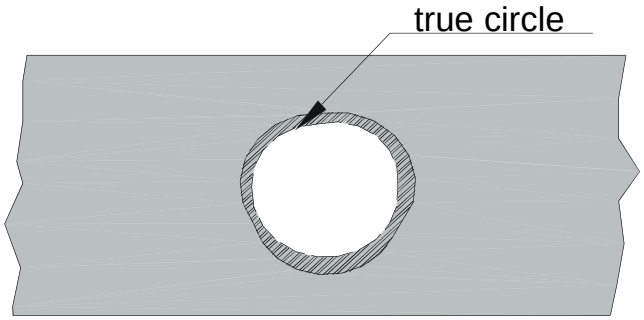
– Walter Prototyp

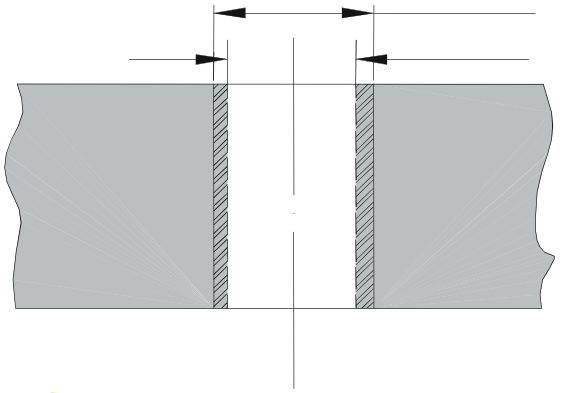
Troubleshooting and Wear Patterns

Core Hole

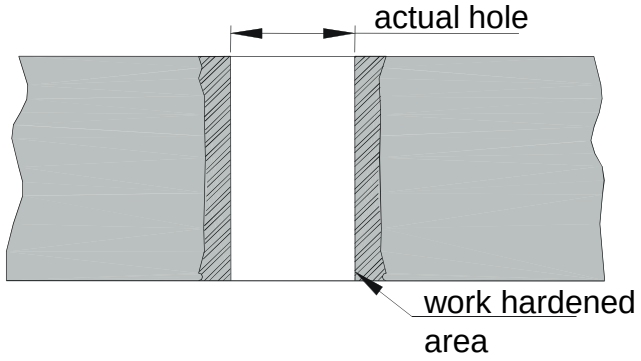
Out of Round Holes



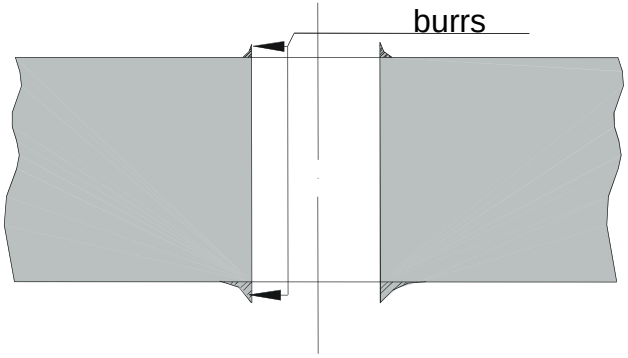
Undersized or Oversized Holes



Hardened Holes

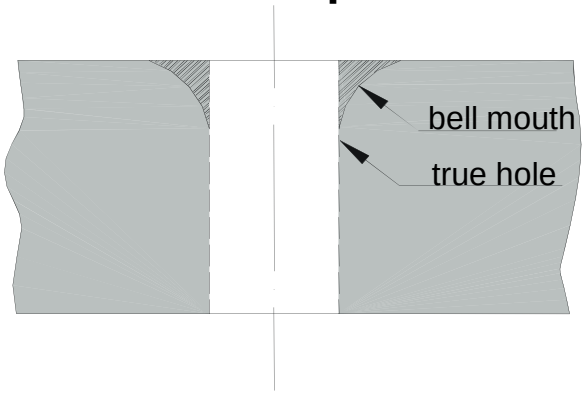


Badly Burred Holes

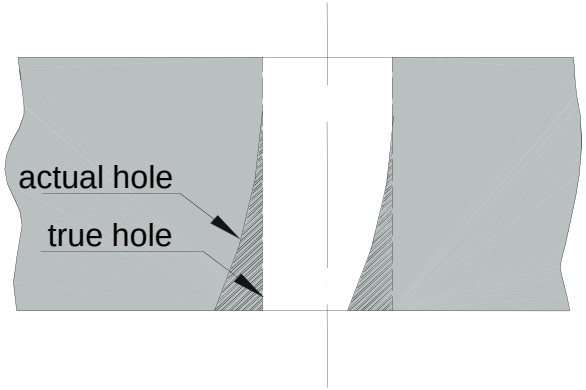


Core Hole

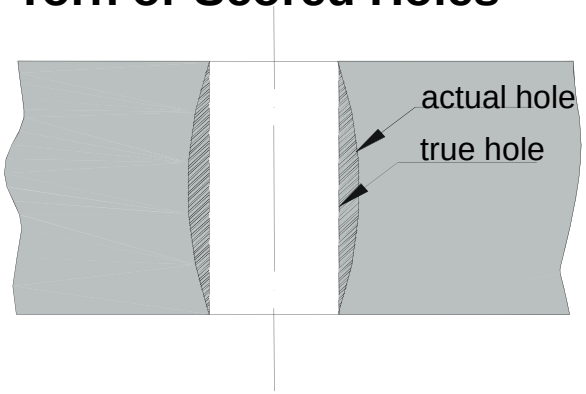
- **Bell Mouth Tapered Holes**



