ADVANTAGES OF JOINTLESS CONCRETE FLOORS

Eliminating control joints in a concrete floor might sound counterproductive. Given the right situation, a jointless concrete floor might provide some hidden advantages.

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Since control joints are used to provide an acceptable place for concrete to crack, eliminating joints in traditional portland cement concrete is counterproductive. Shrinkage-compensating concrete made with Type K cement enables contractors to achieve joint-free and crack-free slabs with a high-quality concrete solution. Larger placement sizes not only reduce the number of joints, but also reduce the number of mobilizations required, and minimize load transfer reinforcement requirements, helping the contractor stay on schedule and within budget.

By addressing joint challenges with higher quality concrete, larger slab sizes and fewer joints, construction can be simplified, time to completion of projects can be compressed, facility maintenance and repair costs can be minimized, and health and safety concerns can be reduced.

No Joints = No Joint Failures; No Curling

Concrete maintenance issues usually start at control joints. Without control joints, owners can experience less down time for maintenance and repair. Floor panels can curl at joints, causing weakened edges to break and spall as equipment like forklifts pass over. Facility owners pay less for forklift maintenance with floors that stay flat since joints that wear out hard-tired equipment are gone. Forklift operator safety is improved because bumping over thousands of curled joints per day is a leading cause of back injuries.

90-95%

of floor damage in warehousing, manufacturing, and processing facilities occurs at the joints.

Алина Бузунова/Adobestock

TYPE K CEMENT

Ihrin /Adobestock

By using Type K cement, Type K shrinkage-compensating concrete allows you to create a concrete floor slab solution that minimizes or eliminates joints and drying shrinkage cracking while **reducing overall project costs.**

Based on calcium sulfoaluminate (CSA) cement technology, Type K cement (ASTM C845) is designed to compensate for the shrinkage of portland cement and the aggregates used in the concrete.

Type K cement is engineered to expand by creating a strong network of ettringite crystals that improves the dimensional stability of the concrete itself. It keeps the concrete in compression throughout its designed service life allowing much larger placements with few - if any - control joints.

$AVINGS

Siam /Adobestock

Larger placement sizes minimize the number of mobilizations required and significantly reduces mobilization costs. Larger placement sizes and fewer joints means fewer load transfer details and reinforcement materials (e.g., dowel bars, baskets, etc.) as well. By eliminating 90% or more of the tooling, cutting, and treating of control joints, additional savings is also realized. All of these aspects help minimize material and labor costs and speed time to completion of the concrete installation.

By addressing joint challenges with high quality concrete, larger slab sizes, and fewer joints, construction can be simplified.

- ✔ **Time to completion of projects can be compressed.**
- ✔ **Facility maintenance and repair costs can be minimized.**
- ✔ **Health and safety concerns can be reduced.**

For new construction and expansion projects that commonly face project delays and additional expenses related to grinding and leveling concrete slabs prior to installation of high-performance flooring systems and other floor coverings, Type K Cement Shrinkage-Compensating Concrete effectively bridges the gap between Division 03 (Concrete) and Division 09 (Finishes). By maintaining floor flatness and floor levelness, timely and costly delays during construction can be avoided, and floor covering installations can proceed efficiently.

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SUB-BASE TESTING

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While somewhat unusual in the U.S., a base compaction plate test to verify compaction should be available in most markets. To perform the test, engineers place a 12-in. diameter steel disk approximately 1 in. thick on the ground and use a hydraulic jacking device to put a measured force on the disk.

The disk is monitored by depth gauges to determine movement in the sub-grade. Movement beyond a certain limit means the sub-grade won't properly support the concrete floor. The base requirement is 150-200 pci depending on design, a standard ACI sub-base recommendation. This requirement must be monitored and validated prior to placement.

ADDITIONAL RESOURCES

"Control Of Thermal And Shrinkage Cracking Of Jointless Slab-On-Ground", by Sergio Botassi dos Santos, Kennedy Leandro de Souza Neves, and Estevão Alencar Bandeira (published by Materials Journal, May 2019), Concrete.org

"544.6R-15 Report on Design and Construction of Steel Fiber-Reinforced Concrete Elevated Slabs", by ACI Committee 544 (published by ACI Technical Documents, September 2015), Concrete.org

"Reducing CO2 Emissions of Concrete Slab Constructions with the PrimeComposite Slab System" by Xavier Destrée and Brad J. Pease (published by Symposium Paper, January 2015), Concrete.org

"Jointless Steel Fiber-Reinforced Concrete Slabs-on-Grade and on Piles" by E. Alexandre and B. Bouhon (published by Symposium Paper, March 2010), Concrete.org

"SP-268: Fiber Reinforced Concrete in Practice" by Ashish Dubey and Nemkumar Banthia / Sponsored by: ACI Committee 549 and ACI Committee 544 (published by Symposium Paper, March 2010), Concrete.org

SOURCES

"Jointless Floors: A High-Performance Solution", Susan Foster-Goodman, CTS Cement Manufacturing Corp. (April 2017), ForConstructionPros.com/12317940

"Concrete Floors Without Control Joints", Joe Nasvik (January 2019), ForConstructionPros.com/21036249

"How to Create Strong, Jointless, High-Performance Floors", by Ryan Olson (April 2014), ForConstructionPros.com/11359477

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