

# Creating a **STIR** at precast and prestressed plants

*Vibrating  
tables  
produce  
high-  
quality  
concrete*

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**V**ibrating tables create quite a stir at precast and prestressed plants where they remove unwanted entrapped air from concrete. These machines are offered as standard products by some manufacturers, but are more frequently designed according to customer specifications. By understanding the purpose and function of vibrating tables and being aware of a few features available from manufacturers, you can determine how this type of machine best fits into your plant.

#### Using a vibrating table

There are a number of reasons for using vibration to consolidate concrete. Vibrating tables ease concrete placement and speed

up the process, allowing higher production rates. They also provide greater strength and density in concrete, creating a more durable product. Vibrating tables increase homogeneity in concrete and reduce air pockets for an improved product finish. Finally, a lower water-cement ratio, and consequent higher strength, is possible when concrete is consolidated by vibration.

Vibrating tables consist of a table top, either flat or grid; a vibratory motor that can be electric, hydraulic, or pneumatic; and shock absorbers, either coil spring or air-mount. In the consolidation of concrete, a mold is either placed on the table top or clamped onto the top. Opinions vary on which practice is best for consolidating concrete. Proponents of clamping the form in place on the table say that all vibration is transferred from the table to the mold with this method, so vibration is more complete. They also contend that forms last longer when clamped down. Those who favor leaving the mold free on the table contend that the bouncing or pounding action of the loose mold against the table provides the best possible vibration, but agree that the mold must be durable. After experimenting with both methods, you can determine which works best for you.

#### Types of vibrating tables

Two basic types of tables are used most frequently for consolidating concrete. The first is the flat-top table. These tables come in a variety of standard sizes and can be custom-designed. They have a smooth surface onto which a mold is either clamped or set. Vibratory motors are attached to the table to move the concrete in the mold. Flat-top tables can use one of two types of



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A grid-top vibrating table with roller conveyor allows a mold to be vibrated and then moved along for fast production.

shock absorbers—either air-mount isolators or spring coils. The choice of shock absorbers with these tables is usually determined by personal preference and whether the plant has an air line available to inflate the air isolators. Flat-top tables can be used for short runs or small jobs to vibrate different types and sizes of molds as long they are within the table's capacity.

The second type of table is a grid-top table. These tables are most often used for high-production jobs where the same product is being turned out in a large quantity or in plants that are automated. They are offered either with a roller conveyor system or with the capacity to be attached to a roller conveyor system. With these vibrating tables, the mold is rolled onto the grid deck which is in the lowered position. The grid is then raised either automatically or manually by inflating the air-mount isolators, and the mold is elevated off the roller conveyor surface. The vibratory motors are then turned on, and the concrete is consolidated. After vibration is complete, the mold is lowered back onto the roller and moved along its course.

#### Selection and operation

When comparing standard vibrating tables, the capacity of a table is important to look at. The load that a table will lift includes the weight of the mold, concrete, table top, and vibratory motor. If you can estimate the weights of the mold and concrete you will be working with, you can then determine the minimum size of vibrating table you need. Most tables can handle different size loads up to their maximum capacity by varying the frequency of the vibratory motor and the force output of the drive.

Another factor to consider when selecting a vibrating table is the slump of the concrete. According to one manufacturer, the drier the mix, the higher the frequency needed. With an extremely wet mix, any vibration level will be acceptable. So, in addition to comparing maximum load, consider slump and check the table's frequency range.

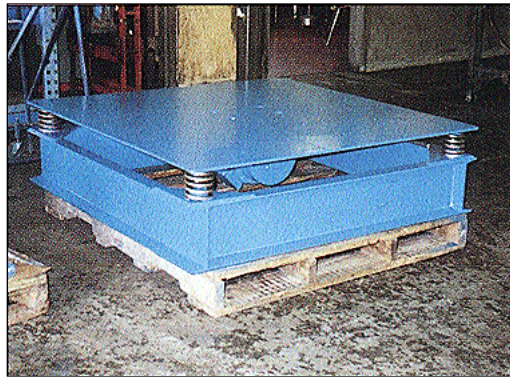
With most vibrating tables, the vibratory motors move in an up-and-down motion, moving the concrete vertically. This design is intended to provide thorough vibration and eliminate the problem of "mold walking" or molds moving off the vibrating table.

One device that is offered on some vi-

brating tables is an AC inverter. This is a variable speed converter that can be used on an AC motor to control the speed of vibration. This feature allows you to run the machine at full speed and then shut off the motor. The mechanism stops vibration completely, so you do not have to worry about the mold bouncing out of control while vibration winds down.

#### Specifying your own table

If you plan to have a vibrating table designed for you, you will have to supply the manufacturer with certain information. The capacity of a table is determined by adding up the weight of everything above a table's shock absorbers, as this is the load that the unit will have to move. This includes the weights of the form to be used, the concrete, the vibratory motors, and the table.



This flat-top vibrating table features coil spring shock absorbers.

The size and shape of the mold is also important for the manufacturer to know. A table that will be used to handle only long beams will be different in shape from one that will hold small architectural molds. In other instances, an average-size table will be designed to handle a variety of sizes and shapes. Other factors you will need to decide on include the type of shock absorber, how the table is powered, and whether the table is a flat- or grid-top style. Any other information that you can provide, such as whether your plant has any height restrictions in the work area and the slump of concrete you will be using, can contribute to getting the best design for your plant.

#### New features and models

**Patented model eliminates dead spot.** One manufacturer has developed a table that has a patented design to ensure that



The air-mount isolators on this flat-top table keep vibration confined to the table top and mold.

there are no dead spots, or areas of concrete that are not thoroughly consolidated. This table consists of two plates. A vibratory motor is attached to only the bottom plate, and that plate is connected to the top plate by only an outside edge. There is space between the plates in their centers. This design allows for complete vibration throughout the top plate. This vibrating table is

used for ornamental concrete and small molds.

**Vibrating form bed moves concrete horizontally.** Another manufacturer has designed a quiet-operating vibrating form bed. The product is unique in that it moves concrete horizontally, rather than vertically as most vibrating tables do. The frame of this vibrating form bed is mounted on two transverse

girders by means of four spring steel bars to provide a loss-free frame movement in all directions. In each corner of the free-swinging frame is an electric vibrator. One vibrator acts as a master and the other three provide synchronized vibration in three possible patterns: oscillation in X or Y direction, or circular motion. The eccentric position of each vibrator is controlled by a series of sensors wired to an electrical control panel that provides speed adjustment of the vibrators. The bed moves concrete in all horizontal directions to provide effective consolidation of concrete with noise output of less than 70 dBA. The vibrating form bed provides effective consolidation in a short period, reducing cycle times and improving plant production. ❖

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