5.54 A crane is used to lift a pile of logs with center of mass at point $D$. Make a free-body diagram of the logs and discuss whether or not the system is statically determinate and/or properly constrained.

![Figure P5.54](image1)

Solution:

![Figure S5.54](image2)

There are 3 unknown scalar forces $T_A$, $T_B$, and $T_C$, provided the geometry is given. Thus there will be 3 unknowns and potentially six equations. However, the 3 forces pass through a common point so the moment equations yield no information. Thus there are 3 equations in 3 unknowns and the system is statically determinant but improperly constrained as rotation could occur about the point of intersection of the three forces.