Master Training Program on Water (Water Supply, In-house Processing, End-of-Pipe) in Textile and Garment factories

Promoting Sustainability in the Textile and Garment Industry in Asia (GIZ-FABRIC)

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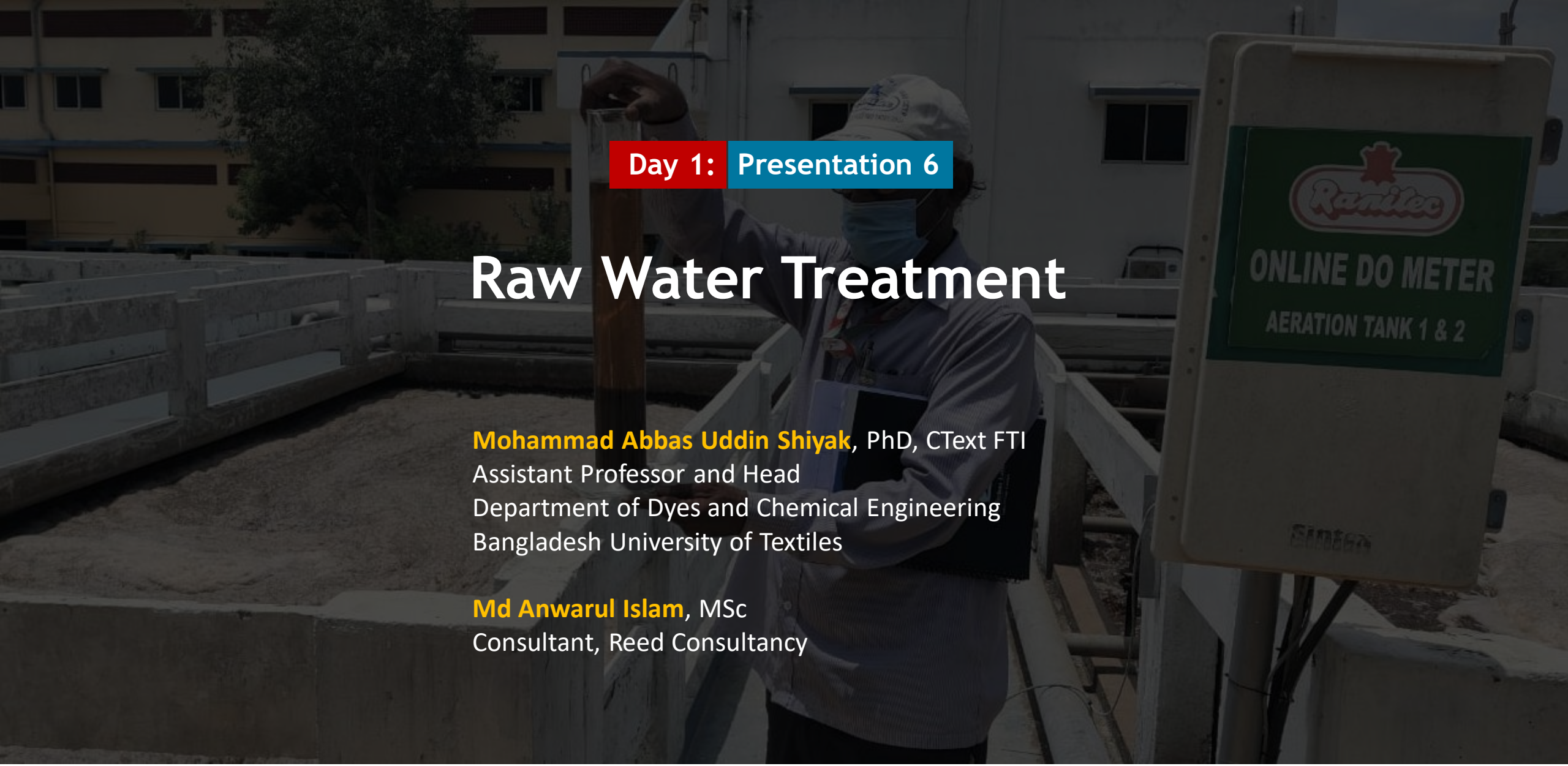
FABRIC Asia



Day 1: Presentation 6

Raw Water Treatment

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Contents

Contents

- Raw water
- Distinguish between technical options for treatment
  - ✓ Pumping
  - ✓ Pre-treatment (softening, pre-process filtration)
- Raw water quality control
- Select suitable or relevant input water treatment options

