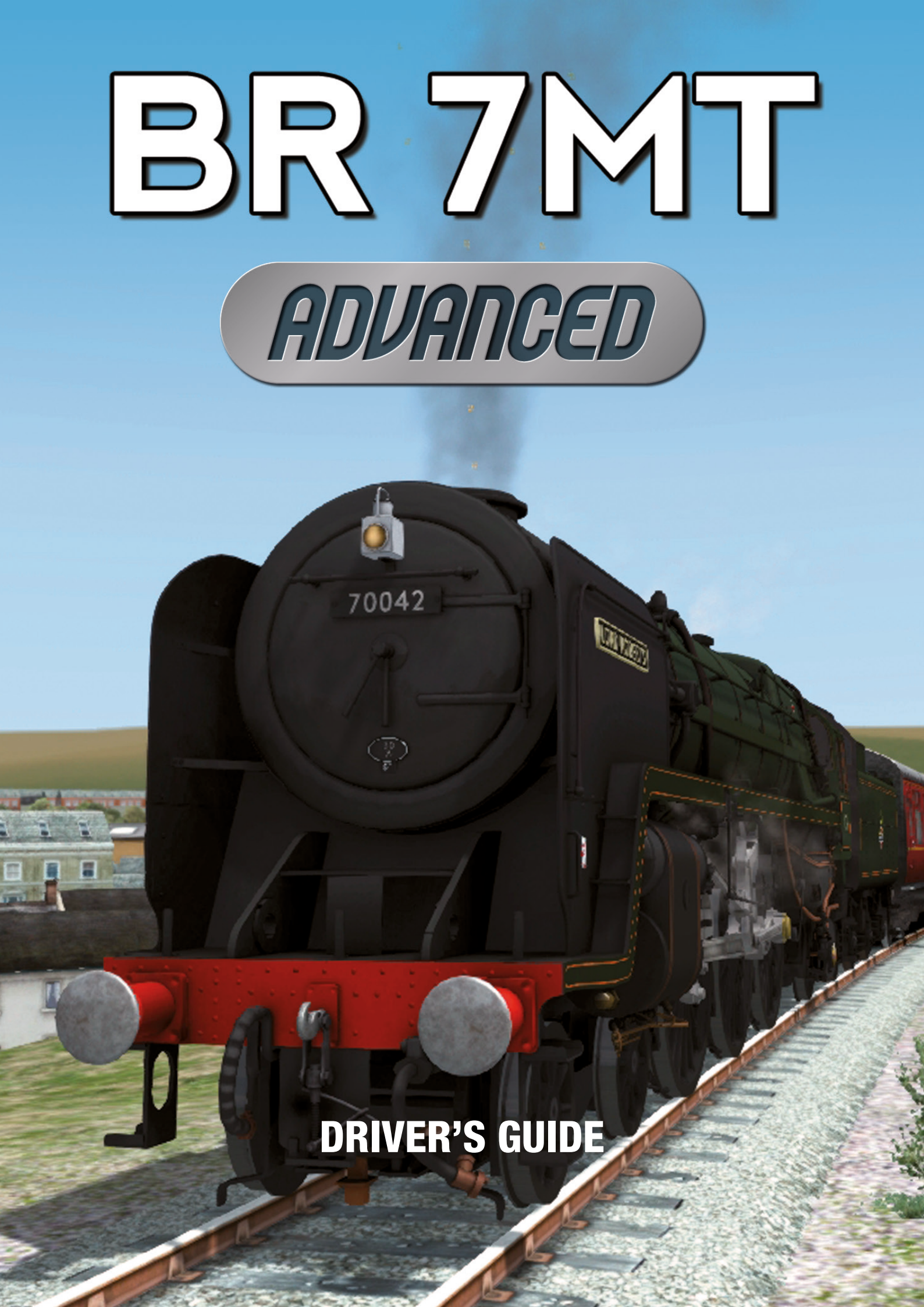
BR 7MT

ADVANCED



DRIVER'S GUIDE

BR 7MT

ADVANCED

Driver's Guide

Advanced steam locomotive expansion for Train Simulator

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INTRODUCTION

The British Railways Standard Class 7MT was a class of 4-6-2 'Pacific' steam locomotives of which 55 were built between 1951 and 1954. It was the first class to be designed and built to the new BR Standard paradigm.

The Second World War having taken its toll on Britain's railways, both in terms of the rolling stock and infrastructure as well as financially, the railways were nationalised and overnight British Railways became the owner of almost the entire railway network on New Year's Eve, 1947. Faced with such a huge assortment of different locomotive classes from the former Big Four (GWR, LMS, LNER and SR) and with the loco's built to each company's own design principles and loading gauge, it was BR's long term intention to eventually replace the vast majority of legacy loco's as they became life expired.

The replacement loco's were to be all-new standard designs, incorporating and combining the best practices of the former Big Four, and they were to be allocated to (and therefore compatible with) all the former Big Four networks. Where practical, parts were to be interchangeable between all of the new classes to reduce maintenance costs.

The locomotive exchange trials were conducted in 1948 by comparing similar classes on a range of different routes across the BR network, to try and establish the best range of design techniques and practices to carry forwards with the design of the new British Rail Standard locomotives. Arguably the trials did not establish this satisfactorily, due to poor experimental technique, and with the BR design team consisting of former LMS men, including Robert Riddles and E.S. Cox, it is not surprising that all of the BR standards were probably most influenced by the former LMS.

The first BR Standard loco, number 70000, emerged from Crewe, all in black and with no name or BR logo on the tender, on 2 January 1951. It very much looked like a former LMS machine, with the tapered boiler, wide Belpaire firebox and decidedly Ivatt-esque features such as the high running plate, as well as a cab and pony truck arrangement similar to those of the two Ivatt Duchesses. There were visible shades of the other Big Four railways present as well, with LNER-style Walschaerts valve gear and slide bars, and safety valve and regulator arrangements similar to the Bulleid Pacifics of the Southern Railway, whilst many of the smaller fittings like water gauge glasses came from the former Great Western.

After further testing and a successful proving run from Crewe to Carlisle, when 70000 hauled 440 tons of empty stock and an ex-LNER dynamometer car between Preston and Carlisle in 98 minutes rather than the expected 145 minutes, 70000 entered the paint shop at Crewe and re-emerged in Deep Bronze Green, lined out in orange and black and now carrying the British Railways early emblem on the tender sides. 70000 was then dispatched to London to be the centre of a formal ceremony at London Marylebone. Alfred Barnes, the Minister of Transport, pulled back the covers on the smoke deflectors to reveal the name, Britannia, and from then on the entire BR 7MT class was affectionately known as the BR Britannia class.

The Britannias were built in batches, with each batch destined for a particular region. The first batch, including Britannia and 70013 Oliver Cromwell, were to replace the LNER B1s and B17s on express passenger duties on the Great Eastern Main Line between London and Norwich, where they significantly reduced journey times. Two of this batch were loaned to the Southern Region at Stewarts Lane to work the Golden Arrow, amongst other classes from various regions, during a state of emergency when the entire Merchant Navy class was withdrawn to resolve a common problem of the crank axle fracturing.

The second batch was dispatched to the Western Region, where they were not very well liked apart from at Cardiff Canton shed. Crewing a Britannia was in many ways the complete opposite of normal WR standard practice – drivers had to deal with sitting on the left and with a regulator and reverser that were in the 'wrong' plane compared to the Castles and Kings, and the firemen quickly had to learn a wide and relatively short firebox. In 1955 the Western Region removed the handrails from the smoke deflectors and cut slots into the deflectors with brass surrounds, as the handrails were blamed for preventing the driver of 70026 from seeing a signal warning to slow down for an unexpected crossover and causing a fatal derailment.

The Midland Region made similar modifications to its Britannias. They changed the deflectors to ones with inset grab-holes, with a horizontal bar to grab onto. During the 1960s many members of the class which had originally been allocated to the Eastern or Western regions were transferred to live out the rest of their days on the Midland region, hauling whatever was required of them as stipulated by their mixed traffic power classification. It was on this region that 70013 Oliver Cromwell came to fame as the last steam locomotive to be overhauled at Crewe; it was frequently used to haul specials and kept in unusually immaculate condition.

Although two were withdrawn as early as 1965, the vast majority of the class weren't withdrawn until 1967. Whilst this was a terrible waste of relatively young locomotives, the fact that so many outlived the other large steam loco's and many of the smaller BR Standard classes is testament to the success of the Britannia design. Indeed, 70013 Oliver Cromwell was chosen for the last BR steam-hauled passenger train, 1T57, which is better known as 'The 15 Guinea Special'. Afterwards, 70013 retired as a BR loco and became part of the National Collection for preservation, whilst sister loco 70000 Britannia had already been saved from the cutter's torch two years earlier.

This BR 7MT Advanced add-on will enable you not only to drive and fire 70000 and 70013 as preservation superstars, but you can also travel back in time and relive the steam era with no less than three BR Era models, each with three different tenders, three different smoke deflectors and all 54 names with nameplates that have been beautifully crafted in 3D. Celebrate the history and heroic achievements of one of the finest classes of steam locomotive that was ever built!

Bibliography

Britannia Pacifics (2003) by Gavin Morrison & Peter Swinger

(Ian Allan Publishing, Hersham)

A Detailed History of BRITISH RAILWAYS STANDARD STEAM LOCOMOTIVES, Volume 2: The 4-6-0 and 2-6-0 Classes (2003)

(The Railway Correspondence and Travel Society, Peterborough)

LOCOMOTIVES AND TENDERS

BR era collection

Step back in time and take command of a Britannia in the days of British Rail. Each variant includes a choice of original, Midland Region and Western Region deflectors, BR1, BR1A and BR1D tenders (with automatic cab conversion when coupled to BR1D tenders) and all 55 numbers, complete with 3D nameplates for the 54 named loco's:

Number	Name	Tender
70000	Britannia	BR1
70001	Lord Hurcomb	BR1
70002	Geoffrey Chaucer	BR1
70003	John Bunyan	BR1
70004	William Shakespeare	BR1
70005	John Milton	BR1
70006	Robert Burns	BR1
70007	Coeur-de-Lion	BR1
70008	Black Prince	BR1
70009	Alfred the Great	BR1
70010	Owen Glendower	BR1
70011	Hotspur	BR1
70012	John of Gaunt	BR1
70013	Oliver Cromwell	BR1
70014	Iron Duke	BR1
70015	Apollo	BR1
70016	Ariel	BR1
70017	Arrow	BR1
70018	Flying Dutchman	BR1
70019	Lightning	BR1
70020	Mercury	BR1
70021	Morning Star	BR1
70022	Tornado	BR1
70023	Venus	BR1
70024	Vulcan	BR1
70025	Western Star	BR1A
70026	Polar Star	BR1A
70027	Rising Star	BR1A
70028	Royal Star	BR1A
70029	Shooting Star	BR1A
70030	William Wordsworth	BR1
70031	Byron	BR1
70032	Tennyson	BR1
70033	Charles Dickens	BR1
70034	Thomas Hardy	BR1

70035	Rudyard Kipling	BR1
70036	Boadicea	BR1
70037	Hereward the Wake	BR1
70038	Robin Hood	BR1
70039	Sir Christopher Wren	BR1
70040	Clive of India	BR1
70041	Sir John Moore	BR1
70042	Lord Roberts	BR1
70043	Lord Kitchener	BR1
70044	Earl Haig	BR1
70045	Lord Rowallan	BR1D
70046	Anzac	BR1D
70047	*Un-named*	BR1D
70048	The Territorial Army 1908-1958	BR1D
70049	Solway Firth	BR1D
70050	Firth of Clyde	BR1D
70051	Firth of Forth	BR1D
70052	Firth of Tay	BR1D
70053	Moray Firth	BR1D
70054	Dornoch Firth	BR1D

Clean/ex-works

Looking spectacular in polished and lined out Deep Bronze Green! From the days when sheds actually took a great deal of pride in their loco's, this will look good at the head of an express passenger or special. You can choose between early emblem and late crest versions of each clean tender.

Scenario editor list names:

- SD BR Std 7MT Green (Clean)
- SD – BR1 Tender (Green Early Clean)
- SD – BR1 Tender (Green Late Clean)
- SD – BR1A Tender (Green Early Clean)
- SD – BR1A Tender (Green Late Clean)
- SD – BR1D Tender (Green Early Clean)
- SD – BR1D Tender (Green Late Clean)

Intermediate weathering

Getting quite grubby now, but nothing that some kerosene, a rag and polish can't fix! Passenger loco's looking like this would have been a fairly common sight in the late 50s and early 60s. Only late crest tenders are available for this variant.

Scenario editor list names:

- SD BR Std 7MT (Green Lightly Weathered)]
- SD – BR1 Tender (Green Lightly Weathered)
- SD – BR1A Tender (Green Lightly Weathered)
- SD – BR1D Tender (Green Lightly Weathered)

Heavy weathering

Oh dear… Is it green? Is it black? Is it lined out? Who knows! Whilst mechanically sound, this variant is really looking for some TLC but, sadly, is unlikely to get it before meeting the cutter's torch. Despite its disgraceful cosmetic appearance, this will look very atmospheric on a stopping passenger or heavy freight set in the mid to late 60s – or maybe even on the odd express passenger train to cover for a broken down Class 40 diesel. There is a late crest under that tender grime somewhere, we think.

Scenario editor list names:

- SD BR Std 7MT (Green Heavily Weathered)
- SD – BR1 Tender (Green Heavily Weathered)
- SD – BR1A Tender (Green Heavily Weathered)
- SD – BR1D Tender (Green Heavily Weathered)

Preservation collection

The included renditions of the two surviving Britannias faithfully recreate the numerous details that make each loco so individual. With preserved details such as OTMR, cab lighting and electronics, TOPS numbers, Train Stop Override, modern warning flashes and dual braking for 70000, these simulations give you a taste of what it must be like to drive these celebrity loco's on famous heritage railways and across the UK's busy modern main line network.

70000 Britannia

Saved by the Britannia Locomotive Co. (formally the East Anglian Loco Preservation Society) in 1966, Britannia was moved to the Severn Valley Railway for restoration and became a preservation celebrity during the 70s, 80s and 90s. After a short period in the 00s when she was owned by pop mogul Pete Waterman back in her home town of Crewe, Britannia was bought by Jeremy Hosking as part of the Royal Scot Locomotive and General Trust and overhauled for the main line, returning in the all-black livery she wore when first revealed in 1951. Since then Britannia has been repainted into BR lined green, hauled the Royal Train and, despite a few setbacks, proved to be a reliable and popular performer on the modern railway and as a gala visitor on heritage railways.

The included model of 70000 Britannia includes dual brakes for operating vacuum- and air-braked trains, so listen out for the air compressor!

Hint: *Try changing the loco number to 70021. You can pretend it's the 2015 Spring Gala on the West Somerset Railway, and there might be a small but significant change in detail…*

Scenario editor list names:

- SD BR Std 7MT Britannia 70000
- SD – BR1 Tender (70000)

70013 Oliver Cromwell

Firstly, is Oliver 'Oli' Cromwell a he or a she – or for those that don't care, just an it? After hauling the last BR steam-hauled passenger train, 70013 moved back to East Anglia, near to his first home at Norwich. He was then transported by road to Bressingham Steam Museum and Gardens in Diss.

After a failed attempt to bring the loco out of Bressingham for a return to steam in the 90s, Oli was a star guest at the NRM's 2004 Railfest in York, where it was announced that the 5305 Locomotive Association would be carrying out an overhaul at the Great Central Railway. Oli was back and in steam in 2008, ready to haul the 40th anniversary special of the '15 Guinea Special'. Oliver Cromwell, 'the nation's Britannia', has remained a favourite of enthusiasts ever since, visiting numerous places via the main line and many different heritage railways as a living patron of the NRM.

Hint: *On Remembrance Sunday, 2008, 70013 was temporarily renumbered as long lost sister loco 70048, with the Territorial Army and the Duke of Gloucester both in attendance at the service. With the brand new nameplate 'The Territorial Army 1908-2008' on the left-hand side and the original nameplate on the right, and adorned with a wreath of poppies, 70013 served as an important memorial to the fallen servicemen of the First and Second World Wars. To change the 70013 model into the temporary guise of 70048, simply change the loco number in the loco string to 70048.*

Scenario editor list names:

- SD BR Std 7MT Britannia 70013
- SD – BR1 Tender (70013)

COACHES

This BR 7MT Advanced package includes three types of Mk.1 coach created by Just Trains. All are complete with passenger view, a unique leaking steam effect from the coach heating system and connecting vacuum hose pipes and steam heat pipes. The steam heating can be turned on and off from the locomotive footplate control.

The Mk.1 coaches are in BR Maroon, BR Blood & Custard, BR Chocolate and Cream, Southern Region Green and WCR Red liveries.

Brake Standard Open

First Open

Tourist Standard Open

ADVANCED FEATURES

As far as possible the typical operations of a real steam locomotive are recreated in this simulation. Fully replicating a realistic steam locomotive in Train Simulator is simply not possible, but we have added features which bring that dream closer to reality and give you a genuine feeling of what the real locomotive is like. We believe this BR 7MT Advanced add-on gives you the most authentic experience to date of operating and driving a steam locomotive.

Unfortunately one of Train Simulator's limitations is that you cannot start with a steam loco cold, i.e. without its fire lit, but you can join a BR 7MT loco at the 'warm' stage where it is nearly ready to drive but still requires several operations to be carried out to ensure that it runs properly and efficiently, namely filling the sandboxes, cleaning out the dust and dirt from the smokebox, priming the oil system via the oil distributor pump, and blowing down the boiler to help remove impurities. These may not be a fully accurate set of operations with the engine warm, but they are the most authentic available to us given the limitations of the host simulator.

The Advanced locomotive features include:

ActivHints

This training system can be toggled on and off at any time. It provides useful hints and tips for operating the loco and also informs you of where you are going wrong and how you could improve your practice, or of urgent matters such as low water in the boiler.

