

---

## Making Rennie's 1796 Lune Aqueduct Watertight Again<sup>i</sup>

Leslie Clarke, CEng, FICE. Principal Engineer, Canal & River Trust, Leeds, UK

### Introduction and History

The Lune aqueduct carries the Lancaster Canal across the River Lune just to the north of the city of Lancaster. It is a magnificent, monumental, five-span, masonry structure constructed between 1793 and autumn 1796 under the auspices of John Rennie. The aqueduct is now a grade I listed structure and forms part of the estate of the Canal & River Trust (*Fig. 1*). Leakage from the aqueduct canal trough has been a continuing problem since construction, as can be seen from the buildup of calcite deposits and the staining on the structure. Calcite deposition by means of precipitation is a slow process that takes many years. The process requires slightly acidic water as an initiator and carrier—just the type of conditions brought about by the Industrial Revolution of the 1700s and industrial production of the 1800s. On the north abutment of the Lune aqueduct, the calcite has formed a surface glaze or flowstone over the masonry. Over that time, quantities of lime have gradually been leached out of the mortar, not only of the canal trough structure but also the aqueduct structure itself. Leakage has occurred from beneath the arches on the upstream and downstream sides, from the pier faces, from the spandrel walls, from the wing walls and from below the ledges at towpath level.

### Aqueduct Structure

The masonry of the aqueduct is sandstone of the millstone grit series that was sourced from several quarries local to the site. The stone has some variation in grain size and coloration consistent with different sources. The masonry piers and abutments are founded on piled timber rafts. Although the structure above the piers looks very solid and bulky, it is in fact hollow. The arch supports a series of vaults springing from two longitudinal walls built from the top of the arch (extrados) within the structure. The canal is contained within a masonry trough 2.3 m deep

---

<sup>i</sup>This essay is a reduced version of a paper published in Engineering History and Heritage. Please see the original for full details in Ref. [1].