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MANUFACTURING METHODS AND PRACTICES

Structural Shapes

Structural shapes is the general term applied to rolled flanged shapes, having at least one dimension of their cross section 3 in or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock and for numerous other constructional purposes.

In the past, the terms shapes and sections were used synonymously. The American Institute of Steel Construction and the producers have now adopted shapes as the standard designation.

Structural shapes are divided as follows:

Regular shapes are those which have extensive applications. Shapes vary slightly with different manufacturers due in part to the demands of their particular trade. In general, regular shapes include standard beams, columns, light beams, joists, stanchions and bearing piles and certain tees.

Regular shapes are described in the American Institute of Steel Construction publication, "Manual of Steel Construction."

Special shapes are those which are designed for specialized applications and have dimensions and/or foot weights which do not conform to regular shapes.

Rolling

Rolling. Structural shapes are produced by passing ingots, blooms or billets through a series of grooved rolls. Only a portion of the shape is represented by the grooves in one roll, the remaining portion being represented in a corresponding roll as illustrated in Figure 1.

There are three stages in the rolling of a structural shape: first, the roughing, where rough forming of the shape begins, then the intermediate, in which the forming is continued and finally the finishing passes.

Blooms and billets, which are square or rectangular in cross section, termed semifinished steel, generally comprise the first stage in the rolling of finished shapes. The blooms used for wide flange shapes usually are partially shaped prior to entry into the roughing stand. This direct shaping is similar to that given blooms in the initial roughing passes of the standard structural mill.

The principles involved in the rolling of structural shapes are in general represented in the rolling of an angle.

The first shaping pass reduces the cross section of the bloom or billet and forms a ridge on one side. This ridge provides the metal for the apex of the angle. Subsequent roughing and forming passes reduce the area and gradually develop the shape desired. The final pass completes the squaring up of the shape and delivers it with the apex at the sharp 90 deg angle. The various steps are shown in Figure 2.

Channels are rolled from billets, rectangular blooms or shaped blooms in practically the same number of passes as used for an angle. In many cases, the rough shape is the same as that used for

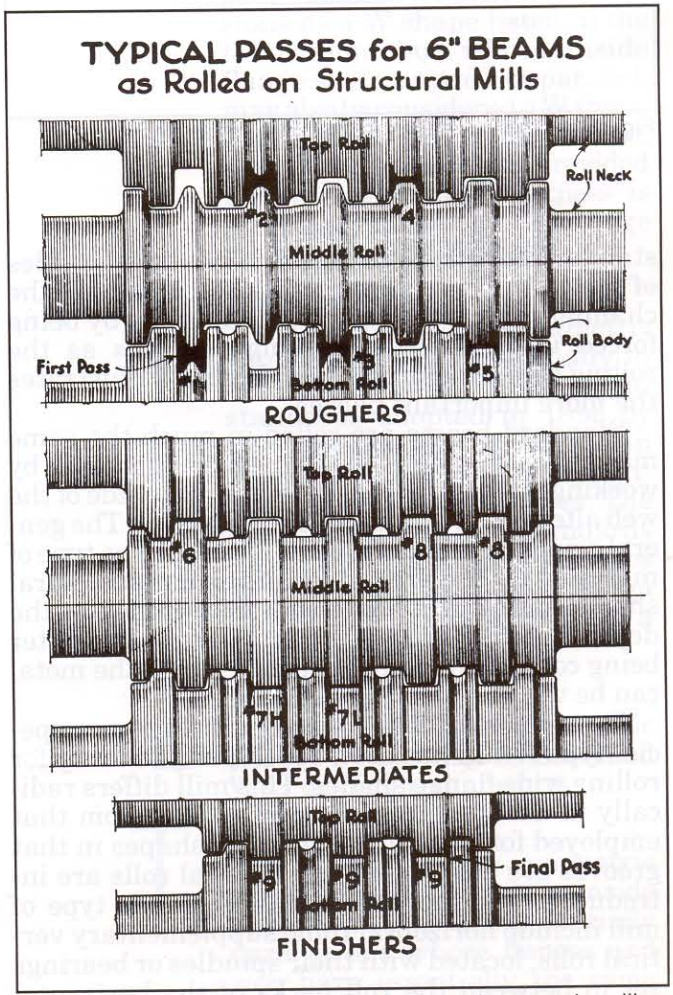

Fig. 1 – Typical arrangement of rolls and passes in rolling standard beams.