

Seminar on "Energy Saving in the Refinery" Held at TAKREER (UAE)

1. Background to the Seminar

UAE is one of the most important countries to Japan in securing a stable supply of crude oil. It also plays a leading role in the Middle East, particularly in the introduction of renewable energies as the next major energy source following crude oil.

In response to JCCP's promotion of Customized Programs-Overseas (CPO) that are specifically designed based on a survey of training needs in major oil-producing countries, Abu Dhabi Oil Refining Company (TAKREER) has requested the implementation of a CPO on energy saving in spring and another on environmental management in autumn. After working out the details and schedule of the programs, we held the first of the two programs that are planned to be implemented during the present fiscal year.

2. Overview of the Seminar

- (1) Name
TAKREER-JCCP Joint Seminar on Energy Saving in Refinery (CPO-21-09)
- (2) Date
June 28 – July 2, 2009

- (3) Location
Abu Dhabi, UAE
- (4) Lecturers
<Lecturers from the JCCP Training Dept.>
 - i) Tetsuji Kubota
 - ii) Shigeyoshi Takahashi
 <Outside lecturers>
 - iii) Mr. Hisato Aoyama, Senior Sales Manager, Heavy Oil Project, Global Marketing, JGC Corporation
 - iv) Mr. Mitsuru Sugihara, Foreman, Administration Section No.1, Tokuyama Refinery, Idemitsu Kosan Co., Ltd.

3. Details of the Seminar

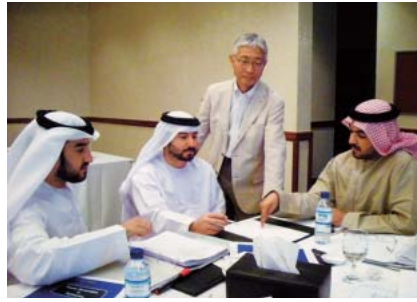
Japan has a long history in energy conservation. Especially since 1979, when the Act on the Rational Use of Energy (Energy Saving Law) came into effect in the wake of the second global oil crisis, the entire nation has shown consistent efforts to save energy. Therefore, we organized this seminar with hopes that Japan's history and experience in energy conservation could be of some use in promoting energy-saving activities in the Middle East.



Seminar participants and JCCP-side lecturers



Lecture scenes



Presentation by a participant

The seminar covered the following topics:

- Day 1: Japan's Oil Industry
 - Alternative Energies to Oil
 - Energy Saving in Japan
 - Energy Saving in the Refinery
- Day 2: Energy Saving in the Refinery 1 (Operational Management, Small Investments)
 - Pinch Technology
- Day 3: Energy Saving in the Refinery 2 (Large Investments)
 - New Energy Saving Technologies
- Day 4: Group Discussion on Energy Saving in the Workplace
- Day 5: Energy Saving Using the Computer
 - Actual Examples of Optimization Using Computers

TAKREER operates two refineries: the large-scale Ruwais Refinery and the Abu Dhabi Refinery situated adjacent to Abu Dhabi City. They use a simple hydro-skimming facility that requires few secondary devices to process light crude oil produced in UAE, including Murban crude. We understand that they have rated favorably in many of the categories of the Solomon Survey. Following the completion of a JCCP technical cooperation project on flare gas recovery, the refineries have actively promoted energy-saving measures, and are now two of the most advanced refineries in the Middle East.

From the above two refineries, 14 experts, including 2 women, attended the seminar held recently.

4. Overview of Lectures

As a new initiative, we added a group discussion

session to our conventional program on energy saving. We divided the participants into groups and had each group discuss energy-saving efforts in their workplace. We then asked all groups to deliver a presentation on the issues, future direction, and other specific aspects of energy-saving activities. Through the group discussion session, we hoped to provide a forum where participants could gain practical ideas and hints that would benefit their future work.

(1) Day 1: Energy Saving in Japan

Following an introduction of JCCP and Japan's oil industry and a lecture on alternative energies, we delivered a lecture on Japan's history and countermeasures for energy saving, and another on the global warming issue and energy saving in the refinery, as scheduled. Though the lectures covered a lot of content in a short time, they seemed to be well received by all participants.

The lectures emphasized the following three points: (1) energy saving is a global commitment that contributes to solving environmental issues; (2) Japan's energy conservation activities are jointly implemented by the public and private sectors; and (3) small-group activities should form the basis of energy saving in refineries. The third point on small-group activities, in particular, seemed to capture the avid attention of the participants as an issue that pertains directly to them.

(2) Day 2: Energy Saving in the Refinery 1 (Operational Improvement, Small Investments) / Pinch Technology

In the first half of the second day's program, we discussed specific examples of operational changes and improvements in Japanese refineries that do not

require capital investment, again with an emphasis on small-group activities, TPM, and other unique initiatives developed in Japan.

