

ISO 2394:2015-03 (E)

General principles on reliability for structures

Contents

Page

6	Uncertainty representation and modelling	25
6.1	General	25
6.1.1	Types of uncertainty	25
6.1.2	Treatment of uncertainty	26
6.1.3	Interpretation of probability	26
6.1.4	Probabilistic models	26
6.1.5	Population/outcome space	26
6.1.6	Hierarchical modelling of uncertainty	27
6.2	Models for structural analysis	27
6.2.1	General	27
6.2.2	Actions and environmental influences	28
6.2.3	Geometrical properties	30
6.2.4	Material properties	30
6.2.5	Responses and resistances	31
6.3	Models for consequences	33
6.4	Model uncertainty	34
6.5	Experimental models	34
6.6	Updating of probabilistic models	35
7	Risk-informed decision making	35
7.1	General	35
7.2	System identification	35
7.3	System modelling	36
7.4	Risk quantification	36
7.5	Decision optimization and risk acceptance	36
8	Reliability-based decision making	37
8.1	General	37
8.2	Decisions based on updated probability measures	38
8.3	Systems reliability versus component reliability	38
8.4	Target failure probabilities	39
8.5	Calculation of the probability of failure	39
8.5.1	General	39
8.5.2	Time-invariant reliability problems	40
8.5.3	Transformation of time-variant into time-invariant problems	40
8.5.4	Out-crossing approach	40
8.6	Implementation of probability-based design	41
9	Semi-probabilistic method	41
9.1	General	41
9.2	Basic principles	41
9.3	Representative and characteristic values	42
9.3.1	Actions	42
9.3.2	Resistances	43
9.4	Safety formats	43
9.4.1	General	43
9.4.2	Partial factor method	44
9.4.3	The design value method	46
9.5	Verification in case of cumulative damage	47
Annex A (informative)	Quality management	48

Annex B (informative) Lifetime management of structural integrity	55
Annex C (informative) Design based on observations and experimental models	62
Annex D (informative) Reliability of geotechnical structures	71
Annex E (informative) Code calibration	79
Contents Page Annex F (informative) Structural robustness	88
Annex G (informative) Optimization and criterion on life safety	100
Bibliography	110