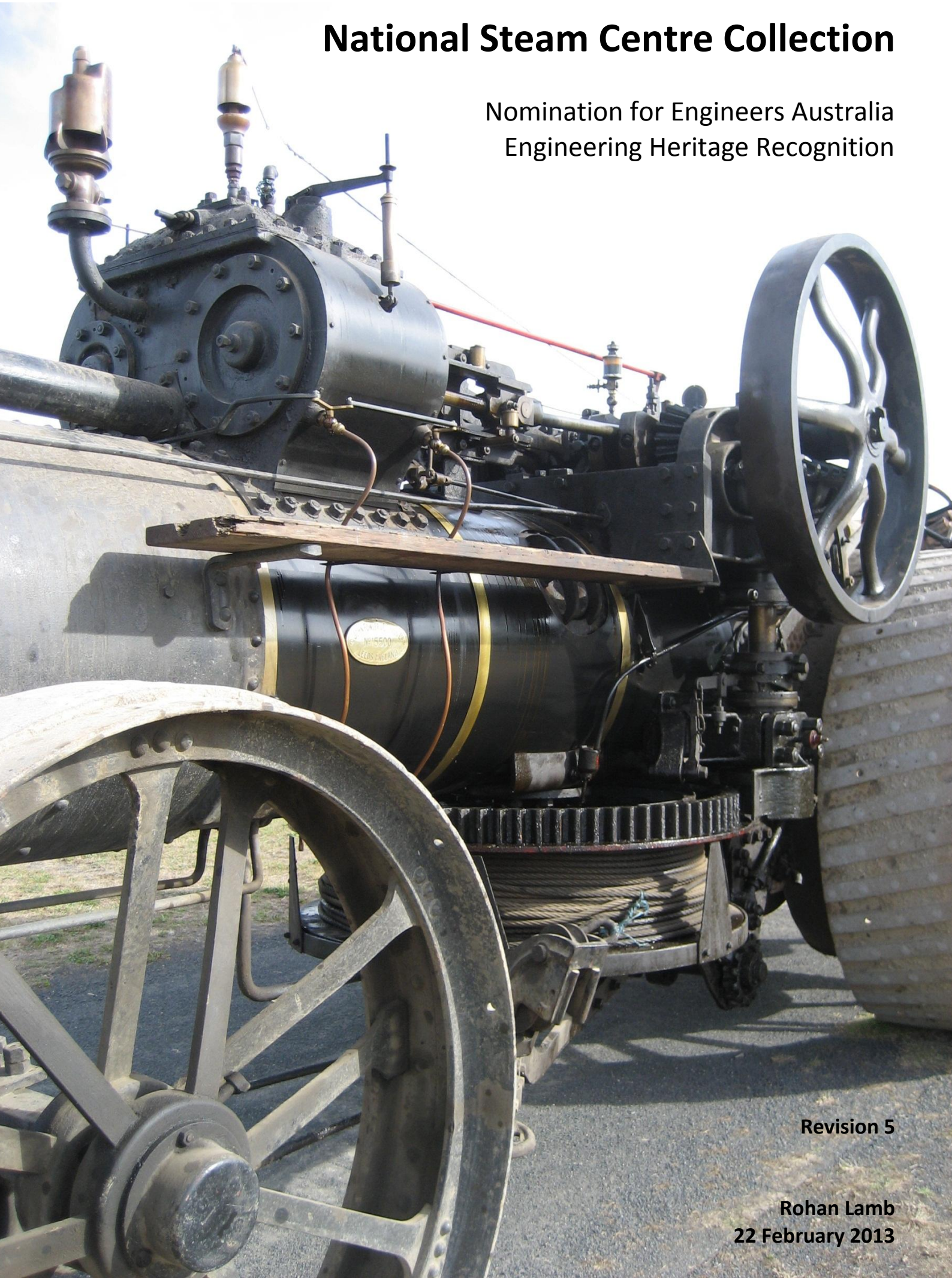


# National Steam Centre Collection

Nomination for Engineers Australia  
Engineering Heritage Recognition



Revision 5

Rohan Lamb  
22 February 2013

## Heritage Award Nomination Form

The Administrator  
Engineering Heritage Australia  
Engineers Australia  
Engineering House  
11 National Circuit  
Barton ACT 2600

Name of work: **National Steam Centre**

The above mentioned work is nominated to be awarded an:

**Engineering Heritage Recognition Award**

Location, including address and map grid reference:

**1200 Ferntree Gully Road, Scoresby 3179, Victoria  
Melways 72 D9**

Owner (name & address):

**Melbourne Steam Traction Engine Club Inc.  
1200 Ferntree Gully Road  
Scoresby 3179  
Victoria**

The owner has been advised of this nomination and a letter of agreement is attached.

Access to site:

**Open on Saturdays and Sundays.  
Operational displays on the last Sunday of the month.**

Nominating Body or person:

**Melbourne Steam Traction Engine Club Inc.**

President, Melbourne Steam Traction Engine Club Inc.  
Date: 22 February 2013

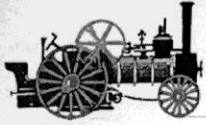
Chair of Divisional EHA Group  
Owen Peake  
Date: 29 April 2013

## Basic Data

Item Name:	National Steam Centre
Location:	Melways Map reference 72 D9
Address:	1200 Ferntree Gully Road
Suburb/Nearest Town:	Scoresby 3179
State:	Victoria
Local Government Area:	Knox City Council
Owner:	Melbourne Steam Traction Engine Club Inc.
Current Use:	Collection of heritage machinery
Year Started:	1963
Physical Description:	The collection is on a site located on the south side of Ferntree Gully Road, and has the Eastlink toll road on its eastern boundary. The site occupies an area of approximately 6 hectares. Exhibits are both undercover, and outdoors. The collection comprises mechanical engineering heritage items including stationary steam engines, large diesel engines, belt driven workshop machinery, refrigeration compressors, portable steam engines, steam rollers, steam ploughing and traction engines, the complete engine room from the Lyttelton II tug, a large walking dragline, a large steam shovel, a tunnel boring machine, and numerous other small engines and exhibits. There is also a library and archive. A 12 inch gauge passenger carrying miniature railway runs around the site.
Physical Condition:	The site is maintained by club members. Exhibits range from those requiring complete restoration through to fully restored exhibits in operational condition.
Historical Notes:	Refer to History of Collection section
Heritage Listings:	Nil

## Heritage Award Nomination Letter

### MELBOURNE STEAM TRACTION ENGINE CLUB INC.



ESTABLISHED 1963 Incorporated Association No.A0020330A A.B.N. 12 716 617 625

PRESERVATIONISTS OF PRIME MOVERS AND INDUSTRIAL EQUIPMENT OF A BY-GONE ERA

Correspondence to: The Secretary, 1200 Ferntree Gully Road, SCORESBY 3179  
Ph (03) 9763 1614 Fax (03) 9531 1804 email [melbournesteam@gmail.com](mailto:melbournesteam@gmail.com)

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15 November 2012

Administrator  
Engineering Heritage Australia  
Engineers Australia  
Engineering House  
11 National Circuit  
**BARTON**  
ACT 2600

Re; Heritage Award Nomination

The attached Award Application has been prepared by Mr. Rohan Lamb on behalf of, and with the full support of the Melbourne Steam Traction Engine Club Inc.

This Club is the owner of the National Steam Centre Collection, the subject of this application, and it is with a great deal of pride that we present the products of our efforts over the past 50 years for your consideration.

Yours Faithfully

A handwritten signature in black ink, appearing to read 'Bob Ayris', with a long horizontal flourish extending to the right.

