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CHAPTER 1
INTRODUCTION

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A. SAFETY PRECAUTIONS SPECIFIC TO THIS CENTRIFUGE

1. Vibration isolators must be used when installing the centrifuge and motor.
2. Use flexible connections in all piping at attachment point to centrifuge.
3. Allow sufficient clearance around discharge chutes.
4. Flush out the centrifuge during each shutdown.
5. The bowl should rotate clockwise when viewed from the pulley end.
6. Tighten the upper casing screws to 20 - 25 foot pounds before starting the centrifuge.
7. Make sure interlock is working so centrifuge cannot be started unless there is adequate oil flow to the pillow block bearings.
8. Do not start the centrifuge unless the tension bar nut is properly seated.
9. Do not operate the centrifuge unless all o-rings and seals are in good condition.

B. CENTRIFUGE DESCRIPTION

Figure 1-1:

Bowl Assembly

The bowl is suspended, horizontally, between two hubs which are supported in bearings enclosed in pillow block assemblies.

Conveyor Assembly

The screw conveyor is mounted concentrically inside the bowl and rotates on roller type bearings mounted in the bowl hubs. The conveyor is driven by a spline shaft connecting the conveyor to the gear box. The rear of the conveyor is supported by a tension bar which extends through the bowl rear hub to the pulley.

The conveyor rotates around the same horizontal axis as the bowl, but at a lower rpm. This difference in speed (differential) moves the solids towards the rear of the bowl. The liquid flows towards the front of the bowl.

Casing Assembly

The casing contains solids discharged from the rear of the bowl and liquid discharged from the front and then diverts them in separate streams away from the centrifuge.

Frame Assembly

The frame supports the rotating and casing assemblies.

Drive Assembly

This assembly drives the rotating assembly in a clockwise direction, as viewed from the pulley end, through a matched set of "V" belts and pulleys.

The high rotational speed produced is responsible for creating the centrifugal force in the bowl.

Gear Box Assembly

The ring gear housing of the gear box assembly is connected to the bowl front hub by an adapter and rotates at the same speed as the driven bowl.

The gear box second stage assembly is connected to the conveyor through a spline shaft and restricts the conveyor to a speed lower than that of the bowl. This restriction creates the "differential" between the bowl and conveyor.

Feed Tube Assembly

The feed tube is designed to introduce the feed to the feed zone of the conveyor. It is also designed to deliver liquid polymer, flush liquid, or rinse, as required to specific areas of conveyor.

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CHAPTER 2
CENTRIFUGE OPERATION

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A. THEORY

Figure 2-1:

The feed slurry to be separated is introduced into the rotating screw conveyor feed zone through a stationary and axially mounted feed tube. It then discharges from ports, located around the periphery of the feed zone, into the bowl.

As the solids separate out of the slurry, they are carried by centrifugal force to the wall of the bowl where they are scrolled by the conveyor up the inclined beach and out the solids discharge ports. Conveyance of solids is accomplished due to the differential rotating speed between the bowl and conveyor. Clarified liquid flows to the front of the bowl where it discharges through ports in the plate dams.

B. POND DEPTH

Figure 2-2:

1. The bowl is equipped with plate dams that can be chosen to vary the depth (pond depth) of the liquid in the bowl. The pond number is stamped on each plate dam.
2. The amount of solids sedimenting in the centrifuge bowl for any specific application is a result of:
   a. The average retention time of the liquid phase in the bowl. (Determined by feed rate and dam size).
   b. The effective centrifugal force acting on the slurry.
3. The plate dams can be chosen to control the liquid holding capacity over a relatively wide range:
   a. The greatest pond depth, represented by the use of a dam carrying the highest number, usually will result in maximum clarification of the liquid discharge and reduced dryness of the solids discharge.
   b. The shallowest pond depth, represented by the use of a dam carrying the lowest number, usually will result in minimum clarification of the liquid discharge and increased dryness of the solids discharge.

