This assignment will reinforce what you have learned about fatigue strengths, and alternating and mean stresses.

An in-line roller-blade skate is shown below. The wheels are 72 mm diameter and are spaced on 104 mm centers. The 10 mm diameter axle pins are in **double shear** and are made of steel with the following properties:

S_{ut} = 550 M Pa.
S_y = 400 M Pa.

Assume **reliability** is 99.999%
Assume the **pins are machined**

Find **the infinite-life factor of safety** for the pins when the force of impact, F_i, is 3.59 k N.

First assume that all four wheels take the landing simultaneously, then assume that only one wheel absorbs the landing force.

1. Calculate appropriate stresses for both cases
2. Calculate **maximum, minimum, alternating, and mean stresses** for both cases
3. Calculate the **fatigue strength** assuming infinite life