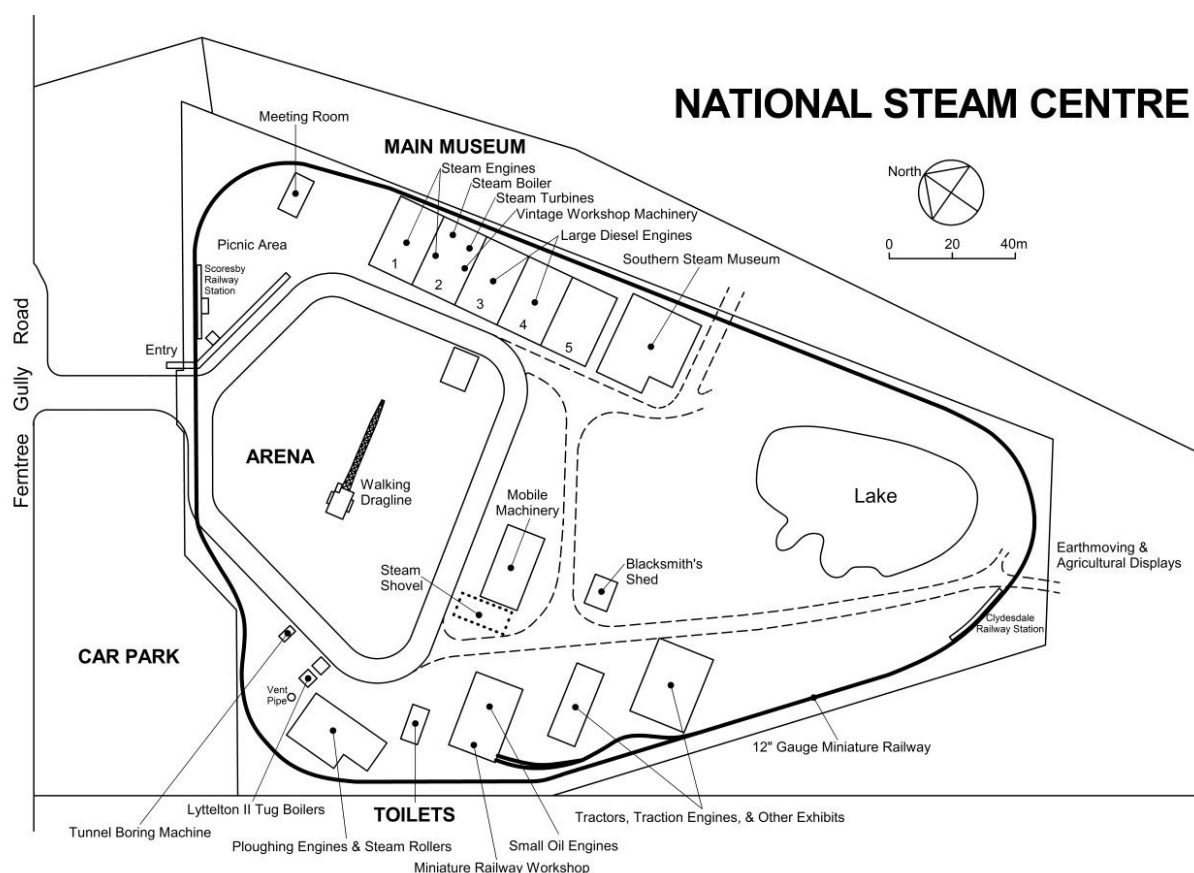
Bob Ayris  
Honorary Secretary  
Melbourne Steam Traction Engine Club Inc.

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## History of the Collection

The Melbourne Steam Traction Engine Club Inc. (MSTEC) was established in 1963, by a group of people who had an interest in engineering heritage, predominantly associated with steam traction engines and allied vintage machinery. Initially club meetings were at different homes, and later at a scout hall. The club was fortunate to gain the use of a site near the corner of Burwood and Mountain Highways at Wantirna but was limited in how it could use the grounds as the site was only on a limited lease. The club held its first steam rally in November 1969, and the funds from this allowed the purchase one month later of a significant group of items, which were the steam engines from the Engine Driving School of RMIT. In 1986 the present six hectare site at 1200 Ferntree Gully Road, Scoresby was obtained on long-term lease from the Melbourne & Metropolitan Board of Works (MMBW). The area had been used by the MMBW since 1973 as a major access site for the construction of the Dandenong Valley Trunk Sewer. When the club took over, the grounds were in rough condition and required extensive remedial works to prepare the site for buildings, and landscaping. The lease has since been renewed with Parks Victoria.



The museum site is called the National Steam Centre, and is open for inspection each weekend. A run day is held on the last Sunday of each month with a selection of exhibits in operation. The main fundraising event for the year is the annual Scoresby Steamfest rally held in March over the three day Labour Day weekend. In addition to the machinery collection owned by MSTEC, the club operates a 12 inch gauge miniature railway around the site. The collection is augmented by privately owned exhibits of members which are displayed on site.

The facilities are used for training, with courses conducted on an as needed basis for boiler attendant and reciprocating engine driver's certificates of competency.

The collection contains over 500 objects, and the group has a membership of around 165.

The purpose of MSTEC as stated in the rules of incorporation is:

- (a) To acquire, preserve and exhibit steam powered road and rail vehicles, steam traction engines, road rollers, road locomotives, and other steam driven vehicles, and stationary and portable steam engines, and boilers, and internal combustion machinery of all kinds; and
- (b) To establish and operate or participate in the operation of a tourist educational and historical interest comprising such vehicles, engines, boilers, machinery, and all related items and equipment therefor.

The collection has grown from its origins with steam machinery to encompass all manner of heritage machinery. Most of the items have a known provenance, some have little known of their working history but are included in the collection because of their technical significance. There is also a strong emphasis on keeping exhibits in operating condition. This is an important part of the role of the museum which allows visitors to experience the machinery in operation, and for members to maintain the skills required repair and operate historical machinery.

Photographs:

Unless otherwise stated, all photographs by Rohan Lamb

Front Cover: John Fowler & Co. ploughing engine for further details, refer to page 21.

## Overview of the Collection

MSTEC has collected engineering related items since its foundation in 1963, with the objective of maintaining and displaying these in operating condition. The collection has a strong industrial heritage focus, with engines collected from a range of industries represented. By virtue of its location in Melbourne, the emphasis of the collection has focussed on Victoria's industrial history.

## Stationary Steam Engines & Turbines Collection

The stationary steam engine collection comprises approximately 50 engines acquired from a range of industries in Melbourne, Geelong, and one from Maryborough, Queensland. Several sites have provided multiple exhibits. These groups within the collection include engines from the RMIT engine driving school, which was the first major acquisition in 1969. Other groups of exhibits include four



auxiliary engines from the Melbourne Harbour Trust bucket ladder dredge *George Kermode*, three steam engines and two turbines from the thermodynamics laboratory at Swinburne University, and two engines from the thermodynamics laboratory of Monash University's, Caulfield campus. A number of Australian engine builders are represented in the collection along with examples from prominent British manufacturers.

The steam turbines in the collection came from Swinburne and Monash Universities and include an instructional example by C. A. Parsons & Co. Ltd., and several by Greenwood & Batley Ltd. The turbine collection is yet to be made operational. The collection is supplied with steam from an oil-fired Cleaver-Brooks package boiler built in 1968 under licence in Western Australia, which was donated by Swinburne University (refer photo).





