= SR U class =

The SR U class were 2 @-@ 6 @-@ 0 (mogul) steam locomotives designed by Richard Maunsell for passenger duties on the Southern Railway (SR) . The class represented the penultimate stage in the development of the Southern Railway ? s mogul " family " , which improved upon the basic principles established by GWR Chief Mechanical Engineer (CME) George Jackson Churchward for Great Western Railway (GWR) locomotives . The U class design drew from experience with the GWR 4300 and N classes , improved by applying Midland Railway ideas to the design , enabling the SECR to influence development of the 2 @-@ 6 @-@ 0 in Britain .

The U class was designed in the mid @-@ 1920s for production at a time when more obsolete 4 @-@ 4 @-@ 0 locomotives were withdrawn , and derived from Maunsell ? s earlier SECR K (? River ?) class 2 @-@ 6 @-@ 4 tank locomotives . The first 20 members of the U class were rebuilds of the K class locomotives , one of which was involved in the Sevenoaks railway accident . A further 20 U class locomotives were built in 1928 to fill the gap in cross @-@ country and semi @-@ fast express passenger services after the withdrawal of the K class . The design also continued the standardisation of the Southern Railway locomotive fleet by using parts designed to be interchangeable with other Maunsell @-@ designed classes .

A total of 50 locomotives were built over three batches between 1928 and 1931 , and the design formed the basis for the 3 @-@ cylinder U1 class of 1928 . They were able to operate over most of the Southern Railway network , gaining the nickname " U @-@ Boats " after the submarine warfare of the First World War , and continued to operate with British Railways (BR) . The class saw continuous use until 1966 , when all members of the U class were withdrawn from service . Four U class locomotives have been preserved on two heritage railways in the south of England .

= = Background = =

The history of the U class is complex as it is linked to the fate of the 2 @-@ cylinder K (" River ") class 2 @-@ 6 @-@ 4 tank locomotives . The design work had for a new passenger 2 @-@ 6 @-@ 0 with 6 ft (1 @.@ 83 m) driving wheels was complete by 1927 , when the involvement of a K class locomotive in the Sevenoaks rail crash presented an opportunity to bring forward construction of the class . The K class tank engines were the passenger counterpart to the N class 2 @-@ 6 @-@ 0 mixed @-@ traffic design , and were noted for rough @-@ riding over the cheaply laid track of the former SECR . The class was withdrawn from service , and the inquiry that followed determined that the rough @-@ riding contributed to the crash . Its recommendation was that the K class should be rebuilt to 2 @-@ 6 @-@ 0 tender locomotives , using tried and tested features used by Maunsell and his assistant , the former GWR engineer Harold Holcroft on the N class .

The N class principles applied to the U class design aided mass production , and incorporated several features found on the GWR 4300 Class locomotives designed by Churchward . An order made in 1926 for a second batch of 20 K class locomotives was delayed until 1928 , when the specification was revised to construct U class locomotives . It was intended to replace several elderly 4 @-@ 4 @-@ 0 classes within the former SECR 's running fleet , and attempted to standardise and ease maintenance of locomotives by sharing parts with other Maunsell designs . The style of the new locomotive reflected the Midland Railway influence of another of Maunsell ? s assistants , the ex @-@ Midland Railway engineer James Clayton . The addition of a tender increased the operating range of the U class over its K class predecessors , and the wheel arrangement applied to the former K class locomotives improved the locomotive ? s stability when operational .

= = Construction details = =

= = = K class rebuilds = = =

The rebuilding programme that followed the derailment of K class No . A800 " River Cray " at Sevenoaks began at Ashford works in June 1928 . The work involved in converting a 2 @-@ 6 @-@ 4 tank engine to a 2 @-@ 6 @-@ 0 tender locomotive included the removal of the side water tanks , rear coal bunker and trailing axles , although the 6 ft (1 @.@ 83 m) driving wheels , right @-@ hand drive and N class ? type boiler were retained . The aesthetic aspects inherited from the K class were the former Midland Railway engineer James Clayton ? s contributions to the design , creating a simple , functional locomotive similar to the N class .

