SOUTH AFRICAN NATIONAL STANDARD

Basis of structural design and actions for buildings and industrial structures

Part 1: Basis of structural design

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Table of changes

<table>
<thead>
<tr>
<th>Change No.</th>
<th>Date</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amdt 1</td>
<td>2011</td>
<td>Amended to update the scope, to delete the definitions of &quot;acceptable&quot; and &quot;competent person&quot;, to modify the general pre-requisites, to correct a value in the table on the partial factors for actions for the ultimate limit state, to add a reference to annex B in the note to 7.4.2.2(a), and to add a cross reference to 7.4.3.2.</td>
</tr>
<tr>
<td>Amdt 2</td>
<td>2018</td>
<td>Amended to update the table on partial factors for actions for the ultimate limit state, the equation on combination of actions for reversible serviceability, and the table on summary of recommended criteria for the irreversible serviceability limit state.</td>
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</tbody>
</table>

Acknowledgement

The South African Bureau of Standards wishes to acknowledge the valuable assistance derived from the South African Institution of Civil Engineering (SAICE).

Foreword

This South African standard was prepared by National Committee SABS/TC 098/SC 01, Structural and geo-technical design standards – Basis structures design and actions (including earthquake design), in accordance with procedures of the South African Bureau of Standards, in compliance with annex 3 of the WTO/TBT agreement.

This document was approved for publication in March 2018.

This document supersedes SANS 10160-1:2011 (edition 1.1).

A vertical line in the margin shows where the text has been technically modified by amendment No. 2.

Compliance with this document cannot confer immunity from legal obligations.

The SANS 10160 series consists of the following eight parts, under the general title Basis of structural design and actions for buildings and industrial structures:

- Part 1: Basis of structural design.
- Part 2: Self-weight and imposed loads.
- Part 3: Wind actions.
- Part 4: Seismic actions and general requirements for buildings.
- Part 5: Basis for geotechnical design and actions.
- Part 6: Actions induced by cranes and machinery.
- Part 7: Thermal actions.
- Part 8: Actions during execution.

Annexes A, B, C, D and E are for information only.
Background

With the revision of SABS 0160, its scope has generally been maintained in terms of the structures provided for, design procedures to be applied and the associated levels of reliability, as well as the actions to be considered. Similarly, the materials-based structural design standards which are intended to be applied in conjunction with SANS 10160 have generally been maintained. Deviations in scope and contents from that of SABS 0160 derive mainly from the incorporation of improved, additional models and procedures that are in the main implemented internationally.

The general basis of structural design utilises the limit states based partial factor procedures to achieve appropriate levels of reliability for the design of safe and sound structures. The requirements include not only the treatment of actions and their combinations and effects on structures, but also the material-independent requirements for structural resistance. Changes from the general requirements stipulated in SABS 0160 result mainly from extensions of the design situations and the related limit states which are required to be considered. Although this appears to increase the complication of the design procedures, it really clarifies the requirements. The extended basis of design should improve the consistency of the reliability of structural performance, improve the reliability where necessary and also remove some unwarranted conservatism.

The provisions of SANS 10160 update the procedures for the treatment of actions as stipulated in SABS 0160 by presenting revised and extended requirements, load models and the determination of appropriate values for the actions. The revised procedures apply to self-weight and imposed loads, wind actions, seismic actions and earthquake resistance as well as crane induced actions.

An important addition to the scope of SANS 10160 is to provide for the following:

a) Geotechnical design and actions for situations within the scope of buildings and similar industrial structures.

b) Other additions include the following:

1) actions induced by stationary rotating machinery are added to the provisions for crane induced actions;

2) new provisions for thermal actions include information on local climatic conditions, as specified in the TMH 7 requirements for bridge design; and

3) requirements and actions on the structure during execution are also added, which represent the situations to which a structure is exposed during construction, prefabrication, erection or reconstruction. These requirements should ensure that proper attention is given to the assignment of responsibilities for the performance of the structure not only ultimately during its use, but also during its execution.

Relationship with Eurocodes

Although SABS 0160 served as basis and reference for the scope and reference levels of reliability and ISO standards, in particular SANS 2394, SANS 10160 is primarily based on appropriate parts of the Eurocodes.