MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION (MUMBAI)

A

Industrial Visit Report

On

"Sugar Factory visit at Palse Nashik "

Submitted by-

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A Report on Industry Visit to Sugar Factory

Date of the Event (DD/MM/YYYY)	01.03.2025	**Duration**	10 :30 am to 1:00 pm
Day of the Event	Saturday	**Venue**	Palse Sugar Factory Nashik
Number of Participants			

1. Introduction

The sugar industry is one of the oldest and most significant industries in India.

During our industrial visit to the Palse Sugar Factory located in Nashik, Maharashtra, we had the opportunity to witness first-hand the various stages involved in the sugar production process.

The factory processes sugarcane to produce raw sugar, ethanol, and other by-products such as molasses.

This report highlights the key processes involved, the plant layout, and the machinery used in the production process.

2. Objective of the Visit

The main objective of the visit was to:

1. Understand the process flow in a sugar factory.

2. Observe the machinery and technology used in sugar production.

3. Learn about the environmental and waste management practices in the sugar industry.

4. Gain insight into the challenges faced by sugar factories.

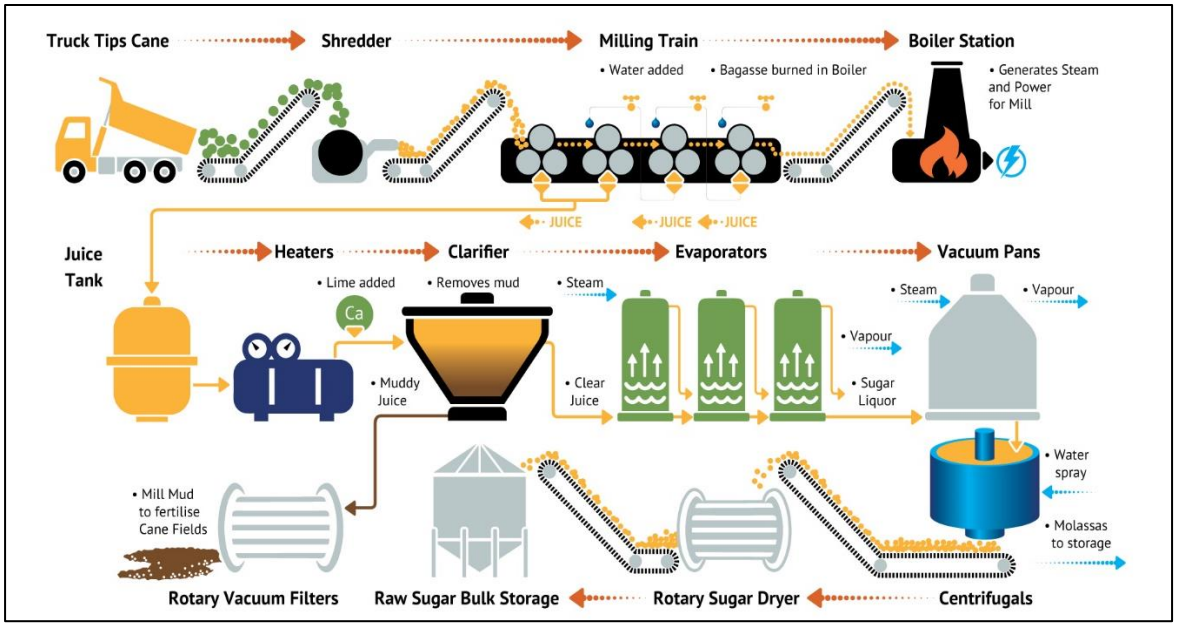
3. Overview of the Factory

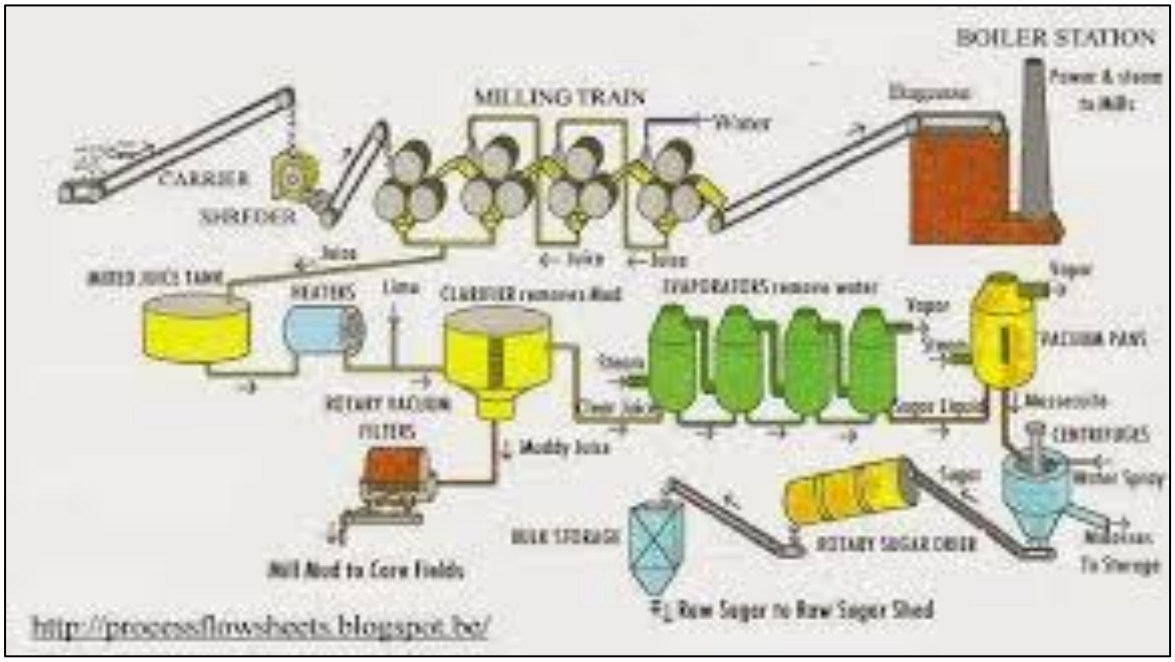
The Palse Sugar Factory is a modern facility with a capacity to crush approximately 5000 tons of sugarcane per day.

