



ELEKTRO-THERMIT GMBH & CO. KG

Thermit Head Repair (THR)

15. November 2012

AG60 Stockholm

THR – THERMIT® Head Repair

process for removal of single defects on running surface of flat bottom rails

- squats
- shelling
- spalling
- wheel burns
- dents

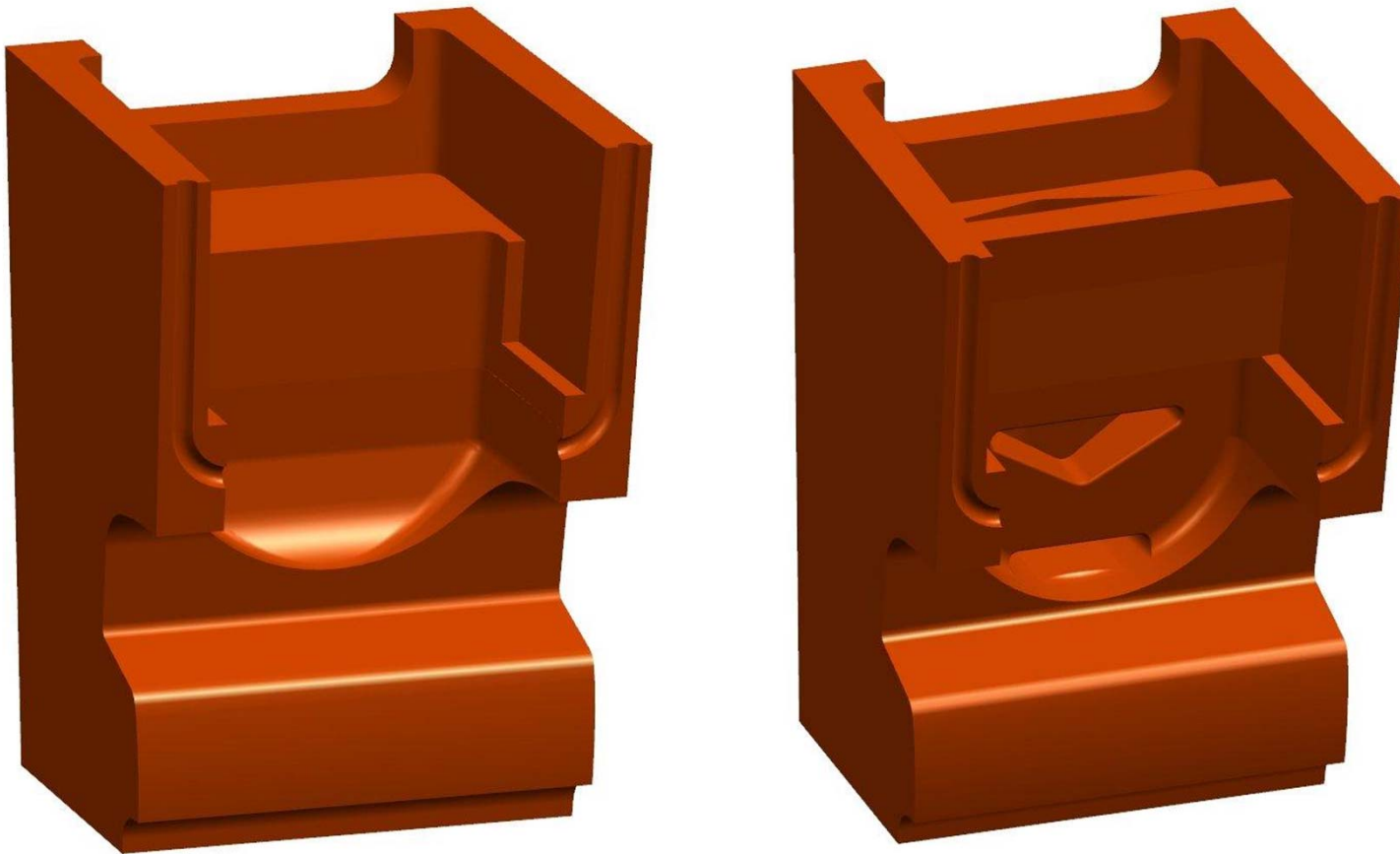


HRW – Thermit Head Repair Weld



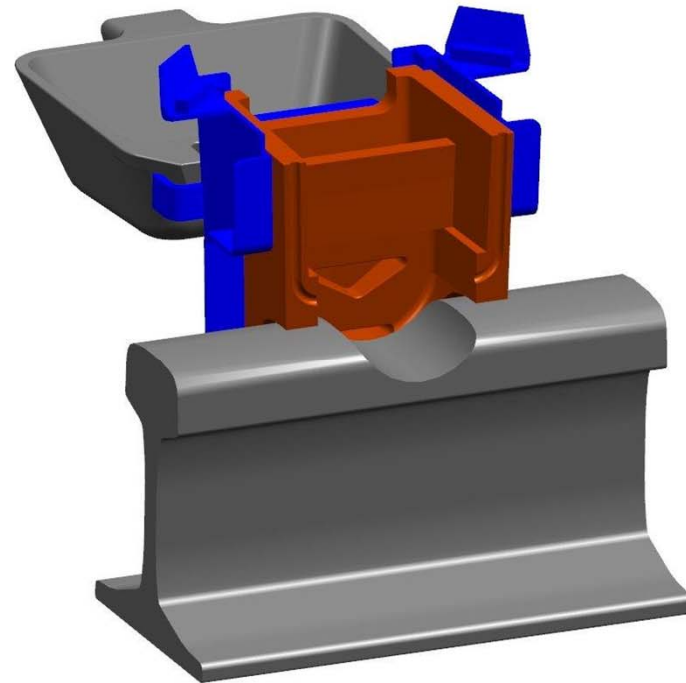
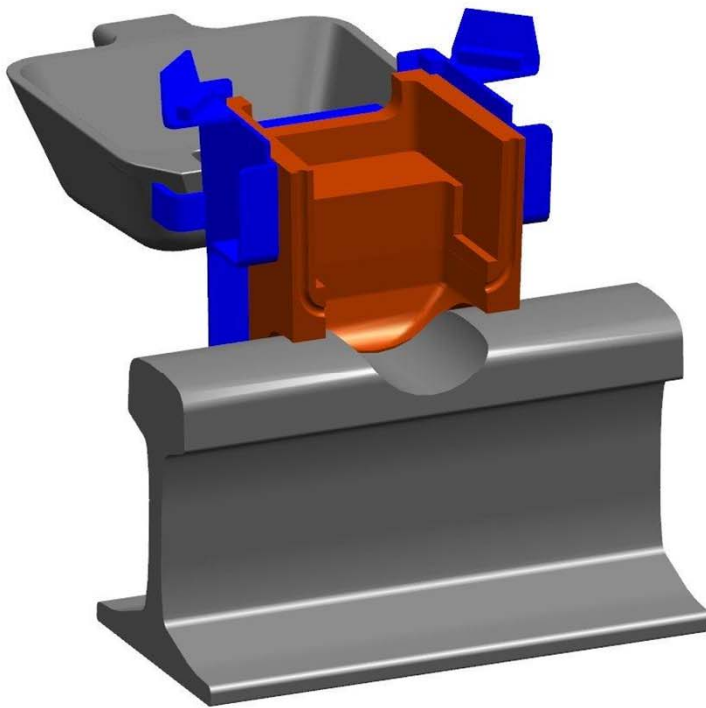
THR pattern design