## Large Diesel & Oil Engine Collection

The large diesel collection comprises eight engines used in stand-by power generation, and one used for the transfer of bunker oil. Makers represented in the collection include an English Electric three-



cylinder air blast diesel engine and alternator, several Ruston & Hornsby Ltd. diesel engines and alternators, a Crossley Ltd generator set, a German built Deutz engine, and a Ruston & Hornsby Ltd four cylinder horizontal engine and associated Guinard variable displacement pump. Other single-cylinder engines in the collection include a Hornsby-Ackroyd gas engine, National gas engine, and two Crossley instructional engines. These smaller engines have been donated from the thermodynamic laboratories of Monash, Melbourne,

and RMIT Universities. Australian made engines include a large Ronaldson Bros. & Tippett single cylinder horizontal engine, several Southern Cross diesel engines, a McDonald diesel engine, and a Clutterbuck Bros. engine.

## Mobile Machinery

The mobile steam powered items in the collection include a Marshall 8-ton steam roller, an American made Buffalo-Springfield steam roller, a John Fowler & Co. ploughing engine, and Clayton & Shuttleworth traction engine (presently disassembled).

The collection includes an Australian made portable steam engine by Johnson & Sons, Tyne Foundry, South Melbourne. There are two other unrestored portable steam engines, a twin-cylinder portable by British maker Brown & May and a large 20HP twin-cylinder portable by Marshall, Sons & Co.

Internal combustion powered machines are represented by a locally built Kelly & Lewis Bulldog tractor based on the German Lanz tractor (ref photo), and a number of locally made road rollers.

These include four examples built by A. H. McDonald, Richmond, and one by Malcolm Moore Pty. Ltd., Port Melbourne. Other machinery built by Malcolm Moore includes a road grade built under licence from the USA company Wehr, and a Malcolm Moore front end loader.



## **Lyttelton II Tug Engine Room**

In 2007 the museum was fortunate to acquire all of the steam plant from the Scottish built Lyttelton II tug along with hull sections which formed the walls and roof of the engine room. The long term intention is to recreate the engine room. In the meantime the components are on display.

## **Ransomes & Rapier W90 Walking Dragline**

The largest individual item in the collection is the 108 ton Ransomes & Rapier walking dragline. This has been restored to operating condition.

## **Ruston & Hornsby Ltd., No.20 Steam Navy Crane (Steam Shovel)**

The most recent donation (2011) has been a 90 ton Ruston & Hornsby Ltd., England, No.20 steam navy crane. The shovel is presently disassembled.

## **Refrigeration Machinery – Ammonia Compressors**

The collection contains several large examples of reciprocating compressors, both locally and British made which were used by industry in Melbourne.

## **Other Items**

The collection contains numerous other items such as a collection of belt driven workshop machines, a collection of small oil engines, and a blacksmith's workshop including a locally made Harman steam hammer.

## **Archive & Library**

The collection includes a library of several hundred books on topics related to machinery design and operation, and engineering company histories. Rare and significant documentation is held in the archive collection. Significant items within the archive collection include:

- Machinery Sales Registers by Robison Bros. & Co., South Melbourne (agents), for Marshall, Sons & Co., portable steam engines, traction engines, road rollers, and threshers;
- Machinery Registers by Welch, Perrin & Co., South Melbourne (agents) for John Fowler & Co. traction engines & road rollers;
- Machinery Registers by Welch, Perrin & Co., South Melbourne (agents) for Clayton & Shuttleworth, portable engines and threshers; and
- A set of plans for the Lyttelton II steam tug.

## **Comparative Collections**

Within Victoria, the collection at the National Steam Centre is one of the largest and most diverse collections in the State of industrial heritage machinery. There are other collections of machinery but these collect in different areas such as railways, aircraft, or agricultural farm machinery.

Other collecting bodies such as the Museum of Victoria (MoV), have a smaller collection of operational machinery including a steam roller, traction engine, farm tractors etc. but these form a small part of a much wider collecting policy. The MoV does maintain items in operational condition, and has demonstration days.

The Lake Goldsmith Preservation Society near Beaufort has a collection which is the most closely related to the collection theme of the National Steam Centre. Lake Goldsmith is structured differently to the National Steam Centre. Whereas the majority of the collection at the National Steam Centre is owned by MSTEC, at Lake Goldsmith the collection actually owned by the society is not as large, but is augmented by over 60 privately owned collections housed in separate sheds, making it one of the largest assemblies of heritage machinery in Australia.

There are collections of steam, and other agricultural plant at the Swan Hill Pioneer Settlement, and at the Echuca wharf where the machinery is part of a wider heritage themed attraction. The Wheatlands museum at Warracknabeal has an extensive collection of agricultural machinery with a large collection of farm tractors.

Interstate, there are notable collections of steam powered machinery at the Powerhouse Museum in Sydney, and at the Queensland museum. The Pearn collection at Westbury in Tasmania is a very large collection of mobile steam machinery of mostly traction engines, and at the West Coast Museum at Zeehan this is a collection of mining related steam powered machinery. In Queensland, the Queensland Steam & Vintage Machinery Society at Petrie houses a collection of steam engines. The Booleroo Steam & Traction Preservation Society has a large club based collection of agricultural machinery at the Booleroo Centre in South Australia.

## Assessment of the Most Significant Items

The collection at the National Steam Centre is significant as a whole for its ability to illustrate the evolution of technology. The provenance of many of the items is known which provides a tangible link with industries and engineering firms which once played an important role in the development of Melbourne, and which no longer exist.

This section provides a brief assessment of the significance of the most important items in the collection.

### Stationary Steam Engines & Turbines Collection

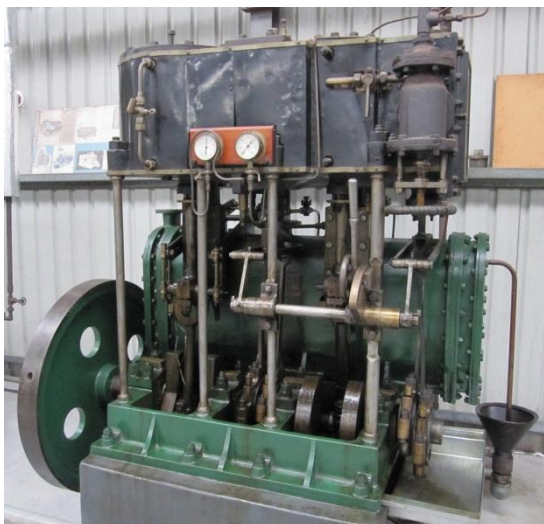
The most significant items in the stationary steam engine collection are the engines built by Australian manufacturers. These are often unique surviving examples from firms which are no longer in business. They provide a tangible link with South Melbourne, and Richmond which were amongst the first industrial suburbs associated with Melbourne's engineering industry. The provenance of the majority of the engines is known and this has allowed for the presentation of the history of many obscure and long forgotten industries both in Melbourne and Geelong. The engines in the collection were constructed between the c.1880s until the mid-1960s.

The oldest engine in the collection is thought to date from the 1880s. It is a single cylinder horizontal mill engine, with no maker's identification on the engine. The engine was recovered from Dalton's Woolscouring works at Breakwater, Geelong and appears to have been secondhand to the site. It is probable that it was associated with mining beforehand.

Australian manufacturers are represented by a compound marine engine by D. & R. Buchanan & Brock, South Melbourne, a compound vertical engine by Kelly & Lewis, Melbourne, a compound high speed enclosed engine by Thompson & Co., Castlemaine, a single-cylinder winch engine by Robison Bros. & Co., South Melbourne, a cross-coupled horizontal ammonia compressor by R. Werner & Co. Richmond., a Perry Ltd., South Australia steam winch, two Taylor Horsfield, Bendigo direct-acting Worthington type pumps, an Alfred Harman logging winch and steam hammer, and a single-cylinder sugar cane crushing engine by Walkers Ltd., Maryborough, Queensland.