ActivFireman

When activated, ActivFireman will take over the firing responsibilities so that you can just enjoy the drive. ActivFireman is more intelligent than the default host simulation fireman, by knowing when you need a large fire and responding to a lack of steam production or excess steam lifting the safety valves.

Note: *The default Train Simulator automatic fireman MUST be turned OFF in the game settings.*

Simulated Malesco superheater header multiple valve regulator

Includes a pilot valve and three main valves, all operated by turning the cams with the regulator handle via the external linkage.

Regulator dynamics

Use your virtual palm to tap the regulator handle in small increments, or quickly slam it open or shut.

Operating snifter/anti-vacuum valves

These protect the cylinders from damage when there is no passage of steam through the cylinders. They help to prevent hot gases and ash from being sucked down the blast pipe and into the piston valves and cylinders. Monitor the state of the snifter valves by listening out for the air hiss in time with the cylinder movement when they're open and see the steam drift out when the pilot valve is open, or the blast of steam shooting sideways as the steam chest pressure rises and the snifter valves close.

Realistic reverser behaviour

The reverser lock is required to lock the reverser in place when the driver is not moving it, to prevent it from oscillating with the Walschaerts valve gear and creeping into forward gear.

Realistic brake simulation

Features include vacuum brakes that take longer to apply or release depending on the length of the train, the simulated diffusion of air into and out of the train pipe, and a locomotive and tender steam brake that can be applied by controlling the vacuum brakes and vacuum reservoir or by directly using the graduated steam brake handle.

Scripted Automatic Warning System (AWS)

Acknowledge the horn by pressing the reset lever. If you press the reset lever when the horn is not sounding, it will apply the brakes (BR era loco's only). If you fail to press the reset lever within 2.5 seconds of the horn starting to sound, the brakes will start to apply but you can still press the reset lever to cancel the automatic application.

Scripted wheel animation, wheelslip and wheelskid

Scripting takes the responsibility of simulating and correctly rendering the wheel animation. The driving wheels will accelerate with wheelslip, decelerate to a halt during wheelskid (when the steam brake is applied harshly) and turn in the opposite direction of travel if the reverser is wound back into the opposite gear.

Chuff sounds and exhaust effects

These are always accurately synchronised with the wheel position, even during wheelslip and wheelskid.

Weather and seasons have a direct effect on adhesion

You could be working hard driving up a steep gradient perfectly well in dry weather, but then the heavens suddenly open with rain, sleet, hail or snow and you can soon find yourself in a whole heap of trouble as the precipitation begins to build up on the rails.

Realistic water levels and gauges

See the photorealistic water level rise and fall with gradients, while also sloshing back and forth during acceleration and deceleration, and oscillating as the water in the boiler boils over. See how the water reverses the chevrons on the gauge glass backplate by refraction.

Permanent damage and solvable performance suppressions

This includes superheater cracking, wear induced by lack of lubrication, build-up of ash in the smokebox and fatal disasters which include cylinder explosion due to an excess of water in the cylinders and loss of connecting rods when wheelslip goes out of control.

Fully modelled 3D firebox interior

The firebox interior includes fire, firebed and coal animations. The fire bed and coal rise as you add more coal to the fire. Also included are animated fore and aft rocking grates and lighting.

Realistic damper and fire temperature control

Use both the main damper wheel to control the main air stream through the fire bed and the fire doors and fire door flap to control the secondary air through the fire hole in the cab.

Intelligent and advanced firing

'Lumps' of coal are thrown into the fire instead of a steady stream. Closing the fire doors automatically turns off the firing control. The fire glow gets paler and brighter as the locomotive works harder, while flashing in time with the exhaust.

Davies & Metcalfe exhaust injector

Use exhaust steam from the cylinders, or automatically switch over to live steam from the boiler when the steam chest pressure is very low.

Tender controls

Click on the Bardic lamp for some light in the cab when it gets dark, turn the handbrake, open the coal doors to view the coal, click on the coal plate doors to view the remaining coal load, and turn the water scoop handle to lower the water scoop into any compatible water troughs (see the Tender section of the CAB CONTROLS chapter).

Working tender water gauge

Keep an eye on the water level remaining in the tender tank.

Warm mode and Hot mode

Prepare your loco in Warm mode by opening the smokebox door to clear out the ash, prime the lubricators, fill the sandboxes and conduct the boiler blowdown to blow out the impurities in the water. Alternatively, start off in Hot mode, where all these tasks have been completed and you're ready to go.

At the end of a hard shift, clean out the smokebox ready for the loco's next turn of duty, blow the boiler down, then open the ashpan doors and empty the firebox with the rocking grate.

Warm mode

In Warm mode you need to carry out the servicing operations correctly before you can drive the locomotive. If you fail to do this, the performance of the locomotive WILL actually suffer.

If you fail to fill the sandboxes: Turning on the sander will have no effect on improving wheel adhesion.

If you fail to clean out the smokebox: This results in a temporary performance problem, with a random degree of severity that will get worse if it is left un-cleaned.

If you fail to turn and thus prime the oil lubricator: This will slowly and permanently reduce the maximum performance of the locomotive to represent the damage being done.

Hot mode

All the operations which must be carried out in Warm mode are already completed and you are ready to drive.

Steam heat control

Keep your passengers on board the Just Trains Mk.1 coaches nice and toasty during the winter season, and see the steam leaks from the carriage steam heat pressure relief valves and sometimes shoddy piping! The gauge will rise to maximum pressure at a varying speed depending on how wide you open the valve. There is a random leak rate which will be slightly different each time you drive, so you should open the valve just far enough to maintain pressure against leaks from the pipe.

Intelligent communication

Intelligent communication is provided between a growing number of Advanced locomotives – couple one or more 7MTs together, or double-head with a Just Trains 4MT, Clan, 5MT or Manor for synchronised control of cylinder drain cocks and regulator, and for communicating with a little toot of your whistle!

Advanced and photorealistic smoke and steam effects

See the main smoke stack change density and velocity with the change in blast pipe pressure and change colour with stoking and the change in fire mass. Use the colour of the smoke to determine the temperature of the fire – lots of black smoke indicates more coal being thrown into the firebox than the fire can burn! See the steam leaks from the safety valves and chime whistle flutter with the air flowing past the loco at speed. Notice the steam emissions from the cylinders in time with the motion. Beware of water droplets blasting out of the cylinder cocks and chimney, indicating a serious case of priming!

Highly realistic and detailed external animations

These include regulator linkage, loco brake linkage, sandbox lids, smokebox door, cab side windows, cab sliding roof hatches, cylinder cock actuator valve and realistically moving mechanical lubricators.

Visible raindrops

These will appear on the windows of the exterior model.

Advanced AI

AI trains whistle when starting to move and open and close the cylinder drain cocks automatically. In bad weather AI trains may even wheelslip and apply the sanders intelligently. For other loco's in the player consist, such as in double-headers, other Britannias or 5MTs have a more 'human' personality in their response to the player driver and loco. They self-manage their cylinder cocks and reverser at standstill. They try to copy the player driver's use of regulator and reverser but only after they're confident that the player needs them to provide assistance and isn't just dabbing the regulator momentarily to maintain momentum, and only if they're not wheelslipping themselves. When at a standstill, they will only get ready when you warn them with a short toot on your whistle, otherwise you will pull them away when they're not prepared.

Headcode

You can change the headcode to whatever you like, whenever you like, or via the number string in the Scenario Editor. Player and AI loco's can both have their headcode preset in the Scenario Editor for additional scenario authenticity.

Headboards

A selection of headboards can be fitted to 70000 Britannia or 70013 Oliver Cromwell on the fly. Headboards include The Hook Continental, Cumbrian Mountain Express and Torbay Express (preserved loco's only). You can cycle the headboards using Ctrl + Shift + W and Ctrl + Shift + Q keys

Bardic lamp

This is a useful appliance for when it gets a bit dark in the cab and is stowed in the tender's fire-iron storage space.

Sliding cab side windows and roof vents

Driving in a double-header

Before you start to move off, you should inform the other driver that you're ready to go by pressing [B] to do a short toot on the whistle. The other driver will put his loco into gear and, once he is ready, will toot back to you. Once he has tooted back, you can set off. If you fail to inform the other driver that you want to go, his loco will leave in mid-gear and he will get into a panic trying to get his loco ready whilst you're pulling him away!

Blowdown

This removes impurities from the boiler which, if left, increase the risk of priming and damage (only required for Warm mode).

Clean the smokebox

Open the smokebox and note the pile of embers in the bottom. Clean it out and you will see ash in the bottom blow out (only required for Warm mode or possibly after journeys of over 100 miles).

Prime the lubricator

Watch as the lubricator handle rotates (only required for Warm mode).

Fill sandboxes

Remove their lids and watch the sand level rise as you fill them. If you run out of sand during a run, you can stop the train and replenish the sandboxes at any time.

Servicing interlock

If the smokebox door and/or sandbox lids are not closed, the tender handbrake will not release.

Operating fore and aft rocking firebox grates

Use the handle from the boiler backplate to rock each grate individually. See the fire mass shake and fall through the grate while the individual grate pieces rock back and forth.

Ashpan doors

These have to be opened to allow the remainder of the fire to drop out through the ashpan when the grate is rocked to drop the fire.

Shed plates

Individual shed plate codes can be selected by presetting them in the Scenario Editor.

Reverser lock

The reverser must be unlocked, by pulling the locking latch back, before it can be moved.

Steam chest

There is a delay between opening/closing the regulator and the subsequent change in steam chest pressure and the supply to the cylinders. The delay varies depending on how saturated the internal steam pipe system is and how much the main valves are open. There is also a simple implementation of the piston valve action controlled by the reverser, which brings the simulation a step closer to replicating the real thing.

Moving the regulator handle to fully open will progressively open the four poppet valves in the Malesco superheater header, starting with a very small pilot valve and then three large main valves. This allows for a finer degree of control over the steam chest than is possible in the Advanced 4MT and 5MT locomotives.

Working steam brake

The locomotive and tender are braked by a steam brake, controlled by the locomotive's graduated steam brake control. This is operated in two ways.

The first is via the vacuum brake used to control the train brakes. The steam brakes will brake the locomotive and tender in conjunction with a decrease in vacuum brake pressure, although they will only start to act when the vacuum brake train pipe pressure is below 19 inches of mercury.

The other method of controlling the steam brakes is to use the steam brake handle to control them directly. This allows you to control the steam brakes independently of the train's vacuum brakes, but on one condition – the vacuum reservoir pressure must be the same as the vacuum train pipe pressure. If the train pipe pressure is less than the reservoir pressure, the steam brakes will apply in proportion to the difference between the reservoir pressure and the train pipe pressure.

Furthermore, it is possible to drive the locomotive on unfitted trains or light engine without creating a vacuum. If the vacuum brake is fully applied with 0 (zero) inches on the gauge, and the reservoir vacuum is destroyed with the release button and is also 0 (zero) inches, then you are free to drive the locomotive and use the steam brake only.

Authentic vacuum brake

The vacuum brake on the 7MT Advanced locomotives is the standard British Railways set-up across the range of Riddles-designed Standard classes.

Press and hold the [J] key to increase and [Shift]-[J] to decrease the small ejector, which you'll be mostly using, and press and hold the [U] key to increase and [Shift]-[U] to decrease the large ejector. Both are used to create a vacuum in the train pipe and overcome any losses in vacuum due to leaks.

The large ejector is normally used to release the brakes more rapidly, particularly with longer trains, and uses more steam. The small ejector can be used to release the brakes fairly quickly when light engine, but may take quite a while on longer trains. The small ejector is also used to maintain the vacuum in the train pipe whilst running, and to maintain the vacuum in the reservoir.

Westinghouse M8 dual brake (70000 preserved only)

The preserved model of 70000 is fitted with dual brakes so as to be able to haul both traditionally vacuum-braked rolling stock and air-braked stock such as many British Rail Mk.2 types. Controlling the train brakes on 70000 is therefore a bit different to the other models, with the brake handle being fully graduated and self-lapping for smooth and easy control over both the air pipe pressure and the vacuum pressure. The main reservoir tank and main reservoir pipe pressure gauges respond realistically to partial and full brake releases, and the steam-driven air compressor speeds up when air pressure in the reservoir tank is getting low.

Cylinder drain cocks

These are operated by steam and there is a simulated delay between moving the handle connected to the actuating valve and the drain cocks responding to the change. After long stationary periods it is important to start the locomotive with the cylinder cocks open in order to flush out the simulated condensed water. The cylinder drain cocks are also the only way of preventing the cylinder from blowing up as a result of priming.

Priming

Priming occurs when the water level in the boiler is able to reach the regulator valve, right in the dome. This means that when the regulator is opened, water enters the steam pipe system. As a result, four things can happen all at once:

- Some of the water evaporates rapidly into steam when passing through the superheater and gives the steam chest an enormous boost of steam. (Because of the extraordinarily high concentration of water in the exhaust vapour, the exhaust will turn a brilliant white.)
- The heat shock of relatively cold water on superheated metal can cause the superheater elements to crack, permanently damaging the locomotive.
- Because water is forcing its way through the regulator valve under immense pressure, priming can prevent the regulator from being closed completely. To overcome this, open the regulator as far as it will go and quickly shut it again. This may take a couple of attempts.
- Finally, and perhaps most importantly, some of the water does not evaporate and finds its way into the cylinders. You will know when this happens as water will erupt from the chimney and will be squeezed out of the cylinder drain cocks. It is therefore paramount that the cylinder cocks are opened very quickly to exhaust all the water before the pressure in one of the cylinders becomes high enough to blow out the cylinder cap. If the cylinder blows up, it's game over. You will visually see the blown cylinder.

Realistic injector performance and steam usage

Always remember that an injector's water valve must always be open whenever the injector's steam valve is open, which means opening the water valve first and closing the water valve last. Opening the steam valve without any water could lead to injector failure until it has cooled down sufficiently!

You will need to balance the opening of the steam valves against how far open the water valves are – more water flow requires more steam to mix properly and pick up. Listen out for the faint hiss as you open the steam valve until you hear the injector singing, with just a faint steam emission from the injector overflow. If you open the steam valve too far and deliver too much steam for the quantity of water, the injector will blow back with an almighty roar!

The BR7 MT Advanced is quite a thirsty model, so you will be using the injectors frequently! The live injector uses much more steam than the exhaust injector, but the trade-off is that it has a bigger cone and so the water flow rate is greater.

Use both injectors strategically and plan ahead along your route. They are very useful for keeping boiler pressure under control when coasting or coming to a stop. They will also have a detrimental effect on steam generation, because you are adding relatively cold water to the boiler, so it is not always ideal to use them for long periods when climbing a steep gradient.

Directional sanders

The sander lever must be pulled to the left to operate the front sanders for when the locomotive operates in forward, and pulled to the far right to operate the rear sanders used when travelling tender first. Using sand depletes the sand level in the sandbox, and when the sandbox is empty the sanders can no longer apply sand to the railhead and improve adhesion. You can stop the train at any time, apply the handbrake and refill the sandboxes as described in the SETTING UP THE LOCOMOTIVE FROM A WARM STATE chapter.

Electronics box (Preservation collection only)

The electronics box can be accessed by opening the locker door under the fireman's seat. The box includes a master switch to turn the TPWS and AWS on, and switches to turn the in-cab lights on/off.

Cabview camera positions

This locomotive uses the Train Simulator multi-position cabview camera to provide various driving positions, including a head-out view out of the side windows that allows you to continue to grab the controls with the mouse and have full freedom of head movement, and a view of the internal firebox to monitor the fire.

DRIVING OPTIONS

Please read this chapter carefully before driving the BR 7MT Advanced locomotives.

This BR 7MT Advanced simulation is probably the most advanced steam loco currently available to drive in Train Simulator and therefore needs to be set up and operated correctly. The locomotive can be in several different states and it is important to understand them so that the correct one is used in specific situations.

Advanced

This is the default locomotive mode and has complex controls with realistic operations and reactions to give you the most authentic experience possible of driving a steam locomotive.

Simple

This mode needs to be set via the included Switcher utility (see the following page) and will allow the BR 7MT Advanced locomotives to be driven in a simple format using the [F4] HUD controls. Simple mode should not be selected to drive the included scenarios – they have been created for use in Advanced mode.

When you are driving in Simple mode the BR 7MT Advanced locomotive has all the visual 'bells and whistles, tricks and treats' as when it is in the Advanced mode, including:

- Dynamic particles
- Oscillating water level gauge
- Headcodes
- Communicating loco's in double/triple/poly loco headers
- Wheelslip
- Steam heat
- Speedometer linked to wheel speed (excluding locomotives which are not equipped with speedometers)
- Exterior animations
- Cylinder cock leak activated by track markers in scenarios
- Operating Bardic lamp
- Handbrake controls on the tender

In these respects, then, Simple mode is very similar to Advanced mode, but there are differences in Simple mode where the controls are concerned:

Regulator – standard operation with no steam chest effect.

Reverser – no reverser lock.

Brakes – no steam brake. The vacuum brake handle has notches for Release, Running and Apply. The ejectors do not need to be turned on.

Damage – you cannot damage the Simple loco, whereas you can damage the locomotive in Advanced mode.

Firing controls are all basic – normal damper, blower, normal fire doors, normal injector controls and normal stoking.

Sanders are unlimited – and there are no forward and reverse sanders, just the one basic sander.

No Warm or Hot start – all Simple loco's start off as Hot.

No maintenance controls – no opening the smokebox door, winding up the lubricator, emptying the smokebox, filling sandboxes, doing a blowdown or dropping the fire with the rocking grate and ash pan.

Warm

This is available in Advanced mode only and means that the required servicing must be carried out on the locomotive to ensure it operates correctly and does not suffer a lack of performance or failure.

This mode can be selected via the locomotive numbering in the Scenario Editor or will be employed in a scenario where its use is required.

Hot

This is the default state of the loco in both Advanced and Simple mode and means it is ready to drive with no need for it to be serviced before setting off. This mode is controlled by the locomotive numbering via the Scenario Editor or when employed in one of the included scenarios.

