Bridge gantry structure



Overview

Typically, precast segmental bridges and precast girders are placed using ground-based cranes to lift each segment or girder. However, ground access to the spans may be challenged by the presence of existing infrastructure or bodies of water, or the height to which the segments must be raised can exceed the reach of ground-based cranes. A launching gantry can be used to solve these issues.

Key Takeaways

A bridge gantry crane consists of a main bridge beam supported by vertical legs, equipped with hoists and trolleys, and designed for precise longitudinal and transverse movement during bridge construction.

Main Components

Bridge (Girder): The bridge, or main girder, is the primary horizontal beam spanning the width of the crane. It supports the hoist and the load, and can be configured as a single or double girder depending on lifting requirements. Single girders are used for lighter loads, while double girders handle heavier capacities and longer spans.

The main beam is typically made of high-strength steel (e.g., Q235-B) and may extend as a cantilever to increase operational range. End beams are box-shaped and rigidly connected to the main beam, often using high-strength bolts for assembly and transport efficiency. Legs (Columns): Vertical structures support the bridge and transfer loads to the ground or rails.

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Legs often have a trapezoidal cross-section, with a wider top for stability and a narrower base. They are crucial for maintaining balance and resisting lateral forces during lifting operations. Trolley and Hoist System: The trolley moves along the bridge, carrying the hoist mechanism that lifts and lowers bridge components.

Hoists may include motors, planetary reducers, drums, and wire ropes. For large bridge segments, multiple hoists are used to ensure balance and stability. Spreader beams are often employed to distribute loads evenly.

Rail and Runway System: The gantry moves longitudinally along rails or tracks laid on the foundation. The runway system distributes weight and ensures smooth movement, preventing damage to the ground or supporting structures. Precision alignment is critical for safe and accurate placement of bridge segments.

Specialized Launching Gantries

Launching Gantry Cranes: These are specialized bridge gantries designed for incremental bridge deck installation. They feature a longitudinal steel truss framework spanning between piers, allowing deck segments to be placed at heights exceeding 50 meters without ground scaffolding. Key features include adjustable width to accommodate different bridge designs, laser-guided alignment for ±3mm precision, and high load capacities (800–1,200 tons).

Launching gantries can move both longitudinally along the bridge and transversely to position segments accurately. Installation Sequence: Typically, the foundation is prepared first, followed by track and lower carriage installation. Columns are erected, the main beam is hoisted and connected, trolley rails are laid, and the hoisting system is assembled.

Finally, lateral and longitudinal movement systems and electrical controls are installed and tested before operational use.

Summary

The bridge gantry crane is a complex, modular system designed for stability, precision, and heavy lifting in bridge construction. Its main components—the bridge, legs, trolley, hoist, and rail system—work together to lift, transport, and position large bridge segments efficiently. Specialized launching gantries enhance this capability by enabling high-elevation, incremental deck placement with precise alignment and high load capacity.

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Article Content

Gantry Cranes and Bridge Transporters | Springer Nature Link

Gantry cranes can be considered as bridge cranes with legs . The tall legs standing on the ground track support the bridge frame with overhanging cantilever, forming a metal structure with

Launching Gantries for Bridge Erection in Difficult Terrain

This gantry can be modified to meet many different bridge configurations and should be considered for use in any situation where site constraints limit access from the ground.

Launching gantry

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What is a Launching Gantry and How Does It Work in

A launching gantry functions as a self-propelled bridge-building factory, consisting of a longitudinal steel truss framework that spans between

Freyssinet Precast segmental erection methods

This construction method is adapted to long structures (deck span from 30m to 60m) with multiple spans; it combines the advantages of cantilever construction together with segment prefabrication.

DLT Bridge Deck Erection Gantries (Launching Gantry

We offer a complete design and supply service, with site supervision to assist and train our client''s site team to assemble, commission, operate and maintain the

LAUNCHING GANTRIES – NRS BRIDGE

NRS Launching Gantry (LG) System – The recognized technology for construction of modern bridges with tight horizontal radius and has become one of the most

A Comprehensive Overview of Bridge Girder Launching

One such crucial piece of machinery is the Bridge Girder Launching Gantry Crane. This article provides a comprehensive overview of this innovative

The operation and maintenance of bridge access gantries and

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Best practice guidance for bridge owners/operators, contractors, utility companies and structural designers considering the performance, function, serviceability and maintenance of new or

Gantry Cranes in Bridge Construction: Innovative Applications and ...

The installation of gantry cranes in bridge construction follows the principle of top-to-bottom and main structure first, followed by auxiliary structures.

Gantry crane

The terms gantry crane and overhead crane (or bridge crane) are often used interchangeably, as both types of crane straddle their workload. The distinction

DLT Bridge Deck Erection Gantries (Launching Gantry

DLT Bridge Deck Erection Gantries We have been designing, supplying and operating bridge deck erection gantries (also known as a launching gantry or

Design of Gantry Crane Girders | BS 5950

Crane gantry girders are usually designed to resist unsymmetrical forces and moments from vertical loads and reactions, horizontal forces, longitudinal forces, fatigue, and impact forces.

How Launching Gantry is being used in Infrastructure

A launching gantry is a specialised equipment used for erecting precast concrete segments in infrastructure projects.

What is a Gantry in Construction?

Gantries are pivotal structures in the realm of construction and engineering, designed to support equipment, facilitate material handling, and

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Bridge Crane vs Gantry Crane: How Do They Compare?

Compare bridge and gantry cranes: design, pros, cons, and uses in warehouses and manufacturing. Learn which crane suits your facility best.

Related Video Reference

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Additional source notes

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