







# Goal

Reuse of 14 columns in the façade of a new building

# Inspection and test plan

- Inspection units
- Specifications
- Inspection and test scope
- Fastening of the assembly





# Specifications

- Elongation [%]
- Tensile strength  $R_{eH} \left[ \frac{N}{mm^2} \right]$
- Yield strength  $R_m \left[ \frac{N}{mm^2} \right]$
- Impact energy [J]
- Chemical composition
- Carbon equivalent  $CEV$

# Engineering Assumptions

- Tensile strength maximum 235 MPA
- No impact resistance
- Material not weldable



# Inspection and testing scope

- Visual inspection for cracks and other non-conformities
- 4 x tensile test
- 4 x chemical composition test
- 4 x micro examination
- Mobile hardness on all columns





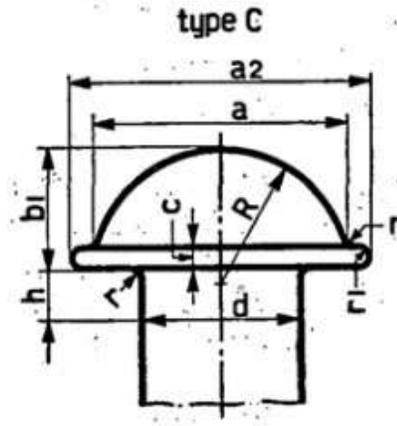
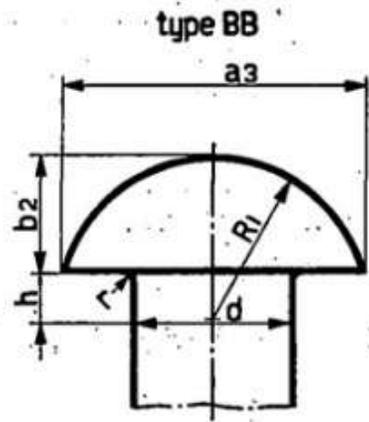
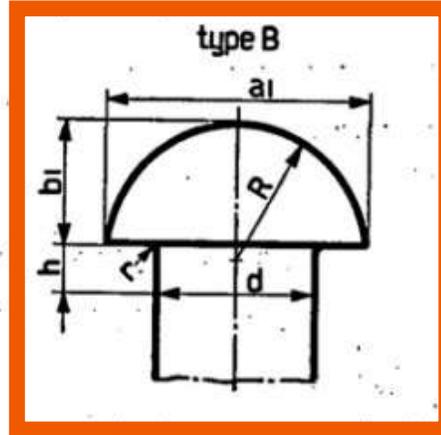
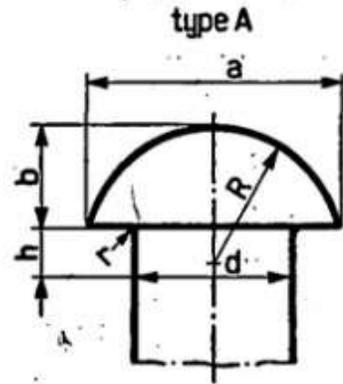




# Inspection fasteners



# Rivets



# Test results

## CHEMICAL ANALYSIS Optical Emission Spectrometry (OES) [SAMPLE "8"]

Specimen	C	Si	Mn	P	S	Cr	Ni	Mo
LT 23.0879-2	0.05	0.01	0.62	0.08	0.08	0.02	0.04	<0.01
Requirement(s)	--	--	--	--	--	--	--	--
Specimen	Al	Co	Cu	Nb	Ti	V	As	N
LT 23.0879-2	<0.01	0.01	0.01	<0.01	<0.01	<0.01	0.07	≈0.01
Requirement(s)	--	--	--	--	--	--	--	--

