



**Waterworks Museum - Hereford**

# Sisson Compound Slow Speed Instructional Engine Set

November 2023

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## An engine set used to train apprentice engineers



The Sisson Instructional Engine Set is one of three engines on display at the Waterworks Museum from an educational setting.

Built in 1953 for Reading Technical College (now part of Reading University), it was used to train students and apprentice engineers in the efficient use of steam power. One engine has a 6 inch piston and the other has an 8 ½ inch piston, which worked in combination at 250 RPM (revolutions per minute) to create 13 brake horse power.

The Sisson engines arrived at the Waterworks Museum in the spring of 2017 after Mr. Edward Tedaldi, a frequent visitor to the Museum, brought them to our attention. He had been an apprentice engineer at the firm of W Sisson & Co Ltd of Gloucester and was aware that a fellow former employee, Mr. Peter Curtis who lived in Devon, was seeking to find the engines a new home. He had acquired them some six or seven years earlier, saving them from scrap, intending to restore them to working order as an unfulfilled retirement project.

Trustees were delighted to accept the donation of the engines, which came with a condition that we restore and repaint them to the battleship grey livery colour more usually associated with engines produced by W Sisson & Co Ltd.

Funding for the restoration project was confirmed in 2018 but things were hugely delayed when the Coronavirus Pandemic resulted in the extended closure of the Waterworks Museum for much of 2020 and 2021. The two aspects of the project, restoring the engines to working order and creating a suitable display in the Museum grounds, came together in the autumn of 2022 and the Sisson Engine Set was finally brought into full operation in March 2023.

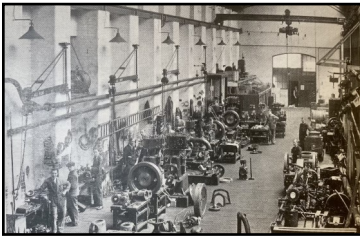


The engine set arriving at the Waterworks Museum in March 2017



Mr. Tedaldi viewing progress in the restoration of the Sisson engine set in February 2023.

## W Sisson & Co Limited, Engineers - Gloucester



Images of the Engine Erecting Shop (above) and a Machine Shop Bay (below) (source: Fifty Years of Engineering - W Sisson & Co Ltd)



In 1889, William Sisson bought the engineering business of Mr. Joseph Seekings (formed in 1865) which initially made small semi-portable engines and boilers and small marine engines, but grew to produce larger and later high speed steam engines.

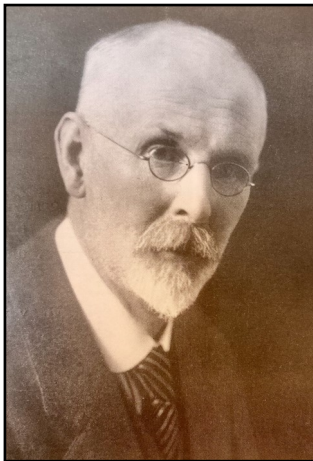
Originally based in Quay Street, Gloucester the firm moved to purpose built premises in Sisson Road, Barnwood in 1905. They started with three engineering bays, but this soon grew to five plus a foundry. The size and power of the engines they developed also grew and in 1905 they built a 750hp marine engine being the first totally enclosed engine in the country.

When developments in science brought a demand from universities and technical colleges for instructional plant these specialist engines were supplied across the UK and in Egypt, India, Hong Kong, New Zealand and Nigeria.



At the end of WW2 a close collaboration started between Sisson and the Birmingham engineering firm of Bellis & Morcom Ltd. This led to them becoming a subsidiary of Bellis & Morcom in 1958, although retaining the Sisson name. It struggled financially, however, and the company was closed down in 1968 when it had 160 employees.

## Encouraging Sisson staff to attend the Technical School



William Sisson \*1853-1935) was the founder of the company and its chairman until his death.

An early winner of a Whitworth Scholarship, the highest educational award for mechanical engineers, he had a particular interest in promoting technical education. Sisson was a founder member of the Gloucester Technical Schools Committee and

from early days he set about designing plant for training future generations of engineers, a focus that the firm maintained after his death.

In 1902 Sisson set up a scheme under which junior employees of the firm could study "machine drawing, steam, solid geometry, mathematics or physical physics" at Gloucester Technical School.

The firm paid fees for one course providing staff sat two classes, had good attendance and devoted three hours homework to each class. Staff could leave work at 5.30pm and the time lost would not be deducted from their wages.

The Sisson company scheme was widely held up as an example for other engineering firms to follow.

## What was an 'instructional engine'?

### Terminology

A 'pressure indicator' is an instrument that senses pressure and records it.

A 'pressure gauge' is a device that converts detected pressure into the mechanical motion of a pointer on a gauge to give continuous real time readings.

They were also called "experimental engines" because they allowed the students to *experiment* with the engines. This was done by changing the valve timings while the engines were still running, in a way that the steam entering the cylinder could be cut off earlier or later on the piston stroke. Cutting steam off earlier allowed it to expand

in the cylinder and reduce the steam consumption and hence save fuel.

A pressure indicator (not a pressure gauge) attached to the cylinder and a pull cord attached to the piston stroke allowed students to see the exact pressure in the cylinder at any part of the piston stroke. Thereby, students could cut the steam off earlier (or later)

and see that the expanding steam was still doing useful work on the downward stroke of the piston. The pressure indicator produced a *draw card* (or a graph) of what was happening inside the cylinder at any point of the piston stroke.

