BR Standard Class 6 'Clan Class'

Drivers Guide

Steam locomotive expansion pack for Train Simulator

CONTENTS

INTRODUCTION

The British Railways Standard Class 6, otherwise known as the Clan Class, was a class of 4-6-2 Pacific tender steam locomotive designed by Robert Riddles. Between 1951 and 1952 ten locomotives were built at Crewe works and another 15 were planned.

Numbers 72000 to 72004 were based solely at Glasgow Polmadie shed (66A) and loco's 72005 to 72009 were based at the Carlisle Kingmoor shed.

The Clan Class was based on the Britannia Class but employed a smaller boiler and used various weight-saving measures to increase the locomotive's route availability for its intended area of operations in the west of Scotland.

The Clan Class locomotives took their names from a previous locomotive class that was being withdrawn from service at the time and reinforced their intended running location.

Locomotives

Clan Pacific – clean
Locomotive in pristine condition with no weathering

Clan Pacific – clean (AWS and speedometer)
Locomotive in pristine condition with no weathering and fitted with AWS and speedometer

Clan Pacific – intermediate
Lightly weathered locomotive equipped with AWS and speedometer

Clan Pacific – weathered
Heavily weathered locomotive equipped with AWS and speedometer

Clan Pacific Hengist
The new-build Hengist locomotive has oval buffers, tablet catcher brackets removed from the cab side, operational air braking installed and the footplate access doors fitted to the included BR1B tender and not the locomotive. It is in pristine condition and equipped with AWS and speedometer.

Example of a cab equipped with AWS and speedometer

You can choose to drive each of the ten Clans that were originally built and the new build Hengist. To do so you need to insert the correct locomotive number via the Scenario Editor:

72000 Clan Buchanan

72001 Clan Cameron

72002 Clan Campbell

72003 Clan Fraser

72004 Clan MacDonald

72005 Clan MacGregor

72006 Clan MacKenzie

72007 Clan MacKintosh

72008 Clan MacLeod

72009 Clan Stewart

72010 Hengist

Tenders

BR1 tender – early, clean (early BR crest and axle box colouring)

BR1 tender – late, clean (later BR crest and red/yellow axle box colouring)

BR1 tender – late, intermediate (later BR crest, red/yellow axle box colouring and light weathering)

BR1 tender – late, weathered (later BR crest, red/yellow axle box colouring and heavy weathering)

BR1B tender – for Hengist use

Coaches

This Clan Class 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 Maroon and Southern Region green/maroon liveries.

Brake Standard Open

First Open

Tourist Standard Open

The ‘Clan’ Project

The ‘Clan’ Project is creating a new real-world build of a Clan locomotive which will bear the name Hengist. Just Trains are proud to have worked in association with them to create this Clan Class expansion and in particular 72010 Hengist.

The following information is provided courtesy of The ‘Clan’ Project.

History

British Railways (BR) intended to build a second batch of ‘Clans’, the first five of which were intended for the southern region, hence the non-Clan names allocated. 72010 Hengist was to have been the first of this allocation.

72010 was originally to have been built towards the end of 1952, however the national steel shortage, followed by the introduction of the Modernisation Plan, led to BR cancelling the order. It is believed, although not confirmed, that the frame plates had already been cut for Hengist before the order was cancelled.

The new frame plates with the horn guides being welded in can be seen below:

72010 modifications

72010 will have various modifications incorporated into the design, some of which were planned by British Railways, and some to meet 21st century running requirements.

Expected modifications will include:
Inclusion of OTMR (On Track Monitoring and Recording).

- Inclusion of GSM-R radios. These are replacing the old radio systems across UK railways.
- Lowering of cab, chimney and dome by ¾" to fit modern railway gauge.
- Improvements to the exhaust, cylinders and drafting. These modifications were proposed by BR and The 'Clan' Project is working with the 5AT group and their modern technology to improve them further.

Many components have already been made for the locomotive and held in store ready for the day that they can be fitted to the locomotive as she is built. Some of the more complex structures, such as the combined lower frame stretcher and spring hanger brackets, took over two years to complete due to their complexity and the fact that they are all unique one-offs.

Pattern to create the mould

Casting fresh from the mould

Casting after fettling.The stretcher will be machined when the frames are assembled

The ‘Clan’ Project Patron and President

The ‘Clan’ Project is very fortunate to have secured the Patronage of the Hon. Sir William McAlpine Bt. By giving his support for the Project by becoming its patron, Sir William said, "I am most happy to be associated with this very worthy project, which is well advanced, and I urge all enthusiasts of main line steam to become involved in this exciting project."

He continued, “I’ve always been fascinated by railways. My earliest memories are of being taken to watch the trains and when Nanny wanted to take me back for lunch, I said, ‘Hold on, there’ll be another one along in a minute.’”

