1481

DUP

Addendum to Preface.

Under Revision see ~~DR 83016 dated 1983~~
DR 85137

SUPERSEDED BY AS 3600-1988

REINSTATED TAS MAY 1988

OBSOLESCENT TAS MAY 1988

AS 1481 — 1978
UDC 624.012.46 : 693.56
SfB Ab3

Australian Standard

1481–1978

WITHDRAWN 199103

STILL CURRENT

SAA PRESTRESSED CONCRETE CODE

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

h

SAA PRESTRESSED CONCRETE CODE — 1978 EDITION

THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Association of Consulting Engineers, Australia

Australian Federation of Construction Contractors

Australian Post Tensioning Association

Australian Precast Concrete Manufacturers Association

Bureau of Steel Manufacturers of Australia

Cement and Concrete Association of Australia

Council of the City of Sydney

CSIRO Division of Building Research

Department of Construction

Department of Public Works, N.S.W.

Department of Public Works, W.A.

Experimental Building Station

National Association of Australian State Road Authorities

National Ready Mixed Concrete Association

Railways of Australia Committee

Steel Reinforcement Promotion Group

Universities

This standard, prepared by SAA Committee BD/2 Concrete Structures ~~4, Prestressed Concrete~~, under the authority of the SAA Building Industry Standards Committee, was approved on behalf of the Council of the Standards Association of Australia on 31 August 1978, and was published on 1 November 1978.

The rules are intended to include the technical provisions necessary for the design and erection of prestressed concrete structures of the materials herein referred to, but do not purport to comprise all the necessary provisions of a contract.

To keep abreast of progress in industry, Australian standards are regularly reviewed. Suggestions for improvements to published standards, addressed to the head office of the Association, Sydney, are welcomed.

AUSTRALIAN STANDARD

RULES FOR
THE USE OF PRESTRESSED CONCRETE IN STRUCTURES

known as the

SAA PRESTRESSED CONCRETE CODE

AS 1481—1978

First published (as AS CA35)	1963
Revised	1973
Revised and issued as AS 1481	1974
Revised	1978

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.

ISBN 0 7262 1567 8

PREFACE

This revised edition of AS 1481 was prepared by the Association's Committee on Prestressed Concrete. The technical intent of the standard has not been significantly altered in this edition.

It is assumed that the design of prestressed concrete structures will be entrusted to engineers who are experienced in the structural use of concrete in general and of prestressed concrete in particular, and that structures designed in accordance with this standard will be adequately supervised to ensure that all the conditions of the design are achieved in the construction.

A number of provisions of this standard are in line with the corresponding provisions of AS 1480, SAA Concrete Structures Code, in particular the rules covering the specification of concrete by required properties, and requirements for lightweight concrete. The same nomenclature has wherever possible been maintained for both standards and in certain cases direct reference has been made to AS 1480.

Although this standard has been drafted to cover the use of prestressed concrete in bridges, more specific requirements for highway bridges acceptable to the National Association of Australian State Road Authorities are given in the Highway Bridge Design Specification and the specifications for highway bridge construction and various addenda thereto issued by NAASRA.

Attention is drawn to the following standards to which reference may be required in connection with the use of this standard:

AS 1012 Methods of Testing Concrete

AS 1129 Fly Ash for Use in Concrete

AS 1130 Code of Practice for Use of Fly Ash in Concrete

AS 1141 Methods for Sampling and Testing Aggregates

AS 1170 SAA Loading Code

AS 1302 Steel Reinforcing Bars for Concrete

AS 1303 Hard-drawn Steel Reinforcing Wire for Concrete

AS 1304 Hard-drawn Steel Wire Reinforcing Fabric for Concrete

AS 1310 to 1313 Steel Tendons for Prestressed Concrete

AS 1314 Prestressing Anchorages

AS 1315 Portland Cement

AS 1317 Blended Cements

AS 1349 Bourdon Tube Pressure and Vacuum Gauges

AS 1379 Ready-mixed Concrete

AS 1465 Dense Natural Aggregates for Concrete

AS 1466 Metallurgical Furnace Slag Aggregate for Concrete

AS 1467 Lightweight Aggregates for Concrete

AS 1478 Chemical Admixtures for Concrete

AS 1479 Code of Practice for the Use of Chemical Admixtures in Concrete

AS 1480 SAA Concrete Structures Code

AS 1509 SAA Formwork Code

AS 1530 Methods for Fire Tests on Building Materials and Structures

ACI Manual of Concrete Practice Part 3, Guide for Use of Epoxy Compounds with Concrete

