

In order to counteract vibration, a counterweight or counter balance is installed between the bearings on the centerline of the outboard shaft or these weights may be part of the shaft placed between the inboard bearings. This counterweight does not act as the one on a Two Bearing Screen, but is used to counteract the weight and centrifugal force of the live frame on the shaft at the inboard bearings, and reduce or eliminate vibration. This counterweight is 180 degrees to the direction of the stroke of the screen at all times.

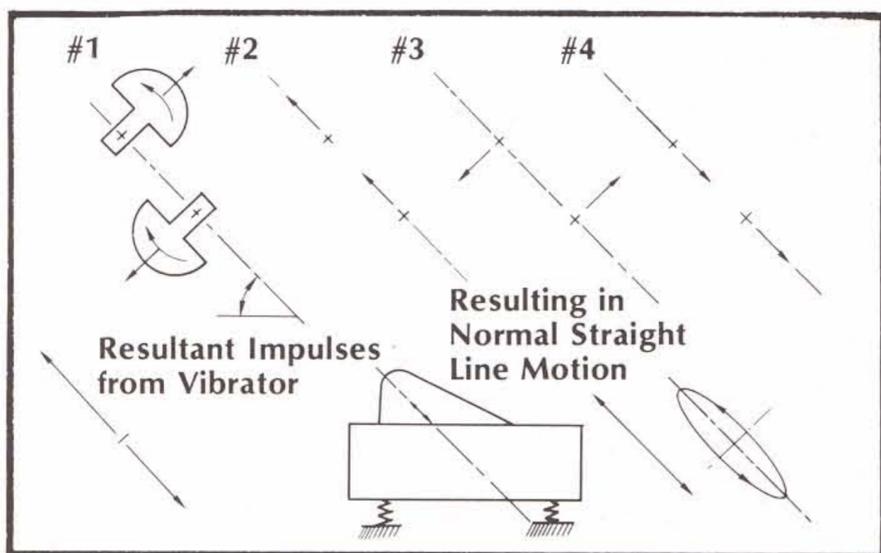
This positive stroke screen, often referred to as a four-bearing screen, starts and stops very smoothly.

The performance of a Positive Stroke Screen can be varied by changing (1) Speed, (2) Direction of Rotation, and (3) Inclination. The stroke can be changed by modifying the eccentric of the shaft since this is the source of the stroke.

Although resilient mounts are not absolutely necessary for Four Bearing Positive Stroke Screens some manufacturers provide them to (1) reduce impact of large lumps or (2) isolate vibration if the screen is not in perfect balance.

One manufacturer employs resilient mounts for both sets of bearings, thus the shaft is free to rotate about its own center of mass which lies between the centerline of the two sets of bearings.

C. TWO SHAFT HORIZONTAL SCREENS:



Although the reasons Horizontal Screens came into existence was in order to save headroom and because there was a need to better control fluids and dewater coal and other products, they have since become quite popular for these applications as well as for many sizing operations.

The primary difference in the horizontal screen is its ability to convey the product since gravity is no longer a force in moving the material over the screen surface.

Another feature of most Horizontal Screens is that they incorporate two shafts and produce an essentially straight line stroke at an angle to the horizontal in the direction of material flow. This throws the oversized material out of the apertures and conveys it along the screen. The action is

necessary since horizontal screens don't have the benefit of being installed with a down-hill inclination.

Due to the larger size of the vibrators, they are seldom found in the center of the screen frame, but mounted above or below the frame. In either case, the line of action is usually set at around 45 degrees from the horizontal.

The vibrator consists of two shafts with eccentric counterweights attached, and supported at each end by roller bearings. The shafts are driven so that they operate in opposite directions. The counterweights forces are additive when in line and cancel out when opposed (See Diagram C). The vibrator is normally located so that the line of action is at approximately 45 degrees to the center of the mass of the screen frame. Since the reactions from the counterweights cancel out one another at all points except two during a cycle the result is a nominal straight line or elliptical motion.

TYPES OF HORIZONTAL SCREENS

Due to their conveying feature horizontal screens can operate slightly uphill, as much as 5 degrees. This is beneficial in some dewatering applications.

1. GEAR DRIVEN HORIZONTAL SCREENS

Many screen manufacturers use gears to control the relationship of the shafts on their Horizontal Screens. Changes to the nominal 45 degree line of action can be made by retiming the gears to give either a flatter angle for faster rate of travel, or a steeper angle for longer retention of material on the surface and possible sharper sizing of the product (provided the bed is not too deep with this slower travel rate).

2. CHAIN DRIVEN HORIZONTAL SCREENS

Instead of gearing together the eccentric shafts, a chain and sprocket arrangement can be used to accomplish the same end as the use of gears.

There are some units produced which use three shafts which produce various stroke configurations which are basically oval rather than straight line or slightly elliptical.

3. MULTIPLE ECCENTRIC SHAFT HORIZONTAL SCREENS

Larger units requiring more driving force have been produced. This is accomplished by gearing together more than two shafts, or adding more vibrators.

4. SYNCHRONIZED SHAFT HORIZONTAL SCREENS

Horizontal screens are produced where the