



ShortSpanSteelBridges.org

Media Kit

Industry Facts & Figures

- Approximately 309,247 (52%) of the bridges in the United States are classified as a city/county/township bridge. Approximately 83,479, or 27%, are structurally deficient or functionally obsolete.¹
- An estimated 219,000 of the U.S. bridges are owned by counties (71% of city/county/township bridges). Local roads account for about 75 % of the nation's highways and roads (about 2.93 million miles). Counties manage about 1.74 million miles of those roads while cities and townships another 1.19 million miles.²
- Short span bridges make up over two-thirds of North America's over 650,000 inventoried bridges.
- Short span bridges are typically 140' in length or less and are generally used on local roads and highways.
- Newly developed steel grades with higher yield strength, better toughness and improved weldability offer significant benefits in weight savings and fabrication cost reduction.

¹ Better Roads Magazine, 2006

² National Association of County Engineers

Short Span Steel Bridge Facts

Design

- Short-span steel bridges offer design flexibility.

Construction

- Steel short-span bridges – especially those of modular design – can be installed quickly with minimal disruption to the bridge users.
- Short-span steel bridges are easily installed and do not require the use of special equipment.

Performance

- Steel has a demonstrated record of strength, reliability and safety in short-span applications.
- Short span steel bridges offer aesthetic and environmental benefits.
- Short span steel bridges are easy to repair and maintain.

Cost

- Steel short-span bridges can be installed using local bridge-maintenance crews, thereby reducing installation costs.
- Short-span steel bridges have lower life cycle costs.

Sustainability

- Steel has specific environmental advantages including recyclability, long-life, low impact, energy savings, reducing carbon footprint and other benefits. It also is sustainable in ways that have political and economic impact.

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Frequently Asked Questions

Busting Short Span Steel Myths & Misperceptions

Q: How does the maintenance of a steel bridge compare to a bridge of concrete?

A: All materials require maintenance to minimize structural deterioration. Concrete, like steel, is particularly susceptible to chloride contamination by de-icing salts, saline water and seawater, thermal effects such as regular freezing/thawing conditions, and sulphate attack.

Q: Do concrete bridges last longer than steel bridges?

A: There is no evidence to suggest this is true. There are many steel bridges with over 100 years of service life that are still performing adequately.

Q: Is weathering steel a viable alternative for under less than ideal climatic conditions?

A: In a word yes. Weathering steel performs successfully when designed and detailed according to the published FHWA and Industry guidelines for its use. When used properly, uncoated weathering steel is by far the most cost-effective material for bridges when considering either first or long-term costs. The FHWA has developed guidelines from 1989 (Technical Advisory – Uncoated Weather Steel Structures) that are still valid, though currently under review and will be supplemented with more data.

Q: What's the real cost of galvanizing plate-girders and rolled-beam bridges?

A: First keep in mind that hot-dip galvanized steel is durable and maintenance free for 50-60 years or longer, so lifecycle costs are extremely compelling compared to alternatives. Due to the relatively stable price of zinc metal over the past 20 years, considering the initial cost of hot-dip galvanized plate girder and rolled beam steel for bridges is very competitive with the life cycle cost of painted steel.

Q: Are modular prefabricated short-span steel bridges available in custom sizes?

A: Yes, these bridges are custom engineered to meet specific requirements. They are fabricated and constructed in accordance with the engineer's specifications in modular units offsite and then assembled in the field to and increasing speed of construction.

Q: Is painting and repainting steel bridges an issue?

A: No. Modern EPA-compliant, high-performance coatings can provide a minimum service life of 25 years to first paint maintenance. Constructing a new steel bridge today offers benefits from a number of environmentally friendly coatings with greatly extended service life.

Q: Do all steel bridges require joints?

A: The development of advanced analysis tools and fast computers has given designers the tools necessary to design complex continuous-span bridges without joints. The joints are integral to the substructure. Many states have a long history of jointless bridges. The State of Tennessee for instance designs mostly jointless bridges, using expansion joints only when absolutely necessary.

Q: Are steel bridges suitable for use with accelerated bridge or modular construction techniques?

A: Absolutely. Short-span modular bridges can be handled with smaller construction equipment. These segments are highly modular. In fact, pre-fabricated steel bridges in 2-to-4 sections/modules, depending on the width of the bridge, are assembled units that can be installed in the field and driven over in a matter of days

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Short Span Steel Options on Bridge Projects Across the Country

Versatile, strong, cost-efficient with long service lives, short span steel bridges offer engineers powerful options when it comes to new, replacement or rehabilitation bridges. Here are some examples of short span bridges in action.

