

**Brassmasters** Scale Models

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# **MR/LMS/BR 4F 0-6-0**

**Prototype notes and instructions**

## Building History

The Midland 4F is attributed to the Henry Fowler although the majority of the design work was done under the supervision of the Chief Locomotive Draughtsman James Anderson. It was MR policy to build prototypes in order to fully prove the design and as such building commenced with two engines in 1911. The testing period was extended by the Great War and this was followed by a fairly concentrated build programme from 1917 to the end of 1922 when, with the demise of the Midland, there were 192 in service. Following the adoption of the design as an LMS Standard in 1924 there followed a period where engines were being built simultaneously at LMS works and with three outside contractors. Inevitably the sequencing of delivery did not follow engine number. The flow of new locomotives from Glasgow, primarily via the ex G&SWR route, would have been fascinating to witness!

The final total was an impressive 772 machines, and the build dates and builders were as follows: -

Midland Series				LMS Series			
1911	(2)	3835-6	Derby	1926	(132)	4159-4176 4217-4287	Crewe Derby
1917	(15)	3837-3851	Derby			4302-4311	Crewe
1918	(28)	3852-3861	Derby			4332-4346	Kerr Stuart
						4382-4399	North British
1919	(22)	3880-3901	Derby			Note: 4343-4346 not taken into stock until 1927	
1920	(33)	3902-3934	Derby				
1921	(59)	3935-4013	Derby	1927	(137)	4288-4301	Derby
1922	(33)	3967-4026	Derby			4312-4322	St Rollox
						4347-4356	Kerr Stuart
						4357-4381	Andrew Barclay
<b>Somerset and Dorset Series</b>						4400-4406	North British
1922	(5)	57-61	Armstrong Whitworth			4407-4436	Derby
		(LMS 4557-4561 in 1930)				4437-4446	Crewe
						4477-4506	North British
						Note: 4318-4322 and 4380-4381 not taken into stock until 1928	
<b>LMS Series</b>				1928	(89)	4323-4331	St Rollox
1924	(11)	4027-4034 4107 4177-4178	Derby Crewe St Rollox			4447-4456	Crewe
						4457-4466	Horwich
						4467-4476	St Rollox
						4507-4556	Crewe
1925	(161)	4035-4056 4057-4081 4082-4106 4108-4158 4179-4206 4207-4216	Derby North British Kerr Stuart Crewe St Rollox Derby	1937	(15)	4562-4576	Crewe
		Note: 4106 not taken into stock until 1926		1939	(20)	4577-4596	Derby
				1940	(8)	4597-4604	Derby
				1941	(2)	4605-4606	Derby

Those locomotives built "in house" had the standard MR or LMS works plate positioned on the middle splashers. MR specimens were replaced with LMS ones in the mid 1920's. Contractor built locomotives fitted their specific works plate, usually positioned on the outside of the front frames above the footplate, with the LMS specimen added on the middle splashers at an early works visit. The contractors plates usually continued to be fitted until either major work on frames were required, or removal in BR days. There are many known instances of "incorrect" LMS plates being carried, for example in 1925 number 3887 (built in 1919) carried a "Rebuilt 1917" plate as did 3863 and 3876 in 1927 (both 1918 builds). At one stage it was believed this related to the boiler build (or rebuild) date as opposed to the frames, but the provision of a set of spare frames for the class from around 1943 meant that frame exchanges became a routine workshop procedure whenever major repairs were needed on a set of frames.

## **Detail differences**

This section concentrates on the visible differences of the various batches and modifications applied over the life of the class; it does not attempt to explain the background to the many technical detail changes.

### **Reversing gear**

The first two locomotives were built with steam reversing gear on the right hand (driving) side for the trial period but this was replaced by the normal screw type around 1922.

### **Right and left hand drive**

No.s 3835-4206, 4302-4311 and 4557-4561 were right hand drive with the reversing lever on this side; the remainder were left hand drive.

### **Cab side beading**

Locos 4012-4026 had no cabside beading.

### **Cab rain strips**

An additional horizontal rainstrip was added from 1939 onwards positioned where the cab side meets the roof. As with many alterations around this date many locos did not have this fitted until the post war or BR period.

### **Splasher beading**

Locos 4012 onwards had no splasher beading.

### **Safety valves**

Originally Ramsbottom safety valves were fitted sitting on a elongated oval base. A change to Ross Pop type sitting on a round base, fitted from new, commenced with 4027. All were ultimately Ross Pop fitted, conversion starting in the 1920s. No doubt some would have reverted to Ramsbottom before being finally fitted with Ross Pops.

### **Leading cranks**

The right hand crank leads on all engines, however at some time 4578, 4585, 4590 and 4604 were experimentally fitted with left hand lead

### **Mechanical lubricators**

Midland series engines 3835-3872 were originally fitted with only one mechanical lubricator. All others had two and all engines were eventually altered.

### **Air relief valves (snifting valves)**

These were fitted to most engines at the base of the smokebox immediately in front of the leading splasher. Some early Midland series engines were not originally fitted, but were later fitted. There is evidence that these items were missing from some engines from the mid 1930s onwards.