→ pattern design – profile 60E1 / JRS 60

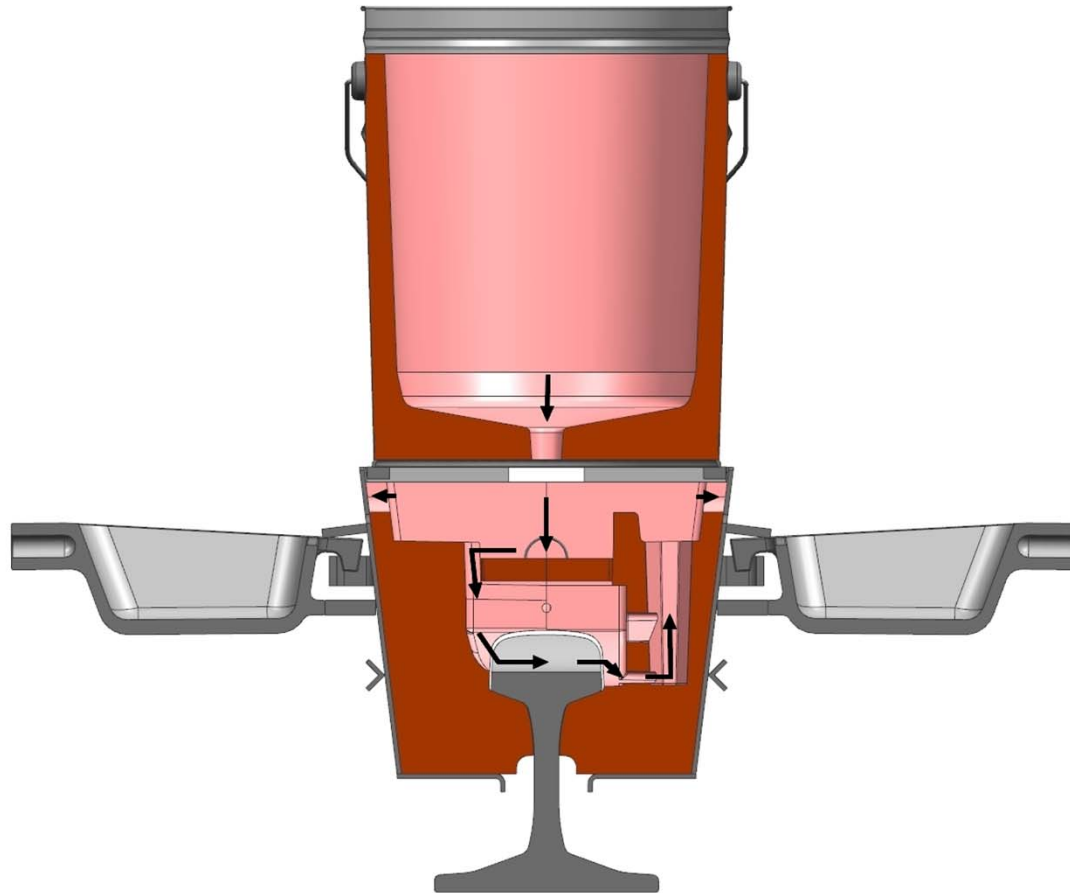


THR pattern design

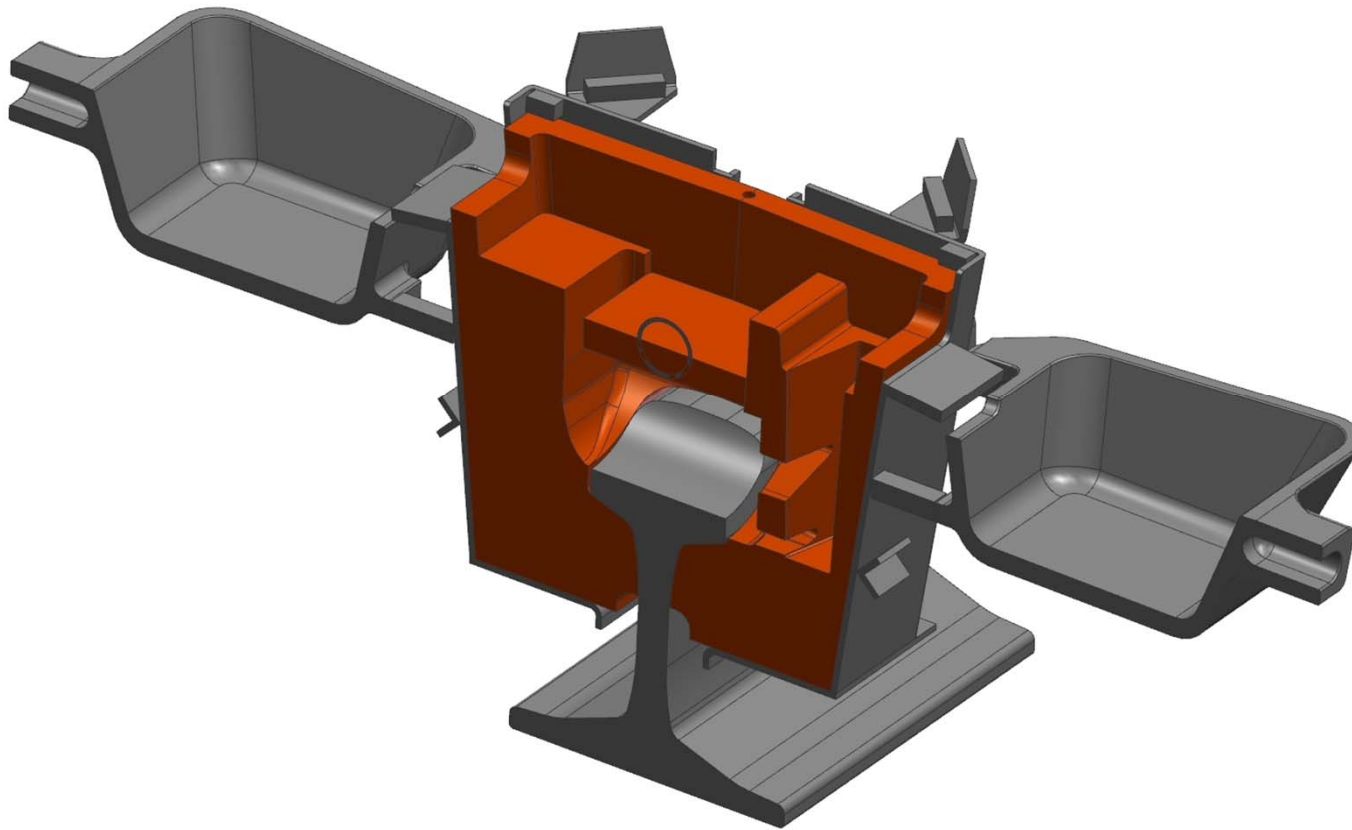
→ pattern design



THR – casting scheme



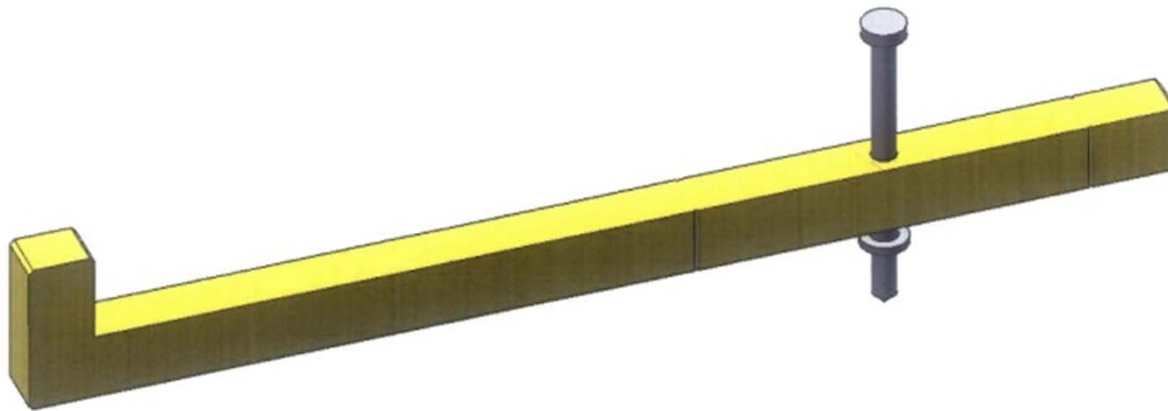
THR – casting scheme



THR – Thermit Head Repair

THR – equipment

