantograph is always kept contact with the catenary wire. For this purpose, periodic maintenance is required to check the catenary setup conditions (height, deviation, and wire wear). The OCS inspection system, “CATENARY EYE,” is a maintenance unit intended to check the conditions of catenary height, deviation, and wire wear through periodic measurements. This system has been adopted by over twelve customers at home and abroad. It has contributed greatly to the improvement of maintenance efficiencies for electric railroads. This time, our track records were recognized and led to the award.

[Conventional System in the Market]

Conventional system in the market is based on an approach that a laser unit is installed in a dedicated inspection car. This method, however, involves a substantial problem in terms of installation space and power capacity. Therefore, it cannot be installed in a normal car in operation. Wire wear of overhead catenary tends to develop in a nearby area of each station. Despite that, it is necessary to suspend measurements in this area because laser radiation may be hazardous to the eyes of passengers.

[Advantages of this System]

- (1) Since this system comes in a compact unit configuration where a small-sized line sensor camera is used, it can be installed in an ordinary commercial car. Since no laser beams are used, there is no danger of causing visual disturbance for passengers and people at the station. In addition, the status of actual train operation can be measured efficiently and such a feature greatly contributes to the improvement of security, reliability, and business efficiencies for electric railroad systems. (Fig. 1 and Fig. 2)
- (2) According to past practice, the line sensor

camera is believed not suitable for outdoor use because variations in illuminance by sunlight are rigorous. Therefore, it has been mostly commercialized for indoor use where the lighting conditions are duly arranged. It has not been used for measurements in the field of electric railroad. Under such a technical background, we developed a small-sized line sensor camera and an image analytical approach inclusive of edge detection techniques and image filtering treatments stable even under conditions of turbulence. This development has resulted in world-first realization of overhead OCS wire wear technologies that enable high-precision telemetry. (3) This system records images of catenary sliding surfaces. Therefore, it is possible to perform the total judgment of catenary conditions such as rolling abrasion and abnormal wire wear from recorded images, and also image checking.



Fig. 1 Conventional Car Equipped with the OCS Inspection System



Fig. 2 Conventional Dedicated Inspection Car Equipped with the OCS System

Launching Ceremony of Prime Meiden Limited

On May 23rd 2014, Meiden Group held a launching ceremony at New Delhi in India for establishing a joint venture with Prime Electric Limited or PEL who is a supplier of power transformer in India. More than 300 people were participated including the ambassador of Japan or ambassadors from Middle East and African countries, high government official in India and people from Japanese subsidiaries in India and the Indian companies.

This time, Meiden Group signed the capital alliance agreement and tech transfer agreement with PEL, an Indian power transformer supplier. We acquired of 23% of PEL share.

By this capital alliance, Meiden Group will combine its long-standing technologies and high quality expertise with PEL's latest manufacturing facility and aim to secure many T & D projects in and out of India. Moreover, we will improve our organization to provide the wider offerings of power products and services for Japanese subsidiaries in India and Indian firms who are in need of quality power products. By

these agreements, PEL changed its name to "Prime Meiden Limited".

Meiden Group so far has developing our T & D business mostly in the Southeast Asia and China. Going forward, with Prime Group as our new partner and our joint venture, Prime Meiden Limited, Meiden Group will try to enter the markets in India and the emerging markets – west of India like Middle East and Africa. We aim to grow overseas and we go forward in enhancing our competitive advantages through the joint product development with them.



The 1st Meiden Group Southeast Asian Area QC and Occupational Safety Training Course was Held

Sponsored by ASEAN Training Center, an organization under Meiden Asia Pte. Ltd. ("MAP"), Singapore, we conducted the 1st Meiden Group Southeast Asian Area QC and Occupational Safety Training Course for two days from 23rd July 2014 at two venues: our Thai Training Center and Meiden Electric (Thailand) Ltd. From Southeast Asian Area, total 6 companies with total 18 persons joined the course and we conducted the training course. This time training course covers Meiden Group's Corporate Philosophy, Corporate Management Policy, QC in general and Safety Management in general. In the safety training program, we designed to incorporate several hands-on training sessions to deepen the understanding of occupational risks through the hands-on experiences.

The sponsoring body, ASEAN Training Center was established in April this year for Meiden Group's HR and Talent Management in the ASEAN Region. This Center aims to provide

the training courses to Meiden Group's ASEAN Area employees to raise an awareness as a Meiden Group and to deepen the knowledge on QC and Safety Management and to improve their technical capabilities.

Going forward, we will have various training programs once in every three months and, in so doing, we will improve the capability and understanding of QC and safety and contribute to our business growth there.



Hands-on Experience on Safety: Witnessing Risk of Retractable Cord Reel – Overloaded Cable Thermal Level Change and the Burning of Cable

MSL and PUB opened the Singapore's First Ceramic Membrane Bioreactor Plant to Treat and Recycle Industrial Used Water

On March 10, 2014, Meiden Singapore Pte. Ltd. (MSL) and Public Utility Board (PUB), Singapore's national water agency, opened Singapore's first Ceramic Membrane Bioreactor (MBR) plant coupled with an Upflow Anaerobic Sludge Blanket (UASB) to treat and recycle industrial used water in a more energy-efficient and cost-effective manner.

This plant processing one million gallons (i.e. 4550 cubic meters) industrial used water is sited at the Jurong Water Reclamation Plant in Singapore and the Ceramic MBR plant was constructed by MSL.

The reclamation of such high chemical oxygen demand (COD) industrial used water was

considered difficult. This demonstration project will prove the effective use of Meiden Ceramic MBR System technologies in achieving energy savings and a consistent high-quality output of recycled water.

This collaboration between MSL and PUB started from a MOU signed in 2010. Under the MOU, MSL has been conducting various test-bedding projects using the Ceramic MBR system in PUB's water reclamation plants. Following satisfactory test results from these projects, MSL took the research one step further by collaborating with PUB to construct a demonstration plant to reclaim industrial used water for recycling purposes.



Opening Ceremony



Ceramic MBR Plant



Ceramic Membrane Unit



Ceramic Membrane