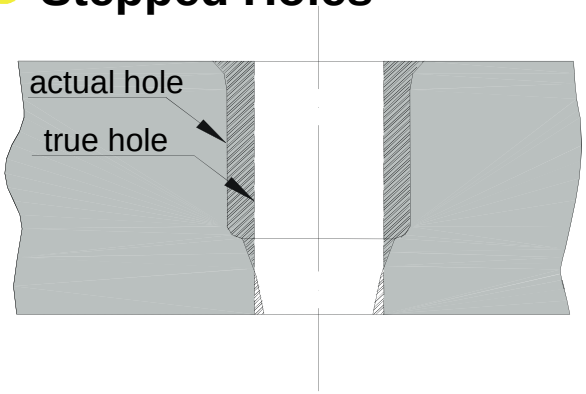
- **Bent or Crooked Holes**



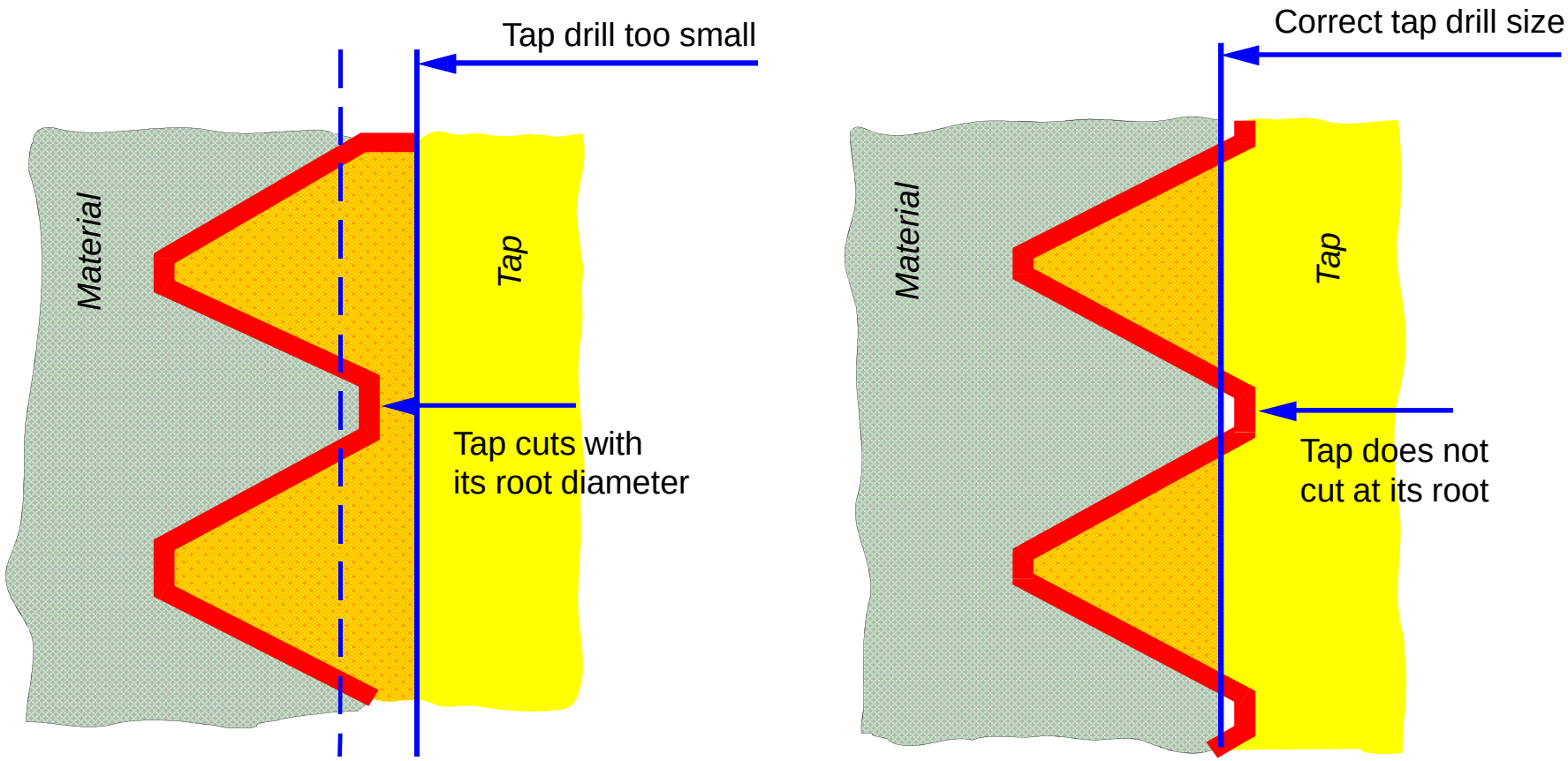
- **Torn or Scored Holes**



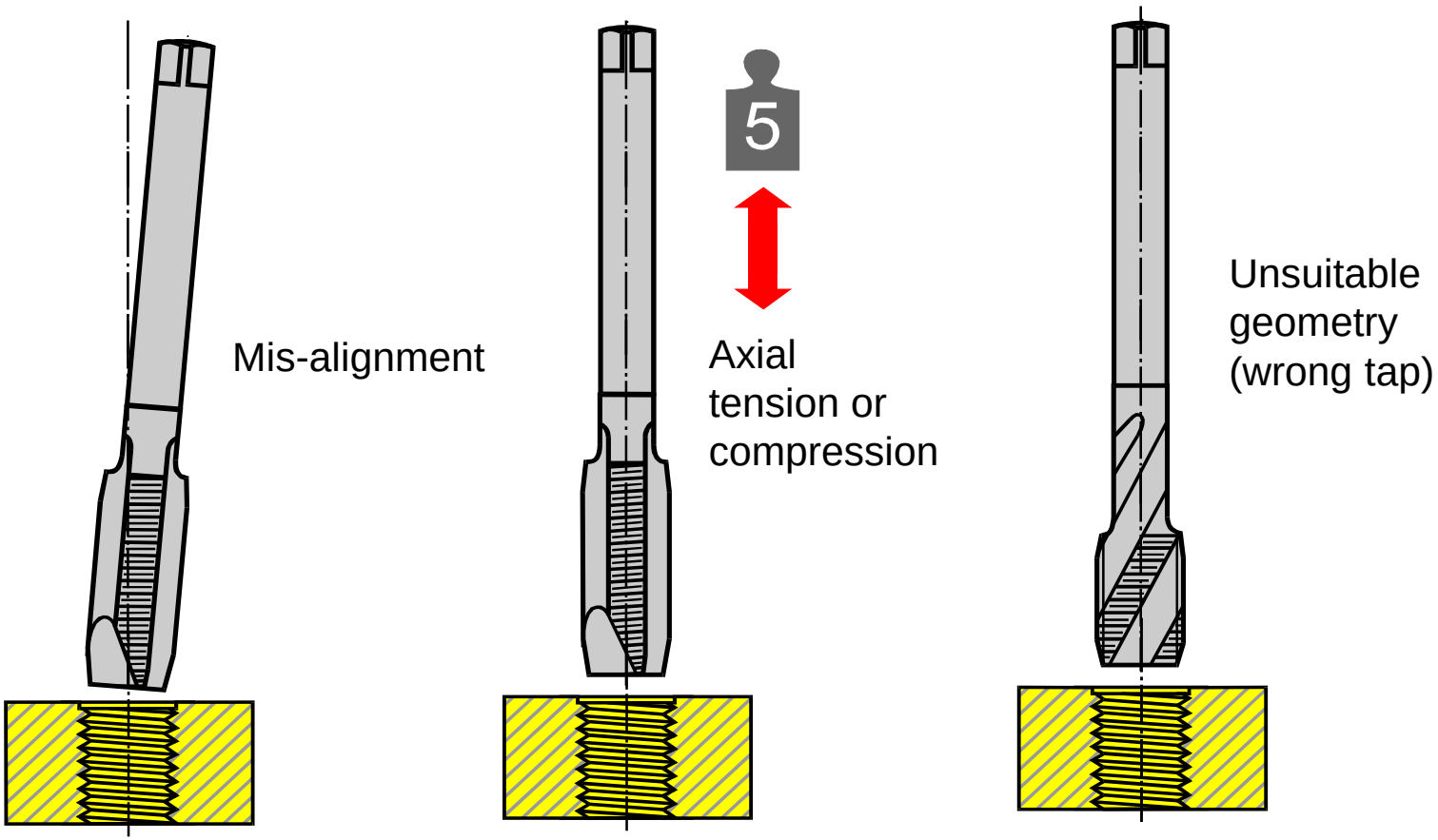
- **Stepped Holes**



Reasons for Inaccurate Threads

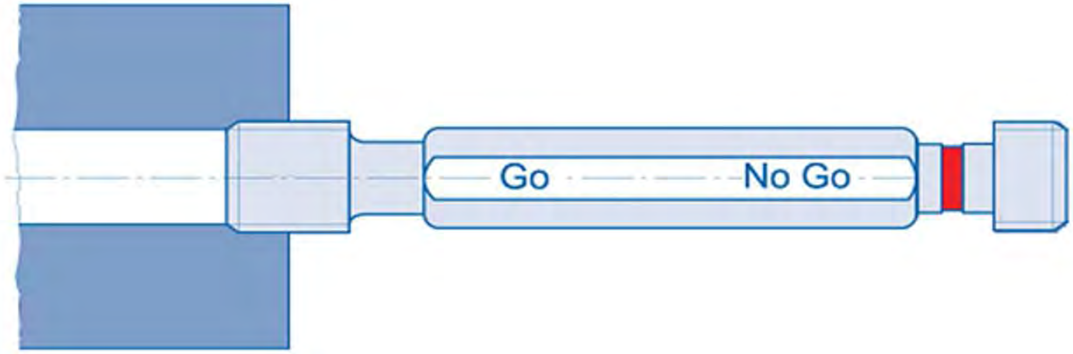


Reasons for Inaccurate Threads



Thread Gaging

Go / No-Go Plug Gage



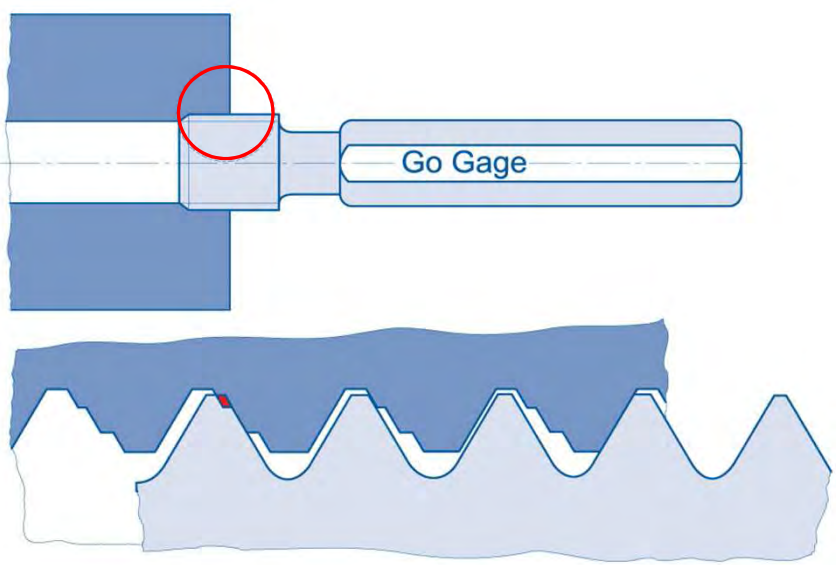
Go Plug Gage

- Checks lower limit of Pitch diameter
- Checks form roundness / straightness
- Checks lower limit of Major diameter

