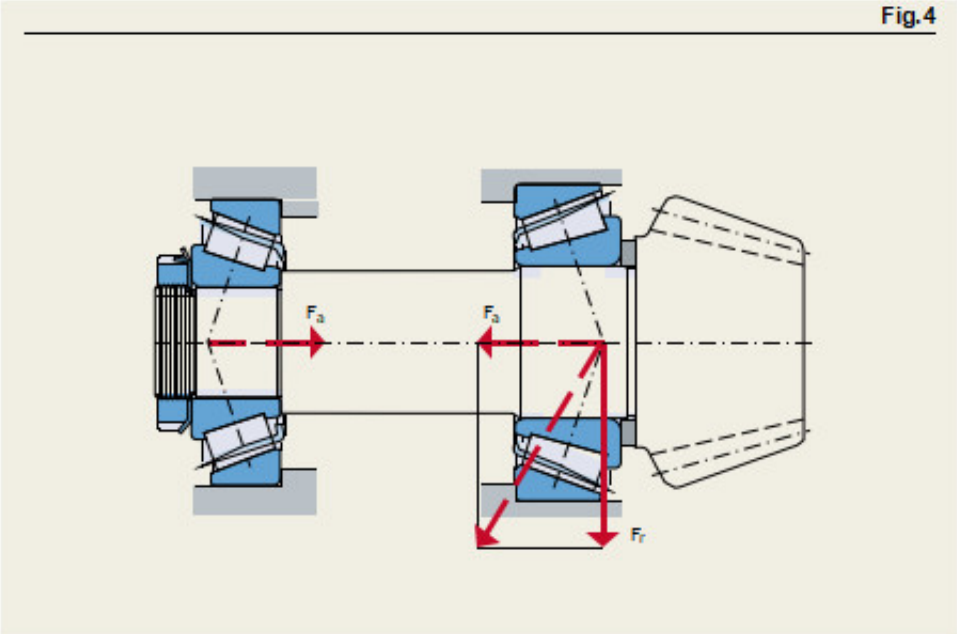
How does single row angular contact ball bearings or tapered roller bearings work in adjusting the preload in the bearing configuration?



When determining preload, the preload force required to provide an optimum com- bination of stiffness, bearing life span and operational reliability should be calculated irst. Then calculate the preload force to be used when adjusting the bearings during mounting; the bearings should be at ambient temperature and should not be subjected to any other load.
The appropriate preload at normal operat- ing temperature depends on the bearing load. A single row angular contact ball bearing or a tapered roller bearing can accommodate radial and axial loads simultaneously. Under radial load, these bearings produce an inter- nal axial load which must be accommodated by a second bearing facing the opposite direction. Purely radial displacement of one bearing ring about the other means that half of the rolling elements are under load. The internal axial load produced in the bearing may be determined by:

When a single bearing is subjected to a radial load Fr, an axial load Fa (external) of the same magnitude as the internal axial load must be used on the bearing if the
basic load rating is for being fully exploited. If the applied external load is lighter, fewer rolling elements will be supporting the load and the load carrying capacity of the bearing is cor- respondingly reduced.In an adjusted bearing arrangement comprising two single row angular contact ball bearings or more tapered roller bearings arranged back-to-back or face-to-face, each bearing must accommo- date the axial load in one direction. When these bearing arrangements are adjusted to near-zero clearance, a radial load acting at a location centrally between the 2 bearings, is halved between them and half the amount of rolling elements in each bearing are loaded.