



The Queensland Railways' BB.18 $\frac{1}{4}$ -class 4-6-2 No. 1089 leaving Caboolture with an eight-car train for Gympie. (Photo: J. Armstrong)

THE BB. 18 $\frac{1}{4}$ -CLASS LOCOMOTIVES OF THE QUEENSLAND RAILWAYS

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(By J. Armstrong)

On the 11th March 1958, the Queensland Railways took delivery of No. 1089 a shining 4-6-2, the last main-line steam locomotive built in Australia. This BB.18 $\frac{1}{4}$ -class engine was built by Walkers Ltd. of Maryborough and was the 557th locomotive produced at their works since their first engine, also for the Queensland Railways, was built in 1897.

The BB.18 $\frac{1}{4}$ -class appeared in service in 1951 but their origin dates back as far as 1926, when the first B.18 $\frac{1}{4}$ -class, built by the Ipswich Railway Workshops, was completed.

The Queensland Railways have long been noted for their standard designs. In the early days of the State's railway system, many different types of locomotive were used with varying degrees of success but, in 1883, a locomotive design, which proved suitable for the then-existing traffic conditions, was introduced. A number of these were built and were followed, in 1889, by an enlarged version, somewhat similar in its design.

In 1899, another design, this one based closely on the second engine, was produced to set the future pattern of enlarging the existing engines as traffic increased, which became the practice throughout the years until the recent diesel era.

This practice involved taking existing designs and adding, in many cases, more modern features, which had come into use in railways throughout the world and, in some cases, modification of components and substitution of improved components. Thus, the

last B.18 $\frac{1}{4}$ -class, built in 1947, although based on the 1926 design, incorporated many changes, including, for example, better cabs, improved boilers, with better water circulation, and welded tenders.

Similarly, C.17-class locomotives, built to alleviate motive power shortages from 1946, onward, differed considerably to the first of the class, which was built in 1920.

About this time, there was a shortage of motive power for passenger work and, with the noted perseverance with older designs, it was not surprising that the Department would develop further on the B.18 $\frac{1}{4}$ -class.

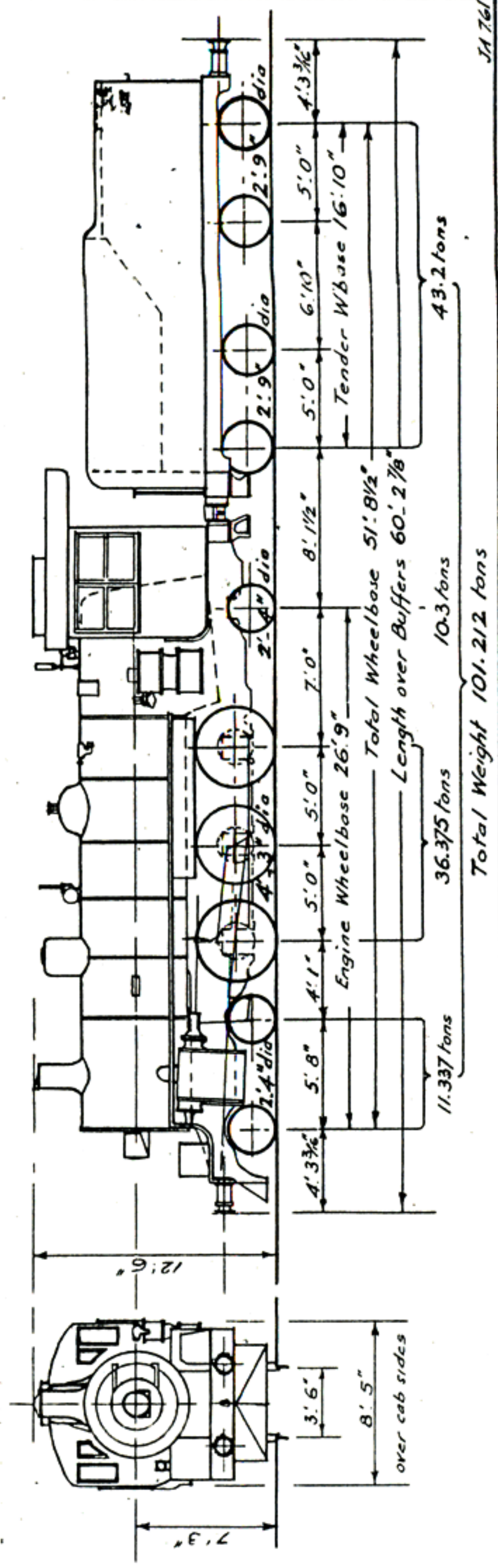
Accordingly, arrangements were made with the Vulcan Foundry, Newton-le-Willows, England, for the production of a suitable steam locomotive, based on the dimensions of the B.18 $\frac{1}{4}$ and incorporating modern design features specified by the then Chief Mechanical Engineer, Mr. V.F. Hall. A contract for 20 engines was signed in November 1948, followed by one for the supply of a further 15 in August 1949.