There was a railway near the family home in Surrey and young William was regularly taken to see the trains. His interest deepened with his first model railway.

He was born in London at the family-owned Dorchester Hotel and was raised at the family home in Surrey. After being educated at Charterhouse School he went on to join the family building firm. The years after World War II were a busy time for construction, with Sir William starting his career at Hayes Depot, Middlesex, a 30-acre site which housed McAlpine’s railway locomotive and wagon fleet.

An acknowledged steam enthusiast, he returned to Hayes depot during the Beeching Axe era to find that the company’s Hudswell Clarke 0-6-0ST No. 31 was for sale as scrap for

£100. So Sir William said, “Send it over to Fawley.” This marked the start, in 1965, of the Fawley Hill Railway, a private railway which now runs to over a mile long.

Sir William is the President of the Railway Benevolent Institution, known as the Railway Benefit Fund, a charity helping current and retired railway industry workers, and he presently chairs the Railway Heritage Trust.

Sir William is the great-grandson of Sir Robert McAlpine, who founded the contracting company that bears his name to this day. Sir William spent his working career, apart from National Service, in the company, starting as an apprentice fitter, and spending many years as a Director. The company is famous for the construction of many famous landmark structures, including the Glasgow Subway, Mallaig Extension Railway, Emirates Stadium, Glenfinnan Viaduct (completed in 1901), the original Wembley Stadium in 1923, the Dorchester Hotel, the Millennium Dome, the Millennium Bridge in London, the Bull Ring in Birmingham, the London Olympic Stadium and the Eden Project in St. Austell, Cornwall.

Sir William McAlpine’s name, however, will be forever synonymous with the rescue of the Flying Scotsman in 1973 and the establishment of the Railway Heritage Trust. He is warmly welcomed to The ‘Clan’ Project, where his wealth of knowledge and experience in the world of heritage railways and business will be put to very good use.

The ‘Clan’ Project is also very fortunate to have James S Baldwin as its President to take the project forward. Jim is a lifelong railway enthusiast, historian, writer and professional film producer. His railway activities past and present include producing the official NRM Flying Scotsman boxed set of films, writing several books about the Flying Scotsman, and advising on several railway projects including the opening of part of the London Mail Rail system.

Where will the locomotive run and where will it be based?

Being a Class 6 with relatively light axle loadings, it will be able (subject to available routing) to run on over 90% of the UK mainline. The ‘classic’ routes such as the Settle and Carlisle and the WCML (West Coast Main Line) will be ideal stomping grounds for the locomotive and also the West Highland Railway. It is also intended to operate the locomotive over heritage lines for galas and special events.

The locomotive will be based on the Great Central Railway in Leicestershire, although it is likely that it will be based away when operating on the mainline.

What will it cost?

The entire build is likely to cost in the region of £2.5m. This sum is being raised from a growing membership and also from commercial sponsorship and donations.

At the time of writing the frames are coming together and will be assembled in 2015.

Find out more

More details about the Hengist locomotive and The ‘Clan’ Project can be found on their website at https://www.theclanproject.org/ and also via Twitter (#72010Hengist) and Facebook (www.facebook.com/theclanproject).

The ‘Clan’ Project is always looking for new members and welcomes help with building the locomotive, running their sales stand and helping with the administration involved in building a mainline steam locomotive for the 21st century.

INSTALLATION

Installation is handled by Steam after purchase of the product. After purchasing the product the files will be downloaded and installation into the Steam Library will be automatic.

Graphics Settings

In Train Simulator set Dynamic Lighting to ON, in game settings, for the best graphical display.

Depending on your computer's specification, you may wish to increase or lower the various Graphical Detail options to get the best performance.

Updates

Updates to the product will automatically be deployed, downloaded and installed via Steam to all users who own the product.

Technical Support

To obtain technical support (in English) please visit the Support pages at www.justtrains.com. As a Just Trains customer you can obtain free technical support for any Just Flight or Just Trains product.

For support specifically on the Steam version of the add-on please contact Dovetail Games.

https://dovetailgames.kayako.com/

Regular News

To get the latest news about Just Flight products, sign up for our newsletter here: http://www.justtrains.com/subscribe.asp

ADVANCED FEATURES

We have tried to replicate as far as possible the typical operations of a real steam locomotive. 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 Standard Class 6 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 with the Class 6 you can join the 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:

Warm mode

You need to carry out the servicing operations 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 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.

Operating tender handbrake

This is located on the fireman's side of the tender.

Blowdown

This removes impurities from the boiler which, if left, increase the risk of priming and damage.

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.

Prime the lubricator

Watch as the lubricator handle rotates.