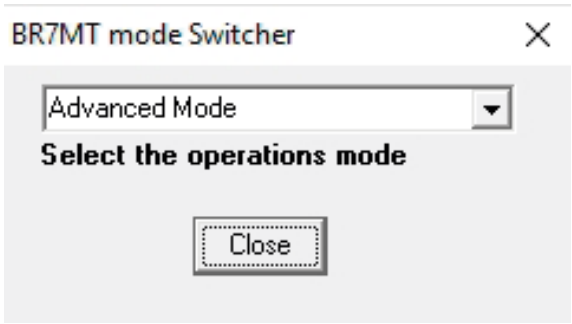
Please refer to the KEY COMMANDS AND OTHER FEATURES section of the manual for details on how to switch between Hot and Warm states.

Switcher utility

The switcher tool can typically be found here.

C:\Steam\steamapps\common\RailWorks\Assets\Steamdevs\BRStandard7MT\RailVehicles\BRStandard7MT

The Switcher is used to swap between the Advanced and Simple driving modes described above. Its use is self-explanatory.



CAB CONTROLS

Please note that although all the cab controls, instruments and indicators are modelled and might be animated, some may not be functional in this simulation. This is due to the limitations of what is possible in the host simulator.

To drive the locomotive with Advanced controls, the 'Automatic Fireman' needs to be OFF and the Expert Controls must be set to ON. You can check this via the Settings>Gameplay menu. When driving the locomotive in Simple mode, you can turn the core Automatic Fireman and Expert Controls on or off as you desire.

The text in square brackets below refers to the keyboard commands.

Many of the controls have mouse-over tips. Briefly hold your mouse over them to see their operation requirements.

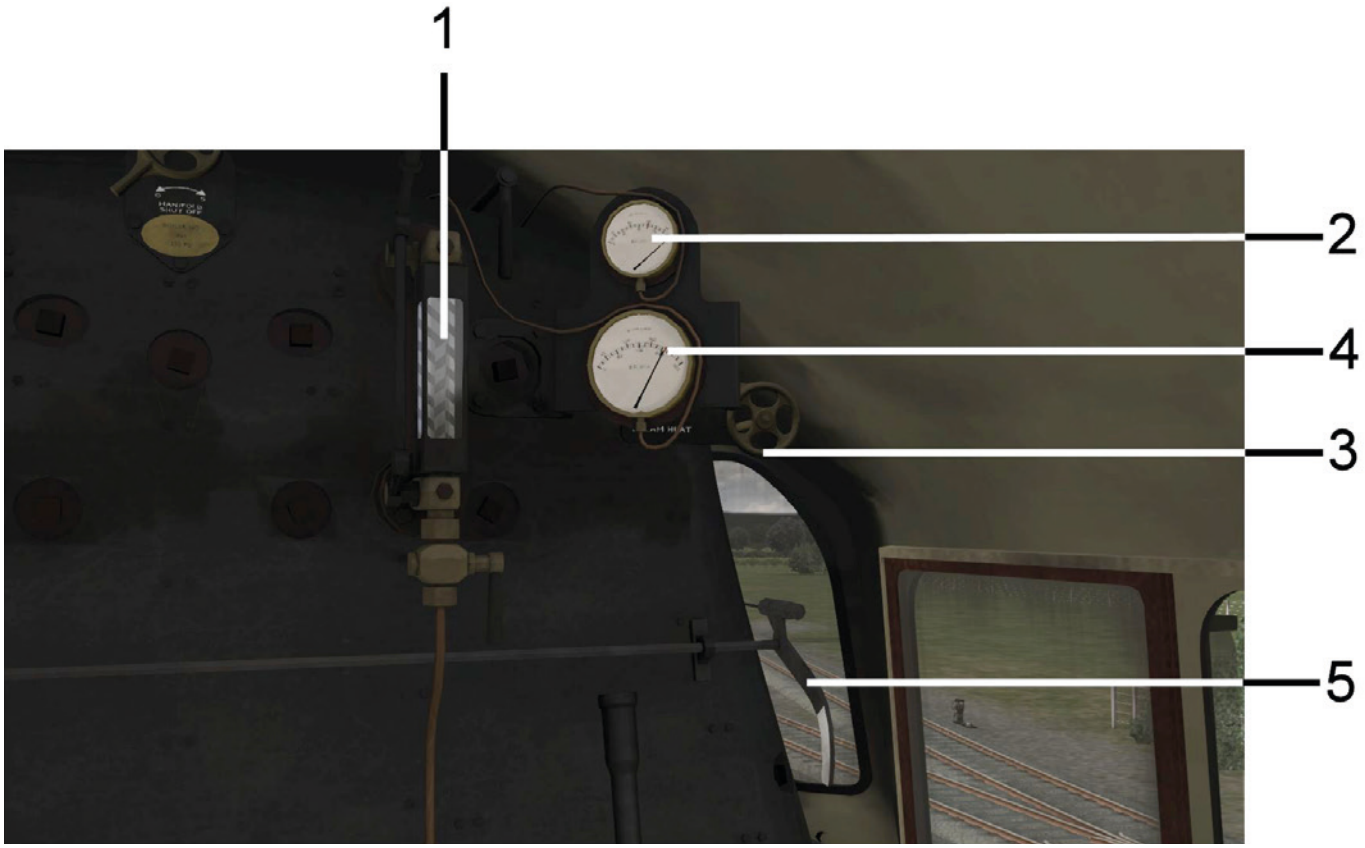
Detailed information on the functions of the cab controls is provided in the DRIVING THE BR 7MT ADVANCED LOCOMOTIVE chapter of this manual.

Cab roof

Sliding roof panels

Drag the handles to let some light in and some heat out!

Right upper cab



1. **Right side boiler water level indicator**

   Shows the level of water in the boiler.

2. **Coach steam heat pressure gauge**

3. **Coach steam heat control wheel**

   Rotate this wheel anti-clockwise to send steam to heat the coaches. The gauge will rise to maximum pressure at a varying speed depending on how wide you open the valve. There is a random leak rate which will be slightly different each time you drive, so you should open the valve just far enough to maintain pressure against leaks from the pipe.

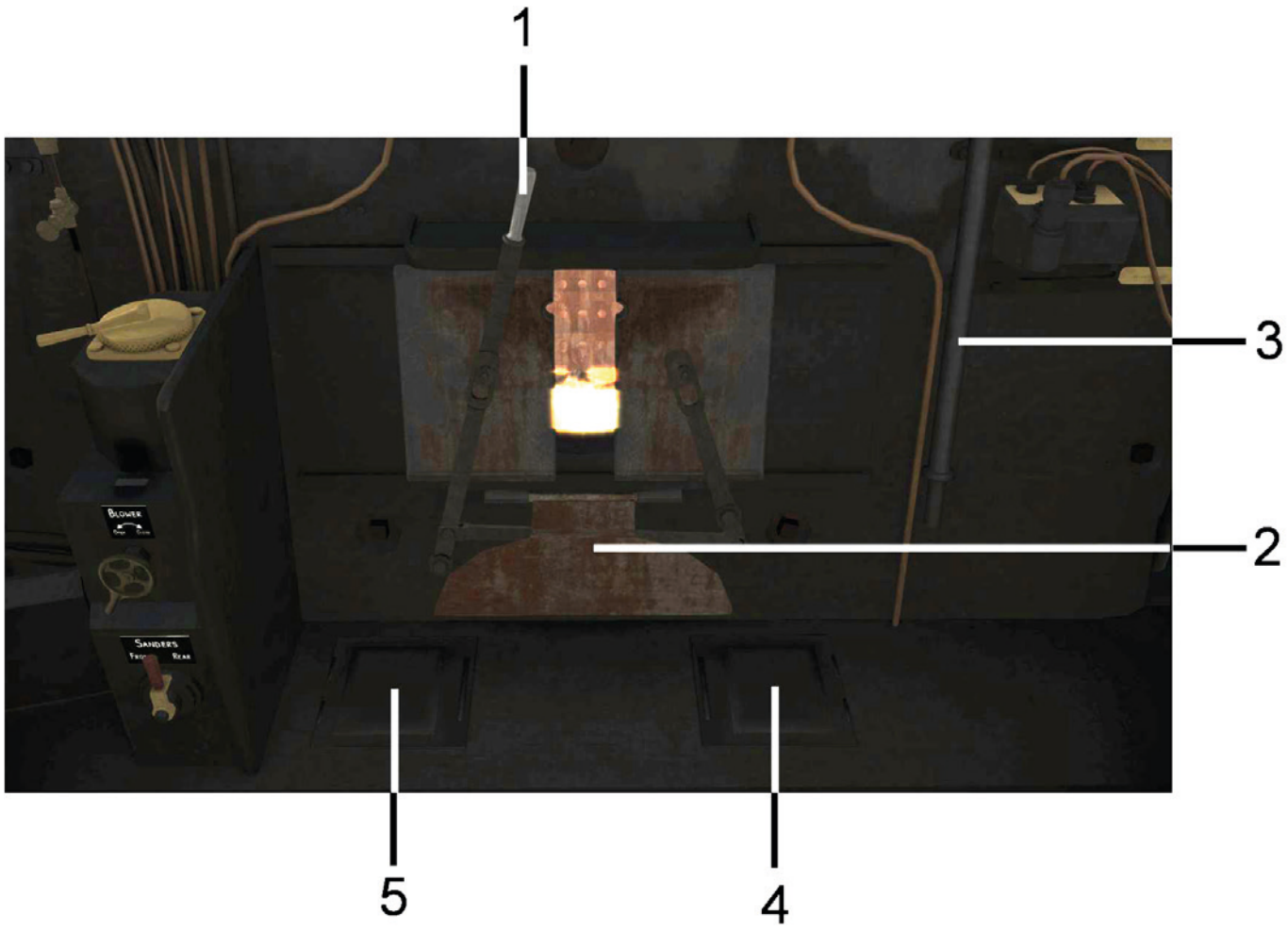
4. **Boiler pressure gauge**

   Shows the steam pressure in the boiler. Try to keep it just below the red line. Blowing off (hitting the red line) wastes steam and makes an awful lot of noise, so make sure you keep the loco quiet at night!

5. **Whistle operating lever, fireman's side**

   Pull down to sound the whistle.

Cab centre



1. Fire door handle

Drag the mouse across it or use the [F] key to open the firebox and [Shift]-[F] to close it.

Fire door notes: *You obviously need the fire doors open to stoke the fire. Skilled firemen will also use the fire doors to control the flow of secondary air and therefore maximise control over the fire temperature in conjunction with the dampers. You should close the doors before entering a tunnel and keep them closed while driving through the tunnel unless the blower is on sufficiently to draw the fire away from the fire hole AND the locomotive is travelling at a slow speed.*

2. Fire door flap

When the fire doors are open you can use the flap to reduce the amount of secondary air going through the fire hole when stoking. This is particularly useful for when you need to maintain as high a pressure as possible when working hard. Mouse-drag up/down to operate.

Firing (adding coal) – when the fire doors are open, you can stoke the fire. Try not to over-fire the locomotive or let the fire get too cold by under-firing, otherwise you will choke the fire with more coal than it can burn, which will be indicated by the grey-brown/black smoke and exhaust colour. Use the smoke colour to assist with firing decisions – if you've got pure black smoke then it's probably time to put the shovel down!

3. Grate rocking rod

This is where the rod for rocking the grate is stowed when not in use.

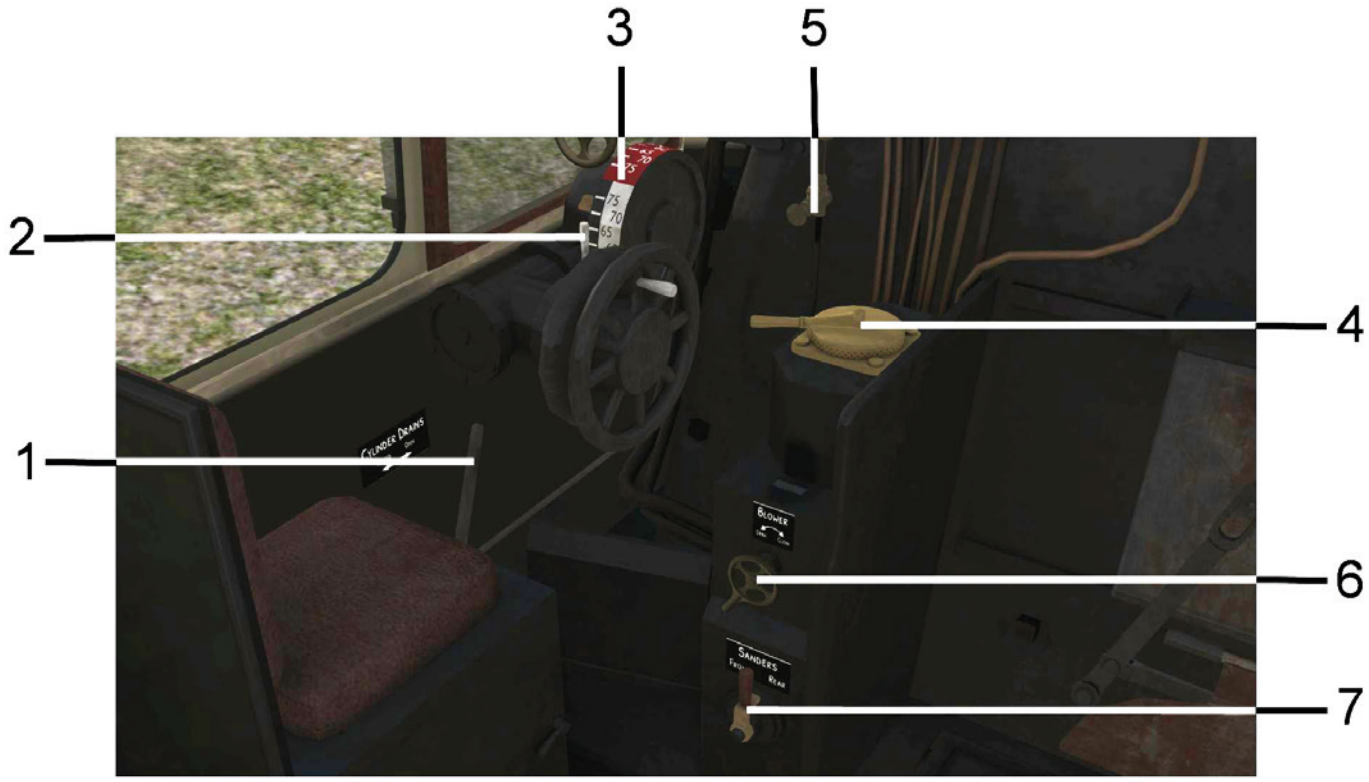
4. Right grate rocking socket cover

This is used to rock the right fire grate. Click on it to insert or remove the rocking rod. You can use your mouse or [Ctrl]-[R] to rock the grate after the rod has been inserted into the socket.

5. Left grate rocking socket cover

This is used to rock the left fire grate. Click on it to insert or remove the rocking rod. You can use your mouse or [Ctrl]-[L] to rock the grate after the rod has been inserted into the socket.

Left lower cab



1. Cylinder drain cocks

These are vital to ensure that water condensation is not trapped in the cylinders, which could result in serious damage to the cylinders. Use the [C] key or mouse-drag the cylinder drain cock lever forward to open the cylinder drain cocks. Press the [C] key again or drag the lever backwards to close them.

Cylinder cock notes: *These are used to drain the cylinders of water which collects in the cylinders due to condensation from steam and during priming. You should always leave them open when at a standstill, unless the standstill is very brief, and close them after a couple of wheel turns. If you see water squirting out of the cylinder drain cocks or blasting out of the chimney, then it's time to open the cylinder cocks very quickly before a cylinder goes bang.*

2. Reverser lock

You need to release this lock to allow the reverser wheel to rotate – use the mouse or press the [E] key to toggle. The lock should be re-engaged after each movement of the wheel.

3. Reverser indicator

The simplest analogy for the steam locomotive reverser is to think of it as being the gearstick/shifter paddles of a manual or semi-automatic car. As a general rule of thumb, start the locomotive in full gear, which is 75% cut-off in forwards and -75% cut-off in reverse, and never start the loco with less than ±45% cut-off. As your speed increases, wind the reverser back down or up towards ±10%. This is like shifting up through the gears of a car and, like in a car, saves fuel because smaller percentage cut-offs use less steam. Furthermore, when you need a kick in power for climbing up a hill, increase the amount of cut-off, like falling back into 4th and 3rd gear when your little 1.1 litre car encounters a steep hill! Use the mouse to rotate by dragging up or down, or use the [W] and [S] keys to increase/decrease cut-off respectively.

Reverser creep – it is very important, for safety reasons, that you lock the reverser again after moving it, otherwise the reverser will start to take on a mind of its own and rock back and forth while steadily moving itself towards full forward gear (75% cut-off).

4. Train brake

This affects ALL the brakes on the train, including those on the carriages, and is the brake normally used when pulling fitted rolling stock. Push the handle away from you to release the train brakes and pull it towards you to apply them. You can also use the [;] key (semi-colon) and [‘] key (apostrophe) to operate it. The brake is quite sensitive, so go steady when you make an application. Listen to the rush of air entering the train pipe and use it to assist your judgement of how much of an application to make, particularly in head-out view.

*B**rake notes:** You need to open the small ejector to allow the brake to release. Also, the brakes will not release unless you have 21 inches of vacuum showing in the vacuum gauge.*

The BR 7MT is fitted with vacuum brakes to brake the train and steam brakes to brake itself and its tender. Use the small ejector and the large ejector to create a vacuum with the vacuum brake handle in the OFF position to create a vacuum in the train pipe. The small ejector is slow and uses much less steam than the more expensive and much faster large ejector, but you must leave it on to maintain a vacuum and overcome any leaks. Pull the vacuum brake handle carefully towards you to destroy the vacuum in the train pipe and apply the brakes. On the vacuum brake duplex gauge you can see the vacuum train pipe pressure on the left and the vacuum reservoir pressure on the right. The difference between these two controls the locomotive’s steam brake. Alternatively, you can use the graduated steam brake handle to independently control the locomotive steam brake.