The balance of the collection reflects the origins of steam power with the majority of the engines built by English and Scottish makers. This includes examples by Alley & MacLellan, W. H. Allen & Sons, Belliss & Morcom, Clarke Chapman, Arnold Goodwin, Marshall, Matthew Paul, Reader, Shanks, Sissons, Tangye, and Waller.

#### D. & R. Buchanan & Brock, South Melbourne, Compound Marine Engine



This compound marine engine with surface condenser was built in the 1890s by D. & R. Buchanan. This firm of marine engineers were based on the banks of the Yarra River in South Melbourne, and it is known that they built several engines of this size for Victorian Defence Department launches. The engine was later used at the Engine Driving school at RMIT before being purchased for the collection in 1969.

The engine is a rare example of a Victorian built marine engine, and is a representative example of a once significant maritime industry centred on the banks of the Yarra River at South Melbourne.

### **Taylor Horsfield Co., Bendigo, Duplex Horizontal Pumps**



Two large horizontal Worthington type duplex pumps were supplied c.1917 to the HMAS Cerberus naval base at Flinders. These pumps were used to transfer bunker fuel to storage tanks at the base. They are significant as rare examples of machinery built by Taylor Horsfield in Bendigo. They are technically significant as large examples of their type, and for their application for pumping bunker oil. The photograph shows one of these pumps.

### **Alfred Harman, Port Melbourne, Twin-Cylinder Logging Winch**

This twin-cylinder double-drum steam winch was built by Alfred Harman in Port Melbourne, and is thought to date from the late 1920s to 1930s. Harman were a prominent engineering firm in Port Melbourne and were known for their cable excavators built between the 1920s and the 1960s. Their earlier work included building steam winches for logging. They gained a good reputation in the timber industry for building a strong winch. This example is complete, and also exhibits a later adaption when it was converted to be driven by a diesel engine with the addition of a large spur gear. It was used by M. Feiglin & Sons to haul logs from the Poley Range near Warburton. The winch is representative of an integral part of the equipment used for early timber getting and of the logging industry of the period.



### **Geo. W. Kelly & Lewis, Melbourne, Compound Vertical Engine**



This compound vertical open crank engine is a rare example of a steam engine built by Kelly & Lewis, at their Melbourne factory. The provenance of this engine is not known. It is an early example of an engine made by Kelly & Lewis from the steam period. The firm was better known for their later production of oil engines, Bulldog tractors, and centrifugal pumps and air compressors. The engine is on long term loan to the museum.

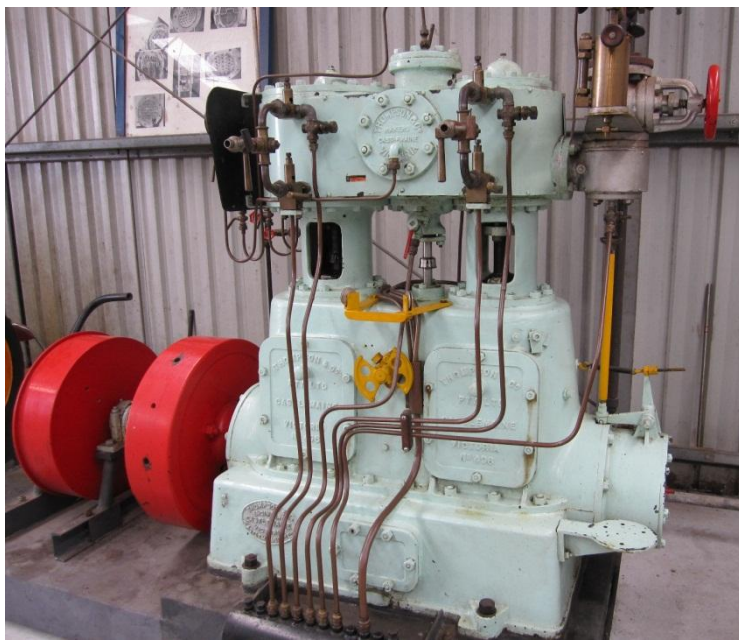
### **Robison Bros. & Co., South Melbourne, Single-cylinder Vertical Single-drum Winch**

This single-cylinder vertical engine drives a single-drum winch via double-reduction gears. It was built c.1904 during the reconstruction of the Dukes & Orr's dry dock in South Melbourne when the dock was enlarged to accommodate bigger ships, and new mitre dock gates were constructed. The winch was used to pull the dock gates into their storage location. New steam driven centrifugal pumps for emptying the dock, and associated boilers also by Robison Bros. were installed at the same time.



The steam winch was a unique design built specifically for the docks, and it has a long provenance having worked at the dock from 1904 until their closure in 1975. It is a significant example of the work of Robison Bros., and of the maritime engineering industry along the Yarra River in South Melbourne.

### **Thompson & Co., Castlemaine, Compound High-speed Vertical Engine**



This compound high-speed enclosed engine, no.496, was built in 1916 for the Victorian Public Works Department (PWD). At the time the PWD were building a land dredge at the State Dockyards at Williamstown for the Bendigo Creek Trust. The engine was the main power source for the dredge which was used to clear Bendigo Creek of years of built up sludge from local mining operations. The engine is significant as an example of the work of Thompson & Co., Castlemaine who were a significant regionally based engineering firm. It is an early example of their production of high-speed engines which were built in

competition against dominant British makers such as Belliss & Morcom, and W. H. Allen. The provenance of the engine is known for the initial period of its working life on the dredge. There is a gap in the history before the engine was known to have been acquired by Swinburne University for their Thermodynamics Laboratory in the 1950s.

### **Walkers Ltd., Maryborough, Queensland, Single-cylinder Cane Crushing Engine**

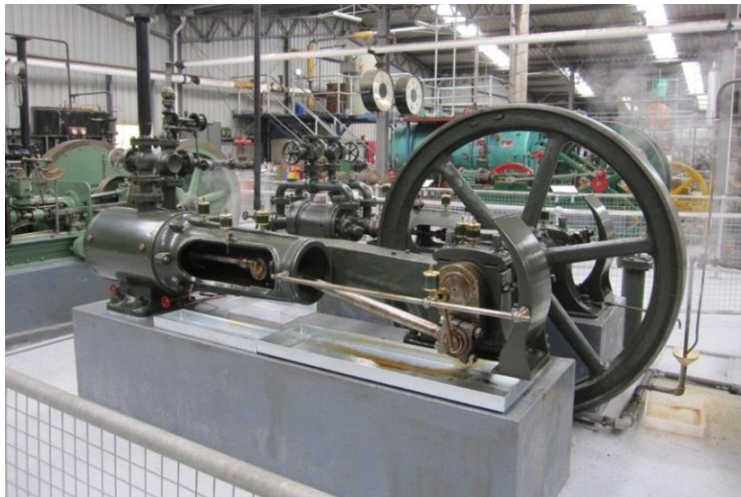
This engine is the most recent acquisition for the steam museum. It was donated in 2009 by Bundaberg Sugar from their Millaquin sugar mill, Bundaberg, Queensland. This engine was built by Walkers Ltd. in 1964 as part of an expansion of the mill, and drove the no.2 crushing mill (see photo). A second engine of the same design was supplied by Walkers Ltd. in 1965 and this was installed on the no.3 mill. The engine is the largest stationary



Photo: Courtesy of Bundaberg Sugar

Horizontal steam engines were widely used throughout Queensland and Northern New South Wales to power the crushing rolls at sugar cane mills from the beginning of the industry. The engine is significant because of its Australian manufacture, and is representative of the Australian engineering industry which supports the sugar industry, and of the sugar cane industry in Northern Australia. Walkers Ltd have a long history associated with building machinery for sugar mills, and it was the second last steam engine built by them, with a very late construction date for a steam engine. This period marked the change in technology for driving crushing mills from reciprocating steam engines to either steam turbines or electric motors.

