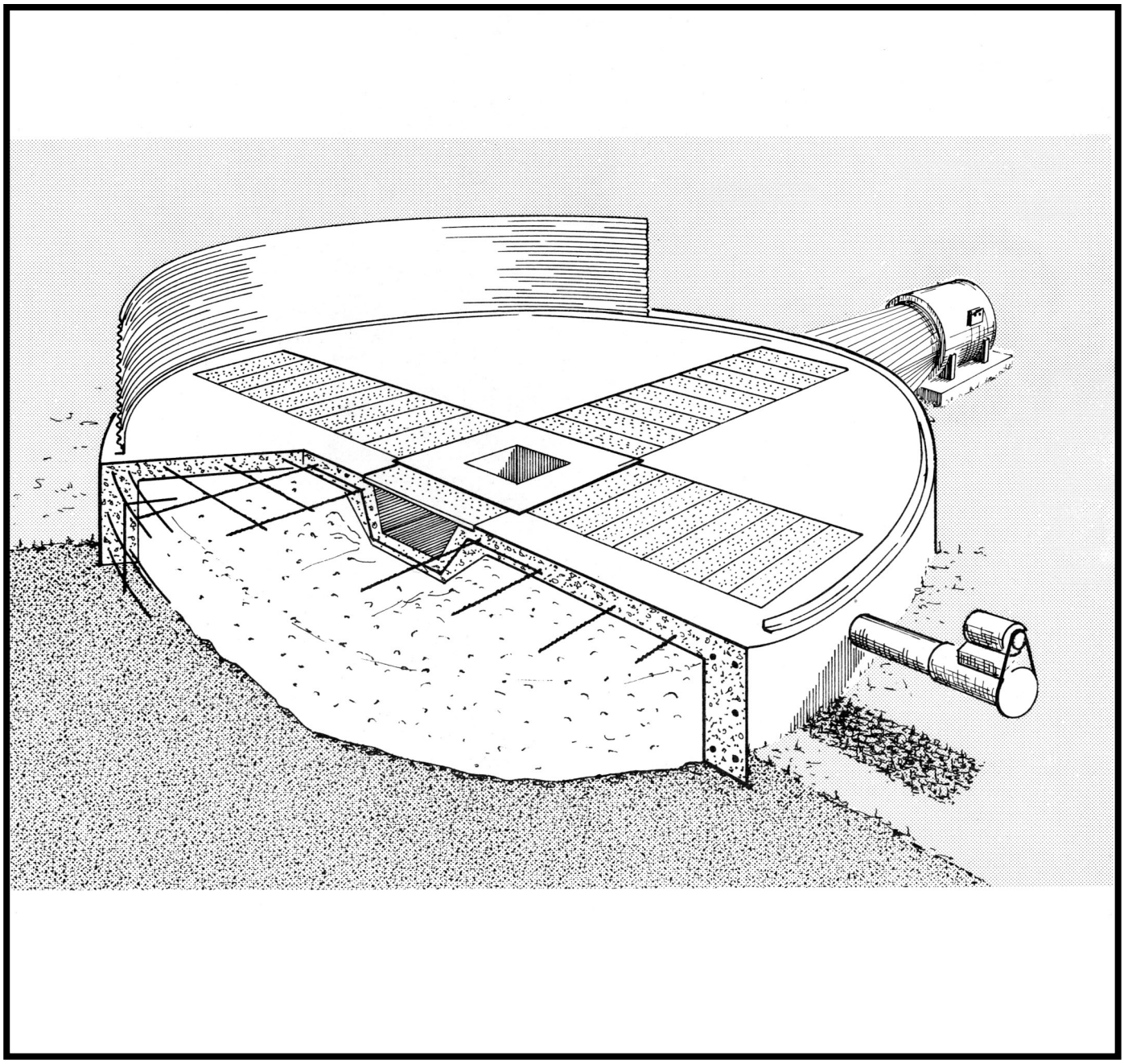
FOUNDATION FOR CIRCULAR STEEL GRAIN BINS



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FOUNDATION FOR CIRCULAR STEEL GRAIN BINS

CPS
PLAN M-7111 REVISED 86:11

This is a general concrete foundation plan for circular steel grain bins. Also see foundation designs available from the bin manufacturers, who may require special features, for example at the bin-to-foundation joint.

Choose your site carefully. Good natural or graded-surface drainage is essential, to prevent wetting and damage to the grain as well as concrete cracks due to heaving in the foundation. Allow space for future storage needs and easy maneuvering of trucks.

For the following purposes stored grain is ventilated with forced air:

	Ventilation rate L/s per m^3 (cfm per bu)
• *Aeration* cools grain, redistributes moisture that has migrated into damp zones due to temperature differences and extends storage life. Provide aeration in all bins over 100 m^3 (2800 bu).	1.3 (0.1)
• *Natural air* drying requires a raised, fully-perforated floor, usually made with perforated steel floor planks supported on steel struts and joists, or on concrete blocks. Lay the blocks with openings horizontal, to spread the airflow. The wide range of ventilation rates is given because of the great variations possible in grain moisture, air temperature, and humidity.	13-80 (1-6)
• *Dryeration* also requires a raised fully-perforated floor. The principle is to use the heat remaining in warm grain coming from the dryer, thus finishing the drying, increasing dryer throughout and reducing kernel stress-cracks.	5-20 (0.4-1.5)

The plan shows a number of aeration duct layouts; choose the one best for the bin volume and available fan size. The perforated floor should have enough area so that average airspeed through the floor does not exceed 0.5m/s (98 ft/min). Ducts should be big enough to keep the air velocity below 10 m/s (1960 ft/min).

EXAMPLE: To size the perforated flooring and duct-work for a 200 m^3 (5600 bu) grain bin with diameter 6.7 m (22 ft) for the minimum aeration rate of 1.3 L/s per m^3 (0.1 cfm per bushel).

In metric units, the minimum aeration rate is 1.3 x 200 = 260 L/s. The nearest available fan moves 870 L/s (or 0.87 m^3/s) at the expected static pressure. To give an airspeed of only 0.5 m/s into the grain above the perforated ducts, the perforated floor area should be at least 0.87/0.5 = 1.74 m^2. For a duct airspeed of only 10 m/s, the duct section area should be at least 0.87/10 = 0.087 m^2.

In imperial units, the minimum aeration rate is 0.1 x 5600 = 560 cfm. The nearest available fan moves 1859 cfm at the expected static pressure. To give an airspeed of only 98 ft/min into the grain above the perforated ducts, the perforated floor area should be at least 1850/98 = 18.9 sq ft. For a duct airspeed of only 1960 ft/min, the duct section area should be at least 1850/1960 = 0.94 sq ft.

An aeration duct may also enclose the bin unloading auger and tube. Check the angle, height and removability of this auger, especially if the bin is to become part of a grain handling and storage system (see Plan **372-18**).

To prevent soil moisture from migrating up through the floor, place a polyethylene plastic sheet on smooth, packed sand under the concrete. High-strength concrete in the floor also helps. A good weather seal at the bin-to-foundation connection is essential to prevent moldy grain around the base of the bin; check your bin hardware and instruction manual for special anchoring and sealing recommendations by the bin manufacturer.