5. Reservoir release

Pressing this releases all the vacuum pressure in the vacuum reservoir tank. Use the mouse to do this. Note that the reservoir vacuum pressure will fight destruction if the vacuum pressure in the train pipe is greater, and that the small ejector will recharge the reservoir if the vacuum brake handle is left in the fully ON position, so ensure that the small ejector is turned off.

6. Blower

Use this to increase steam generation at low speeds or while stationary. This is great for those times when boiler pressure has got a bit low and you need to build up as much steam as possible in a short amount of time. Use the mouse or the [N] key to increase the blower and [Shift]-[N] to reduce it.

7. Directional sander

The sander lever must be pulled left to operate the front sanders for when the locomotive operates in forward, and pulled to the far right to operate the rear sanders used when travelling tender first. Using sand will deplete the sand level in the sandbox. You have 30 minutes of continuous use before the sandboxes run out, after which the sanders will no longer be of any use and you will have to stop and refill the sandboxes if you need them again.

At any time you can stop the train, apply the handbrake, and refill the sandboxes as described in the section for preparing the ‘Warm’ locomotive (see page 48).

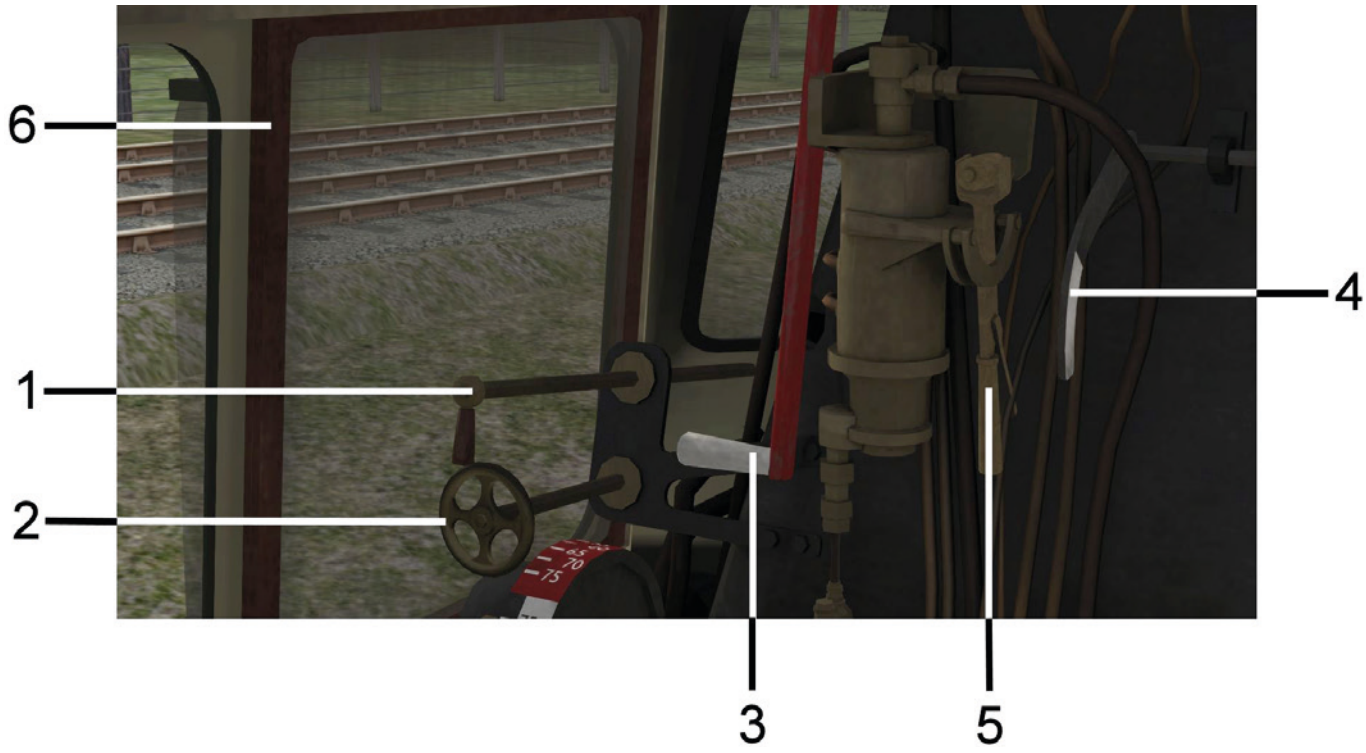
Left lower cab 70000

Dual train brake

The dual train brake affects ALL the brakes on the train, including those on the carriages, and is the brake normally used when pulling fitted rolling stock. Push the handle away from you to release the train brakes and pull it towards you to apply them. You can also use the [;] key (semi-colon) and [‘] key (apostrophe) to operate it. Push the brake handle against a spring-loaded release notch by holding the [;] key (semi-colon), which will release the brakes more rapidly. The further you pull back on the brake handle, the harder the braking force. Pulling it all the way to the emergency notch will initiate an emergency application.

Brake notes: *You should still open the small ejector to create a vacuum, even when hauling air-braked stock. This is because the steam brake is still operated in conjunction with the vacuum pressure in the vacuum train pipe and reservoir, and in real life it is a legal requirement that all vehicles in a passenger carrying service will apply their individual brakes when an application is made by the train brake.*

Left centre cab



1. Small ejector

The small ejector must be opened to allow the brakes to be released and maintain the vacuum in the train pipe. You can adjust its position to vary the release rate. Press and hold the [J] key to increase and [Shift]-[J] keys to decrease the ejector.

2. Large ejector

The large ejector can be used to release the vacuum brakes more rapidly than the small ejector, at the expense of using more steam. It is therefore useful for making a quick getaway from a stop or for saving the train from stopping short because too much braking was used. Use the mouse or press and hold the [U] key to increase and [Shift]-[U] keys to decrease the large ejector.

3. Regulator

This is essentially the throttle of a steam locomotive and is used to regulate the flow of steam from the boiler and into the steam chest. Gently pull the regulator towards you until the steam chest pressure starts to rise. Pull it further towards fully open to increase the steam chest pressure. Be aware of the delay between your action at the regulator and what actually happens at the steam chest. The [A] and [D] keys can be used to move the regulator, as well as the mouse.

The regulator takes some getting used to at first, but with practice you will become accustomed to its behaviour. If the cylinder cocks are open, open the regulator a good way and leave it until the train begins to move. If the cylinder cocks are closed, pump the regulator a few times, pulling the handle a fair way each time with no little dabs, while you wait for the steam to reach the cylinders. Then, as you start to move, leave the regulator open a little.

You MUST ensure that the pilot valve is open to keep the cylinders lubricated. You can tell when the pilot valve is open by the stream of steam coming from above the cylinders, even when the steam chest pressure reads 0, so make sure that the regulator is always slightly open and only ever fully closed at a very slow speed or at standstill. Failure to do this for prolonged periods of time will actually damage the loco and have an impact on its performance.

4. **Whistle**

   Drag the handle down or press the space bar on your keyboard to sound the whistle. For a short blast of the whistle, press the [B] key on your keyboard.

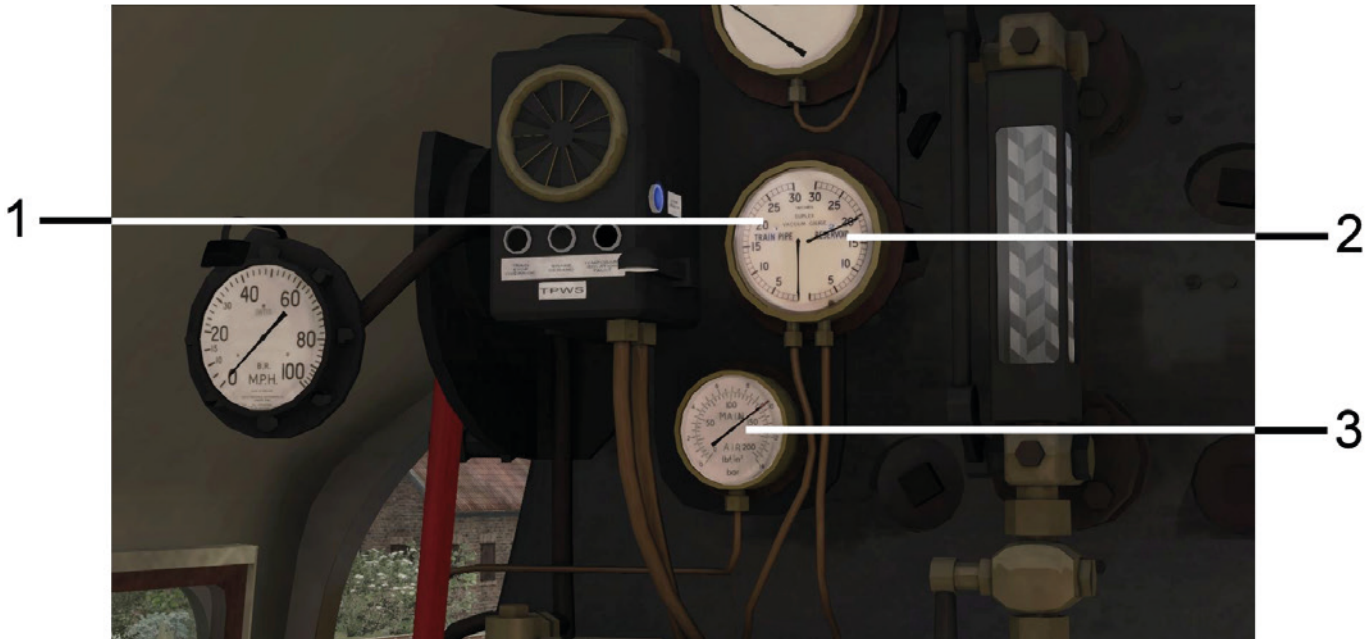
5. **Graduated steam brake**

   Use this brake when driving light engine or an unfitted freight. It operates the brakes on the engine and tender only.

6. **Left sliding window**

   Use the mouse to drag open or closed.

Left centre cab 70000



1. **Air train pipe pressure gauge**

   This shows the air pressure in the air train pipe. When the train brakes are fully released, it should display a reading of 72.5 PSI. A full service application will register 48.5 PSI once the pressure across the entire train pipe has equalised. An emergency application will register 0 PSI on the gauge.

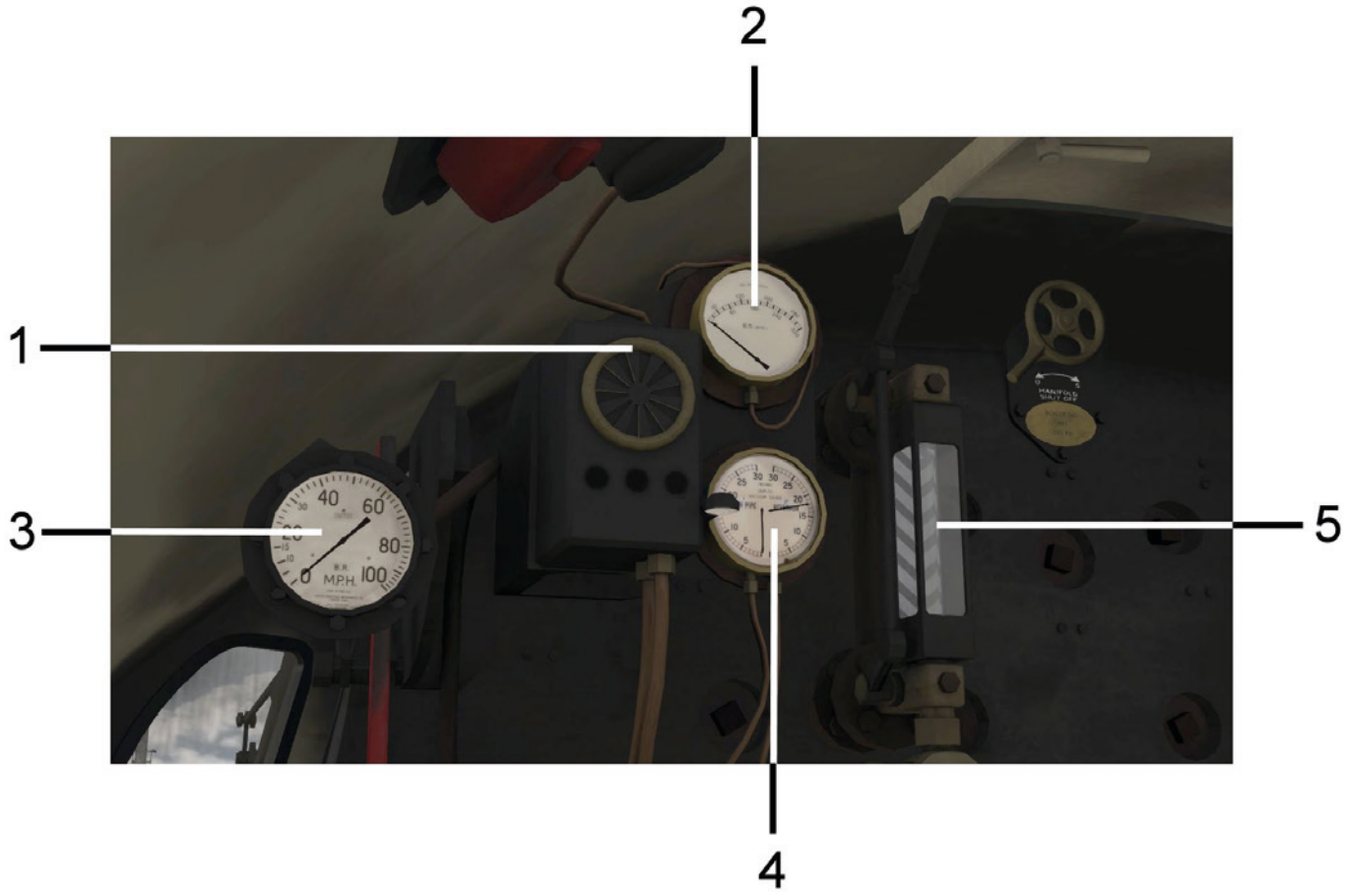
2. **Main reservoir pipe pressure gauge**

   This shows the air pressure in the main reservoir pipe, which is the second pipe that runs along the length of the train. When the train's air brakes are releasing, the main reservoir pipe pressure will decrease as air is transferred to the train pipe to speed up the release rate. The reservoir pipe is fed with new compressed air from the reservoir tank and after a brake release will slowly recharge.

3. **Main reservoir tank pressure gauge**

   The reservoir tank increases the volume of the air brake's total reservoir and feeds the main reservoir pipe, further increasing the speed of brake release. The reservoir tank is charged constantly by the compressor so any decrease in pressure will be seen to slowly increase again on the gauge. Should the main reservoir tank pressure drop too low, the compressor pump rate will increase and the reservoir tank gauge will show a speedier recharge back to full pressure.

Left upper cab



1. AWS indicator and reset

This indicator will display the sunflower pattern when the loco is driven on an AWS-equipped route and has had the AWS warning cancelled by the driver. Press the [Q] key or click on the silver lever to reset the AWS when acknowledging a warning, or click on the small reset lever on the right-hand side of the AWS apparatus.

AWS notes: *The Automatic Warning System is a very basic form of in-cab signalling and serves to remind the driver that the last signal was at caution and he is potentially approaching a signal at danger. It could also be considered as a vigilance test, ensuring that the driver is awake and keeping a keen eye out for approaching signals, although in cases of extreme fog where signals are less visible it can assist the driver.*

As the locomotive passes over an AWS yellow ramp in the four foot, either a bell will ring out with the all clear or a horn will blast out to warn of a signal at caution or danger. It will only stop sounding the horn if the driver acknowledges the warning by pressing the reset lever.

Even if the driver has failed to acknowledge the warning after 2.5 seconds and the brakes are being applied, the driver can still cancel the automatic brake application with the reset lever. Conversely, do not press the reset lever at any time other than when the warning horn is sounding. For the BR era 7MT loco's, pressing it in anticipation or out of habit will cause problems as it will also start to apply the vacuum brakes! Harsh? Maybe, but it stops bad habits and over-reliance on the AWS. Note that this isn't the case on the preserved loco's, which use a more recent version of AWS.

2. Steam chest pressure

The steam chest pressure can be seen on the steam chest pressure gauge in the cab. As this pressure is delivered to the cylinders via the piston valve, it forces the cylinders and hence the locomotive to move. The higher the pressure, the greater the force. Steam is added to the chest by the regulator, and is then exhausted into the cylinders when moving or through the steam chest drain cocks. Alternatively, steam in the system whilst standing will cool down and condense, reducing pressure. The steam chest pressure can never exceed or match the boiler pressure, but it can get pretty close in the right circumstances.

3. **Speedometer**

   This displays the speed of the locomotive.

