

Pulley Technical Bulletin

Pulley Stress Contributors and Their Variables

End disk bellows & bushing expansion are dependent on:

- Manufacturing of hub/bushing system
- Bushing/hub installation alignment
- Assembler bolt torque
- Friction along shaft
- Friction along tapered surfaces
- Friction along threaded surfaces of bolts & holes
- Bushing/hub taper

Belt Tension

- Calculable & Consistent

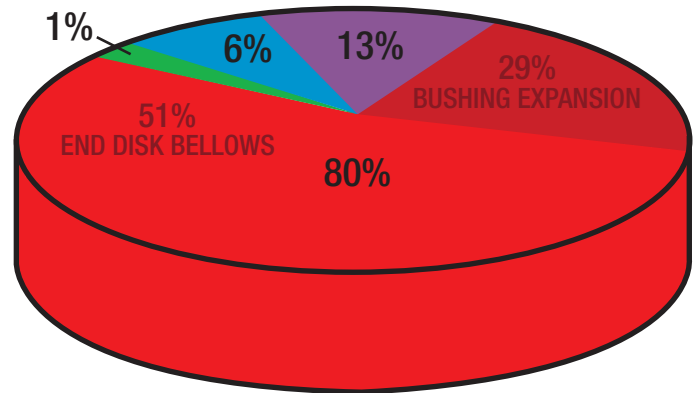
Drive Weight

- Calculable & Consistent

Self Weight

- Calculable & Consistent

The highest contributors to stress have the highest variability, therefore highest risk to pulley reliability!

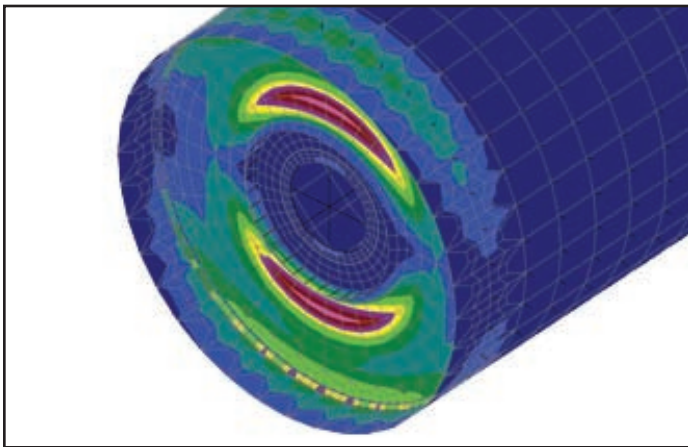


Stress Contributors

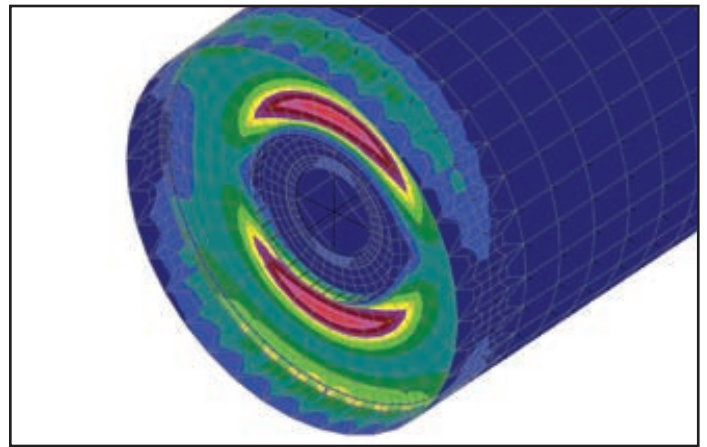
- End Disk Bellows and Bushing Expansion
- Belt Tension
- Drive Weight
- Self Weight

Pulley Stress Analysis Diagrams

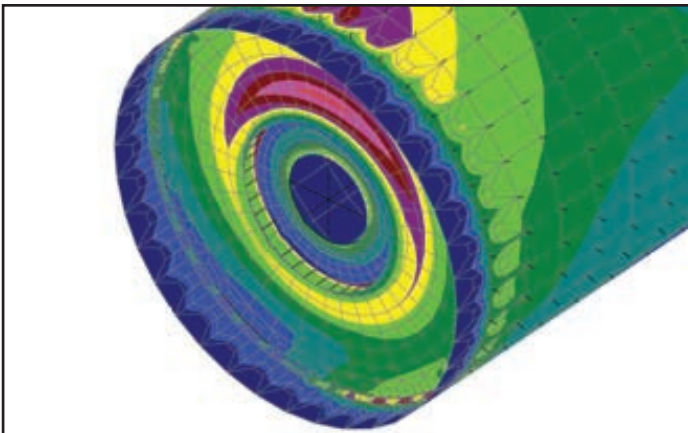
The following diagrams indicate location of stress by each contributing source