Raw water

Introduction

Raw water

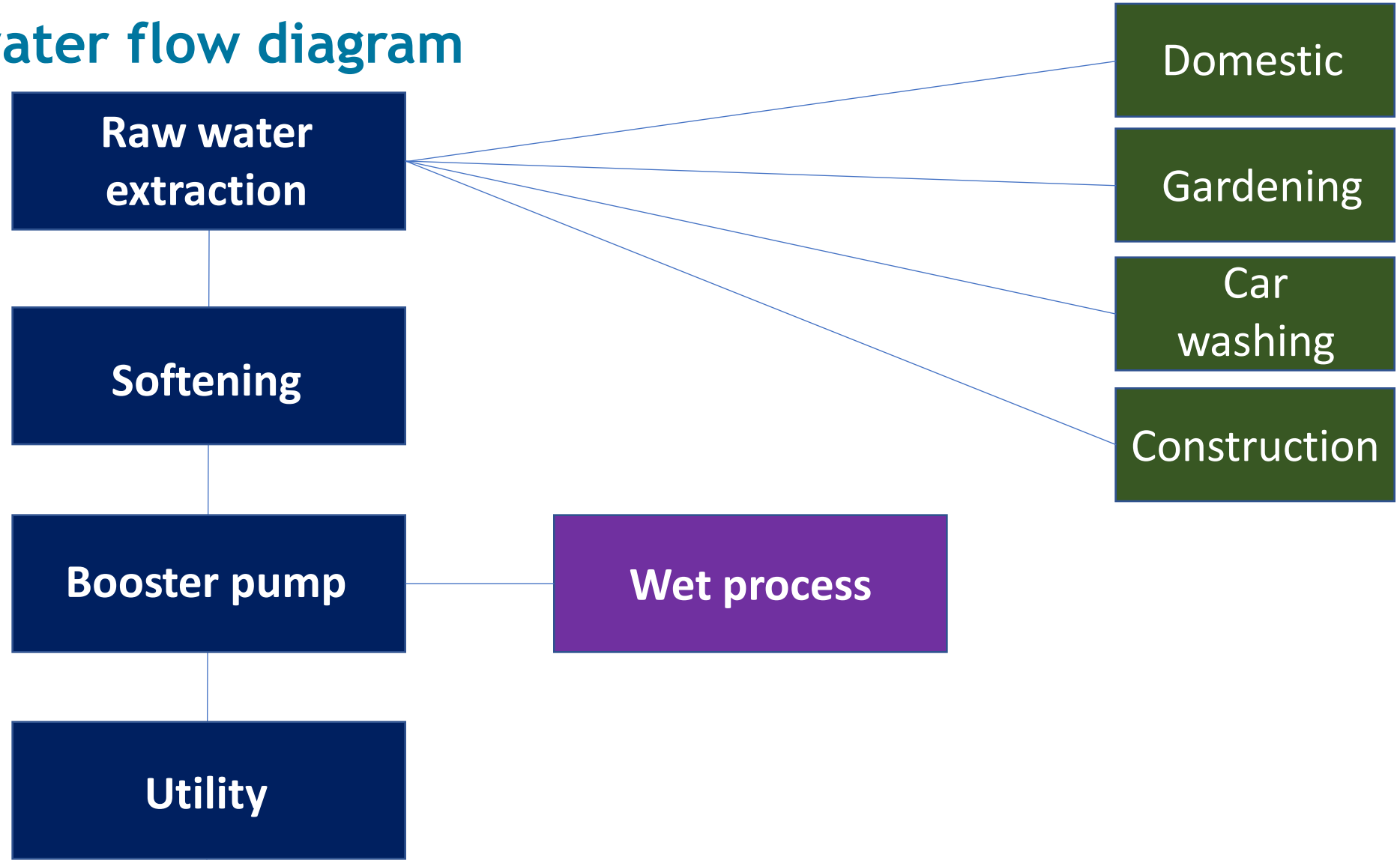
- Green water: Rainwater
- Blue water: Groundwater and surface water
- Grey water: Polluted water

Raw water distribution points

- Extraction
- Softening (if necessary)
- Pumping
- Distribution
- Process water
- Utility
- Domestic
- Others

Raw water

Raw water flow diagram



Raw water quality

Hardness: Prohibit to produce lather or foam

Temporary Hardness

Due to the presence of bicarbonates of Ca and Mg

Can be easily removed simply by boiling

Permanent hardness

Due to the presence of chlorides and sulphates of Ca and Mg

cannot be easily removed

Hardness varies from place to pace

Classification of water hardness

Classification	mg/L or ppm (hardness as calcium carbonate)
Soft	0-17
Slightly hard	17-60
Moderately hard	60-120
Hard	120-180
Very hard	180 & over

Hardness needs to be removed based on process requirement

Problem associated with hardness

- Form scale in the boilers, pipelines
- Cause corrosion
- Reduce dye pickup
- Cause fabric defects
- Required extra soaping agent
- Waste energy and resources