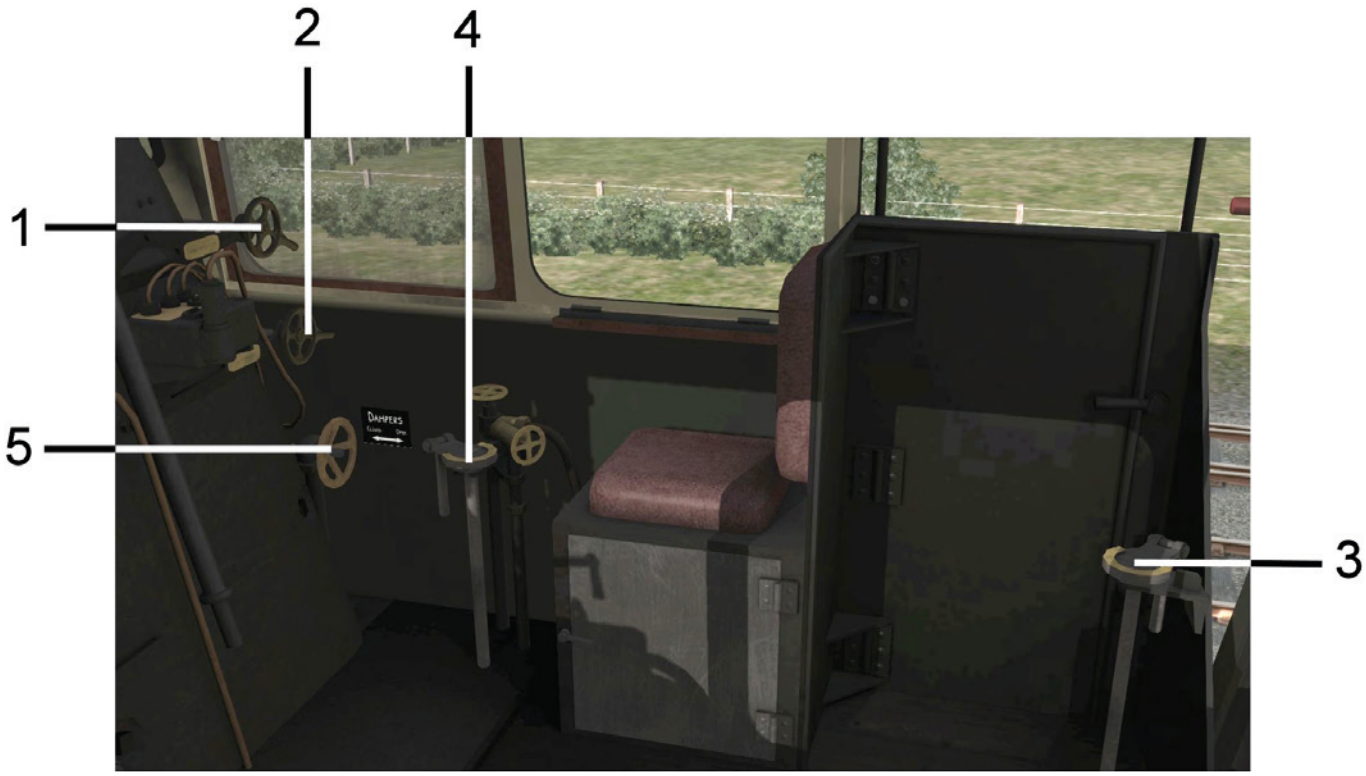
4. **Duplex vacuum gauge for train pipe and vacuum reservoir**

   This indicates the vacuum pressure of the train pipe on the left and the vacuum pressure in the locomotive's vacuum reservoir.

5. **Left water level indicator**

   This indicator shows the level of water in the boiler.

Right lower cab



1. **Exhaust injector steam valve**

   This is used to inject water from the tender into the boiler using exhaust steam. It must be used in conjunction with the exhaust injector water feed, otherwise there will be no water to inject. Turn anti-clockwise to open.

2. **Live injector steam valve**

   This is used to inject water from the tender into the boiler, using live steam. It must be used in conjunction with the live injector water feed, otherwise there will be no water to inject. Turn anti-clockwise to open.

3. **Live injector water feed**

   This valve allows water to flow from the tender to the boiler via the live injector and must be opened before the live injector steam valve is opened and closed. Turn anti-clockwise to open.

4. **Exhaust injector water feed**

   This valve allows the water to flow from the tender to the boiler via the exhaust injector and must be opened before the exhaust injector steam valve is opened and closed. Turn anti-clockwise to open.

5. Damper

Mouse-drag anti-clockwise or use the [M] key to increase the damper and mouse-drag clockwise or use the [Shift]-[M] keys to reduce it. This allows more or less primary air into the fire.

Damper notes: *These control the flow of the main source of air to the fire. Opening the dampers increases the flow of air. The more air supplied to the fire, the more oxygen is available and therefore the hotter the fire will burn. The front damper is most effective when running the locomotive chimney first so make sure the damper is wide open in situations where a hot fire is required (you are allowed to use both!) and is closed when you need to cool down the fire to reduce the chance of the safety valves going off.*

Note on using the water injectors

On the BR 7MT Advanced locomotives, as with many other locomotives, the water system is duplicated to ensure that there is a back-up if one of the injectors fails. If there was only a single injector and it malfunctioned, the boiler could run out of water and explode.

There are two types of injector fitted to the BR 7MT Advanced locomotives. The first is a standard live steam injector, which always uses live steam from the boiler and is therefore more costly in terms of steam usage and more powerful. The other injector is a Davies & Metcalfe exhaust injector, which uses exhaust steam from the locomotive cylinders when the steam chest pressure is a third of the boiler pressure, otherwise using live steam from the boiler. It is much less costly to use, but less powerful than the live steam injector.

For the purpose of these instructions we will only operate one injector system.

Each injector has two controls:

- The valve which allows water from the tender to the injector control, known as the water feed
- The injector steam valve itself (the spindle on the steam valve)

The water feed has to be opened to allow water to flow from the tender to the injector control, and then the injector steam valve is opened to release steam into the steam cone and mix the steam and water in the combining cone of the injector. The Venturi effect massively increases the speed of the mixture in the throat of the converging-diverging cone before back-converting the velocity energy into pressure energy. This in turn raises the pressure and velocity of the water, now that it is compressed with the steam, lifts it up the water feed pipes at the side of the boiler and delivers it into the boiler via the check valve.

Before you turn on an injector steam valve, ensure that the associated water valve is already open. For example, to turn on the exhaust injector, open the exhaust injector water valve, look outside and check that you can see water pouring out of the overflow on the right-hand side, below the cab, then turn on the exhaust steam injector.

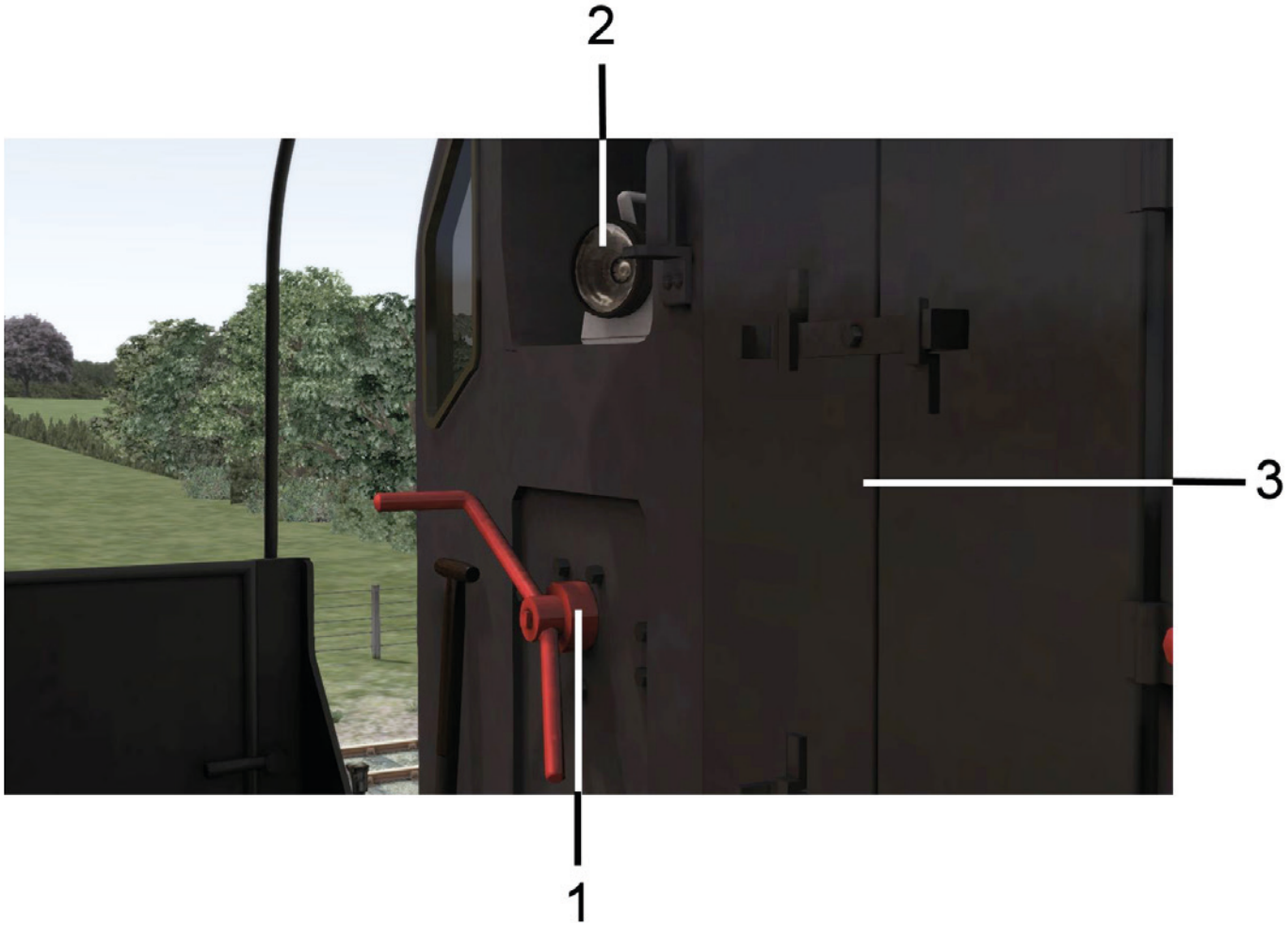
To turn the exhaust injector off, first turn off the exhaust steam injector then close the exhaust injector water valve. Do not be tempted to do this operation the other way round, otherwise the injector will blow back and a lot of steam will blast out of the overflow pipe accompanied by lots of noise. Operating the live steam injector is exactly the same.

If the locomotive is consuming a lot of steam when working hard, such as when travelling at high speed or climbing a steep gradient with a heavy load, you may find that using only one injector is insufficient and that you need to call on the other injector. Normally just the one will be adequate for at least holding the water level constant.

IMPORTANT: *You need to open the water valve first, before you open the injector, otherwise you will get a blowback!*

Try to use the injectors at appropriate times, such as when you are slowing for a speed limit or a station. If you are climbing, just use one injector and adjust the regulator/reverser to maintain water level and speed. The best time to turn on the injectors is when the loco isn't working hard, otherwise you will waste valuable boiler pressure. Try and learn the routes you drive so that you know when and where it is possible to turn on the injectors.

Tender



1. **Tender brake**

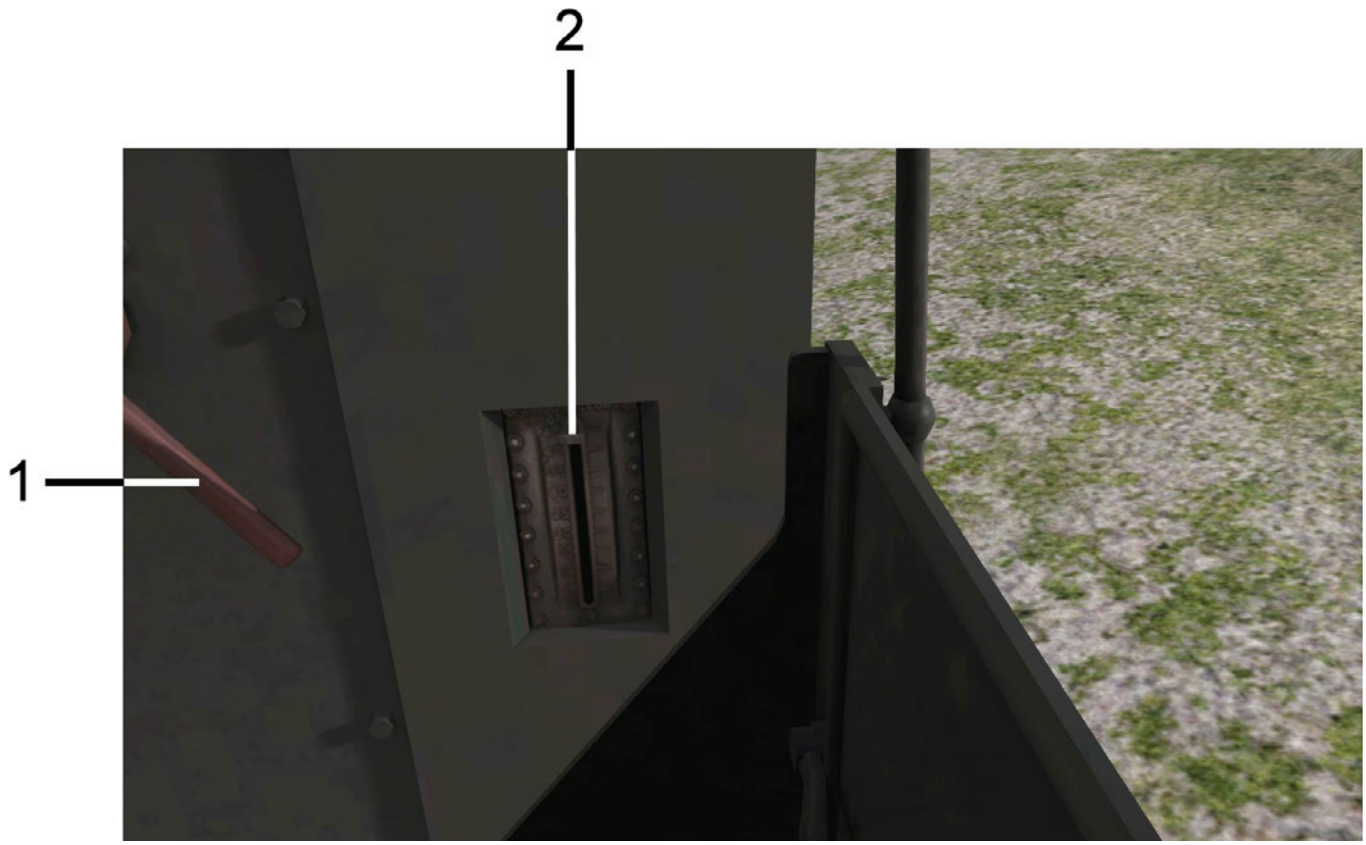
   Use the [/] key (forward slash) to set the brake ON and OFF. We advise against using the mouse on this control as it is less accurate than using the keystroke. The brake has to be ON for all servicing to be carried out. If it will not release, either the smokebox door or the sandbox lids have not been fully closed.

2. **Bardic lamp**

   This will help illuminate the cab area for night operations. Click on the lamp to turn it on/off.

3. **Tender coal doors**

   Click on these to open/close the doors so you can view the coal level.



1. **Tender water scoop handle**

   Use the [Ctrl]-[T] key combination to toggle the water scoop up or down, or use the mouse to drag the handle clockwise for DOWN and anti-clockwise for UP. Ensure that the scoop is only ever down when over a working and compatible water trough, otherwise the scoop will break and damage the water tank, causing a water leak. (At the time of writing, the only compatible water troughs are those used in the default TS2016 'Riviera Line in the Fifties' route).

2. **Tender water level indicator**

   This shows the water level in the tender.

CAB VIEWS

Move view to various pre-set points left and right in the cab – Left and Right arrow keys.

Zoom view in and out – Up and Down arrow keys, or scroll the middle mouse wheel up and down.

Look around the cab – hold the right mouse button down and drag the mouse to move your viewpoint around the cab.

Head out of cab – press [Shift-[2] to move to the 'head out' position. Use the Up and Down arrow keys to look forward or backward when in this view. Use the Left and Right arrow keys to change sides of the cab.

Note: *An alternative option for head out views is available as part of the in-cab view, which you can access by cycling through the cabview positions with the Left and Right arrow keys.*

HEAD-UP DISPLAY (HUD)

IMPORTANT: *When the locomotive is in Advanced mode (as it is by default) operating it via the [F4] HUD (Head-Up Display) controls can result in erratic operation and the HUD will display unrealistic readings. The [F4] HUD is NOT compatible with Advanced mode and we strongly advise that you use the [F3] HUD and [F5] HUD with keyboard and mouse controls to receive more accurate information and to prevent any erratic behaviour. The list of control key commands is provided in the KEY COMMANDS AND OTHER FEATURES section of this manual.*

If you have used the Switcher utility in order to drive the BR 7MT Advanced in Simple mode, you can use the [F4] HUD controls to operate the locomotive.

Here is some information about the Head-Up Display:

In Train Simulator the default control display is the HUD, which is enabled with the [F4] key on your keyboard. This shows the status of the scenario and the train, and also provides mouse-operable controls to allow you to drive the locomotive.

All the function key views and functions from previous versions of Train Simulator are still available as described, but when the HUD is selected the views controlled by the [F3] and the [F5] keys do not display. Turning OFF the HUD (with the [F4] key) will allow the [F3] and [F5] views to display.

The information and controls available via the HUD will differ depending on your current scenario, driving mode (Simple or Expert) and the type of engine that you are driving.

If you hover over a section of the HUD with your mouse you'll see a handy explanation of the feature, but for full information on the HUD and all of its features please refer to the Train Simulator manual.

To get more detailed information about the engine, turn off the HUD (using the [F4] key), press the [F5] key twice to bring up the engine information and you will see the following indications:

Speed – MPH

Regulator – position in %. In Advanced mode this shows the pressure in the steam chest as a percentage of its maximum. In Simple mode it shows the position of the regulator handle in the cab.

Reverser – forward/reverse position from neutral in %, NOT the cut-off.

Train brake – in Advanced mode, 0-100% Direct will be shown, with 0% being fully released at 21" Hg and 100% being fully applied at 0" Hg. In Simple mode the percentage shows the position of the vacuum brake handle with the notches Release, Running and Apply – ensure the brake is in the Running position after the brakes have been released (Simple mode only).

Boiler pressure – PSI up to a maximum of 250 PSI. Aim to keep the pressure between 225 and 250 PSI under normal running conditions, especially when attacking a climb. For driving on gentle heritage railways, 200 PSI will be more than adequate in most cases.

Steam chest pressure – displayed in PSI. Note that this is not the steam chest pressure as modelled on the BR 7MT Advanced; it is part of the host software and, while called Steam Chest Pressure, it is actually an indicator for the Power of the loco (force x speed).