Sherman County, Nebraska

Challenge: Replace a single-span 100 ft. x 28 ft, remote wooden bridge in 60 days

Solution: Engineers used four W40 x 277 steel beams, each 101-feet long fabricated to 116,880 lb of weathering steel. The lighter weight required less heavy equipment than alternative designs of precast concrete, which would have required two cranes. In turn, the simpler assembly helped keep the costs down. The new bridge was completed early and on budget.

SOURCE: ENR 4 April 2005 NYS Steel Bridge Article

Denver, Colorado

Challenge: Originally built in 1930, the two-lane, 470-foot long bridge across Box Elder Creek on U.S. 36 near Denver had outlived its structural life.

Solution: The Colorado DOT opted to replace an existing bridge with a continuous span steel superstructure. CDOT engineers designed the bridge using a simple span made-continuous construction in which steel girders were connected together at the piers. This technique simplified the project and saved labor costs, holding the cost of the superstructure to only \$1.1 million using alternative materials such as concrete.

SOURCE: Roads Bridges NYS September 2007

Atasco, Colorado

Challenge: The Borrego Creek Bridge replacement with steel open grid deck truss design

Solution: Engineers selected a prefabricated structural system to speed installation and simplify construction. The truss design includes 60-foot single span rolled sections with an open steel grid deck. The open steel grid deck required no forming or curing time, and weighed as little as 15-26 lbs/sf. U.S. Bridge delivered the prefabricated structural system in 62 working days.

SOURCE: USBridge_BorregoCreek_TXDOT

San Juan, Puerto Rico

A series of ten weathering steel bridges traverse the mountainous region from San Juan to the southern shore of Puerto Rico, carrying route PR52 over gullies and grade separations. The tropical climate is hot and humid with prevailing salt-laden winds and approximately 100 inches of rainfall a year. This series of bridges, in service for over 25 years in this questionably location and atmosphere, have performed exceptionally well without any major maintenance problems.

SOURCE: MythsAndRealitiesOfSteelBridges.pdf

Resource Links

American Iron and Steel Institute (AISI)

www.steel.org

National Steel Bridge Alliance (NSBA)

www.steelbridges.org

National Corrugated Steel Pipe Association (NCSPA)

www.ncspa.org

Canadian Institute of Steel Construction (CISC)

www.cisc-icca.ca

International Iron and Steel Institute (IISI)

www.worldsteel.org

North American Steel Sheet Piling Association (NASSPA)

www.nasspa.com

American Association of State Highway and Transportation (AASHTO)

www.transportation.org

Federal Highway Administration Office of Bridge Technology

www.fhwa.dot.gov/bridge

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Common Bridge Types

The following product categories may be used in the construction of a steel bridge:

Sheet Piles:

Sheet pile is a hot-rolled structural shape with interlocks on the flange tips. The interlocks permit individual sections to be connected in order to form a continuous steel wall which is earth tight and virtually water resistant. Sheet piling is transportable and is a fast and economical solution for a durable, long lasting wall system. It may be used for bridge abutments (permanent) or for cofferdams used to construct piers for bridges (temporary).³

Sheet piling is typically available in 12, 10, 8, and 7 gauges in lengths to 50 feet. (*Big-R specs*)

Plate Girder:

Steel plate girders are typically shop welded. A minimum flange size of 12 by $\frac{3}{4}$ " and a minimum web thickness of $\frac{7}{16}$ " is recommended to control flange and web distortions and simplify fabrication and erection. Plate girders can be used for typical span lengths of 80 to over 300 feet.

Stay-in-place Forms:

A galvanized corrugated metal form can be used to construct the bridge deck of concrete or asphalt. Such a system, reduces dead load and provides a good work environment

Bars:

Steel bars may be used to construct a steel grid deck. Steel Grid can be left open or filled with concrete. They are useful when light decks are desired. While an open steel grid has less dead load than one filled with concrete, it does not offer as good a riding surface and can be prone to poor skid resistance. An open grid deck system is also susceptible to corrosion from the elements and chemicals.

Wide Flange Shapes:

The most common type of rolled beam used as a primary member in highway bridges is the wide-flange variety. To expand a wide flange beams span length, a cover plate can be added. A wide flange beam bridge can span 20 to nearly 100 feet.

H-Piles:

Piles (steel H-piles) are used when the soil under a footing cannot provide adequate support for the substructure. They are available in two yield strengths. They can penetrate to bedrock where other piles would be destroyed by driving. Due to the light weight and ease of splicing, they are useful where great depths of unstable material must be penetrated before reaching the desired load carrying stratum and in locations where reduced clearances require use of short sections. They are useful where piles must be closely spaced to carry a heavy load because they displace a minimal amount of material when driven.⁴

³ www.nasspa.com

⁴ www.rembco.com