A number of improvements were incorporated, including improved steam passages and longer travel piston valves, Vulcan balanced-type regulator and steam pressure valves, roller bearings on all wheels and on the eccentric return cranks and utilisation of SCOA-P wheels. A tender with larger bunker and water capacity was fitted.

The 35 engines were allotted Nos. 1011 to 1045, inclusive. The first two to arrive in Queensland were Nos. 1017 and 1018. They were unloaded from the ship "Clan MacAuley"

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at Pinkenba on the 3rd February 1951 and, after passing through Ipswich Workshops for final assembly, inspection and weighing, were placed in service the same month. Both locomotives were allotted to Mayne Depot, Brisbane, and commenced running on suburban and country passenger services.

The second batch consisted of five, Nos. 1028 to 1032 inclusive, and were landed from the "Clan MacLaren" during the following April. The remainder followed in one large group on the "Christian Smith", two months later, and all engines were in service by August 1951.

Although unmistakably of B.18 1/4 origin, the Vulcan engines exhibited several features not previously seen on Queensland locomotives. They had pressed steel pilots or cowcatchers, steel cab roofs, chime whistles, the patent SCOA-P wheels and Vulcan safety valves. Some of these features, of course, had been introduced with the DD.17-class suburban tank engines, produced in 1948. The Beyer-Garratts, which were put into service the previous year, also had some of these features and many more. Compared with the B.18 1/4-class, though, these new engines had many refinements.

A new position for the headlight - in the centre of the smokebox door - altered the front-end appearance considerably. A smarter-looking sand dome had been provided by the makers and a different steam dome cover but the locomotives were fitted with the standard pattern funnel and were rather spoiled in appearance by this large unattractive piece of cast iron on top of the smokebox. Behind this funnel was fitted the anti-vacuum or "snifting" valve.

The location of the Westinghouse brake was changed from the right-hand side running board in front of the cab to the left-hand side on the BB.18 1/4's, to give the driver a better forward view. The cabs remained much the same but the steam manifold was removed to a position outside the cab, in order to make conditions cooler for the crew. The cylinders of the B.18 1/4-class were fitted with tail rods but, coupled with other alterations to the valve gear, the BB.18 1/4-class eliminated the necessity for this feature.

The tenders were larger and, due to their extra height, were not fitted with coal boards as were the earlier class.

The first 20 Vulcan engines were fitted with Pyle-National electric lighting and the remaining 15 had Stone's equipment.

Dimensions

The BB.18 1/4-class are 60' 3" long over buffers and weigh 101.2 tons. Of this, the tender contributes 43.2 tons and has a capacity of 10.35 tons of coal and 3,500 gallons of water. The engine is built to

an axleload of 12 tons, with an adhesive weight of 36.37 tons.

The boiler is slightly tapered, having a minimum diameter of 4' 9 $\frac{3}{4}$ " and is 15' 9 $\frac{3}{8}$ " between tubeplates. It has a round top firebox, which is all welded, 5' 6 $\frac{1}{4}$ " long over grate and fitted with Hulston-type cab-operated rocking firebars. A welded ashpan with air-operated sliding doors is provided. Grate area is 25 sq. ft. and the firebox provides 106 sq. ft. heating surface.

