

The Water Hydraulics Systems of Liverpool and Manchester.

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Most people have heard about hydraulics even if only to do with their car brakes. They work with unparalleled reliability and quiet efficiency to operate, amongst other things, aircraft landing gear, presses, mobile cranes and civil engineering diggers.

Dr Jarvis, Curator of Liverpool Maritime Museum, gave a talk on the history of hydraulics beginning with the first use of pressurised water to power small lifting devices in warehouses and culminating in Victorian times to being used to move massive parts such as lock gates and bridges. (most famously Tower Bridge which still uses the original hydraulic system to raise and lower the bascules, though now powered by electrically driven pumps and not steam.)

Sir William Armstrong, of Newcastle-upon-Tyne developed a jigger hoist in 1845 using hydraulic power. He used the mains pressure from the local water company to move a piston which was geared up by a system of rope blocks. These small cranes could be installed any warehouse where there was a water supply with sufficient pressure to fill a head tank on the roof. The success of these machines was such that Armstrong gave up his practice in law and founded an engineering works to produce cranes and only later on expanded his factory to produce armaments.

The value of hydraulic power was increased as high pressure systems were developed using water at a pressure of 750psig (52 barg) maintained by an accumulator. Individual systems could be installed for lifts, hoists and safety curtains in theatres. The flexibility of the system could also utilise either the brute power of direct ram force for heavy lifts or the swift, silent power for office lifts.

Powering the lock gates of Liverpool Docks was an example of where hydraulic power transformed an industry. The 120 ton gates were opened and closed either side of high tide by hand. This took 2 hrs and severely limited the time available for ships to enter and leave the docks. With the installation of hydraulic power the gates could be opened or closed in 3 mins.

The success of hydraulics was such that in 1871 Edward Ellington of the Chester Hydraulic Engineering Co began to install pressurised mains under many city streets. These were generally at a pressure of 750 psig but as high as 1000 psig and were supplied by central pumping stations. By 1890 Manchester and Liverpool had these pressured ring mains which was illustrated by a short film showing the Manchester installation.

Electric power eventually made these early hydraulic systems redundant. But such was their simplicity and reliability that they were not directly replaced. The Liverpool ring main closed as late as 1963 and the Manchester one in the 1970's but many individual systems are still in use powered by pressurised water supplied by electric pumps.

Dr Jarvis's lecture and photographs was a fascinating look at the past as well as a reminder of the brilliant beginnings of modern hydraulics.