

Target reliability levels – needs for harmonisation in present standards

Milan Holicky, Jana Markova and Miroslav Sykora

*Klokner Institute, Department of Structural Reliability,
Czech Technical University in Prague,
Solinova 7, Prague 16608, Czech Republic
miroslav.sykora@klok.cvut.cz*

The target reliability levels recommended in various national and international documents for new structures are inconsistent in terms of the values of reliability indices and recommendations for their applications. In general, optimum reliability levels should be specified taking into accounts both the relative costs of safety measures and the expected consequences of failure over the design working life. The minimum reliability for human safety should also be considered when people may be killed or injured as a result of failure.

Submitted contribution attempts to clarify the link between the design working life and the reliability index, and to provide guidance for specification of the target reliability level for a given design working life. Recommendations given in present European EN and international ISO standards for the Ultimate and Serviceability Limit States are critically reviewed and deficiencies to be improved within further developments are indicated. A particular attention is paid to the effect of dependencies between failure events. Recommendations for practical applications are provided considering the principles of EN and ISO standards.

The following concluding remarks are drawn from the study:

- In the present normative documents the target reliability levels are specified for different reference periods - typically one year, fifty years and life-time assuming mutual independence of failure events.
- A simple recalculation of targets to a given reference period (say 50 years) is proposed taking into account mutual dependence of failure events.
- With increasing mutual dependence the target reliabilities approach values related to one year (basic) reference period.
- The target reliabilities indicated in available documents are within a broad range and should be carefully revised.
- Target reliabilities related to different reference periods should be supplemented by clear recommendations on how to use them in practice.