BS 3626 Recommendations for a System of Tolerances and Fits for Building

SAA MP20, Part 1—Information on Permeability-reducing Admixtures for Concrete

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

ADDENDUM TO THE PREFACE
of
AS 1481—1978
SAA PRESTRESSED CONCRETE CODE

Among the principal changes in this edition are the introduction of a definition for 'anchorage' (Rule 1.5.3); provisions for the use of aggregate to AS 1466 (Rule 2.2); deletion of the prohibition on use of 19-wire steel strand for pretensioned work (Rule 2.5 (c)); reference to blended cement in moist curing requirements (Rule 3.2.3.2); additional requirements for grouting (Rule 3.4.3); alteration of the tolerance on twist (Table 3.10.3); provision for 'super strand' tendons (Table 4.4.1); provision for inclination of anchorage in the calculation of stresses (Rule 4.4.4.3); reduction of the distance '0.45a' to '0.33a' used in calculations for designing for end zones (Rule 4.4.4.4); alteration of the formula for calculating modulus of elasticity (Rule 4.6.1(a)); a number of changes in the rules relating to deferred losses of prestress (Rules 4.7.2.2.3, 4.7.2.4, 4.7.3.1, 4.7.3.2, 4.7.3.3.1, 4.7.3.3.2, 4.7.4, Fig. 4.7.3(B)); alterations to the rules relating to the analysis of flexural members (Rules 4.8.1, 4.8.4.1) and introduction of a new rule relating to allowable stresses if a cracked section analysis is carried out (Rule 4.8.4.4); introduction of an additional limitation for M' (Rule 4.8.5.2.4); clarification of the requirement for examination of additional cross-sections for shear resisted by concrete (Rule 4.9.2.5); changes in some of the rules relating to shear reinforcement (Rules 4.9.3.3, 4.9.3.5, 4.9.3.6); additional information on the design procedure for beams of hollow rectangular cross-section subject to torsion (Rule 4.10.1); variation of the application of the rule for ultimate strength design (Rule 4.10.2.1.1); replacement of the rule relating to cracking in prestressed concrete having untensioned reinforcement (Rule 4.12.2) and deletion of the rule covering shear and bond (Rule 4.12.3); replacement of the rules covering design criteria and design methods for prestressed flat slabs (Rules 4.13.2.1 and 4.13.2.2); deletion of the words 'for dense concrete' in Rule 4.13.2.3, and clarification of the requirement for the distribution of tendons in column strips (Rule 4.13.2.5(a) (ii)); replacement of the rule relating to vertical stresses and bending moments in the design of cylindrical walls for liquid-retaining structures (Rule 4.15.2.3) and alterations to the rule relating to location of tendons in the construction of cylindrical walls in liquid-retaining structures (Rule 4.15.3.3); substitution of the term 'sprayed mineral fibre' for 'sprayed asbestos' in the rule relating to fire insulating materials (Rule 4.16.4.3). A number of minor editorial changes have also been made.

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
RULES FOR THE USE OF PRESTRESSED CONCRETE IN STRUCTURES

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. These Rules (hereinafter referred to as 'this Code') apply to the design and construction of prestressed concrete structures—

(a) including composite structures comprising prestressed concrete members and plain or reinforced concrete members; and

(b) excluding prestressed concrete pipes.

1.2 STANDARDS. Unless otherwise noted, a standard referred to in this Code is the current edition thereof.

1.3 NEW MATERIALS OR METHODS.

1.3.1 General. This Code shall not be interpreted to prevent the use of materials or methods of design or construction not specifically referred to herein.

1.3.2 Use of New Materials or Methods. If it is desired to seek the opinion of the SAA Committee on Prestressed Concrete as to whether materials other than those specified, or methods of design or construction not covered herein, are deemed to comply with the intention of this Code, details of these materials or methods, including relevant test results, shall be submitted to the Committee.

NOTE: It will be necessary to seek approval from the appropriate Authority, if any, for the use of new materials or methods.

1.4 DESIGN AND SUPERVISION.

1.4.1 Design. The design of a structure or the part of a structure to which this Code applies shall be the responsibility of a Chartered Engineer (or a person holding equivalent qualifications) experienced in the structural use of concrete in general and in the design of prestressed concrete in particular.

1.4.2 Supervision.

(a) The supervision of construction of a structure or the part of a structure to which this Code applies shall be the responsibility of a Chartered Engineer (or a person holding equivalent qualifications) experienced in the supervision of construction of such structures.

(b) All stages of construction of a structure or the part of a structure to which this Code applies shall be adequately supervised.

(c) The supervision of construction shall be such as will ensure that all the requirements of the design are satisfied in the completed structure.

(d) The supervising engineer shall ensure that each person selected for supervision of construction is familiar with the techniques of making high-quality concrete and is experienced in the stressing operations concerned.

(e) All stressing operations shall be carried out under the direct supervision of the person or persons selected for such supervision.

NOTE: Although the execution of design and supervision may be delegated to other acceptable persons, Rule 1.4 requires that design and supervision must be the responsibility of experienced engineers.

Similarly, the Rule does not require the design engineer to be responsible for supervision of construction also unless he has been assigned this responsibility specifically. The design engineer and the supervising engineer need not be the same person.

1.5 DEFINITIONS.

1.5.1 General. For the purposes of this Code, the definitions in Rules 1.5.2 and 1.5.3 shall apply.

NOTE: Other terms having special meanings are defined in the Section, Rule or Appendix in which they occur.

1.5.2 Administrative Definitions.

(a) *Approved,* except as may be otherwise stated, means approved either by the design engineer or the supervising engineer or the appropriate authority, as the case requires.

(b) *Authority* means the body having statutory powers to control the design and erection of structures in the area in which the structure concerned is to be erected.

(c) *Design engineer* means the engineer responsible for design.

(d) *Supervising engineer* means the engineer responsible for supervision of construction.

1.5.3 Technical Definitions.

(a) *Anchorage* means a mechanical device or other means to transfer the load from a stressed tendon to the concrete.

(b) *Construction joint,* in relation to a part of a structure where placing of concrete has been or is to be interrupted, means a joint—

(i) at which the concrete to one side has set or is intended to have set before the concrete is placed on the other side; and

(ii) so made that the load-carrying capacity of the structure will not be less than if placing of the concrete had not been interrupted.

NOTE: Other types of joint are referred to in Rules 3.9.4, 4.14 and 4.15.3.

(c) *Design density,* in relation to lightweight concrete, means the density determined from the mass of standard cylinders moist-cured for 28 days in accordance with AS