



Voie Libre #118

SLATE FOR A SLATE QUARRY

Voie Libre

#118

THE MAGAZINE OF RAILWAY CREATORS

CENTRAL FOLDER
THE SMALL
FALCON 4-4-0S

ADDING A TURNOUT,
TURNING AN ENGINE,
PROTECTING A RUNNING TRAIN,
CREATING AN AUTOMATON...
THIS SUMMER IS ALL
ABOUT OPERATING!

LAYOUTS GALORE

www.voielibre.com



1 NG 6 n° 97 4-4-0
in its South African
Railways black livery.

THE FALCON 4-4-0S of the Beira Railway

Tender locomotives with a 4-4-0 wheel arrangement are not a frequent sight on narrow gauge. Two such engines have been preserved in the U.K. and four in Africa, two of which are in working order. Voie Libre helps you discover the Falcon locomotives of the Beira Railway!

Text: Vincent Lepais

BIBLIOGRAPHY

- « The two foot enigma, Beira Railway 1890-1900 », Antony Baxter, Plateway Press.
- « The corkscrew », n° 85 February 2015
- « The Sandstone Steam Railway, the story continues », Dave Richardson.

In terms of motive power, the Beira Railway required 42 engines. A first series of 6 locomotives of the F2 type was built by Falcon. They featured a steel cow-catcher, a short smokebox, a funnel fitted with a spark arrestor and a cab whose floor was level with the running board. The tender was of the four-wheeler type. These engines had an inside Stephenson valve gear. The piston crosshead was guided by two slidebars. The cab roof was tropicalized, while the side windows were fitted with sliding shutters. The first engine in the series was the only one to feature two windows on each side of the cab, whereas the five others only had one window on each side. The front panel of the cab had two spectacles and a central opening fitted with fixed shutters. The steam dome carried two balanced safety valves. The sandboxes were



Sandstone Estates

2 NG 6 n° BR 7 in Beira Railway livery.

located on each side of the body, on the running plate. A Far West type headlight was also fitted. Their Falcon builder's numbers ranged from 230 to 235. They were delivered in 1895 and numbered BR 4 to 9 on the railway.

THE F4 TYPE LOCOMOTIVES

The 36 other locomotives, more powerful, were of the F4 type. They shared some features of the F2 class, with a few differences, however. Their smokebox was longer and fitted with a conventional funnel, and the cab floor was lower than the running plate. The Ramsbottom type safety valves were above the firebox. There was a single piston crosshead slidebar. Falcon built 26 units of the F4 version. The first six were numbered BR 10 to 15 (serial n° 242 to 247) with a tender identical to that of

the F2. The next 20 engines had a 6-wheeler tender with a larger capacity and became BR 16 to 35 (n° 254 to 273). The last 16 were delivered in 1897. All the Falcon locomotives carried their number of the sandboxes with brass letters and numbers, and the builder's plate on the cab. Falcon sub-contracted the construction of the last 10 engines, BR 36 to 45, to the Glasgow Railway Engineering Company. They were fitted with direct loaded safety valves. Their number was on an oval plate fixed onto the sandboxes.

Originally, the F2 and F4 locomotives were wood-fired. Once in service, both series of engines displayed a real lack of hauling power when compared to the traffic they had to handle. Two bogie tenders were ordered from John Fowler & Company. One of them was assigned to engine BR 5, its own 6-wheeler tender having been destroyed in an accident, and the two tenders were subsequently assigned to engines BR 6 and 8.

THE BEIRA RAILWAY SWOPS GAUGES...