The boiler is fitted with 119 tubes of 2" diameter and 21 superheater flues of 5" diameter, giving a heating surface of 1,418 sq. ft. An N.L.S. superheater is fitted and its elements provide a further 334 sq. ft. The superheater is fitted with an anti-vacuum or "snifting" valve to prevent burning when standing or coasting with the regulator closed. Total superheated heating surface is 1,858 sq. ft and the boiler working pressure is 170 lbs.

Cylinders are 18 $\frac{1}{4}$ " x 24" and transmit drive to the 51" diameter coupled wheels through Walschaert's valve gear. A tractive effort, at 80% boiler pressure, of 21,316 lbs. (22,648 lbs. at 85% B.P.) is developed, with a factor of adhesion of 3.75 (3.6).

Braking equipment is Westinghouse A-6-ET type, with air supplied from a 7"/80 cross-compound pump. This equipment incorporates both automatic and independent brake valves.

Livery

The entire class is painted green. The smokebox and undergear is black and the boiler is encircled by stainless steel bands making the engines quite distinctive. The buffer beams are painted the standard red, with buffers, drawhook and pilot black. Lining out is done in red, a single line running along each running board from front buffer beam to cab. A single red line encircles each side of the tender.

Driving rods are not painted but wheel rims are lined out in silver. Numerals on the boiler and builder's plates are raised, polished brass on a red background. The Vulcan plates were originally painted green but have been altered with repaints. Other lettering is executed in white. Number, class and depot initial are painted on the front buffer beam and the engine number on the back of the tender. Cab interiors are painted predominantly in a stone colour.

Modifications

The first engines were found to require modification to the springing, to avoid derailing on points and crossings, and a number were found to weigh more than was specified. One engine, believed to be No. 1018, was found to weigh 1 $\frac{1}{2}$ tons more on one driving axle than had been stipulated.

Difficulty was also experienced with the reversing lever, which was hard to move from

full gear. However, as these troubles were remedied, it can be said that the teething stage was relatively negligible.

The Walker Group

When the second contract was signed with the Vulcan Foundry, the Railway Department entered into a contract with Walker's Ltd. of Maryborough for the supply of 20 engines of the class, to be numbered 1070 to 1089. At the time of the signing of the contract Walker's were producing C.17-class engines for the Department and delivery of the BB.18 $\frac{1}{4}$ -class was not immediately scheduled.

Due to difficulties experienced by this firm, steel shortages and disruptions in the metal trades industry, Walker's were not able to deliver the first locomotive until November 1955 and the last - No. 1089 - was not handed over until the 11th March 1958.

Several boiler fittings of the Walker BB.18 $\frac{1}{4}$'s are different to the Vulcan engines and the last group have the additional feature of electric side and rear lamps. They can be recognised by the conduit pipe running along each side of the tender.

The only other changes of note are the slightly different steam dome covers and the reversion to old-style sand dome covers. When first introduced, the Walker engines were the only ones with red Westinghouse brake pumps but other locomotives are having red paint on the pumps as they pass through the workshops.

Service and Performance

All locomotives from the Vulcan Foundry were in service by August, 1951. They were allocated main-line duties in the Southern and Central Divisions, being based mainly at Brisbane Toowoomba and Rockhampton.

At this time, the North Coast line had not been strengthened throughout and engines heavier than the C.17-class were not permitted to work North of Bowen, 713 miles from Brisbane. An isolated section - from Stuart (near Townsville) to Babinda (near Cairns) - was available for all classes of locomotive but the BB. 18 $\frac{1}{4}$'s could not get through from the South, where they were stationed. The same thing applied to the Great Northern line, which was also available for all the classes of engine power, from its junction with the North Coast line at Stuart to Charters Towers. The BB18 $\frac{1}{4}$ -class, therefore, worked between Brisbane and Bowen.

The Main and Southern lines were available throughout for the class and they worked through to Wallangarra. The Western line was available as far as Roma.

Other sections upon which they could run were from Rockhampton to Emerald on the Central line and on the Dawson and Callide Valley lines, which branch off this railway. The Kilcoy branch, near Brisbane, was also available but rarely worked by these engines



Vulcan-built BB.18 $\frac{1}{4}$ No. 1042 coasting downgrade past the Tennyson power house sidings toward Yeerongpilly, on the South Side system of the Brisbane lines, with a freight train. (Photo: J. Armstrong).

as lighter locomotives are used in preference, to reduce maintenance on this line.

