

# Institute of Physics – London & South East Branch – Retired Members Section

## Visit to Kirkaldy Testing Museum, Southwark on Thursday 10<sup>th</sup> March 2016

This visit has been organised by John Belling.

### Description

We shall visit David Kirkaldy's *Testing and Experimenting Works*, which was the world's first independent, commercial testing facility for construction materials. The Curator, Hugh MacGillivray, will host us and we can look forward to private tours to include a demonstration of the large 'universal testing machine'.



David Kirkaldy (1820-1897) was born in Dundee to a merchant family, was educated at Edinburgh University, then apprenticed at Napier's Vulcan Foundry in 1843 where he designed steamships, engines and boilers. By 1847 he was Chief Draughtsman and Calculator. He started his mammoth comparative test program on iron & steel in 1858 with results published in 1862.



Key to this was his 'universal testing machine'. Built in Leeds, the machine was installed initially in premises in The Grove, off Southwark Street, London SE1, opening on 1st January 1866. Rapidly earning a worldwide reputation meant expansion with staff and equipment moving to a specially designed building at 99 Southwark Street where business began on 1st January 1874.

The 'universal testing machine' is single-acting, water hydraulic powered with a designed load capacity of 1,000,000 lbs/446 tons at 6700 psi. The actuator is 18" in diameter with a 6' stroke. Samples up to 20' long can be tested in tension or compression, and up to 26' span in bending. Crushing, shear and torsion tests also are possible.

Contemporary advertisements of the testing machine's abilities offer 'Pulling, Thrusting, Bending, Twisting, Shearing, Punching and Bulging'. Materials tested on this and other machines at the Works went beyond iron and steel to include stone, brick, concrete, timber; glazed earthenware sewer pipes; glazed and plain tiles tested for porosity; railway tyres, rails and couplings; Admiralty and other chains, rope, wire, manilla and hemp; fabrics, parachute cord and harnesses.



The museum also houses a number of smaller pieces of equipment including this 60,000 lb Riehle tension-compression machine, made in Philadelphia PA by the Riehle Bros in about 1890. It has a very compact compound-lever force measurement system and a force-displacement recording drum. It worked in the Mechanical Engineering Dept. at Imperial College London from new until 1985, and was then donated to the Kirkaldy Museum. Visitors can have a go at crushing a concrete cube on this machine.

**Where and when to meet:** at the museum, 99 Southwark Street, London, SE1 0JF. Refreshments served at 11:00, before a talk at 11:15.

**Getting there:** See map, below – the museum in indicated by the red arrow.

Car parking in the area is difficult - public transport is preferable.

The nearest Main Line stations are: Waterloo, London Bridge, Blackfriars.

The nearest Tube stations are: Waterloo (Northern, Jubilee & Bakerloo), Southwark (Jubilee), London Bridge (Northern & Jubilee), Borough (Northern).

Buses 381 and RV1 pass the museum.

**Lunch:** at the *Founders Arms* pub.

Timetable

Time	Details
11:00	Meet at museum for refreshments
11:15	Talk: David Kirkaldy, the testing works, and the machines collection
12:00	Private tour, Part 1: demonstration of smaller equipment
13:00	Lunch – <i>Founders Arms</i> suggested by Hugh, 200 yards away
14:30	Return to museum for private tour part 2: demo of the big testing machine
15:30	End, but with free time for further exploration

**Size of party:** Maximum 25, minimum 10.

**Cost:** £5 including refreshments. Lunch at cost.

**Contacts:** Tony Colclough on 020 8398 0766, [tonycolclough@tiscali.co.uk](mailto:tonycolclough@tiscali.co.uk) or John Belling on 07986 379935, [john.a.belling.secrems@gmail.com](mailto:john.a.belling.secrems@gmail.com) .

**Late arrivals:** Go to museum and ask to be directed to our party – phone John Belling as above.

