changing \( w \) to \( m \), we have for material in \( ab, \ldots \frac{2D^3}{v} m \). But

\[ \delta^2 = h^2 + v^2, \text{ whence } \frac{2D^3}{v} m = \frac{2}{3} \left( \frac{h^2}{v} + v \right) M = \left( \frac{2h^2}{3v} + \frac{2v}{3} \right) M. \]

Again, \( ab' \) sustains \( \frac{1}{3} w \), with length \( = \sqrt{4h^2 + v^2} \), and by multiplying and changing as in case of \( ab \), we obtain material in \( ab', = \left( \frac{4h^2}{3v} + \frac{v}{3} \right) M \), which added to amount for \( ab \), gives \( \left( \frac{6h^2}{3v} + v \right) M \) for the two braces, and \( \left( \frac{4h^2}{3v} + 2v \right) M \) for the four.

The horizontal thrust of \( ab = \frac{1}{3} w \frac{h}{v} \) while that of \( ab' = \frac{1}{3} w \frac{2h}{v} \). Hence the horizontal thrust of \( ab \) and \( ab = \frac{1}{4} w \frac{h}{v} = \) tension of \( aa' \), and material for chord \( aa' \), equals \( 3 \times \frac{1}{3} \frac{h}{v} M = \frac{4h^2}{v} M \). Tension of \( bc \) and \( b'd \), each, equals \( w \), and material for the two \( = 2v M \), which added to amount in \( aa' \), makes the whole tension material equal to \( \left( \frac{4h^2}{v} + 2v \right) M \), being the same co-efficient of \( M \) as was obtained for compression.

In truss Fig. 7, \( \ldots ab \) and \( a'b' \) \((= D = \sqrt{h^2 + v^2})\), evidently sustain each a weight equal to \( w \), and a stress \( = \sqrt{h^2 + v^2} w \). Whence, material \( = \left( \frac{h^2}{v} + v \right) M \) for each, and \( \left( \frac{2h^2}{v} + 2v \right) M \) for both, while \( bb' \), equal to \( h \), sustains compression equal to the horizontal thrust of \( ab \), equal to \( \frac{h}{v} w \), and requires material equal to \( \frac{h^2}{v} M \), making, with amount in braces \( ab \ a'b', \left( \frac{3h^2}{v} + 2v \right) M \).

Now we have just seen that the horizontal thrust of \( ab \), equal to the tension of chord \( aa' \), equals \( \frac{h}{v} w \), and the

* When \( v \) is used in the co-efficient of \( M \), then \( M \) represents the product of the stress, in terms of \( w \), by length according to any assumed unit, which may be equal to \( v \) or not.