The principal train then on the North Coast line was the "Sunshine Express", the predecessor of the air-conditioned "Sunlander". The "Sunshine Express" was the "top link" in the State and was worked by the Vulcan engines from Roma Street to Bundaberg and from Rockhampton to Bowen. The intermediate Bundaberg-Rockhampton section is heavily graded at many locations and the Beyer-Garratts, with their greater tractive effort, were used on that part of the run.

This was a hard run, for heavy trains were built up fairly regularly and, with their rather low tractive effort, the BB.18 $\frac{1}{4}$ engines were required to "slog" for long periods. The longest run made by one of these locomotives was from Brisbane to Bundaberg, 217 miles, which is equalled elsewhere in the State from Toowoomba to Roma.

The BB.18 $\frac{1}{4}$'s worked through to Cairns when the North Coast line was strengthened but they hauled the "Sunshine Express" for only a short time to its Northern terminus and, then came the diesel. The first of the diesel-electrics was introduced in November 1952 and it was not long before their advantage of high tractive effort, coupled with relatively low axleloading, was seen.

As their numbers increased, the demand for steam power decreased. Consequently, when delivery of a second group of BB.18 $\frac{1}{4}$'s was made by Walker's, the demand had fallen to such a degree that it was actually necessary to store one or two of the last ones built when they were delivered.

The BB.18 $\frac{1}{4}$ -class quickly built up a good

reputation, as they were free steamers and could perform well under varied operating conditions. On the Main line, many fine performances on passenger trains were recorded.

The Main line from Brisbane to Toowoomba calls for both high speed operation and steady plugging on the two range sections, the 4 $\frac{1}{2}$ -mile climb of the Little Liverpool Range and the 17-mile climb of the main range.

Probably one of the most outstanding runs made over this line by steam was in 1952, when No. 1031 cut the then schedule of the "Western Mail" to shreds. Although it had quite a number of conditional pick-up stops between Ipswich and Murphy's Creek, the "Western Mail" was the fastest train between Brisbane and Toowoomba for many years. Indeed, it was 11 minutes faster than the present-day "Westlander", which has the same stops, and five minutes faster than the nearest diesel-hauled equivalent, the "South Western Mail".

On this particular day, No. 1031 was blocked by signals between Roma Street and Ipswich but, although this happened at the foot of a grade, the delay had been overcome and, by the time Ipswich was reached, the train was three minutes early. Away from Ipswich on time, No. 1031 got a clear road all the way and kept getting further and further ahead of schedule, until the Helidon distant signal was passed 10 minutes before the train was due at the platform.

The Brisbane-Grantham section had been run out at an average of 34.4 m.p.h., which represented an average of 37.1 m.p.h., ex-

clusive of the range section. Top speed of over 50 m.p.h. was attained.

Beyond Helidon, two unscheduled stops put the train $3\frac{1}{2}$ minutes behind time, as it commenced the climb of the main Divide and banked by B.18 $\frac{1}{4}$ No. 829. The two engines lifted the nine-car train up the range in such fine style that the late start was turned into a $6\frac{1}{2}$ -minute early arrival into Toowoomba.

Many passenger trains were banked on the range in those days, the through load for a single B.18 $\frac{1}{4}$ or BB.18 $\frac{1}{4}$ being 255 tons. The banking ceased with the introduction of diesel power on this line after 1953.

One of the first runs the first diesel-electric locomotive was to have made, late in 1952, was to Toowoomba in regular passenger service and it turned out to be an eventful day. Due to an electrical fault, the diesel had been cancelled and, instead, into Roma Street station came BB18 $\frac{1}{4}$ No. 1017 with empty cars from Mayne.

It may have been a jubilant day for steam locomotion, as No. 1017 made good time to Ipswich but, unfortunately, that was as far as the "Pacific" got. When the right-away signal was given, No. 1017 just would not budge! It had developed cylinder trouble and, when a replacement engine was found, No. 1017 could barely manage to get off the train and into a siding under its own steam. Altogether, it took the services of four engines to get the train to Toowoomba that day, excluding the diesel that broke down in the first place!

