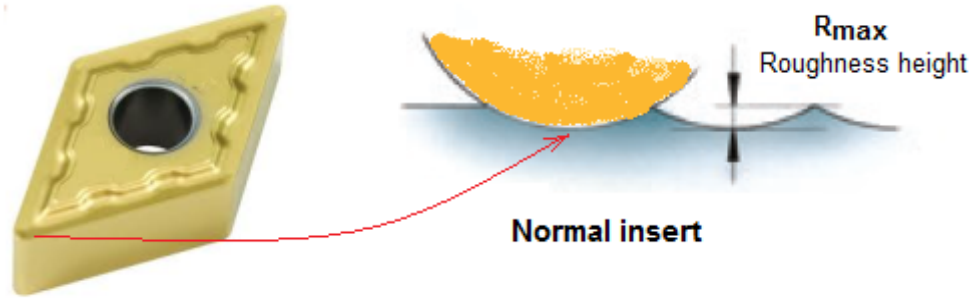
Wipe off some turning time with a wiper insert

How a wiper insert can halve the turning / boring time

Our problem in turning/boring

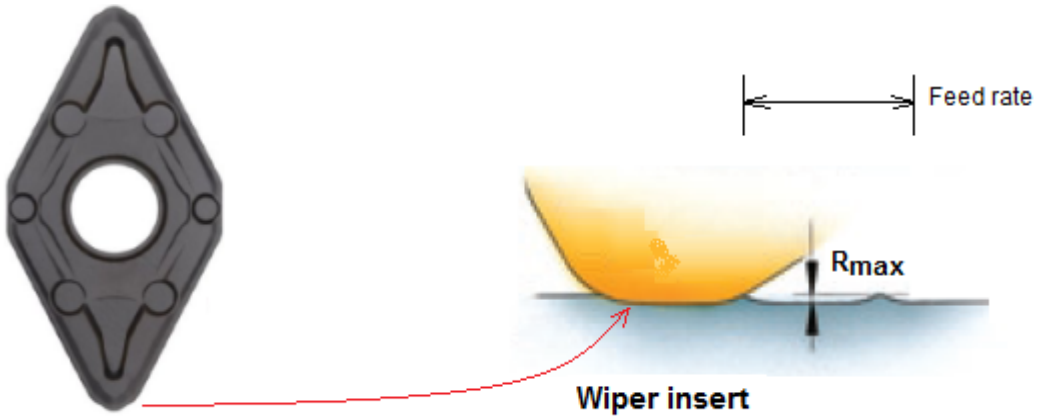


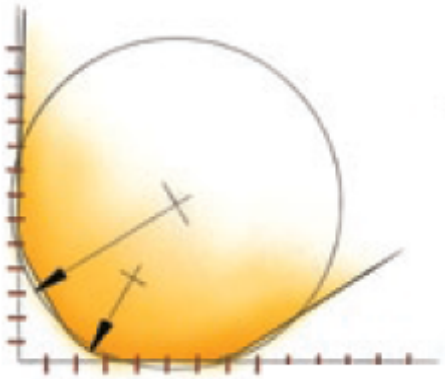
We want two things in finish turning:

1. Good surface finish
2. Low cutting forces so that part distortion is minimized.

The surface finish is decided by the nose radius and feed rate. A larger nose radius gives a better finish, but increases the cutting forces. Higher cutting forces lead to more vibrations, more bending of long parts, more distortion of thin walled parts, etc. A higher feed rate reduces the cycle time, but results in poorer finish. So in finish turning we are forced to use an insert with a smaller nose radius, and forced to use a lowfeed rate to get a good surface finish. This is on the normal insert, with a single radius on the nose.

The wiper insert as a solution





Some pictures are courtesy Sandvik.

A wiper inserts looks just like a normal insert, and comes in the same shapes (C, D, V, etc.). The difference is in the nose radius. The nose is actually a combination of radii instead of a single radius. So you can double the feed rate and achieve the same surface finish, with an increase of 10-15 % in cutting forces. Which means you halve the cutting time, but get the same quality. Alternately, you can use the same feed rate and get a better surface finish – Ra values are typically 2 to 3 times lower. On some materials you can even eliminate a grinding operation. Also, at a higher feed rate chips are thicker and break better.

In sum, the benefits of a wiper insert are:
When cutting at high feed rate

- Reduced machining time
- More number of workpieces with a single insert
- Better chip breaking

When cutting at conventional feed rate

- Improved surface finish
- Eliminate the finishing step by roughing and finishing together

 **Caution:** When turning tapers and radii with a wiper insert, you may have to change the program or the tool offsets. The nomal tool nose radus compensation will not work because of the non-circular nose of the insert. The manufacturer's catalog will have details of any corrections that you will have to make. Some contours may not even be possible with a wiper insert.