Fill sandboxes

Remove their lids and watch the sand level rise as you fill them**.**

Servicing interlock

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

Operating left and right rocking grates

Use the handle from the boiler backplate to rock each grate individually.

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.

Opening tender doors

Open the tender doors to view the coal.

Bardic lamp operation

An operating Bardic lamp is placed on the tender to help illuminate the loco controls and gauges during night operations.

Carriage steam heating

Turn on the steam heating control in the cab and you will see steam leaking from the supplied Just Trains Mk.1 carriages. 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.

Brake linkage

See the brake linkage next to the wheel move as the steam brakes are used.

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. There is also a simple implementation of the valve action controlled by the reverser, which brings the simulation a step closer to replicating the real thing.

The first half of regulator travel controls the pilot valve which admits a relatively small amount of steam into the steam pipe and subsequently the steam chest. The second half of regulator travel closes the pilot valve and opens the main valve which admits a much greater volume of steam to the steam chest.

Note that the main valve uses much more steam and is a bigger drain on resources such as fire mass and the water in the boiler. It is therefore generally only used to work the locomotive to the maximum when necessary. The pilot valve offers a greater degree of control over the locomotive at slower speeds.

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 Clan Class 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.

Authentic air brakes (Hengist only)

On the Hengist locomotive an authentic air braking system is fitted as well as an authentic-sounding Westinghouse air compressor to supply the required air pressure.

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. It is important to start the locomotive after long stationary periods 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 vapours, 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

Open the injector water valves first, then open the respective injector steam valves. The flow rate is not changeable. To turn the injectors off, first turn the injector steam valve off, then turn the respective injector water valve off. Whenever the injector steam valves are in use, the injector water valve must already be ON, otherwise the injectors will blow back.

The Just Trains Clan Class 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.

Water gauges

These indicate the level of boiler water and the water level is realistically affected by the gradient of the line.

Uphill track gradients increase the water level and downhill gradients decrease it. You should therefore keep a close eye on the water level and have a good idea of your route's gradient profile, because it is important not to overfill the boiler when travelling uphill as you risk priming the locomotive, and even more important when you are going downhill that the water level is not so low that the crown sheet of the firebox becomes exposed, which will melt the fusible plugs and end the scenario. Water is also sloshed back and forth along the boiler when accelerating and decelerating; this will display on the gauges with some sinusoidal behaviour.

Realistic damper behaviour

The dampers are used to control the amount of air going to the fire via the ash pan and up through the fire grate. More air means more oxygen and therefore a hotter and better burning fire.

The Just Trains Clan Class Advanced has working front and (on Hengist only) rear dampers at your disposal. The dampers are located at the forward and rear facing locations on the locomotive and are tools for you to use as you wish to maintain control over the fire.

Damper controls

A set of front and rear operating dampers (rear dampers on Hengist only) are fitted.

Directional sanders

The sander lever must be pulled to the right to operate the front sanders for when the locomotive operates in forward, and pulled to the far left 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 chaper for preparing the ‘warm start’ locomotive (see page 27).

Glowing embers

You will see these coming from the chimney.

Steam feed to injectors

Under the cab on the right side you can see the steam feed to the injectors. You will only see it when the injectors are operating.

Steam chest pressure

This oscillates a little in time with the pistons, which is thanks to the simulated valve events.

Cylinder cocks

These emit steam from each side in time with the pistons and wheels.

External animations

External animations such as the regulator rod and reverser pole are present in the locomotive.

Advanced particles

A wide range of scripted photorealistic particle effects include exhaust from the chimney which changes colour when you stoke the fire and changes velocity and density depending on the blast pipe pressure.

Wheelslip

If the regulator is opened too fast the wheels will visibly spin. In severe cases it may be necessary to open the cylinder cocks in order to release back pressure so you can close the regulator successfully. The wheels will also lock up if you over-apply the brakes. When the wheels are slipping you will see sparks flying!

Double-header locomotive interaction

There is a basic level of interaction between the player's locomotive and the AI-driven one in a double-header. The regulator and cylinder cocks are synchronised, and if you use the short whistle on the [B] key the other locomotive will whistle back to you in acknowledgement.

Head and tail lights

These are customisable for all conditions.

Cabview camera positions

This locomotive uses the Train Simulator multi-position cabview camera.

Firing the firebox

Stoking is different from the default operation in that instead of controlling the firing rate, pressing [R] simply turns the firing on and you can watch the fire mass on the [F5] display increase as the fireman throws on shovelfuls of coal, instead of just increasing the fire mass very slowly like in other Train Simulator loco's. Firing should automatically stop whenever the fire doors are closed.

Firebox doors

The firebox doors now play a role in controlling the fire temperature. When you are on the move, cold air from the footplate gets sucked through the fire hole and acts as a secondary stream of air for the fire. In real life the effects of this depend on the coal type and the locomotive, but the secondary stream generally has a slightly detrimental effect on the fire temperature.

