

TRAINING OF TRAINERS PROGRAMME ON CAPACITY DEVELOPMENT OF ETP OPERATORS

Promotion of Sustainability in the Textile and Garment Industry in Asia - FABRIC



Day 1: Presentation 1

Need for Training For ETP Operator & Expected Outcomes

What is an ETP?



An ETP is the facility to treat wastewater: to remove pollutants to required levels before discharge.

ETP employs physical, chemical and/or biological treatment.

Removes pollutants like BOD, COD, TSS, metals etc. and make the pH neutral.

Depending on degree of treatment wastewater can be recycled and reused.

Who and What is an ETP operator?



- An ETP operator is the one who operate, maintain and monitor the ETP.
- ETP operator works in three shift and senior ones in general shift.
- The ETP operator is the most important person in the ETP. A bit **carelessness can destroy entire functioning of an expensive ETP.**
- Background of an operator can be varying from basic to technical qualifications.
- Sometimes operator also act as maintenance technicians, laboratory assistant and stand-in for the ETP manager.

Why does the operator needs training?



- Investments in ETPs in South Asia is > 85 billion USD. 9 billion USD is spent annually to operate these plants.
- 92% of these plants underperforms. <45% performs with 50% of designed efficiency, about 35% does not function at all!
- A non-performing ETP would be a waste of money, energy and does not ensure legal security.
- Design mistakes account for 17% failures, 29% due to wrong/substandard construction and 51% of the ETP failures are due to bad operation.
- Few are deliberate operational failures
- Majority of the bad operation practices are due to inefficient, unqualified and/or untrained operators.

Why does the operator needs training?



- Discharge of improperly treated effluents contaminates huge amount of fresh water.
- Contamination of water bodies affect **livelihoods of millions**.
- Operationalising the non-functional ETPs through effective training of operators would save huge amount of money,
- Industry achieve **legal security** & environment protected.
- Buyers and their customers assured of environment protection.
- Many ETP personnel die not knowing Safety practices in ETP.
- In future, ETP operator need qualification as per **ZDHC**.

Why we do not see many ETP training programs?



- Despite benefits, ETP training programs seldom successful.
- Employer's reluctant to sponsor, fresh students are not interested to enrol and few qualified personnel seek job elsewhere.
- Lack of interest from Employers - (a) lack of awareness & seriousness, (c) fear of increase in salaries, (d) fear of trained person leaving and (f) fear of increase (!!) in O & M costs after training.
- Employees reluctant: loss of holidays, extra effort.
- Insufficient value of degree offered - unlike a Diploma or Degree, a certificate course may not add value to trainee's resume.
- Situation is changing : Greater awareness, increased pressure for ETP performance, stipulation by agencies like ZDHC.

Challenges in ETP training programs

- **Structuring the program** : finding time for working Operators.
- **Divergent background of Trainees** : engineering, science or even nothing! Too much or too little qualification
- Divergence of topics to be covered : from mech/electrical engineering to chemistry to biology to OSH.
- Baseline difficulties : a novice may lack any background, an already employed person may find it boring.
- Lack of training materials, especially in practical levels.
- Lack of good models for practical training: On the other hand, a well operated ETP may not like getting their facility converted to a test ground, especially if there is occasional gaps.

Challenges in ETP training programs

- **Redundancy** : environment laws are getting stringent and treatment schemes more sophisticated every year.
- Trainers may also need constant updating.
- **Varying nature of treatment in ETP** : each industry has unique treatment need.
- **Team effect affecting results**: negligence of untrained operator negate performance - need to train the entire staff.
- **Widely varying level of trainees**: operator in a large ETP may be an engineer, one in a small ETP a casual labour.
- Keeping the ETP operator away for long period for training might affect the ETP operation.

Then Why should we strain to organize ETP training?

1

It is a National interest : every trained operator results in preservation of our most important resource : water!

2

It is challenging task, far more than the routine academic work.

3

It could be a life saver : even if one person is saved from an accident due to the training, it is a big achievement.

