

**- REEFSTEAMERS LOCOMOTIVE PROFILES -
CLASS 15CA NO.2056 'DOROTHY'**



Class 15CA No.2056 'Dorothy' represents American practice, being amongst the few ALCO-built locomotives on the SAR. They are based on the Class 15C 'Big Bills.' The initial 12 Class 15Cs were ordered on an experimental basis from the USA (Baldwin) in 1925, designed with an unusually large boiler that was pitched 10 inches higher than was then-usual. The larger boiler size would be an advantage, but there were then doubts as to the stability of the 'tall design' on the Cape Gauge.

The experimental Class 15Cs were successful locomotives and the high-pitched boilers did not cause stability problems. (The methodology was adopted for all future SAR main line locomotives.) Unfortunately, the bar frames soon started to fracture under the front end of the firebox.

The Class 15CA is basically a Class 15C with an improved frame design with an added bridle casting for additional strength. The 'A' stands for 'ALCO.' The original 12 15Cs were modified to the improved standards of the 15CA, and were reclassified 15CB. ('B' for 'Baldwin') From 1926 onwards, 84 of the new Class 15CA machines were built. These simple, powerful locomotives are an early SAR heavy mixed-traffic design and are the 'grandmothers' of the famed Class 15Fs and later, the Class 23s. They were also incidentally reputed to be the loudest locomotive on the SAR!

The new 15CAs started work between Kimberly and Cape Town, eventually moving to East and North Transvaal after working some years based from Bloemfontein. (Free State.) They are conventional 4-8-2 machines, but with a profiled combustion chamber equipped with arch tubes. All the class 15CAs are manually stoked. An archaic feature of the Class 15CA is a steam-powered locomotive brake. Being difficult to modulate, those steam-brakes were unpopular amongst SAR drivers as they tend to come on too hard. (Most later SAR locomotive types used vacuum.)

Their 57 inch dia. driving wheels were later replaced with 60 inch (5 ft.) wheels to allow slightly faster running, and the boiler pressures were increased slightly to compensate for the reduced tractive effort. These mixed-traffic engines could then also be used for fast main-line passenger work. In the 1980s, the now-modified Class 15CAs were used across the border to Mozambique and were also prominent around Pretoria. Because of the 17 ton axle load, they could be used for heavy shunting and nearly 40 of these locos ended their days in the great shunting yards of Kaserne and Germiston.

Entering our roster in 2005 (not running) our 15CA No.2056 was repaired and operated. Although the boiler passed inspection, the tubes were worn and the locomotive suffered several boiler-related failures. The decision was taken to completely re-tube the 15CA in 2007, to eliminate the weakened tubes. The job was done on a night shift rush-basis during the week before a Dave Rogers tour! No.2056 ran successfully for two years until a flue ('super heater tube') failed. The problem turned out to be poor flue welding from the later railway days. Although only one flue actually failed, other similarly poor welds were detected and the 15CA was withdrawn from service by the Boiler Inspector.

During the 2007 rebuild, the bronze bearings of the valve motion were replaced with Vesconite, a synthetic self-lubricating plastic material that is tolerant of intermittent lubrication. Reefsteamers is a pioneer in using low maintenance Vesconite bearings for steam traction and operate the only Vesconite-equipped steam locos in Africa. 15CA No.2056 was the 2nd of our fleet to be converted.

While our 15CA No.2056 awaits for boiler flues as of June 2013, the KT-type tender's leaky water tank needs repair. The tender's plain white-metal axle bearings are also to be converted to roller bearings for reduced maintenance. The boiler flue work alone will cost about R400 000. 15CA No.2056 is one of the two primary engines that we were using for day trips, being simple, economical, powerful and yet short enough to turn easily within a turning triangle. Apart from the boiler flues, the locomotive is otherwise in excellent shape and should run for many years to come.

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Class:	Class 15CA – 84 Built by ALCO. 12 x 15C rebuilt to 15CB. (Same Stds)	Tender Type:	Type KT.
Designer:	Baldwin Loco Works for SAR 15CA – Improved by ALCO.	Tender Weight:	70.5 tons working order.
Builder(s):	American Locomotive Company. Baldwin Locomotive Works. Società Italiana Ernesto Breda. North British Locomotive Company.	Fuel Type:	Coal – hand fired.
Configuration:	4-8-2 'Mountain.'	Tender Coal:	14.2 tons.
Track Gauge:	3 ft 6 in (1,067 mm) Cape Gauge.	Tender Water:	27 000 liters.
Driver Wheel Diameter:	57 in. (1,450 mm) as built. 60 in. (1,520 mm) new wheels.	Boiler Dimensions:	6 ft 2.25 in. (1.9 m) int dia 20 ft 0.5 in. (6.1 m) int length 8 ft 6 in. (2.6 m) pitch as built 8 ft 7.5 in. (2.63 m) pitch (60" wheels)
Total Locomotive Length:	73 ft 3.2 in. (22.331 m)	Boiler Pressure:	200 psi. (1,380 kPa) as built 210 psi. (1,450 kPa) with 60" wheels
Height:	12 ft 10 in. (3.912 m) as built 12 ft 11.5 in. (3.950 m) w. 60" wheels	Fire Grate Area:	48 sq. ft. (4.46 m ²)
Frames:	Bar Frame with split saddle.	Heating Surface of Tubes:	143 tubes 2.25 in. (57.2 mm) ext dia 30 tubes 5.5 in. (140 mm) ext dia 2,554 sq. ft. (237.3 m ²)
Loco Weight:	105 tons as built. 106.1 tons with 60" wheels.	Heating Surface of Flues:	23 sq. ft. (2.14 m ²)
Max. Axle Load:	17.7 tons on 2nd driver. (As built) 18 tons on 2 nd driver. (60" wheels)	Heating Surface of Firebox:	200 sq. ft. (18.58 m ²)
Total weight on drivers:	70.4 tons on drivers. (As built) 71.5 tons on drivers. (60" wheels)	Total Heating Surface:	2,777 sq. ft. (258 m ²)
Tractive Effort:	At 75% boiler pressure: 42,440 lbf (188.8 kN) (as built) 42,340 lbf (188.3 kN) (60" wheels)	Superheater Area:	716 sq. ft. (66.5 m ²)
Cylinders:	Two	Valve Gear:	Walschaerts. (With powered Reverser)
Cylinder Size:	24 in. (610 mm) bore. 28 in. (711 mm) stroke.	Locomotive Brake:	Steam.



A nice clean 15CA No.2056 'Dorothy' takes a break while shunting in the yard on a Reefsteamers weekend work day, 30 August 2008. (Photo by Lee Gates.)