

CPJ Seminar on TPM Activities for Refinery Maintenance Management for Iraq

A Customized Program-Japan (CPJ) on TPM activities for refinery maintenance management was held for a group of maintenance engineers from oil refineries and gas plants in Iraq from January 15 to 25, 2013, in response to a request from the Ministry of Oil-Iraq.

1. Overview

Along with the progress of reconstruction efforts in Iraq, oil refineries and gas plants have become vital to the stable supply of oil products in Iraq. Thus, ensuring stable operations and proper maintenance of refinery facilities has become an issue of urgent concern.

To address this need, the seminar was held with the attendance of a group of 20 selected engineers. The group included one engineer from the Ministry of Oil, four from the North Refinery Company, five from the Mid-Land Refinery Company, five from the South Refinery Company, two from the North Gas Company, and three from the South Gas Company.

The seminar was designed to provide knowledge of TPM (total productive management) activities in Japan, where the practice originated, and to offer hands-on training in autonomous maintenance and the latest in maintenance management at refineries that incorporate TPM in their maintenance activities.

Initially, the Ministry of Oil-Iraq requested a seminar for practical training in Iraq, but with due consideration to various circumstances in the country, a seminar was agreed to be held in Japan.

2. Training at JCCP

(1) Japan's Oil Industry

The lecture began with a description of Japan's geography, followed by an overview of the development of the oil industry in Japan. It discussed trends in the ratio of oil in Japan's primary energy mix, examined the present state and issues regarding oil distributors in Japan, their market share, and the locations and sizes of their refineries, and covered issues related to crude oil import destinations, policies for processes up to the stockpiling of oil, and recent trends in the oil industry.

The lecture also used a video to introduce Japan's cultural characteristics and maintenance management practices.

(2) Maintenance Management and Safety

Management by TPM Activities in the Refinery

This lecture aimed to share an understanding of the purpose and role of maintenance by providing an overview of maintenance in the refinery and explaining the methods for maintenance management employed by oil companies in Japan. It also defined and gave a general description of TPM, and discussed how TPM activities came to be introduced to refineries as a means for improving maintenance management practices. In relation to the latter, examples of serious accidents that have occurred at oil complexes in Japan were introduced, including accidents caused by such factors as facility design flaws, failure to change management, deterioration of safety culture and violation of regulations, and natural disasters, along with the explanation that human error and management system flaws are at the very root of most accidents. Additionally, the lecture discussed ideal management practices and explained the importance of the role of managers in increasing motivation in the workplace, and introduced representative TPM small-group activities such as the Tool Box Meeting (TBM), hazard prediction activities, learning from near-misses, and the 5S policy.

(3) Group Discussion on "Problems and Countermeasure in My Section"

After making a round of offsite training destinations, a group discussion session on "Problems and Countermeasure in My Section" wrapped up the seminar. The participants were divided into three groups with careful attention to achieve an equal balance in terms of job level, affiliation and age, and decided on a leader and presenter among each group.

To come up with a discussion theme, group members wrote problems they face on separate post-its, categorized them according to genre, and selected an issue of high priority. They then shared a common understanding of the selected theme and analyzed the cause of the issue based on the 5-why, 4M and fishbone analysis methods.

Ultimately, they aimed to prepare their own action plan for solving the issue. All three groups selected an issue related to the maintenance of equipment they are in charge of, and analyzed its causes by combining the 4M and fishbone methods. All three groups attempted to solve their problem by examining the quickest method for restoring the relevant facility to its initial state. This clearly showed that in Iraq, returning equipment to its initial state is a pressing issue, and efficiency improvement can be addressed only after that is done. Because discussions ran deep and one day was not enough to fully examine all possible causes, none of the groups went as far as to create an action plan. In future seminars, 1.5 days may need to be allotted to this group discussion session. However, many participants rated the discussion as having been extremely meaningful.