4

A well operated ETP means better image with public, compliance with DoE (security), satisfying buyers (more business)

What should be training goal?



- Trained Operator should know function of each ETP unit, **process control**.
- Should teach operation & maintenance aspects and **monitoring** of ETP components.
- It should convey the **basic safety precautions** he should observe.
- It should give him idea of necessary **first aid**.
- It should impart the idea of basic essential **repairs and trouble shooting**.
- The task of **record keeping** at an operators level should be explained
- Empower him to monitor the operation.

Trainee options



Already
Employed



Fresher

Pros

- Surety of being employed, the training does not go waste!,
- Has some idea on the ETP already, no need to start from scratch,
- Can get sponsorship from employer.

- Shall be open to training,
- Has interest to learn,
- Possible to select candidates of desired background,
- shall be available for sufficient duration.

Cons

- May not have adequate background,
- May not be available for long time/too far from work place and
- May not be very open to learning.

- Unless course is rewarding, could be reluctant to spend time & money
- May lack any understanding of subject
- May not chose the field after training.

QUIZ

In your opinion, in a day, how much water is used in total by the textile industry of Bangladesh?



Benefits from the training



- Operators will understand proper ETP operation, not just switch on or switch off pumps and machines.
- Operator will start valuing himself, get motivated once he realize the importance of ETP.
- Better process control & efficiency once he knows **why** he is doing a particular action.
- He will know basic principle of different operating units.
- Getting trained on basic **spot-checking** (e.g. jar tests, MLSS settling, pH or DO).
- Operator may meet ZDHC criteria better.

Expected outcome of training program

- Creation of a pool of qualified operators for managing the effluent treatment plants in Bangladesh.
- To enable the operators to meet the knowledge criteria as suggested by the ZDHC guidelines.
- To instil confidence in operator & motivate him to do job of operator more effectively.
- The operator will know what they should do in the ETP and more importantly, what they should not do.
- Safer ETP operations with less accidents.
- Better management of operational failures with trouble shooting.
- More economical operation of ETPs in textile sector.

What is ZDHC and their guidelines?



- ZDHC stands for zero discharge of hazardous chemicals.
- ZDHC is a group of apparel brands and retailers working together to lead the industry towards zero discharge of hazardous chemicals.
- ZDHC specified guidelines for operator qualification levels divided into multiple categories,
- Levels 1 through 5, and Levels 1A, 2A, 3A, 4A, and 5A
- The qualification based on ETP complexity. A score card is prepared for calculating the score.
- Complexity score is based both on ETP capacity and its units.

What is ZDHC and their guidelines?



- The Z-category exists for the most-experienced operators at Level 5 who work on zero liquid discharge systems.
- For an operator to qualify at higher level, they must satisfy all the requirements of the lower qualification levels.
- Each level of 1-5 have an advanced level too (1 and then 1A, 2 and then 2A and so on).
- Operator qualification as per the above levels awarded based on demonstration of knowledge levels.
- Demo of knowledge levels will be determined based on the number of years of hands on experience an operator.

What is ZDHC and their guidelines?



- Candidates with formal education is considered as additional years of experience.
- For instance, a 4 year bachelors science degree is considered equivalent to two years' experience.
- In future **every ETP operator qualifies** based on this guidelines: to be eligible for appointment or continuation in the job.
- For this he should submit qualification format & undergo a multiple choice knowledge test.
- The curriculum of the 12 day operator training program is aimed to meet ZDHC requirements.

Course outline



- Focus entirely on the operators' work in the ETP.
- The program will cover the following topics:
 - ✓ General ETP scheme
 - ✓ Primary treatment
 - ✓ Secondary treatment
 - ✓ sludge management
 - ✓ Monitoring
 - ✓ Safety & health
 - ✓ Trouble shooting
 - ✓ Tertiary treatment & membrane based treatment
- Each treatment stages explained with details of unit, function, operational steps, maintenance, do's ad don'ts and record keeping.
- There will be visits to operational ETPs if feasible.

