B3 Reliability differentiation

B3.1 Consequences classes

(1) For the purpose of reliability differentiation, consequences classes (CC) may be established by considering the consequences of failure or malfunction of the structure as given in Table B1.

Table B1 - Definition of consequences classes

Consequences Class	Description	Examples of buildings and civil engineering works
CC3	**High** consequence for loss of human life, *or* economic, social or environmental consequences **very great**	Grandstands, public buildings where consequences of failure are high (e.g. a concert hall)
CC2	**Medium** consequence for loss of human life, economic, social or environmental consequences **considerable**	Residential and office buildings, public buildings where consequences of failure are medium (e.g. an office building)
CC1	**Low** consequence for loss of human life, *and* economic, social or environmental consequences **small or negligible**	Agricultural buildings where people do not normally enter (e.g. storage buildings), greenhouses

(2) The criterion for classification of consequences is the importance, in terms of consequences of failure, of the structure or structural member concerned. See B3.3

(3) Depending on the structural form and decisions made during design, particular members of the structure may be designated in the same, higher or lower consequences class than for the entire structure.

NOTE At the present time the requirements for reliability are related to the structural members of the construction works.

B3.2 Differentiation by β values

(1) The reliability classes (RC) may be defined by the β reliability index concept.

(2) Three reliability classes RC1, RC2 and RC3 may be associated with the three consequences classes CC1, CC2 and CC3.

(3) Table B2 gives recommended minimum values for the reliability index associated with reliability classes (see also annex C).

Table B2 - Recommended minimum values for reliability index β (ultimate limit states)

Reliability Class	Minimum values for β	
	1 year reference period	50 years reference period
RC3	5,2	4,3
RC2	4,7	3,8
RC1	4,2	3,3

NOTE A design using EN 1990 with the partial factors given in annex A1 and EN 1991 to EN 1999 is considered generally to lead to a structure with a β value greater than 3,8 for a 50 year reference period. Reliability classes for members of the structure above RC3 are not further considered in this Annex, since these structures each require individual consideration.

B3.3 Differentiation by measures relating to the partial factors

(1) One way of achieving reliability differentiation is by distinguishing classes of γ_F factors to be used in fundamental combinations for persistent design situations. For example, for the same design supervision and execution inspection levels, a multiplication factor K_{FI}, see Table B3, may be applied to the partial factors.

Table B3 - K_{FI} factor for actions

K_{FI} factor for actions	Reliability class		
	RC1	RC2	RC3
K_{FI}	0,9	1,0	1,1

NOTE In particular, for class RC3, other measures as described in this Annex are normally preferred to using K_{FI} factors. K_{FI} should be applied only to unfavourable actions.

(2) Reliability differentiation may also be applied through the partial factors on resistance γ_M. However, this is not normally used. An exception is in relation to fatigue verification (see EN 1993). See also B6.

(3) Accompanying measures, for example the level of quality control for the design and execution of the structure, may be associated to the classes of γ_F. In this Annex, a three level system for control during design and execution has been adopted. Design supervision levels and inspection levels associated with the reliability classes are suggested.

(4) There can be cases (*e.g.* lighting poles, masts, etc.) where, for reasons of economy, the structure might be in RC1, but be subjected to higher corresponding design supervision and inspection levels.

B4 Design supervision differentiation

(1) Design supervision differentiation consists of various organisational quality control measures which can be used together. For example, the definition of design supervision