



STUDY & BUSINESS MISSION TO JAPAN FOR WATER AND WASTEWATER TREATMENT SYSTEMS

MAY 2017

ORGANIZED BY



ABDULLAH AMMAR, I ABDULLAH AMMAR, I
الجمعية العربية السعودية للبيئة المائية
Saudi Arabian Water Environment Association



Japan Cooperation Center
for the Middle East



1. MISSION AT A GLANCE

The Saudi Arabian Water Environment Association (**SAWEA**) and Japan Cooperation Center for the Middle East (**JCCME**) organized a study and business mission for water and wastewater treatment systems in Japan. The purpose of this mission is to provide information on state-of-art technologies related to water and wastewater treatment and operation in Japan for water quality professionals working in the Kingdom of Saudi Arabia. The tour was scheduled from May 14 to 23, 2017 in two different Japanese cities (Osaka and Tokyo). It included site visits to local government agencies, private factories and research centers related to water treatment.

On the first day, the team visited the **Center for Membrane and Film Technology** in Kobe University. This center is the largest center in the world focusing on membrane and thin film technologies.

On the second day, the team visited **Hirano Wastewater Treatment Plant** managed by Osaka City Public Works Bureau. The team also conducted a training-based visit to **Osaka City Municipal Training Center** where the team members are trained on the latest technologies in water leak detection systems & leak repairing techniques.

On the third day, the team attended the **1st B to B Meeting** in Osaka where the meeting was attended by (6) Japanese companies specialized at several areas related to water and wastewater treatment e.g (RO Membrane, Pumps, Desalination Technologies and Leak Detection). The team also visited at the same day the **Green Front Sakai** where they get exposed to the TSE utilization for both industrial and municipal usage.

During the fourth day, **Toyobo** arraigned for a very interesting and joyful tour at Iwakuni city, followed by a visit to **Toyobo plant** where the team was introduced to several presentations that focus on RO and FO membrane technologies.

On the fifth day, the team was hosted by **Yokogawa Electric Corporation** and received a comprehensive overview about SCADA and plant control systems. Followed by another visit to **Hitachi** where the team benefited from a very promising technology in underground network management.

The team left Osaka and arrived Tokyo at the fifth day and spent their holiday touring its beautiful attractions before commencing the program on the 8th day by visiting **JFE Engineering** to capture a very interesting information regarding JFE Forward Osmosis (FO) desalination technologies including a visit to a pilot FO desalination plant.

On the 9th day, the **second B to B meeting** was held in Tokyo attended by (5) companies. After the meeting, the team celebrated the accomplishment of SAWEA Japan mission with JCCME and attendance certificates were disseminated to the mission members. During the ceremony, Nidhal Al-Dossary, SAWEA President, expressed his deep thanks and appreciations to JCCME and the company's representatives for such a great, informative and beneficial mission. He also invited all water professionals to effectively participate in the upcoming Water Arabia conference which is planned to take place on October 2017.

Finally, the team had visited the Ministry of Economy, Trade and Industry (METI) where the team was greeted by Mr. Koichi Inoue, Director for Projects Coordination, and had a brief discussion about the team impression and comments regarding the mission.



To conclude, this mission to Japan provided the SAWEA members with valuable knowledge about water treatment and utilization of treated water, and Japan's efforts for effective utilization of sludge. It also helps Japanese companies to gain more understanding of the Kingdom needs for water sector. This hopefully will increase the collaboration between Japan and Saudi Arabia to develop water industry and protecting environment.



Group Photo: Mission Opening Ceremony Hosted by JCCME



2. ABOUT SAWEA

SAWEA is a non-profit organization founded on January 1, 2002 by a group of professionals working in Saudi Arabia in water and wastewater treatment. The Objective of SAWEA is to **preserve and enhance water quality in Saudi Arabia and the world.**

SAWEA is a professional self-directed group, predominantly within Saudi Aramco. The main sponsors of the association are the Saudi Aramco Utilities & Technical Support and Environmental Protection Departments. In addition SAWEA is the official local chapter of the International Water Environment Federation (WEF), which is the largest Water Association in the world.