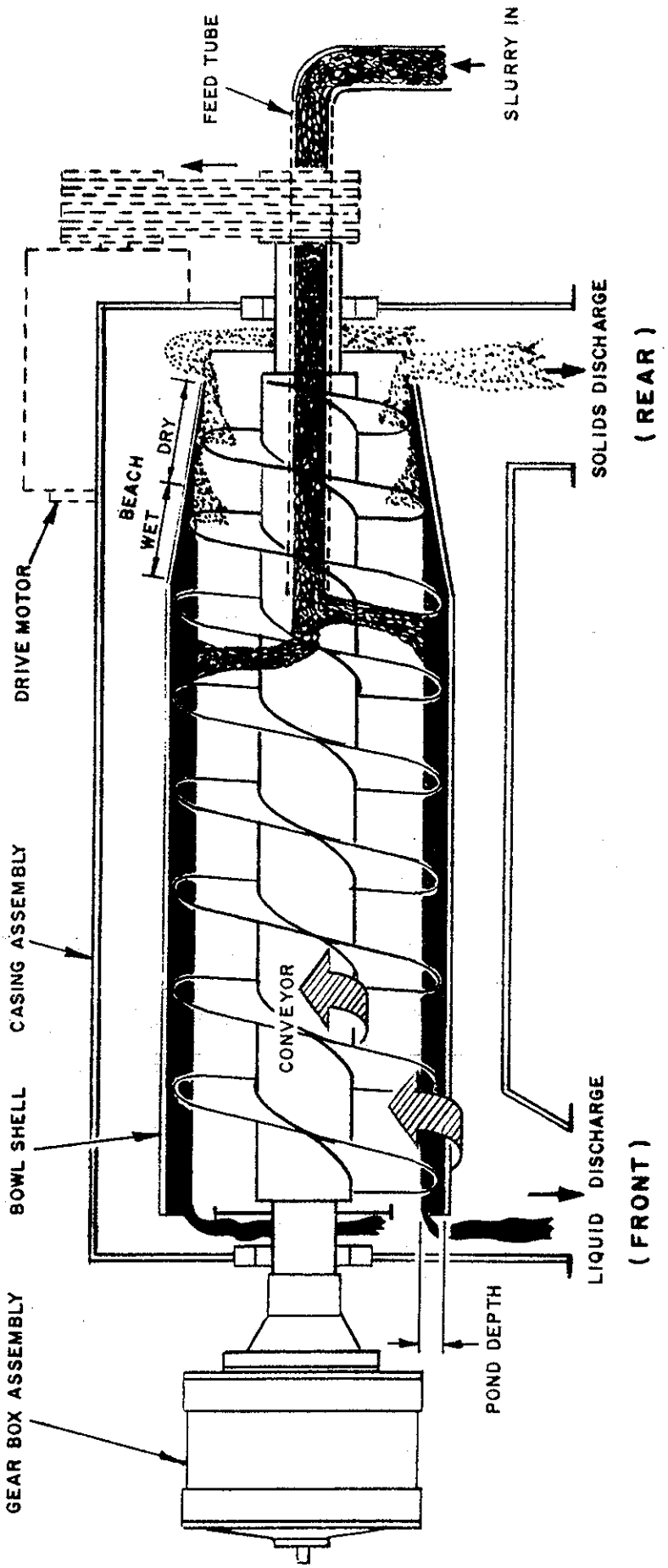
The optimum pond setting for each application can be determined only by taking into account the desired results, and by actual experience with the application.

C. BOWL SPEED

The centrifugal force of the bowl is a function of the product of the bowl diameter and the square of the rotational speed: Centrifugal Force = $(rpm)^2$ x (Bowl Diameter in inches) x (0.0000142). Since the diameter of the centrifuge bowl is fixed, the centrifugal force can be varied only by changing the rotational speed of the bowl.

WARNING

THE MAXIMUM ROTATIONAL SPEED IS STAMPED ON THE NAMEPLATE OF EACH CENTRIFUGE AND MUST NEVER BE EXCEEDED.



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CENTRIFUGE OPERATION
FIGURE 2-1