When running under power, therefore, the fire doors should be kept closed or a crack open, and only opened fully to stoke the fire, of course! When closing the regulator, you should open the doors fully while you coast and adjust the main dampers to cool the fire down and prevent too much steam being generated when it isn't required.

An important exception to this is when entering a tunnel, where the fire doors must be completely closed, because the core simulation of Train Simulator will cause a fatal blowback and end the scenario.

DRIVING OPTIONS

Please read this chapter carefully before driving the Clan Class locomotives.

This Clan Class 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.

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 is selected via the locomotive numbering in the Scenario Editor or when employed in one of the included scenarios.

Hot

This is the default state of the loco 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 (page 48) for details on how to switch between Hot and Warm states.

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.

Note: *Some of the cab operations and animations can only be operated manually when the 'Control Method' is set to 'Expert'. You can check this by clicking on the 'Drive' option from the Main Menu and looking at the 'Control Method' slider on the bottom right of that screen.*

To drive the locomotive with Advanced controls, the 'Automatic Fireman' needs to be OFF. You can check this via the Settings>Gameplay menu.

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.

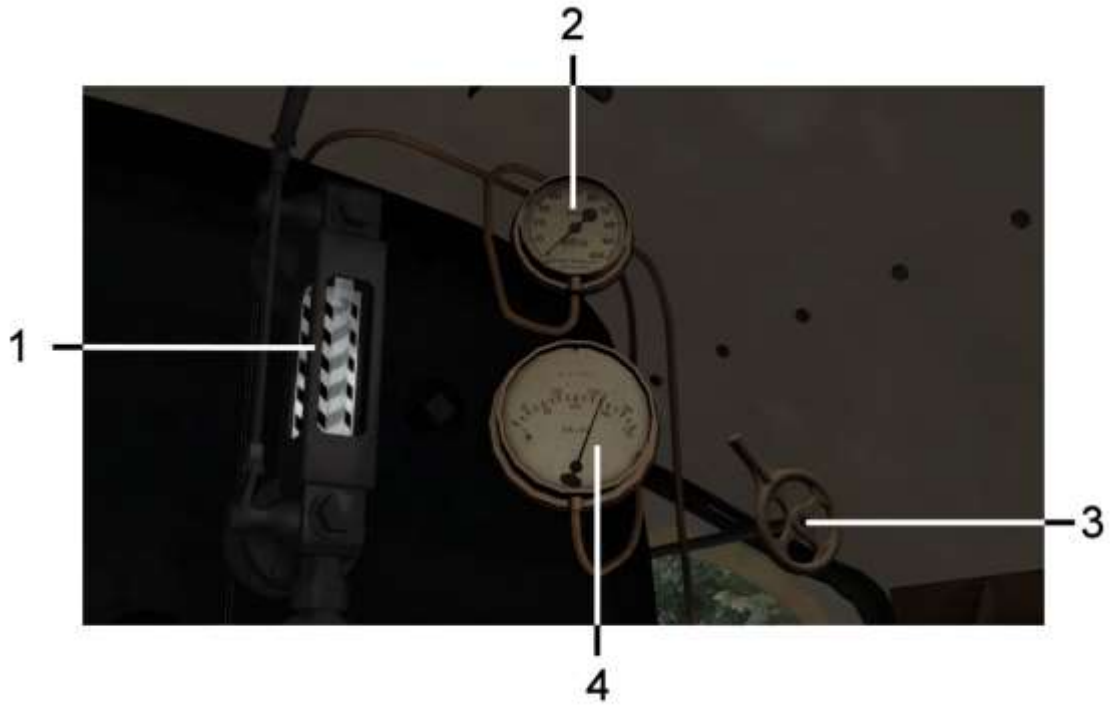
Detailed information on the functions of the cab controls is provided in the DRIVING THE CLAN CLASS LOCOMOTIVE chapter of this manual.