In the latter half of the program, we introduced pinch technology, a tool that is used to analyze system design in the rearrangement of a heat exchanger. We also covered topics that provided a foundation for studying specific cases the next day at a refinery.

(3) Day 3: Energy Saving in the Refinery 2 (Large Investments) / New Energy Saving Technologies

On the third day, we explained about capital investment projects for energy conservation that are being implemented in refineries, and the profit of such projects. In response to lectures on the plot and layout of actual heat exchangers and the reliability and safety of additional equipment, the participants also introduced their experiences at TAKREER. JCCP lecturers and TAKREER participants thus actively exchanged opinions and engaged in interactive discussions with each other.

In the latter half of the day's program, we talked about the introduction status of the latest equipment in refineries, and proceeded to describing the details of such equipment. Since there were a number of power plant engineers among the participants, we hastily arranged a lecture on IGCC (Integrated Gasification Combined Cycle), which captured the participants' attention and gained their appreciation.

Information on high-efficiency heat exchangers that incorporate the latest technologies was also a source of strong interest among the participants.

(4) Day 4: Group Discussion on Energy Saving in the Workplace

On the fourth day, we provided a forum for group discussions on designated energy-saving issues. Adopting a method commonly used in TQM, TPM, and various other management practices, each group identified a specific issue they face in their workplace, analyzed its causes, and gave a presentation on improvement measures or future visions regarding that issue.

As a summary of the constructive ideas that emerged from the discussions, we emphasized four important points and then wrapped up the session. The four points were: (1) the development of operators who read manuals carefully and think for themselves; (2) encouragement of small-group activities; (3) the necessity of risk management when considering an operational change; and (4) constant efforts to make improvements using the PDCA (Plan, Do, Check, Act) cycle.

After the final discussion session, many participants articulated their appreciation of the seminar. By participating in the seminar, they said they obtained knowledge and information for resolving problem areas in their workplace, and were inspired by the exchange of views with participants from fields other than their own.

The stronger-than-expected positive feedback from the participants has in turn inspired us to incorporate such discussion sessions in other seminars as well.

(5) Day 5: Energy Saving Using the Computer / Examples of Optimization Using Computers

In the first part of the day's lecture on energy saving using the computer, we provided the basics of PID (Proportional-Integral-Derivative) control, MPC (Model Predictive Control), APC (Advanced Predictive Control, and RTO (Real Time Optimization). We explained their differences and introduction methods in an easy-to-understand manner in relation to the various controls needed to drive a car, as an example.



Presentation of the completion certificate

In the second part of the lecture, we introduced a case example in which APC was introduced to optimize operations in response to changes in needs regarding multi-boiler and power generator utility systems. In the example, the introduction of APC also contributed to reducing the manpower needed to switch between steam, electricity, and fuel operations.

5. Reflections

At the end of the seminar, the participants were asked to fill in an evaluation sheet and give their impressions and opinions of the seminar. As a result, we received many opinions concerning the group discussion session. It was the first attempt of its kind for us lecturers, but it was a new experience for the participants as well. They said that the opportunity to hold a discussion with members from the same workplace, followed by a discussion with groups of participants from other workplaces, was extremely interesting and meaningful.

At the closing ceremony, we received kind words of appreciation from Mr. Ahmed Herzallah, Senior Career Development Officer, and Mr. Anwar M. G. Al Mutawa, Senior Training Officer. (Mr. Al Mutawa is also the gentleman who undertook all of the necessary preparations for the seminar as our counterpart in TAKREER.) Mr. Ahmed M. Al Gattan, Director, Training & Career Development, also attended the ceremony to confirm the participants' reaction to the seminar, and both the TAKREER and JCCP sides were gratified by the participant's extremely high evaluations of the seminar.

The participants, many of whom attended a JCCP program for the first time through this seminar,



*Mr. Ahmed M. Al Gattan, Director,
Training & Career Development (seated center),
at the TAKREER Head Office*

expressed their wish to also attend a JCCP regular course in the future.

After the seminar, we visited the TAKREER Head Office to assess the results of the seminar and discuss future plans. We also paid a courtesy call on the Japanese Embassy in UAE, where we gave a report on the seminar, as well as received invaluable information on current issues in Abu Dhabi.

In sum, the recent seminar convinced us that the continuous implementation of joint seminars with TAKREER would further strengthen our two organizations' long-standing relationship and contribute to enhancing mutual understanding.

Duly realizing that the implementation of such seminars is made possible by JCCP member companies and cooperating companies inside and outside of Japan, we would like to extend our deepest appreciation to everyone who gave us their cooperation in the planning of the recent seminar through to its implementation.

<by Tetsuji Kubota, Training Dept.>