

LIST OF CONTENTS

	Page
1 Introduction	6
2 Bolts	10
Q&A 2.1 Loss of Bolt Pre-Load	12
Q&A 2.2 Bearing of Slip Resistant Connections	12
Q&A 2.3 Shear Resistance of Pre-Loaded Bolts Carrying a Tension Force	13
Q&A 2.4 Maximum Bolt End and Edge Distances	13
Q&A 2.5 Deformation Criteria for Bolt Bearing Resistance	14
Q&A 2.6 End and Edge Bolt Distances	15
Q&A 2.7 Bearing Resistance of Bolt Group	15
Q&A 2.8 Bearing Resistance in Slotted Holes	16
Q&A 2.9 Design Method for Fitted Bolts	17
Q&A 2.10 Combined Shear and Tension	18
Q&A 2.11 Resistance of Connections Using High-Strength Steel	19
3 Welding	20
Q&A 3.1 Connecting Two Angles to Gusset Plate	22
Q&A 3.2 Effective Width of Welded Beam-to-Column Connection	23
Q&A 3.3 Throat Thickness of a Fillet Weld used in a Hollow Section Joints	24
Q&A 3.4 Modelling the Resistance of a Fillet Weld	24
Q&A 3.5 Design of Partially Penetrated Butt Weld	25
Q&A 3.6 Weld Design for Full Resistance of Connecting Members	26
4 Structural Modelling	27
Q&A 4.1 Preliminary Design of Connections	29
Q&A 4.2 Use of Elastic Theory for Global Analysis of Structures	29
Q&A 4.3 Classification Criteria for Column Bases	31
Q&A 4.4 Design of Connections Loaded by Low Forces	32
Q&A 4.5 Modelling of Joint Eccentricity in Frame Design	33
5 Simple Connections	35
Q&A 5.1 Bolt Bearing Resistance with Respect to Tolerances	41
Q&A 5.2 Angles Connected by One or Two Bolts	42
Q&A 5.3 Rotation Capacity	43
Q&A 5.4 Structural Integrity	44
6 Moment Connections	46
Q&A 6.1 Stiffness Modification Coefficient for End-Plate Connections	49
Q&A 6.2 Effective Length of Stiffened T-stub	50
Q&A 6.3 Haunched Connections	51
Q&A 6.4 Diagonal and K-stiffeners	51
Q&A 6.5 Field line Patterns for End Plate Connection with Four Bolts in a Row	52
Q&A 6.6 Distribution of Forces in a Thick End Plate Connection	53
Q&A 6.7 Distribution of Shear Forces in a Bolted Connection	54
Q&A 6.8 Tearing Force of T-stub in Fatigue Design	54
Q&A 6.9 Joints Loaded by Bending Moment and Axial Force	56
Q&A 6.10 Stiffening of the Column Web Panel with a Morris Stiffener	60

	Page
7 Column Bases	62
Q&A 7.1 Elastic Resistance of Base Plate	63
Q&A 7.2 Base Plate Resistance with Low Quality Grout	64
Q&A 7.3 Comparison of Concrete Strength Calculation according to EC2 and EC3	64
Q&A 7.4 Stress Concentration under the Base Plate	66
Q&A 7.5 Effective Length of a Base Plate T-stub	67
Q&A 7.6 Base Plates with Bolts outside the Column Flange	69
Q&A 7.7 Slip Factor between Steel and Concrete	71
Q&A 7.8 Transfer of Shear Forces by Anchor Bolts	72
Q&A 7.9 Transfer of Shear Forces by Friction and Anchor Bolts	73
Q&A 7.10 Anchorage Rules for Holding Down Bolts	73
8 Seismic Design	76
Q&A 8.1 Connections Subject to Dynamic Load	80
Q&A 8.2 Influence of Unsymmetrical Loading	81
Q&A 8.3 Influence of Strain-Rate Loading	81
Q&A 8.4 Welding Technology	81
Q&A 8.5 High Strength Bolts in Seismic Joints	82
Q&A 8.6 Column Web Panel	83
9 Fire Design	84
Q&A 9.1 Bolts Resistance at High Temperature	84
Q&A 9.2 Weld Resistance at High Temperature	85
Q&A 9.3 Temperature Distribution with Time within a Joint	85
Q&A 9.4 Component Method under High Temperatures	87
10 Hollow Section Connections	90
Q&A 10.1 Circular Hollow Section Joints	92
Q&A 10.2 Rectangular Hollow Section Joints	94
Q&A 10.3 Joints between Hollow and Open Section Members	96
Q&A 10.4 Design Charts	98
Q&A 10.5 Blind Bolting	100
Q&A 10.6 Hollow Section Joints using High Strength Steel	102
Q&A 10.7 Offshore Construction	102
11 Cold-Formed Connections	103
Q&A 11.1 Increased Yield Strength by Cold-Forming	108
Q&A 11.2 Deformation Capacity of Shear Connections	109
Q&A 11.3 Screws in Sandwich Panels	109
Q&A 11.4 Bearing of Thin Plates	110
12 Aluminium Connections	111
Q&A 12.1 Resistance of Fillet Welds	111
Q&A 12.2 Effective Width and Throat Thickness of Fillet Welds	112
Q&A 12.3 Butt Welds in Aluminium Joints	113
Q&A 12.4 Heat Affected Zones	114
13 Good and Bad Detailing	117
14 Lessons on Internet/CD	123
15 Text of PowerPoint Lesson on the Design of Connections for Fire Safety	125
List of Symbols	128
References	134