Cab roof

Sliding roof panels

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

Right upper cab



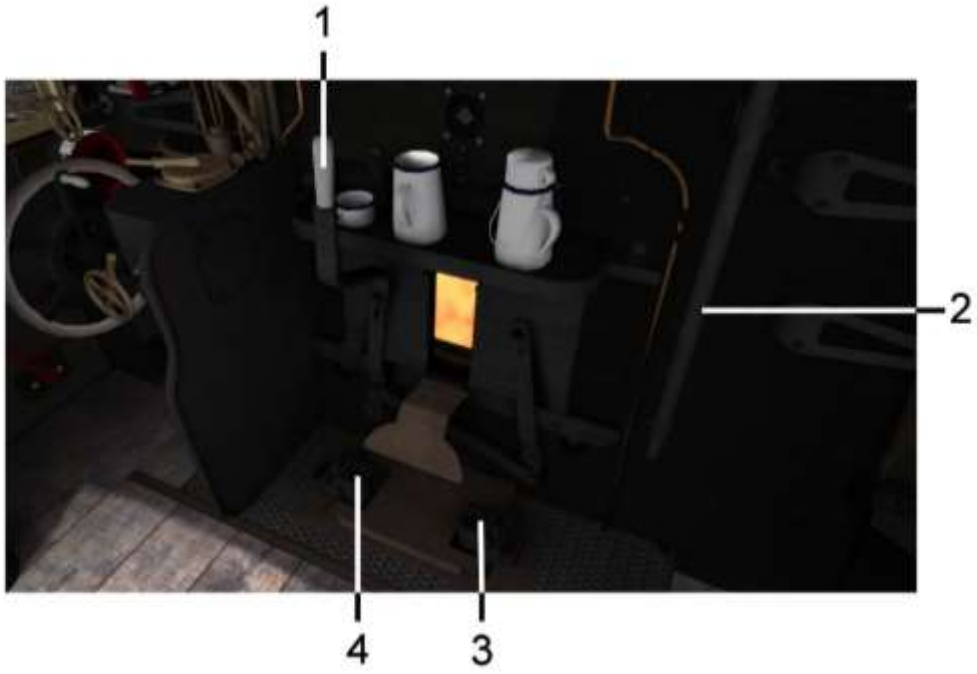
1. Right side boiler water level indicator
Shows the level of water in the boiler.

2. Coach steam heat pressure gauge

3. Coach steam heat control wheel
Rotate this wheel 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!

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 these 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 to avoid the risk of a blowback and the scenario ending.*

Firing (adding coal) – when the fire doors are open you can add coal to 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 smoke and exhaust colour. Use the smoke colour to help you with firing decisions – if you've got pure black smoke then it's time to put the shovel down!