Boiler water level – a low water level spells disaster. Keep the water (shown as blue) well up the tubes. Don't go above 1.00, though, as the loco will waste steam and begin 'priming'. Aim to keep the water level between 0.5 and 0.75 as much as possible. Note that the water level always starts at 1.0 on a zero gradient, which is a limitation of the host software. If starting and facing uphill, and the water level exceeds 1.1 (Hot mode) or 1.05 (Warm mode pre-blowdown), to avoid priming you MUST keep the cylinder cocks open until the water level has fallen below these critical levels.

Fire mass – displayed in pounds (lb) and referring to the 'strength' of the fire. Don't let it get too high as the coal won't burn quickly enough; you generally need to keep it at around 840 pounds if you need a really hot fire.

Steam generation rate – how much steam the boiler is creating.

Steam usage rate – how much steam the engine is using. If this is above the steam generation rate then you are using more steam than can be produced. This is usually not ideal but it can be helpful if too much steam is being produced and the safety valves keep going off. On gradients make sure that the usage rate is as close to the generation rate as possible, to take advantage of the maximum available work. When you open the injectors, more steam will be used.

Cylinder cocks – open or closed. Open to allow water out of the cylinders to prevent damage. Use them for around 10-15 seconds after standing for more than 5-10 minutes. Make sure that they are open for longer when moving off-shed. In Advanced mode the cylinder cocks are fully operational. Use them to drain any residual pressure from the steam chest after coming to a stop. If you leave the locomotive for a long period of time, condensation will build up and, if the cylinder cocks are not open, you risk blowing a large hole through the cylinder cap when you begin to move.

Main reservoir pressure – this entry only displays if the locomotive is light engine or is coupled to air-only coaches or to dual-braked coaches; it displays in PSI (Pounds per Square Inch). ***Note:*** *Due to work-arounds this will display 7,500 PSI – please ignore this and use the in-cab gauge which is displaying the true figure, circa 120-140 PSI.*

EQ reservoir pressure – this entry only displays if the locomotive is light engine or is coupled to air-only coaches or to dual-braked coaches; it displays in PSI (Pounds per Square Inch).

Brake pipe pressure – the pressure in inches of the vacuum in the brake pipe. You need to have 21 inches when the engine is moving. The brakes start to take effect properly below 15 inches. If you are going down a steep hill it is generally a good idea to leave the brakes applied to maintain a constant speed, although to prevent overheating ensure that you give the brakes a 'breather' by releasing and re-applying them periodically.

Small ejector – open or closed. This creates the vacuum needed for the brakes to function. In Advanced mode be aware that it will only show as open when the large ejector is being used and NOT the actual small ejector, to simulate the increased steam usage by the large ejector.

Tender water level – displayed in gallons. You will see the level go down as the water is used. Don't run out!

Tender coal level – displayed in pounds (lb). You will see the level go down as the fire is stoked. Again, make sure you don't run out. You can usually fill up with coal at Motive Power Depots, and water columns are available at many stations.

Blower – on/off. This is used to blow steam out of the chimney and thereby create a through-draught which will draw the fire through the boiler tubes. Generally this can be turned down when you begin to slow for a station and then increased prior to departure, helping to ensure that you don't 'blow off'.

Damper – on/off. The damper is a flap which regulates the flow of air through the ash pan to the fire.
In Advanced mode this shows the 'overall' damping of the fire between the front damper and the fire door.
In Simple mode it shows whether the single damper control is NOT closed (off). 'On' can mean anything from 1% to 100% open.

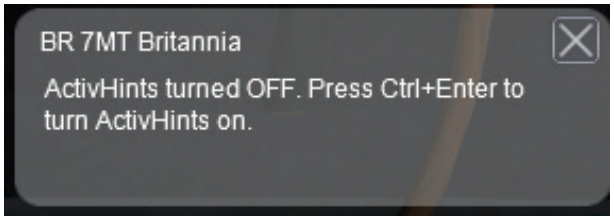
KEY COMMANDS AND OTHER FEATURES

Control	Key mapping/Action
Reverser	[W] – Increase cut-off [S] – Decrease cut-off
Regulator handle	[A] – Increase opening [D] – Decrease opening
Vacuum brake handle	[;] – Decrease brake application ['] – Increase brake application
Handbrake	[/] – Toggle on/off
Whistle	[Spacebar] – Loop [B] – Short toot
Firebox doors	[F] – Increase door opening [Shift]-[F] – Decrease door opening
Cylinder drain cocks	[C] – Toggle open/close
Exhaust injector steam valve	[I] – Increase opening [Shift]-[I] – Decrease opening
Live injector steam valve	[O] – Increase opening [Shift]-[O] – Decrease opening
Exhaust injector water valve	[K] – Increase opening [Shift]-[K] – Decrease opening
Live injector water valve	[L] – Increase opening [Shift]-[L] – Decrease opening
Sander handle	[X] – Move right/forward sanders [Shift]-[X] – Move left/reverse sanders
Damper wheel	[M] – Turn anti-clockwise and open [Shift]-[M] – Turn clockwise and close
Blower valve	[N] – Increase opening [Shift]-[N] – Decrease opening
Stoking (fire box doors must be open)	[R] – Start stoking [Shift]-[R] – Stop stoking
Headlights	[H] – Cycle from no headlights to forward headlights, then backward headlights [Shift]-[H] – Cycle from backward headlights to forward headlights, then no headlights
Load fuel/passengers/freight	[T] – Begin loading
Reverser lock	[E] – Toggle lock on/off
Large ejector	[U] – Increase [Shift]-[U] – Decrease
Small ejector	[J] – Increase [Shift]-[J] – Decrease
Steam brake handle	[[ ] – Increase application [ ]] – Decrease application
Vacuum reservoir release	[P] – Push and hold to release
Top lamp (NUM lock ON)	[Ctrl]-[8] – Toggle to place/remove
Left lamp (NUM lock ON)	[Ctrl]-[1] – Toggle to place/remove
Middle lamp (NUM lock ON)	[Ctrl]-[2] – Toggle to place/remove
Right lamp (NUM lock ON)	[Ctrl]-[3] – Toggle to place/remove
Smokebox door	[Ctrl]-[6] – Increase door opening [Ctrl]-[Shift]-[6] – Decrease door opening

Smokebox clean-out	[Shift]-[6] – Hold to clear
Sandbox lids	[Ctrl]-[Shift]-[X] – Toggle lids on and off
Sandbox filling	[Ctrl]-[X] – Hold to fill
Ashpan doors	[Ctrl]-[7] – Toggle to open/close
Blowdown valve	[Y] – Hold to blowdown
Lubricator wind-up	[Z] – Hold to prime lubricator
Aft rocking grate (right rod position)	[Ctrl]-[R] – Repeatedly tap to rock grate
Fore rocking grate (left rod position)	[Ctrl]-[L] – Repeatedly tap to rock grate
Regulator handle tapping	[Ctrl]-[A] – Tap to increase opening [Ctrl]-[D] – Tap to decrease opening
Regulator handle slamming open/shut	[Ctrl]-[A] – Hold to slam open [Ctrl]-[D] – Hold to slam shut
Steam heat	[Ctrl]-[5] – Toggle on/off
Headboards	[Ctrl]-[Shift]-[W] – Hold to cycle forwards through headboard options [Ctrl]-[Shift]-[Q] – Hold to cycle backwards through headboard options
Water scoop	[Ctrl]-[T] – Toggle water scoop up/down
ActivHints	[Ctrl]-[Enter] – Toggle to turn ActivHints on/off
ActivFireman	[Ctrl]-[F] – Toggle to turn ActivFireman on/off

ActivHints

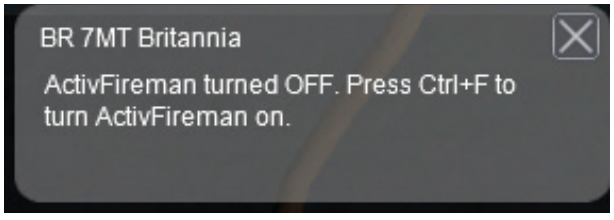
Use [Ctrl]-[Enter] to toggle the ActivHints training system on/off at any time. ActivHints provides useful hints and tips for operating the loco and informs you where you are going wrong, how you can improve your technique and about urgent matters such as low water in the boiler. A message at the top right of the screen will show the on/off status of ActivHints. ActivHints are displayed at the top right of the screen and will continue to display periodically until the situation displayed by the ActivHint is resolved.



ActivFireman

This is the custom AI fireman built specifically for Advanced steam locomotives; use [Ctrl]-[F] to toggle the ActivFireman feature on/off. When activated, ActivFireman will take over the firing responsibilities so that you can just enjoy the drive. ActivFireman is more intelligent than the default host simulation fireman, by knowing when you need a large fire and responding to lack of steam production or too much steam lifting the safety valves.

Note: *Automatic fireman MUST be turned OFF in the game settings. A message at the top right of the screen will show the status of the ActivFireman.*



Rocking the fire grate

Click on the right-hand side rocking handle socket cover on the floor in front of the firebox doors. The cover plate will open and the rocking grate rod will move from the boiler backplate into that socket. Drag your mouse up and down the rod to drop the fire from the aft rocking grate.

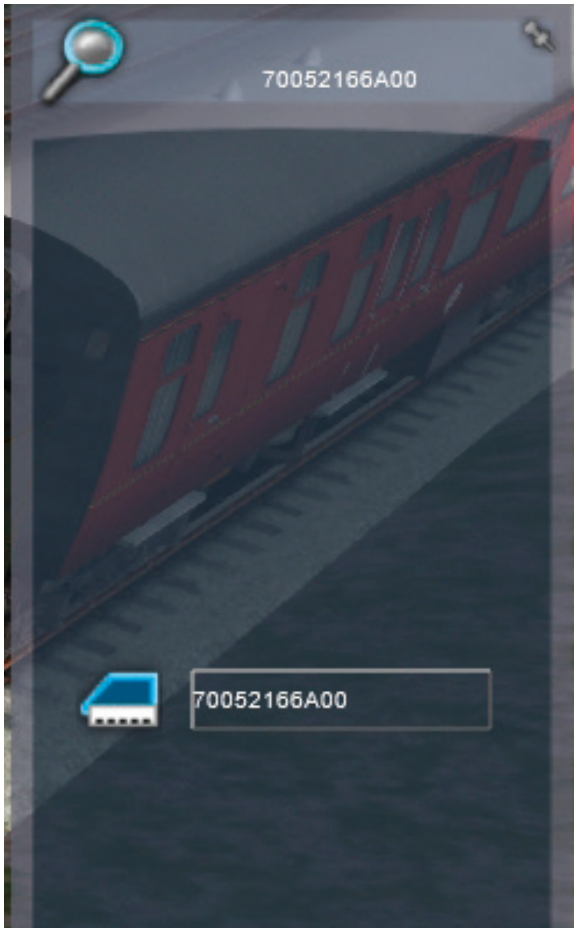
Click on the socket cover plate to return the rod to the backplate, then click on the left socket cover plate and repeat the process to drop the fire from the fore grate.

You can use [Ctrl]-[L] and [Ctrl]-[R] to rock the rod after it has been inserted into the socket. Rocking the left side grate rod will rock the grate at the rear of the firebox. Rocking the right side grate rod will rock the front (nearest the footplate) grate.

Presetting the nameplate options, Hot/Warm mode, headcode, shed code and smoke deflectors

You can preset a number of different characteristics and details via the locomotive's number set in the Scenario Editor:

- Start your scenario
- Press [Ctrl]-[E] to enter the Editor
- Press the orange-coloured train icon in the top left fly-out menu
- Click 'Yes' on the next window
- In an external view double-mouse-click on the locomotive
- A fly-out menu showing the current locomotive number set will appear In the top right corner



Note that the number string options are slightly different for different variants, so it is important that you set the number string correctly for the variant that you wish to edit.

IMPORTANT: *After you have changed the locomotive numbering, press the [Enter] key, otherwise your changes will NOT be saved.*

Note: *Some changes may not be apparent or visible until you have left the Scenario Editor and start to drive the scenario.*

Britannia (preserved)

The preserved Britannia model ALWAYS uses a TEN character number string to work. The string is in the following format:

AAAAABCCCD

In this number format:

- AAAAA = loco number, e.g. 70000
- B = Warm/Hot mode (1 for Hot and 0 for Warm)
- CCC = shed code. Either use all three characters for a three character shed code such as '10A' for 10A, or if you want a two character shed code such as 2B, you need it in the form 'X2B'.
- D = lamp headcode of 0 (no lamps), A, B, C, D, E, F, G, H, J, K

For example, if we set the number string to 700001X5AA, we will have:

- Loco number: 70000
- Hot/Warm mode: Hot mode
- Shed code: 5A
- Headcode: Class A Express Passenger

Oliver Cromwell (preserved)

The preserved Oliver Cromwell model can EITHER use a TEN character number string or an ELEVEN character number string to work. For the ten character number string option, the number string should be in the exact same format as for the preserved Britannia. The eleven character string adds one extra option:

AAAAABCCCDE

- AAAAA = loco number, e.g. 70013
- B = Warm/Hot mode, 1 for Hot and 0 for Warm
- CCC = shed code. Either use all three characters for a three character shed code such as '10A' for 10A, or if you want a two character shed code such as 2B, you need it in the form 'X2B'.
- D = lamp headcode of 0 (no lamps), A, B, C, D, E, F, G, H, J, K
- E = optional eleventh character. This character is non-specific.

Example 1. If we set the number string to 70013010AB (the ten character string), we will have:

- Loco number: 70013
- Hot/Warm mode: Warm mode
- Shed code: 10A
- Headcode: Class B (stopping passenger)

Example 2. If we decide to add an eleventh character to make 70013010AB?, we now have:

- Loco number: 70013
- Hot/Warm mode: Warm mode
- Shed code: 10A
- Headcode: Class B (stopping passenger)
- Nameplates: BLACK backed nameplates instead of red

By default Oliver Cromwell has red nameplates and a ten character string. You must add an extra character if you wish to have black nameplates instead.

The extra (eleventh) character can be ANYTHING on your keyboard – it does not have to be a specific character.

BR Era (Clean, Intermediate, Weathered)

The BR Era models share the same number string system, which is slightly different to those of the preserved Britannia or Oliver Cromwell. These models include all 54 sets of 3D nameplates, which are automatically matched to the correct number (this includes Britannia and Oliver Cromwell). They also include smoke deflector options, so that loco's can be portrayed after receiving modifications by the Midland and Western regions in their later lives.

By default the number string is ELEVEN characters long, but you can add an extra character to form a TWELVE character number string instead. This extra character can be ANYTHING on your keyboard – it does not have to be a specific character. On these models the extra twelfth character will remove the nameplates altogether, which is particularly useful for scenario authors wishing to model the final years of the BR steam era when many loco's lost their nameplates. For example:

AAAAABCCCDEF

- AAAAA = loco number, e.g. 70021
- B = Warm/Hot mode, 1 for Hot and 0 for Warm
- CCC = shed code. Either use all three characters for a three character shed code such as '10A' for 10A, or if you want a two character shed code such as 2B, you need it in the form 'X2B'.
- D = lamp headcode of 0 (no lamps), A, B, C, D, E, F, G, H, J, K
- E = smoke deflector type, with 0 for original ones with handrails, 1 for London Midland region ones with grab holes, and 2 for Western region ones with brass slots
- F = optional twelfth character, non-specific

Example 1. If we set the number string of a BR era loco to 70019186CG2 we now have:

- Loco number: 70019
- Hot/Warm mode: Hot mode
- Shed code: 86C
- Headcode: Class G (light engine)
- Smoke deflector: WR with brass slots

Example 2. We want to remove the nameplates, so we add a character to get 70019186CG2* and the result is:

- Loco number: 70019
- Hot/Warm mode: Hot mode
- Shed code: 86C
- Headcode: Class G (light engine)
- Smoke deflector: WR with brass slots
- Nameplates: removed

REMEMBER: *The extra character that can be used for Oliver Cromwell (preserved) and the BR era loco's can be ANYTHING on your keyboard. You don't need to worry about a specific character. It is more important that the other characters are set correctly and that the number string is of a valid character length, as previously outlined.*

When you are ready to go back into the simulation, press the orange triangle in the lower right corner of the screen. Press 'Yes' when prompted and you will be taken back into the simulation.

Headcode and shed code resources

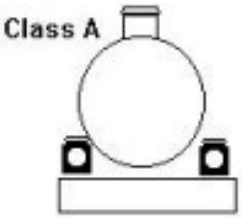
A list of shed codes can be found online:

https://en.wikipedia.org/wiki/List_of_British_Railways_shed_codes

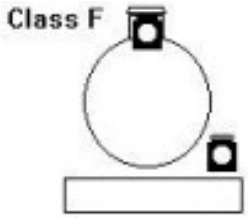
The available headcode letters that you can use when setting up the number string are:

A, B, C, D, E, F, G, H, J, K or 0 (zero) for none. Please note that Class I was not used.

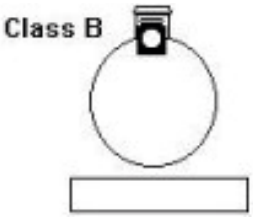
Refer to the following headcode images to find the suitable headcode for the services that your locomotives are going to work.