### **Tender cabs**

Back weather boards and additional doors in the tender space were fitted to several engines, initially these were for working snow ploughs in the Carlisle District. Numbers 4000 and 4009 were so fitted in December 1928, followed by 3999, 4007 and 4008 in Jan 1934. In later days several others were so fitted, mostly LMS series engines including 4588.

In the BR period a sliding cover arrangement was added to most of the tender cab engines associated with snowplough duties, primarily allocated to Skipton, Buxton and over the Settle and Carlisle route.

### **Top feed water heaters**

Gresham and Craven top feed water heaters, which atomised the feed water before injection into the steam space and raised the water temperature to about 300 Degrees, were fitted to 4168 and 4291 probably from new. This equipment was removed, it is believed, by 1935.

### **Chimneys**

Initially all locos had a Fowler type with capuchons. The Midland pattern was taller giving a height of 13'3" to the top of chimney, whereas the LMS series was 12'10<sup>3/8</sup>". On the majority of engines these were replaced by a Stanier pattern with a thinner rim from the late 1930s onwards. The Stanier pattern was of both heights.

In 1935 4337 was fitted with a tapered chimney and jumper blast pipe for trial.

### **Dome covers**

There were several permutations of type. In summary the Midland type was a high rounded affair, with the LMS variant displaying a more flat topped appearance.

### **Exhaust steam ejectors**

This item included pipes from the side of the smokebox, along and below the left-hand footplate angle on the few locos that were fitted. The grease separator condensation and oil trap was the large bulbous item visible below the footplate angle just in front of the cab and the exhaust steam ejector was behind the left hand cab steps. We believe examples of both Midland and LMS series engines were so fitted. Engines known to have been fitted at one time with exhaust injectors: 3856, 4048, 4110, 4112, 4118, 4167, 4190, 4304, 4351 and 4364.

### **Valve spindle tail-rod covers**

All except 4562-4606 originally had valve spindle tail rods and their covers were prominent on the front buffer beams. These were removed commencing in the Stanier period and was usually complete by the Nationalisation. However a colour photo exists of 44255 at Fort William with these still fitted (or possibly refitted) in 1963!

### **Stanier built engines**

The last two batches of engines, 4562-4606, were built under Stanier and had some minor differences: plain non fluted rods, tall Stanier chimneys and all tenders with coal rails from new.

## Tenders

The first two were given reconstructed 2950 gallon 4 ton tenders taken from 4-4-0s numbers 386 and 388. Many of the remaining Midland engines had second hand 3250 gallon tenders fitted as a temporary measure. 3837 to 3847 were first attached to modified second hand Schenectady tenders from withdrawn American 2-6-0s and 3848 to 3851 had ex 2-4-0 tenders. Second-hand tenders were also used on engines up to 3876 including some from 4-2-2s. The old 3250 gallon varieties were replaced with 3500 gallon types, although in addition 3889/92/94/95 and 3917 all had the 3250 variety at one time.

New 3500 gallon tenders were fitted starting with 3877, initially of the standard MR pattern followed by the new Fowler LMS standard 3500 gallon variety. The tenders attached to 3954/55/57/58 had Whittaker's tablet exchange apparatus for use on the M&GN and S&DJ sections, as did many other engines (primarily on the S&D) in the BR period.

<p><b>Johnson-designed 3500 gallon tenders</b></p> <p>There were four basic styles of tender visually different as follows:</p> <p>Flush Riveted side panels and flat beading:</p> <ul style="list-style-type: none"><li>(i) With vertical centre beading</li><li>(ii) Without vertical centre beading</li><li>(iii) Without vertical beading but with much visible riveting</li><li>(iv) Fowler-built (Johnson design) with no flat beading and many visible rivets</li></ul> <p><b>Fowler-designed 3500 gallon tenders</b></p> <p>The majority of the LMS built examples were fitted with new flat sided Fowler tenders. Once again there were differences visible in the beading:</p> <ul style="list-style-type: none"><li>(v) Without vertical centre beading</li><li>(vi) With riveted beading (built for Stanier 2-6-0s) It is believed that this type was transferred to a very limited number of locos in the late BR period.</li></ul> <p>Coal rails were known to be fitted to those tenders attached to 4066/76, 4190, 4346, 4445/7/53, 4516 in addition to the Stanier built locos.</p> <p><b>Stanier high sided 3500 gallon tenders</b></p> <p>There were also a few instances of the high sided flush tenders from Jubilees 5607-5616 being re-allocated in the mid 1930s and post war. Known locos were 4578, 4594 and 4604.</p>	<p><b>Tender distribution</b></p> <p>There was no fixed pattern and it is essential to refer to photographs but a generalisation (as given by Bob Essery) is as follows:</p> <p>Johnson types (i) to (iii) were generally fitted to the first 80 engines with the fully beaded type (i) being very common on the lowest numbered. Type (iv) was fitted from new on 3937-4026 and was common on locos from 3920 upwards.</p> <p>There is photographic evidence that type (i) ran behind: 3836/42/7/50/1/2/4/6/8/9/60/1/6/70/1/5/95 and were also fitted to LMS locos 4028 and 4049.</p> <p>Type (ii) ran behind 3840/4/5/78/9/80/3/5/8/93/7 3902/5/10</p> <p>There is photographic evidence of type (iii) behind 3909.</p> <p>Some of the LMS 1925 Derby batch, numbers 4037-4046 had second hand Johnson tenders, mostly type (i), all the remainder had the new Fowler 3500 Gallon variety, type (vi). Locomotive 3874 had a 3500 gallon Fowler tender at one time.</p>
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## Maintenance

