Shear Force Calculations – Mecanum Shaft

Bearing selected is NSK 698 ZZ. Width 6mm as per 3d model. This shear force calculation is to determine whether an 8mm mild steel shaft is sufficient to bear the total load on a 60/40 load scenario with acceptable deflection.

Total Mass: 575kg

60/40 Apportioned: 30% / wheel

Total Wheel Mass:

Total Wheel Force:

Supporting Rollers / Wheel: 1

Bearings / Roller: 2

Total Bearing Force:

846N

846N

133mm

117mm

846N

846N

**GREEN** forces represent weight of platform and load.

**RED** forces represent normal force for static equilibrium.

Peak Shear Force is +/- 846N.

Now I will examine shear stress using the following parameters…

Material: Mild Steel

Yield Strength: 370MPa

Young’s Modulus: 205GPa

Shaft Diameter: 8mm = 0.08m

F = 846N

8mm shaft is therefore acceptable for this use-case.