Reducing radial cutting forces in turning and boring

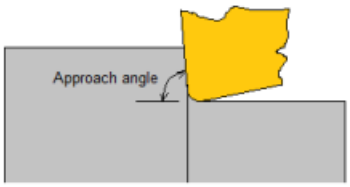
To reduce vibrations, part bending, distortion

The following document applies to both turning and boring.

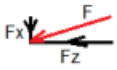
You need to reduce radial forces to:
1. Reduce bending of long parts
2. Reduce vibrations, improve surface finish and dimensional accuracy
3. Reduce distortion of thin walled parts.

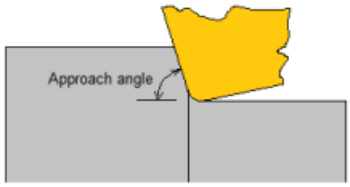
Just 4 rules to achieve this
1. Use a holder style with a larger approach angle
2. Use an insert with a smaller nose radius
3. Use a positive insert
4. Use an insert with a sharper edge

Use a holder style with a larger approach angle



Approach angle less,
Radial force less

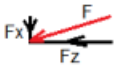


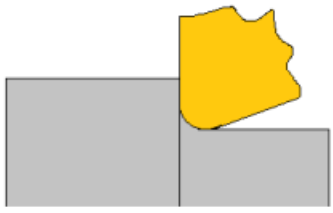


Approach angle more,
Radial force more

Use an insert with a smaller nose radius

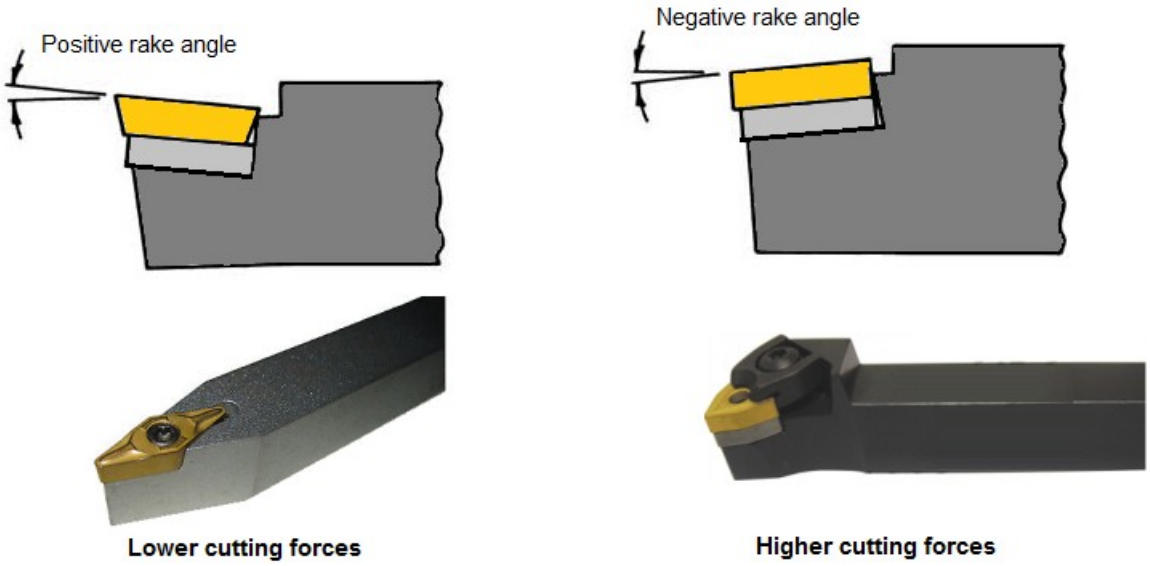
Nose radius less,
Radial force less



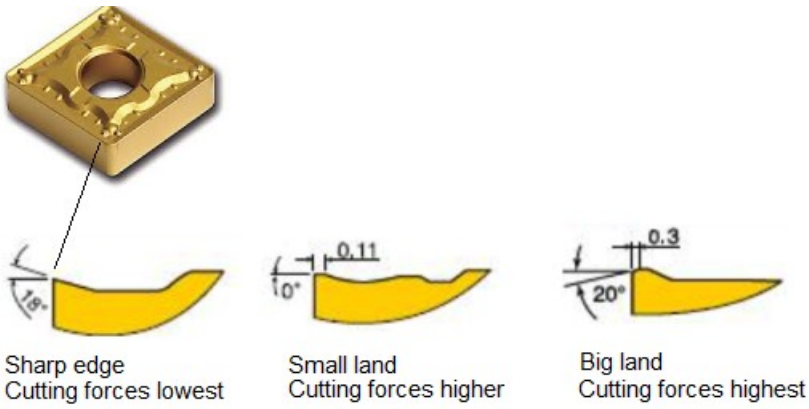


Nose radial more,
Radial force more

Use a positive insert



Use an insert with a sharper edge



Inserts come with different cutting edge geometries for different applications. E.g., Inserts for roughing will have stronger edges with a large land, while inserts for finishing will have a sharp edge.