= SR Q1 class =

The SR Q1 class is a type of austerity steam locomotive constructed during the Second World War . The class was designed by Oliver Bulleid for use on the intensive freight turns experienced during wartime on the Southern Railway network . A total of 40 locomotives were built . Bulleid incorporated many innovations and weight @-@ saving concepts to produce a highly functional design . The class lasted in service until July 1966 , and the first member of the class , number C1 , has been preserved by the National Railway Museum .

The highly unusual and controversial design represents the ultimate development of the British 0 @-@ 6 @-@ 0 freight engine , capable of hauling trains that were usually allocated to much larger locomotives on other railways . Nicknames for the class included " Ugly Ducklings " , " Coffee Pots " and " Charlies " .

= = Background = =

In late 1939 , the Southern Railway , until then primarily a high @-@ density commuter railway serving London and South @-@ East England , much of it electrified with third @-@ rail pick @-@ up , found itself on the British front line of the Second World War , with a severe lack of modern freight @-@ handling capability . The newest freight design was the Q Class 0 @-@ 6 @-@ 0 of 1938 , the last locomotive designed by Richard Maunsell . Built to essentially Victorian era principles , these had been designed as replacements for many of the older 0 @-@ 6 @-@ 0s inherited by the Southern Railway in 1923 , and entered service in January 1938 . Maunsell , having retired at the end of October 1937 , was replaced by Oliver Bulleid .

The Southern Railway , therefore , became an essential strategic war @-@ asset because of its proximity to continental Europe , and needed to equip itself with adequate freight @-@ handling capability to transport the vast quantities of supplies and troops required for the conflict . The brief stipulated high route availability and high tractive effort .

= = Construction history = =

The answer to this problem came from the drawing board of the Southern Railway 's innovative Chief Mechanical Engineer , Oliver Bulleid in the shape of the Q1 . Using the minimum amount of raw materials , and with all superfluous features stripped away , he produced in 1942 the most powerful 0 @-@ 6 @-@ 0 steam locomotive ever to run on Britain 's railways . The first twenty locomotives were constructed at Brighton works and the remaining twenty at Ashford . Powerful and light , the Q1s formed the backbone of the Southern 's heavy freight capability . The engine weighed less than 90 tons (90 @.@ 6 tonnes) so could be used over more than 97 % of the Southern Railway 's route mileage .

= = = Design = = =

The class was one of several built under the wartime austerity regime , which stressed pure functionality above any considerations of style or decoration . This austere approach to the design explains its functional appearance . One aspect of their shape was that , like Bulleid 's SR Merchant Navy class and SR West Country and Battle of Britain classes , they could be simply driven through a coach @-@ washer for cleaning at a time when manpower for this time @-@ consuming chore could not be spared .

The unusual shape was also dictated by the use of materials ; the lagging was made of a glass fibre insulation material known as ' Idaglass ' , which , although cheap and plentiful during the war years , could not support any weight , and therefore a separate casing was required which followed that seen in the Merchant Navy class locomotives , and the boiler rings were adapted to lend the lagging the support needed . A copper , rather than steel , firebox was utilised , unlike Bulleid 's Pacific designs . The wheels were smaller , 5 ft 1 in (1 @.@ 55 m) adaptations of the Bulleid Firth

Brown type utilised on the Pacifics . The locomotive had two cylinders with Stephenson link outside admission piston valves , having a travel in full gear of 6 1 ? 8 in (155 @.@ 58 mm) and a steam lap of 1 5 ? 8 in (41 @.@ 28 mm) . It was provided with a five @-@ nozzle blast @-@ pipe .

The boiler design was based upon that of the Lord Nelson class , and the firebox used the same throatplate and backplate . The boiler barrel measured 10 ft 6 in (3 @.@ 20 m) in length , with diameters of 5 ft 0 in (1 @.@ 52 m) at the front and 5 ft 9 in (1 @.@ 75 m) at the back . The grate area was 27 sq ft (2 @.@ 51 m2) , the heating surface of the 209 tubes and 21 flues was 1 @,@ 302 sq ft (120 @.@ 96 m2) , that of the firebox was 170 sq ft (15 @.@ 79 m2) giving a total evaporative heating surface of 1 @,@ 472 sq ft (136 @.@ 75 m2) ; the superheater heating surface was 218 sq ft (20 @.@ 25 m2) .

= = Operational details = =

The Q1 represented the final development of the British 0 @-@ 6 @-@ 0 main line steam locomotive . Later designs of medium @-@ powered freight locomotives , such as the LMS Ivatt Class 2 2 @-@ 6 @-@ 0 and LMS Ivatt Class 4 Moguls all had a 2 @-@ 6 @-@ 0 wheel arrangement ; the 0 @-@ 6 @-@ 0 wheel arrangement was not used again in the BR Standard designs of locomotive .

BR classified the Q1 class in the power classification 5F . This represented a rarity , as few other 0 @-@ 6 @-@ 0s exceeded the classification of 4F , with notable exceptions being the LNER Class J20 (5F) , LNER Class J39 (4P5F) and LNER Class J38 (6F) .

The Q1 's route availability meant that although they were primarily freight locomotives , they also frequently deputised on secondary passenger services . However , the class gained a reputation for poor braking on unfitted freight trains due to the light construction of the tender braking system .

The Q1s thrived on their intended duties during World War II , where the class had proved that they were an indispensable addition to the Southern locomotive fleet . This was achieved to such an extent that they all remained in service until the 1960s , long after they were intended to cease operation as an " austerity " design . Withdrawals began in 1963 , during the implementation of the BR Modernisation Plan which saw the end of steam operations on Britain 's railways , the last example of the class being withdrawn in 1966 .

= = Livery and numbering = =

= = = Southern Railway and Bulleid numbering system = = =

Livery of the Q1 Class was plain freight black , with Sunshine Yellow numbering on the cabside , and " Southern " lettering on the tender , shaded in green . Bulleid advocated a continental style of locomotive nomenclature , based upon his experiences at the French branch of Westinghouse Electric before the First World War , and those of his tenure in the rail operating department during that conflict . The Southern Railway number followed an adaptation of the UIC classification system where " C " refers to the number of coupled driving axles ? in this case three . All these locomotives therefore carried numbers which started " C " followed by the individual identifier from C1 to C40 .

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

After nationalisation , the original Southern livery was in continued use , although with " British Railways " on the tender in Sunshine Yellow . From 1950 onwards , livery remained plain , although in the guise of British Railways Freight Black without lining of any description . The British Railways crest was located on the tender side . Given the British Railways power classification 5F , the locomotives were also renumbered to the British Railways ' standard numbering system as 33001 ? 33040 .

= = Preservation = =

Only one locomotive of the class survived into preservation . First @-@ of @-@ class 33001 (C1) has been preserved , and now resides at the National Railway Museum in York , where it carries its original SR livery and number . Before its return to York in 2004 , the locomotive worked on the Bluebell Railway in East Sussex .

= = In fiction = =

The locomotive Neville in the Thomas and Friends children 's television series is based on Q1 class No. 33010 .