

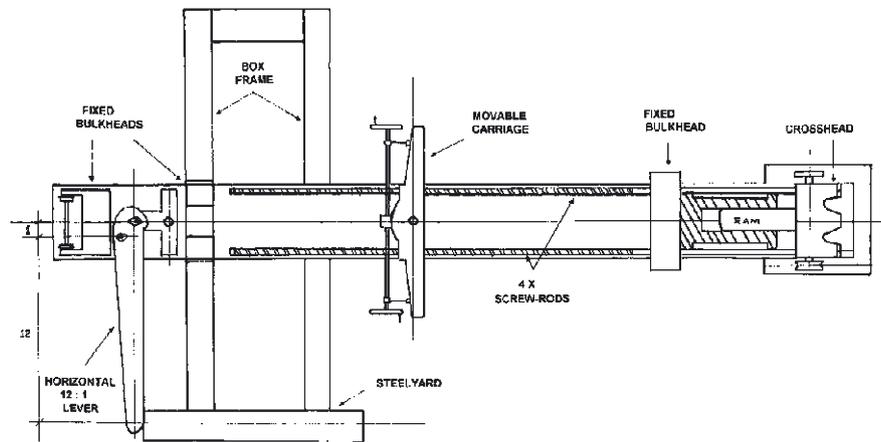
## Input 9 David Kirkaldy

David Kirkaldy was one of the first engineers to put the mechanical testing of construction materials onto a systematic basis when he opened his test-house in Southwark, London in 1865 (**Figure C14**). He was for many years a draughtsman of engineering drawings for the firm of Napier at their foundry in Glasgow, where he became responsible for the testing of wrought iron for high-pressure boilers using a giant lever-arm tensile testing machine.



*Figure C14*  
David Kirkaldy

In 1862, he published a book about his experiments, and went on to patent a new design of tensometer powered by hydraulic pressure (**Figure C15**). The machine was built and installed at the newly leased premises of his



*Figure C15* Kirkaldy's tensile testing machine

works in London, where he set himself up as a consultant and tester of materials for practising engineers.

He was not the first to realize the importance of mechanical testing. Stephenson, for example, engaged Fairbairn and Hodgkinson to test the properties of wrought iron to be used in his tubular Britannia bridge over the Menai Straits for the Chester and Holyhead railway. However, Kirkaldy's new machine was a great improvement on existing designs, being capable of tension, bending and compression testing, as well as having a capacity of up to 300 tonf.

He was meticulous in his work, and preserved failed samples in a museum of fractures on an upper floor of his premises in Southwark. Unfortunately, the samples – including those tested for Henry Law – were removed in 1940, and melted down for the war effort.

His involvement with the Tay Bridge enquiry was through Henry Law, who selected the many samples for testing. The testing took some time to arrange, however, and results were not delivered to the enquiry until its last few days at the sitting in London.

Kirkaldy died in 1897. His biographer describes his unhappiness at not being called himself before the court. He had presented other evidence before, in many other court cases involving premature failure of structural materials.