

= LSWR M7 class =

The LSWR M7 class is a class of 0-4-4 passenger tank locomotive built between 1897 and 1911 . The class was designed by Dugald Drummond for use on the intensive London network of the London and South Western Railway (LSWR) , and performed well in such tasks . Because of their utility , 105 were built and the class went through several modifications over five production batches . For this reason there were detail variations such as frame length . Many of the class were fitted with push-pull operation gear that enabled efficient use on branch line duties without the need to change to the other end of its train at the end of a journey .

Under LSWR and Southern Railway ownership they had been successful suburban passenger engines , although with the increased availability of newer , standard designs , many of the class were diagrammed to take on a new role as reliable branch line engines , especially in Southern England .

Members of the class lasted in service until 1964 , and two examples have survived into preservation : number 245 in the National Railway Museum , and 53 (as BR 30053) on the Swanage Railway .

= Background =

Drummond designed these locomotives to answer the need for a larger and more powerful version of William Adams ' 0-4-4 T1 class of 1888 . The Adams T1 design of 1888 with 5 ft 7 in (1 , 702 mm) wheels had been developed to meet the LSWR 's requirement for a compact and sure footed suburban passenger locomotive to be utilised on the intensive commuter timetables around London . However , by the mid 1890s the suburban services around London were growing at a rate which began to preclude the use of these and other older classes of locomotive .

= Construction history =

The M7 tank locomotive was the first design by Dugald Drummond upon replacing William Adams as Locomotive Superintendent of the LSWR in 1895 . It was an enlargement of the T1 with a sloping grate of increased area giving greater power . Drummond drew upon his previous experience with the successful London Brighton and South Coast Railway D1 class , whilst he was works manager at Brighton in the early 1870s , and his own 157 class of 1877 , on the North British Railway in Scotland . It was the heaviest 0-4-4 type ever to run in Britain .

The first 25 were constructed at Nine Elms Locomotive Works between March and November 1897 . Thereafter the M7 class had a long production run with five major sets of design variants . Between 1897 and 1899 the locomotives were constructed with a short overhang at the front , and sandboxes combined with the front splashers . Injectors and a lever type reverser were also added , and a conical , as opposed to flat , smokebox door was implemented on numbers 252 - 256 . In 1900 the design was modified to incorporate the sandboxes inside the smokebox ; these were later relocated below the running plate .

After 1903 , a 36 ft 3 in (11 . 05 m) frame with a longer overhang at the front end was introduced and steam reversing gear fitted . Some sources record these locomotives as X14 class , and this designation was sometimes used to refer to the longer framed versions , but for most purposes the two sub classes were grouped together and known as M7 . The 1904 / 05 construction batch moved the sandboxes back to the front splashers and new items were feed water heating , single ram pumps and balanced crank axles . For the remainder of construction from the outshopping of the 105th locomotive in 1911 , duplex pumps were fitted .

Several of the most successful features of the class were used by Drummond on his other designs . Thus the boiler , cylinders and motion were identical and interchangeable with those used on his 700 class 0-6-0 freight locomotives of 1897 and the same boiler was used on his C8 4-4-0 passenger class .

== Boiler pressure ==

According to Bradley (p . 108) the original 175 lbf / in² (1 @. 21 MPa) working pressure was reduced to 150 lbf / in² (1 @. 03 MPa) to reduce wear on the boilers in 1900 when it became clear that they were no longer to be used for sustained high speed running . However H. C. Casserley states that the pressure was increased from 150 to 175 pounds @-@ force per square inch (1 @. 03 to 1 @. 21 MPa) .

== Push @-@ pull equipment ==

After 1912 thirty @-@ one M7 locomotives were equipped with push @-@ pull train capabilities with the provision of a primitive cable and pulley device . This was a modification that was designed to save time on country branch lines where the locomotive would usually have to run around its train in order to make a return journey . As a result , it was possible for the driver to drive his train from a cab located at the front of a designated push @-@ pull coach , leaving the fireman to tend the fire and operate the injectors on the locomotive footplate .

The pulley system was eventually deemed unsafe due to instances of sagging and delayed reaction . As a result , it was replaced on 36 engines by a safer compressed air system between 1930 and 1937 . This system had seen previous successful use on the LBSCR . Because the air compressor required extra space for installation , these conversions were confined to the long @-@ framed members of the class .

A further four conversions to push @-@ pull capability appeared between 1960 ? 62 . This was the result of short @-@ framed M7s having long frames substituted during overhaul in order to create room for the air compressor .

== Variants ==

Following the successful use of superheating on other Drummond classes , Robert Urie experimentally fitted a superheated boiler to No.126 in December 1920 , together with an extended smokebox and larger cylinders . The additional weight of the new boiler raised the centre of gravity of the locomotive , thereby adding to problems of instability on faster main line trains , whilst simultaneously preventing its use on many branch lines . As a result , no further examples were fitted , and No.126 was eventually broken up for spare parts in 1937 . In 1931 No. 672 was experimentally fitted with the Strowger @-@ Hudd Automatic Warning System , but the equipment was not adopted by the Southern Railway and the equipment later removed .