Raw water quality control

Raw water quality control

Hardness: removal

1. Inorganic ion exchange (permutit) method

   Sodium aluminium silicate ($Na_2Al_2Si_2O_8.x.H_2O$) are known as zeolites or permutit

2. Organic ion exchangers (ion exchange resins)

   Organic polymers having –COOH or –SO_3H or–NH^{3+} OH^- groups act as ion exchange resins

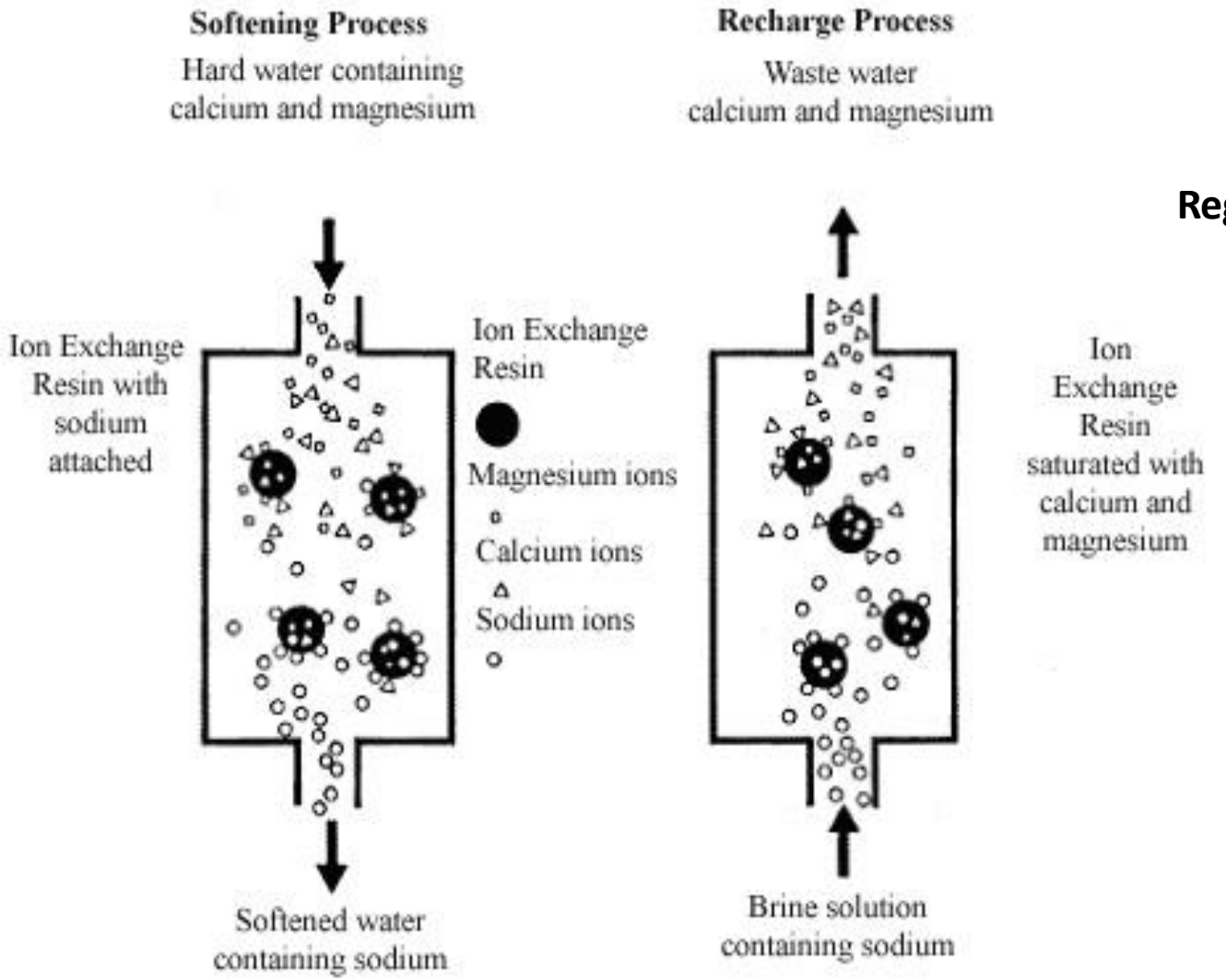
   - Cation ion exchange resin (Resin-H)
   - Anion ion exchange resin (Resin –OH)

Raw water quality control

Hardness: removal

Raw water quality control

Softening process



Regeneration/backwash process

Select suitable water treatment options

Select suitable or relevant input water treatment options

Depends on:

- Degree of raw water hardness
- Hardness type: anions, cations
- Required process parameters: dyeing, steam etc.

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