On 22nd May 1899, the 3 foot 6 inch gauge (1066.8mm, known as «Cape gauge») line from Salisbury (today Harare) to Umtali was opened. The problems linked to the transshipment of goods at Umtali meant that the 2 foot gauge line had to be re-gauged. The conversion was completed on 1st August 1900. The company then became the Beira & Mashonaland Railway. The 2 foot gauge rolling stock, having become redundant, was stored at Bamboo Creek station (today Vila Machado). Six F4 locomotives, five of which were Scottish-built, were used on the Salisbury line at the Ayrshire Gold Mine railway, built in 1902 in 2 foot gauge, until it was in turn converted to the Cape gauge in 1912. The line then



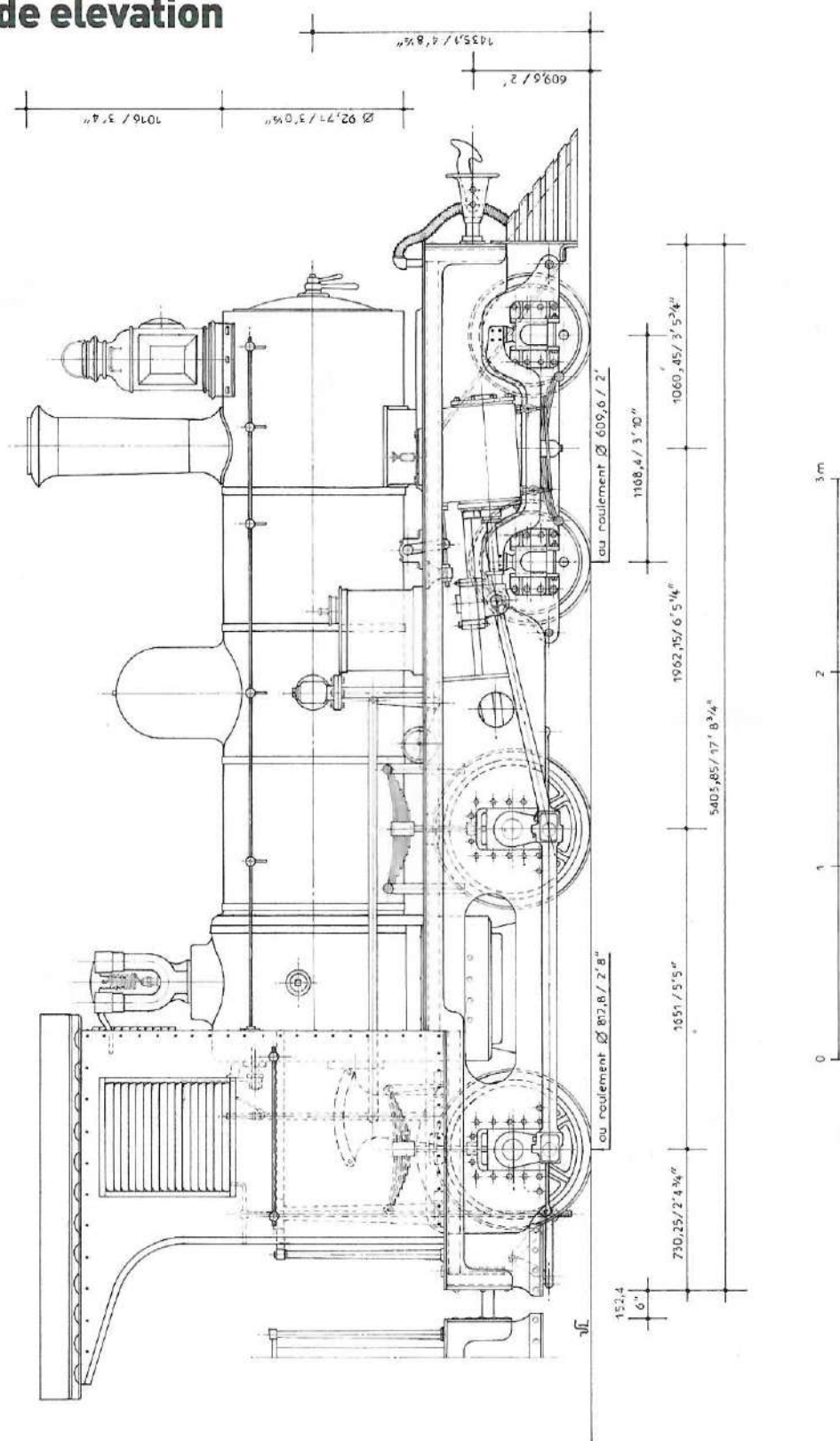
Sandstone Estates

3 The sandbox on the left-hand side of 4-4-0 BR 7.

FALCON F4 TYPE 4-4-0

Scale 1/35

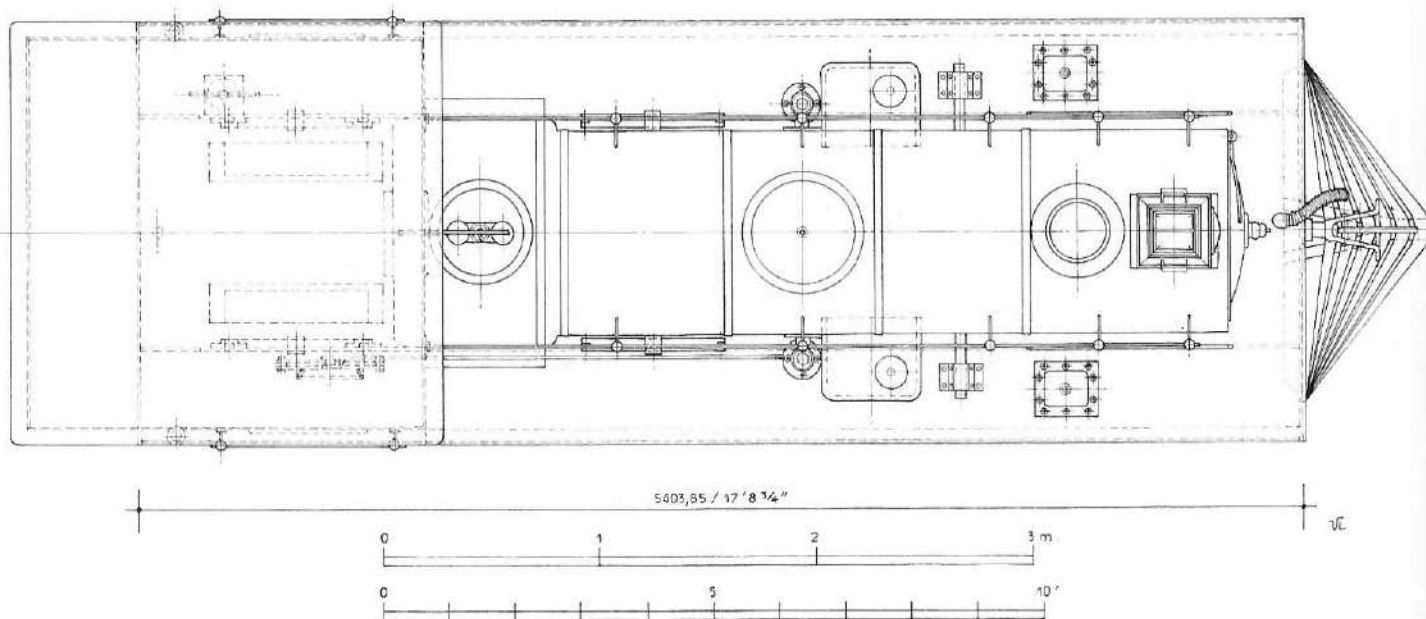
Right-hand side elevation



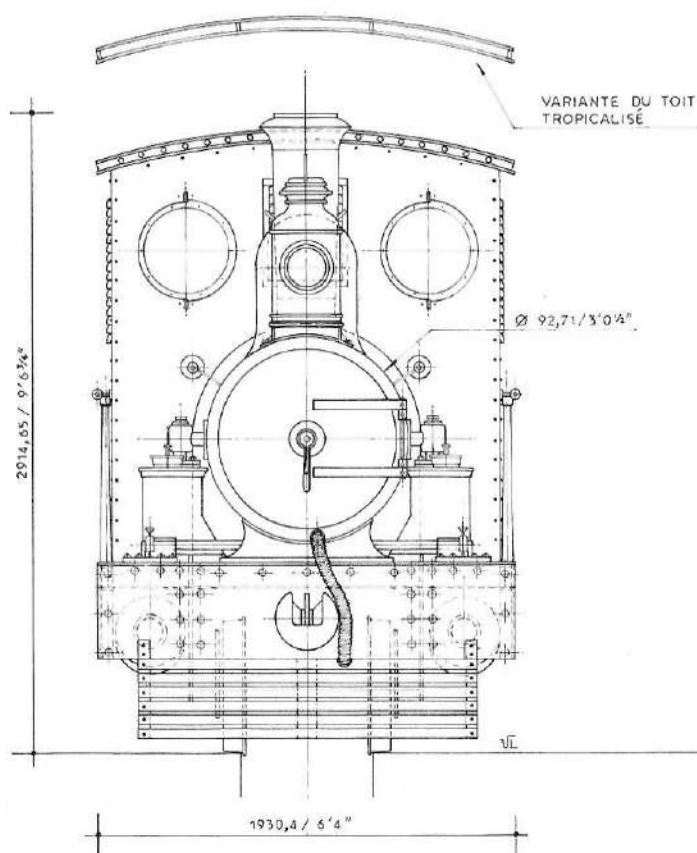
FALCON F4 TYPE 4-4-0

Scale 1/35

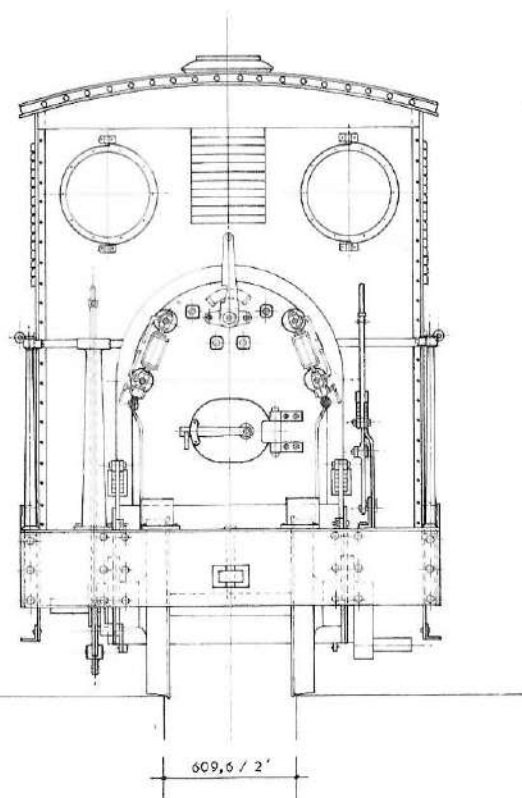
View from above



Front view