There always seemed to be something happening to No. 1017. One night in 1954, it worked a "special" to Maryborough. It went all right as far as Palmwoods but broke an injector line and kept on losing time from there on and finally arrived at its destination 38 minutes late.

Two months later, taking over a "Sydney Mail", for which no diesel was available, it ran into trouble just beyond Ipswich. The preceding train had broken down and had to make extra stops en route to Gatton. On this occasion, it refused to steam, gave injector trouble and the crew had to make two extra "loco" stops before Toowoomba was eventually reached 66 minutes late.

On the other hand, No. 1017, on one occasion, ran from Caboolture to Landsborough (19.7m.), on the North Coast line, in time which has probably never since been equalled by either steam or diesel!

The North Coast line is single track North of Caboolture and, as it is worked under electric staff regulations with hand changing, express trains have to slow down considerably to effect the staff changes. With four such intermediate checks, No. 1017 ran the section, start to stop, at an average

speed of 36.18 m.p.h.

Express runs in Queensland are restricted to a few mail trains and, in steam days particularly, there were rarely any long non-stop runs. Indeed, although the water capacity of the BB.18 $\frac{1}{4}$ is greater than the B.18 $\frac{1}{4}$'s, stops to replenish the tender have to be made every 40 miles or so. The longest non-stop runs were between Ipswich and Helidon, 48 miles, by relief mails at holiday periods. The longest distance run without refuelling by these locomotives appears to be between Toowoomba and Warwick (57m.).

Since the class was first introduced, strengthening of bridges has been carried out, with the result that the locomotives may now run further afield than they were previously permitted.

Sections strengthened include those from Bowen to Stuart and Babinda to Cairns, permitting through-operation to the latter place, as previously noted, and the sections Charters Towers - Hughenden, on the Great Northern line, and Emerald-Bogantungan, on the Central line.

The extra availability has not been taken to advantage, to any great extent, as the strengthening was primarily intended to extend operations of the heavier diesels.

At present, most of the locomotives of the class are stationed in the Southern and Central parts of the State. They have been largely displaced from passenger train operation, except in the Brisbane suburban area where they work local services.

The increasing numbers of D/E's have made major inroads to the goods services throughout the State, where the BB.18 $\frac{1}{4}$'s are permitted to work, and the steam engines have been relegated to miscellaneous duties. Recently, they have been noted on one or two occasions working ballast trains, surely one of the most lowly of railway duties!

The loads for these engines are based on theoretical tractive effort and are, therefore, the same as the B.18 $\frac{1}{4}$ -class. Between Brisbane and Ipswich, they are scheduled to haul suburban passenger trains of up to 210 tons tare weight. Goods loads on this section is 460 tons in each direction but a through load of 490 tons may be hauled in the down direction.

Maximum passenger train load allowed is between Rockhampton and Mackay, where 400 tons are permitted. Most ratings are considerably lower than this on the more heavily graded parts of the line. Assistant engines were often required to bank the down "Sunshine Express" on the Eumundi Range and between Monkland and Gympie. Through loads for this train was 315 tons in either direction.

Double-heading was also standard practice for passenger trains on the range

sections on the Main, Central and Great Northern lines, prior to diesel traction.

Goods loads on the range section of the Great Northern line are as low as 210 tons but the maximum allowed in more favourable sections for goods trains is 730 tons.

One of the Vulcan engines was involved in the fatal Walumbilla smash on 1st December 1956. No. 1042 was hauling the east-bound Roma-Brisbane passenger train. It had stopped to cross the up "Westlander" at this station, when the diesel-hauled express appeared in the early morning and collided head-on with it.

Several casualties resulted, all in the stationary train. Passengers in the "Westlander", thanks to centre couplers and anti-shock members, suffered only a large jolt. No. 1042 was extensively damaged in the smash but was later rebuilt and replaced in service.

The BB.18 $\frac{1}{4}$ -class locomotives have a tendency to slip when starting but are quick off the mark when properly handled. They have a crisp exhaust and a characteristic slap of the snifter when the regulator is opened. All 55 engines are in service.