Jöfnur

$$l = cos(40^\circ) \cdot 0.48m = 0.3677 \tag{1}$$

τ_{hne} is the torque if the knee would have to lift a 120 kg person up all by itself with out any help from the change of the weight position.

$$\tau_{hne} = 1176 \cdot 0.3677 = 432.417\ Nm \tag{2}$$

Then we have an extreme example τ_{hne90° is when a 120 kg person needs to stand up from a chair using only their knee.

$$\tau_{hne90} = 1176 \cdot 0.48 = 564.48\ Nm \tag{3}$$

Midstance/Heal strike

$$l = cos(86^\circ) \cdot 0.48m = 0.0334\ Nm \tag{4}$$

$$\tau_{hne4^\circ} = 39.4\ Nm \tag{5}$$

τ_{hne4° is the torque of the knee motor during the midstance.

$$A = \pi \frac{(30^2 - 27.5^2)}{4} = 112.901\ mm^2 \tag{6}$$

$$\sigma = \frac{120 \cdot 9.8}{112.901} = 10.4162\ MPa\ [N/mm] \tag{7}$$

Torque going through the lower leg