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Synopsis :

Mechanical properties of the base metal and welded joints as well as low cycle fatigue strength of the beam- to-column connection using low YR (yield ratio) 53 and 60kgf/mm² steel plates, which have been newly developed for building use, have been investigated. The flexural strength of the beam -to-column connection in full-

Full-Scale Experiment on Elastic-Plastic Behaviour

and Low Yield Ratio Steel for Building Use

要旨

建築用低 YR 53, 60 キロ級鋼を用いて, 母材および各種溶接継

Tensile Properties, Impact Value, Anisotropy

Tensile properties*1	Impact value*2	Anisotropy
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Table 2 Chemical compositions of low YR steel plates

(wt.%)

Steel	C	Si	Mn	P	S	Cu	Ni	Mo	V	Others	C_{eq}^{*1}	P_{cm}^{*2}
53 kgf/mm ²	0.13	0.41	1.31	0.005	0.0017	0.15	0.12	0.003	0.003	REM-Ti treat.	0.37	0.22
60 kgf/mm ²	0.12	0.27	1.44	0.006	0.0020	0.23	0.19	0.220	0.041	REM-Ti treat.	0.43	0.23

*1 $C_{eq} = C + Si/24 + Mn/6 + Cr/5 + Mo/4 + Ni/40 + V/14$

*2 $P_{cm} = C + Si/30 + (Mn + Cu + Cr)/20 + Mo/15 + V/10 + Ni/60 + 5B$

Table 3 Mechanical properties and anisotropy of low YR steel plates

Steel	Thickness	Tensile test*1	Impact test	Anisotropy test*3
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Table 5 Welding conditions

Welding method	S A W	C E S	C E S + G M A W
	Column skin-plate		

Table 9 Charpy impact values*1 of cross joints

Table 10 Low cycle fatigue test results of cross joints

Test piece	Steel (kgf/mm ²) DF-CS-BF	Strain amplitude (%)	σ_y (kgf/mm ²)	σ_i (kgf/mm ²)	σ_c (kgf/mm ²)	σ_i/σ_y	σ_c/σ_y	N_c (cycle)	N_f (cycle)
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