3. ABOUT JCCME-JAPAN WATER DESK

The objective of JCCME is to contribute to the promotion of Japan's cooperation in the areas of trade and investment for the furtherance of industrial and economic development in countries in the MENA region. JCCME has set up a Water Desk in Jeddah to promote Japanese investment and technology transfer on water projects in Saudi Arabia. The Japanese Water Desk (JWD) was set up in early March 2005 at the premises of the Jeddah Chamber of Commerce.

The objective of JWD is to support promotion of technology transfer and direct investment from Japan to Saudi Arabia in the private sector in water resources and related projects.



4. MISSION TEAM

Below are the SAWEA members who participated in this mission trip:



Nidhal S. Al-Dossary



Mohammad H. Al-Abdulatif



Sultan R. Al-Shaifan



Mahmoud A. Al-Moaikel



Faisal I. Al-Shukri



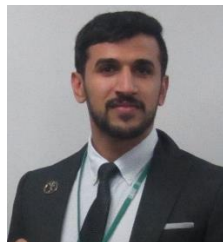
Subhi Al-Aama



Mohammad A. Al-Falah



Ali S. Al-Ghamdi



Ibrahim Al-Nemer



5. MISSION AGENDA

May 14, 2017	Arrival to Osaka - Japan
May 15, 2017	Center for Membrane and Film Technology at Kobe University
May 16, 2017	Hirano Wastewater Treatment Plant Osaka City Training Center
May 17, 2017	B2B Meeting Green Front Sakai
May 18, 2017	Toyobo (Iwakuni Plant)
May 19, 2017	Yokogawa Hitachi Ltd.
May 22, 2017	JFE Engineering (Yokohama)
May 23, 2017	B2B Meeting Ministry of Economy, Trade and Industry

6. OVERVIEW OF SITES VISITS

CENTER FOR MEMBRANE AND FILM TECHNOLOGY

The Center for Membrane and Film Technology was founded by the KOBE University. This center is the largest center in the world focusing on membrane and thin film technologies. This research center covers wide range of research and development from highly functional membrane and films to novel processes for producing them with the aid of material chemistry and chemical engineering. This center consists of the following four education and research groups.



- **Functional Organic Thin Films Group:** Current research activities include preparation and characterization of organic thin films and basic research of molecular nanotechnology.
- **Functional Catalytic Materials Fabricated in Thin Films and Membranes:** This research group aims for the developments of novel catalytic materials with high functions by synthesizing monolayer of active components or by combining nano-catalytic particles with micro- or mesoporous thin film layer to expect a new catalytic function or molecular sieving function, respectively, for hyper active and selective catalytic performance.
- **Functional Separation Membranes:** Research/education include the preparation of various types of porous membranes by phase separation methods as well as quantitative clarification of structure formation mechanism. In addition, gas separations for various systems by facilitated transport membrane using carrier are also targets in this research group.
- **Manufacturing Processes for Thin Films:** This research group aims for control of micro and/or nanostructure of thin films to have highly efficient function by coating and drying process engineering.

Non-Business Use



HIRANO WASTE WATER TREATMENT PLANT

Hirano Wastewater Treatment Plant was built in 2014 with the concept of producing solid fuel (carbonized fuel) from sewage sludge which will lead to reduce the environmental impact of using conventional fuel sources. The project was implemented under the PFI concept (Private Finance Initiative) where the contractor is responsible to operate, manage and maintain the facility during the concession period (20 years).

During the visit, the team listened to a brief presentation followed by a visit to the plant which is producing a total of 8558 tons of carbonized fuel per year. The ultimate product of the plant (carbonized fuel) is transported and sold to power plant for electricity generation and to municipality as well for asphalt production.



