Ball-bearing systems

One option which may be suitable for the modeling of **ball-bearing systems** is to use a Tension/Compression (T/C) Isolator link for each bearing. If the bearings and races serve as a hub at the center of a larger wheel-truss system or another rotating assembly, it may be sufficient to model one T/C isolator per set of rollers tributary to each spoke or radial component.

The types of motion to be resisted include radial, tangential, and longitudinal. Due to the reduced friction coefficient of the roller bearings, tangential resistance may be small relative to the radial resistance which results from the force component normal to the bearing. A small gap may also be present. The kinematics of this gap may be accounted for with the type and sequencing of analysis methods. Finally, longitudinal resistance comes from the force component normal to the bearings due to their axes not being aligned with the axis of the overall system.

Use of a T/C isolator link will incorporate a gap in compression, and will allow for friction in the tangential and longitudinal directions. Circumferential and longitudinal friction coefficients should be resolved or decided upon as input parameters.

Links should be drawn perpendicular to the roller axes, and should be connected to the outer moving surface. The links may need to be assigned advanced local axes such that friction coefficients may be oriented along the circumferential and longitudinal directions.

If there is no gap between the bearings and the contact surface, a nonlinear static analysis may be used to generate results. However, if a gap is present, the model will be initially unstable, and a nonlinear static solution will not work. As an alternative, load may be applied using a direct-integration time-history analysis. Here, a nonlinear load case may be defined for application of the assembly self-weight, then any additional combination of loads may be set to continue from the end of this nonlinear analysis.

See Also

- Wikipedia article