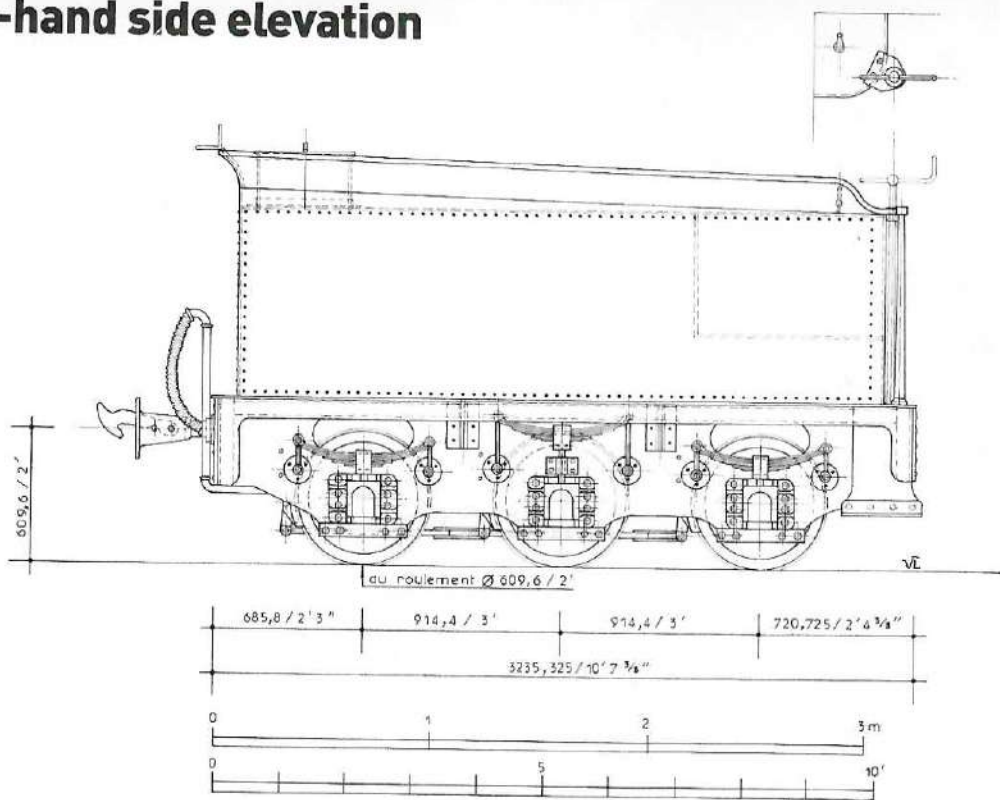
Rear view



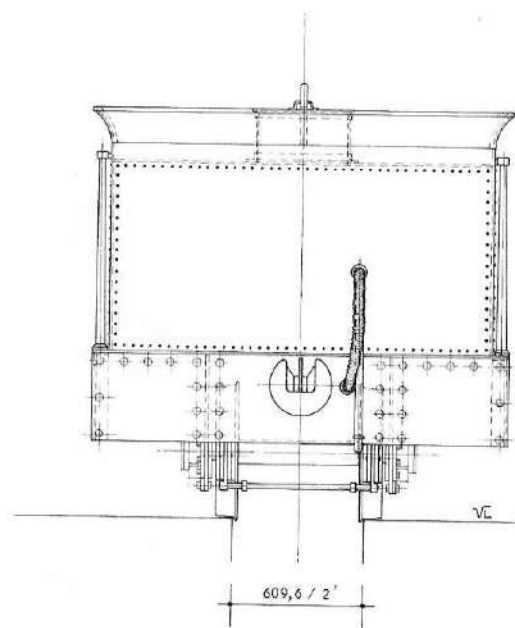
FALCON F4 TYPE 4-4-0

Scale 1/35

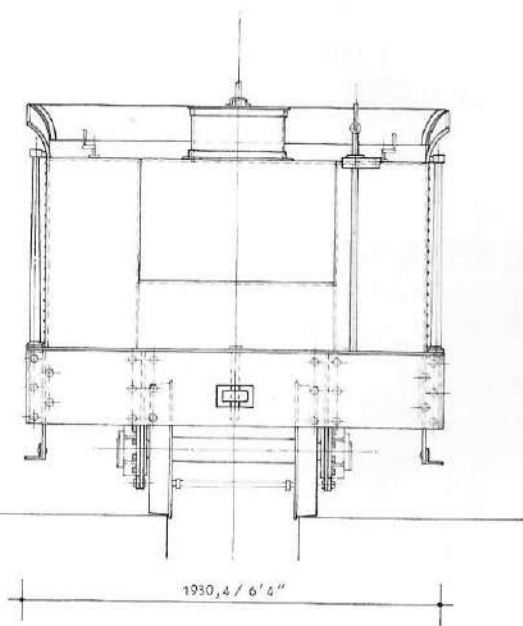
Right-hand side elevation



Front view



Rear view





4 South African Railways plate on 4-4-0 n° 97.

became the Sinoia Branch of the Beira, Mashonaland & Rhodesia Railway.