Hirano Wastewater Treatment Plant



Team Group Picture

EXPERIENCE-BASED TRAINING CENTER IN OSAKA MUNICIPAL WATERWORKS BUREAU

The design and construction of the Osaka municipal training center was commenced in 2007 and completed in April 2012. The aim of the center is to passing-on the technical know-how of waterworks utilizing a new experience-based training facility. The center provides three levels of training: new hired training, compulsory level training and case study level training. The center had trained more than 2700 personnel in year 2016.

During the visit, the team was involved in a real hands-on training experience on utilizing leak detection devices such as correlation type water leak detectors, sounding sticks and





pipeline and cable detectors. The visit also includes a real scenario based training on the repair methodology of leaks on service pipelines.



The mission team “hands-on” training on leak detection devices and leak control methodology





OSAKA B2B MEETINGS

On May 17, 2017 the 1st B2B meeting was held in Osaka attended by (6) Japanese companies from the water and wastewater industry. The meeting commenced with an opening presentation by SAWEA President Nidhal S. Al-Dossary. The short presentation illustrated SAWEA mission, objective and initiatives including the upcoming Water Arabia conference which will be held in Al-Khobar on October 2017. He also emphasized on potential investment opportunities for Japanese companies in the water sector in Saudi Arabia. The meeting was held with the active participation of the following companies:



1. Fuji Tecom Inc.
2. T.Chatani Co. Ltd.
3. Kuraray Co. Ltd.
4. Toyobo Co. Ltd.
5. Hanshin Engineering
6. Horiba





GREEN FRONT SAKAI: TSE UTILIZATION PLANT

This visit was organized by Kobelco Eco-Solutions and its partner Sojitz Corporation. During the visit, the team was introduced to three companies. **Kobelco** illustrated its business domain and both municipal and industrial wastewater technology. Also, it highlighted its sludge digestion system. The presentation was concluded with Kobelco's experience in the Middle East which includes completed projects for QATAR STEEL CO. and MODON.



Sojitz Corporation was the second company introduced to the mission team. The Managing Director presented the company's full domain and business divisions which includes Metal, Chemicals, Energy and Infrastructure Business.

Sankyu concluded the presentation highlighting its plant maintenance service and model. Followed by their completed projects in the Middle East with YASREF, PETRO RABIGH and SATORP.

The visit was concluded by a visit to the Advance Treated Water Recycle Center. By the end, SAWEA President and the team expressed their appreciations to the all three companies for the rich information and valuable experience shared with us.

TOYOBO

On May 18, the team visited Toyobo plant located at Iwakuni. The visit started with a short tour organized by Toyobo to Iwakuni main attractions. Followed by a visit to the plant. During the visit, Toyobo briefed the team with regards to its latest membrane technology and the both produced types: Hollow Fiber and Spiral Wound. Most of Toyobo membranes in Saudi Arabia are used by SWCC in multiple projects from 1989 to 2014 which leads to establishing the Arabian Japanese Membrane Company, the first RO membrane manufacturer in Saudi Arabia.



Additionally, the team was introduced to Toyobo's application of Forward Osmosis (FO) which is a promising technology that has many advantages headed by reducing power consumption.

With Toyobo management at the membrane manufacturing plant

Non-Business Use



YOKOGAWA

Yokogawa is a Japanese electrical engineering and software company, with businesses based on its measurement, control, and information technologies. It has a global workforce of over 19,000 employees, 84 subsidiary and 3 affiliated companies operating in 55 countries. During the visit, the team was exposed to the solutions that Yokogawa offers to improve the reliability of water plants. In addition to the SCADA systems. The visits include a special tour at Yokogawa training center where the team observed the technical training environment on Yokogawa designed control systems.





Left: The team is listening to a presentation about Yokogawa plant management and control systems. Right: The team is visited the SACAD Training Center



HITACHI

Hitachi is a Japanese company established in 1920 & it's headquarter is located in Tokyo. It has more than 330,000 employees and 1040 affiliates. The company is operating in various business sectors such as IT, Automotive, Social Infrastructure, Electronic Systems and Construction Machinery.