- *setting gauge for correct positioning of clamping device*
internal approval, No. 03/2011

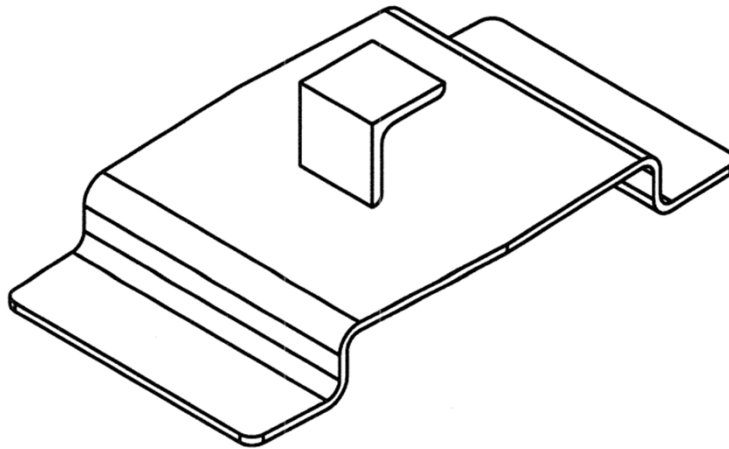


THR – equipment

- *cover plate to protect the mould from sand falling into the mould during luting*



internal approval, No. 01/2012

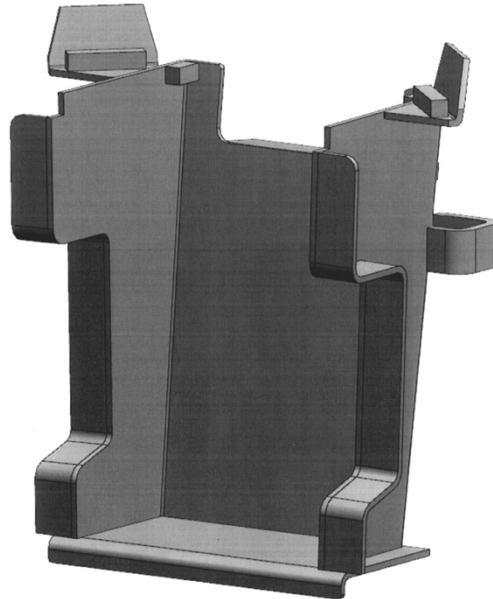


THR – equipment

