Sludge Treatment process from textile effluents

Lecture-34
How can sludge be treated

There are many processes for sludge treatment, which fall in the following categories—

1. Conditioning—addition of chemicals or heat treatment to improve separation

2. Dewatering-Separation of solids and water

3. Stabilization- use of biological processes to stabilize organic solids so they can be used as soil conditioners without creating hazards

4. Reduction- reduction of solids to a stable form by use of incineration or wet oxidation
Sludge management

• On an industrial scale the sludge resulting from the dyeing and printing operations of textile mills is managed through destructive methods: land filling practices and incineration.

• Due to the prohibitive cost of sludge disposal most of the textile mills in India dispose of the sludge in agricultural fields, open dumps, along the roadside or railway tracks and poorly designed sanitary land fills which can pollute surface or ground water causing public health hazards.

• Apart from this, such practices entail wastage of organic and inorganic nutrients present in the sludge that might be put to good use
Textile sludge

- In such circumstances, management of sludge in textile industry has now become a burning issue due to its surplus volume and undesired characteristics.

- In such grim scenario, an attempt has been made to effectively dispose of the sludge generated in the treatment units of the textile sectors of India.

- The main objective is to study the suitability of utilizing sludge in the manufacture of bricks.
Production of by-products from textile sludge

• It thus serves two important purposes, namely - efficient management of textile sludge and production of useful by-product, which fetches cash to the industry and a low cost construction material to the public.

• It was proposed that the sludge would be collected from the effluent treatment plant and it would be analyzed to explore its characteristics.

• Then the bricks, made up of this sludge, were tested for water absorption, compressive strength, presence of soluble salts and drop test, and the results were compared with those of ordinary bricks.
Bricks of Textile sludge and cement

• The potential reuse of textile effluent treatment plant (ETP) sludge in building materials.

• The physico-chemical and engineering properties of a composite textile sludge sample from the southern part of India have been studied.

• The tests were conducted as per Bureau of Indian Standards (BIS) specification codes to evaluate the suitability of the sludge for structural and non-structural application by partial replacement of up to 30% of cement.

• However the cement–sludge samples failed to meet the required strength for structural applications.
Just a possibility

• The strength and other properties met the Bureau of Indian Standards for non-structural materials such as flooring tiles, solid and pavement blocks, and bricks.

• Results generally meet most ASTM standards for non-structural materials, except that the sludge-amended bricks do not meet the Grade NW brick standard. It is concluded that the substitution of textile ETP sludge for cement, up to a maximum of 30%, may be possible in the manufacturing of non-structural building materials.

• Detailed leachability and economic feasibility studies need to be carried out as the next step of research.
Textile sludge blocks

- The use of textile sludge in cement can result in reduction in strength, and so the investigation considered both structural and non-structural building components.

- The sludge was used in cement concrete flooring tiles (BIS, IS: 1237:1980), pavement blocks, hollow blocks (BIS, IS: 2185:1980), and solid blocks (BIS, IS: 2185:1980) with 10%, 20% and 30% replacement of cement from the mix.

- Common burnt clay building bricks (BIS, IS: 1077–1976) were also made by partial replacement of composite clay soil with the textile sludge (up to 30%). Various tests were conducted for the developed building materials as per BIS specification codes.