2. Grate rocking rod

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

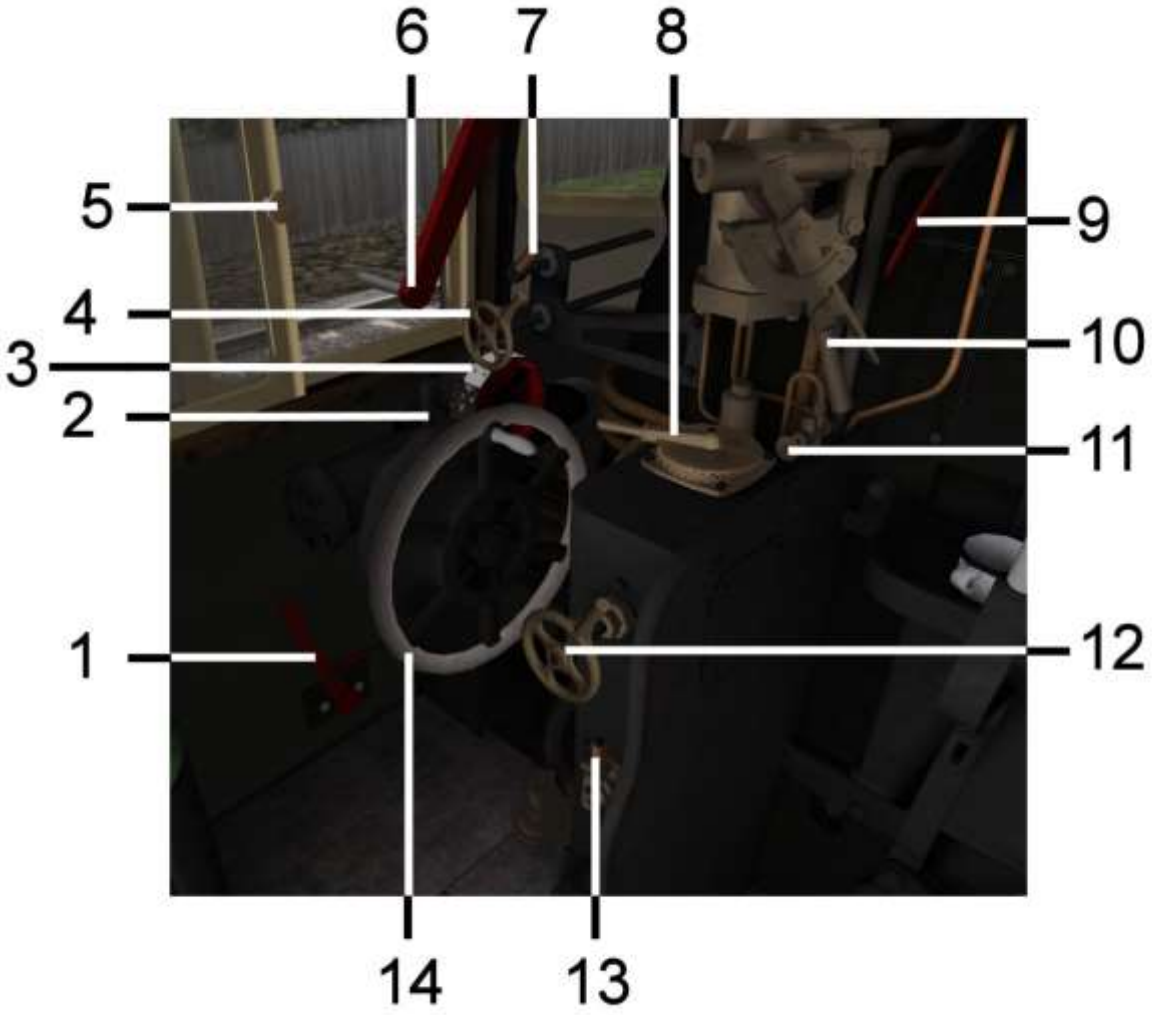
3. Right grate rocking socket

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.

4. Left grate rocking socket

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 mouse or the [C] key to operate the cylinder drain cocks.

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, closing 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 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 hold down the [E] key. 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 ±15%. This is like shifting up through the gears of a car and, like a car, it saves on 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!

In other words, it is more economical to drive the locomotive on a smaller cut-off. The flip side of this is that with a smaller mass of steam per stroke, there is less pressure acting on the cylinder head and therefore less tractive force, which is why the reverser is often compared to the gearbox of a car: low gear (high cut-off) provides more torque while using more fuel per unit speed, whereas high gear (low cut-off) is more economical but could quickly stall the vehicle going up a steep hill if the driver hasn't shifted down (increased cut-off)!

There is a forward section shown in black, and a reverse section shown in white for driving tender first. Use the mouse to rotate or the [W] and [S] keys.

Reverser lock and creeping – the reverser lock must be unlatched before you can move the reverser. 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. 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.

5. Left sliding window

Use the mouse to drag open or closed.

6. Regulator

This is essentially the throttle of a steam locomotive. Pull this towards you to allow steam into the steam chest to drive the pistons. The steam chest has an authentic delay built in so do not expect an instant reaction to your movement of the regulator. Be aware of the delay between your action at the regulator and what actually happens at the steam chest. Push the regulator away from you to close it. 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 (but not into main valve) and leave it until the train begins to move. If the cylinder cocks are closed, pump the regulator a few times while you wait for the steam to reach the cylinders. Then, as you start to move, leave the regulator open a little.

IMPORTANT: *When coasting, you MUST ensure that the pilot valve is open in order to keep the cylinders lubricated. You can tell when the pilot valve is open by the stream of steam coming out from above the cylinders, even when the steam chest pressure reads 0. Failure to do this for prolonged periods of time will actually damage the loco and have an impact on its performance.*

7. Small ejector

The small ejector must be opened to allow the brakes to be released and maintain the vacuum in the train pipe. Press and hold the [J] key to increase and [Shift]-[J] keys to decrease the ejector.

8. 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.

Note: *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.*

Brakes notes: *The Clan Class Advanced is fitted with vacuum brakes to brake the train, and steam brakes to brake the locomotive 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 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, which will 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.*

An air brake system is fitted on Hengist, although this still requires vacuum to operate.

9. Whistle

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

10. Engine brake

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

11. 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.

12. Blower

Use this control to blow more air through the fire to make it burn hotter and faster. 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.

13. Directional sander

The sander lever must be pulled right to operate the front sanders for when the locomotive operates in forward, and pulled to the far left 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.