- *mould shoes for using luting sand*



internal approval, No. 02/2012

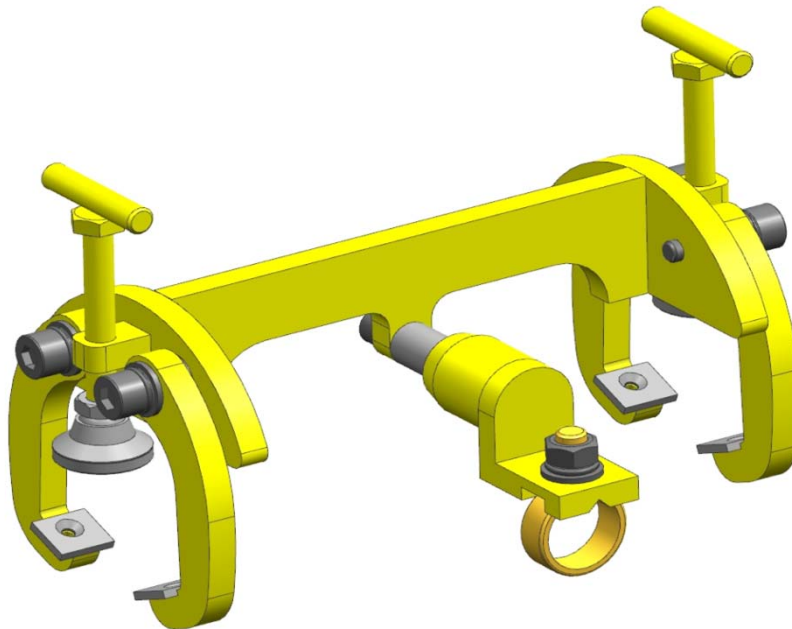


THR – equipment

- cutting gauge



internal approval, No. 04/2012rev.01



THR Equipment

→ development of cutting gauge suitable for different excavation depths (worn rails, different rail profiles)



