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METAL TRUSS BRIDGES

It's easy to love a covered bridge. It's a bit harder, it seems, to grow attached to the successor of the covered bridge.

Throughout New Hampshire, metal truss bridges are being cut down at an alarming rate. When the New Hampshire Division of Historical Resources and the New Hampshire Department of Transportation carried out a bridge inventory in the 1980s, New Hampshire had seventy-nine metal truss highway bridges in use. Today, that number has dwindled to forty-three – a loss of 45% in about twenty years.

Some historic metal truss bridges have been bypassed and preserved. Rare exceptions, like Henniker's Patterson Hill Road Bridge and Franconia's Dow Avenue Bridge, have been restored by proud and discerning communities. But many have been destroyed.

Compared with the forty-three metal truss bridges still in use, New Hampshire has fifty-four covered bridges. Without our realizing it, our metal truss bridges are becoming more endangered than our prized wooden spans.

Patterson Hill Road Bridge, 1915, Henniker, NH
(*Photograph by James. L. Garvin*)

Metal truss bridges are in jeopardy for many reasons. Unlike wooden covered bridges, which have mostly survived on little-traveled roads, metal trusses often stand on major thoroughfares. On highways with high traffic volume, a bridge with a relatively narrow roadway or a low portal is deemed a hazard to high-speed travel.

Many metal truss bridges are town-owned and have suffered from poor maintenance. By the time such spans are "red-listed" by NHDOT inspectors, the cost of rehabilitating them is painfully high.

It's often cheaper to replace a metal truss bridge than to rehabilitate it. More than one New Hampshire truss has been condemned simply by the cost of removing the red lead paint that was the universal primer for steel until within the past few years. Few boards of selectmen dare to commit their towns to an expensive rehabilitation, even of a recognizably historic span, when engineers tell them it's cheaper to cross the stream with a modern bridge of steel stringers.

And yes, it is hard for many of us to love a steel bridge. Such spans are beautiful to the engineer, who can see the logic with which the stresses in the structure have been analyzed and channeled through members that are exactly right for their jobs. But the layman, especially when faced with the prospect of paying for the costly rehabilitation of a neglected and rusting span, has been known to condemn the steel truss as an "Erector set bridge."

So why worry as one after another of New Hampshire's metal bridges is put to the cutting torch?

Metal truss bridges embody the early maturity of American civil engineering. The older wooden covered bridges were often built on the basis of intuition derived from

experience. Metal trusses, by contrast, express engineers' newfound ability to analyze the precise compressive or tensile stresses in a complex structure, and to design a bridge that would carry a specific load with a known factor of safety. Because iron and steel are strong both in tension and compression, early metal trusses, designed for relatively light horse-drawn loads, were almost ethereal in appearance, echoing in their thin metal sections the delicate lines of the engineer's stress diagrams.

Metal truss bridges also reflect a crucial chapter in American transportation history. In the late 1800s, rural roads in the United States were a national disgrace, rutted and dusty in the summer and a sea of mud in the spring. Bridges, mostly built and maintained by towns, ranged in condition from substantial to decrepit. Our poorly-maintained highway system isolated rural residents, cut them off from potential markets for their produce, wasted the energy of draft animals, and worsened the pervasive problem of farm abandonment.

Beginning in the 1880s, roads in the United States began to be transformed by a campaign for reform of rural transportation. Called the "Good Roads" movement, this effort convinced states and towns to improve their highways and rebuild their bridges.

A number of enterprising bridge companies began to market iron and steel truss spans as a substitute for deteriorated wooden bridges. In New Hampshire, laws of 1903 and 1905 created a state highway department that offered financial and engineering aid to towns wishing to erect new bridges. Even before the advent of the automobile in noticeable numbers, the Good Roads movement had caused many of the state's wooden bridges to be replaced by light, strong steel truss spans.

Light and strong though they are, the metal trusses of the late 1800s and early 1900s have proven to be no match against neglect and ever-increasing highway demands. Of the forty-three wrought iron parabolic trusses that the famous Berlin Iron Bridge Company had built in New Hampshire by 1898, for example, only four remained a century later. The grandest of those four, at Livermore Falls in Campton, is now a mere ruin.

New Hampshire is quickly becoming destitute of the legacy of this inspiring period of reform in engineering and transportation. In contrast with our paltry forty-three metal trusses now in service, the state of Indiana has thus far inventoried over a thousand metal truss bridges in use in that state. Indiana's inventory is incomplete; the state probably retains twice that number of metal truss bridges.

We have many tasks ahead of us if we are to keep even a fragment of our history of civil engineering. We must show residents and tourists alike that our metal bridges are as important a heritage as our wooden spans. We must create a dedicated endowment fund to help hard-pressed communities carry out maintenance on all historic bridges, including those that have been bypassed. We must experiment with new bridge paints that promise to reduce the deadly cost of lead abatement. We must adopt alternate highway standards that provide adequate safety while retaining old bridges in use. Finally, when an old bridge has to come down, we must create a place of storage for its trusses to permit the span to be re-erected as a much-needed crossing on a pedestrian trail or other recreational byway.

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