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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

**General principles on reliability for structures —
List of equivalent terms**

**Principes généraux de la fiabilité des constructions —
Liste de termes équivalents**

**Общие принципы надежности конструкций —
Список эквивалентных терминов**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8930 was prepared by Technical Committee ISO/TC 98, *Bases for design of structures*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Avant-propos

L'ISO (Organisation internationale de normalisation) est une fédération mondiale d'organismes nationaux de normalisation (comités membres de l'ISO). L'élaboration des Normes internationales est normalement confiée aux comités techniques de l'ISO. Chaque comité membre intéressé par une étude a le droit de faire partie du comité technique créé à cet effet. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'ISO participent également aux travaux.

Les projets de Normes internationales adoptés par les comités techniques sont soumis aux comités membres pour approbation, avant leur acceptation comme Normes internationales par le Conseil de l'ISO. Les Normes internationales sont approuvées conformément aux procédures de l'ISO qui requièrent l'approbation de 75 % au moins des comités membres votants.

La Norme internationale ISO 8930 a été élaborée par le comité technique ISO/TC 98, *Bases du calcul des constructions*.

L'attention des utilisateurs est attirée sur le fait que toutes les Normes internationales sont de temps en temps soumises à révision et que toute référence faite à une autre Norme internationale dans le présent document implique qu'il s'agit, sauf indication contraire, de la dernière édition.

Введение

ИСО (Международная Организация по Стандартизации) является всемирной федерацией национальных организаций по стандартизации (комитетов-членов ИСО). Разработка Международных Стандартов осуществляется техническими комитетами ИСО. Каждый комитет-член, заинтересованный в деятельности, для которой был создан технический комитет, имеет право быть представленным в этом комитете. Международные правительственные и неправительственные организации, имеющие связи с ИСО, также принимают участие в работах.

Проекты Международных Стандартов, принятые техническими комитетами, рассылаются комитетам-членам на одобрение до их утверждения Советом ИСО в качестве Международных Стандартов. Они одобряются в соответствии с процедурой ИСО, требующими одобрения по меньшей мере 75 % комитетов-членов, принимающих участие в голосовании.

Международный Стандарт ИСО 8930 был разработан Техническим Комитетом ИСО/ТК 98, *Основы расчета строительных конструкций*.

При использовании Международных Стандартов необходимо принимать во внимание, что все Международные Стандарты подвергаются время от времени пересмотру и, поэтому, любая ссылка на какой-либо Международный Стандарт в настоящем документе, кроме случаев, указанных особо, предполагает его последнее издание.

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General principles on reliability for structures — List of equivalent terms

Principes généraux de la fiabilité des constructions — Liste de termes équivalents

Общие принципы надежности конструкций — Список эквивалентных терминов

Scope and field of application

This International Standard fixes the equivalence in different languages of the principal terms used in the field of reliability of structures.

NOTE — In addition to terms used in the three official ISO languages (English, French and Russian), this International Standard gives the equivalent terms in German; these have been included at the request of Technical Committee ISO/TC 98 and are published under the responsibility of the member body for Germany, F.R. (DIN). However, only the terms given in the official languages can be considered as ISO terms.

An annex contains approximate but simple definitions of, and commentary on, the terms listed, gives indications about their use and quotes the corresponding symbols and subscripts.

Definitions of these terms are given in ISO 2394.

Some of the terms in the list are not given in ISO 2394: they have been retained as they are used in several countries and explanations are given about them in the annex.

Objet et domaine d'application

La présente Norme internationale fixe les équivalences entre différentes langues des principaux termes utilisés dans le domaine de la fiabilité des constructions.

NOTE — En supplément aux termes donnés dans les trois langues officielles de l'ISO (anglais, français et russe), la présente Norme internationale donne les termes équivalents en allemand; ces termes ont été inclus à la demande du comité technique ISO/TC 98 et sont publiés sous la responsabilité du comité membre de l'Allemagne, R.F. (DIN). Toutefois, seuls les termes donnés dans les langues officielles peuvent être considérés comme termes ISO.