The rebuilt locomotives were given a tender and a re @-@ designed cab that bore a strong resemblance to those featured on designs by Henry Fowler . Two designs of Maunsell tender were used , the straight @-@ sided 3 @,@ 500 imperial gallons (15 @,@ 911 l) variety , and the larger 4 @,@ 000 @-@ imperial @-@ gallon (18 @,@ 184 l) design used on later batches of the N class with inward @-@ sloping raves to prevent coal spillage . The first rebuild was No . A805 River Camel , which also became the first U class locomotive into service in March 1928 , three months before the first production locomotive under construction at Brighton . The rapid turnaround was achieved as design work was already in place , and the rebuilding of existing locomotives was cheaper than building from scratch .

No . A805 was put on performance trials prior to work commencing on rebuilding of the rest of the class at Brighton and Eastleigh works . The rebuilds lost their names because of the bad publicity attached to the " River " class after the 1927 crash , and the heavily damaged No . A800 was the last member of the K class to be rebuilt to U class configuration in December 1928 . The unique 3 @-@ cylinder " River " tank , K1 class No . A890 River Frome was also rebuilt to the general U class specification , becoming the prototype of Maunsell 's 3 @-@ cylinder U1 class derivative in June 1928 .

= = = First production batch and differences with rebuilt locomotives = = =

Construction of the delayed 1926 order for 20 K class locomotives began in 1928 after alteration to the U class specification . As a result of Harold Holcroft ? s position as one of Maunsell ? s assistants , the new @-@ builds also displayed the Churchward GWR 4300 Class influence . The ideas applied to this class were already used on the N , N1 and K class rebuilds , including long @-@ travel valves for fast running , Belpaire firebox and conical boilers , constructed at the North British Locomotive Works in Glasgow . The first of the production batch emerged from Brighton works in August 1928 and featured a tapered chimney and smokebox snifting valves , both of which were used on the K and N class locomotives .

The 20 locomotives of the first production batch were split equally between Brighton and Ashford works , and all were completed by December 1929 . The production locomotives had a slightly different profile to the K class rebuilds and featured left @-@ hand drive to improve the visibility of signals from the driver 's side of the footplate . They also had higher running plates along the sides of the boiler than the rebuilds , which required smaller wheel splashers to cover the tops of the driving wheels . Another variation was the flatter top to the dome covers , as the rebuilds retained the high N class type used on the K class .

In common with the N , N1 and K class locomotives , the Midland Railway influence of Clayton showed in the placement of locomotive fittings on the production batch , as the water top @-@ feed into the boiler was located inside a dome , whilst the cab area was a modified version of those on the 0 @-@ 6 @-@ 0s of Henry Fowler and the K class rebuilds . The rebuilds had Midland Railway @-@ style double spectacle plates (the small windows on the front face of the cab) left over from the K class cabs , whereas the production versions had one each side of the boiler . Such modifications were becoming typical of the Southern Railway ? s attempt to produce a fleet of standardised locomotives . However , all members of the U class were to vary from GWR practice , as the superheating surface area was increased , and all were equipped with outside Walschaerts valve gear .

= = = Second production batch and modifications = = =

The second batch of ten new @-@ build U class locomotives was constructed between February and May 1931 when more obsolete locomotives were withdrawn from service . This brought the total of new @-@ build locomotives to 30 , and the total number of operational U class engines to 50 . The new batch also featured detail differences from the rest of the class , such as the arrangement of the footsteps at the front of the locomotive , though continued to use the standard left @-@ hand drive cab layout to improve the driver ? s forward vision from the cab . Smoke deflectors were fitted to the whole class from 1933 to prevent drifting smoke from obscuring forward vision . The smokebox snifting valves applied to the class by Maunsell were removed by his successor Oliver Bulleid , who also fitted U1 class chimneys to improve the draughting .

= = Operational details = =

The U class was a reliable and economical design more than capable of attaining speeds in excess of 70 mph (110 km / h) as a result of being fitted with long @-@ travel valves . They had high capacity , tapered boilers which promoted free steaming , and 6 ft (1 @.@ 83 m) driving wheels which allowed fast running over long distances . They were distributed more widely than their N class counterparts , although one drawback in operating the class was the size of the cylinders and cab , which meant the U class was out of gauge for the Tonbridge @-@ Hastings line due to inadequate clearances in tunnels along the route . Otherwise , their " go anywhere " nature earned them the nickname of " U @-@ Boats " , and crews praised their abilities to achieve what they were designed to do .