Remark(s):  $C_{eq} = 0.20^*$

Note: All results (mass percentages) are an average of minimum 3 measurements

Requirement(s): Not specified

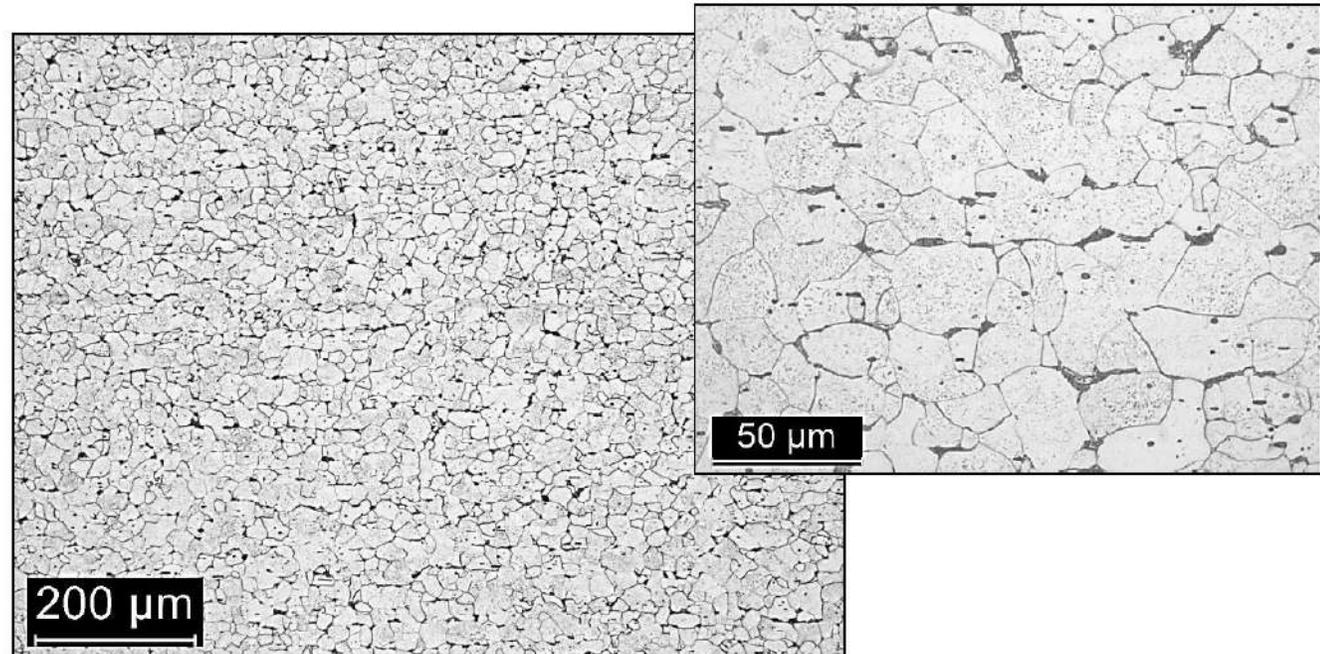
\* Carbon equivalent value calculated acc. IIW

## TENSILE TEST AT ROOMTEMPERATURE

Method: conform ISO 6892-1 method A						
Specimen	Size [mm]	Yield strength [MPa]		Tensile strength [MPa]	Elongation (A5) [%]	
		$R_{eH}$ %	$R_{p1.0}$ %		After fracture	After fracture
LT 23.0879-2-1	Ø 7.96	263	240	391	31	63
LT 23.0879-2-2	Ø 7.96	252	244	394	30	65
LT 23.0879-3-1	Ø 7.96	262	240	372	33	66
LT 23.0879-3-2	Ø 7.98	255	230	391	32	67
Requirement(s)		--	--	--	--	--

Remark(s): See figure 1 for specimen sampling position

Requirement(s): Not specified



# Analysis

- Material of the sections is a cast steel variant
- The material properties are equal or higher than the assumptions
- Rivets are larger than expected
- Cross plates are not yet included in the engineering



Let's reuse steel!