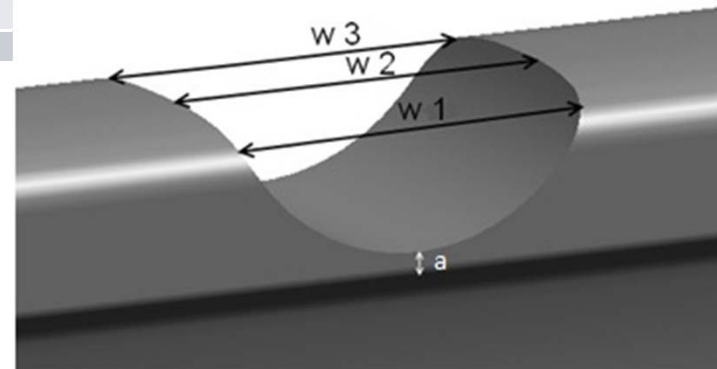
THR – equipment

- cutting gauge



fixed geometry for excavation (dependant on rail profile)

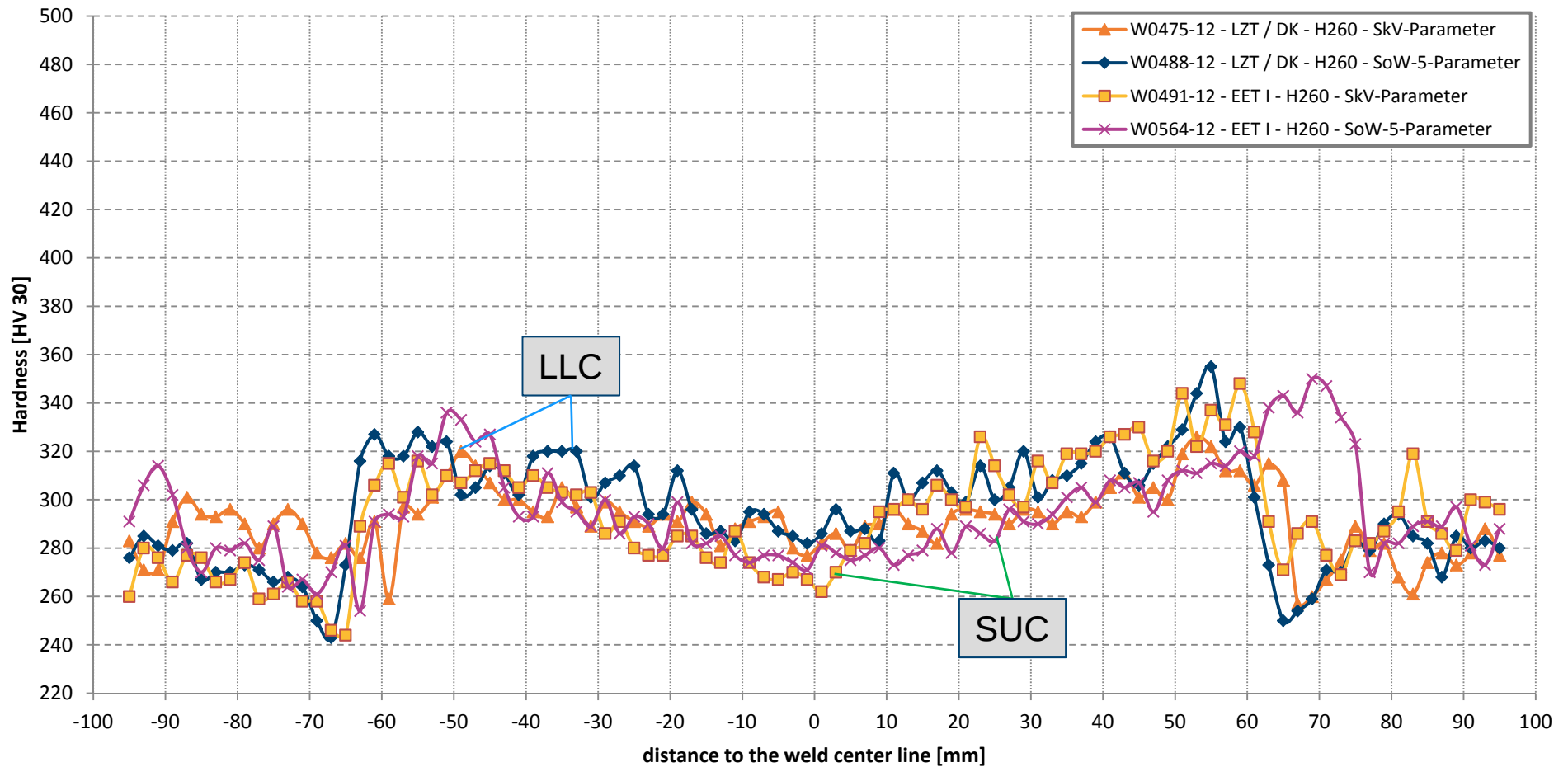
JIS60A (JRS60)		geometry of excavation [mm]			
length	No.	w ₁	w ₂	w ₃	4 mm worn rail
	1	78	77	75	73,97
	2	78	77	75	
	3	77	77	78	
depth	1	29	28	28	24
	2	28	28	28	
	3	28	28	28,5	
a		side 1	side 2		
	1	11	11,5		
	2	11	11		
	3	11	11,5		



