

RO Plant Troubleshooting

21-22 AUGUST 2017, VIVA GARDEN HOTEL, BANGKOK

Organized by **Utility Technology Institute @ TechnoBiz**

Event Code: **UTI-17-003**

This 2-day training course is aimed for RO Plant operators and consultants to learn about operational and design problems involved with RO Plant. The course is suitable for both experienced and inexperienced people. Participants should have basic understanding on water treatment principles and membrane principles. The program will be conducted in ENGLISH only. Participants are encouraged to bring their operational problems issues with pictures and relevant data to discuss with instructor.

Program Outline

1. RO Fundamentals

- What is Osmosis & Reverse Osmosis?
- What are the factors affecting separation

2. RO Membranes

- Membranes Ratings
- Salt Rejection
- Flux
- Typical Element specification sheet
- Effect of time & temperature
- Spiral wound module construction demonstration
- (Explain Permeate back pressure, brine seal, out/inside adapters, brine spacer)

3. RO Operating Parameters

- Flow – Feed, Permeate, Reject (Recovery)
- Concentration - Salt Passage, Salt Rejection
- Recovery and concentration factor
- Effect of high recovery
- Pressure - Feed, Reject, Permeate (Show membrane element again for ΔP & FP)

4. RO System - Construction

- Arrays (Max & Min Limiting flows)
- Reject staging
- Permeate staging
- Conductivity, Pressure, Flow and pH variation in system

5. RO Pretreatment Monitoring

- Feed water limiting conditions
- pH
- Temperature
- Turbidity
- Silt Density Index (SDI)
- Organics
- Micro-biological matter
- Oil & Grease

- Oxidising Agents
- Chemicals and Heavy metals

6. RO Performance Monitoring – Data Normalization

- Objective
- Principles
- Quality, flow and pressure drop
- Spreadsheet use
- Evaluation and Decisions

7. Scaling, Fouling, Membrane Damage and Chemical Cleaning

- Scaling (Potentials – LSI, SDSI; CaCO_3 , $\text{Ca}_3(\text{PO}_4)_2$, CaSO_4 , BaSO_4 , SrSO_4 , CaF_2 ; Silica)
- Fouling – Membrane fouling and Spacer fouling (Silt Density Index; Iron, Manganese; Biological; Silt (colloidal); Organic; Oil)
- Membrane Damage
- Identifying fouling condition
- Element examination procedure
- Testing of returned element
- Membrane autopsy

8. RO Process – Troubleshooting

- Increased normalized salt passage (Profiling / Probing)
- Reduced normalized permeate flow
- Increased normalized pressure drop
- Increased normalized permeate flow
- Principles – Record keeping
- Data collection
- Investigations
- Corrective actions
- Membrane replacement
- Preventive actions
- Case studies



Program Instructor: **Satish Chilekar**

Mr. Satish Chilekar, Water Management Advisor, will deliver this course. Recognized as a pioneer in the Indian membrane technology sector, Mr. Chilekar provides technical expertise to industries and utilities in applications of membrane technology. This includes reverse osmosis, nanofiltration, ultrafiltration, microfiltration and MBR membrane technologies applied for seawater desalination, potable water treatment, and industrial and municipal wastewater reclamation. Mr. Chilekar is currently active in research, consultancy and training work in India and SE Asia. Training is an important part of Mr. Chilekar's work. He conducts regular training courses around the world on various aspects of Membrane Technology and Water Treatment.

Registration Fee / Participant

- 850 US\$ (Overseas Delegates)
- 25,000 Baht (Thailand Delegates)

Remark: Payment is required with registration. The registration fee includes conference documentation, lunch and refreshments. VAT 7% applies on above registration fees.
Group Registration: Register for 3 delegates from the same organization, 4th delegate participation is FREE.

To Register, please contact

Utility Technology Institute

TechnoBiz Communications Co., Ltd.

2521/27, Lardprao Road, Khlongchaokhunsingha, Wangthonglang, Bangkok 10310 Thailand

Tel: +66-2-933 0077 **Fax:** +66-2-955 9971 **Mobile:** +66-81-988 6874

Email: training@technobiz-asia.com **Web:** utility-technology.org

Contact Person: **Khun Sirinthip, Program Coordinator**