

ISO 20332:2008-12 (E)

Cranes - Proof of competence of steel structures

Contents		Page
Foreword		v
1	Scope	1
2	Normative references	1
3	Terms, definitions, symbols and abbreviations	2
4	General	7
4.1	General principles	7
4.2	Documentation	7
4.3	Alternative methods	7
4.4	Materials of structural members	7
4.5	Bolted connections	9
4.5.1	Bolt materials	9
4.5.2	General	9
4.5.3	Shear and bearing connections	9
4.5.4	Friction grip type (slip resistant) connections	9
4.5.5	Connections loaded in tension	10
4.6	Pinned connections	10
4.7	Welded connections	10
4.8	Proof of competence for structural members and connections	11
5	Proof of static strength	11
5.1	General	11
5.2	Limit design stresses and forces	11
5.2.1	General	11
5.2.2	Limit design stress in structural members	12
5.2.3	Limit design forces in bolted connections	13
5.2.4	Limit design forces in pinned connections	22
5.2.5	Limit design stresses in welded connections	25
5.3	Execution of the proof	26
5.3.1	Proof for structural members	26
5.3.2	Proof for bolted connections	27
5.3.3	Proof for pinned connections	27
5.3.4	Proof for welded connections	28
6	Proof of fatigue strength	28
6.1	General	28
6.2	Limit design stresses	29
6.2.1	Characteristic fatigue strength	29
6.2.2	Weld quality	30
6.2.3	Requirements for fatigue testing	31
6.3	Stress histories	32
6.3.1	Determination of stress histories	32
6.3.2	Frequency of occurrence of stress cycles	32
6.3.3	Stress history parameter	34
6.3.4	Determination of stress history class, S	36
6.4	Execution of the proof	37
6.5	Determination of the limit design stress range	37
6.5.1	Applicable methods	37
6.5.2	Direct use of stress history parameter	37

6.5.3	Use of S classes	38
6.5.4	Independent concurrent normal and/or shear stresses	39
Annex A (informative)	Limit design shear force, F_v, R_d, in shank per bolt and per shear plane for multiple shear plane connections	40
Annex B (informative)	Preloaded bolts	41
Annex C (normative)	Design weld stress, w, S_d and w, S_d	43
Annex D (normative)	Values of slope constant, m, and characteristic fatigue strength, c, c	47
Annex E (normative)	Calculated values of limit design stress range, R_d	64
Annex F (informative)	Evaluation of stress cycles -- Example	66
Annex G (informative)	Calculation of stiffnesses for connections loaded in tension	68
Bibliography		71