

ERRATUM

- Page 48 Table 3.1: Overview of key parameters applied and information on the welding experiments of the publications. Column 2: Publication I, Row 2: Steel grade, "SSAB Domex 355 MCD" should read "SSAB Domex 500 MCD"
- Page 60 The phrase "Figure 5.2: Laser welding speeds and laser powers for welding of steel S355 MC from Publication I." should read "Laser welding speeds and laser powers for welding of steel S500 MC from Publication I."
- Page 61 Table 5.1. Welding energies of laser welding tests made in publications. Column 2: Publication I, Row 2: Steel grade, "S355 MC" should read "S500 MC"
- Page 62 The phrase "Some welding tests were made with other steel grades such as lower strength structural steel (thermo-mechanically rolled S355 MC) and typically used press hardened automotive steel (22MnB5)." should read "Some welding tests were made with other steel grades such as lower strength structural steel (thermo-mechanically rolled S500 MC) and typically used press hardened automotive steel (22MnB5)."
- Page 62 The phrase "According to standard CEN ISO/TR 15608 S960, MC steel is classified as a QT steel and belongs to the material group 3.2 and S355 MC steel belongs to the material group 1.2." should read "According to standard CEN ISO/TR 15608 S960, MC steel is classified as a QT steel and belongs to the material group 3.2 and S500 MC steel belongs to the material group 2.2."
- Page 63 Table 5.2. Chemical composition and carbon equivalent (wt.%) of test materials. CEV = $(C+Mn/6+Cr+Mo+V/5+Ni+Cu/5)$. Column 1: Steel, Row 4, "S355 MC" should read "S500 MC"
- Page 63 Table 5.3 Nominal mechanical properties of test materials. Column 1: Steel, Row 5, "S355 MC" should read "S500 MC" and Column 2: $R_{p0.2}$ (MPa), Row 5, "355" should read "500" and Column 3: R_m (MPa) "430-550" should read "550-700"
- Page 64 The phrase "The same observation was made in a laser welding study of a lower strength structural steel ($R_{p0.2} = 355$ MPa)" should read "The same observation was made in a laser welding study of a lower strength structural steel ($R_{p0.2} = 500$ MPa)."
- Page 65 The phrase "The peak temperature and cooling rate are the most important factors in determining the microstructural evolution within each zone of the welded joint. The tested ultra-high strength ($R_{p0.2} = 960$ MPa) steel has a martensitic-bainitic microstructure when non-welded, while the lower strength thermo-mechanically rolled structural steel ($R_{p0.2} = 355$ MPa) has a ferritic-pearlitic microstructure. The third tested steel grade 22MnB5 can also be called ultra-high strength steel after press hardening. It then has a fully martensitic microstructure and when delivered its microstructure is similar to the microstructure of a S355 MC steel, i.e. ferritic-pearlitic. When welded, a martensitic base material stays martensitic in the fusion zone but some softening occurs there in the HAZ area. The same phenomenon is discovered in some studies made by other authors as well (Amraei et al., 2019; Guo et al., 2015; Keränen et al., 2022). Lower strength structural steel S355 MC shows some hardening in the fusion zone (= weld area), being martensitic." should read
- "The peak temperature and cooling rate are the most important factors in determining the microstructural evolution within each zone of the welded joint. The tested ultra-high strength ($R_{p0.2} = 960$ MPa) steel has a martensitic-bainitic microstructure when non-welded, while the lower strength thermo-mechanically rolled structural steel ($R_{p0.2} = 500$ MPa) has a ferritic-pearlitic microstructure. The third tested steel grade 22MnB5 can also

be called ultra-high strength steel after press hardening. It then has a fully martensitic microstructure and when delivered its microstructure is similar to the microstructure of a S500 MC steel, i.e. ferritic-pearlitic. When welded, a martensitic base material stays martensitic in the fusion zone but some softening occurs there in the HAZ area. The same phenomenon is discovered in some studies made by other authors as well (Amraei et al., 2019; Guo et al., 2015; Keränen et al., 2022). Lower strength structural steel S500 MC shows some hardening in the fusion zone (= weld area), being martensitic."

- Page 65 The phrase "*The hardness profiles of laser-welded S355 MC structural steel are depicted in Figure 5.6.*" should read "*The hardness profiles of laser-welded S500 MC structural steel are depicted in Figure 5.6.*"
- Page 65 The phrase "*Figure 5.6: Vickers hardness (HV5) of laser-welded S355 MC steel (thickness 4 mm).*" should read "*Figure 5.6: Vickers hardness (HV5) of laser-welded S500 MC steel (thickness 4 mm).*"
- Page 66 The phrase "*The laser-welded ultra-high strength steel S960 MC shows a totally different hardness profile than the above-mentioned lower strength steel S355 MC (Figure 5.7). The maximum hardness achieved for the S960 MC steel is almost double compared to the hardness of the S355 MC steel.*" should read "*The laser-welded ultra-high strength steel S960 MC shows a totally different hardness profile than the above-mentioned lower strength steel S500 MC (Figure 5.7). The maximum hardness achieved for the S960 MC steel is almost double compared to the hardness of the S500 MC steel.*"
- Page 69 The phrase "*Figure 5.11: Laser-welded steel S355 MC (thickness = 4 mm). a) transversal tensile specimens after testing, b) transversal tensile strength test results, c) cross-sections of laser-welded specimens.*" should read "*Figure 5.11: Laser-welded steel 500 MC (thickness = 4 mm). a) transversal tensile specimens after testing, b) transversal tensile strength test results, c) cross-sections of laser-welded specimens.*"
- Page 69 The phrase "*When the steel type and strength level change from thermo-mechanically rolled S355 MC to direct quenched S960 MC some differences are to be expected in the final weldments as well.*" should read "*When the steel type and strength level change from thermo-mechanically rolled S500 MC to direct quenched S960 MC some differences are to be expected in the final weldments as well.*"