WORLD WAR I

During WWI, South Africa found itself in conflict with the German territories in what is nowadays Namibia. 13 locomotives stored at Bamboo Creek were transferred to South Africa for repairs carried out by the South African Department of Defence. The engines stored without having been maintained had also had some of their parts removed.

Various types of 2 foot gauge locomotives in service in South Africa had been moved to Namibia to replace the engines sabotaged by the German troops when they retreated. The 4-4-0s took over in South Africa, renumbered NG96 to 108; four of them being cannibalized for spare parts (n° 99, 100, 107, 108). Engines F2 104 to 106 ran on lines in the province of Natal, the F4 locos on Cape province routes. As the ex-German locomotives were

put back into service, the engines from South Africa were sent back to their original lines, making the 4-4-0s redundant for the second time.

THE SOUTH AFRICAN RAILWAYS PERIOD

Once overhauled, engines NG 101 and 102 returned to service in 1921 on the Pienaarsrivier-Pan kop line. The other locomotives were used on the Upington-Kakamas and Fort Beaufort-Seymour lines. In 1924, NG 104 could be seen on the Naboomspruit-Singlewood line. NG 103 joined it there in 1927. With the introduction of the class system within the SAR between 1928 and 1930, these engines became the NG 6 class. Growing traffic emphasized their lack of power even further, and they were gradually withdrawn, the last one being NG 103, in 1935. One engine was scrapped, the others sold to various industries in Rhodesia and South Africa, where they ran until 1959.

THE PRESERVED LOCOMOTIVES

Zimbabwe has preserved two locomotives in Bulawayo, F4 BR 15 (Falcon n° 247 built 1896) at the Station Railway Museum and F2 BR 8 (ex-SAR 105 Falcon 234, built 1895) at the Centenary Park. Previously, they had been used by Rhodesian Timber Limited until 1961. In Britain, the Phyllis Rampton Heritage Trust (Hambleton - Surrey) owns F4 BR 27 and 28 (Falcon 265 and 266, built 1897). Two Falcon locomotives, F2 BR 7 (ex-SAR 106 - Falcon 233, built 1895) and F4 BR 25 (ex-SAR 97 - Falcon 263, built 1897) are in service at the Sandstone Estates in South Africa. These two engines are regularly seen on hauling duties, in parallel with other locomotives of the collection, including class NGG 16 Garratts!

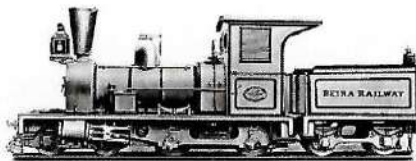
THE BEIRA RAILWAY

The Beira Railway Company was founded on 12th July 1892. Its purpose was to connect the harbour at Beira to Umtali (since renamed Mutare). At the time, Beira was part of a Portuguese colony (nowadays Mozambique), while Umtali was in Rhodesia, nowadays Zimbabwe. This 370km long line was built to 2 foot gauge (609.6mm) and laid with 9.93kg/m (20 pounds/yd) rail, supplied by Kerr, Stuart & Co. Providing this landlocked territory with access to the Indian Ocean required an agreement between the Portuguese and British governments. Construction was entrusted to George Pauling and Co. with

Alfred Lawley as chief engineer in charge of the works. Five wood-fired 0-4-0 T locomotives were supplied by Falcon Engines & Car Works, a builder located in Loughborough, U.K. Work began in September of the same year, starting from Fontesvilla. The line reached Beira in October 1896, and Umtali in February 1898. This is where the depot and workshops were established. In order to reduce construction costs, earthworks had been kept to the strict minimum and the bridges were more like temporary wood structures than proper engineered structures. Tragically, construction of the line was accompanied by the

death of several hundred labourers, caused by malaria and yellow fever. This contributed to the legend of «one dead man per sleeper» on the Beira Railway. The Beira Railway also procured Falcon 0-6-0 engines fitted with the same tender as the F2 series. The short smokebox featured a funnel fitted with a spark arrestor. The boiler barrel carried the steam dome, with balanced safety valves, and the sandbox, which acted only on the first axle. The railway operated various types of goods wagons, and tropicalized bogie passenger carriages.

