Cold joint sc-c



Overview

Mechanics-based model for cold joints in reinforced concrete Abstract This study introduces a mechanics-based numerical model to characterize the behavior.

Key Takeaways

A cold joint in concrete is a plane of weakness formed when fresh concrete is poured against partially hardened concrete, potentially compromising structural integrity and durability. What is a Cold Joint? A cold joint occurs when a new batch of concrete is placed against concrete that has already begun to set, preventing full chemical bonding between the layers.

Unlike cracks, cold joints are not gaps but seams where the concrete layers fail to integrate completely. They are often visible as a line or seam with a slightly different color or texture on the surface.

Causes

Cold joints typically form due to: Delayed pouring between concrete batches, exceeding the initial set time (usually 30–60 minutes depending on temperature and mix). Improper vibration or compaction, which prevents the fresh concrete from fully knitting with the older layer. Large-scale pours where continuous placement is difficult, or logistical delays in concrete delivery.

Consequences

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Structural weakness: Cold joints interrupt the monolithic nature of concrete, creating a plane where stresses concentrate, reducing the element's capacity to resist bending, shear, or lateral forces. Durability issues: They can act as pathways for water infiltration, potentially leading to corrosion of reinforcement or reduced lifespan, especially in exposed foundations or slabs. Aesthetic concerns: Visible seams may affect the appearance of finished surfaces.

Prevention and Mitigation

Continuous pouring: Minimize delays between batches; ideally, pour within 30 minutes of the previous batch. Proper surface preparation: Roughen the hardened surface and apply bonding agents if a delay is unavoidable. Adequate vibration: Ensure proper compaction to reduce voids and improve bonding.

Planning for construction joints: In large pours, intentionally place construction joints in low-stress areas and treat them with bonding techniques to maintain structural integrity. Special Considerations for SC-CIn structural concrete (SC-C), cold joints are particularly critical in slabs, beams, and foundations. Studies show that short time lapses (15–60 minutes) between layers can still allow acceptable bonding if proper techniques are applied, but longer delays significantly reduce flexural and compressive strength.

Therefore, careful scheduling, supervision, and quality control are essential to prevent cold joint-related failures. In summary, cold joints are preventable with proper planning, timely pouring, and surface treatment, but if they occur, they must be assessed for structural and durability implications, especially in critical structural elements.

Article Content

Mechanics-based model for cold joints in reinforced concrete

Abstract This study introduces a mechanics-based numerical model to characterize the behavior of cold joints in reinforced concrete members subjected to monotonic loading.

What is a Cold Joint in Concrete? (And How to Fix them!)

A cold joint in concrete is an area or surface with a structural discontinuity caused by the delayed concrete pouring between two layers of concrete.

cold joints Topic

Practice oriented papers and articles ON COLD JOINTS Impact of Retarder-Induced Roughness on Shear Friction Capacity using Conventional and High-Strength Reinforcement

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Critical cold joint angle in concrete

90° cold joint angle is the most critical angle for splitting tensile strength. This study aims to understand the effect of different cold joint angles on splitting tensile and compressive strength of

An experimental and numerical study on the effects of cold joint ...

Cold joints, formed due to interruptions in the concrete placement process, significantly impact the mechanical behavior of concrete structures. This study comprehensively examines the

Effect of Cold Joint on Stratified Slabs

Abstract— Stratified Slab consist of two or more types of concrete; in particular, of composite materials consisting of High Strength Concrete (HSC) and Normal Strength Concrete (NSC). This study had

Shear strength in reinforced concrete beams with cold joint

Cold joints in reinforced concrete (RC) beams can significantly impact shear behavior, influencing stress distribution and failure patterns. This study examines how delay times, compressive strength, and

(PDF) Experimental Investigation of the Effect of Cold

PDF | This study investigated the effects of cold joints on the strength and some durability properties of concrete.

Cold Joints | Concrete Society

Cold joints, unlike cracks that form in hardened concrete through tensile restraint, are not gaps in the concrete but merely seams containing no appreciable void

Effect of rock shear keys on the shear performance of cold joints in ...

Therefore, the influence of SCC strength on the shear performance of RFC cold joints should be assessed. Numerical tests were carried out for SCC strength of seven grades from 10

Effect of normal force on shear behaviors evolution at cold joints in ...

Meanwhile, taking into account that as dam height varies, the synergistic effect of self-weight pressure and water pressure on the cold joints of SCC becomes increasingly notable, it is

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-SCC mixtures featuring a self-roughening capability to produce adequate shear friction between cold joints and to produce draft provisions addressing shear-friction, for consideration in the AISC N690

An experimental and numerical study on the effects of cold joint ...

For the flexural zone, a cold joint location of 0.75 and an angle of 45° were determined to be optimal. The results of this study offer valuable insights into the effects of cold joints on concrete

Cold Joints [Prevention & Definition] | FMP Construction

Cold joints can cause problems on a construction project. Learn more about the different types and how to prevent them.

Cold Joints in Concrete: Invisible Threat to Structural Integrity

A cold joint in concrete may appear minor at the time of construction; however, long-term cold joints can have serious long-term effects.

What Are Cold Joints in Concrete and Are They Bad?

Cold joints create critical flaws in concrete. Learn how these weaknesses develop, their structural impact, and practical methods for prevention and repair.

(PDF) Mechanical behavior of concrete cold joints

A loss of resistance over 30% for cold concrete cylinders with diagonal joints was found, while concrete cylinders with horizontal cold joints had no loss of resistance.

Cold Solder Joint: Causes, How to Identify One, and How to Prevent It ...

A cold solder joint is one of the most common — and costly — PCB defects. Learn what causes them, how to identify them visually and electrically, and how temperature-controlled soldering

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North American project region: Ashburn, Loudoun County, Virginia, United States

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