DEMONSTRATION OF FORMULA FOR FLOOR BEAMS.

Let the notation be the same as given on p. 19, viz.:—

\( A \) = area of bottom flange in square inches,
\( A' \) = area of web in square inches,
\( A'' \) = area lost by a rivet hole in square inches,
\( W \) = the uniformly distributed load in tons,
\( L \) = length of beam in feet between centres of supports,
\( D \) = depth in feet between centres of gravity of flanges,
and
\( T \) = intensity of working tensile stress in tons.

The moment at the centre of the beam is \( \frac{WL}{8} \). Let us take
the centre of moments at the middle of the web, which will
 correspond with the neutral surface, if we assume, which is
nearly true, that the upper and lower flanges are of the same
area, and are subjected to numerically equal stresses.

The moment of the load is resisted by the sum of the moments
of the flange stresses and those of the web stresses. The sum of
the moments of the flange stresses is

\[ 2(A - A'') T \times \frac{D}{2} = (A - A'') TD. \]

The resisting-moment of the web stresses is found as fol-

The resisting-intensity of stress on the fibre most remote
from the neutral surface may be taken equal to \( T \); then that
for any fibre at the distance \( x \) will be, by the common theory
of flexure, \( \frac{2Tx}{D} \). The stress on an elementary area at this