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Concrete Slabs that Receive Moisture-Sensitive Flooring Materials—Guide

Reported by ACI Committee 302

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Concrete Slabs that Receive Moisture-Sensitive Flooring Materials—Guide

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Concrete Slabs that Receive Moisture-Sensitive Flooring Materials—Guide

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This guide contains materials, design, and construction recommendations for concrete slabs-on-ground and suspended slabs that are to receive moisture-sensitive flooring materials. These flooring materials include sheet rubber, epoxy coatings, vinyl composition tile, sheet vinyl, carpet, athletic flooring, laminates, and hardwood.

Keywords: admixtures; cracking; curing; curling; drying; mixture proportioning; moisture movement; moisture test; relative humidity; slabs-on-ground; specifications; vapor retarder.

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CHAPTER 1—INTRODUCTION AND SCOPE

1.1—Introduction

Moisture-related problems with floor covering materials are a serious and costly construction issue. Such problems include blistering, delamination, adhesive degradation, adhesive bleed, and mold growth. Claims for the correction of these problems may call for full or partial replacement of the flooring system. Claims may also be made for construction delays, lost revenue, or health issues related to indoor air quality. It is currently up to architects, engineers, flooring installers, flooring and adhesive manufacturers, concrete contractors, and concrete producers to solve these problems.

1.2—Scope

Chapters 1 through 8 provide an understanding of concrete moisture behavior and drying and show how recommended construction practices can contribute to successful performance of floor covering materials. This background provides a basis for the recommendations in Chapter 9 to improve the performance of floor covering materials in contact with concrete moisture and alkalinity.

Because this guide is specific to floor moisture problems and solutions, refer to ACI 302.1R and ACI 360R for general information. These two documents contain guidance on floor design and construction that is needed to achieve successful floor covering performance.

The objective of this document is to provide information and guidance to help reduce the potential for moisture-related flooring problems to occur with both slabs-on-ground and suspended slabs. It provides basic information on the



Fig. 1.3a—Debonded sheet flooring due to moisture in the concrete slab (photo courtesy of P. Craig and H. Protze III).

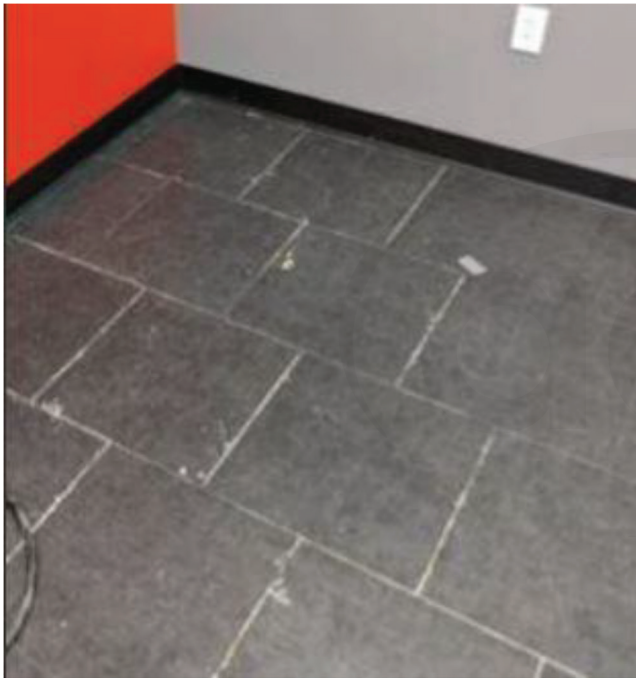


Fig. 1.3b—Adhesive bleed (image courtesy of Adam Bakeman).

concrete drying process, moisture behavior in concrete, testing for moisture, the use of below-slab vapor retarders, and corrective options.

1.3—Flooring moisture issues

Figures 1.3a to 1.3e show typical problems that can occur in concrete slabs covered with flooring materials. These problems include debonding, adhesive bleed, blistering, mold growth, and adhesive degradation.

1.4—Concrete slabs that receive flooring materials

This document focuses on the behavior of moisture in concrete slabs and the effect of the concrete moisture condition on the performance of applied flooring materials. Reaching a desired moisture state, however, should not be



Fig. 1.3c—Blisters due to moisture in concrete (photo courtesy of P. Craig).



Fig. 1.3d—Mold growth in carpet due to moisture in concrete (photo courtesy of Floor Seal Technology, Inc.).



Fig. 1.3e—Adhesive degradation leading to debonded solid vinyl tile installed over asbestos tile (photo courtesy of P. Craig).

the only acceptance criterion for a concrete slab that will be coated or covered. Floor flatness, surface texture and finish, cracking, curling, structural capacity, jointing requirements, and the potential for the slab to stay acceptably dry should also be considered. The goal is installation of a flooring system—subgrade, subbase, vapor retarder, concrete slab (and possibly reinforcement), coating or flooring adhesive, and floor covering—that satisfies performance requirements.

ACI 360R and 302.1R provide recommendations for designing and building concrete slab-on-ground substrates that are suitable for receiving flooring materials. This docu-