### **R. Werner & Co., Richmond, Single-cylinder Cross-coupled Ammonia Compressor**



This ammonia compressor was built by R. Werner & Co. at their Richmond works. The firm was established in 1904 by Rudolf Werner and this example probably dates from the first tens year of Werner's production. It was built for the Colonial Gas Association's Footscray gasworks. The compressor was not used in its usual application of compressing ammonia as part of a refrigeration cycle but rather for handling ammonia which was produced as a by-product of town gas

manufacture. The majority of Werner compressors were driven by oil or gas engines, or electric motors, and very few steam driven compressors were built by the firm. This is therefore a rare steam driven example. The provenance of the compressor is known, with it only ever working at the gasworks until it was acquired for the collection in 1971.

### **Significant Overseas Built Steam Engines**

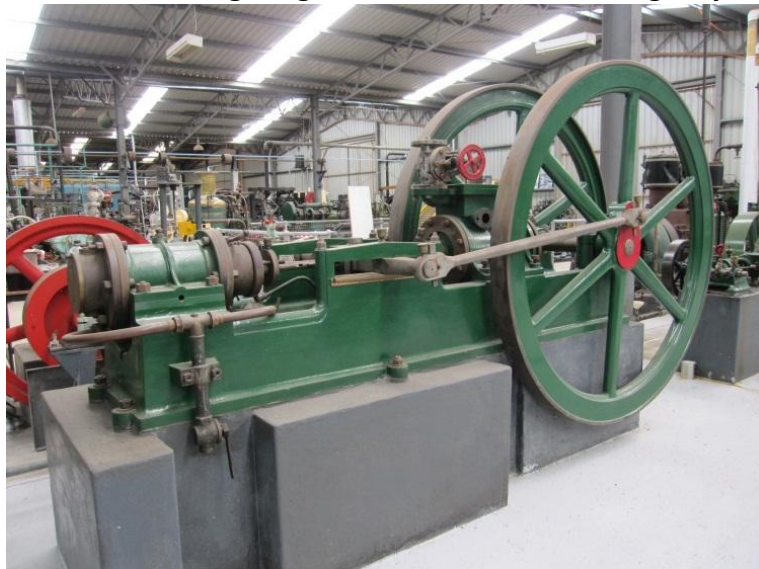
Two of the more significant examples of steam engines built by overseas companies are the Marshall instructional teaching engine, and the Pintsch gas compressor.

#### **Marshall, Sons & Co. Ltd., Gainsborough, England, Compound Instructional Engine**

This instructional engine (no.85859) was built in 1931 for the new Kernot Engineering School at the Working Men's College (now RMIT). It was used for teaching engineering students about steam engine operation and efficiency. Later it was transferred to the Engine Driving Department before being purchased from RMIT in 1969. This compound horizontal engine could be operated as a single cylinder or compound engine. The flywheels were fitted with rope brakes, and the flywheel rims were water cooled. The engine was fitted with a tachometer, thermometers, and engine indicators to allow the study of engine efficiency under various conditions. It is a rare operational example of an engine specifically built for teaching, and demonstrates an important aspect of the earlier training methods used for mechanical engineering students.



#### **Pintsch Patent Lighting Co., London & Berlin, Single-cylinder Pintsch Gas Compressor**



This compressor was one of four installed at the Pintsch gas works of the Victorian Railways at Spencer Street, Melbourne in 1898. Pintsch gas was made from crude oil and used for railway carriage lighting. The compressor took the gas from the low pressure holder and compressed it for storage under high pressure at 165psi (1137kPa). It was then piped to the station where tanks on each railway carriage were filled. The Pintsch gas cylinder is to the left of the photo, and is directly coupled to the steam

cylinder via the crosshead. The compressor is a rare example of its type, and allows for the interpretation of a method of providing lighting on railway carriages prior to electrification.



## Large Diesel & Oil Engine Collection

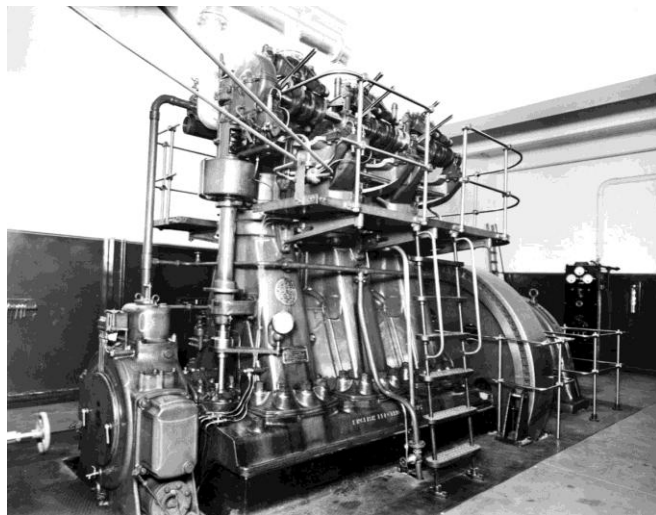
The large diesel engine collection presents examples of engines used in Melbourne primarily in standby power generation, which was the typical use for larger stationary engine installations of the period. The majority of these engines were used in a standby capacity resulting in them being in very good condition due to their limited running hours. The provenance of these engines is well established with most only ever being installed in the one location, or being associated with the one owner.

### Deutz Motorenfabrik, Germany, Four-cylinder Vertical Diesel Engine

This engine (no.166651-654) was built in 1928 and was installed as a standby generator at the former State Theatre, Flinders Street, Melbourne. The engine was rated at 100 bhp (75kW), and features an earlier style of construction where each cylinder is a separate casting. It is a rare example (in Victoria) of a German built diesel engine.



### The English-Electric Company, Rugby, England, Three-cylinder Vertical Air-Blast Diesel Engine

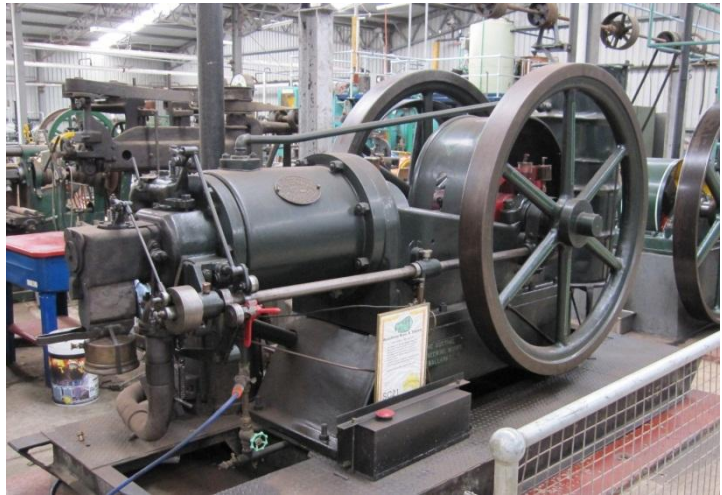


This diesel engine (no.ID219) was built around 1928, and was installed by Carlton & United Breweries (CUB) at their Carlton Brewery as a standby generator. It was erected off Ballarat Street, near its north east corner with Swanston Street. A second engine of the same size was supplied at the same time and installed at the Victoria Brewery (see photo). It was originally installed with a DC generator, which was later replaced with an AC alternator. The engine was made redundant by 1950, and was removed. Later, it was re-erected at CUB's Yorkshire Brewery in Wellington Street, Collingwood where it was in

operation by 1953. Following a bearing failure in September 1969 the engine was destined to be scrapped. Fortunately it was saved, and passed through several hands before being displayed at the Puls museum near Horsham. With the closure of the Puls collection it was donated to the museum in 2011. The engine is presently undergoing restoration. The engine is of historical significance because of its association with the CUB breweries, and because it was one of the first generation of large industrial diesel engines used in Victoria. The engine is technically significant because of its use of compressed air blast injection, which has a direct design lineage back to the earliest compression-ignition engines developed by Rudolf Diesel. This is a superseded method of fuel injection. It is also significant for the massive design of the engine and the open crank A-frame form supporting the cylinders.

