It should be about three (3) tons for bridges of Class A, and four (4) tons for those of Classes B and C. The total area of the lower flange of the beam should therefore be

\[ A + A'' = \frac{wl_3^2}{12dC} - \frac{1}{3}A' + \frac{1}{2}(\frac{P_1}{C'D} - A') = \frac{wl_3^2}{12dC} + \frac{P_1}{2C'D} - \frac{2}{3}A'. \]

If the beam be a rolled one, as it nearly always is, there is no need of figuring upon the size of the upper flange; while, if it were a built beam, it might be as well, for practical reasons, to make the flanges of the same size, although theoretically a slight reduction in the area of the upper one would be permissible.

For a beam with a single trussing-post, the bending-moment over the post is

\[ \frac{wl_1^2}{8}, \]

and the area of flange necessary to resist bending is, as before,

\[ A = \frac{wl_1^2}{8dC} - \frac{1}{3}A'. \]

\( P \), in this case, is equal to \( wl_1 \); making the re-action at each end of the beam, under the supposition of concentrated loading,

\[ \frac{1}{2}wl_1. \]

The direct compression on the upper chord of the trussed beam is, therefore,

\[ \frac{1}{2} \frac{wl_1^2}{D} = C'(A' + 2A'') : \]

\[ \therefore A'' = \frac{1}{2} \left( \frac{wl_1^2}{2C'D} - A' \right), \]

and the total area of the flange is

\[ A + A'' = \frac{wl_1^2}{8dC} - \frac{1}{3}A' + \frac{1}{2} \left( \frac{wl_1^2}{2C'D} - A' \right) \]

\[ = \frac{wl_1^2}{8dC} \left( C'D + 2Cd \right) - \frac{2}{3}A'. \]