Elle est accompagnée d'une annexe qui contient des définitions approximatives mais simples, avec des commentaires, des termes qui y figurent, donne des indications sur leur emploi et rappelle les symboles et indices correspondants.

Les définitions de ces termes sont détaillées dans l'ISO 2394.

Quelques-uns des termes de la liste ne figurent pas dans l'ISO 2394; ils ont été ajoutés en raison de leur utilisation dans plusieurs pays et des explications à leur sujet sont données dans l'annexe.

Объект и область применения

Настоящий Международный Стандарт устанавливает на различных языках эквивалентность основных терминов, применяемых в области надежности конструкций.

ПРИМЕЧАНИЕ — В дополнение к терминам на официальных языках ИСО (английском, французском и русском) настоящий Международный Стандарт дает эквивалентные термины на немецком языке; эти термины введены по просьбе Технического Комитета ИСО/ТК 98 и публикуются под ответственность комитета-члена Федеративной Республики Германии (ДИН). Однако, лишь термины на официальных языках могут рассматриваться как термины ИСО.

В приложении приведены приблизительные, но достаточно ясные определения терминов (только на английском и французском языках), включенных в настоящий Международный Стандарт, а также даны указания по применению этих терминов и соответствующие символы и индексы.

Определения терминов рассмотрены подробно в ИСО 2394.

Не все термины этого списка определены в ИСО 2394; они добавлены в настоящий Международный Стандарт, так как находят применение в некоторых странах. Объяснения по этому поводу даны в приложении.

Alphabetical indexes of the terms, in English, French, Russian and German, are also given.

As necessary, a list of equivalent terms in other languages will be published later as an addendum to this International Standard.

Reference

ISO 2394, *General principles on reliability for structures.*

Des index alphabétiques des termes anglais, français, russes et allemands sont également donnés.

Le cas échéant, une liste des termes équivalents dans d'autres langues sera publiée ultérieurement en tant qu'additif à la présente Norme internationale.

Référence

ISO 2394, *Principes généraux de la fiabilité des constructions.*

В конце даны также алфавитные указатели терминов на английском, французском, русском и немецком языках.

В случае необходимости, список эквивалентных терминов на других языках будет опубликован в качестве дополнения к настоящему Международному Стандарту.

Ссылка

ИСО 2394, *Общие принципы надежности конструкций.*¹⁾

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1) Опубликован только на английском и французском языках.

No. N°	Terms English	Termes Français	Термины Русский	Begriffe Deutsch
1	General terms	Termes généraux	Общие термины	Allgemeine Begriffe
1.1	reliability	fiabilité	надежность	Zuverlässigkeit
1.2	safety ; structural safety	sécurité ; sécurité structurale	безопасность ; безопасность конструкции	Sicherheit ; Tragsicherheit
1.3	serviceability	aptitude au service	пригодность к нормальной эксплуатации	Gebrauchstauglichkeit
1.4	durability	durabilité	долговечность	Dauerhaftigkeit
1.5	deterministic method	méthode déterministe	детерминистический метод	deterministisches Verfahren
1.6	probabilistic method	méthode probabiliste	вероятностный метод	probabilistisches Verfahren
1.7	permissible (allowable) stresses method	méthode des contraintes admissibles	метод допускаемых напряжений	Verfahren mit zulässigen Spannungen
1.8	limit states method	méthode des états-limites	метод предельных состояний	Verfahren mit Grenzzuständen
1.9	limit states	états-limites	предельные состояния	Grenzzustände
1.10	ultimate limit states	états-limites ultimes	предельные состояния первой группы	Grenzzustände der Tragfähigkeit
1.11	serviceability limit states	états-limites de service	предельные состояния второй группы	Grenzzustände der Gebrauchstauglichkeit
1.12	partial factors method	méthode des coefficients partiels	метод частных коэффициентов	Verfahren mit Teilsicherheitsbeiwerten
2	Situations and load cases	Situations et cas de charge	Ситуации и варианты нагрузки	Situationen und Lastfälle
2.1	design situation	situation de projet	расчетная ситуация	Bemessungssituation
2.2	persistent situation	situation durable	установившаяся ситуация	ständige Situation
2.3	transient situation	situation transitoire	переходная ситуация	vorübergehende Situation
2.4	accidental situation	situation accidentelle	аварийная ситуация	außergewöhnliche Situation
2.5	load arrangement	disposition des charges	схема нагрузки	Lastanordnung ; Lastbild
2.6	load case	cas de charge	вариант нагрузки	Lastfall
3	Actions	Actions	Воздействия	Einwirkungen
3.1	action	action	воздействие	Einwirkung
3.2	direct action	action directe	прямое воздействие	direkte (mechanische) Einwirkung
3.3	indirect action	action indirecte	косвенное воздействие	indirekte (geometrische) Einwirkung
3.4	permanent action	action permanente	постоянное воздействие	ständige Einwirkung
3.5	variable action	action variable	переменное воздействие	veränderliche Einwirkung
3.6	accidental action	action accidentelle	аварийное воздействие	außergewöhnliche Einwirkung
3.7	fixed action	action fixe	фиксированное воздействие	ortsfeste Einwirkung