The students were learning about the *working properties of steam*.

## Images of the restoration and creating a display of the Sisson engine set

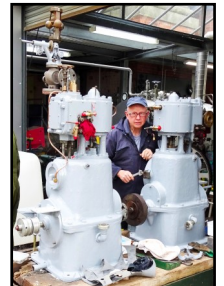


April 2017  
Start of cleaning  
of the engine & its  
component parts



Sept 2018  
Laying the  
display shed base

May 2019  
Work to  
reassemble &  
repaint the  
engines in their  
new livery is  
complete



Nov 2019 - building the display  
shed, which was completed in  
July 2020



Oct 2020  
Rolling shutter door being installed



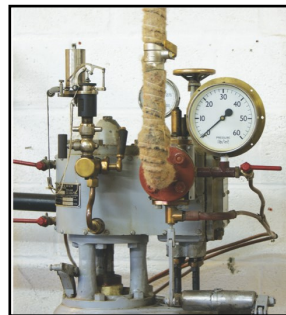
Nov 2021  
Engines moved  
to display shed  
- it then took 15  
months to  
install the  
engines in  
working order

## Other Sisson instructional engine sets in the UK

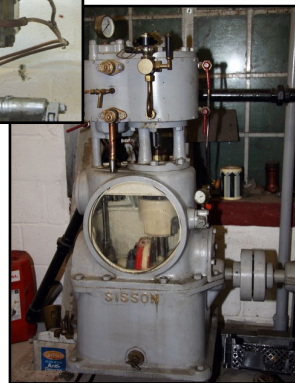


This engine is on  
display at Combe Mill,  
the original sawmill  
and workshop on the  
Blenheim Estate.

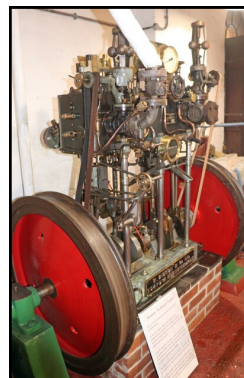
Made in 1956 it was  
used at a University  
Engineering Dept. in  
Oxford.



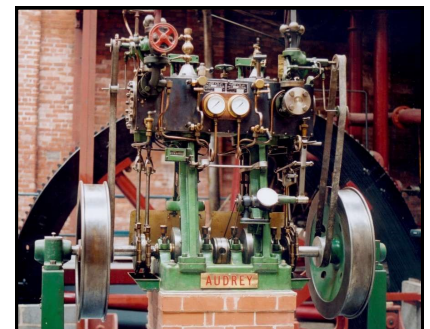
This instructional engine set is similar to  
ours and can be seen at the Museum of  
Steam Power and Land Drainage at  
Westonzoyland in Somerset.



Made in 1961, 'Audrey' is a  
marine style instructional  
engine set at Bolton Steam  
Museum operated by the  
Northern Mill Engine Society.



This engine can be seen in  
the Boiler House at Mill  
Meece Pumping Station,  
Eccleshall, Staffordshire.  
© Chris Allen



## Other engines at the Waterworks Museum with an educational provenance

### Blackstone 7½ hp Oil Engine

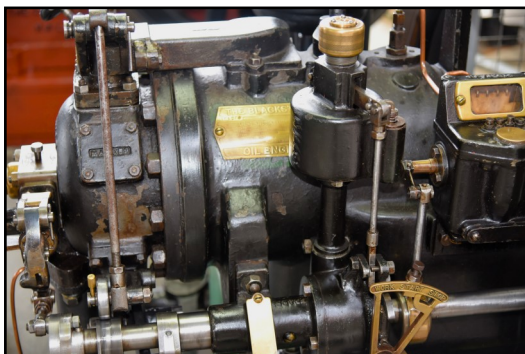


This open-crank oil engine was installed in Burnley Technical College in April 1934. It enabled students and apprentices from local engineering firms to make measurements such as brake horse power during their practical work.

This was installed just months before the death of the joint inventor of the Blackstone Oil Engine, Frank Carter. At the time it was said there were over 100,000 such engines in use around the globe. They were commonly used for pumping water. However, ours is the last known working example of a Blackstone instructional engine.

In September 1934, the Burnley Express newspaper reported on an open evening at the Technical College and that 'considerable new equipment has been added to the Engineering Dept. and is on exhibition for the first time'. This included an Oil Engine. This new equipment had been obtained mainly by the generosity of the Miners Welfare Fund Committee.

The engine was later transferred to a museum in Burnley where it was stored but not displayed. It was donated to the Waterworks Museum by Lancashire Museum Service in 2012.



### Brighton Steam Engine



The engine seen in situ at the University of Sussex



The Brighton Steam Engine was donated to the Waterworks Museum by the University of Sussex in 2014. Unlike other instructional engine sets this engine was not produced by a commercial supplier.

A plate on the engine tells us that the components of the engine were probably made in 1860-1870 in Lancashire and are typical of a portable engine practice of the period. The components were donated by SS Stott of Haslingden and the engine was restored by G Cussons Ltd of Manchester. It arrived at the University of Sussex in 1967.

The engine was brought back to working order by our volunteer engineers and can now be seen in operation on Steam Days in the Museum's steam bay.



The Brighton Steam Engine on the day of its first steaming in Bay 7 in June 2020