The factory uses state-of-the-art machinery and implements modern technologies to ensure high efficiency and quality in sugar production.

4. Process Flow of Sugar Production

The sugar production process at Palse Sugar Factory can be broken down into the following key stages





4.1 Reception and Washing of Sugarcane

The process begins with the arrival of sugarcane at the factory. Sugarcane is transported from the farms to the factory by trucks or tractor trolleys.

The cane is weighed at the factory gate to determine the quantity.

The first step is the washing of sugarcane to remove dirt, leaves, and other contaminants.

4.2 Crushing and Juice Extraction

The washed sugarcane is then fed into crushers (also called mills). These crushers apply mechanical pressure to extract juice from the sugarcane.

The juice obtained from the crushing process is called "cane juice." The remaining fibrous part of the sugarcane, called bagasse, is separated and used as fuel for the boiler.

4.3 Clarification of Juice

The cane juice extracted from the mills contains various impurities, including suspended solids, proteins, and other organic materials.

The juice is treated with lime and heated to remove these impurities through a process known as clarification.

In this stage, lime is added to the juice to neutralize the acidity, and heat is applied to help the impurities settle out.

The clarified juice is then filtered and sent to the next step.

4.4 Evaporation and Concentration

The clarified juice is then passed through evaporators to remove excess water content.

Multiple evaporators are used in a multi-effect evaporation system, where the juice is concentrated into a thick syrup called "evaporated juice" or "syrup."

This syrup will later be processed into sugar crystals.

4.5 Crystallization

The syrup obtained from the evaporation process is cooled and seeded with tiny sugar crystals to promote crystallization.

Crystallization occurs in vacuum pans, where heat and pressure are carefully controlled to form sugar crystals.

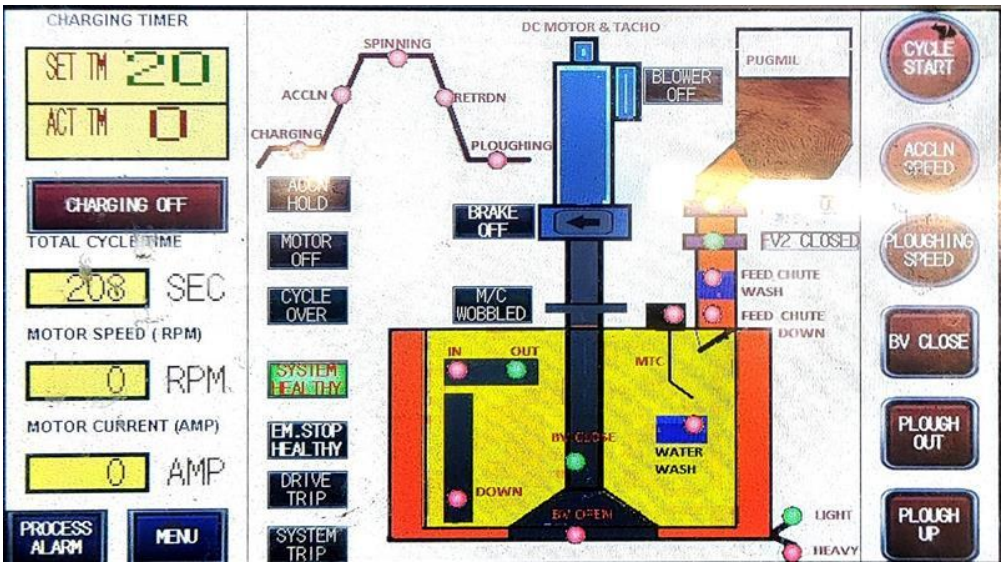
The process is done under vacuum to avoid caramelization of the syrup, which helps in obtaining high-quality sugar.

4.6 Separation of Crystals (Centrifugation)

Once crystallization is complete, the mixture contains sugar crystals and molasses.

The next step is centrifugation, where the sugar crystals are separated from the molasses using a centrifuge machine.

