

Bolinder Engine and the Grand Canal Company

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The Grand Canal Company had long been aware of the problems of transportation on a mixed navigation of canal, river and lake. The existing fleet was mainly horse-drawn boats with a number of steam tugs which towed them across lakes and along the Shannon, with some attempts to tow trains of barges over long sections of canal. When internal combustion oil engines became available, the GCC bought a 4 cylinder Scott Sterling engine in 1910 which they installed in a barge in May, but it was not a success. The following year they purchased and installed four Bolinder engines. A trial trip was carried out in July 1911 and was reported to be "very satisfactory". More engines were ordered and by 1914 twentyeight former horse barges had been converted.

Prior to 1870 all boats, when registered, were given consecutive numbers. As the numbers had exceeded 1000 the company decided to start a new series, with the company's new boats being numbered, commencing with No. 1. Bye-traders (independent operators also known as hack boats) were started with 1B. The new series had not reached 100 when the suffix M (for motorised) was introduced to denote a company barge in which an engine had been installed. Company maintenance boats, usually older trade boats were given the suffix E to denote engineering. The government subsidised the building of twenty-nine horse-drawn barges during the second world war to cope with the transportations of turf to Dublin and these were denoted with the letter G.

"The starting ritual involves pre-heating the hot bulb with a blow-lamp and hand pumping oil to the main bearings, big end, small end and piston and greasing several exposed lesser bearings"

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Click the play button to hear

the sound of a bolinder engine
{audio}media/chugchug1.mp3{/audio}

Bolinder engine on 45M - Photo thanks to Brendan Davis

The Bolinder Company

The Bolinder Company was founded in Stockholm, by the teenage brothers Karl and Jean Bolinder, in 1832. They first produced components for steam engines, railways and sawmill machinery but later developed their first internal combustion engine, a four-stroke hot bulb, in 1893. In 1903 E. A. Rundlof invented the two-stroke, crank case scavenge hot bulb engine and passed it on to the Bolinders, who developed their range of semi-diesels from this - and the legend was born. The engines were so reliable and durable that they were used in barges throughout the world and Bolinder became synonymous with barge engines.

The engines installed by the Grand Canal Company in 1911 were the 1908 E-type single-cylinder 8.35-litre direct reversing engines (invariably 15bhp). These were in continuous use in the fleet until CIE removed the last working Bolinder's from its maintenance boats in the mid-seventies. Consequently the E-type is known as the Irish engine. B boats eventually numbered up to 133B but a lot of these were former GCC boats that had been sold off. Most bye-traders followed the GCC lead and converted to engines.

How the engines work

The semi-diesel is the link between steam and internal combustion. A semi-diesel relies for combustion on heat and compression, whereas in Dr. Diesel's engine combustion is caused by compression alone. The vertical block of the Bolinder is surmounted by a pre-heated cast iron hollow hot bulb, where combustion takes place, driving down the piston

through a vent in the bulb. This remains hot, allowing the fuel to combust and the air to change without high compression. Peripherals such as the water-pump, fuel-oil pump and five lubricating-oil pumps in line, each with its own oil well, are driven by eccentrics from the shaft-all exposed and fully accessible in the steam engineering tradition. The silencer or expansion chamber is bolted to the block and is almost as large, being water-cooled by direct circulation with the engine. The starting ritual involves pre-heating the hot bulb with a blow-lamp and hand-pumping oil to the main bearings, big end, small end and piston, and greasing several exposed lesser bearings. Heating takes about ten minutes, but varies according to the age and condition of the bulb.

At the crucial moment a few squirts of fuel are pumped into the bulb and a smart swing of the great flywheel, with the hand or the boot, results in compression and then combustion. Non-starting usually arises from attempting to start before the bulb is fully heated, with repeated squirts of fuel and exhaustive flywheel swinging-and an engine-room full of noxious diesel vapour. Spontaneous loud explosions as the engine backfires contribute to spectator sport on the bank, followed by resolutions (over pints) to get rid of it and put in a proper engine. Overheating of the bulb causes expansion of the block and loss of compression, with the same result: non-starting and similar resolutions. Writing in 'Canal Mania' (Arum Press, 1993) Anthony Burton, the canal historian, deduced that life was seldom dull with a Bolinder!

The New Motor Fleet

The first thirty motor boats were all converted horse boats. In 1925 the Grand Canal Company ordered the building of a new fleet of custom-built steel motor canal-boats. The first one, 31M, was built by the Ringsend Dockyard Company at a cost of £1000. Between 1925 and 1939 forty-eight barges were built, most of them by the Ringsend Dockyard Company (known as McMillan's) and Vickers (Ireland) Ltd. (subsequently the Liffey Dockyard Company).

These boats were powered by the 15bhp E-type Bolinder and measured about 60' X 13' X 5' 6". They had bluff bows with accommodation forward for a crew of four. The cargo hold was 40', separated from the engineroom and bows by watertight bulkheads. The plates were quarter-inch and hot-riveted on angle frames. The barges were of rugged design and with the exception of the turn of the bilges, which are subject to constant wear, they have stood the test of time. Most of the new fleet are still around

A Day at the Harbour

Gerard D'Arcy, in his Portrait of the Grand Canal describes a typical day at the harbour in the early 1950s. The first sound at 5.00 or 6.00 was of a blow-lamp starting, followed by a colossal bang, back-firing, starting and further back-firing. (It was often difficult to get the bulb hot enough, with the old paraffin blow-lamps, to ensure a smooth start.) After the engine was started, it was essential to keep the bulb hot, so the clutch was engaged as soon as possible and the throttle turned fully up. In the steam tradition there was no gearbox. The throttle was of the hit-and-miss variety peculiar to these engines. A striker on an eccentric engaged the end of the fuel-oil pump-piston, injecting some fuel into the bulb. The tension on a spring above the striker determined the frequency with which the striker engaged. At full tension and throttle, it engaged nearly every time. A short distance out from the harbour, dropping revs. and black smoke would indicate over-heating and pre-ignition. At this stage the engineer would introduce the combustion water, from a deck tank, in a gradual drip into the engine; this would cool the bulb, increasing the revs and ensuring a small puff of blue exhaust. The engine was now more or less set.

Locks

There was no reverse gear. To put the engine into reverse it was necessary to put it out of gear and then cut the engine, re-engaging it in reverse when it was just about to stall. The boatmen all exhibited great expertise at this procedure; however it was not something that was used routinely. With 47 tons of cargo and drawing 4' 6", the boats were run into the locks at high revs. and checked by an 80' rope whipped around the wooden stop post at the lock. The volume of water against the bluff bows also acted as a brake. With the stop-rope made fast, the clutch was kept engaged at high revs. to keep the bulb hot and prevent the engine from cooling and stalling in the lock.

Then and Now

So on to Shannon Harbour at about 4 mph, reaching Limerick in around four and a half days. But that was in the early 1950s and, while hot bulb handling was transformed subsequently by bottled propane/butane gas, in Ireland the Bolinder - with its unique sound - is going the way of the Corncrake. At present there are only four boats - 45M, 50M, 75M and 78M - that retain their original engines and all of them featured on this site.

In Britain, where canal heritage is cherished, the Bolinders are highly prized. Reconditioned and restored engines are frequently reinstalled in traditional narrowboats, attracting much attention at rallies, and Volvo (who acquired the Bolinder Company) present an annual trophy for the best-kept engine.

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