The team was introduced to two major segments of Hitachi business: Water Solutions and Hitachi Pumps. Hitachi presented its long-tracked record on delivering projects in multiple locations. The projects cover Sewage Treatment Plants, Pump Stations and MBR-RO Wastewater Recycling Systems.

Non-Business Use



Also, Hitachi introduced the Pipe Network Management System which support the operation and maintenance of underground networks. This system is fully integrated with monitoring sensors and leak detection devices which gives the ability of controlling leaks and minimizing service interruption.



JFE ENGINEERING

JFE Engineering is a branch of JFE Holdings, established in 1912 as a steel manufacturing company and expanded its business to cover multiple sectors. JFE has more than 9000 employees and operating widely at the GCC region in several locations at Khobar, Jeddah, Kuwait, Dubai and Abu Dhabi.

The company is providing various water related technologies in Water Purification, Water Piping, Sewage Treatment and Sludge Treatment.

During the visit, the team was briefed regarding JFE attempt to introduce Forward Osmosis (FO) desalination system into refineries. Followed by a presentation about the latest FO desalination technology using thermo-sensitive polymers and NF membranes. The visit was concluded by a visit to the pilot plant that illustrates the technology.



Left: The team attending a technical presentation delivered by JFE Engineering, Right: Group picture with JFE management.



TOKYO B2B MEETINGS

On May 23, 2017 the 2nd B2B meeting took place in Tokyo attended by (5) Japanese companies from the water and wastewater industry. The meeting commenced with an opening presentation by SAWEA President Nidhal S. Al-Dossary. The short presentation illustrated SAWEA mission, objective and initiatives including the upcoming Water Arabia conference which will be held in Al-Khobar on October 2017. He also emphasized on potential investment opportunities for Japanese companies in the water sector in Saudi Arabia. The meeting was held with the active participation of the following companies:

1. Asahi Kasei Corporation
2. Marubeni Corporation
3. Toray Industries Inc.
4. Yokogawa Electric Corporation
5. Kubota Corporation

VISIT TO MINISTRY OF ECONOMY, TRADE AND INDUSTRY (METI)

On the last day, the team visited the Ministry of Economy, Trade and Industry (METI) and met Mr. Koichi Inoue, Director for Project Coordination. During the meeting, Mr. Inoue greets the team and discussed the mission and its potential outcome. He has also acknowledged the importance of the Saudi-Japanese business relationship with regards to water and wastewater sector.



He also expressed his understanding and respect to Saudi Arabia 2030 Vision which was heavily discussed with Japanese companies during King Salman's visit to Japan.

He was also interested about knowing the potential opportunities in Saudi Arabia with regards to water business. Mr. Mohammad Al-Abdullatif, SAWEA Director has expressed SAWEA interest in Forward Osmosis (FO) technologies and highlighted its promising future in Saudi Arabia in desalination projects. Also he requested METI to encourage the Japanese companies to consider the investment in water manufacturing opportunities in Saudi Arabia.



Left: SAWEA team meeting METI Director. Right: Group picture with METI staff

Non-Business Use



7. CONCLUSION

In conclusion, the mission offered the participants an opportunity to see and experience some of the best practices in water and wastewater treatment and management. It was a very informative mission. It helped the mission's participants to gain more knowledge about water and wastewater treatment methodologies & new technologies which can be implemented in the organizations of participants. On the other side, it helped Japanese companies to have more understanding of the Kingdom's needs in the water sector. Hopefully, this will increase the collaboration between Japan and Kingdom of Saudi Arabia to develop water industry in the Kingdom of Saudi Arabia as well as protecting our environment.

SAWEA would highly recommend such missions to Japan. Finally, SAWEA would like to thank JCCME for the arrangements made to make this trip a very valuable experience, especially Masaki Nishida and Taiji Horiuchi from JCCME Planning and Development Department, Go Takeuchi representative of Japan Water Desk and Waleed Bushara the Manager of Japan Water Desk in Jeddah.