

Twist Compensation in Threaded Wheel Grinding

Twist or bias is a geometric phenomenon in all grinding processes when grinding helical gears with lead modifications. Gleason was a pioneer in understanding the twist phenomena and has developed sophisticated methods to control and compensate for this unfavourable effect.

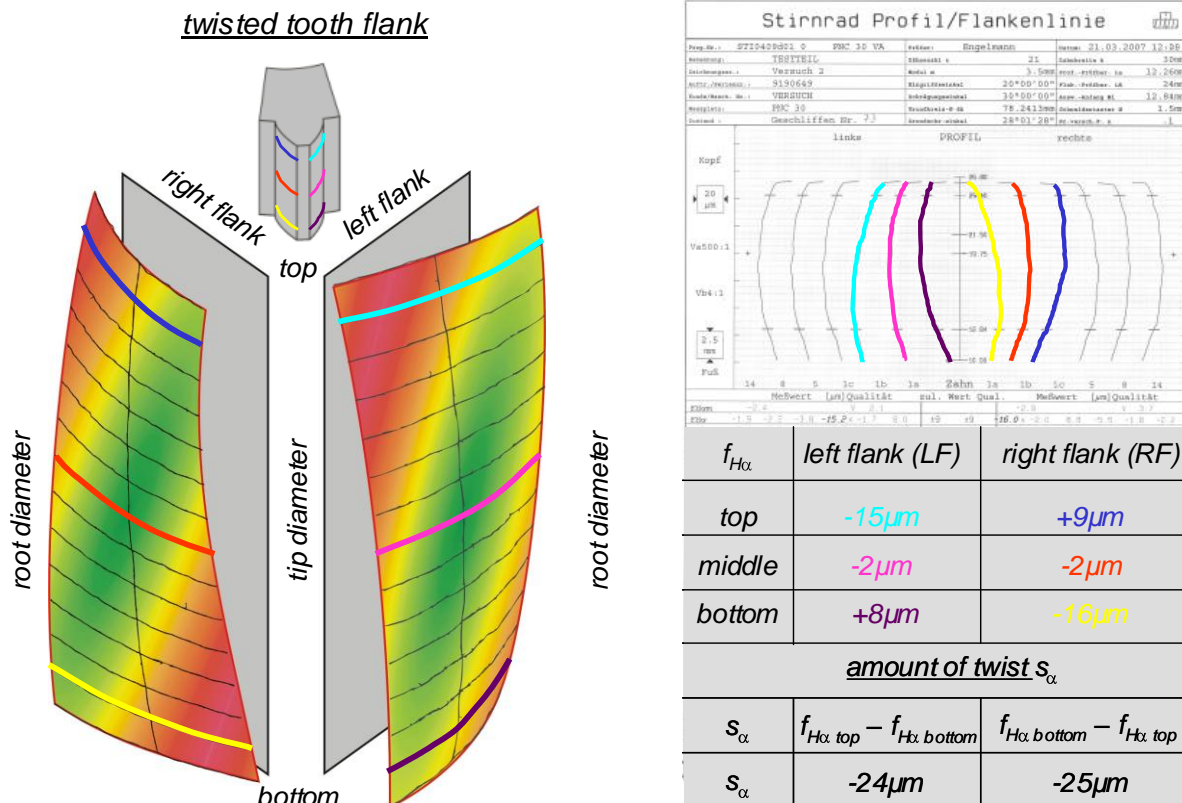


Fig. 1: Twisted tooth flank (natural twist)

Figure 1 shows the so-called natural twist when grinding a helical gear without any compensation. The effect is a dramatic change of profile slope error from the top to bottom of the gear. In this particular case the change is about 24 µm which is equal to a DIN 9 quality! Only the middle profile and lead line has the right, target value. Needless to say, such a quality level is unacceptable in a finishing process such as grinding.

Gleason has developed and patented a method to compensate for this effect. For years gear designers were looking for such methods, and they are now available on Gleason's profile and threaded wheel grinding machines.

By using a non cylindrical but barrel shaped grinding worm wheel (see figure 2), different pressure angles on left and right flank of the gear can be generated by changing the axial position along the wheel length. This effect allows the creation of defined amount of twist which compensates with the natural twist resulting in no twist or whatever the customer requirements are.