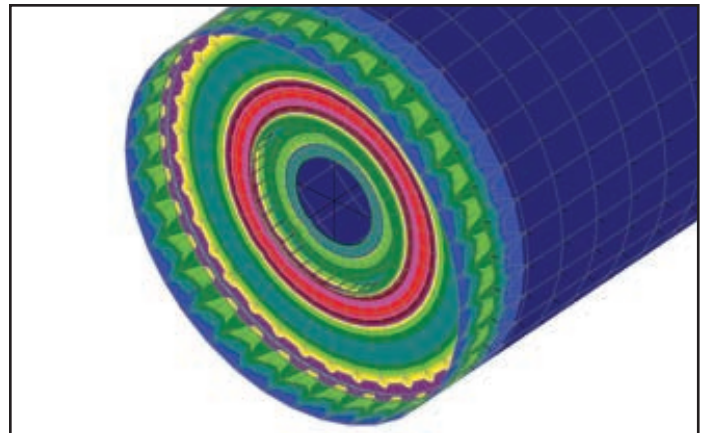
Self Weight



Drive Weight



Belt Tension



Bushing Expansion and End Disk Bellows

XT Bushings Proven to Reduce Pulley Failure

XT bushings are designed specifically for applications with two hubs vs. single hub and bushing applications such as drive sheaves and sprockets.

XT bushings have a 2" per foot taper requiring minimal axial movement on the shaft. This reduces additional stress on the end disk of the pulley. QD bushings have a $\frac{3}{4}$ " taper per foot, the bushing hubs are wider and longer allowing more movement, which creates additional stress on the end disk.

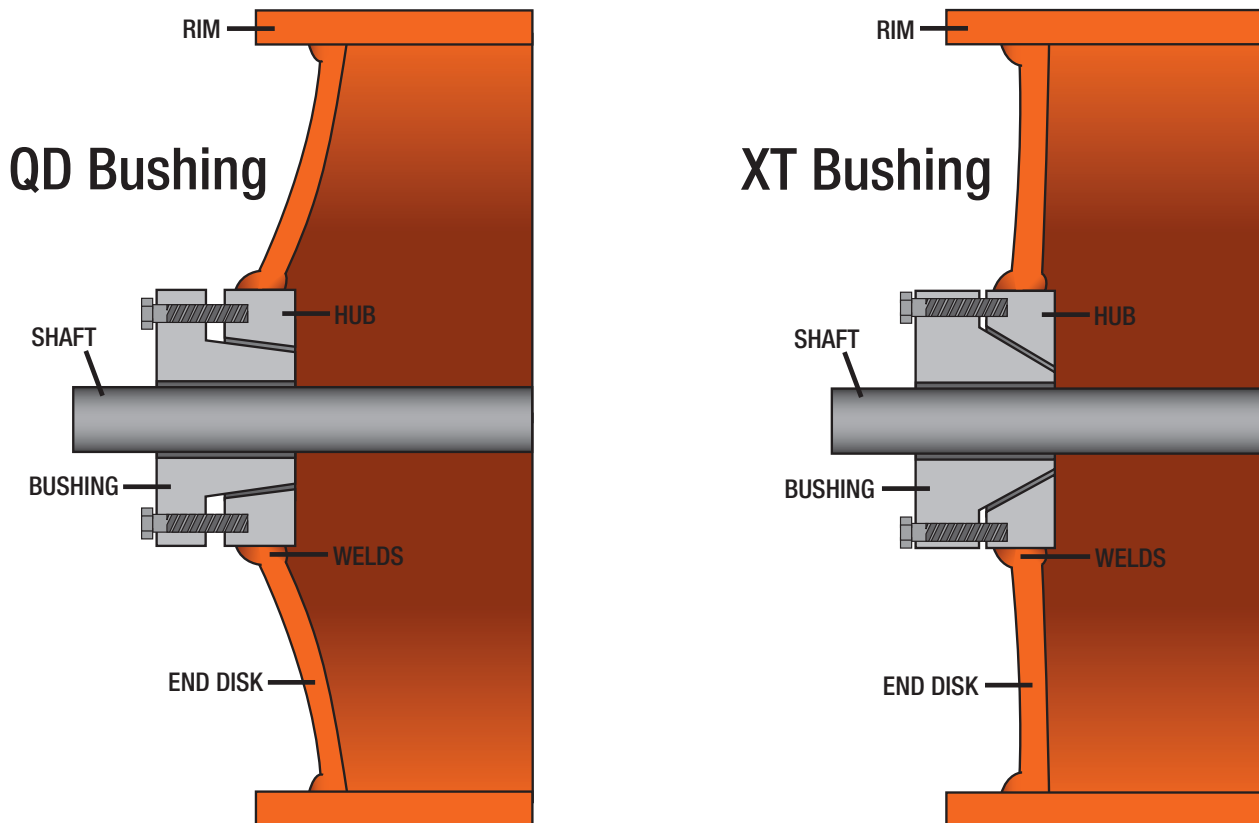
XT bushings have a four-bolt flange rather than a three bolt flange making installation and aligning the bushing to the hub easier.

XT bushings have less draw and reduce end disk bellows.

End disk bellows and bushing expansion contribute 4X more stress than all other factors combined.

End Disk Bellows From Bushing/Hub Assembly Movement

QD bushing assembly bellows 1.5X further than an XT bushing assembly



The increased movement of the end disk with QD style bushing/hub is 1.5X that of XT style bushing/hub. This creates additional end disk stress. The shallower taper of QD style will also increase Bushing Expansion stresses. The summation of these stresses is higher than the summation of XT type stresses and causes the 7X increased end disk failure rate. This is due to non-linear effects of fatigue where XT style end disk stretch measures 0.079" while QD style end disk stretch measures 0.120".

To get more information you can visit:
www.superior-ind.com or call 1-800-437-9074

