Torsion Member Assumptions:

200 lb outward load applied 45.5 in. above the top of the member.

Torsion moment = T = (45.5 in.)(200 lb) = 9100 in-lb

Following Section 4.6 of Timber Construction Manual (6th edition):

$$f_{vt} = \frac{T(3d + 1.8b)}{d^2 b^2}$$

For 6x10 SPF sawn lumber:

F_{vt}' = 2/3*F_v*C_D = 2/3*(125 psi)*1.6 = 133 psi

$$f_{vt} = \frac{T(3d + 1.8b)}{d^2 b^2} = \frac{(9100 \text{ in-lb})(3(9.25 \text{ in.}) + 1.8(5.5 \text{ in.}))}{(9.25 \text{ in})^2 (5.5 \text{ in})^2} = 132 \text{ psi} \leq F_{vt}' = 133 \text{ psi}$$

For 5-1/8 in. x 9-1/4 in., 16F-1.3E glued laminated timber:

F_{vt}'=2/3*F_{vx}*C_{vr}*C_D = 2/3*(195 psi)*0.72*1.6 = 150 psi

$$f_{vt} = \frac{T(3d + 1.8b)}{d^2 b^2} = \frac{(9100 \text{ in-lb})(3(9.25 \text{ in.}) + 1.8(5.125 \text{ in.}))}{(9.25 \text{ in})^2 (5.125 \text{ in})^2} = 150 \text{ psi} \leq F_{vt}' = 150 \text{ psi}$$