

LAIGH MILTON VIADUCT REFURBISHMENT

Professor Roland Paxton of Heriot-Watt University writes of the saving of the oldest surviving public railway viaduct in Scotland

'A' listed Laigh Milton Viaduct, the world's oldest surviving public railway viaduct, over the Irvine about 3 miles west of Kilmarnock, was the major structure on the first public railway in Scotland, the 'Kilmarnock & Troon', engineered by William Jessop. The line which was operated by horse traction from 1811-46, the operational life of the viaduct, was nearly 10 miles in length, double-track, and enabled a horse to draw an 8-10 times greater load than it could by road. In conjunction with the new deep-water harbour at Troon, also planned by Jessop, the railway made an immense contribution to the development of the area and led to the creation of the town of Troon.

Both improvements were carried out largely at the expense of the 4th Duke of Portland, mainly to facilitate the carriage and export of coal, but the line had the unexpected distinction of becoming a passenger-carrying railway from 1811 and, in 1816, was the first in Scotland to operate with steam locomotion, although with limited success. Duncan's *Itinerary* of 1826 records that the railway and its 'handsome' bridge over the Irvine were serving 'the fashionable sea-bathing town of Troon'. Commercially, the railway was so successful that, on Robert Stephenson's advice, it was leased rather than purchased by the 'Glasgow & Ayrshire' in 1846.

The viaduct's conservation was particularly challenging because of its lack of any recent use, indeterminate ownership, inaccessibility to the public road network, unknown ground conditions, precarious and generally ruinous state and requirement for substantial funding. Following authoritative predictions that the viaduct was in 'imminent danger of collapse', the Scottish Office was asked by the Institution of Civil Engineers (PHEW) to take it into care and although this request was refused, Historic Buildings and Monuments indicated a willingness to consider grant-aiding its repair through an appropriate trust. Accordingly, in 1992, the Conservation Project was formed as a limited liability company with a directorate of civil engineers, an elected member from each local authority involved and a banker/lawyer.

The Project's objectives were, to conserve the viaduct by preserving as much of its original construction and existing form as practicable, to seek local government commitment to its future repair, to promote knowledge of the viaduct and its future use, and to seek, receive and

disburse the necessary funding. It became necessary for the Project to acquire ownership of the viaduct as a condition of the major funders, but this was done only after Strathclyde Regional Council had agreed to contribute the formulation, letting and overseeing of the main contract as 'Employer' and to take over the viaduct on completion, probable costs were known and covered by adequate funding and



Laigh Milton Viaduct "before"

acceptable terms for access and future ownership of the viaduct had been agreed with all parties. The viaduct was then purchased from the adjoining farmers, who were supportive of the project, for £1.00.

In April 1994 a decision was made to proceed with the main work by 'design and build', lump-sum, contract. The Project



Laigh Milton Viaduct "after"

specified numerous requirements relating to the physical work, including those of Historic Scotland, which were incorporated into the specification and invitations to tender were extended to four firms. Pre-tender presentations of proposals by prospective contractors were made at Ayr in July 1994. High frequency radar scanning indicated firm ground beneath the badly eroded piers. Within two months, tender bids were received ranging from £0.98-£1.55m. The lowest tender, for continuous execution of the whole contract, was accepted in February 1995. It was agreed that if the viaduct collapsed before it was secured, the contractor's liability would not extend to rebuilding it.

By February 1995 the following funding package totalling £1.065m had been assembled: National Heritage Memorial Fund £400,000; Strathclyde Regional Council £63,000 plus Roads & Planning

services; Kyle & Carrick District Council £65,000; Kilmarnock & Loudoun District Council £45,000; Enterprise Ayrshire £15k. Historic Scotland £277k; E.U. £200k.

The out-turn was that the main contract with agreed extras was completed within budget for £1.024m or 95% of the funding. A new site access road accounted for a further 1.5% and administration 3.5% including rent to both farmers for the temporary use of roads and land for site compounds.

The viaduct had become fragile during 150 years of neglect largely because of the crumbling of much of its stone which was of minutely fissured weak texture. This weakness, combined with vegetation and weather effects, had led to widespread stone loss and serious undercutting to all piers at or near water level. The west pier had become seriously cracked with *stretching* and *hogging* of adjoining arches and had lost about a third of its thickness. The north spandrel face had suffered extensive stone loss. Work to the contractor's approved design started on site in June 1995. In August the water level had been lowered sufficiently to enable pairs of transverse reinforced concrete beams to be constructed on the river bed under each arch. Temporary steel support frameworks were then assembled between the dam and the viaduct and slid into place under each arch by means of skates running on beams. When the arches were secured, work commenced on the structure removing vegetation and clay fill from the spandrels.

By November 1995 the clay fill had been removed down to the archstones and replacement of missing stones, removal of loose flakes and pointing had begun. The undercut piers were secured by means of reinforced concrete collar surrounds resting on what fortuitously had proved to be a mainly intact foundation of harder stone. The surrounds were faced with near-matching new stone. The Spandrels were back-filled with mass concrete and sealed against water penetration. On the deck, drainage and a layer of broken stone similar to that used originally was provided and steel handrails in an authentic period style. Sufficient funding remained to provide a 7.3m length of replica plate-way modelled from an original rail, iron plaques with explanatory details, fencing, and public access ramps from each bank. The viaduct, now in the ownership of South and East Ayrshire Councils, was formerly re-opened by their Provosts on 29th October 1996. Access is by footpath from Laigh Milton Mill.