

Nomograph for Design of Channel Section Beams

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CHANNEL SECTIONS are frequently used in the construction of operating platforms, passageways, stairs, etc. of industrial structures. They behave as beams and their moment of resistance for actual unbraced length must be calculated. The formulas used for channel sections are given in AISC Specification Sect. 1.5.1.4.6a. The value of d/A_f (in these formulas) is available in manufacturers' tables of properties for structural shapes as well as in the AISC *Manual of Steel Construction*. The value of C_b may be taken as unity for a simply supported system.

For the convenience of designers, the AISC *Manual of Steel Construction* contains charts for determining the moment of resistance, M_R , of wide flange beams when their unbraced lengths are known. However, no such charts are available for channel sections. A nomograph is presented herein for rapid determination of the values

of F_b and M_R of channel sections when their unbraced lengths are known. See Fig. 1. The nomograph is for steel with $F_y = 36$ ksi and is applicable for pure bending (located through the shear center) only. An example is worked out to explain the use of this chart.

EXAMPLE

Problem:

Find M_R of a C12 $\times$ 20.7 when the unbraced length is 10 ft (120 in.)

Solution:

From tables for structural shapes, for C12 $\times$ 20.7:

$$d/A_f = 8.13; \quad S_{xx} = 21.5$$

Join point 120 of L line of the nomograph with 8.13 of d/A_f line to intersect F_b line at 12.3 (corresponding point on K line being 1.02.)

Therefore,

$$M_R = K(S_{xx}) = 1.02 (21.5) = 21.9 \text{ kip-ft}$$

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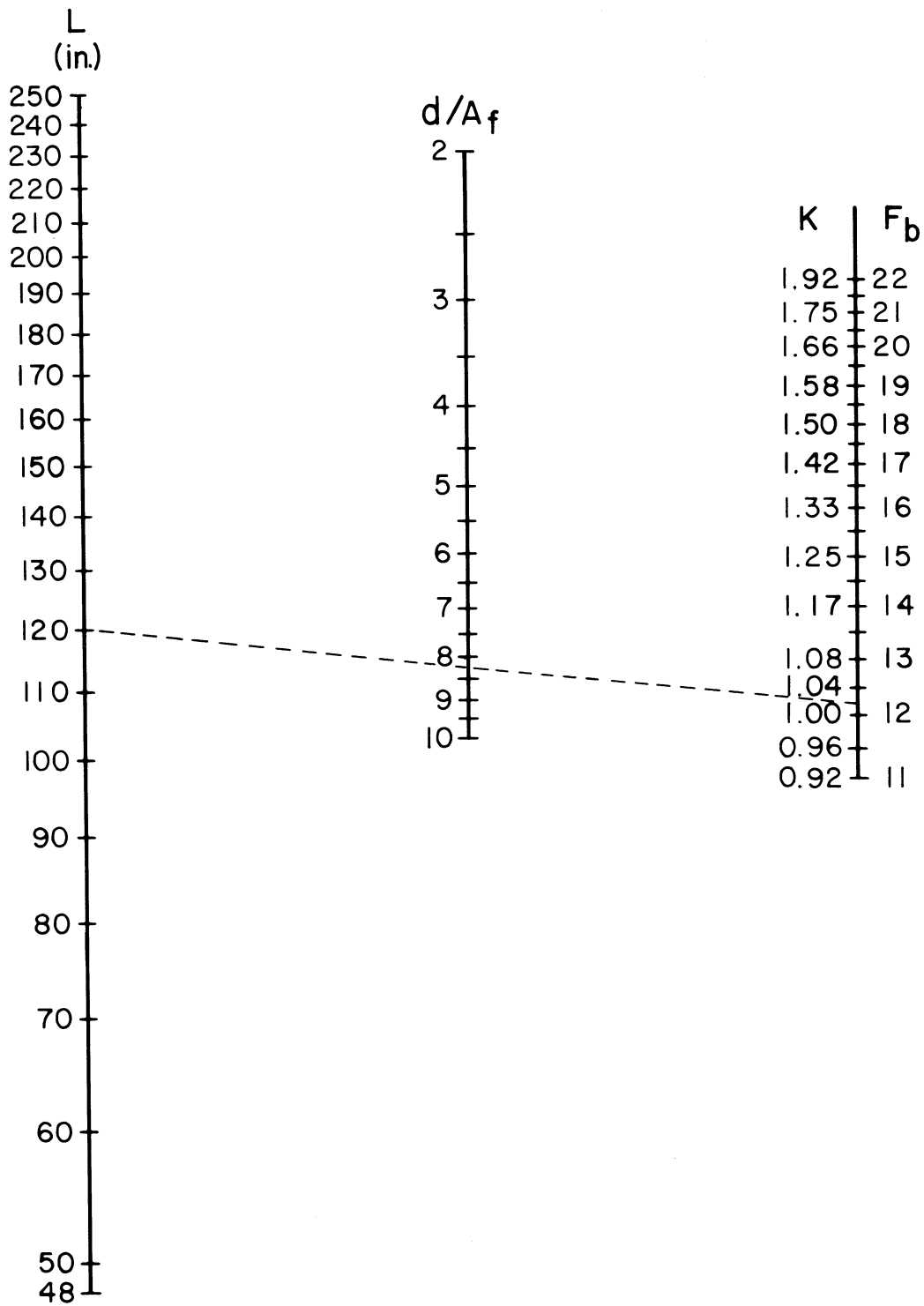


Figure 1