THR – portion

hardness profile (60E1)

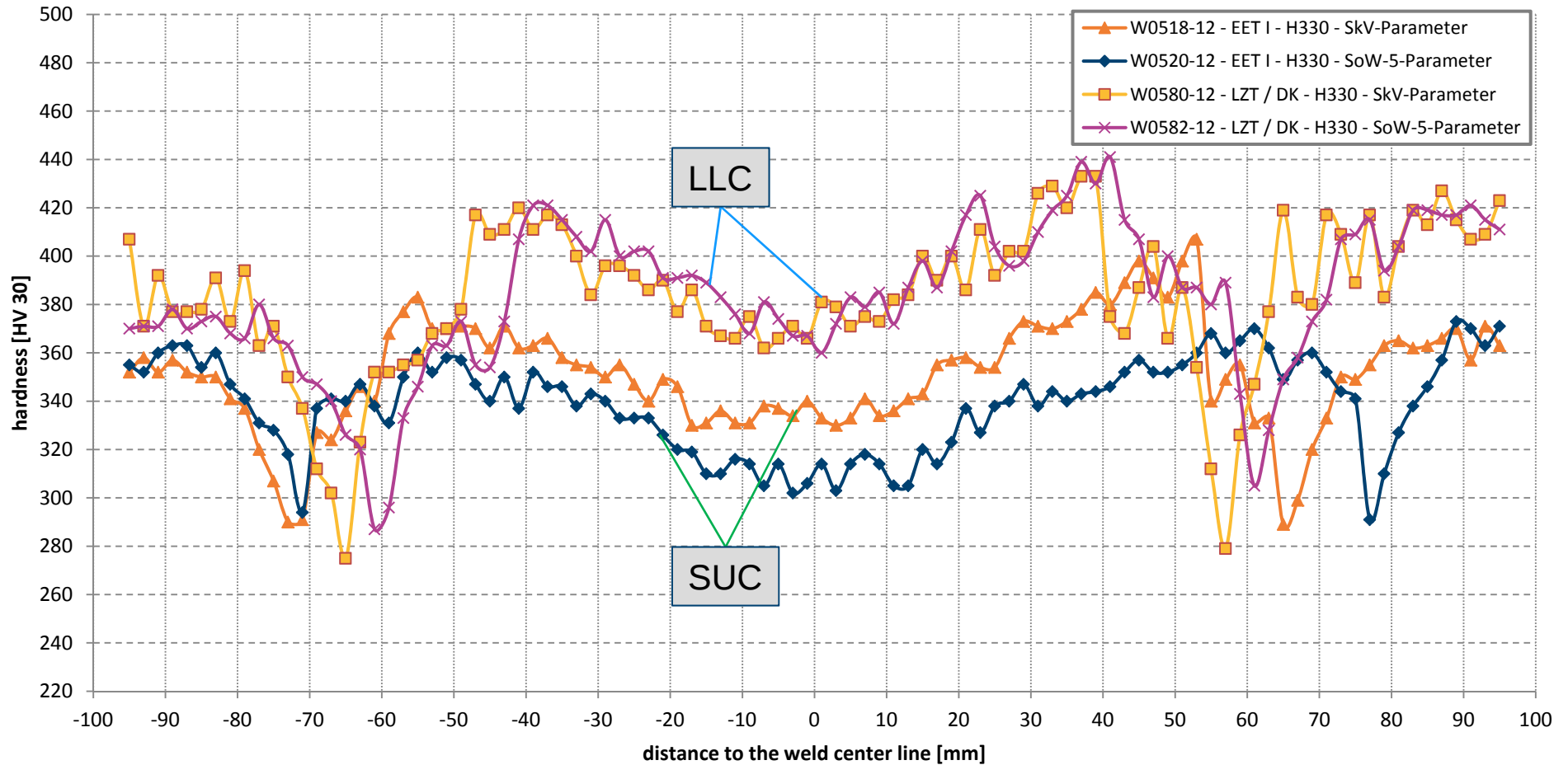
W0475-12 / W0488-12 / W0491-12 / W0564-12



