

# CPO Seminar on Corrosion, Maintenance and Inspection of Static Equipment for Professional Engineers from Saudi Aramco

## 1. Background and Objective

Customized Programs-Overseas (CPO) on maintenance management, maintenance management by TPM activities, and safety management have been held on a continuous basis for Saudi Aramco's refinery engineers since fiscal 2007. Within this scheme, JCCP recently received a request for a course on specialized maintenance and inspection technologies for middle-level-class engineers and above, from the Professional Engineering Development Division (PEDD), a division under the Engineering Services Department at Saudi Aramco that is responsible for providing education and training programs to Saudi Aramco's professional engineers. In response to this request, JCCP organized a seminar that aimed to build the technical capacities of engineers who engage in maintenance and inspection activities at Saudi Aramco. Based on three themes—corrosion control technologies for refinery equipment, facility deterioration evaluation and countermeasures, and inspection technologies—selected from among the technical management standards compiled by the Japan Petroleum Institute (JPI) (and translated into English by JCCP), the seminar was implemented over a five-day period from February 9 to 13, 2014 at PEDD, located in Saudi Aramco's Head Office district. The lecturers of

the seminar included Fumihito Tone and Hiromitsu Saito from JCCP, Mr. Kiyoshi Sakaino from JGC Corporation, and Mr. Takashi Shimizu from Chiyoda Corporation. These members were judged and approved by Saudi Aramco as highly appropriate lecturers for the seminar, based on a prior screening of their curriculum vitae and an oral examination conducted over the phone.

The participants were a group of 15 engineers engaged in maintenance and inspection activities at Saudi Aramco's various facilities, including refineries, NGL fractionation plants, gas production plants, pipelines, and research institute. They were a wide-ranging group composed of engineers with only a few years of experience to those with more than 25 years of experience.

## 2. Seminar Content

The seminar opened with a message from Mr. Bassam Bokhari, Division Head of PEDD, who explained that the seminar was realized with support from JCCP, and encouraged the participants to absorb the knowledge of Japanese maintenance and inspection technologies related to corrosion and make full use of that knowledge in future operations. Following Mr. Bokhari's speech, Tone (JCCP) gave a lecture entitled "Maintenance



*Participants of the seminar*

management in Japanese refineries,” and discussed the significance and purposes of maintenance management. He also introduced case examples in which facility design flaws led to corrosion accidents, from among serious accidents that have occurred at oil complexes in Japan.

On the second day, Mr. Shimizu (Chiyoda Corporation) gave a lecture on facility deterioration evaluation and countermeasures with particular focus on three issues: deterioration and damage from high-temperature operations (temperatures above 200°C), environmental embrittlement and cracks (temperatures below 200°C), and mechanical damage (ductile fracture, brittle fracture, fatigue fracture). The lecture captured the attention of the participants by incorporating references to the JPI standard, API and NACE as much as possible, and actual case experiences.

On the third day, Mr. Sakaino (JGC Corporation) lectured on inspection technologies that are frequently used in refineries, ranging from the general to the latest technologies, and introduced specific application examples to discuss the advantages and precautions of various inspection methods.

On the fourth day, Hiromitsu Saito (JCCP) spoke on corrosion control technologies for refinery equipment. Giving particular focus to such topics as corrosion that occurs in the process from the vacuum distillation unit to desulfurization unit, material deterioration and

other similar types of damage, material improvement as a countermeasure to inspection damage, and operational environment measures, he introduced Japan’s experience, knowledge and technologies that have been applied to corrosion and other similar types of damage in Japanese refineries, the improvement of materials as a countermeasure to such damage, and measures for operational environments.

On the final day, quizzes that were given every day during the seminar and graded were returned to the participants, and each of the lecturers explained the major points. On the whole, the participants rated the seminar extremely highly, with no negative feedback concerning the content and materials of the seminar, or the English proficiency of the lecturers. Moreover, JCCP received a request from PEDD for continued implementation of the seminar.

### 3. Summary

As mentioned above, a quiz was given after each lecture for the first time in a CPO, to verify the participants’ degree of understanding of each lecture. As it prompted the participants to focus on answering all questions while referring back to their textbooks, the quizzes seemed to be an effective way to maintain concentration and enhance learning among the participants.

*<by Fumihito Tone, Training Dept.>*

