

**BIHAR ANIMAL SCIENCES UNIVERSITY**  
**BIHAR VETERINARY COLLEGE, PATNA**  
**Department of Animal Nutrition**

**Class: M.V.Sc.**

**Course No.: ANN-603 (Unit-I)**

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**Familiarization of feed mills, layout & operations**  
**(Part-1)**

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# Planning

- ❖ Determine Needs
- ❖ Determine Purpose
- ❖ Design to Requirements



## Operation , material handling & flow

- Plant layout design plays an important part in the design and engineering phases of any industrial facility.
- Ease of operation; avoiding disturbance in material flow i.e. raw material & finish goods, sufficient space for turning of vehicles , space for movement of fire fighting vehicle, parking , other utilities like
- **Weighbridge:** near main gate & security –with straight approach access; unloading and waiting areas for truck ;

- **Boiler:** height & location of chimney as per government norms , should be at a distance from living , office area and inflammable products, storage space for fuel as per density – wood , oil & husk,
- **Machinery:** Select the location of machinery in such a way; that there should be sufficient distance between the dust control equipment's and nearby residential area.
- Select the location of blower duct outlet opposite to the nearby residential area.

- **Store:** Select the location of store and daily need equipment's as per the process flow and ease of operation.
- **Rodent proof construction:** Rats and mice cause serious damage to all kinds of grains if they are allowed access to them.
- As rodents cannot crawl upside down; so a 2 feet extended platform above 3 feet plinth level helps to prevent rodents in feed mill.
- **Electric Transformer:** should near the mail line & security.

# Product Mix

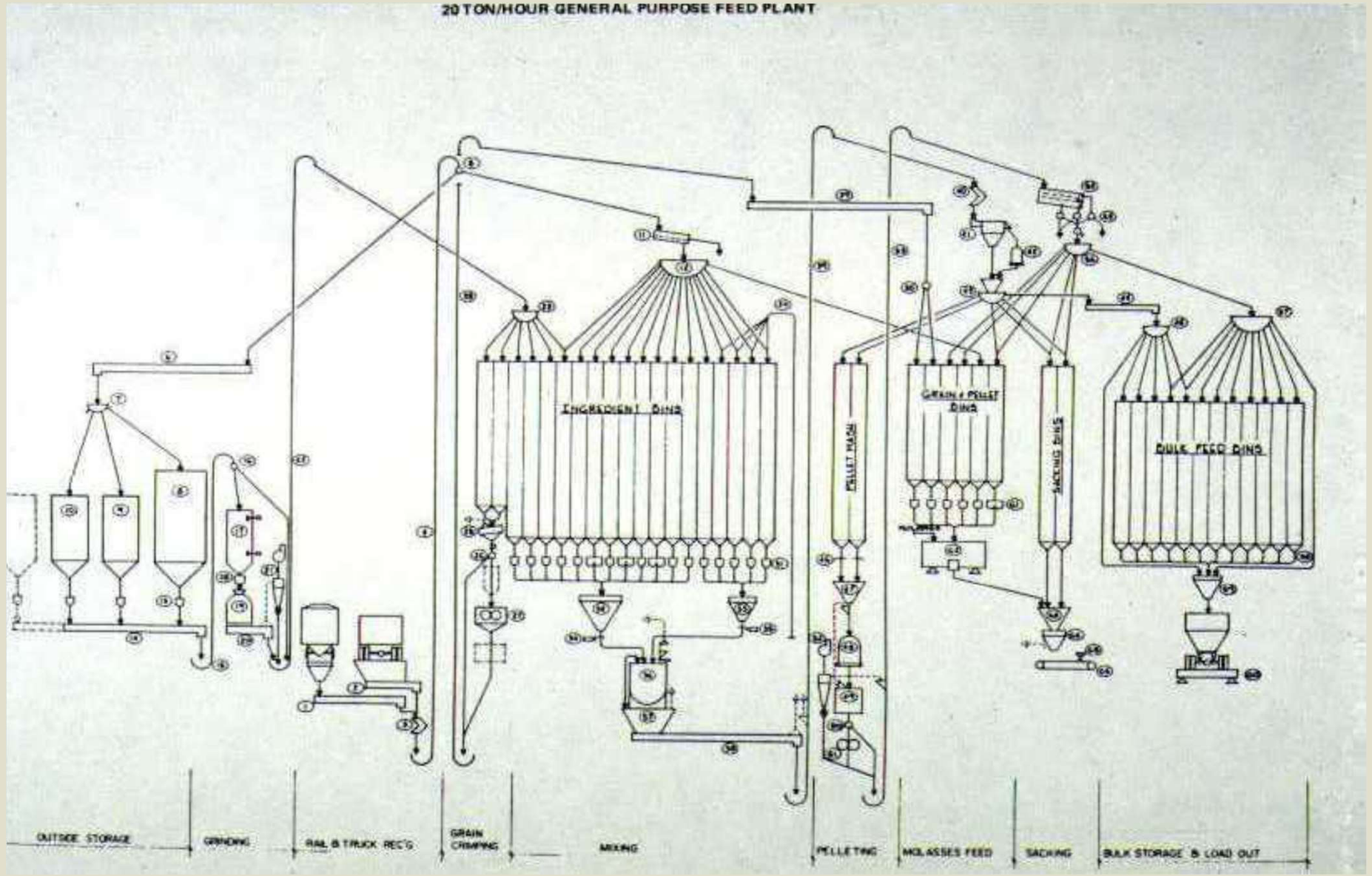
<b>Bulk Feeds</b>	<b>Bagged Feeds</b>
<b>Mash</b>	<b>Mash</b>
<b>Pellets &amp; Crumbles</b>	<b>Pellets &amp; Crumbles</b>
<b>Textured Feeds</b>	<b>Textured Feeds</b>
<b>Miscellaneous</b>	<b>Whole/Processed</b>
	<b>Grains</b>
	<b>Premixes</b>
	<b>Scratch Feed</b>