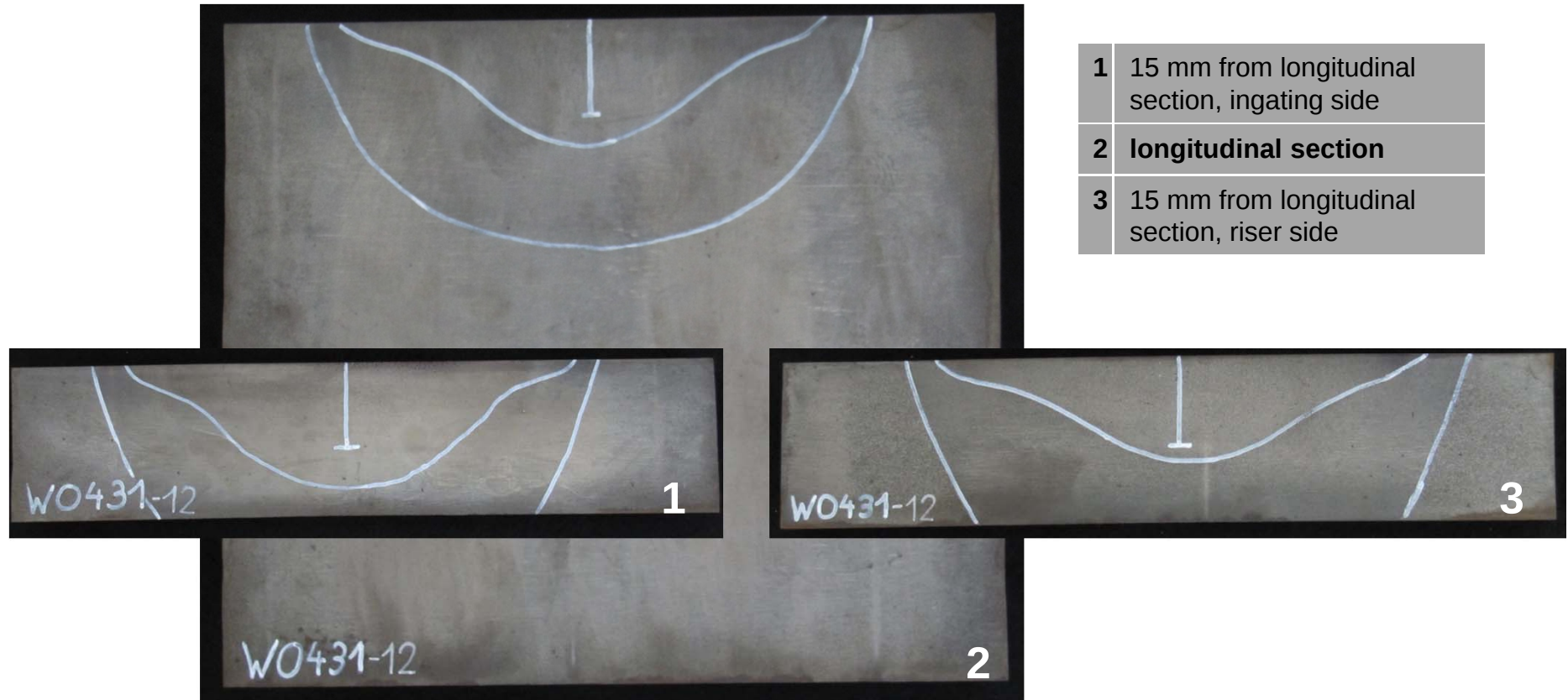
THR – portion

hardness profile (60E1)

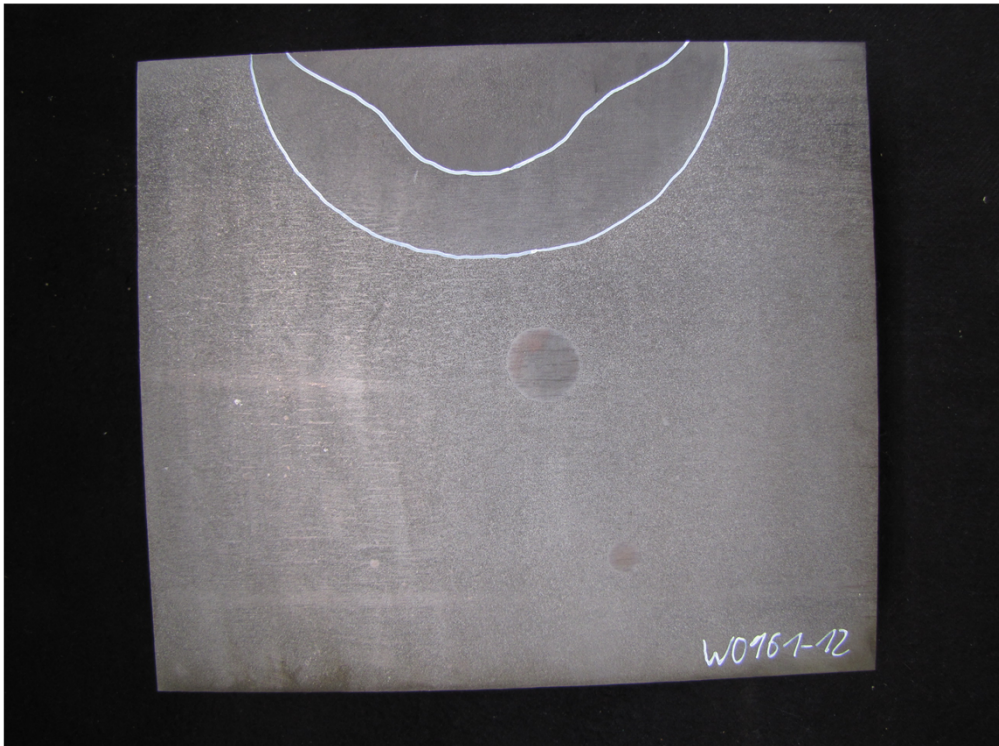
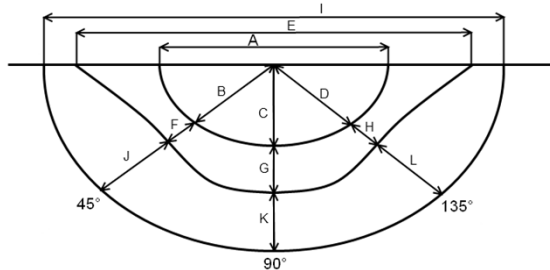
W0581-12 / W0520-12 / W0580-12 / W0582-12