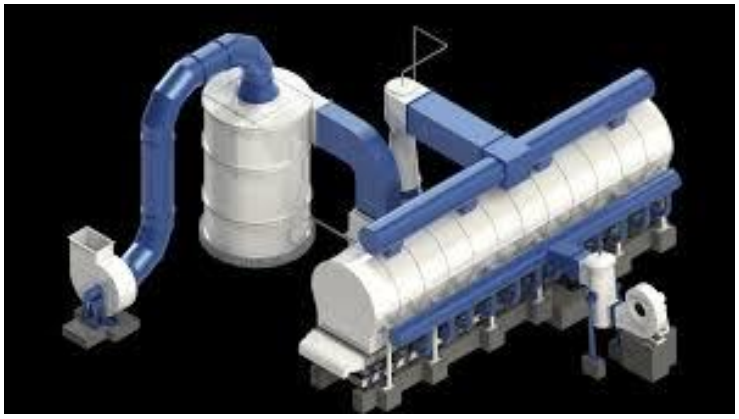
The sugar crystals are washed with water to remove any remaining molasses, resulting in raw sugar.



4.7 Drying

The raw sugar is then sent to the dryer to remove any moisture content.

The dried raw sugar is cooled and packed for shipment or further refinement.



4.8 Refining (Optional Process)

If the factory is producing refined sugar, the raw sugar is further refined.

In the refining process, the raw sugar is dissolved, filtered, and recrystallized to produce white sugar.

4.9 By-product Processing

During the production process, several by-products are generated:

Molasses: This is a thick, dark liquid remaining after the sugar is crystallized. It is often used in the production of ethanol or as animal feed.

Bagasse: The fibrous residue of the sugarcane after juice extraction. Bagasse is often used as fuel in the factory's boilers, which generate steam and electricity to power the plant.

Ethanol Production: Molasses can be fermented to produce ethanol, which is used in the pharmaceutical, chemical, and biofuel industries.

5. Machinery and Equipment Used

Sugarcane Crushers (Mills): These are heavy-duty machines used for crushing sugarcane to extract juice.

Evaporators: These are used for removing water from the cane juice to concentrate it into syrup.

Vacuum Pans: These are used for the crystallization process under controlled pressure and temperature.

Centrifuges: Machines that spin the sugar syrup to separate the sugar crystals from the remaining liquid.

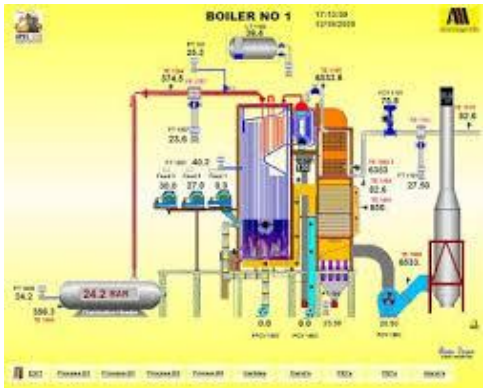
Dryers: Used for drying the sugar crystals.

Lime Treatment Units: Used for adding lime to clarify the juice.

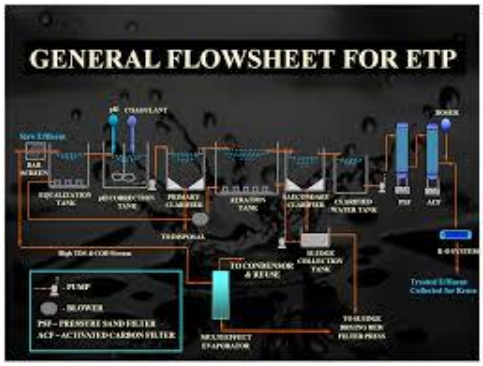
6. Environmental and Waste Management

The Palse Sugar Factory is committed to sustainable practices and manages its waste efficiently. Some of the key initiatives include:

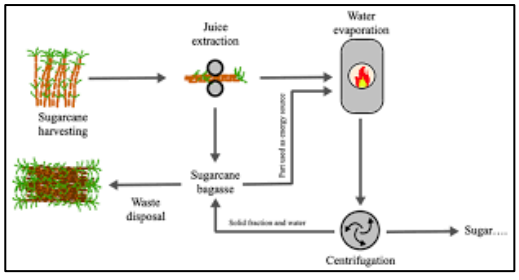
Bagasse as Fuel: The factory uses bagasse as a biofuel to generate electricity, reducing dependence on external power sources.



Effluent Treatment Plant (ETP): The factory has an effluent treatment plant to treat any wastewater before it is released into the environment.



Solid Waste Management: The factory recycles solid waste, and ash from the boilers is used as fertilizer for nearby farms.



7. Conclusion

The visit to the Palse Sugar Factory was an enriching experience, providing us with an in-depth understanding of the complex processes involved in sugar production. The factory utilizes modern machinery and efficient processes to ensure high productivity while maintaining environmental sustainability. The use of by-products like molasses and bagasse helps to minimize waste, making the production process more eco-friendly.

This visit gave us valuable insights into the operational dynamics of a sugar factory, and we were able to witness how each process contributes to the overall efficiency and quality of the final product.

Thank You..!!

Plant Guide Mr. Ganesh Tajanpure.