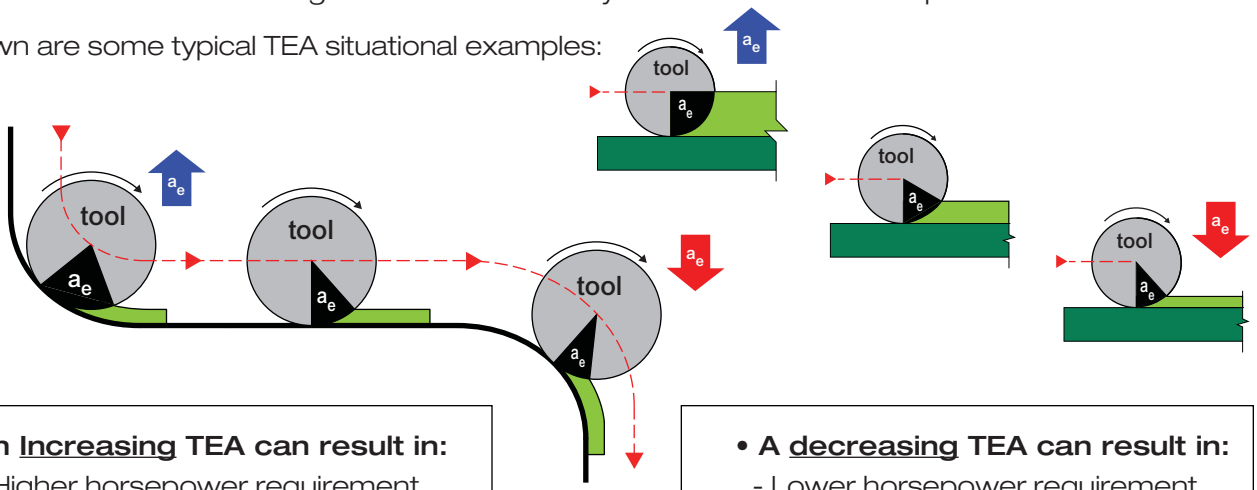
Angle of Engagement & Chip Thinning

Tool Engagement Angle (a_e) - An angular measurement about the periphery of the cutter that is in contact with the material being removed and directly related to the radial chip thickness.

• Shown are some typical TEA situational examples:

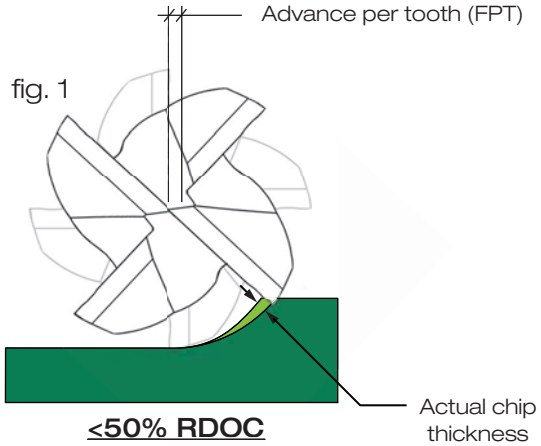


• An Increasing TEA can result in:
- Higher horsepower requirement
- Increased tool deflection
- Higher spindle load (wear/tear)
- Decreased feed rates

• A decreasing TEA can result in:
- Lower horsepower requirement
- Decreased tool deflection
- Lower spindle load (wear/tear)
- Increased Feed Rates

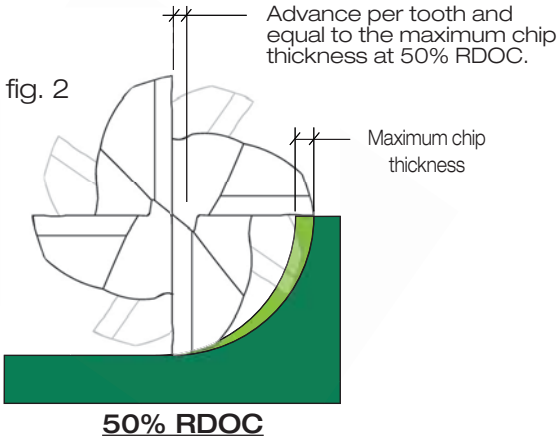
Chip Thinning - Milling with a light radial depth of cut (less than 50% of cutter diameter) causes the chip being formed to be much thinner than the programmed advance per tooth. This results in excessive tool "rubbing" and premature tool wear/life.

fig. 1



<50% RDOC

fig. 2



50% RDOC

So here's what you can do!

- When programming a radial depth of cut (RDOC) less than 1/2 the tool diameter (fig.1) employ the chip thinning calculation (fig. 3). A chip thinning adjustment will prolong tool life and help to reduce cycle time.
- Beware that this feed rate adjustment needs to be considerate of drastic tool engagement, angle increases when milling into corners. Serious feed rate reductions in these areas still apply and will need attention. For more information review page 103.

Radial Chip Thinning Calculation

$$CLPT_{adj} = \frac{CLPT \times (D/2)}{\sqrt{(D * RDOC) - RDOC^2}}$$

Fig. 3