INTERNATIONAL STANDARD

ISO 20987

First edition
2019-10

Simplified design for mechanical connections between precast concrete structural elements in buildings

Conception simplifiée pour les assemblages mécaniques entre éléments structurels en béton préfabriqué dans les bâtiments

Reference number
ISO 20987:2019(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 5, *Simplified design standard for concrete structures*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document contains a set of practical provisions for the design of the mechanical connections in precast elements under seismic actions. Design of the connections is carried out in terms of strength verifications. Indications are also provided for defining the actions to be used in design.

If national standards provide alternate formulae for the same typology, those can be used instead of the ones given in this document.

Simplified design for mechanical connections between precast concrete structural elements in buildings

1 Scope

This document refers to connections in precast frame systems, either for single-storey or multi-storey buildings. The connections for all orders of joints are considered. Large wall panel and three-dimensional cell systems are not considered.

According to the position in the overall construction and of the consequent different structural functions, the seven following orders of joints are considered:

a) *mutual joints between floor or roof elements* (floor-to-floor) that, in the seismic behaviour of the structural system, concern the diaphragm action of the floor;

b) *joints between floor or roof elements and supporting beams* (floor-to-beam) that give the peripheral constraints to the floor diaphragm in its seismic behaviour;

c) *joints between beam and column* (beam-to-column) that ensure in any direction the required degree of restraint in the frame system;

d) *joints between column segments* (column-to-column) used for multi-storey buildings usually for dual wall braced systems;

e) *joints between column and foundation* (column-to-foundation), able to ensure in any plane a fixed full support of the column;

f) *fastenings of cladding panels to the structure* (panel-to-structure) that ensure the stability of the panels under the high forces or the large drifts expected under seismic action;

g) *joints between adjacent cladding panels* (panel-to-panel) possibly used to increase the stiffness of the peripheral wall system and provide an additional source of energy dissipation.

Simple bearings working by gravity load friction are not considered. Sliding and elastic deformable supporting devices neither, being all these types of connections not suitable for the transmission of seismic actions.

The document provides formulae for the strength design of a large number of joint typologies.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
union
generic linking constraint between two or more members