### **Ronaldson Bros. & Tippett, Ballarat, Single-cylinder Horizontal Hot-bulb Engine**

This engine, (no.2421), is a single cylinder surface-ignition (hot-bulb) engine built in 1919, and rated at 26 bhp (19kW). It was first sold to Mr Quick at Cobram for use driving an irrigation pump for his citrus grove. The engine was not a standard product for Ronaldson & Tippett and this example was fitted with parts normally used on the 30BHP model. In September 1949 the engine was sold to Mr Waterhouse at Monbulk for his sawmill where it was used until the 1960s. The engine was made in Australia, and is a rare example of Ronaldson & Tippett's larger Austral single-cylinder engine design.



### **Ruston & Hornsby Ltd, England, Four-cylinder Vertical Engine & Generator**



This 132 bhp (98kW) engine (no.154551) was built in 1929 and installed in the AMP Building, at the corner of Collins & Market Streets, Melbourne as a standby generator. It is a 4VXC model, and illustrates the earlier form of engine construction with separate cylinders. The engine is directly coupled to the DC generator and also drives via belts an AC alternator. It is historically significant as an example of the first generation of large industrial diesel engines installed in Melbourne.

### **Ruston & Hornsby Ltd., England, Four-cylinder Horizontal Engine & Guinard Pump**

This 210 bhp (157kW) engine (no.332617) was built in 1952, and installed at the Commonwealth Oil Refineries Ltd (COR) Port Melbourne facility (later BP). The pump set was used for pumping bunker fuel. It is a rare engine configuration using four horizontal cylinders (model 8HRF), and its application to pumping of bunker fuel was unique in Melbourne. Two other pump sets were installed around the same time at Fremantle, and one pump set at Dakar, Africa as part of a global network of ship fuelling ports. The Guinard variable displacement pump built by Stothert & Pitt, Bath, England is technically significant, and this is a large example of its type. The internal complexity



of the pump caused operational issues, and they fell out of use, with the preference to use two centrifugal pumps instead for simplicity.

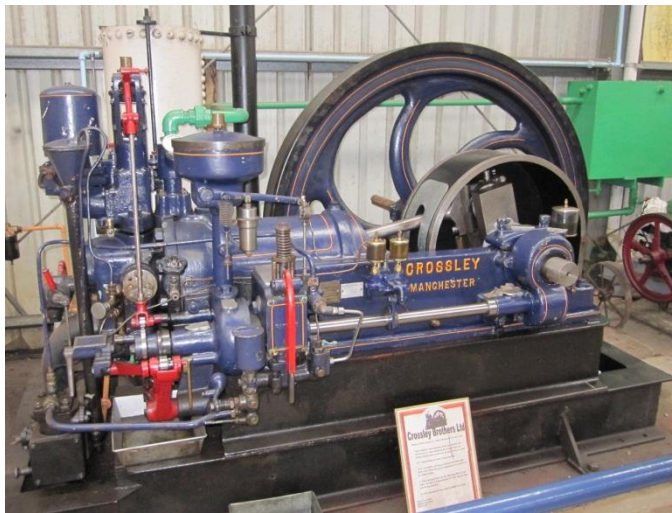
### **Petters Ltd., Yeovil, England, Six-cylinder Vertical Two-stroke (Positive Scavenge) Diesel Engine**

This 576 bhp (430kW) engine (no.6RA492) was built c.1945 and directly coupled to a General-Electric alternator. The engine was originally installed at The Age newspaper building in Collins Street, Melbourne as a standby generator. When The Age moved to its new premises in Spencer Street in 1969 the engine was sold to Princes Laundry, Mentone where it was installed as standby power supply. The Petter Superscavenge engine uses the two-stroke cycle and was built using an effect patented by Michel Kadenacy whereby the pressure-drop resulting from the Kadenacy effect assists the flow of a fresh fuel-air mixture charge into the cylinder. The engine illustrates the intermediate stage of engine development prior to turbo charging with the application of mechanical supercharging.



### **Smaller Single Cylinder Oil & Gas Engines**

Within the internal combustion engine collection there are five significant smaller single-cylinder horizontal engines. These are oil and gas engines which were used at various universities around Melbourne for training engineers. They are significant for their age, and their association with the teaching institutions and their role in education. They are technically significant for the principles of operation they represent. The two Crossley engines were specifically supplied for instructional purposes, and the other engines had prior industrial use before being acquired for teaching.



The Crossley Bros. engine pictured (no.108972) was specifically supplied as an instructional engine to the Working Mens College (now RMIT) in 1930 for the new Kernot Engineering School. It could be run on gas, petrol, or diesel by changing the piston. A second Crossley engine was supplied new to Melbourne University which was directly coupled to a generator to provide a load. Two other engines used for teaching have come from Melbourne University. These are a R. Hornsby & Sons Ltd., 3½hp hot

bulb ignition engine using the Hornsby-Ackroyd patent (no.4833) built in 1900, and a National gas engine (no.15292). A smaller R. Hornsby & Sons Ltd., gas engine was used at the Monash University, Caulfield campus thermodynamics laboratory. This engine (no.110006), was built in 1919 and was originally sold to the David Mitchell Estate Cement Factory in Burnley.

## Mobile Machinery

### Johnson & Sons, Tyne Foundry, South Melbourne, Single-cylinder Portable Engine



The Johnson portable steam engine is a rare example of a Victorian built portable steam engine. This example was built c.1895-1910 for the Victorian Mines Department, and was used at the Queenstown state battery. It appears that the Mines Department owned several of these engines, and they were used at various state batteries. It is fitted with a single cylinder engine mounted on a cylindrical Jackass boiler. It is the only example known to be in complete condition.

### Marshall. Sons & Co. (Successors) Ltd., Gainsborough, England, Compound Steam Roller

The Marshall 8 ton steam roller (no.88198) was owned by the Moorabbin City Council and is representative of steam rollers widely used by City and Shire Councils for road construction and repairs. This roller was built in 1937, and is a Marshall S type design fitted with Marshall's patented single eccentric radial valve gear. It was the last steam roller sold by Marshalls in Australia, and is historically significant as it marked the end of the steam era for the sale of new steam road rollers. The roller worked for the council until sold to the museum in 1971.



### Buffalo-Springfield Roller Co., Springfield, Ohio, USA Twin-cylinder Steam Roller



The Buffalo-Springfield 12 ton roller (no.10699) was built in 1922 and was owned by the Brunswick City Council until 1962 (it was possibly second hand to the council). American built rollers were rare in Australia as British makers dominated the market. These rollers featured a twin cylinder engine and were designed for rolling asphalt with wide rolls, and a quick reversing engine to minimise the dwell time as it changed direction. It is significant as a rare example of an American built roller used in Australia.