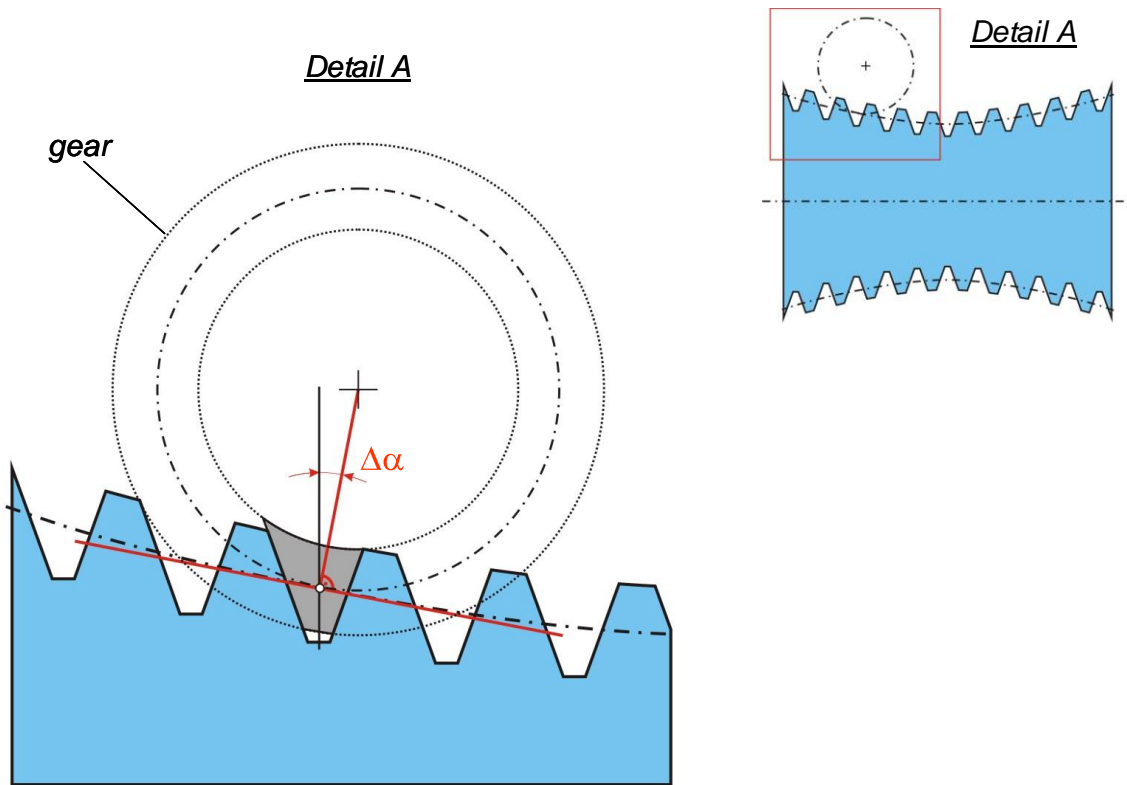


Fig. 2: Principle of twist modification

The results of this method are amazing. A result for twist compensation is presented in figure 3. The left hand side shows a profile and lead chart of a ground module 3 gear with 10 μm lead crowning. The twist phenomenon (change of slope error from top to bottom) is obvious and is $-21 \mu\text{m}$ in this example. The right hand side shows a result of the same gear but ground with Gleason's twist compensation method. The twist is totally eliminated.

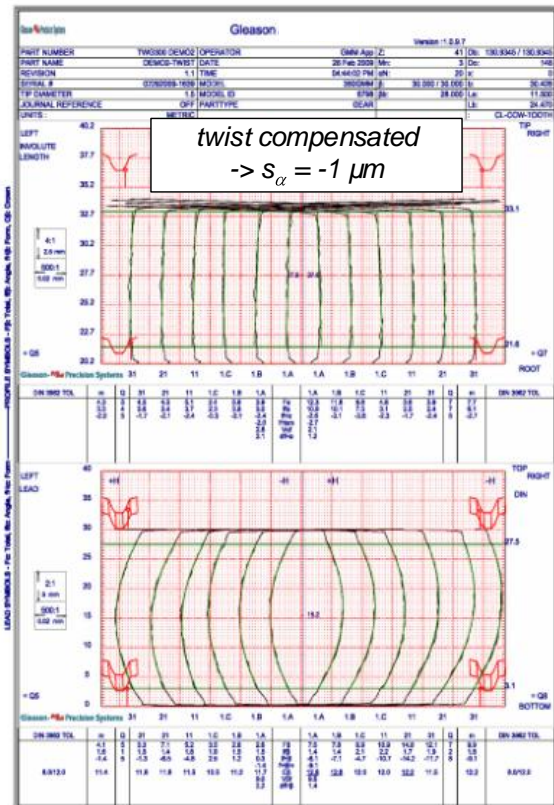
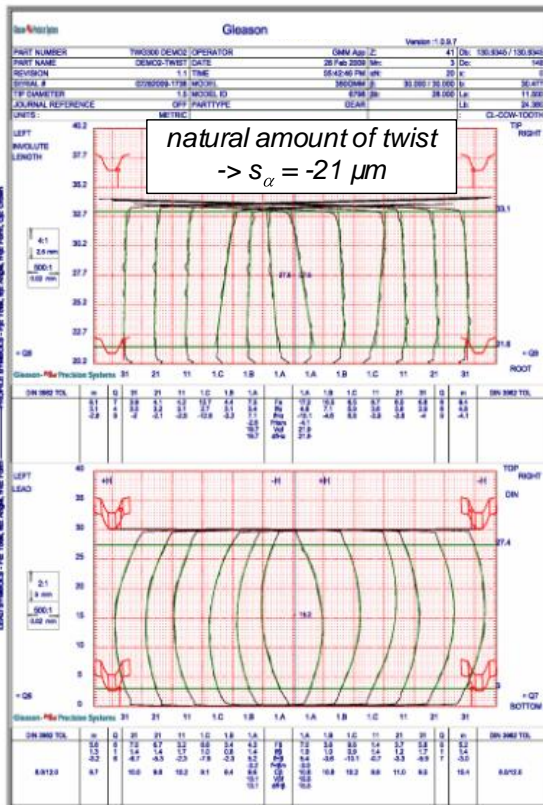


Fig. 3: Result of twist compensation

Please contact Gleason or watch the Webinar about threaded wheel grinding on our website to learn more about this sophisticated method.

[Click here to watch webinar now](#)