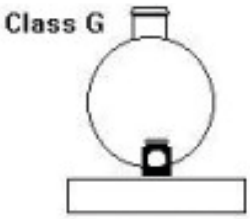
Class A – express passenger or a breakdown train or snowplough en route to a job



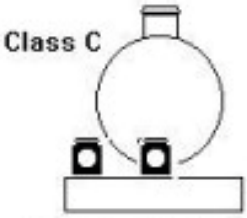
Class F – express freight all unfitted stock



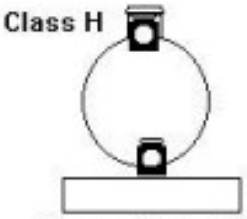
Class B – stopping passenger, rail motor or a breakdown train returning from a job



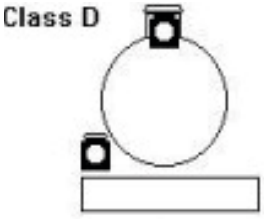
Class G – light engine or engine with one or two brake vans attached



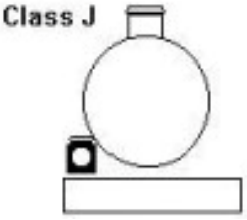
Class C – parcels, fish, livestock, milk, fruit or perishables, all XP stock



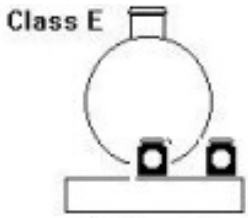
Class H – through train or ballast train



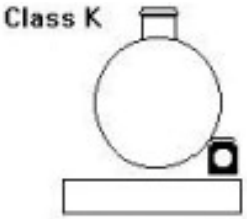
Class D – express freight or live stock with at least 30% XP connected to loco



Class J – through mineral or empty wagon train



Class E – express freight with at least four fitted vehicles connected to the loco or a short unfitted express freight



Class K – pick-up or branch freight or mineral/ballast train on a short haul run

Headcode lamp operations

Note: *You can either preset the lamps/headcodes via the locomotive number in the Editor, as described above, which is very useful for scenario authors to set the headcode on non-player loco's. If that is not applicable to you, you can set the lamps/headcodes when in-sim as described below.*

Use the master light switch [H] and [Shift]-[H] to show or hide the lights or discs. Use the number pad number keys to show/hide the different lamps:

[Ctrl]-[1] – left lamp

[Ctrl]-[2] – centre lamp

[Ctrl]-[3] – right lamp

[Ctrl]-[8] – top centre lamp

Note: *We recommend using the Numpad to control the lamp positions. The [Num Lock] key must be ON to do this. If your keyboard does not have a Numpad, then you can use the number keys instead.*

Adding a cylinder cock leak in scenarios

You can add a leaking cylinder cock by placing the supplied marker in your scenario:

- Start your scenario.
- Press [Ctrl]-[E] to enter the Editor.
- Press the orange-coloured train icon in the top left fly-out menu.
- Click 'Yes' on the next window.
- On the middle fly-out window select the 'Track infrastructure' icon (this looks like a semaphore signal).
- Scroll down to find and select 'JT-Trigger Point (Cylinder cock leak)'.
- Place this between the rails at your desired location. Ensure that the arrow is facing the direction of travel. When you are happy with its location, sink the marker to be invisible below the track by using the Up/Down arrow on the marker sphere.

- At a location further along the track find and select from the menu the 'JT-Trigger Point (Cylinder cock leak off)' marker.

- Place this between the rails at your desired location. Ensure the arrow is facing the direction of travel. When you are happy with its location, sink the marker to be invisible below the track by using the Up/Down arrow on the marker sphere.
- When you have done this, press the orange triangle on the bottom right corner of the window and save the changes.

You are now ready to run!

SUPPLEMENTARY TECHNICAL INFORMATION

Here is some supplementary information for those of you with a deeper technical interest in how a British Rail 7MT worked and who would like to get the most out of this Advanced locomotive simulation.

How does the regulator work?

The regulator handle in the cab is connected to the regulator valve, all the way in the smokebox, via the regulator rodding and linkage that extends along the left-hand side of the boiler. External linkage was one of the benefits of the British Rail Standard locomotive paradigm, because it made maintenance of the linkage exceptionally easy (it didn't need to be removed from the inside of the boiler) and didn't put the rodding and linkage under intense heat and pressure. At the other end of the linkage you can see a small lever attached to the end of the rod near the back of the left-hand side of the smokebox. It rotates when the regulator handle and linkage is moved. Turning this handle rotates a shaft that directly controls a set of valves in the superheater header.

Enter the Malesco multiple valve regulator, built into the superheater header. This type of regulator was used in BR 6MTs, 7MTs and the unique 8P. The other standards, including the 4MT Mogul and 5MT, used a slide-type regulator valve in the dome. The two designs are drastically different, but for now you only need to know how the Malesco regulator works.

The design is fairly simple and beautiful. The shaft turned by the exterior handle rotates a set of cams. As each cam rotates, it presses up against the bottom edge of a valve and pushes the valve upwards, lifting it off its seat and letting steam pass through the valve. The cams operate four valves in series, so that the first cam pushes up the first valve, then the second cam pushes up the second valve, and so on. The four valves consist of one pilot valve, the first one, and three sequential main valves. The purpose of this sequential, staggered operation is to provide the driver with very fine control over the rate of steam entering the superheater and hence the steam chest. If they all moved together at once, you would get a very large change in steam input from very tiny movements of the regulator.

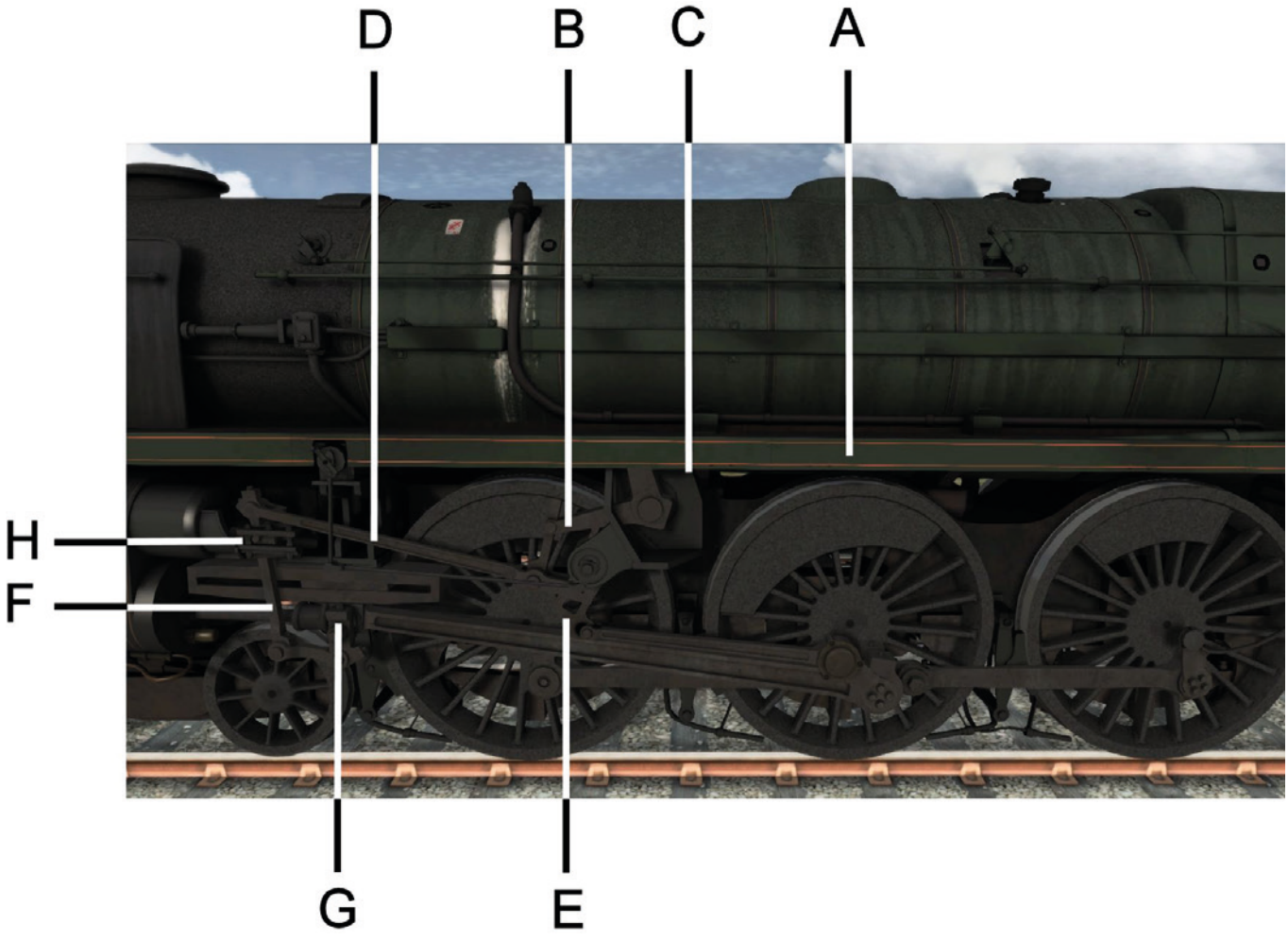
The pilot valve does not open up to the superheater, but sends saturated steam down a bypass pipe that diverges into a T-junction, with each pipe meeting one of the main steam pipes from the superheater header to the steam chest via a valve. The saturated steam from the pilot valve actuates lubricators at the main steam pipes and enters the steam chest, contributing a very small amount of steam to the chest. The lubricators provide lubrication for the cylinders and piston valves, and are designed to stop adding more oil when there is no further need for it (when the locomotive is stationary). It is therefore important that the pilot valve remains open when coasting, to prevent the cylinders and piston valves from running dry. You can tell when the pilot valve is open as saturated steam leaks and rises out of the snifting valves above the cylinders.

The three main valves simply direct the saturated steam to the superheater elements, which dries and superheats (and thus further expands) the steam; this aims to improve water economy and reduce condensation from 'wet' saturated steam. The one downside of a superheater is that it results in a delay between the movement of the regulator handle in the cab and the action taking place at the steam chest. This delay has been modelled and actually changes depending on how saturated the internal steam pipe system is and how open the three regulator valves are.

What causes reverser creep?

The 7MT was fitted with two sets of Walschaerts valve gear, arguably the most mathematically interesting, simple and downright beautiful of the steam locomotive valve gears. Before answering the question on reverser creep, we should discuss what valve gear is and how it works in basic terms.

The valve gear is designed to control the 'cut-off', the point at which the piston valves prevent the further admission of steam into the cylinders. With the 7MT and its Walschaerts valve gear, this is done by using the reverser in the cab to rotate a shaft that in turn rotates a screw under the running plate (A). A lifting arm (B), bound to a pinion, is rotated by the thread of the rotating screw meshing with the pinion teeth and moving them in the direction of the screw (C). Rotating this lifting arm lifts and lowers the radius rod (D) up and down the expansion link (E). This is important, as depending on where the radius rod is coupled to the expansion link, the radius rod will move to and fro in time with the rest of the motion and wheels. At the other end of the radius rod is yet another rod, the combination lever (F), which connects to the crosshead (G) of the cylinder piston shaft, and about one eighth of the way down this combination lever is where the piston valve rod (H) is connected. The amplitude of longitudinal movement in the radius rod therefore directly changes the amplitude of piston valve movement, hence changing the cut-off. Due to the timing of the piston valve in relation to the cylinder, forwards cut-off is when the radius rod is below the pivot point of the expansion link, and reverse cut-off is when the radius rod is above the pivot point of the expansion link.



So, back to the original question: Why does the reverser 'creep'? To understand this, we need to consider several forces at work. We have the weight of the lifting arm, lifting link and radius rod that obviously wants to pull these components down. We have normal forces, where the interfaces of the expansion link are pushing at the tangent of the radius rod bearing as it rocks back and forth. We also need to consider when the entire motion, including cylinder heads, piston valves, connecting rods etc. is slack or taut, depending on whether there is steam pressing against the cylinder heads and piston valve heads.

When the locomotive motion is moving and we have all of these heavy rods swinging to and fro, up and down, round and round, and back and forth, it's not inconceivable that anything that is not FIXED in place is going to move out of place, one way or another. With the radius rod, we have a combination of its weight and the normal forces acting on the bearing at the expansion link end, which causes it to slip up and down the expansion link, therefore changing the cut-off. This is why a screw reverser will oscillate sinusoidally, in time with the motion of the valve gear. When the system is slack, the situation gets even more interesting.

Due to a combination of the normal forces and gravity, this resultant force is enough to squeeze the end of the radius rod downwards along the length of the expansion link. Essentially, the valve gear forces itself into full forwards gear if left to its own devices. It takes a lot of force for the teeth of the lifting arm pinion to rotate the screw, and therefore it doesn't take too much intervening force by the driver in the cab to keep the creeping in check. But the driver is not able to keep hold of the reverser at all times, so a lock was added to hold the reverser in place.

The importance of the reverser lock should not be underestimated, as it prevents potentially disastrous reverser creep. According to the Rail Accident Investigation Branch, it was due to the reverser creeping on Southern Railway S15 '825' that the locomotive unexpectedly moved by itself from reverse gear to forwards gear, resulting in a tragic accident. Another case was when 60532 Blue Peter famously destroyed its valve gear during a horrendous slip at Durham – the resultant forces of the valve gear were strong enough to violently spin the reverser into full forward gear when the lock was unlatched. Furthermore, when a steam locomotive primes, making the regulator almost impossible to close, and then wheelslips, a technique is to reduce cut-off to stop the wheelslip, but it requires a lot of elbow to fight the reverser and wind it towards mid-gear.

Vacuum and steam brakes

The vacuum brake on the 7MT Advanced is the standard British Railways set-up across the range of Riddles-designed standard classes. There is an S.S.J. ejector mounted on the left-hand side of the smokebox, which contains the small ejector and large ejector cones. These are operated by two spindles in the cab that control the duplex stop valve in front of the driver's side of the cab.

For controlling the train brakes, your main priority is the train pipe pressure (shown on the left of the duplex brake gauge), not the reservoir pressure (shown on the right of the duplex brake gauge). This is because the brakes of a fitted train do the majority of the braking work and the reservoir pressure will only affect the locomotive's steam brakes. Pulling the vacuum brake handle towards you admits air into the train pipe through the holes around the base of the vacuum brake handle. Pushing the handle away from you to the OFF position isolates the train pipe from the air entering through these holes.

The reservoir vacuum pressure needs to be maintained with the small ejector to overcome leaks, and ideally it needs to be kept at 21 inches. To create the reservoir vacuum and maintain it, either the train pipe pressure must be greater than the reservoir pressure with the small ejector turned on, or the vacuum brake handle should be in the fully ON position while the small ejector is turned on. You may wish to destroy the reservoir vacuum in some cases, for example taking the brakes off the locomotive while they are left fully applied on the train, to enable a squeeze (compression of buffers) before uncoupling the train. To do this, ensure the train pipe pressure is at zero, turn off the small ejector and press and hold in the reservoir release valve.

The train pipe pressure and reservoir pressure control the steam brake by opposing one another on two sides of a cylinder head in the Gresham and Craven steam brake housing. This cylinder head is connected to the valve that admits steam from the boiler to the steam brake cylinder and exhausts the steam out of the cylinder when releasing. The train pipe side is on the underside of the cylinder and the reservoir side is above. When air is admitted into the train pipe, molecules of air enter the underside of the cylinder and collide with the cylinder head, so pressure acts upwards. If the reservoir has less air molecules (higher vacuum pressure), the opposing force of pressure in the reservoir side is less than the train pipe side, so the cylinder head moves up until the two opposing sides reach a state of equilibrium. Raising the cylinder header lifts the valve and admits steam into the steam brake cylinder.

If the reservoir pressure is the same as or less than the train pipe pressure, the steam brake will release, because the pressure on the reservoir side is greater than on the train pipe side or equal to it AND works with gravity to push the cylinder head back down, closing the steam admission valve and exhausting the steam. Furthermore, if both the train pipe and the reservoir pressure read 0 inches of mercury, or in other words are both at atmospheric pressure, the cylinder head will simply drop with gravity anyway. Therefore, to apply the steam brake with the vacuum brake, the train pipe pressure must always be less than the reservoir pressure.

SETTING UP THE LOCOMOTIVE FROM A WARM STATE

The 7MT Advanced locomotive can be used in two ways when creating or driving a scenario. A Warm start is a situation which simulates a loco that is almost ready to leave the depot or yard, but still needs final checks to be carried out before it can leave.

It is possible to start your own scenarios in a Warm state – here are the instructions for getting your loco ready for action:

Firstly, you need to ensure that the locomotive is set to be in the Warm state. Please see the 'Presetting the nameplate options, Hot/Warm mode, headcode, shed code and smoke deflectors' section for instructions.

1. **Apply handbrake**

   Apply the handbrake located on the right side of the tender with the [/] key (forward slash). Use the [F4] HUD coupling view to confirm the brake is set to ON.

2. **Fill the sandboxes**

   Look outside using the [2] key. Press [Ctrl]-[Shift]-[X] to open the boxes then hold [Ctrl] and [X] to fill them with sand. Hold these keys down for around 10 seconds. You will see the sand level rise in the sandboxes.

   Replace the lids by pressing [Ctrl]-[Shift]-[X]. If you fail to fill up with sand your sanders will be completely ineffective. If you run out of sand, you can stop the loco and refill the sandboxes at any time.

3. **Prime the lubricator**

   The lubricator handle is located near the smokebox end of the running plate. Simply hold down the [Z] key and wait until the handle stops turning. Before moving the locomotive in Warm mode, it is essential that you wind up the lubricator to prime it. Priming the lubricator will activate the locomotive's mechanical lubrication system. Failure to prime the lubricator before moving the locomotive will wear out the moving parts and quickly result in a failed locomotive.

4. Empty the smokebox

Open the door to access the inside of the smokebox, which will allow you to remove any build-up of ash. Even a self-cleaning (SC) locomotive leaves a pile of ash that may need to be cleared out before the start of a shift, if the previous crew decided they couldn't be bothered! Be the better person and clear the smokebox of any ash when disposing of the locomotive.

Hold [Ctrl]-[6] to open the smokebox door, then press [Shift]-[6] to empty the smokebox of ash. This should take around 20 seconds. Once this process is completed you can close the smokebox door by pressing [Ctrl]-[Shift]-[6].

5. Conduct blowdown

Press and hold [Y] for five seconds to remove impurities from the boiler which, if left, can increase the risk of priming and damage. It is important that a boiler is blown down at the start and end of a shift to remove any impurities and sediment in it, otherwise these impurities will cause the water to foam up and greatly increase the likelihood of priming.