TECHNICAL DATA SHEET OF THE F2 ENGINES



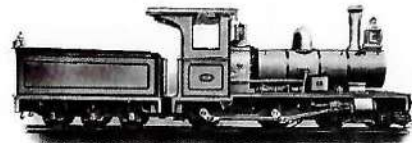
Class F, Nos. 1, 2 & 3.
FOUR-WHEEL COUPLED TENDER LOCOMOTIVES
WITH FOUR-WHEEL BOGIE.

These engines are built for light railways from 22-in. to 3-ft. 6-in. gauge. The weight is evenly distributed and kept down to the lowest point necessary for adhesion. The chimney is fitted with spark arrester, and for hot climates the cab has a double roof with intermediate air space.

Number of Engines	No. 1	No. 2	No. 3
Gauge	22 in.	24 in.	24 in.
Diameter of cylinders	14 in.	14 in.	14 in.
Stroke of piston	14 in.	14 in.	14 in.
Diameter of wheels	27 & 25 in.	32 & 24 in.	36 & 24 in.
Right wheel base of engine	5 ft. 2 in.	5 ft. 5 in.	5 ft. 5 in.
Total wheel base of engine	10 ft.	10 ft. 5 in.	10 ft.
Wheel base of tender	4 ft.	4 ft. 6 in.	4 ft. 6 in.
Capacity of tanks	450 gals.	520 gals.	600 gals.
Fuel capacity	35 cu. ft.	40 cu. ft.	50 cu. ft.
Traction power with 100 lbs. mean pressure	2,840 lbs.	3,000 lbs.	3,600 lbs.
Heating surface (radi)	100 sq. ft.	200 sq. ft.	240 sq. ft.
Heating surface (radi)	22	25	30
Total heating surface	122	225	270
Gross area	21	41	41
Weight net of engine	91 tons	101 tons	12 tons
Weight gross of engine (with fuel and water)	111	121	12
Weight net of tender	3	3	4
Weight gross of tender (with fuel)	51	61	71
Weight of suitable rails (per yard)	20 lbs.	23 lbs.	25 lbs.
Minimum radius of curves	110 ft.	120 ft.	170 ft.
Price	905	985	1,205

-25-

TECHNICAL DATA SHEET OF THE F4 ENGINES



Class F, Nos. 4, 5, 6 & 7.
FOUR-WHEEL COUPLED TENDER LOCOMOTIVES WITH
FOUR-WHEEL BOGIE.

These engines are suitable for light railways from 2-ft. gauge upwards, with long distances between watering stations, and where fuel only is obtainable. They have ample heating surfaces, and carry a large quantity of water and fuel in the tender. The cab has a double roof, with ventilating Venetians in front and at the sides.

Number of Engines	No. 4	No. 5	No. 6	No. 7
Gauge	24 in.	24 in.	24 in.	24 in.
Diameter of cylinders	14 in.	14 in.	14 in.	14 in.
Stroke of piston	14 in.	14 in.	14 in.	14 in.
Diameter of wheels	36 & 24 in.	36 & 24 in.	40 & 27 in.	42 & 27 in.
Right wheel base of engine	5 ft. 6 in.	5 ft. 6 in.	6 ft.	6 ft.
Total wheel base of engine	14 ft.	14 ft.	16 ft.	16 ft.
Wheel base of tender	4 ft. 6 in.	4 ft. 6 in.	5 ft. 6 in.	5 ft. 6 in.
Capacity of tanks	600 gals.	700 gals.	800 gals.	800 gals.
Fuel capacity	50 cu. ft.	60 cu. ft.	70 cu. ft.	70 cu. ft.
Traction power with 100 lbs. mean pressure	3,270 lbs.	4,100 lbs.	5,400 lbs.	6,000 lbs.
Heating surface (radi)	240 sq. ft.	250 sq. ft.	300 sq. ft.	300 sq. ft.
Heating surface (radi)	30	34	40	44
Total heating surface	270	284	340	344
Gross area	41	41	41	41
Weight net of engine	12 tons	14 tons	16 tons	16 tons
Weight gross of engine (with fuel and water)	13	15	17	17
Weight net of tender	4	4	4	4
Weight gross of tender (with fuel)	21	21	21	21
Weight of suitable rails (per yard)	20 lbs.	20 lbs.	20 lbs.	20 lbs.
Minimum radius of curves	110 ft.	110 ft.	110 ft.	110 ft.
Price	1,145	1,320	1,460	1,595