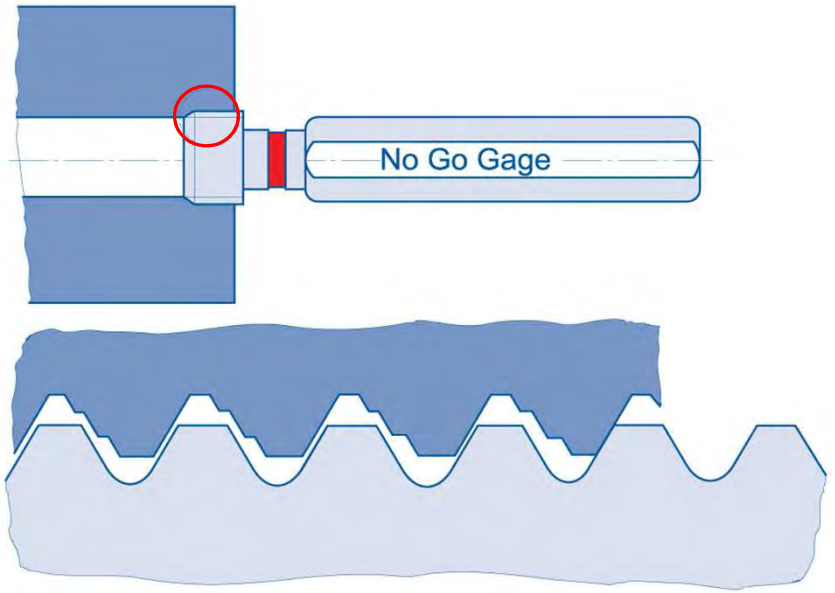
No-Go Plug Gage

- Checks upper limit of Pitch Diameter
- Should not exceed 2.5 turns

Axial Miscut

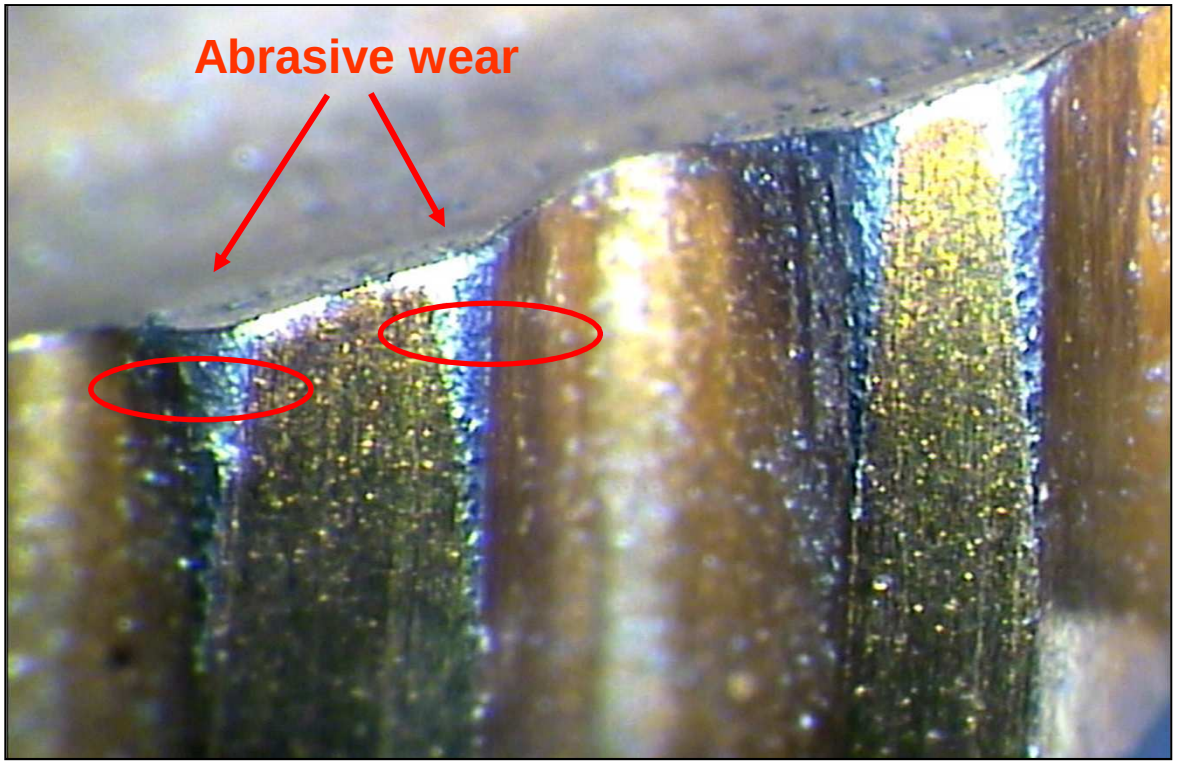


- Go Gage is unable to thread into part



- No Go Gage is able to thread into part more than 2.5 turns

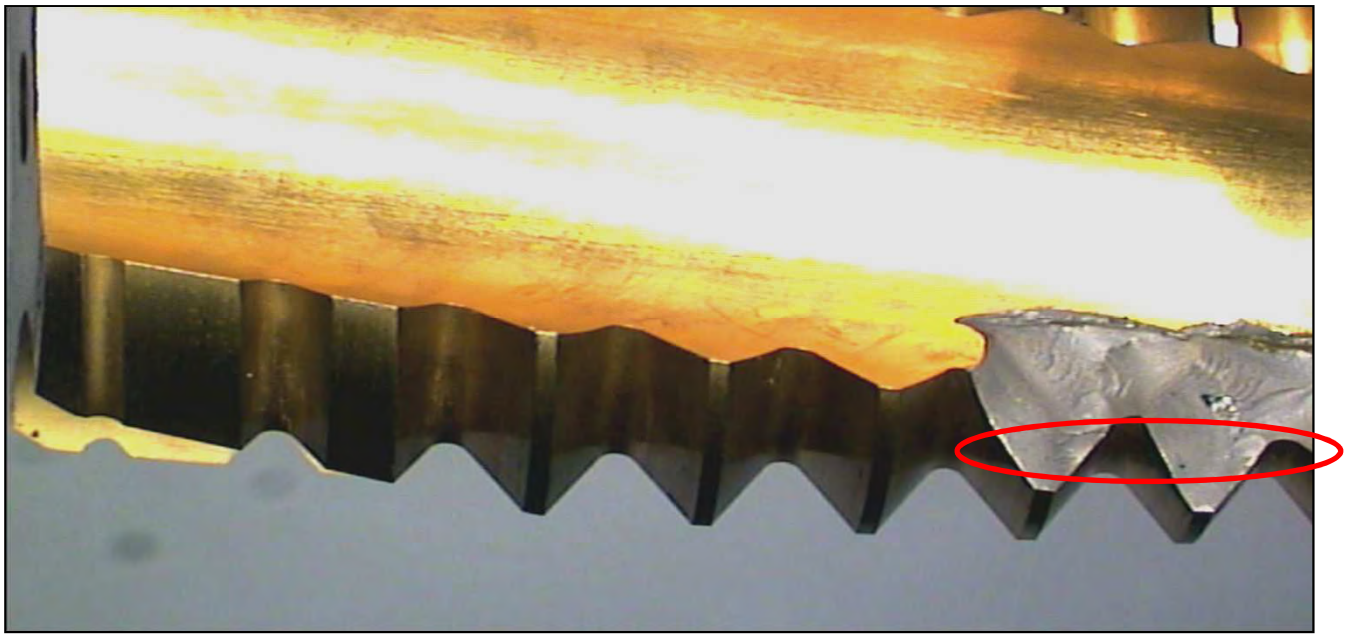
Abrasion



Cause

- Low thread relief
- Inappropriate coating or surface treatment

Chipping on the chamfer



Cause

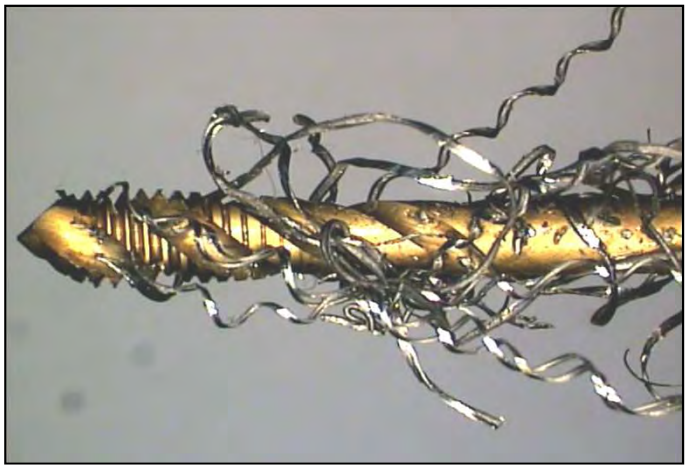
- **Rake angle is too positive**
- **High tool hardness**

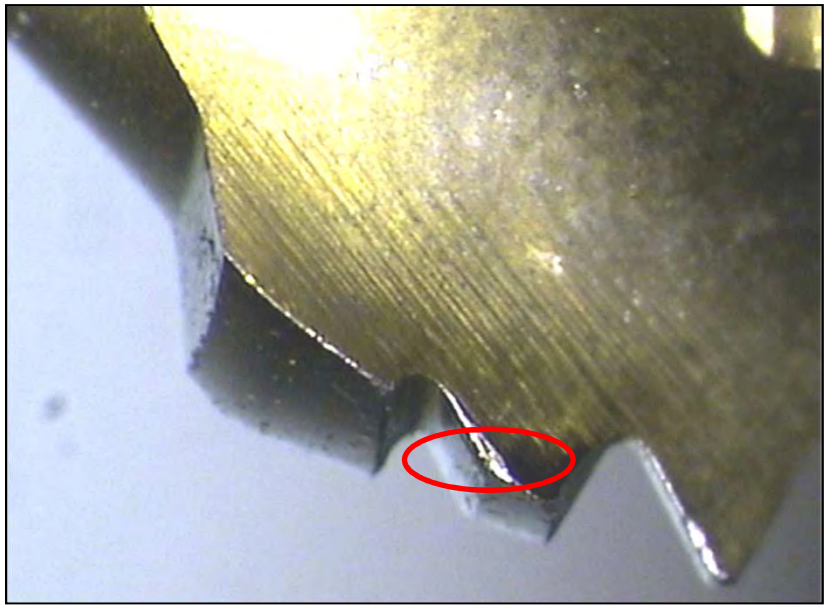
Oversize threads

To avoid oversize threads:

- **Check class of fit**
- **Rigid tapping / Synchronous machining**
- **Use a material specific tap**
- **Use a tap with lower spiral angle where appropriate**
- **Use taps that have had a special blasting treatment**

Bird nesting



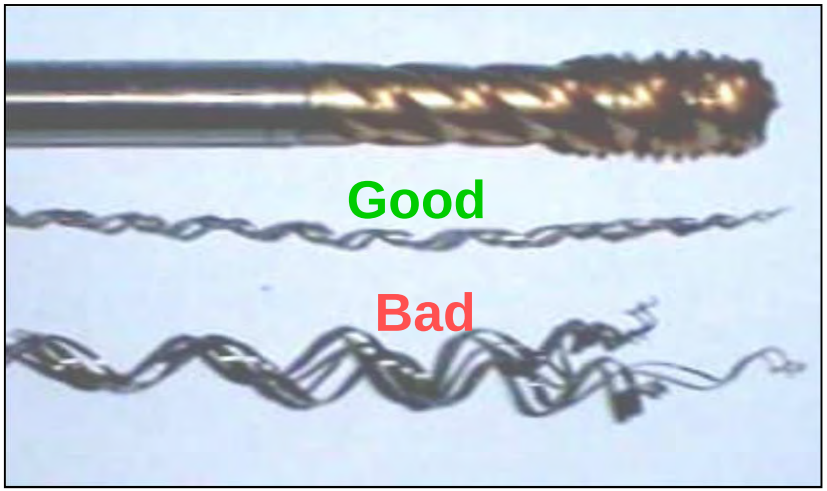


- Due to poor chip formation
- Occasional peaks in torque
- Results in tool chipping
- Breakage on small diameters

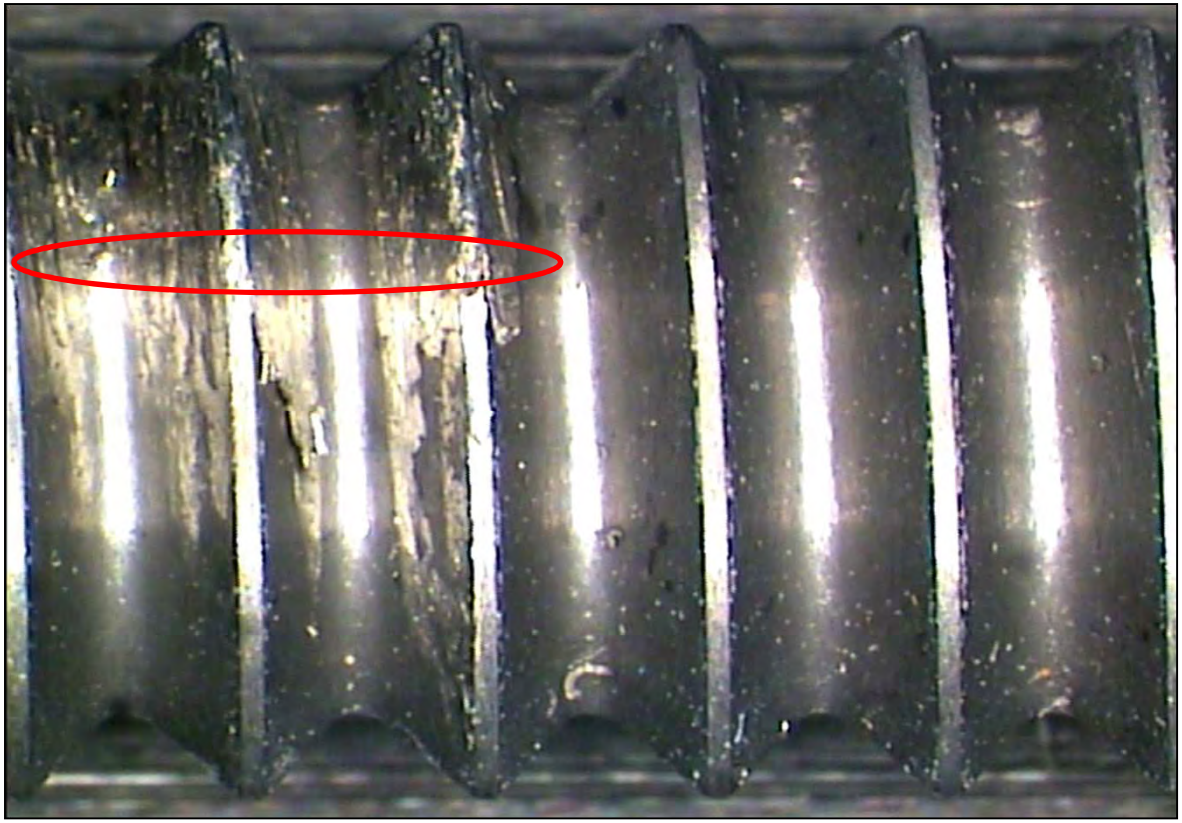
Bird nesting

<u>To improve chip formation:</u>

- Use bright or steam-oxide taps instead of PVD-coated tools
- Use THL instead of TIN and TICN
- Reduce the rake angle
- Shorten the chamfer length
- Reduce the number of flutes