### **John Fowler & Co. (Leeds) Ltd. Leeds, England, Compound Ploughing Engine**



The Fowler ploughing engine (no.15500) was one of six purchased by the Water Conservation & Irrigation Commission (WC&IC) in New South Wales for use at the Murrumbidgee Irrigation Area (MIA). The engines were ordered in 1919 and arrived in 1920. The engine was Fowler's Z7 model which was the largest they produced which weighed 25 tons. A ploughing engine is distinguished by the cable drum under the boiler, and two engines are used with one each side of the paddock to be ploughed, and a balance plough is hauled between them. On

the MIA scheme they were used for deep ploughing land in preparation for agriculture. The engines were only used for a short time before being put up for sale in 1926. The role of this engine after being sold is not known. It was last used to drive a circular saw bench at a sawmill at Darlington Point, NSW.

### **Clayton & Shuttleworth Ltd., Lincoln, England, Compound Traction Engine**

The Clayton & Shuttleworth traction engine, (no.42129) was built in 1910, and sold by the NSW agents Dalgety & Co. The engine was recovered from Browns Creek, Blayney in the late 1960s (see photo), and was donated to the museum in 1977. The engine is presently disassembled. The engine was known to be in the ownership of Paddy South, Blayney during the 1930s and 40s. He used the engine for chaff cutting in the area. Traction engines built by Clayton & Shuttleworth are relatively rare in Australia, and this example is technically significant as one of three known examples fitted with Joy valve gear. The engine is also representative of the many traction engines used for chaff cutting and threshing on farms around Australia.



Photo: Alan Robert

### **Internal Combustion Powered Road Rollers**

There are six Australian built internal combustion powered road rollers in the collection. Four of these were built by A. H. McDonald & Co. Pty Ltd., Richmond who were the most prominent local maker of rollers. Two of these are 6 and 8 ton models for road rolling, and two are smaller 1.5 and 3 ton models referred to as footpath rollers. These were owned by various local councils around



Melbourne. The fifth is an example of an 8 ton roller built by Malcolm Moore Pty Ltd, Port Melbourne which was originally owned by the Country Roads Board.

The sixth roller was built by Armstrong-Holland in Sydney, and is referred to as their Champion Cub model (refer to photo). This group of rollers are representative of a strong local manufacturing industry during the 1940s to 1960s, and illustrate a diversity of designs, with the McDonald rollers using engines of their own manufacture, and the others using imported engines.

## Lyttelton II Steam Tug (Engine Room)

The Lyttelton II steam tug was built by Lobnitz & Co., Scotland in 1939 for the Lyttelton Harbour Board in New Zealand. In 1981 it was sold to a preservation group in Sydney. In 1987 it was sold to another group and moved to Melbourne. Attempts to preserve the vessel failed and in 2007 it was scrapped. Fortunately MSTEC was able to save all the steam machinery on board, and the walls and roof of the engine room with a view to recreating the engine room. This collection includes the two main triple expansion engines built by Lobnitz (see photo), circulating pump, fan engine, steering engine, generator engine, feed pumps, deck winch, fire monitor pump and the two scotch marine boilers. The engine room is yet to be reassembled. The only other steam powered maritime engine rooms preserved in Victoria are aboard the HMAS Castlemaine at Williamstown, and the Wattle steam tug.



## Ransomes & Rapier Ltd., England, W90 Walking Dragline

The largest object in the collection is the 108 ton Ransomes & Rapier Ltd., Ipswich, England, W90



two cubic yard walking dragline. The dragline, built in 1948, was owned by the State Electricity Commission of Victoria (SECV) and worked at the Morwell open cut. It was one of the first machines on the new site for the Morwell mine and briquette plant and started work in 1950. It was used around the mine cleaning drains until 1980. The photo shows the dragline in operation at the 2011 rally.

The dragline was one of thirteen built, and one of three supplied with diesel power, and is the only known complete surviving example. It

is fitted with a National five cylinder 200 bhp diesel engine. The dragline is technically significant for its relatively small size, the use of the Cameron & Heath design of walking mechanism, and the combination of riveted and welded construction techniques. The machine was one of the oldest machines in operational service at Morwell, having arrived on site when it was just a paddock and being involved with the earliest earthworks for the mine and briquette factory foundations.

## **Ruston & Hornsby Ltd., England, No.20 Steam Navy Crane (Steam Shovel)**

This 90 ton steam shovel worked near Geelong at the Batesford quarry of the Australian Portland Cement Company between 1925 and 1980 mainly excavating limestone. It is presently disassembled, and is the sister shovel to one on display at the Lake Goldsmith Steam Preservation Society. These two shovels are the largest surviving steam powered shovels in Australia. The photo shows the shovel on the quarry floor in 1992. The shovel is significant for its use of steam power, its intactness and size, and its long documented working history at the quarry.



## **Ransomes & Rapier Ltd., England, 4 ½ 0 Model, Cable Dragline**

This small 5 cu. feet cable excavator (no.1195) was the smallest machine built by Ransomes & Rapier Ltd. starting in 1937. This machine was built around 1941, and is powered by a petrol engine. They were marketed as a versatile machine with four separate attachments comprising a shovel, a skimmer, a trencher, and a dragline. This example was owned by Brown & Gilmartin Pty Ltd., who were earthmoving contractors in Stawell. This machine is representative of a typical cable excavator built between the 1930s and 1960s, and provides a contrast with the larger Rapier W90 dragline. This machine, along with the Ruston steam shovel, and Kato hydraulic excavator demonstrates the technical development of excavators, both in the method of powering them, and how the digging forces were created.



## **Kato Works Co. Ltd., Tokyo, Japan, Hydraulic Excavator**



This model HD-350 excavator (no. 350064) was built in March 1968, by the Kato Works, Kobe, Japan. Kato commenced construction of hydraulic excavators in 1967, and this machine was the 64<sup>th</sup> ever built. Kato were to become a major maker of excavators, and several thousand Kato machines have been sold in Australia since. This machine was purchased directly from Japan by Thiess Bros. and was used on the Roma gasfield project in Queensland. The machine is historically significant as one of the

first generation of hydraulic excavators used in Australia. The 1960s marked the beginning of a technological shift from cable excavators to hydraulic machines which are widely used today. The significance of this machine was recognised by Banbury Engineering who were the local Kato agents and they restored the excavator.

## Tunnel Boring Machine

This 2200mm diameter full-shield tunnel boring machine was used by the Melbourne & Metropolitan Board of Works (MMBW) for local sewer tunnel construction during the 1970s. The site occupied by the National Steam Centre was originally used by the MMBW as one of the main access points for the construction of the Dandenong Valley Trunk Sewer during the early 1970s until the early 1980s. This tunnel boring machine was one of two built by the MMBW in their own workshops. This machine was the smallest used by the Board and tunnelled the 2.6km long Mentone Interceptor Sewer as part of the earlier South Eastern Trunk Sewer project during the first half of the 1970s.

It is significant as a representative example of the tunnel boring machines used by the MMBW,

and is significant for its construction by the MMBW. The MMBW developed considerable expertise in tunnelling which was recognised internationally.





## Refrigeration Machinery – Ammonia Compressors

### Werner Ltd., Richmond, Single-cylinder Horizontal Ammonia Compressor



This compressor was one of two installed in the engine room of the Victoria Brewery of Carton & United Breweries Ltd. (CUB), Abbotsford. It was driven by electric motor via a rope drive and was rated at 100 tons capacity (i.e. 100 tons of ice in 24 hours). It is an important example of a locally produced compressor, and was amongst the largest built by Werner. It is also representative of the use of refrigeration in the brewing industry, and significant for its association with CUB.