-25-

ENGRAVING ILLUSTRATING THE CARRIAGES OF THE BEIRA RAILWAY

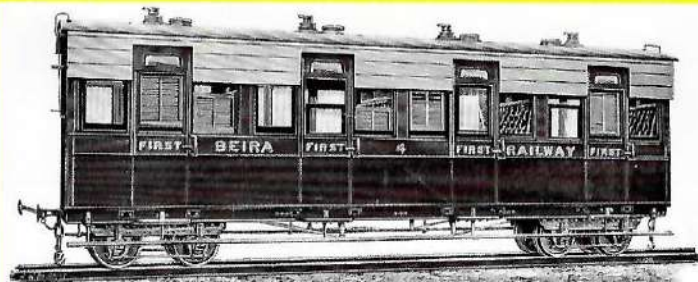


Fig. 1.

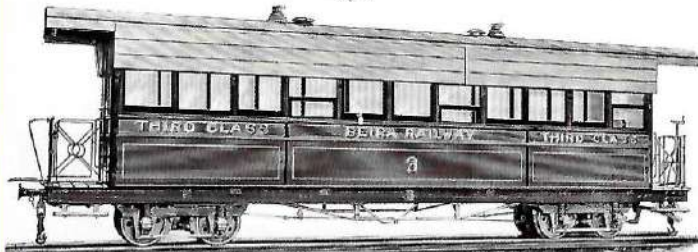


Fig. 2.

ENGRAVING SHOWING THE FALCON 0-6-0 ENGINES OF THE BEIRA RAILWAY

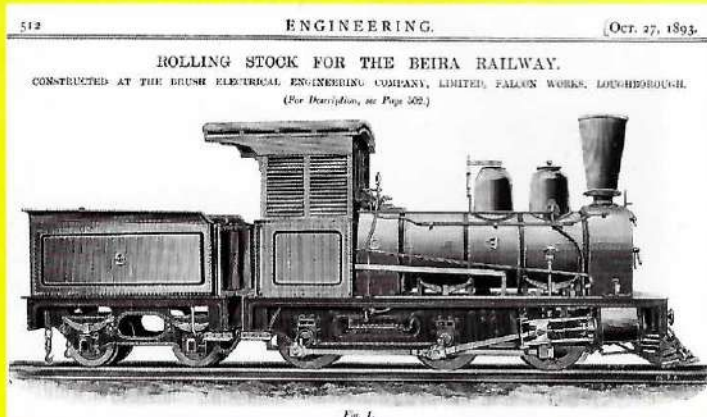


Fig. 1.

Sandstone Estates



5 Rear view of 4-4-0 n° 97 showing the tender with its bunker extensions.

Sandstone Estates



6 Back of engine n° 97.

Sandstone Estates



7 Inside of the cab of BR 7.

IN THE MODELLING WORLD

The only existing scale models of the Beira Railway locomotives are the Accucraft live steam locomotives in 1/19 scale for 32 and 45mm gauges. They are available in two SAR versions, green and black, and in one Beira Railway green version, with shutters.

The central folder of drawings shows the type F4 Falcon in its original version, the one best documented, and we hope this will prompt you to undertake building this attractive engine!

Many thanks to Dave Richardson of the Sandstone Estates for his documentary assistance.