No. No	English	Français	Русский	Deutsch
3.8	free action	action libre	свободное воздействие	freie Einwirkung
3.9	static action	action statique	статическое воздействие	statische Einwirkung
3.10	dynamic action	action dynamique	динамическое воздействие	dynamische Einwirkung
3.11	sustained action	action soutenue	длительная доля воздействия	dauernde Einwirkung
3.12	transient action	action transitoire	кратковременная доля воздействия	vorübergehende Einwirkung
3.13	short duration action (or value) (with respect to . . .)	action (ou valeur) de courte durée (vis-à-vis de . . .)	кратковременное воздействие (по отношению к . . .)	Kurzzeit-Einwirkung (in bezug auf . . .)
3.14	long duration action (or value) (with respect to . . .)	action (ou valeur) de longue durée (vis-à-vis de . . .)	длительное воздействие (по отношению к . . .)	Langzeit-Einwirkung (in bezug auf . . .)
3.15	short-term value	valeur à court terme	кратковременное значение	Kurzzeitwert
3.16	long-term value	valeur à long terme	длительное значение	Langzeitwert
3.17	final value	valeur finale	установившееся значение	Endwert
3.18	selfweight	poids propre	собственный вес	Eigenlast
3.19	imposed load	charge d'exploitation	эксплуатационная нагрузка	Nutzlast
3.20	site load	charge de chantier	монтажная нагрузка	Nutzlast im Bauzustand ; Baunutzlast
4	Representative values of actions	Valeurs représentatives des actions	Нормативные значения воздействий	Repräsentative Werte für Einwirkungen
4.1	representative values	valeurs représentatives	нормативные значения	repräsentative Werte
4.2	characteristic value	valeur caractéristique	характерное значение	charakteristischer Wert
4.3	reference period	durée de référence	условный период	Bezugszeitraum
4.4	nominal value	valeur nominale	номинальное значение	Nennwert
4.5	service value	valeur de service	эксплуатационное значение	Gebrauchswert
4.6	combination values	valeurs de combinaison	значения, используемые в сочетании	Kombinationswerte
4.7	frequent values	valeurs fréquentes	часто встречающиеся значения	häufige Werte
4.8	quasi-permanent values	valeurs quasi-permanentes	квазипостоянные значения	quasi-ständige Werte
4.9	design values	valeurs de calcul ; valeurs de dimensionnement	расчетные значения	Bemessungswerte
5	Combinations of actions	Combinaisons d'actions	Сочетания воздействий	Kombinationen der Einwirkungen
5.1	combination of actions	combinaison d'actions	сочетание воздействий	Kombination der Einwirkungen
5.2	ultimate combination (of actions)	combinaison (d'actions) ultime	сочетание (воздействий) для проверки предельных состояний первой группы	Kombination für den Nachweis der Tragsicherheit
5.3	fundamental combination	combinaison fondamentale	основное сочетание	Grundkombination
5.4	accidental combination	combinaison accidentelle	аварийное сочетание	außergewöhnliche Kombination

