

Together with Code SIA 266/2, replaces the recommendation SIA V 178, 1996 edition

Erhaltung von Tragwerken – Mauerwerksbau, Teil 1: Natursteinmauerwerk

Maintenance des structures porteuses – Structures en maçonnerie, partie 1: pierres naturelles

Conservazione delle strutture portanti – Costruzioni in muratura, parte 1: pietra naturale

Existing structures – Stone masonry, part 1: natural stone masonry

269/6-1

Reference number
SN 505269/6-1:2011 en

Valid from: 2011-01-01

Published by
Swiss Society of Engineers
and Architects
P.O. Box, CH-8027 Zurich

Any corrections to and comments on this publication can be found at www.sia.ch/korrigenda.

The SIA assumes no liability for any damages which might be caused through the application of this publication.

CONTENTS

	Page		Page
Foreword	4	Appendix	
0 Scope	5	A Overview of the most important natural building stones in Switzerland (normative)	34
0.1 Limitations	5	B Investigation methods (normative)	35
0.2 References	5		
0.3 Deviations	5		
1 Terminology	6		
1.1 Technical terms	6		
1.2 Symbols	7		
2 Principles	8		
2.1 Service life	8		
2.2 Construction materials	8		
2.3 Examination	8		
2.4 Preservation value	8		
2.5 Construction documents	8		
3 Construction materials	9		
3.1 Description and requirements	9		
3.2 Original construction materials	9		
3.3 Construction materials dating from previous interventions	10		
3.4 Construction materials for interventions	11		
4 Structural analysis and verifications	15		
4.1 Analysis of the structure	15		
4.2 Examination values	15		
4.3 Verification of structural safety	16		
4.4 Verification of serviceability	16		
4.5 Fatigue	17		
5 Condition survey	18		
5.1 General	18		
5.2 Investigations	18		
5.3 Deterioration mechanisms and damage scenarios	20		
5.4 Investigation methods	21		
6 Condition evaluation	22		
6.1 General	22		
6.2 Quantitative analysis	22		
6.3 Empirical analysis	22		
6.4 Prediction of the development of the condition	22		
6.5 Recommendation of intervention measures	23		
7 Interventions	24		
7.1 General	24		
7.2 Maintenance	24		
7.3 Moisture protection	24		
7.4 Structure	25		
7.5 Faces	30		

FOREWORD

The majority of the construction works and monuments constructed prior to the beginning of the 20th century consist of structural natural stone masonry. A few decades later, this method got replaced by concrete construction. The preservation of natural stone structures represents an ongoing task, also into the distant future, since structures built using this technique represent an important part of our cultural heritage and are generally robust and durable. Additional regulations relating to masonry structures constructed using artificial stones are currently in preparation. These will be published later as Code SIA 269/6-2.

Code SIA 269/6-1 forms part of the SIA's structural codes relating to the preservation of existing structures and is supplemented by the following codes:

- Code SIA 269 Existing structures – Bases for examination and interventions
- Code SIA 269/1 Existing structures – Actions
- Code SIA 269/2 Existing structures – Concrete structures
- Code SIA 269/3 Existing structures – Steel structures
- Code SIA 269/4 Existing structures – Composite steel and concrete structures
- Code SIA 269/5 Existing structures – Timber structures
- Code SIA 269/7 Existing structures – Geotechnics.

Technical Specification SIA 2018 continues to apply to the examination of existing buildings with respect to earthquakes. However, it is planned to supplement the codes for existing structures with a Code SIA 269/8 *Existing structures – Seismic aspects*.

Code SIA 269/6-1 describes the information and procedures that are used, in particular in the preservation of natural stone masonry structures. It is directed at project planning specialists, the persons carrying out the work and at the owners of structures.

The present Code, together with Code SIA 266/2, replaces the recommendation SIA V 178, which dealt with both the construction and preservation of natural stone masonry. This code relates exclusively to the preservation of natural stone masonry, with the main focus being on aspects relating to the preservation of the structure, but also addressing aspects relating to the preservation of visible masonry faces surfaces. The newly-published code SIA 266/2, which addresses the construction of new natural stone masonry structures, is closely linked with the present code, in particular with respect to structural safety, and has adopted methods that were developed for existing structures. For this reason, in the case of natural stone no distinction is made between dimensioning values and examination values.

Codes SIA 269 Project Management Team and Working Group SIA 269/6-1

Abbreviations for the organisations represented in the commission SIA 266

ETH Zürich Swiss Federal Institute of Technology, Zurich

Project Management – Codes for Existing Structures

Dr. Paul Lüchinger, dipl. Ing. ETH, Zurich (chairman)
Prof. Dr. Eugen Brühwiler, dipl. Ing. ETH, Lausanne
Thomas P. Lang, dipl. Ing. ETH, Berne
Prof. Thomas Vogel, dipl. Ing. ETH, Zurich

Working Group SIA 269/6-1**Existing structures – Natural stone masonry**

Dr. Philipp Rück, dipl. Geol. ETH/SIA, Schinznach-Dorf (chairman)
Bruno Portmann, dipl. Arch. ETH/SIA, Steinhauer, Niedergösgen
Prof. Dr. Joseph Schwartz, dipl. Ing. ETH, Zurich
Thierry Berset, dipl. Ing. ETH/SIA, Winterthur
Dr.-Ing. Bernd Kister, dipl. Geophys., Horw
Dr. Nebojša Mojsilović, dipl. Ing. TU/SIA, Zurich
Hans Ulrich Remensberger, dipl. Ing. ETH/SIA, Zurich
Gianfranco Sciarini, dipl. Ing. ETH/SIA, Vira
Gabi Zwysig-Gall, dipl. Ing. ETH, Zug

Commission SIA 266 “Masonry”

President	Prof. Dr. Joseph Schwartz, dipl. Ing. ETH, Zurich	ETH Zürich
Members	Thierry Berset, dipl. Ing. ETH/SIA, Winterthur Ralph Gantenbein, dipl. Ing. ETH/SIA, Buchs Dr. Nebojša Mojsilović, dipl. Ing. TU/SIA, Zurich Dr. Kerstin Pfyl-Lang, dipl. Ing. ETH/SIA, Zurich Ruedi Räss, dipl. Ing. ETH/SIA, Sursee Dr. Philipp Rück, dipl. Geol. ETH/SIA, Schinznach-Dorf Stefan Schmid, Produktmanager, Dättwil Gianfranco Sciarini, dipl. Ing. ETH/SIA, Vira Gabi Zwysig-Gall, dipl. Ing. ETH, Zug	Consulting Engineer Industry ETH Zürich Administration Research Material Research Mortar Industry Consulting Engineer Consulting Engineer

Approval and validity

The SIA's central committee for codes and regulations approved the present Code SIA 269/6-1 on 23rd November 2010.
It is valid as from 1st January 2011.
Together with Code SIA 266/2, it replaces the recommendation SIA V 178, 1996 edition.

Copyright © 2011 by SIA Zurich

All rights are reserved, including the right to print extracts, partial or full reproduction (photocopy, microcopy, CD-ROM, etc.), storage in data processing systems and translation.