The Southern Railway operating department undertook trials to improve fleet efficiency . When built , Eastbourne @-@ based No . A629 was fitted with an experimental pulverised fuel burner of German design ; the experiment was terminated when a minor explosion was caused by the powdered coal coming into contact with sparks thrown from the blastpipe . The experiment also proved that pulverised coal was a false economy , as much of the fine dust was sucked through the chimney without combustion taking place . The locomotive was returned to normal coal burning in 1935 . In 1947 the class became a test @-@ bed for a government @-@ backed scheme regarding fuelling arrangements in anticipation of a coal shortage . Two of the class , Nos. 1625 and 1797 , were converted to oil burning , with more set to follow suit ; but the project was abandoned and the two oil burners were reverted to coal @-@ firing before this could take place .

All members of the class entered British Railways service in 1948 , and from 1955 23 of the U class received chimneys of the British Railways Standard Class 4 variety and replacement cylinders , which had become worn through intensive use . A few members of the class were given replacement frames at overhaul with a shallower curve between the front buffer beam and smokebox . During the early 1960s , the withdrawal of the ageing T9 class designed by Dugald Drummond saw the U class replacing them on services west of Exeter , though their large wheels offered little advantage on the steeper gradients that characterised this part of the railway network . The favoured form of 2 @-@ 6 @-@ 0 motive power west of Exeter was the smaller @-@ wheeled N class , while heavier passenger work was allocated to Bulleid ? s Unrebuilt Light Pacifics , which were within the weight restrictions imposed in this area . The U class represented one of the less glamorous classes of passenger locomotive due to the fact that they were used mainly on mixed @-@ traffic and secondary passenger duties .

= = Withdrawal = =

The class were withdrawn between 1962 and 1966

= = Accidents and incidents = =

On 25 May 1933 , a passenger train was derailed at Raynes Park , London , coming to rest foul of an adjacent line . Locomotive No. 1618 , hauling a passenger train , was in a side @-@ long

collision with it . Five people were killed and 35 were injured . The cause of the accident was the failure to implement a speed restriction on a section of track that was under maintenance .

On 14 November 1949 , a rake of carriages was left foul of an adjacent line at Bournemouth Central station , Hampshire . Locomotive No. 31624 collided with them and was derailed . One person was injured .

On 18 November 1962 , locomotive No. 31816 was derailed at Tipton Yard , Eastleigh , Hampshire .

= = Preservation = =

Unusually , all four surviving U Classes have steamed at some point in preservation and of the 4 survivors , 31625 has worked on the mainline .

= = Livery and numbering = =

= = = Southern Railway = = =

From 1928 , the entire class was painted in Maunsell ? s lined Southern Railway Olive green with yellow markings and " Southern " on the tender . During the Second World War , the U class was painted in wartime black livery with Oliver Bulleid 's Sunshine yellow lettering , and some were later painted in lined Malachite green livery . The class was initially numbered in the Southern Railway 's post @-@ grouping system from A790 ? A809 for the K class rebuilds , and A610 ? A639 with the production batches . The " A " in the numbering system denotes Ashford , where the locomotive design had originated . Southern numbering policy was eventually rationalised , and final batch of 15 locomotives , built between 1932 and 1934 , were numbered 1400 ? 1414 without the " A " prefix . The other U class locomotives were subsequently renumbered to 1790 ? 1809 , and 1610 ? 1639 at the same time .

= = = British Railways = = =

The entire class was absorbed by British Railways in 1948 , and was given the Power classification 4P3F , denoting a mixed traffic locomotive . Livery was initially similar to the Southern Railway , though with " British Railways " on the tender , and an " S " prefix to the Southern number . This was succeeded by the British Railways mixed @-@ traffic lined black livery with red , cream and grey lining and the British Railways crest on the tender . The British Railways standard numbering system was used to replace the Southern Railway system , and the class was allocated the series 31790 ? 31809 for the K class rebuilds , and 31610 ? 31639 for the rest .