Working principle of cold joint positioner



Overview

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

Key Takeaways

A cold joint positioner operates as a closed-loop control system, continuously comparing the desired position of the concrete pour or valve actuator with the actual position and adjusting the actuator to prevent cold joints.

Overview

A cold joint positioner is designed to ensure continuous and uniform concrete pouring, preventing weak interfaces (cold joints) between successive pours. It functions similarly to a control valve positioner, using a feedback loop to maintain precise control over the pouring mechanism or conveyor system.

Key Components

Control Signal Input (Setpoint, SP): The desired position or flow rate of the concrete mixture, often calculated based on pouring schedule and structural requirements. Feedback Mechanism: Sensors (e.g., laser ranging, GNSS-RTK) detect the actual position or flow of the concrete and relay this information to the positioner. Actuator: Adjusts the movement of the conveyor, pump, or valve to match the setpoint, ensuring continuous flow and preventing cold joints.

Control Logic: The positioner compares the setpoint with the actual position (process variable, PV) and generates a manipulated variable (MV) to correct any deviation.

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Working Principle

Signal Reception: The positioner receives a control signal representing the desired pouring rate or position.

Force-

Balance or Feedback Comparison: The system compares the control signal with the actual position measured by sensors. Error Detection: Any difference between the setpoint and actual position creates an error signal. Actuation: The positioner adjusts the actuator (e.g., conveyor speed, valve opening) to correct the error.

Feedback Correction: As the actuator moves, the feedback mechanism updates the position, bringing the system back into balance at the new desired state.

Diagram Representation

A simplified working principle diagram can be visualized as: CodeCopy[Control Signal (SP)] ---> ---> ---> [Concrete Flow / Valve] ^ | | v [Feedback Sensor]

Article Content

Concrete Mixture Cold Joint Prevention and Control System

In order to solve the problem of cold joints in the mixture caused by subjective control of the pouring process parameters by workers, this paper developed a cold joint prevention and control

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

Formation mechanism of joint interface in cold spot joining method and ...

A novel solid-state joining method called Cold Spot Joining (CSJ) has been successfully developed. In this joining concept, the material near the joining interface is plastically deformed under

(PDF) Mechanical behavior of concrete cold joints

The location of concrete joints is mostly determined by the designer engineer in traditional concrete, but forced casting joint (FCJ) is unlike the known separators such as the settlement joints...

Lining cold joint defect formation mechanism and pouring interval ...

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By intentionally interrupting the on-site pouring process and controlling the slurry injection timing, we systematically investigated the formation mechanisms and characteristics of cold joints.

Concrete Cold Joints: Causes & Prevention | Vinawood

Here is what actually drives them, the time window you are working against, how a cold joint differs from a planned construction joint, and how to prevent and repair one.

Cold Joint Repair Method Statement

The repair work will involve cleaning and preparing the surface, saw cutting along the cold joint line, patching the groove with quick set cement using PVC hose as a form, and allowing it

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

What is a Cold Joint in Concrete? Cold joints occur when a fresh concrete batch is poured against a partially hardened existing layer. As you know, concrete

Effect of Cold Joint and Its Direction on The ...

In this study, 38 uncracked and cold-joint push-off specimens were tested to explore how joint interface characteristics affect shear transfer behavior of recycled aggregate concrete (RAC).

MECHANICAL BEHAVIOUR 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. Thus, the loss of resistance depends

Technical Insights into Welding Positioners: Enhancing

Working Principles of Welding Positioners Welding positioners operate through a combination of secure clamping mechanisms and controlled

Valve Positioner

The basic principle of valve positioners is based on either Force-balance mechanism or motion-balance mechanism. Force Balance Principle based valve positioner A

Valve Positioner Principles and Maintenance

Valve Positioner Components A valve positioner consists of several essential components, each working in harmony to maintain precise valve control: Input Signal: The positioner receives a control signal,

What is Positioner in Pneumatic actuators Control Valve?|Positioner ...

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This video describe What is Positioner in pneumatic actuator Control Valve? and Positioner working principle with basic functionality and overall benefits to using valve positioner.

What is Cold Junction Compensation in Thermocouples?

Learn about the theory behind cold junction compensation in thermocouples using the Seebeck voltage, reference tables, and by finding the hot junction temperature.

Basics of Control Valve Positioners ~ Learning Instrumentation And ...

A pneumatic signal (usually 3-15 psig) is supplied to the positioner. The positioner translates this to a required valve position and supplies the valve actuator with the required air pressure to move the

VALVE POSITIONER PRINCIPLES AND MAINTENANCE GUIDE

A valve positioner is a device used to increase or decrease the air load pressure driving the actuator of a control valve until the valve''s stem reaches a position balanced to the output signal from the process

Valve Positioners

As a common control valve accessory, the valve positioner delivers pressurized air to the valve actuator so that the position of the valve stem or shaft corresponds to the set point from the control system.

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