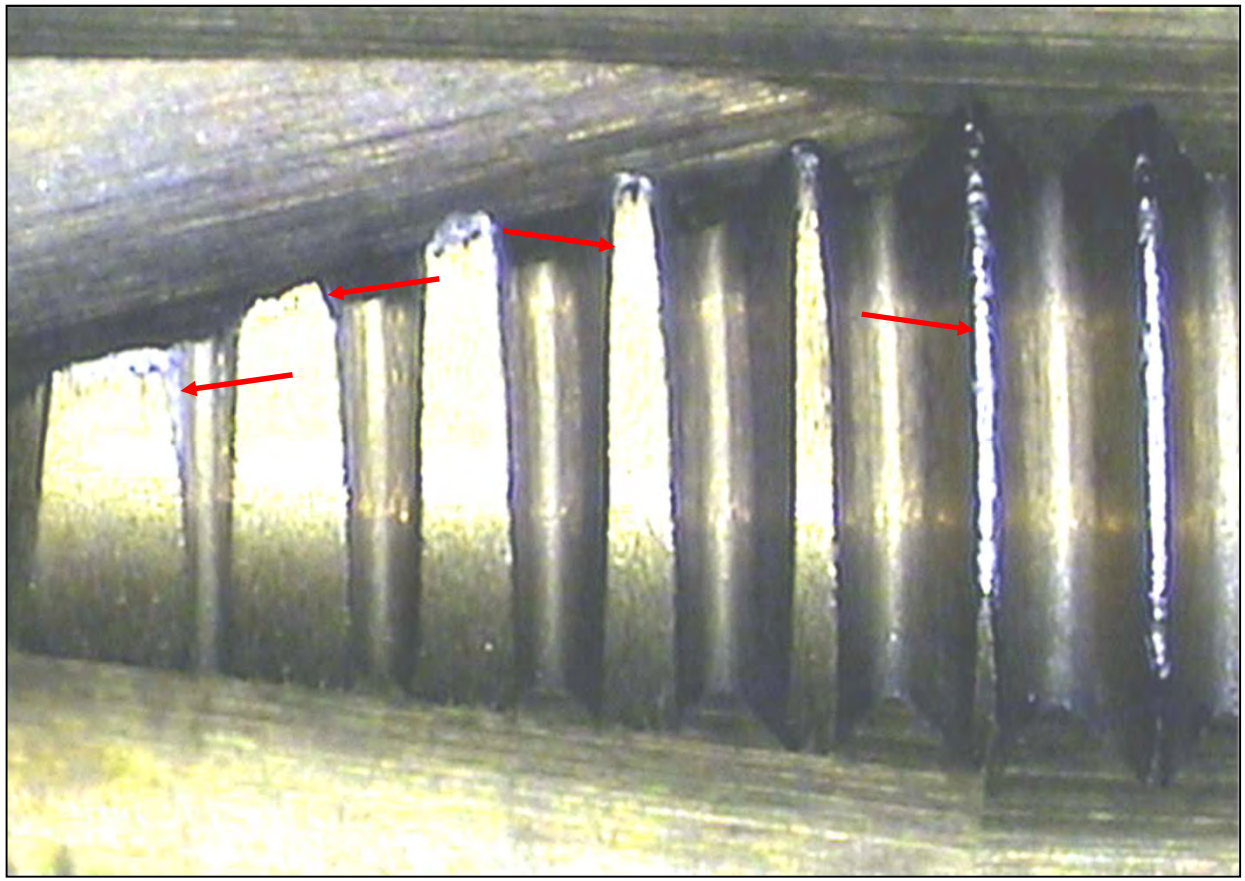


Cold welding



Causes

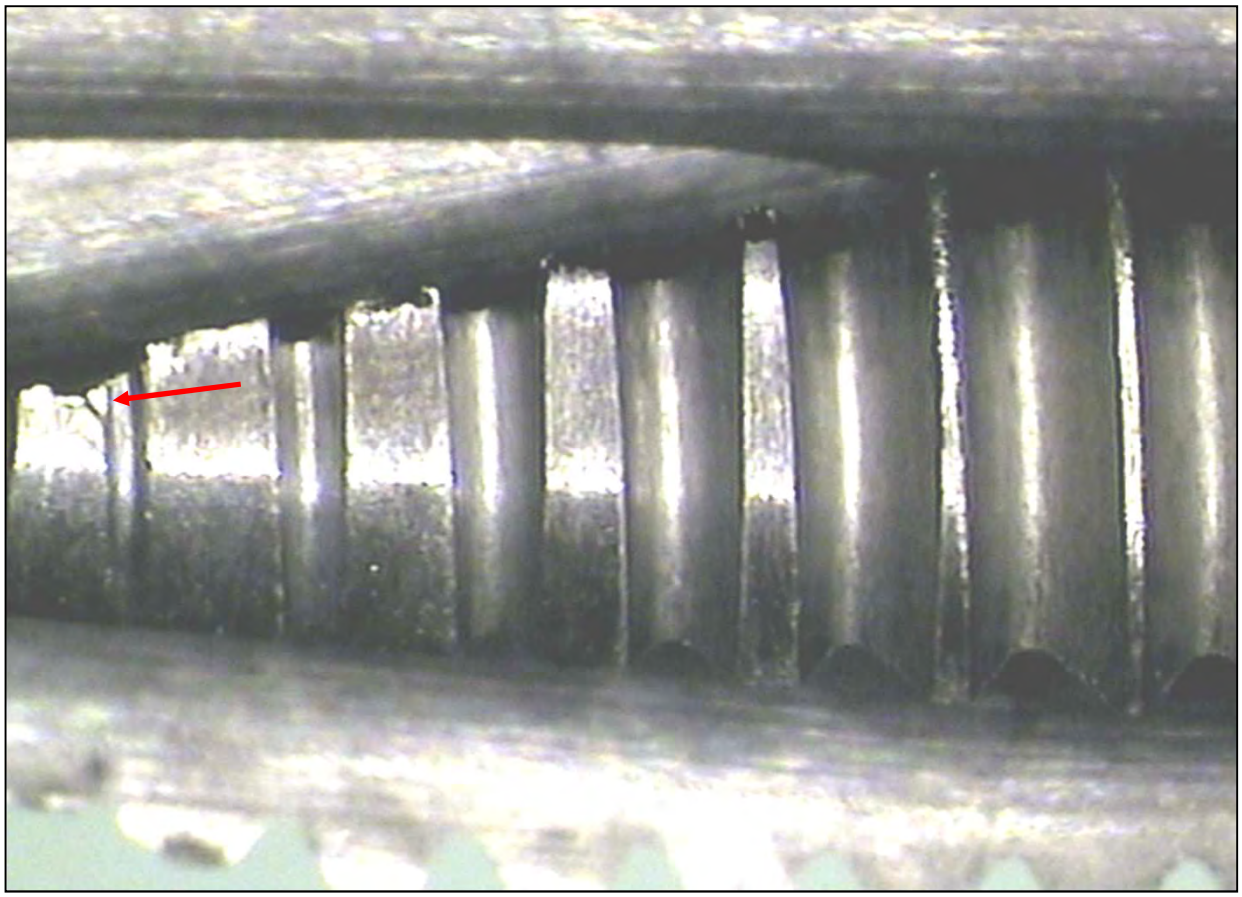
- Thread relief too high
- Surface finish of tool inappropriate



Flank wear

Causes:

- Friction between the tool's flank and work piece due to relatively small relief angles
- Greater reliefs only possible with synchronous thread cutting!

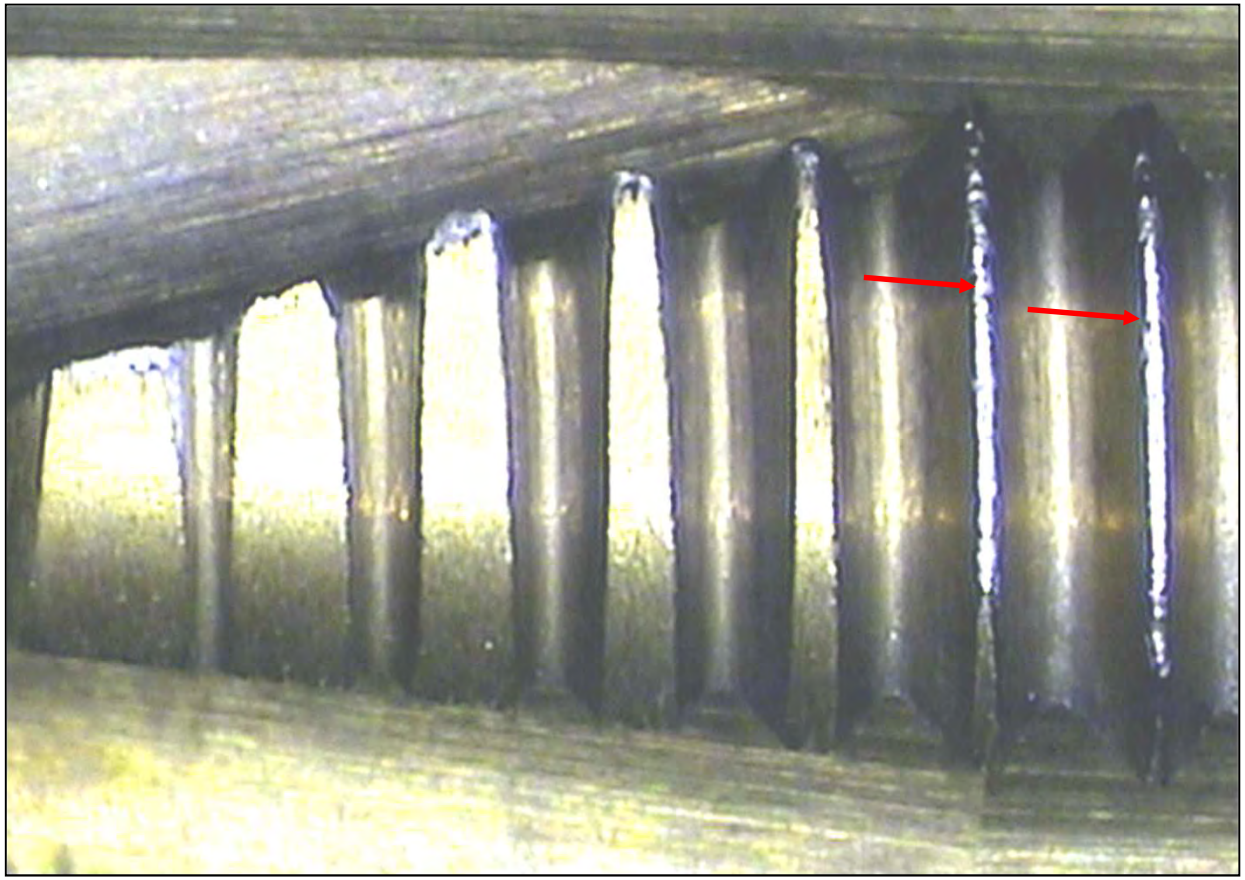


Flank wear

Here, particularly in the core area of the first chamfer tooth

Cause:

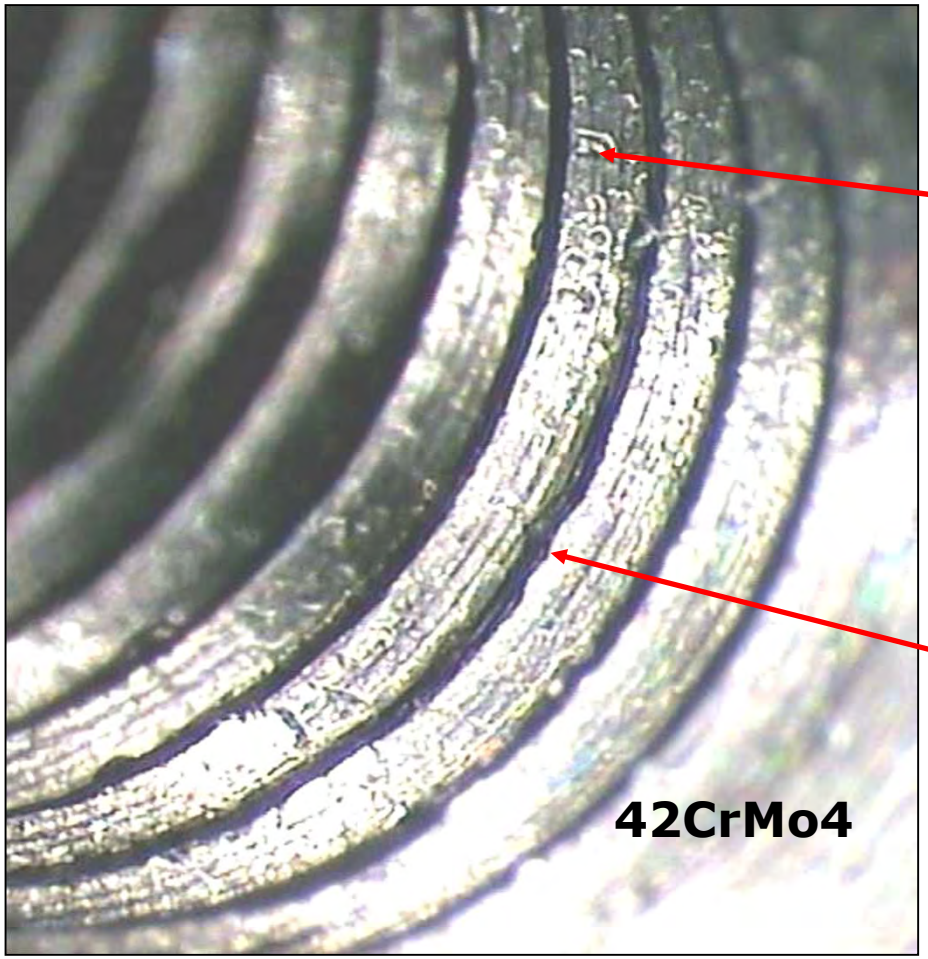
- Hardening of the core hole from drilling with solid carbide twist drill and oil as lubricant



Flank wear

Wear on the first full tooth facilitates wear at the second tooth, etc.

