THE KENNET & AVON CANAL TRUST

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Crofton Pumping Station gets into Systems Engineering

The HLF-funded restoration project at the historic Crofton Pumping Station recently featured in a keynote address at the annual systems engineering conference of the International Council on Systems Engineering (INCOSE). This is INCOSE UK's annual flagship event, bringing together a wide range of professionals from a variety of backgrounds, with a common interest in building up their Systems Engineering (SE) knowledge and sharing ideas with their peers. UK's foremost conference in this field, this year's event was attended by nearly 200 delegates and was held at Warwick University's new Slade Conference Centre on the 21st and 22nd November 2017

Jon Willis and Mike Rodd of the Kennet & Avon Canal Trust (KACT), together with Jon Holt of Scarecrow Consultants, presented some pioneering work on the development of a formal specification as part of the overall Crofton project, aimed at introducing the latest monitoring and instrumentation techniques within a 19th Century plant.

The Crofton Pumping Station was built in 1807-9 as the primary source of water for the summit pound of the Kennet & Avon Canal, using (then) state-of-the-art coal-fired beam engines to pump the water. As the canal fell into disuse, the Pumping Station stopped work in 1959. After the canal was finally abandoned in 1968, Crofton was purchased and restored to full working order some 50 years ago by KACT volunteers, rescuing it from the previous owners' plans to scrap it completely. Crofton still houses two engines dating back to 1812 and 1846.

Crofton's Georgian and Victorian beam engines are themselves in good working condition, but they are vulnerable, especially as they run under full load conditions; most historic engines such as these failed long ago. However, the building that houses the engines now has urgent structural issues that need to be addressed in order to secure the long-term future of this Grade 1 listed site, one of the most important surviving (and, uniquely, fully operational) monuments of the Industrial Revolution.

In a joint project with Bath University and Scarecrow Consultants, and now as part of a Heritage Lottery funded project to restore and refresh the site, a unique

mechatronics initiative is being developed. The proposal is to exploit modern industrial technology in a heritage-acceptable fashion to provide real time data monitoring of the plant's internal operation. This will allow operating and maintenance engineers, students and visitors to observe how the various components of the pumping station are functioning in real time, and will provide a deeper understanding of the critical 200-year-old station's operation and the condition of its various components.

Following experimental pilot work undertaken by Bath University Mechanical Engineering students, the key to taking this project forward to implementation has been the development of a complete set of requirements and system specifications for the mechatronics system to be installed. The methodology adopted was led by Scarecrow Consultants, and involved input from many of Crofton's steam experts. The paper presented at INCOSE 2017 described how an agreed initial set of requirements, together with the system specification, provides a basis for a commercial tender for developing the actual solution system. In this way, state-of-the-art modern technology will be used to heighten our understanding of technology that was itself state-of-the-art two hundred years ago!

The Crofton project is supported by The Heritage Lottery Fund, Bath University and Scarecrow Consultants, together with grants from the Garfield Weston Foundation, Manifold Charitable Trust, Tanner Trust, Saddlers' Company, Wolfson Foundation, Sylvia Waddilove Foundation, Charles Hayward Foundation and the Kennet & Avon Canal Trust itself.

Information on the project is available from:

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