## **Cost Centers**

- **Receiving**
- **Sizing**
- **Flaking/Crimping**
- **Batching/Mixing**
- **Pelleting**
- **Continuous Proportioning Mixing**
- **Bagging**
- **Warehousing**
- **Bulk Loadout**

# Process Flow Diagram

20 TON/HOUR GENERAL PURPOSE FEED PLANT





# System Capacities

- ❖ Individual processing systems in the total production process must be able to support the plant production requirements to avoid restricting production rates.
- ❖ Equipment sizing is based on the production rate(s) required.

## Example:

- ❖ If the majority of the formulas made use a maximum of 65% ground grains, the grinding equipment should operate at no less than 70% of the plant production capacity.

# Bin Types

- Round, Square, Rectangular
- Metal or Steel



# Receiving System

- ✓ **Minimum receiving capacity should be 2 times the plant production capacity.**

**Other factors affecting receiving capacity include:**

- ✓ **Receiving operating hours**
- ✓ **Availability of shipments**
- ✓ **Size of shipment**
- ✓ **Permitted unloading times**
- ✓ **Large pit openings and deep pits can accommodate full truck or rail car loads, but require dust control systems to keep free falling ingredient dust within the pit.**

# Ingredient Processing Hammermill

- ❖ Hammermill capacity should be designed to operate near full motor capacity.
- ❖ The addition of an air assist system on the hammermill will increase capacity by 10-15% while narrowing the particle size distribution band.



# Ingredient Processing Hammermill Air Assist System

- ✓ Air required is .007- .009 cubic meters of air per square centimeter of hammermill screen area.
- ✓ Air assist forms negative pressure inside hammermill.



# Ingredient Processing Roller Mill

- Requires less energy than hammermill.
- Use 2 or 3 pairs of rolls to grind in steps for better particle size control.
- Does not grind fibrous materials.



# Ingredient Processing Steam Flaking

- ✓ Pre-conditioning by adding water prior to steam chest.
- ✓ Steam chest should have a minimum of 1 hour capacity at processing rate.



**Discussion.....**

**Thank you**