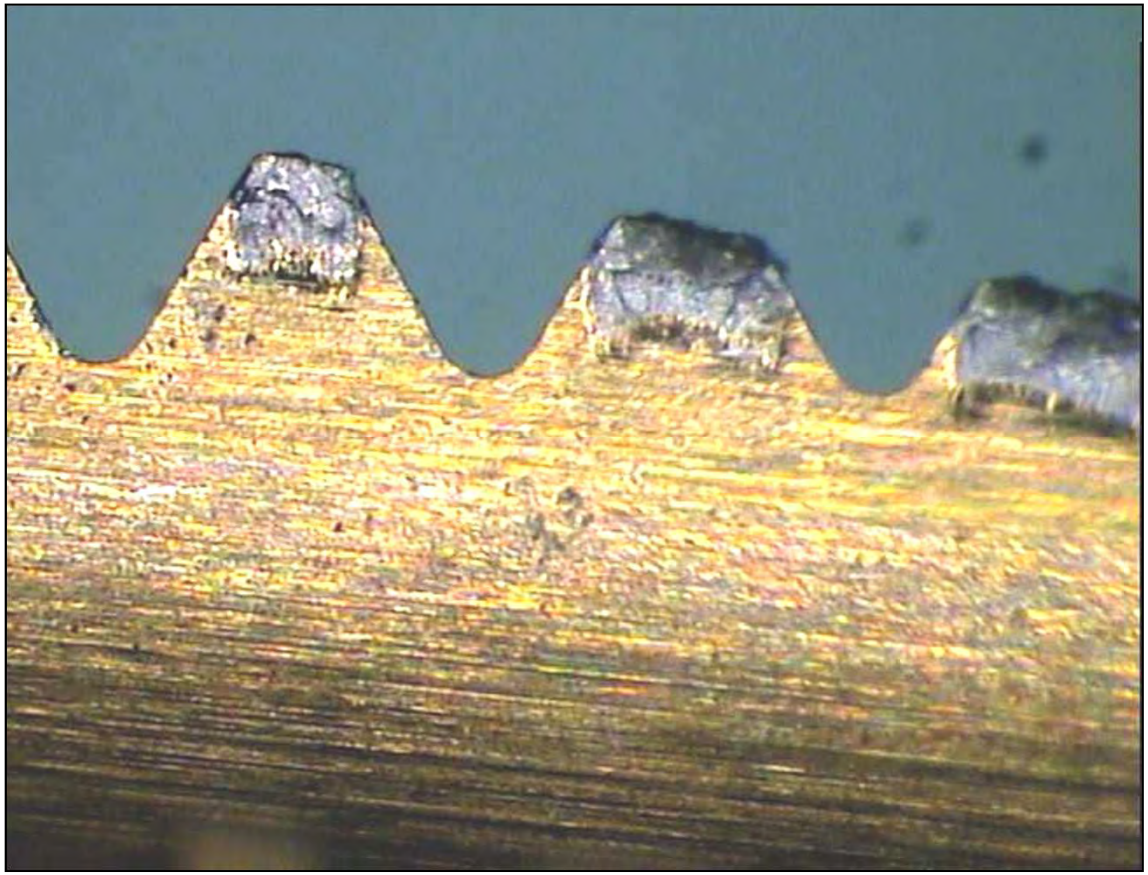
The tapering of the guide section means that the cut thread becomes increasingly smaller



Flank wear

Creation of burrs in the core of the internal screw thread particularly when the screw taps wear more in the core due to hardening of the core holes

Core diameter may therefore even become smaller!



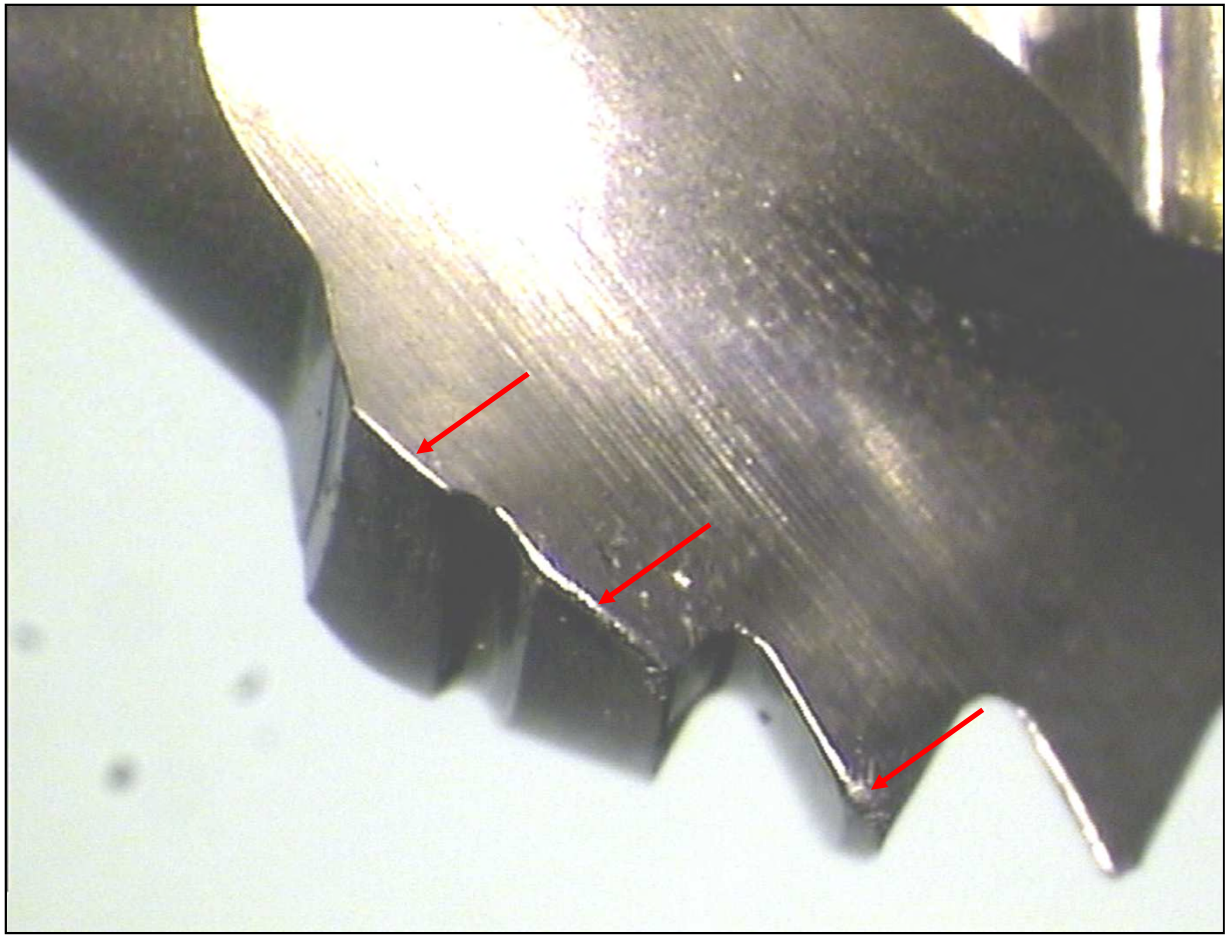
Crater wear

Cause:

- Cutting speed too high

Occurs more in materials that are difficult to cut

Example:
Prototex ECO-HT in 42CrMo4

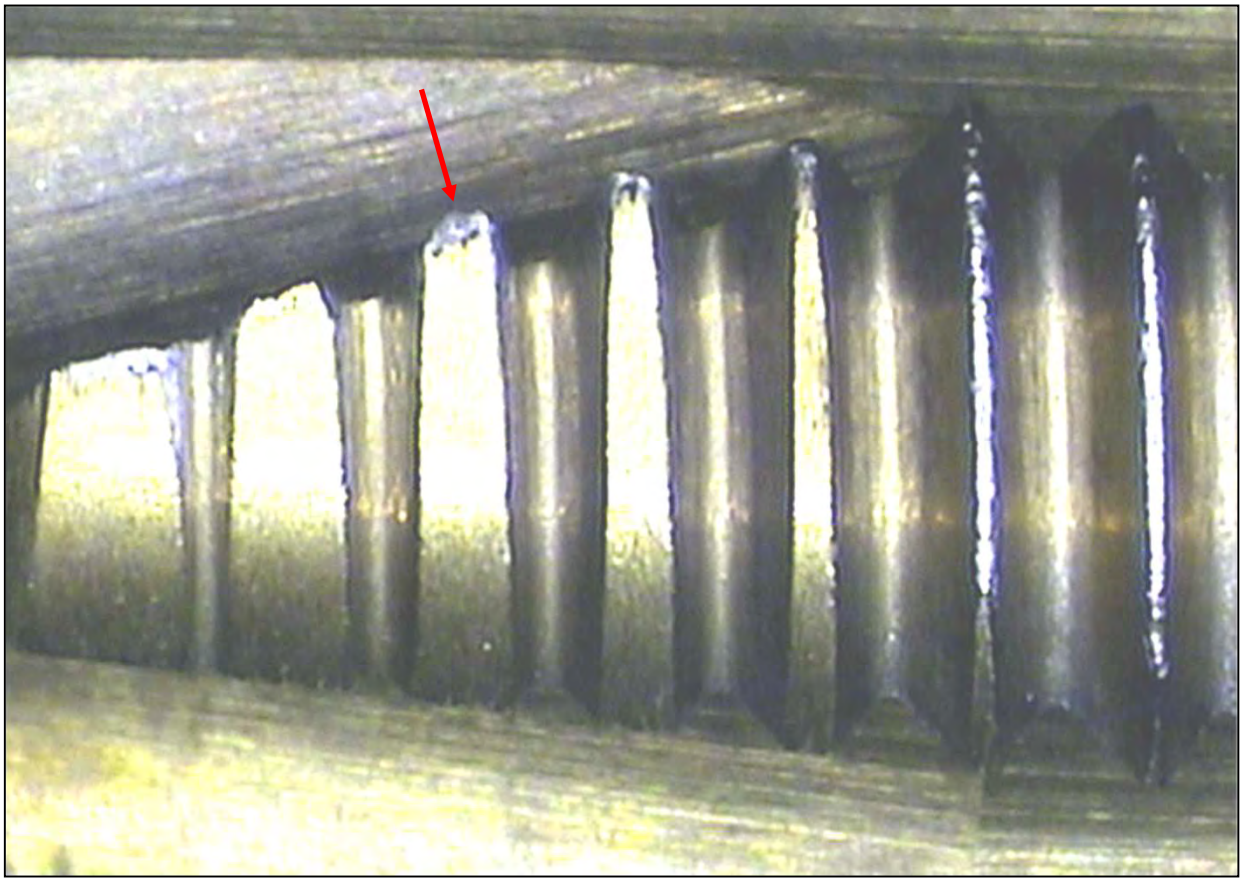


Rounded cutting edges

Cause:

- Sum of flank and face wear immediately on the cutting edge

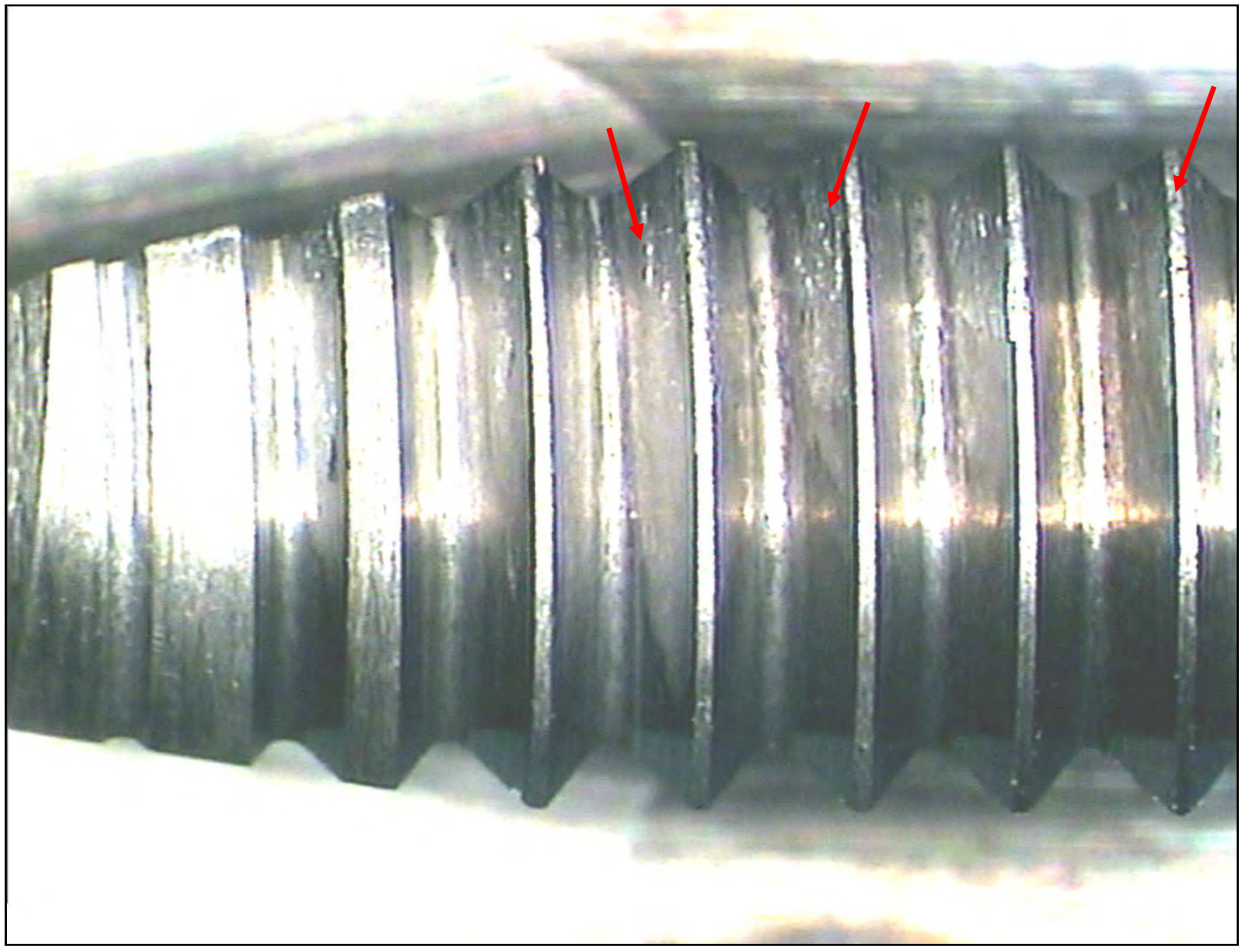
Positively affects the creation of chips and true-to-gauge properties



Built-up-edge cutting

Causes:

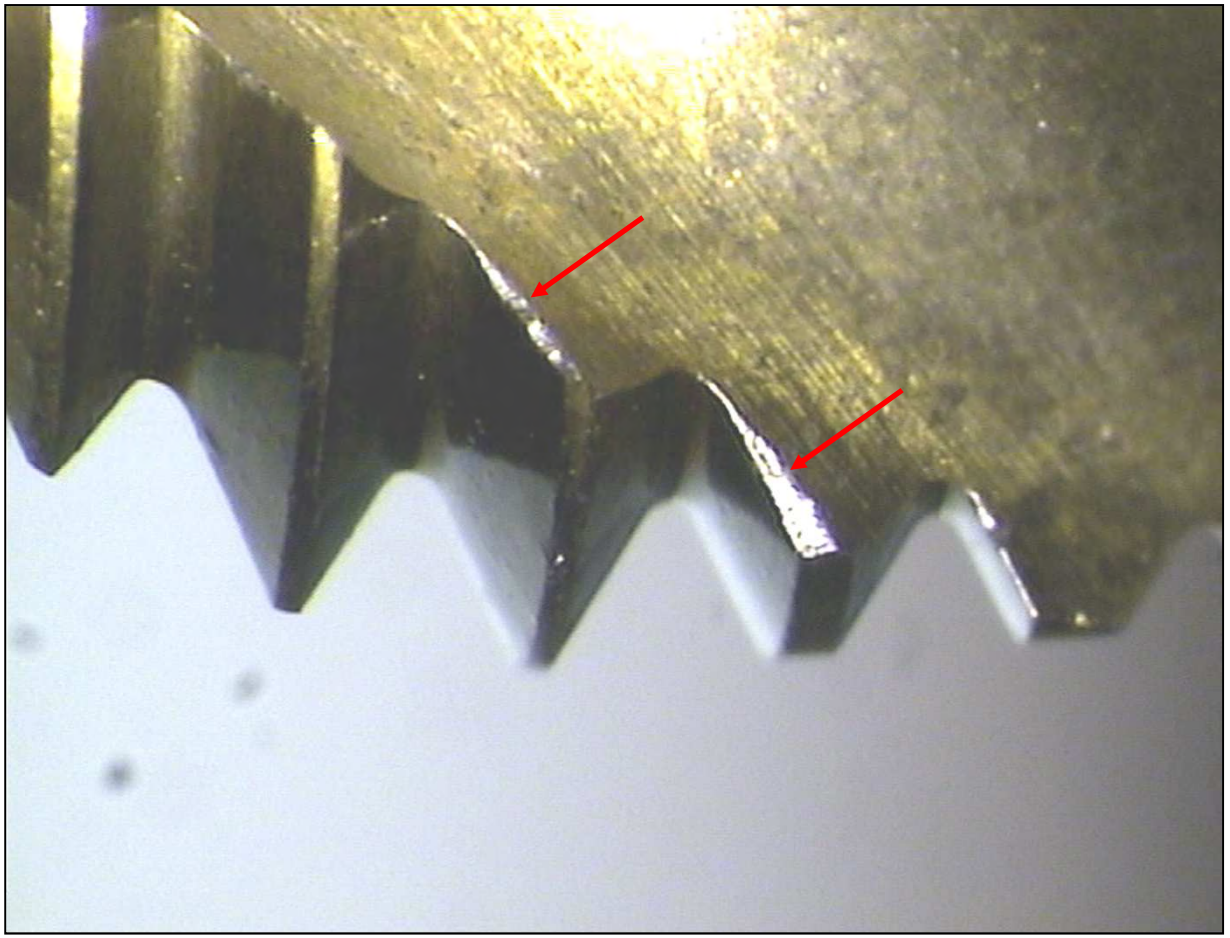
- Insufficient cutting speed
- Insufficient lubrication