Obviously in Midland days Derby performed all major work. In LMS days the majority of work continued to be done by Derby with St Rollox covering primarily the Northern Division locos. Bow and Rugby also carried out the odd repair.

War-time demands meant Crewe also shopped 4Fs up to early 1948 when Horwich took over. By 1950 Cowlairs was also assisting in the backlog of repairs and Inverurie took over responsibility in 1958 until the remaining Scottish engines were withdrawn. Derby stopped shopping steam in September 1963 and Darlington took over their quota of the class. A similar transfer to Darlington followed when Horwich stopped shopping Steam.

Finally in December 1965 Crewe became responsible for the few survivors receiving attention.

## Allocations

Allocation details are surprisingly difficult to obtain for the pre-BR period, although we have recently been passed a large amount of material by Chris Crofts which we are currently analysing. Snapshot information is available as follows:

### Midland period

During the trial period the first two were initially allocated to Saltley.

### LMS period

#### Late 1924 into early 1925

Working from Toton (presumably on loan from Carlisle) 4000/02/04/09-13/15-16

#### 1925

Working from Wellingborough were 4018/20/22-3/26. Working from Leicester was 4021, a few other temporary allocations also took place in this period.

As part of the LMS "Block Allocation" system the allocation of the Midland series was as follows:

#### June 1925

Derby (Shed 1)	3872/78/79	(Total 3)
Saltley (3)	3869-71, 3911-13	(6)
Leicester/Coalville (10)	3873-77/80-84, 3936-39, 3950	(15)
Wellingborough (13)	3885-3902, 3914-27	(32)
Kentish Town (16)	3931-35	(5)
Toton (17)	3835-68, 3903-10/40-49/90-91/93	(55)
Nottingham (18)	3951-58	(8)
Walton (19)	4017-21	(5)
Belle Vue (21)	4022-26	(5)
Westhouses (22)	3959-63	(5)
Hasland (23)	3964-68	(5)
Staveley (24)	3969-74	(6)
Brightside (25)	3975-86	(12)
Leeds (28)	3928-30/87-89/92/94-98	(12)
Carlisle (33)	3999-4016	(18)

As more of the LMS series became available they were allocated to the various divisions as follows:

<b>Midland Division</b>		
4027-4056, 4157-4176, 4197-4206, 4227-4299, 4332-4338, 4407- 4436, 4517-4536, 4547-4556, 4562-4591, 4597-4606. (Total 240)		<b>Western Division "B" (Later Central Division)</b>
		4207-4226, 4457-4486, 4537-4546 (Total 60)
Notes: 4176 later transferred to Northern Division in exchange for 4196 4401-4406 later transferred from Western Division "A".		<b>Northern Division</b>
		4177-4196, 4312-4331 (Total 40)
		Note: 4196 later transferred to Midland Division in exchange for 4176.
<b>Western Division "A"</b>		
4057-4156, 4300-4311 (North Staffs), 4339-4406, 4437-4456, 4487-4516, 4592-4596. (Total 235)		
Note: 4401-4406 later transferred to Midland Division		

There were subsequently many transfers as the LMS "Block Allocation" system broke down!

## Allocations

### BR period

The information for post 1948 is relatively easy to obtain and changes were frequent.

By 1950 the headline allocations were:

London Midland Region -	648
Scottish Region -	48
Ex S&D -	12 Bath, 3 Templecombe
Ex LTSR -	2 Plaistow
Ex M&GN-	24 Peterborough Spital Bridge

Due to boundary changes some locos were transferred to Western and North Eastern Regions.

A few found themselves the last steam shunters at Crewe Works, relegated to works shunting and associated local trip working.

## Withdrawals

The attached table shows the dates for withdrawal together with the final shed. The first Midland series loco to be withdrawn was 43862 from Saltley in May 1954 and the last was the minor celebrity 43953 from Workington in November 1965. The five S&D locos were withdrawn between April 1962 and August 1965. Three still allocated to the SDJ section at Bath.

The first LMS series loco to go was 44145 from Toton in February 1959 and the class became extinct with 44525 from Crewe Works in October 1966.

Withdrawals by calendar year were:-

1954	1
1955	5
1956	8
1957	19
1958	3
1959	80
1960	49
1961	38
1962	96
1963	156
1964	189
1965	117
1966	11