Group discussion

3. Offsite Training

(1) Sankyu Inc., Maintenance Center

Sankyu's Maintenance Center first introduced the company and the goal and role of the Center, and explained its engineer training programs that are respectively geared toward university, technical college and industrial high school graduates. Additionally, an explanation was given of the framework for training foreign maintenance managers in reference to a case example of rotary machines, and provided understanding of the Center's initiatives in training local personnel in foreign countries. The Center also directs its efforts to improving the technical abilities of maintenance managers, as introduced through numerous examples. Additionally, EagleBurgmann, which resides in the Maintenance Center, provided a general description of mechanical seals and its framework for technical assistance.

Here, the participants particularly appreciated the exposure to the heavy machinery and the latest

technologies that are used in actual maintenance activities.



At Sankyu's Maintenance Center

(2) Idemitsu Kosan Co., Ltd., Chiba Refinery

Following an introduction of the company and the Chiba Refinery, the participants received a general overview of the objectives, history and effectiveness of TPM activities. They learned that Idemitsu's TPM activities are composed of the four pillars of maintenance innovation, safety and environment innovation, production innovation, and business innovation, and received a detailed explanation of maintenance innovation. With regard to autonomous maintenance activities, an explanation was given of the process of initial cleaning and visualization activities, and with regard to professional maintenance, a description was given of activities that helped to reduce malfunctions by changing the mechanical seal of rotary machines. The case examples facilitated understanding of the effectiveness of autonomous maintenance, and provided useful information to the participants. After receiving a lecture on TPM activities, the participants toured the site of an atmospheric distillation unit and directly observed various Kaizen and visualization activities.

The program provided by Idemitsu Kosan was highly evaluated by the participants, and is expected to be extremely beneficial to their future activities.



At Idemitsu Kosan's Chiba Refinery

(3) Toa Oil Co., Ltd., Keihin Refinery

At the beginning of the program at Toa Oil's Keihin Refinery, a general description that linked the state of oil demand-supply in Japan with the refinery's unit composition provided the understanding that the refinery is well-suited to meeting domestic demand for oil and enjoys high profitability. The participants then learned about the refinery's maintenance framework and maintenance activities based on the PDCA cycle, as well as about risk-based inspection (RBI) and reliability-centered maintenance (RCM). They also received detailed explanations of Furmanite repair technologies, creep inspections of hydrogen reforming tubes using a creep inspection robot introduced by Toa Oil, and the decoking of a VDU furnace using high-pressure helical water jet, with reference to photos and abundant data. After these lectures, the participants walked through the refinery site and confirmed the real maintenance situation.



At Toa Oil's Keihin Refinery

(4) JGC Corporation, Yokohama Head Office

After an introduction of the company and its activities in Iraq, the participants received a lecture on risk management and the significance of OSHA and PSM in preventing plant accidents and malfunction in reference to case examples of serious accidents that have occurred in the past. The main points of RCM were summarized in Q&A format for easy understanding, and RBI was discussed using case examples. Additionally, the participants received a description of JGC's Inspection Data Management



At JGC Corporation's Yokohama Head Office

System and its initiatives to extend plant life, as well as a description of the thermal spraying technology as a method of equipment repair. Active discussions were held among the participants and JGC staff members and made for a highly effective training program.

(5) Mitsubishi Heavy Industries, Ltd., Yokohama Works Kanazawa Plant

The participants received a presentation that introduced Mitsubishi Heavy Industries' entire businesses. The technical explanation of steam turbines covered their scope of applicability, structure and characteristics, and presented specific case examples to explain the key points of preventive maintenance. In regard to boilers, examples of past malfunctions were introduced, and a detailed lecture was given on the status of malfunctions and countermeasures for parts that are particularly susceptible to problems. The lectures on steam turbines and boilers by an expert in this field were extremely easy to understand. In a tour of the shop floor, the participants experienced the vibrant operations of the plant.



At Mitsubishi Heavy Industries' Kanazawa Plant

4. Summary

In a prior report, all 20 participants noted that they participated in this seminar so they could solve a problem they face in their workplace. After completion of the seminar, most of them said they derived some type of solution and future direction, and others expressed a strong desire to implement TPM activities in their workplaces and to use what they learned in this seminar to take initiative in solving their problem by themselves. As rigorous guidance and a strong spirit of challenge are needed to genuinely solve problems, the lecturers of this seminar hope to plan some type of program for practical guidance when circumstances allow.

<by Fumihito Tone, Training Dept.>