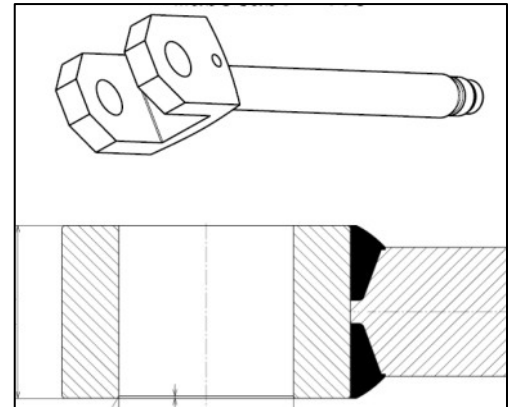


Piston rod with connecting pieces (compound: 42CrMoV4 – S355JRG2)

Initial situation:

- In order to transmit power from hydraulic systems to mechanical parts, e.g. excavator shovels, so called lugs must be mounted on the piston rods
- Connecting pieces are usually applied on the piston rod by arc welding or friction welding.
- High heat input as well as to some extent remarkable material accumulation in the joining area require cost-intensive reworking
- hard chromium plating up to the connecting piece would not make sense, as the high heat excess of the joining processes would destroy this plating

=> overall length can only be used to a certain extend



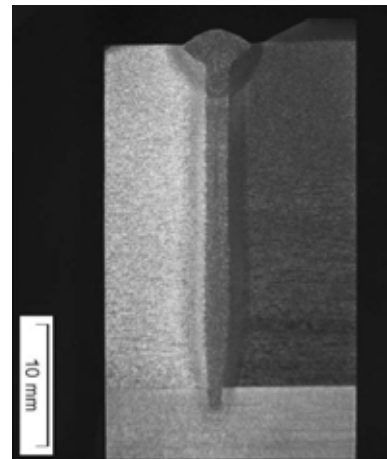
MSG Weld joint

Solution: Electron Beam welding of piston rod and connecting piece

Advantages of Electron Beam weld joints:

- Little distortion often requires no reworking
- Little heat excess prevents the hard chromium plating from being damaged

=> overall length can be used



Electron beam weld joint

Difficulties:

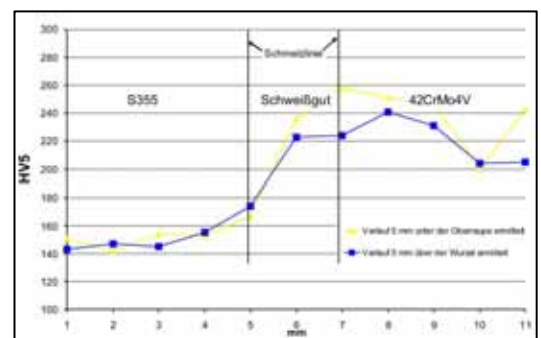
Excessive hardness increase is to be avoided when using common processes as well as when using electron beam welding.

Solution:

Preheating or Postheating.

Advantages of the electron beam:

- efficient pre-heating with the same beam that is used for welding (multi-process technology)
- no overheating required, adjustable, homogeneous heating.



Hardness spreading when suitable pre-heating using the electron beam is applied