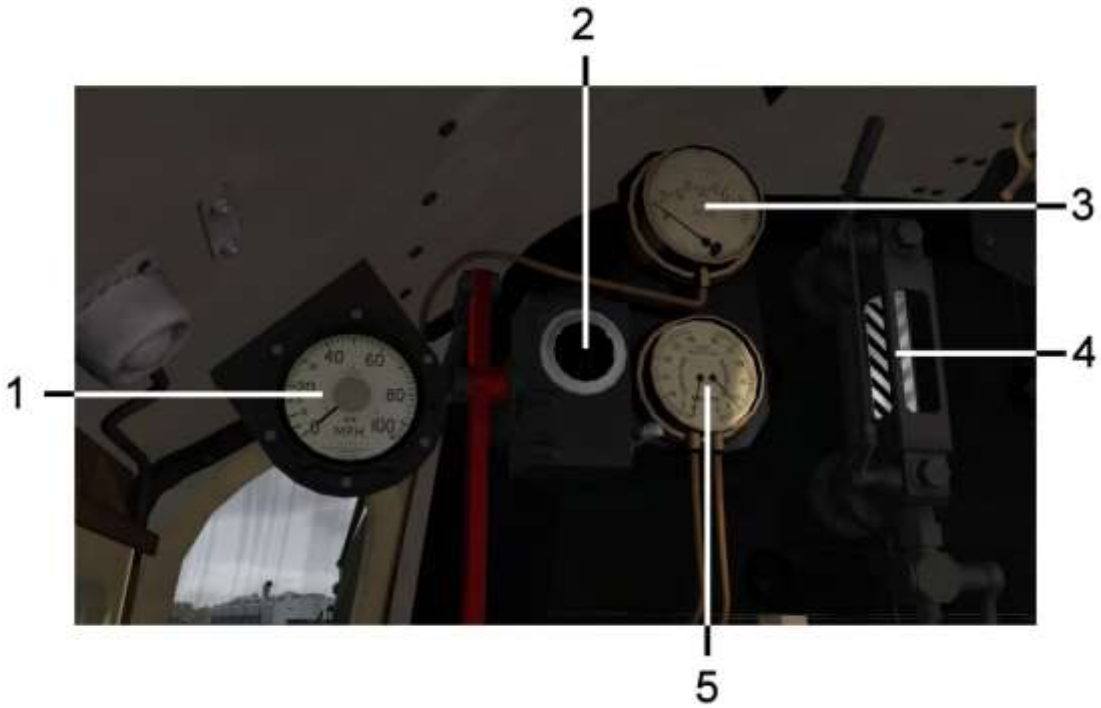
At any time you can stop the train, apply the handbrake, and refill the sandboxes as described in the section for preparing the ‘warm’ locomotive.

Hengist left cab area differences

Hengist has an air braking system fitted. The left gauge shows the air pressure Main Reservoir Pipe and the Main Reservoir pressure displayed in pound per square inch. The right gauge shows the train pipe pressure, also displayed in pounds per square inch. On the right side of these is the Air Brake operating handle which is different in appearance to the normal vacuum brake handle fitted on the other locomotives in this pack.

Hengist has the TPWS (Train Protection and Warning System) fitted along with an OTMR (On-Train Monitoring Recorder) indicator but these are non-operational due to limitations in the host simulation.

Left upper cab



1. Speedometer
This displays the speed of the locomotive. A speedometer is not fitted to all the locomotives in this pack.

2. AWS
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. This is not fitted to all the locomotives in this pack. Press the [Q] key 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 that 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 set in the middle of two rails, 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 after 2.5 seconds the driver has failed to acknowledge the warning 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. 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.

3. Steam chest pressure

This shows the pressure in the steam chest.

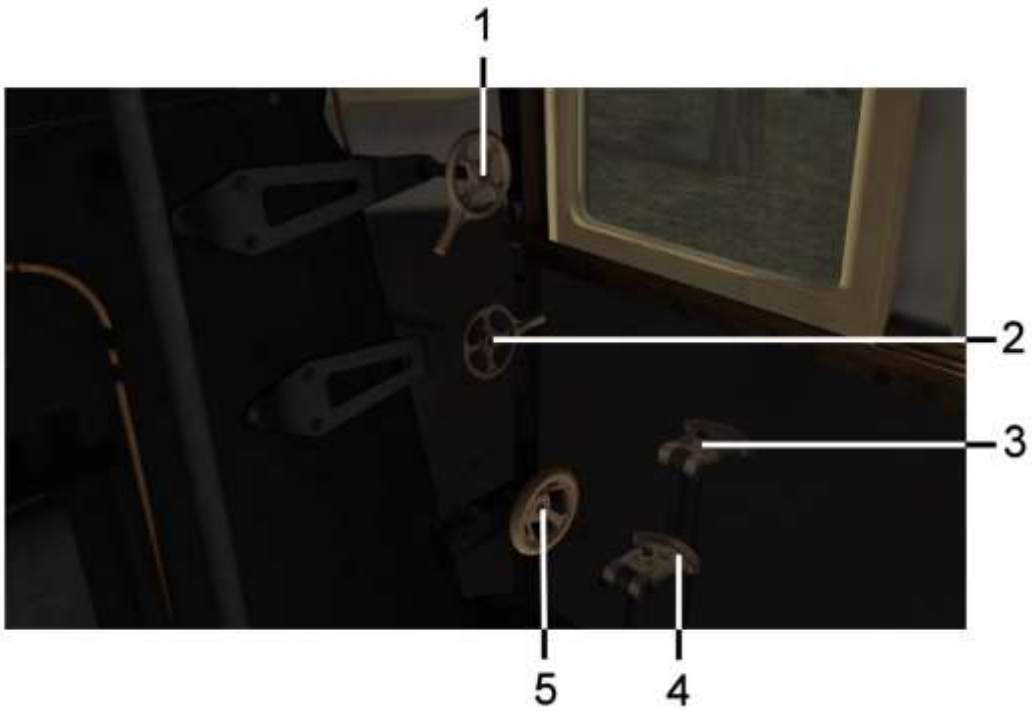
4. Left water level indicator

Shows the level of water in the boiler.