Bonded deposits

Causes:

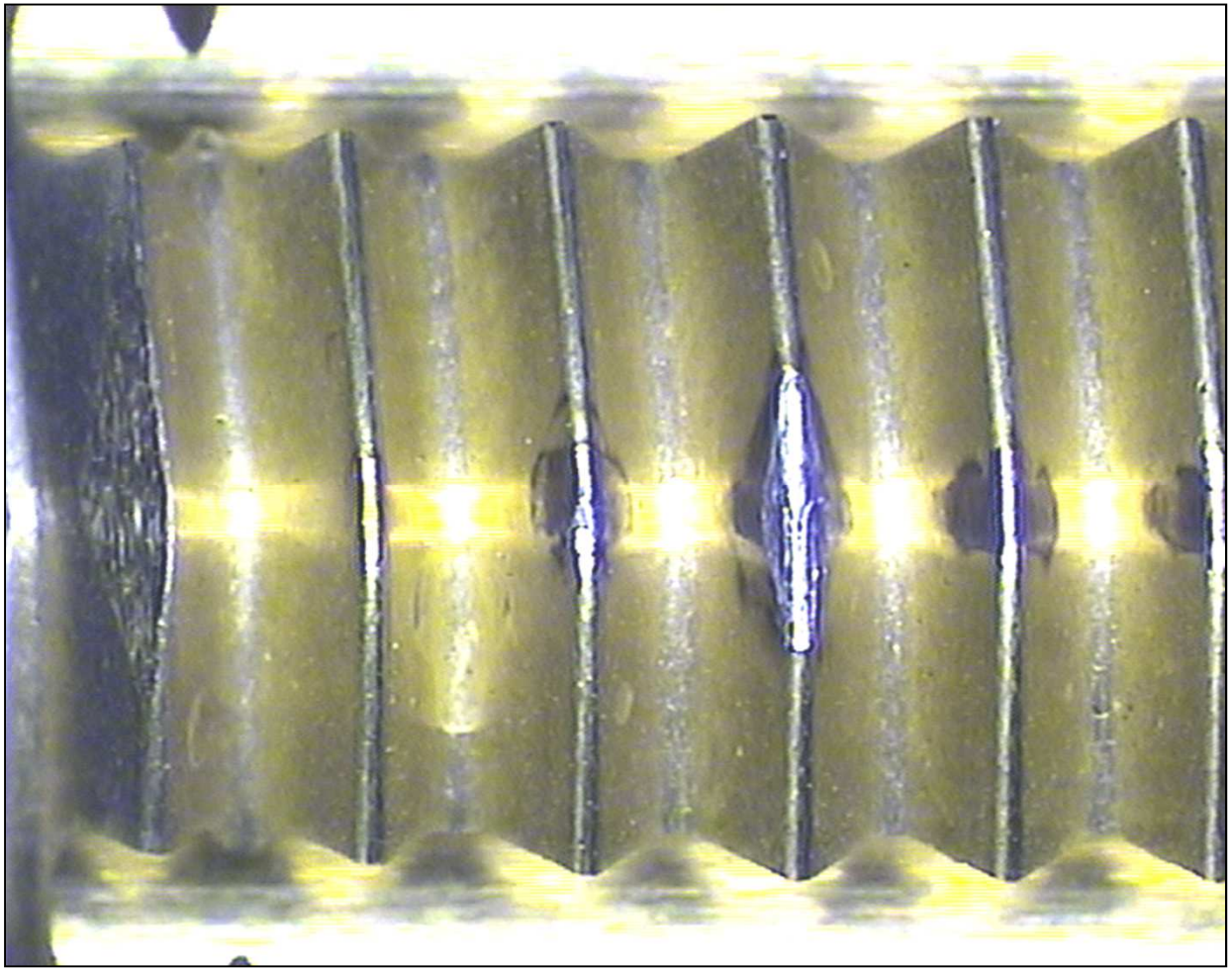
- Insufficient lubrication
- Lacking or unsuitable coating
- Relief angle too small



Chipping on the heel

Cause:

- Chips getting stuck during reversing
- Usually occurs in blind holes

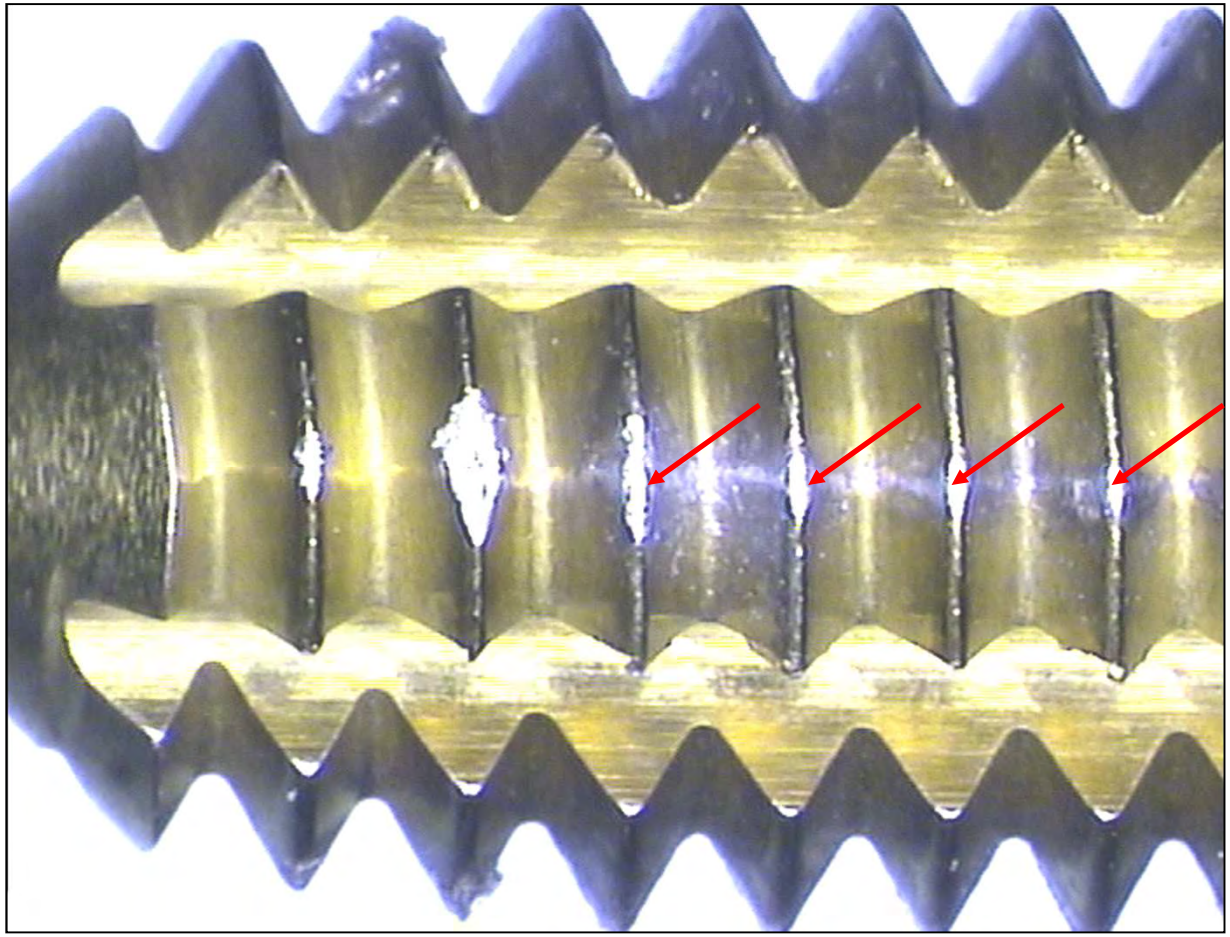


Wear usually commences on the first full tooth

Causes:

- Material in the last deformation stage has already strain hardened the most

- Greatest exposure to pressure



Advanced wear

Wear progresses tooth by tooth in the guide section

Thank you