No. №	English	Français	Русский	Deutsch
5.5	service combination (of actions)	combinaison (d'actions) de service	сочетание (воздействий) для проверки предельных состояний второй группы	Kombination für den Nachweis der Gebrauchstauglichkeit
5.6	infrequent combination	combinaison rare	редко встречающееся сочетание	seltene Kombination
5.7	frequent combination	combinaison fréquente	часто встречающееся сочетание	häufige Kombination
5.8	quasi-permanent combination	combinaison quasi-permanente	квазипостоянное сочетание	quasi-ständige Kombination
6	Values of material properties	Valeurs des propriétés des matériaux	Значения свойств материалов	Kennwerte für die Eigenschaften der Baustoffe (Werkstoffe)
6.1	characteristic value (of a property of a material)	valeur caractéristique (d'une propriété d'un matériau)	характерное значение (величины, характеризующей свойство материала)	charakteristischer Wert (für eine Eigenschaft eines Baustoffs)
6.2	characteristic strength	résistance caractéristique	характерное значение прочности	charakteristische Festigkeit
6.3	required strength	résistance requise	требуемая прочность	erforderliche Festigkeit
6.4	nominal strength	résistance nominale	номинальная прочность	Nennfestigkeit
6.5	observed (or measured) strength	résistance observée (ou mesurée)	наблюденная (или замеренная) прочность	festgestellte Festigkeit
6.6	design value (of a property of a material)	valeur de calcul ; valeur de dimensionnement (d'une propriété d'un matériau)	расчетное значение (величины, характеризующей свойство материала)	Berechnungswert (für eine Eigenschaft eines Baustoffs)
7	Action-effects and resistances	Sollicitations et résistances	Силовые эффекты и сопротивления	Schnittgröße und Widerstände
7.1	partial safety factor	coefficient partiel de sécurité	частный коэффициент надежности	Teilsicherheitsbeiwert
7.2	effects of actions	effets des actions	эффект воздействия	Beanspruchung
7.3	action-effect	sollicitation (agissante)	силовой эффект воздействия	Schnittgröße
7.4	design action-effect	sollicitation de calcul ; sollicitation de dimensionnement	силовой эффект расчетного значения воздействия	Bemessungswert der Schnittgröße
7.5	resistance	résistance (ou sollicitation résistante)	сопротивление	Widerstand (z.B. Querschnittswiderstand)
7.6	design resistance	résistance (ou sollicitation résistante) de calcul ; résistance (ou sollicitation résistante) de dimensionnement	расчетное значение сопротивления	Bemessungswert des Widerstands

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Annex

Definitions and commentary

This annex gives brief definitions of those terms for which a list has been established in the body of the Standard, and provides relevant commentary. For details concerning these definitions, see ISO 2394.

No.	Term	Definitions and commentary
1.1	reliability	"Reliability" covers safety, serviceability and durability of a structure.
1.2	safety; structural safety	Until now, this term has been used generally in the sense of reliability. In its restricted sense, it means the capacity of a structure to resist all the actions, and also certain specified accidental phenomena, which it will have to withstand during construction and anticipated use (ultimate limit states related).
1.3	serviceability	Ability of the structure and structural elements to perform adequately in normal use (serviceability limit states related).
1.4	durability	Ability of the structure and structural elements to maintain adequate performance in time.
1.5	deterministic method	Calculation method in which the basic variables are treated as non-random.
1.6	probabilistic method	Calculation method in which the basic variables are treated as random.
1.7	permissible (allowable) stresses method	Calculation method in which the stresses occurring under the expected maximum loads are compared with some fraction of the resistance of the materials.
1.8	limit states method	Calculation method in which an attempt is made to prevent the structure attaining certain limit states. Allowable stresses method is sometimes used with the same meaning.
1.9	limit states	States beyond which the structure no longer satisfies the design (performance) requirements.
1.10	ultimate limit states	Limit states corresponding to the maximum load-carrying capacity of a structure or of a part of the structure (safety related).
1.11	serviceability limit states	Limit states related to normal use (often related to function).
1.12	partial factors method	Calculation method in which allowance is made for the uncertainties and variabilities assigned to the basic variables by means of partial safety coefficients (see 7.1).
2.1	design situation	Situation of the structure over a period of time in which the distributions (or processes) of all the reliability data may be regarded as constant.
2.2	persistent situation	Situation having a duration of the same order as the life of the structure.
2.3	transient situation	Situation having a shorter duration than the life of the structure, with a high probability of occurrence. <i>Examples:</i> situation during construction; situation of a structure subjected to loads caused by storage of material during construction, normal use or repair.