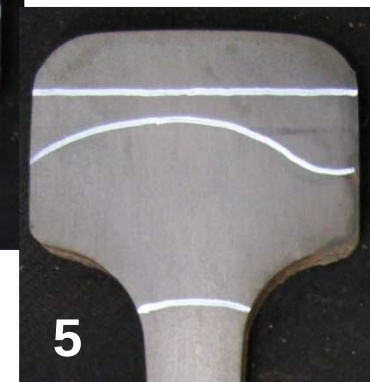
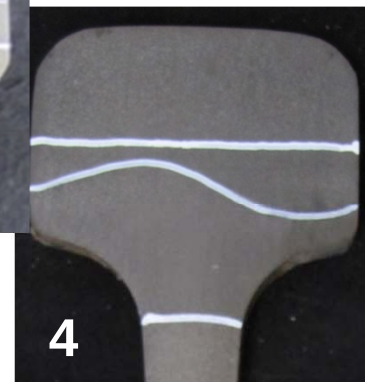
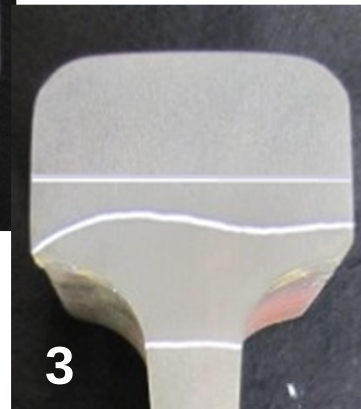
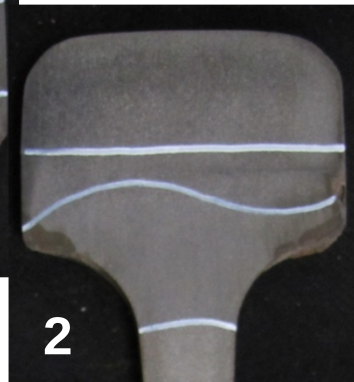
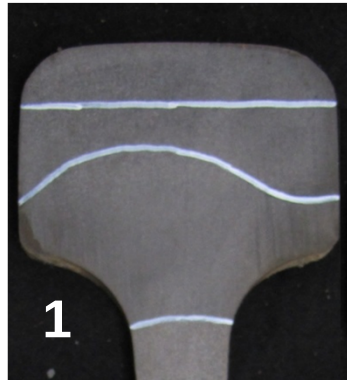
THR – longitudinal section (W0431-12, 60E1)



THR – longitudinal section (W0161-12, JRS60)

Weld	W0161	Year	2012	fusion	
				A	76 mm
				B	28 mm
				C	31 mm
				D	30 mm
				E	108 mm
				F	34 mm
				G	36 mm
				H	32 mm
				I	127 mm
				J	62 mm
				K	58 mm
				L	60 mm
					
welding parameter					
crucible:		LZT			
rail grade:		R 260			
portion:		H260 THR-E			
preheating time:		1,5 min.			
pressure /oxygen:		5,0 bar			
pressure /propane:		1,5bar			
burner height:		130 mm			

THR – cross section (W0264-12, JRS60)



1	30 mm from weld center
2	15 mm from weld center
3	cross section weld center
4	15 mm from weld center
5	30 mm from weld center

- ingating side on the right
- riser side on the left

THR – conclusions

- process based on well-known Thermit technology
- track welding personnel can easily be trained in using the HRW process
- no influence on longitudinal stresses of the rail (no re-neutralization of track after installation)
- properties linked to Thermit portion: chemical composition and hardness
- properties linked to rail: bending and fatigue properties
- properties linked to conventional Thermit welds: hardness profile
- ***safe and robust process***