Arch bridge bridge frame turning



Overview

CN111535203B The invention relates to the technical field of bridge engineering, in particular to an arch bridge swivel construction method under the condi.

Key Takeaways

Arch bridge frame turning involves rotating arch ribs or segments into their final position using horizontal, vertical, or combined swivel mechanisms, often to reduce high-altitude construction risks and improve assembly accuracy.

Overview of Arch Bridge Turning

Arch bridges rely on arch ribs as the primary load-bearing elements, transferring vertical loads into compressive forces along the arch and outward thrusts at the abutments. During construction, especially in steep or mountainous terrain, assembling these ribs directly at their final position can be risky and difficult. Frame turning methods allow the arch ribs to be assembled on the ground or low supports and then rotated into place, minimizing high-altitude work and improving safety.

Types of Turning Methods

Horizontal Rotation

The arch rib is rotated in a horizontal plane to align with the bridge axis. Typically used when the rib is partially assembled at an angle and needs to be swung into its final position.

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Vertical Rotation

The rib is rotated vertically to reach the designed height. Often combined with a low-height support system to reduce the structural weight during lifting.

Combined Horizontal and Vertical Rotation

Integrates both horizontal and vertical movements for precise positioning. Useful in complex terrains where neither horizontal nor vertical rotation alone is sufficient. Construction ProcessSingle-Rib Swivel Assembly: Each arch rib is treated as an independent unit, supported on lower and upper rotary tables.

This reduces the height of temporary supports and the overall structural weight during rotation. Positioning and Closure: Ribs are rotated to the design axis, either uphill or downhill, and then connected at the crown to form a continuous arch. Cross braces and deck supports are installed afterward.

Safety and Efficiency: This method avoids extensive mountain excavation, reduces ecological impact, and shortens construction time while improving segment assembly accuracy.

Advantages of Frame Turning

Reduced High-

Altitude Work: Assembly occurs at lower elevations, minimizing risk. Material and Cost Savings: Lower support heights and single-rib rotation reduce temporary material usage. Improved Accuracy: Controlled rotation allows precise alignment of arch ribs.

Adaptability: Effective for steep slopes, deep valleys, and complex mountainous areas.

Practical Considerations

Support Systems: Lower and upper rotary tables, balance cables, and rear anchor systems are critical for stability during rotation. Surveying and Monitoring: Precision surveying ensures the two halves of the arch align correctly before final closure. Bridge Type: Steel arches, tied arches, and through arches may require different turning strategies depending on span, deck position, and site conditions.

Arch bridge frame turning is a modern, efficient construction technique that enhances safety, reduces environmental impact, and allows for the construction of large-span arches in challenging terrains.

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Article Content

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The invention relates to the technical field of bridge engineering, in particular to an arch bridge swivel construction method under the condition of steep slope terrain.

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Arch bridges Structural reponse / Parametric study

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The bending moments due to arch compression (strictly also acting on the frame system) and second order moments must be superimposed to obtain the total moments.

Frame bridges

Strictly speaking, most bridges are framed structures. While frame action is obviously relevant e.g. in arches and in girder bridges longitudinally stabilised by piers, it also matters in many other cases,

Arch bridge | Definition, Mechanics, Examples, History,

Arch bridge, bridge in which the main supporting elements are arches. Arch bridges can be made of stone, concrete, iron, or steel and typically require less material

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Arch bridges are one of the oldest types of bridges that are still being used to date. Take a look at their classification, design

Arch Bridge Design | Physics, Strength & Dynamics

Explore the design of arch bridges, covering physics principles, material strengths, dynamics, historical evolution, and modern challenges.

7. TURNING PIECES AND CENTERS FOR ARCHES

7. TURNING PIECES AND CENTERS FOR ARCHES To enable a bricklayer to construct an arch over an opening in the wall of a building, the carpenter must provide him with a support on which he can

Tied-arch bridges

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Tied-arch bridges Masonry arch bridges, which have a very long history, and more recent landmark bridges, such as Sydney Harbour Bridge in Australia and the

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