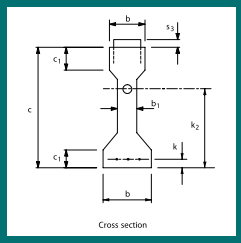
Manual

Precast/Prestressed Concrete Institute

Tolerance Manual

for Precast and Prestressed Concrete Construction



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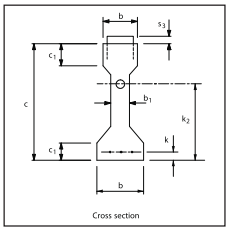

MNL-135-00

TOLERANCES

FOR PRECAST AND PRESTRESSED CONCRETE CONSTRUCTION

MNL-135-00

prepared by

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Substantial effort has been made to ensure that all data and information in this manual are accurate. However, PCI cannot accept responsibility for any errors or oversights in the use of material or in the preparation of engineering plans. This publication is intended for the use by personnel competent to evaluate the significance and limitations of its contents and able to accept responsibility for the application of the material it contains. Special conditions on a project may require more specific evaluation of practical engineering judgement.

While every effort has been made to prepare this publication as the national standards for the industry, it is possible that there may be some conflicts between the material herein and local practices.

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Tolerances for Precast and Prestressed Concrete Construction

FOREWORD

Precast concrete is a building system which depends on a system of realistic and consistent tolerances to meet the objectives of providing acceptable appearance, durability and economy.

This document is the compilation of over 50 years of Precast/Prestressed Concrete Industry experience that defines this essential tolerance system for each phase of the building project: design, production, erection and performance. This document also provides information on other building materials.

Design information for engineers, architects and building owners is presented to assist in the selection and design of Precast and Prestressed Concrete Products.

The Committee has designed this manual to complement and support the PCI quality control manuals: MNL-116 *Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products,* and MNL-117 *Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products*. Together, these three documents form the basis of quality design and quality fabrication and erection for Precast and Prestressed concrete products.

Tolerances For Precast and Prestressed Concrete

1.0 Preface To Tolerance Committee Report

1.1 General

This document is a working reference for the dimensional control of precast concrete products and construction. It covers both plant-cast or site-cast and precast and precast prestressed concrete.

The information contained herein should be used by architects, engineers, general contractors, precast and precast prestressed concrete producers, erectors, quality control agencies, and other related or interfacing building trades.

The original tolerance committee report was published in the *PCI Journal* in 1985. A supplement to the original document was published in the *Journal* in 1993. Portions of this document have been republished in the Third, Fourth and Fifth Editions of the PCI *Design Handbook*. MNL-116 *Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products* and MNL-117 *Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products* have included portions of the information published in 1985 for use in the Plant Certification program.

Since 1985, the PCI Committee on Tolerances has listened to concerns, answered questions and considered the reported use (and misuse) of the published tolerances. In response, this document addresses some of the most frequently asked questions and concerns.

Readers are encouraged to report any experiences, problems and concerns regarding tolerances for precast products and projects to the PCI technical staff.

1.2 Need for Collaboration

The owner, architect/engineer, general contractor, precaster and erector all have the same goal: a successful project. The overall building project involving precast concrete building members should be successful from all points of view, namely, client satisfaction, on time schedule performance, economy, aesthetics, constructability, and long term functional durability. It is essential that the members of the building team collaborate to provide an overall project tolerance system which will meet all of the project's functional needs and allow economical fabrication and erection for the precast concrete members and all of the interfacing building systems.

Contractual relationships which provide incentives for cooperation among the building project team members, full exchange of information regarding the needs of the various aspects of the project, and proactive communication approaches, such as project partnering, will help the building team successfully implement project tolerance plans.

1.3 Responsibility for the Overall Project Tolerance System

The concept of responsibility for specifying tolerances on precast concrete building projects has been misunderstood and at times misused. The consequences can be not only expensive, but damaging to customer/client relationships. Consider the following. It is not uncommon for the published tolerances for precast concrete products to be used as a tool for rejection (or conversely, as a tool for advocating acceptances), after a project has experienced tolerance related construction difficulties.

In some instances the architect/engineer may specify PCI documents MNL-116 or MNL-117 as a reference guide, believing that this will cover every situation. In other instances, building team members may review the published product tolerances only after fit up problems become apparent in the field.

Depending on the nature of the contractual relationships, the precast concrete manufacturer may follow the specifications and use them as proof of member tolerance compliance. In the event construction problems arise, the architect/engineer may take the position that the precast manufacturer is responsible for the proper fit of a precast member into the completed structure, regardless of whether or not the individual members meet PCI tolerances.

The tolerances defined by the Committee were set to provide a suitable reference point. Each of these tolerances was set based on current modern precast concrete production techniques. They are based on a standard of quality and craftsmanship that can be reliably accomplished by a PCI plant certified to produce the various member types. The published tolerances are not intended to be an unyielding and rigid set of tolerances used only as a measure of acceptance or rejection. The intent of the Committee was to provide both a feasible and economically reason-