== Operational details ==

When first introduced to LSWR , several of the class were allocated to work semi @-@ fast passenger services between London and Portsmouth , Exeter and Plymouth , and Bournemouth and Weymouth . However they were withdrawn from these duties after a high speed derailment near Tavistock in 1898 , following criticism by the Board of Trade inspector about the use of front @-@ coupled locomotives on fast services . As a result , the class was to become synonymous with local main line and branch workings , as well as London suburban services .

With the gradual growth of the electrification of the inner London suburban lines after 1915 , the class tended to be used on stopping trains on the LSWR main line , and on services to Guildford and Reading . After the formation of the Southern Railway in 1923 the class gradually began to be used , further afield , notably in the west of England , but also on branch lines in Kent , and on the former South Eastern and Chatham Railway line between Redhill and Reading .

During the 1950s a substantial number of the " push @-@ pull " fitted members of the class was transferred to the Central Section of the Southern Region , at Brighton and Horsham , replacing worn @-@ out D3 locomotives on the branch lines of the former London Brighton and South Coast

Railway in West Sussex . A further ten were transferred to Tunbridge Wells and Three Bridges in 1955 for use on East Sussex branches . These were less well accepted by the train crews , who preferred the less powerful SECR H class . Others remained in the London area on empty stock workings , notably between Clapham Junction and Waterloo Station .

The class was gradually replaced in the southeast England during the late 1950s and early 1960s due to the introduction of further electrification , new lightweight standard steam classes , diesel shunters , and diesel @-@ electric multiple units . By the end of 1963 the majority that remained were based at Bournemouth to work the Swanage branch .

= = Accidents and incidents = =

On 25 May 1933 , locomotive No. 107 was hauling a passenger train when it was derailed at Raynes Park , London , coming to rest foul of an adjacent line . Another passenger train was in a side @-@ long collision with it . Five people were killed and 35 were injured . The accident was caused by a failure to implement a speed restriction on a section of track under maintenance .

On 27 November 1962 , locomotive No. 30131 was derailed at Eastleigh , Hampshire after it was moved by an unauthorised person]] .

= = Withdrawal and preservation = =

Apart from the experimentally boilered No. 126 , all the M7s entered into British Railways service in 1948 . In that year No. 672 fell down the lift shaft which provided rolling stock access to the Waterloo and City Line at Waterloo , and was cut up . The remainder survived until 1957 , but over the next seven years the remainder of the class was withdrawn as part of the Modernisation Plan ..

Two examples of this quintessential class of steam locomotive have survived into preservation . They are :

No. 245 (built 1897) is at the National Railway Museum in York Surviving records indicate that number 245 was constructed in 1897 at the cost of £ 1 @, @ 846 , and lasted in service until 1962 .

No. 30053 (built 1905) is based at the Swanage Railway ; this locomotive was sold to Steamtown in Bellows Falls , Vermont in the United States of America in 1967 , but was repatriated in 1987 .

= = Livery and numbering = =

= = = LSWR and Southern Railway = = =

Under the LSWR the class saw various liveries over its pre @-@ grouping career . Most associated with the class during this period was the LSWR passenger light sage green livery with purple @-@ brown edging , creating panels of green . This was further lined in white and black with " LSWR " in gilt on the water tank sides , and the locomotive number on the coal bunker sides . The National Railway Museum has chosen a non @-@ typical green for the livery on No 245 .

When transferred to Southern Railway ownership after 1923 the locomotives were outshopped in Richard Maunsell 's darker version of the LSWR livery , with numbering having an ' E ' prefix to denote Eastleigh . This was to prevent confusion with other locomotives of the same number inherited by the Southern from its constituent railways . " A " (denoting Ashford) was used for former South Eastern and Chatham Railway locomotives and " B " (Brighton for those from the London Brighton and South Coast Railway . After 1931 the prefixes were dropped from former LSWR locomotives and the remainder were renumbered .

The gilt lettering was changed to yellow with " Southern " on the water tank sides with black and white lining .

With the appointment of Oliver Bulleid as Chief Mechanical Engineer of the Southern , livery policy was changed once again to malachite green for passenger locomotives , with Sunshine Yellow lettering on the tank sides . This was lined with yellow and black with solid black edging . The

numbers also lost their " E " prefix . During the war years the locomotives were outshopped in wartime black after overhaul , and some of the class retained this livery to nationalisation . Numbering depended on which batch the locomotive belonged to , and therefore each batch was allocated a series .

= = = Post @-@ 1948 (nationalisation) = = =

The M7 Class was given the BR Power Classification of 2P upon Nationalisation . Livery remained Southern lined malachite , though two which were painted soon after (numbers 30038 / 30244) were lettered for British Railways in Sunshine yellow Gill Sans style along the sides of their tanks . This was eventually replaced with BR lined mixed traffic black livery . Numbering was initially that of the Southern , though for a period an " S " prefix was added to the number . This was replaced with the BR standard numbering system , with all locomotives being allocated , by batch , numbers within the 30xxx series .

= = Models = =

Hornby Railways manufacture a model of the M7 in OO gauge . Dapol manufactured a model of the M7 for British N gauge in 2006 but has since ended production of this model .