

List of contents

	pg.
Symbols	
1 Introduction	9
2 Connection design	11
3 COMPONENT BASED FINITE ELEMENT METHOD	18
3.1. Material model	18
3.2. Plate model and mesh convergence	20
3.3. Contacts	23
3.4. Welds	24
3.5. Bolts	26
3.6. Interaction of shear and tension in bolt	28
3.7. Preloaded bolts	30
3.8. Anchor bolt	32
3.9. Concrete block	33
3.10. Local buckling of compressed plates	36
3.11. Moment - rotation relation	38
3.12. Bending stiffness	41
3.13. Deformation capacity	44
4 WELDED CONNECTION	46
4.1. Fillet weld in lap joint	46
4.2. Fillet weld in angle plate joint	54
4.3. Fillet weld in fin plate joint	57
4.4. Fillet weld in beam to column joint	61
4.5. Connection to unstiffened flanges	65
5 BOLTED CONNECTION	70
5.1. T-stub in tension	70
5.2. Splices in shear	79
5.3. End plate minor axis connection	83
5.4. Generally loaded end plate	86
5.5. Interaction of shear and tension in bolt	90
5.6. Splices in shear in slip-resistant connection	95
6 SLENDER PLATE IN COMPRESSION	98
6.1. Triangular haunch	98
6.2. Column web panel in shear	105
6.3. Column web stiffener	109
7 HOLLOW SECTION JOINT	113
7.1. Uniplanar T-joint between RHS braces and RHS chords	113
7.2. Multiplanar TT joint between RHS braces and SHS chords	121
7.3. Uniplanar T-joint between longitudinal gusset plate and RHS chord	126
7.4. Uniplanar T-joint between RHS brace and H/I chord	130
8 COLUMN BASE	136
8.1. Open section column in compression	136
8.2. Open section column in bending to strong axis	140
8.3. Open section column in bending to weak axis	146
8.4. Hollow section column	152
9 COLUMN WEB PANEL IN SHEAR	160
9.1. Welded portal frame eaves moment connection	160
9.2. Bolted portal frame eaves moment connection	168
10 PREDICTION OF STIFFNESS	173
10.1. Bending stiffness of welded joint of open sections	173
10.2. Bending stiffness of bolted joint of open sections	176
10.3. Bending stiffness of column base	180

11	PREDICTION OF DEFORMATION CAPACITY	184
11.1.	Deformation capacity of welded joint of open sections	184
11.2.	Deformation capacity of bolted joint of open sections	188
12	JOINT MODEL IN GLOBAL ANALYSES	193
	References	197