No.	Term	Definitions and commentary	Symbol	Sub-script
2.4	accidental situation	<p>Situation (during or after an accident) normally having a short duration and a low probability of occurrence.</p> <p><i>Example:</i> situation associated with a fire, explosion, impact, etc.</p>		
2.5	load arrangement	<p>Arrangement of loads introduced into the calculation to allow for the variation in space of a free action (see 3.8).</p> <p><i>Example:</i> arrangement of traffic loads on a bridge.</p>		
2.6	load case	<p>A load case is determined by fixing the arrangement of each of the free actions.</p>		
3.1	action	<p>An action is:</p>	F	f
3.2	direct action	<p>— a set of concentrated or distributed forces acting on the structure (direct actions), or</p>		F dir
3.3	indirect action	<p>— the cause of imposed or constrained deformations in the structure (indirect actions). Symbols such as a, α, ε, etc. shall be chosen to designate each particular indirect action.</p>	a α ε	ind
3.4	permanent action	<p>The term "load" may be used with essentially the same meaning as "action". It is often used to describe direct actions only. The term "action" was introduced to cover also the effects due to imposed deformations.</p>		
		<p>Action which is likely to act throughout a given design situation and for which the variation in magnitude with time is negligible in relation to the mean value, or for which the variation is always in the same direction until the action attains a certain limit value.</p> <p><i>Examples:</i> selfweight, prestressing force.</p>	G, g	g G
3.5	variable action	<p>Action which is unlikely to act throughout a given design situation or for which the variation in magnitude with time is not monotonic nor negligible in relation to the mean value.</p> <p><i>Examples:</i> imposed loads, wind action.</p>	Q, q	q Q var
3.6	accidental action	<p>Action, the occurrence of which, with a significant value, for a given structure, is unlikely for the period of time under consideration and which in most cases is of short duration. The occurrence of an accidental action could be expected in many cases to cause severe consequences unless special measures are taken.</p> <p><i>Examples:</i> impact, explosion, fire.</p>	A or F_a	a A ac
3.7	fixed action	<p>Action having a distribution in space over the structure such that the magnitude and direction of the action are determined unambiguously for the structure as a whole if this magnitude and this direction are determined at one point on the structure.</p> <p><i>Example:</i> static water pressure.</p>		

