Design of Slabs-on-Ground

Reported by ACI Committee 360

Arthur W. McKinney
Chair

Robert B. Anderson
Vice Chair

Philip Brandt
Secretary

J. Howard Allred
Carl Bimel
Joseph A. Bohinsky
William J. Brickey
Joseph P. Buongiorno
Allen Face
C. Rick Felder
Barry E. Foreman
Terry J. Fricks
Patrick J. Harrison
Jerry A. Holland*
Paul B. Lafontaine
Steven N. Metzger
John P. Munday
Joseph F. Neuber, Jr.
Russell E. Neudeck
Scott L. Niemitalo
Nigel K. Parkes
Roy H. Reiterman
John W. Rohrer
A. Fattah Shaikh
Richard E. Smith
Scott M. Tarr
R. Gregory Taylor
Eldon G. Tipping
Wayne W. Walker

*Chair of ACI 360 who served during a portion of the time required to create this document.

The committee would also like to acknowledge Miroslav Vejvoda for his contributions as Chair of the Prestressing Subcommittee and Roy Leonard (deceased) for his work on soil support systems.

This document presents information on the design of slabs-on-ground, primarily industrial floors. The report addresses the planning, design, and detailing of slabs. Background information on design theories is followed by discussion of the types of slabs, soil-support systems, loadings, and jointing. Design methods are given for unreinforced concrete, reinforced concrete, shrinkage-compensating concrete, post-tensioned concrete, fiber-reinforced concrete slabs-on-ground, and slabs-on-ground in refrigerated buildings, followed by information on shrinkage and curling problems. Advantages and disadvantages of each of these slab designs are provided, including the ability of some slab designs to minimize cracking and curling more than others. Even with the best slab designs and proper construction, however, it is unrealistic to expect crack-free and curl-free floors. Consequently, every owner should be advised by both the designer and contractor that it is normal to expect some amount of cracking and curling on every project, and that such occurrence does not necessarily reflect adversely on either the adequacy of the floor's design or the quality of its construction. Design examples appear in an appendix.

Keywords: concrete; curling; design; floors-on-ground; grade floors; industrial floors; joints; load types; post-tensioned concrete; reinforcement (steel, fibers); shrinkage; shrinkage-compensating; slabs; slabs-on-ground; soil mechanics; shrinkage; warping.

CONTENTS

ACI 360R-06 supersedes 360R-92 (Reapproved 1997) and became effective August 9, 2006.