

Bridge Structure and Curved Bridge



Article Overview

Curved bridges use arches or in-plan curves to distribute loads efficiently, adapt to terrain, and enhance stability and aesthetics.

Types of Curved Bridges

Arch Bridges: These are the most common type of curved bridge, featuring abutments at each end shaped as a curved arch. The arch transfers weight both horizontally into the abutments and vertically into the supports, making the structure strong and rigid. Roman engineers popularized semicircular and segmental arches, with segmental arches allowing higher spans and lighter structures while accommodating floodwaters effectively . Notable examples include the Great Stone Bridge in China and the Sydney Harbour Bridge, which uses a through-arch design .

Curved Deck Bridges: Modern bridges often incorporate in-plan curves, especially in urban expressways or highway interchanges. Curved decks allow bridges to follow the natural terrain, avoid unstable ground, and integrate seamlessly into existing road networks . Precast segmental construction is commonly used for long viaducts, balancing economy and structural efficiency .

Advantages of Curved Designs

- **Load Distribution:** Curved structures spread weight across multiple points, reducing stress on any single part of the bridge and improving stability .
- **Terrain Adaptation:** Curves allow bridges to navigate around hills, unstable soil, or environmentally sensitive areas, minimizing excavation and ecological disruption .
- **Resistance to Natural Forces:** Curved bridges can better withstand landslides, earthquakes, and strong winds by redirecting forces and dissipating energy more e...

Article Content

Mar 28, 2026

Bridge Geometry Manual

Bridge Geometry Manual Publication No. FHWA-HIF-22-034 Infrastructure Office of Bridges and Structures

Feb 16, 2026

(PDF) Dynamic Analysis Of Horizontally Curved Bridges

This thesis investigates the strength behavior of a representative highly skewed and horizontally curved bridge as well

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Appendix C: Cross-Frame Design Example (Curved Bridge)

The geometry was developed in accordance with the geometric parameters outlined in the original Design Example 3 document

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Design of composite highway bridges curved in plan

It deals with the additional effects that need to be considered in design when a bridge is curved in plan, which is a fairly common

May 12, 2026

Skewed and Curved Steel I-Girder Bridge Fit

Skewed and curved I-girder bridges generally exhibit torsional displacements, or twisting, of the individual girders and of the overall

Feb 15, 2026

Why curved is not the same as straight

Why curved is not the same as straight Many of us have marvelled at the beauty and technological know-how behind

Apr 24, 2026

PCI Bridge Manual Chapter 12

In addition to the benefits that continuity provides for straight bridges, there are two additional benefits for curved

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Curved vs. Straight Beams: Impact on Bridge Design

The following example uses a three-span continuous curved composite steel bridge. You will see a comparison result

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Types of bridges

Arch Bridge An arch bridge is a type of bridge that uses a curved, semi-circular structure, known as an arch, to span an obstacle.

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Optimized ultra-high-performance concrete horizontally curved bridge ...

Curved bridge alignments are common in complex interchanges. According to a 1991 Structural Stability Research Council survey,¹

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CURVED AND SKEWED, STEEL, I-GIRDER BRIDGE DESIGN FOR

Data obtained from these structures were examined and the numerical model accuracy for curved and skewed, steel,

May 05, 2026

Curved Bridges: A Comprehensive Overview | Flyriver

These structures exemplify the creativity and engineering skill required to build successful curved bridges. Further research into

Aug 03, 2025

Modern Curved Bridge Design Insights | PDF | Buckling

This document summarizes a research project on the design and construction of modern curved bridges. The objectives were to

Feb 02, 2026

Design of Curved Steel Bridges | PDF | Bending | Beam (Structure)

The document discusses the design of horizontally curved girder bridges. It covers curved bridge configurations using chords to

Oct 30, 2025

Curved Bridges

For most practical bridge applications, the effect of curvature on the calculation of bending moments may be neglected; i.e. the

Dec 23, 2025

Plan curvature in bridges

Railway bridges are rarely curved in plan, since the track radius is normally so great that the deviation from

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Curved Pedestrian Bridge—Straightforward Design

To keep curved pedestrian bridge designs competitive, it is essential to fully understand how the design principles of

Jun 28, 2026

Comparison of Analysis of Normal Bridge and Horizontally Curved Bridge

The bridge which is under study is girder bridges subjected to some radius of curvature that is also known as curved bridge. The

Oct 24, 2025

Horizontally Curved Bridges | 15 | Bridge Engineering Handbook

Due to geometric complexities, the gravity load will induce torsional shear stresses, warping normal stresses, and flexural stresses to

Mar 06, 2026

Research on the effects of curvature and shear keys on torsional ...

This paper investigates the segmental U-shaped curved bridge of Bogotá Metro Line 1 project in Colombia. The effects

Apr 21, 2026

Stressed ribbon bridge

A stressed ribbon bridge (also stress-ribbon bridge or catenary bridge) is a tension structure similar in

Jan 02, 2026

Design and Analysis of Curved Steel Bridges Using 3D Shell

For curved or skewed bridges, this can give erroneous indications of the structure's true behaviour. Refined methods

Jan 10, 2026

Curved Bridges Curved Bridges

An in-plan curved alignment may favour aesthetics and view of the bridge by the users. Integration of bridge structures into the

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Analysis, design and construction of curved composite girder bridges ...

The horizontally curved composite girder bridges have excellent properties, such as quick construction, good seismic performance,

Jun 27, 2026

CURVED AND SKEWED, STEEL, I-GIRDER BRIDGE DESIGN FOR

This project utilized remote acquisition capabilities for instruments on two structures in the Interstate 99 corridor: a

Jun 08, 2026

State-of-the-Art in Design of Curved Box-Girder Bridges

The objective of this paper is to provide highlights of the most important references related to the development of

Jan 21, 2026

Design of composite highway bridges curved in plan

This new guide describes the two options of using a series of straight girder lengths (chords to a curve) and of using curved girders; it

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