Synopsis:

Helix end relief is often specified on gear drawings. Mitsubishi Heavy Industries Machine Tool Co. has developed a successful method to achieve this within the hobbing cycle.

Special Hobbing Function: Helix End Relief Within the Hobbing Cycle

When helix end relief is required for gear manufacturing, it can be achieved with a optional modification to the hobbing cycle without additional tooling.

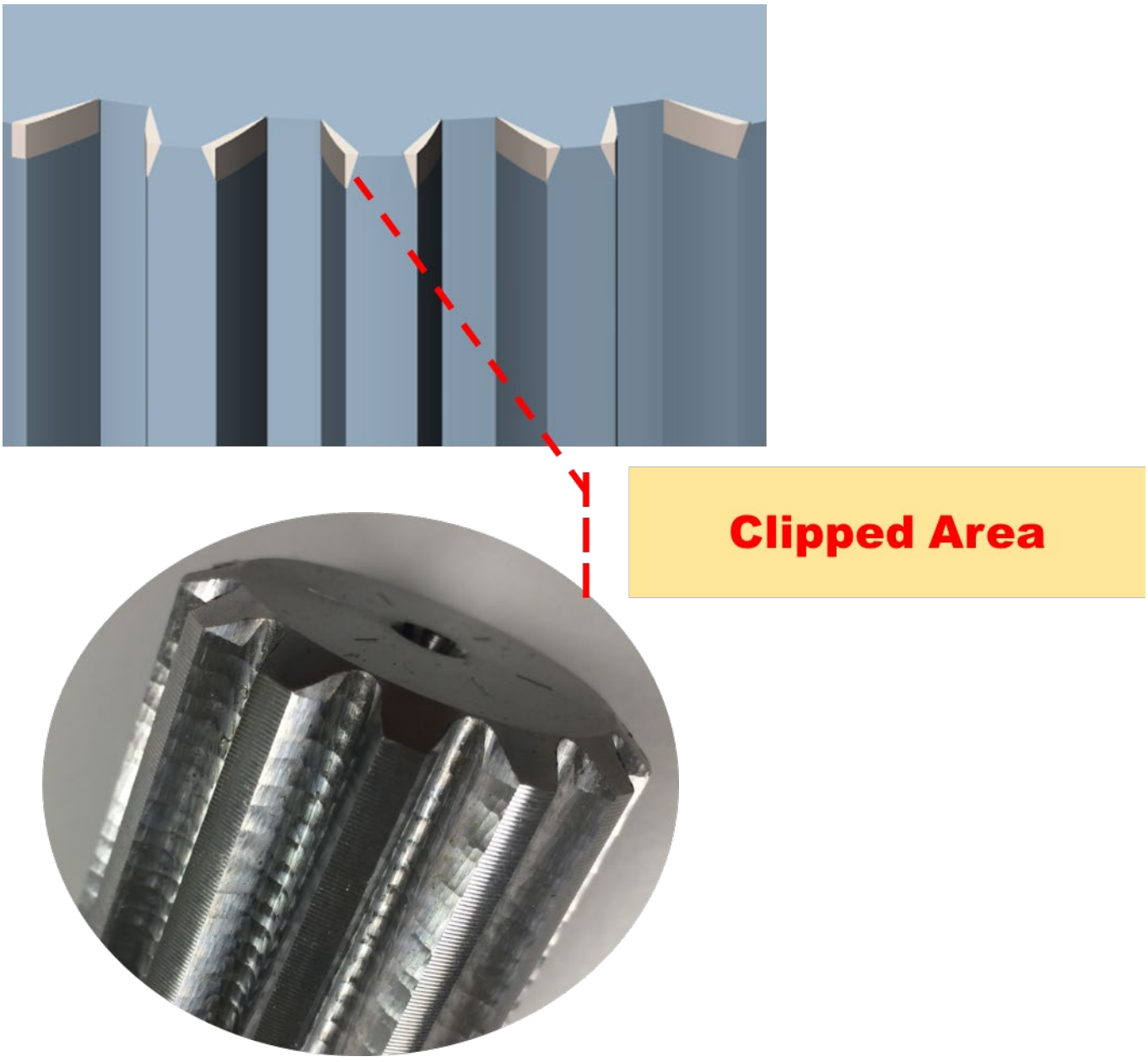
End Relief on Spur Gear

End relief on gear teeth is often used to maintain contact in the central region of the tooth and avoids edge contact which can reduce load capacity. It may also be employed on splines as a lead in for motion or assembly and on certain pump gears. Certain applications can reduce or eliminate the need for secondary deburring.

