CPJ on TPM Activities for Refinery Maintenance Management for Iraq

From June 10 to 20, 2014, JCCP implemented a course on refinery maintenance management based on TPM (Total Productive Management), a practice which originated in Japan, in response to a request from the Ministry of Oil-Iraq.

1. Overview

The course was designed to enhance refinery engineers' awareness of refinery operations and maintenance to the same degree as their understanding of refinery equipment, by providing knowledge of autonomous maintenance activities and the latest maintenance technologies. With the cooperation of Idemitsu Kosan Co., Ltd., it also included a hands-on workshop on discovering problems and devising countermeasures to those problems while actually examining onsite equipment in a refinery.

The participants were a group of 20 selected engineers from oil companies affiliated with the Ministry of Oil-Iraq, and included four each from North Refinery Company, Mid Land Refinery Company, South Refinery Company, North Gas Company and South Gas Company.

2. Training at JCCP

The program began with a lecture on "Japan's Oil Industry," to provide an understanding of the oil situation in Japan. The lecture covered Japan's geographical features, the background to the development of the oil industry in Japan, and trends in the ratio of oil in Japan's primary energy mix, and discussed the present state and issues regarding oil distributors in Japan, their market share, and the locations and sizes of refineries they operate. It also discussed Japan's energy security policies, including the stockpiling of crude oil, and examined recent trends in the oil industry.

Group discussion

Next, a lecture titled "Maintenance Management and Safety Management by TPM Activities in the Refinery" was given to define and provide a general description of TPM and to outline maintenance management methods that are adopted by oil companies in Japan.

Additionally, a group discussion session was held under the title, "Problems and Countermeasures in My Section." To come up with a discussion theme, the participants shared problems they face and how they should be resolved, categorized them by genre, and selected an issue of high priority. They then analyzed the causes of the issue using the 5-why, 4M and fishbone analysis methods, and prepared an action plan for solving the issue. As the themes discussed in each group were practical issues that pertained to all organizations, the discussions yielded ideas that could be applied horizontally within each organization.

3. Offsite Training

3.1 Mitsubishi Hitachi Power Systems, Ltd. (MHPS), Yokohama Works

Under the theme, "The latest boiler and turbine technologies and methods for their maintenance and inspection," MHPS Yokohama Works provided training that focused on the scope of applicability, structure and characteristics of steam turbines, and explained the key points of preventive maintenance in an easy-to-understand manner in reference to specific case examples. In regard to boilers, a summary was given of past cases of malfunction, and a detailed explanation was given on the status of malfunctions and countermeasures for parts that are susceptible to problems. The participants were also given a tour of the production floor, where they witnessed the boiler tube bending and forming process.

3.2 JGC Corporation, Yokohama Head Office

The participants received a lecture titled "The latest maintenance technologies and efficient maintenance management," which discussed the significance of OSHA and PSM in reference to case examples of serious accidents that have occurred in the past. The lecture also provided a summary of reliability-centered maintenance (RCM) in Q&A format for easy understanding, and discussed risk-based inspection (RBI) through an introduction of case examples.

3.3 Sankyu Inc., Maintenance Center

A lecture titled "The role of contractors, implementation frameworks and technologies" gave a detailed description of the company's engineer training programs that are respectively designed for university, technical college and industrial high school graduates, and its initiatives for enhancing the technical capabilities of maintenance engineers. Additionally, in a hands-on session, the participants were exposed to heavy machinery that is used in actual maintenance activities and the latest technologies.

3.4 Idemitsu Kosan Co., Ltd., Chiba Refinery

On the first day of the two-day training session at Chiba Refinery, a lecture was given on "TPM activities for refinery management: Case examples of Kaizen activities," which covered the purpose and effects of TPM activities. Particular focus was placed on autonomous maintenance activities, including the processes of initial cleaning and visualization activities, and a description was given of a professional maintenance activity that helped to reduce malfunctions, with reference to a case example involving mechanical seals. The participants then received an explanation of a TPM activity board in the instrument room of the refinery, and gained first-hand experience in various examples of Kaizen and visualization activities within the refinery.

On the second day, an onsite workshop was held under the title, "Visualization training: Simulation exercise." Divided into three groups, the participants identified mechanical flaws and areas for improvement (visualization) using a compressor unit and two pumps in an idle plant. Around 15 discoveries were made by each group under the supervision of an Idemitsu engineer from an operations division who was assigned to each group to respond to questions and to ensure safety. They analyzed the problems that were identified, discussed countermeasures, and summarized their findings in a presentation. The presentations touched on the important points of visualization training, and seemed to provide a strong motivation for future activities.

Problem-finding in a refinery (compressor)

Problem-finding in a refinery (pumps)

Discussion of countermeasures

4. Summary

This was the second time that a course on TPM activities for refinery maintenance management had been offered. To distinguish it from the first offering, an onsite workshop was planned with the cooperation of Idemitsu Kosan, where sufficient preparation was made to pick out relevant equipment in an idle plant. The opportunity to personally engage in discussions with an instructor to seek countermeasures to problems through direct access to actual onsite equipment is expected to benefit the participants when they return to their countries and play a part in rebuilding refinery plants.

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