

## **Making and maintaining**

### *Lines*

The Engineer-in-Chief, first appointed in 1856, oversaw line construction let out to contractors. Thousands of workers and horses put skill and muscle to forming the track bed to allow the easiest possible gradients. This meant embankments pierced by drainage culverts, cuttings through hills, brick-lined tunnels through the ranges, bridges over streams, and some spectacular viaducts across deep valleys. Lengths of steel rail were bolted together and fixed by metal claws (dog spikes) to hardwood sleepers laid across the track bed and supported by stone and river gravel ballast. Station buildings, water tanks on high stands, signals, fences and crossing gates were set along the line.

Railway employees from the Way and Works branch upgraded and maintained lines, buildings and equipment. Fittler gangs were provided with trikes to make daily inspections of their sections. Their tools were the pick, shovel, crowbar and 28-pound hammer, with improvised flails to quash grass fires set off by flying sparks from engines. Occasional teams, such as a fencer and his mate or two painters, lived in a railway 'home on wheels' shunted off onto a station siding.

### *Safeworking*

Signals to indicate clear lines ahead were set at station approaches, rail junctions and where single and double track sections merged and diverted. The trackwork was interlocked with the signalling system to ensure correct signal indications for the allocated route. Signal boxes staffed by signalmen controlled local networks, using a tablet and staff system from 1896. Electro-mechanical automatic systems were introduced from 1915 on lines branching from Richmond station. A Southern hemisphere first was automatic signalling on the single track end of the Belgrave line in 1922.

Road level crossings, whether protected by gates or not, were brought into the automated system from 1923 when 'wig-wag' signals were installed at Amess Street North Carlton. In 1933 a new system of twin hooded flashing red lights linked to a bell was introduced at Bungaree and the south end of Warragul Road. In 1925, Seymour initiated remote-control signaling at Goulburn Junction near Tallarook. Other firsts were relay interlocking with automatic signaling at Nar Nar Goon in 1954, and automatic boom barriers which replaced the gates at Toorak Road, Tooronga in 1956.

### *Rolling Stock*

Locomotive engines, passenger and goods wagons were all imported at first. Victorian skills in assembly and repair were the foundation of the Rolling Stock Branch at the North Williamstown workshop from 1859. There in 1871 the first of seven locomotives was built and given the number 100.

Workshops opened at Newport in 1882 for building coach units (also called carriages or cars), including sleeping cars for longer routes, such as the Adelaide Express run. From 1893 Newport produced engines as well, 560 of them over 70 years to 1963, as well as electric tram cars, rail motors in the 1920s and diesel rail cars in the 1950s. Proud achievements were the world's first all-welded goods wagon in 1931 (wagon IZ 600) and, in 1937, the streamlined *Spirit of Progress*, a train of lightweight steel alloy carriages which were air-conditioned. Its locomotives were named for Victorian pioneers, Matthew Flinders, Sir Thomas Mitchell, Edward Henty and C. J. LaTrobe. Unique in power and weight was H-class 4-8-4 engine *Heavy Harry* launched at Newport on 7 February 1941.

For the electrification program begun in 1913, specialist workshops were built at Jolimont, and a power station at Newport. Newport's workforce, peaking around 5000 in the 1920s, produced railway needs from dog spikes to pressure gauges to goods truck tarpaulins. The main workshops expanded to Spotswood just before the Second World War during which some capacity was given over to armaments. Newport was to host the 1984 sale of Tait carriages, the Red Rattlers originating there up to 75 years before.

A workshop-associated Technical School began in 1922, closed while apprentice intake was suspended in 1932, but reopened with new vigor in 1934. In new premises from 1960, it was upgraded to a College with trade subjects covering electrical, fitting and turning, boiler making, car and wagon building, blacksmithing and spring making.

### *Power*

Coal-fired locomotives heated water to produce high-pressure steam which turned the wheels. From 1922 to 1955 petrol-driven rail motors 'Beetles' carried branch line passengers and parcels. Diesel-fired rail cars went into service from 1948; heavy mainline diesel-electrics from 1952. By 1968 steam locomotives were confined to work in rail yards and branch line goods hauling. The last steam engines in revenue service outside a railway workshop ran in May 1972.