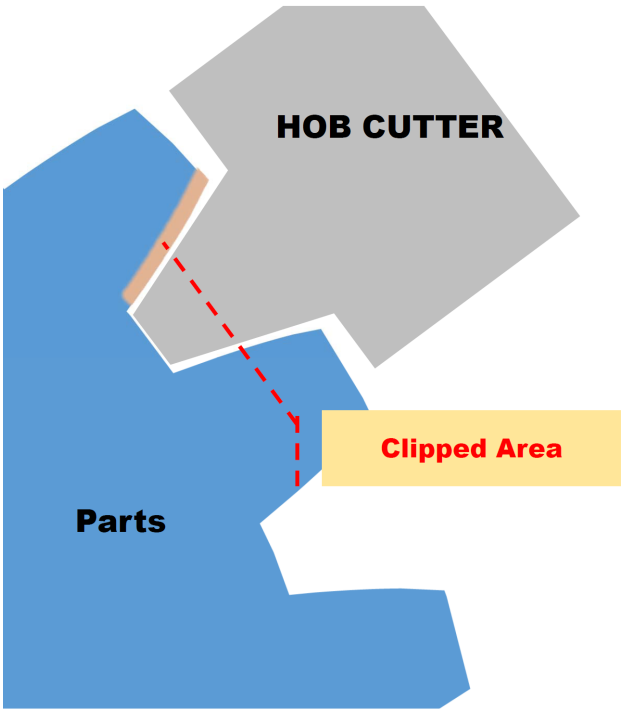
For gears that are finished ground, end relief can be created by kinematics of the grinding operation. For gears or splines that are finish hobbed, creating the end relief may be achieved by a secondary operation requiring additional equipment, time and cost.

By utilizing precise control of multiple axes and controlling it with custom software, the Mitsubishi GE20A hobbing machine uses the hob mounted for generating the part to cut

the end relief. This method has been nicknamed “clipping”, and is a special extension of the standard hobbing process.



Due to the angle of the hob thread lead relative to the gear or spline tooth, there is a slight asymmetry to the amount and length of the relief from one flank to the other. This is generally within an acceptable range.



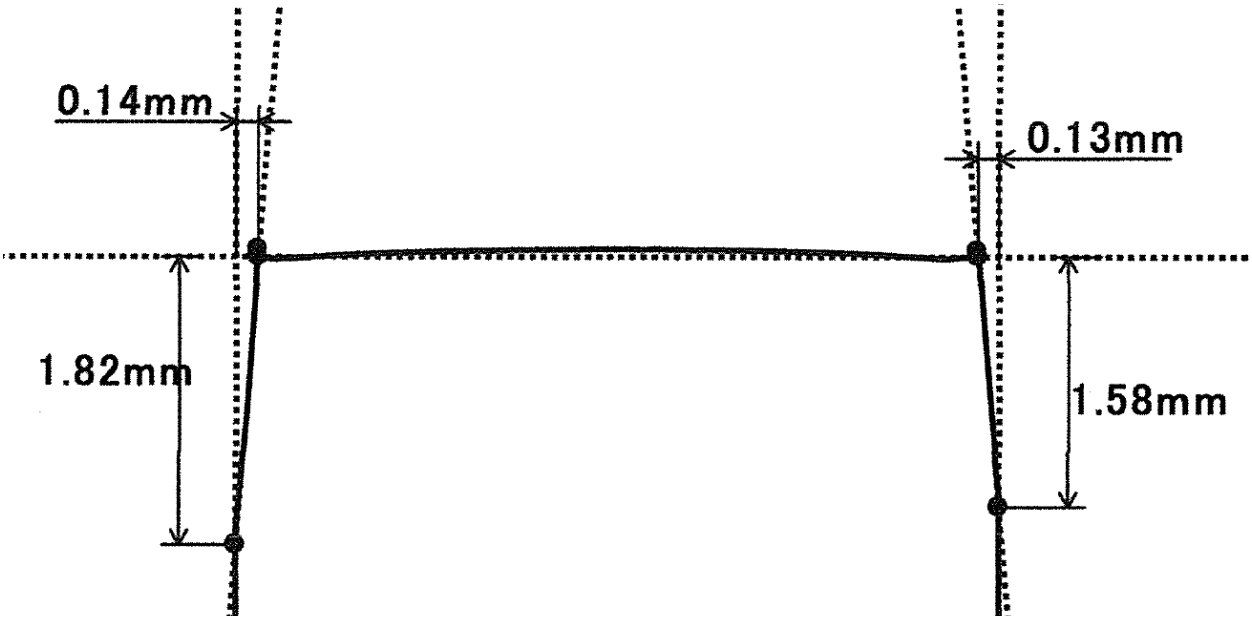
Principle

(1) Hob spindle and part spindle are synchronized in for normal hobbing.

(2) The part spindle is offset at the end of part when clipping process is applied.

(3) By using this offset, the tooth flank at the end is side cut and the end is clipped, creating end relief.

(4) The clipping process is done one flank at a time.



End Relief amounts and lengths

Producing gears and splines with helix end relief can be efficiently and cost effectively achieved without the need for secondary operations or special equipment. Use of Mitsubishi's "clipping" process is a proven manufacturing solution for gear makers.

For more information or to talk with our experts, contact Mitsubishi Heavy Industries America, Inc. Machine Tool Division at 248-669-6136.

Follow us, and check out our videos:

MITSUBISHI MACHINE TOOLS