No.	Term	Definitions and commentary	Symbol	Sub-script
3.8	free action	Action which may have any distribution in space over the structure, within certain limits (see 2.5 and 2.6). <i>Example:</i> action of vehicles on a bridge.		
3.9	static action	Action which does not cause significant acceleration of the structure or structural members.		st (stat)
3.10	dynamic action	Action which causes significant accelerations of the structure or structural members. Whether the action is regarded as dynamic or static is dependent upon the structure.		dyn
3.11	sustained action	} Terms to be reserved for a qualitative classification of actions; e.g. in a floor loading, the weight of the furniture represents the "sustained" action, and the weight of persons represents the "transient" action.		
3.12	transient action			
3.13	short duration action (or value) (with respect to . . .)	} For example, with respect to time-dependent behaviour of materials, such as creep or the strength of concrete; these expressions may either relate to all the representative values of an action, or only to certain of them; in the former case they are assigned to a qualitative property of the action.		
3.14	long duration action (or value) (with respect to . . .)			
3.15	short-term value	} Concerns the values of certain actions (e.g. shrinkage, prestressing) or other properties relating to the performance of the structure (e.g. creep, strength of concrete) at different dates.		
3.16	long-term value			
3.17	final value			
3.18	selfweight	Avoid the expression "dead load" on account of its ambiguity.	G_o, g_o	
3.19	imposed load	Avoid the expression "live load" on account of its ambiguity.	Q_o, q_o	
3.20	site load	Load applied provisionally to the structure during construction.		sit
4.1	representative values	For different purposes, different values may be assigned to each action. These values are called "representative values".	F_{rep} or F_r	rep r
4.2	characteristic value	} The principal representative value of an action is its "characteristic value". Insofar as this characteristic value can be fixed on statistical bases, it is chosen so as to correspond to a prescribed probability of not being exceeded on the unfavourable side during a "reference period" taking into account the intended life of the structure and the duration of the design situation.	F_k	k
4.3	reference period			
4.4	nominal value	Value fixed on non-statistical bases, for example on experience acquired or on physical constraints.		nom
4.5	service value	Value differing from the characteristic value which can be used for certain serviceability limit states.	Q_{ser}	ser

No.	Term	Definitions and commentary	Symbol	Sub-script
4.6	combination values	Values associated with the use of combinations of actions (see 5.1), to take account of a reduced probability of simultaneous occurrence of the most unfavourable values of several independent actions. They may be expressed as a certain part of the characteristic value by using a factor $\psi_0 \leq 1$.	$\psi_0 Q_k$	
4.7	frequent values	Values determined so that the total period for which they will be exceeded is only a small fraction of the reference period or so that the frequency with which they are exceeded is limited. They may be expressed as a certain part of the characteristic value by using a factor $\psi_1 \leq 1$.	$\psi_1 Q_k$	
4.8	quasi-permanent values	Values determined so that the total period for which they will be exceeded is a large fraction of the reference period. They may be expressed as a certain part of the characteristic value by using a factor $\psi_2 \leq 1$.	$\psi_2 Q_k$	
4.9	design values	Values obtained by multiplying the representative values by partial coefficients γ_f . If the partial coefficient γ_f is resolved into various factors, it is necessary to state in each case the coefficient which has been taken into account. In certain cases, the design value is obtained by applying additive or subtractive elements.	$F_d = \gamma_f F_{rep}$	d
5.1	combination of actions	Set of design values (see 4.9) used for the verification of the structural reliability for a limit state under the simultaneous influence of different actions.		
5.2	ultimate combination (of actions)	Combination of actions used for studying an ultimate limit state (this term covers the two following terms 5.3 and 5.4).		
5.3	fundamental combination	Combination of permanent actions and variable actions used for studying an ultimate limit state.		
5.4	accidental combination	<ul style="list-style-type: none"> — Combination of permanent actions, variable actions and one accidental action, used for studying an ultimate limit state. — Combination of permanent actions and variable actions used for studying a structure in an accidental situation (e.g. resulting from a fire). 		
5.5	service combination (of actions)	Combination of actions used for studying a serviceability limit state (this term covers the following three terms 5.6, 5.7 and 5.8).		
5.6	infrequent combination	Combination to be considered for serviceability limit states connected with a single occasion on which the effect under study attains a certain value (these are generally limit states, the first occurrence of which casts doubt on the durability of the structure).		
5.7	frequent combination	Combination to be considered for serviceability limit states connected with the effect under study attaining a certain value either during a small fraction of the reference period, or several times (e.g. with deformations obstructing the use or the appearance of the structure, unpleasant oscillations for users, etc.). Limit states of fatigue shall be the subject of specific justifications.		
5.8	quasi-permanent combination	Combination to be considered for serviceability limit states connected with the actions attaining a certain value for a prolonged period (e.g. for the calculation of creep).		