Finally, check that everything is replaced (smokebox door shut and sandbox lids closed) and then release the handbrake. If the handbrake will not release, you have not shut the smokebox door or sandbox lids, in which case check them again.

6. Turn on the electronics and AWS/TPWS (preservation collection only)

Turn the camera to face the fireman's seat and use the mouse to grab the locker door and pull it open. Pull down the bottom left switch to turn on the electronics. The system will boot up and then the AWS warning horn will sound – simply acknowledge the AWS warning by pressing the AWS reset lever with the [Q] key to complete the process.

Note: *In real life this would only be necessary for running on Network Rail's metals, and so you can choose to ignore the electronics when running on heritage railways. It is important that this stage is completed for scenarios set on the main line, as the AWS will NOT work without this switched on.*

You are now ready to drive!

DRIVING THE 7MT ADVANCED LOCOMOTIVE

General information

Tender water capacities (gallons):	BR1: 4,250
	BR1A: 5,000
	BR1D 4,750
Ideal fire mass:	840lb
Vacuum brake pressure when released:	21 inches Hg
Air brake pressure when released (70000):	72.5 PSI
Maximum boiler pressure:	250 PSI
Recommended maximum trailing load:	12-13 coaches on moderate/light gradients
	9 coaches on steep gradients
	12-15 coaches on the level
M**aximum speed:**	95 MPH approx. (depending on load)

Prior to starting a journey

1. If running at night, click on the Bardic lamp placed on the tender to turn it on and help illuminate the cab area.
2. Ensure that the handbrake is released.
3. Check that the boiler is not overfilled with water.
4. Turn on (open) the cylinder drain cocks if you have not already done so.

Moving off

1. Move the train brake to the OFF position and apply the loco steam brake. If you are driving the preserved 70000 Britannia, release the air brakes by moving the handle all the way forward until it reaches the spring-loaded release notch, and either quickly release the brakes by holding the handle against the spring, or let it gradually release until a reading of 72.5 PSI can be seen on the air brake train pipe pressure gauge.
2. Normally you should move the reverser to full forward (or full reverse if travelling tender first) (75% cut-off). In adverse weather conditions, however, it might be better to start off at around 50% cut-off to reduce the chance of slipping. Consider applying some sand, especially if trying to start on a steep hill with a heavy train.
3. Turn ON the small ejector slightly (with the [J] key or by using the mouse) so that the vacuum brakes begin to ease off. Leave the small ejector in this position to hold the brakes off until you next stop. To release the brakes more quickly you can open the large ejector (with the [U] key or by dragging the mouse) but close it once the brakes are released. Check the brakes are off by verifying that there is a reading of at least 19” on the left side of the brake gauge. You should always do this for the preserved Britannia with dual brakes as well, because the vacuum pressure in the train pipe and reservoir will allow the air brakes to indirectly control the steam brakes by changing the vacuum pressure.
4. Open the regulator to about 10% of its full travel (press [A] or drag with the mouse carefully). When you see the steam chest pressure rise and hear the cylinder cocks, release the steam brake. Allow the cylinders time to drain water while making a steady departure.

5. After a couple of wheel turns, close the cylinder drain cocks. If there is any water squirting out of the cylinder cock drain pipes next to the front bogie wheels there is still water in the cylinders, so open the drain cocks again and let them flush for a short time while you start to gain momentum.
6. In most circumstances you can now notch the reverser up to 45% cut-off and continue to wind it up gradually as you increase in speed. If you are confident that the locomotive isn't going to slip violently, open the regulator fully and drive the loco by carefully adjusting the reverser setting to maximise power and efficiency – you should get up to line speed in no time. Good luck and have fun!

Dealing with wheelslip

The 7MT Advanced uses lua script to simulate and animate wheelslip, instead of the core simulation used by the host game. It uses various factors to affect the adhesion model, such as random fluctuations in friction coefficient, weather and precipitation, and season. The purpose of this is to get around the shortcomings and temperamental nature of the core simulation and to provide a much more realistic experience for the driver, whilst correctly animating the wheels. Wheels will always spin when slipping, and they will always lock when skidding. The wheels will also rotate in the opposite direction of travel if the reverser is moved from one side of mid-gear to the other, i.e. from forwards (0-75%) to reverse (-75-0%) whilst moving forwards.

So what should be done when the locomotive starts to wheelslip? Firstly, you should learn to listen out for the cues that occur during slip – is the exhaust beat accelerating faster than the train? The chuff sounds and exhaust smoke are always linked to the wheel speed so watch and listen out for the cues.

When the locomotive does slip, you should shut the regulator immediately and wait for the wheels to return to the actual speed of the train before opening the regulator again for another go. For steel-steel contact, the coefficient of friction in kinetic friction (when the wheels are moving at a faster relative speed than the rails and are hence sliding over the rails) is significantly less than the coefficient of friction in static friction or 'stiction'. In other words, once the wheels have started to slip, it takes less force for the wheels to continue to slip than it took to start the slip in the first place.

If wheelslip is persistent, you can try two things to stop it from consistently happening. You can try winding the reverser down to reduce the cut-off, which will reduce the tractive effort, but this may provide insufficient tractive effort for climbing up a steep hill with a heavy train. The other option is to apply the sanders (remembering to apply the correct ones for the direction of travel!), which will significantly improve adhesion, but the downside of this is that you can't use the sanders forever without stopping to refill the sandboxes.

What to do if the driving wheels lock up

You should not allow the wheels to slide along the rails for prolonged periods of time as this would cause wheel flats in the tyres and, more importantly, reduce the effectiveness of the locomotive brakes in the same way as a car skidding in the snow, so you need to ease off the locomotive's steam brake. Remember that the steam brake is either controlled by the difference in vacuum pressure between the vacuum train pipe and the vacuum reservoir, or by the graduated steam brake handle. If you applied the steam brake using the steam brake handle, then simply release the brake quickly with the handle and apply again more carefully. If the wheels lock up during a vacuum brake application on a fitted train, then it gets more interesting.

You could simply release the vacuum brakes again to stop the wheels from skidding, but this can take quite a long time when ideally we want to stop the skidding as soon as possible. You also probably don't want to release the entire train's brakes. We therefore use the reservoir release valve, a brass button behind the vacuum brake handle. Pushing this in will let air into the vacuum reservoir, and the difference in vacuum pressure between the train pipe and reservoir reduces to zero, releasing the steam brake on the locomotive and tender whilst keeping the brakes on the rest of the train applied. You can then use the graduated steam brake handle to carefully re-apply the steam brakes.

Stopping the train

1. Close the regulator enough that there is little to no steam pressure in the steam chest and steam flowing out of the anti-vacuum valves above the cylinders, but do not close it fully.
2. Apply the brakes and keep an eye on the brake gauge; the closer the needle on the left side is to 0 inches Hg, the harder the braking force. To control the pressure you need to adjust the brake valve and use the small ejector to set the brakes to the desired pressure reading. Most trains should be stopped with the gauge reading no less than 10 inches Hg otherwise it can be a rather uncomfortable stop for the passengers. Nobody likes their cup of tea spilt!

   For the dual-braked Britannia the minimum air pipe pressure should be 48.5 PSI. Seasoned drivers are able to brake their train safely with minimal glances at the brake pressure gauges, using the deceleration rate to judge how hard to apply the brakes and adjusting accordingly, as well as releasing the brakes slightly just before the train is about to come to a stop and bringing the train smoothly to a stand.
3. Once at a stand, if you are staying long, dump the vacuum or air by fully applying the brakes or, in the case of the preserved 70000, moving the brake handle to the emergency position. Turn off the ejectors, wind the reverser into neutral gear (0%), open the cylinder cocks and apply the tender handbrake. If you are only stopping for a few minutes, apply the steam brake, release the train brakes, put the reverser into position and get ready for the off.

Recommended reverser settings

These settings are only a rough guide and very much depend on the load, fire condition and route:

0-5 MPH	75 cut-off
5-25 MPH	45 cut-off
25-40 MPH	35 cut-off
40-60 MPH	30 cut-off
60-75 MPH	25 cut-off
75+ MPH	15-20 cut-off

With practice you will get a good idea of what kind of reverser setting is required in any situation. If performance is sluggish but the safety valves will not shut up, try increasing the cut-off in the direction of travel to use that excess steam and increase your acceleration. If boiler pressure is plummeting and the loco keeps hitting a constant speed, then you need to reduce cut-off to reduce back pressure and use your steam more economically.

Filling the boiler with water

1. Turn on the chosen tender water feed by holding [K] (exhaust) or [L] (live) for around three seconds or by dragging the water feeds with the mouse.
2. Turn on the respective injector steam valve by holding [I] (exhaust) or [O] (live), or by dragging with the mouse, until the injector starts to sing. If there is a loud roar then the injector is blowing back, in which case reduce the amount the steam valve is open.
3. When the boiler water level reaches the desired amount (look in the water level sight glasses) shut off the injector steam valve by holding [Shift]-[I] (exhaust) or [Shift]-[O] (live) or by dragging the valve with the mouse.
4. Remember to turn off the water feed by pressing [Shift]-[K] (exhaust) or [Shift]-[L] (live) so as to not waste water by spilling it all over the ballast.

Note: *Aim to keep your water level between half and three-quarters full. If your boiler steam pressure is not as high as you would like it, using the exhaust injector is recommended.*

IMPORTANT: *Remember that, unlike most steam locomotives in Train Simulator, the 7MT Advanced has dynamic water gauges and readings (both in the [F5] fly-out and in the cab). These readings are affected by gradients and braking/acceleration.*

When descending a gradient of 1 in 100 or more you must ensure that the water level doesn't go above 0.75, as any ease in the gradient at this point would result in considerable damage (priming) to the loco.

When ascending a gradient you must ensure that the water level remains above 0.25, as any ease in the gradient would mean the loco could quite easily drop a fusible plug (plugs in the firebox that melt if exposed to overheating and aim to drown the fire with steam and hot water from the boiler), instantly ending your journey. When braking hard, the water gauge will empty completely, so you must take note of how much water you have before you begin to brake.

Priming

If you should happen to overfill the boiler at any time you will experience problems, namely 'priming'. This dramatically affects the loco's performance and can cause permanent damage, resulting in reduced power for the remainder of your journey or, in a worst case scenario, the explosion of a cylinder.

You will know the loco is priming if:

- The water level in the glass is completely out of sight and the smoke has turned white and fluffy, regardless of the regulator setting.
- The loco is struggling to steam.
- Water emanates from the chimney/cylinders.
- A cylinder blows up!

How to stop the loco priming

If you heavily overfill the boiler or are stood at a station you will need to be patient. As soon as you know that the loco is priming, open the cylinder cocks and shut the regulator, which may need slamming shut if the water carry-over is jamming the regulator. This will clear the cylinders whilst the loco is moving. Open the regulator gently now without any sudden movements as a sudden drop in pressure at the dome will cause the local water surface to rise up and make the priming worse. You also want to limit the amount of water entering the internal steam system. Only when you can see the water bobbing in the gauge glasses again should you shut the cylinder cocks.

Providing steam heat

The 7MT Advanced and Mk.1 coaches are both equipped with steam heat for realistic winter operation. On a winter's day you may wish to provide heat to your passengers. To do so, simply turn on the steam heat with the handle provided and watch the gauge rise towards 100 PSI; you should then notice steam rising from the pipes between the coaches.

At the end of your journey

This 7MT Advanced simulation includes a unique feature which enables you to dispose of the loco at the end of the working day, as per its real-life counterparts.

1. **Apply tender handbrake**

   Apply the tender handbrake with the [/] key.

2. **Open the ash pan doors**

   You must open the ash pan doors before you can drop the fire, otherwise you'll damage them if heavy molten coals and clinker pile up on them. To do this, press the [Ctrl]-[7] keys.

3. **Rock the grate to drop the fire**

   Click on the right-hand-side rocking handle socket cover plate on the floor in front of the firebox doors. The rocking grate rod will move from the boiler backplate into that socket. Drag your mouse up and down the rod for around five seconds to drop the fire from the aft grate. Click on the right socket cover plate to return the rod to the backplate, then click on the left socket cover plate and repeat the process to drop the fire from the fore grate. You can use [Ctrl]-[R] and [Ctrl]-[L] to rock the rod if you wish after it has been inserted into the socket. You should see the remnants of the fire falling through the bottom of the firebox and into the pit. Note that you cannot stoke the fire again after the fire has been dropped.

4. **Conduct blowdown**

   Press and hold [Y] for five seconds to remove impurities from the boiler which, if left, can increase the risk of priming and damage.

5. **Empty the smokebox**

   Hold [Ctrl]-[6] to open the smokebox door. You will note that there has been a build-up of debris in the lower part of the smokebox. Then press [Shift]-[6] to empty the smokebox of ash, which should take around 20 seconds. Once this process is complete, you can close the smokebox door by pressing [Ctrl]-[Shift]-[6].

SCENARIOS

All the supplied scenarios have been created using the Advanced version of the 7MT so you should have the locomotive in Advanced mode to drive these scenarios (the 7MT is set to Advanced mode by default). Driving these scenarios with the locomotive in Simple mode may work, but is not supported or recommended.

If you have used the Switcher utility to switch to the Simple version, the scenarios will not operate correctly.

Please note also that not all the following routes are included in Train Simulator by default and are not supplied with this product. You can purchase them either from the Just Trains website or from the STEAM store.

Note: *At least one of the scenarios requires the Train Simulator: European Locomotive & Asset Pack for some of the rolling stock used. You can purchase this pack by Download from the STEAM store.*

Standard scenarios

The total duration of these scenarios is approximately 16 hours.

Great Western Main Line Route Add-on (STEAM)

SD BR7MT – Charter to Oxford Part 1

Duration: 45 minutes

Drive 70013 on a Cathedrals Express from London to Oxford between Reading and Oxford.

SD BR7MT – Charter to Oxford Part 2

Duration: 45 minutes

Take 70013 to be turned at Didcot Triangle before returning to your train at Oxford in preparation for the return run.

SD BR7MT – Charter to Oxford Part 3

Duration: 60 minutes

Drive 70013 on the returning charter from Oxford to London as far as Reading.


70013


OLIVER CROMWELL


70000
BRITISH RAILWAYS


70013
BRITISH RAILWAYS


70000
BRITANNIA

QUICK DRIVE

This locomotive is Quick Drive enabled. You will find it in the menu under ‘SD BR 7MT Class 4-6-2’.

ADDING THE BR 7MT ADVANCED TO YOUR OWN SCENARIOS

By default the BR 7MT Advanced is only available via the supplied scenarios, but you can make it available for other routes in the following way:

Adding the locomotive

Start Train Simulator.

From the Main Menu click ‘Build’.

Click on the ‘Scenario’ tab at the top.

Click on the route on which you want to use the 7MT Advanced.

Click on ‘Free Roam’.

Click on ‘New Scenario’.

Select the location where you want the scenario to start from in the ‘Set location’ menu.

Select the type of scenario you want from the ‘Select Scenario Type’ menu.

Set the name for the scenario you want in the ‘Name’ box.

Click ‘Create’. The simulator will start to load.

When the simulation has loaded, ensure the padlock symbol is unlocked in the bottom right of the window.

Move to the top left menu (partly hidden in the border). It will slide out. Click on the pin image to lock it out, then move your mouse down to slide out the next partly hidden menu. Again, lock it with the pin.

On the lower, middle left menu, select the blue square with the orange triangle on it (Object Set filter) and a new menu will slide out to the top right of your screen. Once more, pin it to the screen.

Select ‘SteamDevs’ from the drop-down list and ensure that ‘BRStandard7MT’ has been ticked in the middle box.

Once this has been done, click on the blue ‘Engines and tenders’ icon (this looks like a side-on view of the nose of an HST125) in the middle left menu and scroll down until you see the ‘SD BR Std 7MT XXX’ entries – these are the locomotives from this 7MT Advanced collection.

Select one of these and then click on the area of track in the main window where you want the locomotive to be placed. When you have the right location, left-click, then right-click to deselect it.

You can change the direction it is facing by clicking on it until a large orange arrow appears above it and then clicking on the arrow to change direction.

Adding the tender

To add the tender, perform the same steps above for adding an engine but look for the entry that says ‘JT - BR1, (BR1A and BR1D) Tender’ and place it up against the rear of the engine. Ensure that the tender is located with the correct orientation to the engine and that you place it right behind the engine.

The three types of tender were allocated to the locomotive fleet accordingly:

- BR1: Numbers 70000-24, 30-44
- BR1A: Numbers 70025-9
- BR1D: Numbers 70045-54

To remove the locomotive or its tender, click it so it goes red and then press the [Delete] button on your keyboard.

Adding the driver

You will need to add a driver to the engine so you can drive it. To do this, click on the engine, click on the face with a cap icon on the top left slide-out menu, then click on the engine once more. A white icon with a blue driver image will appear above the engine. Double-click on this icon and a slide-out menu will appear in the top right corner of the screen. Enter a name in the top box, and in the lower drop-down box select 'Express passenger'.

Adding carriages

If you want to add some Just Trains Mk.1 passenger carriages, select the red 'Rolling Stock' icon (this looks like a container wagon) on the middle left-hand slide-out menu, then select the blue square with the orange triangle on it (Object Set filter) and go back to the top right menu and tick the 'Mark1 coach' entry.

Move back to the middle left menu, select the red 'Rolling Stock' icon and then scroll down until you see the relevant entries, i.e. 'JT – Mark 1'. Place these behind the tender in the same way you added the engine and tender.

When you have finished all this, click on the bottom right large orange arrow (Drive) and click 'Yes' to save your changes.

When the screen reloads, click on the BR 7MT Advanced locomotive and you will now be the driver of the engine.

IMPORTANT: *If you have manually added any BR 7MT Advanced engines or tenders to an installed scenario that was not supplied with this BR 7MT Advanced package, be sure to go back into that scenario and delete them and save the scenario BEFORE you uninstall the BR 7MT Advanced package. Failure to do this will prevent the default scenario from operating.*

SPECIAL THANKS

Special thanks to Locomotive Services Ltd.

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BR 7MT

ADVANCED