### The British Refrigeration Co. Ltd., Single-cylinder Horizontal Ammonia (Linde System) Compressor

The Linde ammonia compressor was driven by electric motor via a rope drive and an 18' (5486mm) diameter flywheel. This example was used at the William Angliss, Imperial Meatworks, Footscray until the early 1980s. It is significant as a large example of the Linde system compressor which was the dominant make of overseas built compressor used in Australia. It is also significant



for its association with the Angliss meatworks, who were major exporters of frozen meat. The photograph shows it partly assembled with half the flywheel erected.

### Werner Ltd., Richmond, Twin-cylinder Vertical Enclosed Compressor

The final design of reciprocating compressors built by Werner were fully enclosed, and an example of their largest 150 ton compressor is in the collection. It also came from the CUB Victoria Brewery.

### Robison Bros. & Co., South Melbourne, Single-cylinder Horizontal Compressor



This single-cylinder horizontal reciprocating compressor was made by Robison Bros. in South Melbourne, and most likely dates from the early 1890s. It was acquired by Swinburne University and converted to an air compressor, and used for teaching engineering students. It is a very rare early example of an Australian made refrigeration compressor.

## Statement of Significance

The National Steam Centre collection is of significance because it illustrates the technical development of power in relation to steam and internal combustion engines both in terms of their engineering principles, and contextually in terms of their use in industry. The collection covers machinery built during the period from the late 1880s until the 1960s. The collection strongly relates to the Melbourne area, with significant examples of regional and interstate machinery and industries represented.

The collection is historically significant with:

- Stationary steam engines from a wide range of Melbourne's industries including town gas production, dredging the Port of Melbourne, lighting on the Victorian Railways, soap manufacture, ammunition production, sugar refining, bacon manufacture, and maritime engineering at Dukes & Orrs dry docks. These firms were associated with early industrialised areas of Melbourne including South Melbourne, Richmond, Footscray, and Dandenong;
- Stationary steam engines from regional industries, including HMAS Cerberus naval base at Flinders, Dalton's woolscouring works at Breakwater, Bendigo Creek land dredge, and Ezards Sawmill, Swifts Creek;
- A stationary steam engine built by Walkers Ltd., Queensland, and used at the Millaquin Mill, Bundaberg. It was the second last engine built by Walkers in 1964, and is representative of wider use of steam power for sugar cane crushing;
- Diesel engines used as standby power generators at notable buildings including the State Theatre, and AMP Building;
- A diesel engine and pump set used at BP, Port Melbourne for bunker fuel transfer;
- A Willans air blast diesel engine standby generator set used by Carlton & United Breweries at their Carlton Brewery, and later at the Yorkshire Brewery, Abbotsford;
- Various mobile steam engines including a Marshall steam roller, Buffalo-Springfield steam roller, Clayton & Shuttleworth traction engine, John Fowler ploughing engine, and Johnson & Sons portable steam engine;
- A Ransomes & Rapier W90 walking dragline used by the SECV at their Morwell coal mine;
- A Ruston & Hornsby No.20 steam navy crane used by Australian Portland cement at their Batesford limestone quarry; and
- The Lyttelton II steam tug engine room.

The collection is a record of some of the local and overseas engineering firms who built these machines, and shows the role and influence of British makers in particular in supplying engines and machinery to the Australian market. The collection also has examples of Australian built engines and machinery by some of the earliest established local engineering firms, some of which had their origins around the time of the Victorian goldrush. Makers represented include Robison Bros., Thompsons & Co., Kelly & Lewis, Taylor Horsfield, Werner, Ronaldson Bros. & Tippett, Perry & Co., and Walkers Ltd.

The collection is technically significant with a diverse range of examples of engines and associated machinery represented. It allows for the study and understanding of the evolution of power from steam to internal combustion engines. Some of the more significant examples are the Marshall instructional teaching steam engine, the Willans air blast injection diesel engine, the Ransomes & Rapier W90 walking dragline, and Ruston & Hornsby No.20 steam navy crane. These machines are also significant at an international level based on their rarity, and the stage of engineering development they represent. The evolution of power, and the general change in design and construction of machinery is represented in the context of earthmoving machinery by the Ruston steam shovel, followed by the transition to internal combustion power as shown on the Ransomes & Rapier cable excavator, to the present form hydraulic excavator shown by the early Kato machine.

The collection has social significance for workers and people associated with exhibits from when they were operational in industry, with former engineering students of the universities who were trained using some of the engines, and from trade based students who gained boiler and engine driving qualifications from the RMIT engine driving school.

The collection as a whole is representative of the era of the 1880s until the 1960s, and provides an insight into typical machinery in use during this period, particularly in relation to steam and internal combustion engines. The collection also allows an insight into an earlier period of Melbourne's industrial development in terms of the industrial users of power of the time, and the builders of the engines and machines.

Many of the items in the collection are rare examples, and are either unique, or represented by very few surviving examples in Australia. Most of the items described in the assessment of significance fall into this category.

The items in the collection are generally in good condition and have high integrity. Most of the significant items are intact and are operational. Items which are yet to be restored are generally mechanically complete, but will require cosmetic work to repaint them when restored. The Lyttelton II tug engine room, Ruston steam shovel, and Walkers steam engine fall into the latter category.

The collection has high interpretative potential which is enhanced by the policy of maintaining exhibits in operational condition. This adds to the interpretation and experience of the history of the machinery for visitors. The collection has interpretative potential with regard to the technical development of the engine, and for the changes in industry from a technical and historical perspective. It allows for the story of forgotten and obscure industries such as the engineering firms along the Yarra Banks in South Melbourne to be told. The research into the history of the exhibits is ongoing which will yield further information about them.

## Interpretation Plan

### Interpretation Strategy

The interpretation of the collection relative to the Engineering Heritage Marker will be through the use of the round heritage marker, with a public ceremony to unveil the marker, and an interpretative panel which summarises the significance of the collection to warrant the marker.

The Engineering Heritage panel would be augmented by existing interpretation of the collection through the availability of a guide booklet "A Guide to the National Steam Centre"<sup>1</sup> which provides additional history on the major collection items. Extensive use has been made of individual interpretative panels for many of the exhibits.

### Date for the Event

The recommended date for an unveiling ceremony is Sunday 29<sup>th</sup> of September 2013. The club is celebrating the milestone of achieving 50 years on this date.

### Interpretation Panel Content

The following will be incorporated into the design of the panel:

- A title: "National Steam Centre";
- Logos of Engineers Australia, and MSTEC;
- A small scale representation of the EHA marker plate;
- The date and other details of the marking ceremony;
- No map is required on this panel; and
- Historic photos which will be captioned will be used to illustrate the panel.

The following parties will review the panel content during its development:

- MSTEC Historian & Archivist;
- MSTEC committee;
- Engineering Heritage Victoria committee; and
- Nominated graphic designer.
- Heritage Recognition Committee of Engineering Heritage Australia

### Interpretation Panel Location

The preferred location for the marker and panel is inside the main museum building. A final location is to be confirmed. This may either be on a prominent wall, or free standing on a stand.

### Interpretation Panel Type

The interpretation panel will be constructed and erected as follows:

- Size to be nominally 1200mm wide x 600mm high; and
- To be made from vinyl film on aluminium sheet construction.

The manufacturer of the panel is yet to be determined. EHV to provide recommendations for potential suppliers.

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<sup>1</sup> Lamb. Rohan, 2013, *A Guide to the National Steam Centre*, Second Edition

## **Funding**

Funding for the panel is expected to be required as follows:

Graphic Design (supplied by EHA)	\$500
Manufacture of panel (interior type)	\$500
Mounting	TBA
EHA marker (supplied by EHA)	\$150

These are budgetary figures only.