

Chapter

7.1

The Necessity for Construction History to Assess Historic Bridge Bearings

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Introduction

With existing bridge structures having to be maintained or refurbished, we find that historic steel bridge bearings are reentering the engineers' perception. Due to their sturdiness, they are mostly found to be in sound condition despite having served for more than a century, often negligently maintained and carrying increasing loads. If still in use, however, we have very little reliable information as to their structural assessment. This uncertainty often leads to the costly replacement of bearings that look intact. Such premature exchanges contribute to a permanent loss of historic fabric.

Historic Bridge Bearings

With hindsight, we can recognize three generations of bridge bearings, which are distinguishable with regard to their mode of action and to their material: wood, iron/steel and synthetic materials. This article deals with the second generation, that is, those made of iron and steel. They were introduced in the same period that saw iron being widely used for bridges, which allowed for new dimensions in bridge building that were hardly dreamt of only few years before. Rollers, pins and pivots came to characterize this generation of bearings in a very short time; these prominent features, together with the optimized bearing geometry, give this generation its specific aesthetic value. Initially, the bearings were used to provide movability in a longitudinal direction, and subsequently in the lateral direction too. Occasionally, we do not find any fixed bearings in these bridges at all.¹ This second generation is characterized by two main materials—cast iron and steel, the latter produced by casting or by forging. The compact bearing plates with complex geometrical designs were initially made of cast iron. However, bearing technology was an early instance of appropriating steel castings. Beginning in the 1870s, for both tilting and bearing plates, steel castings became a serious competitor for the last domain of iron castings in bridge building. By 1880, steel castings were ranked as excellent, albeit expensive, substitutes for cast iron. From 1920 onward, the former had fully replaced cast iron. Historic bearings still in use tend to be