Program for Day-1 & 2



Module 1: Importance of water & effluent management

- **Topic 1:** Need for training & expected outcomes
- **Topic 2:** Importance of water, Need for water in BD textile industry
- **Topic 2:** Legal requirements as per DoE norms,
- **Topic 3:** pollutants & hazardous material in textile effluent

Module 2: Introduction to effluent treatment

- **Topic 1:** Introduction to effluent treatment,
- **Topic 2:** Effluent treatment schemes in Bangladesh,
- **Topic 3:** Optimization of ETP
- **Topic 4:** Standard operating procedures of ETP and
- **Topic 5:** Roles, responsibilities & duties of operator

There will be group discussions, exercises & home works

Module 3: Primary treatment



- Topic 1: Objective, function and details of primary treatment.
- Topic 2: Control of physical treatment.
- Topic 3: Chemicals used in ETP, function of chemicals
- Topic 4: Control of chemical treatment and
- Topic 5 Importance of jar tests and how to fix chemical dosing.

Day 4: Field Visit to an ETP

There will be group discussions, exercises & home works

Module 4: Secondary treatment



- Topic 1: Objective, function and details of secondary treatment,
- Topic 2: Different type of aeration systems and settling units
- Topic 3: Activated sludge treatment
- Topic 4: Biological treatment techniques: aerobic & anaerobic

Also, group discussions, exercises & demonstration of Jar tests

Program for Day-6,7 & 8

Module 5: Sludge management



- Topic 1: Introduction to sludge management
- Topic 2: Sludge dewatering techniques
- Topic 3: O & M of sludge deatering units
- Toipc 4: Reduction of sludge volume.
- Topic 5: Storage and disposal of dried sludge

Day 7 : Visit to an ETP

Module 6: Monitoring of ETP



- Topic 1: Introduction to ETP monitoring
- Topic 2: Sampling of wastewater
- Topic 3: Analysis of effluent
- Topic 4: Record keeping and review

There will be group discussions & exercises

Module 7: Health & safety at work



- Topic 1: Importance of safety & health
- Topic 2: Management of Hydrogen Sulphide
- Topic 3: PPEs, sign boards, safety in handling chemicals.
- Topic 4: First aid practices
- Topic 5: Firefighting

Module 8: ETP maintenance and Trouble shooting



- Topic 1: ETP maintenance, preventive & break down maintenance
- Topic 2: Trouble shooting in primary treatment.
- Topic 3: Trouble shooting in biological treatment
- Topic 4: Trouble shooting in sludge management

There will be group discussions, exercises & home works



Module 9: Tertiary treatment & general operation steps

- Topic 1: Tertiary treatment systems: filtration
- Topic 2: Tertiary treatment: oxidation.
- Topic 3: Operation-rounds in ETP
- Topic 4: Operation-rounds in ETP (part 2)

Module 10: Membrane systems & re-starting of an ETP

- Topic 1: Membrane based effluent treatment
- Topic 2: Safe restarting of ETP

Program for Day-11 & 12



Examination

Written examination to evaluate the ETP operator trainee

Conclusion

- After training, the operator is not another labour, deputed from one section to another - he will be a skilled person.
- It makes him operate the ETP better and more efficiently & cost effectively.
- The knowledge gained would be useful even if he switch job.
- The training would enable him to take precautionary measures against accidents, it will enable him to quickly react to emergencies
- When visitors come to ETP, with the knowledge gained, he can interact more effectively.
- Above all, the feeling of self-importance & professional satisfaction after the training will be a major benefit.



**Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH**

Registered offices
Bonn and Eschborn

Friedrich-Ebert-Allee 32 + 36
53113 Bonn, Germany
T +49 228 44 60 - 0
F +49 228 44 60 - 17 66

Dag-Hammarskjöld-Weg 1 - 5
65760 Eschborn, Germany
T +49 61 96 79 - 0
F +49 61 96 79 - 11 15

E info@giz.de
I www.giz.de