5. Duplex vacuum gauge for train pipe and vacuum reservoir

Indicates the vacuum pressure of the train pipe on the left, and the vacuum pressure in the locomotive’s vacuum reservoir.

Right lower cab



1. Exhaust injector

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 cock, otherwise water will not flow.

2. Live injector

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 cock, otherwise water will not flow.

3. Exhaust injector cock

This valve allows the water to flow from the tender to the boiler via the exhaust injector and must be opened before it.

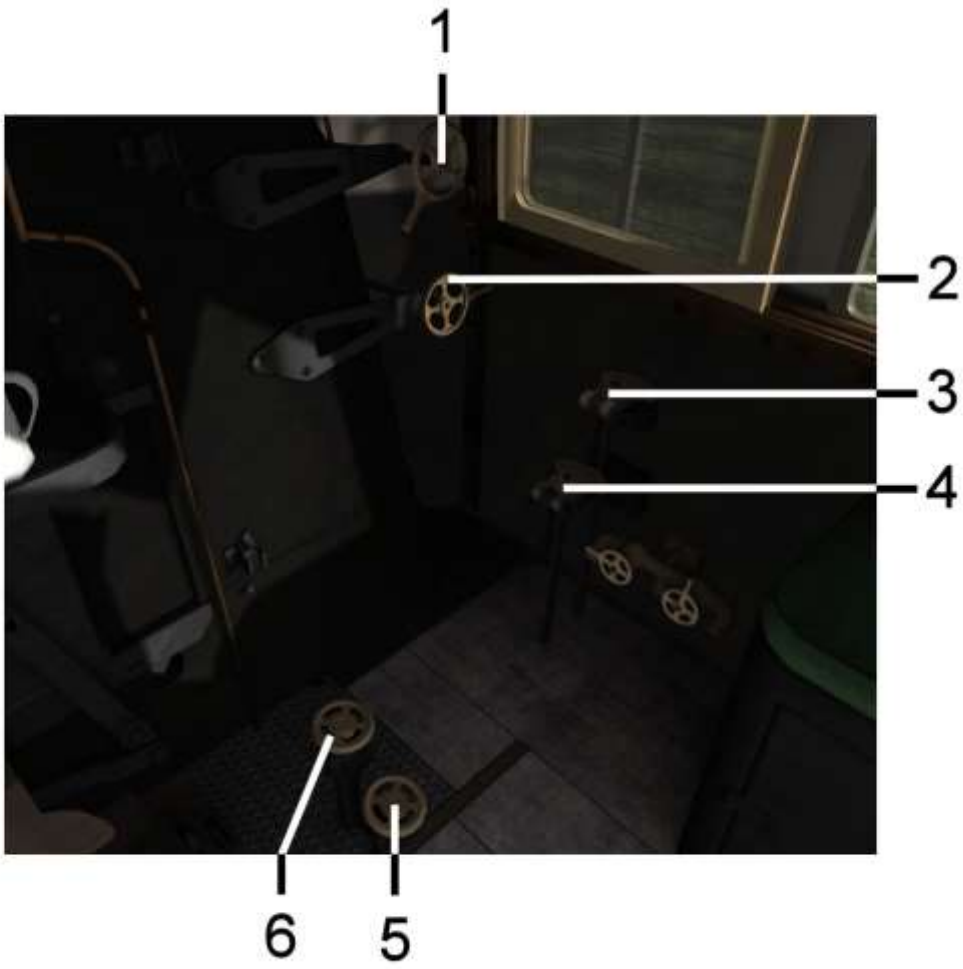
4. Live injector cock

This valve allows water to flow from the tender to the boiler via the live injector and must be opened before it.

5. Front damper

Use the [M] key to increase the FRONT damper and [Shift]-[M] to reduce it. This allows more or less air into the fire.

Hengist right cab area differences



1. Exhaust injector

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 cock, otherwise water will not flow.

2. Live injector

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 cock, otherwise water will not flow.

3. Exhaust injector cock

This valve allows water to flow from the tender to the boiler via the exhaust injector and must be opened before it.

4. Live injector cock

This valve allows water to flow from the tender to the boiler via the live injector and must be opened before it.

5. Rear damper

Use the [Ctrl]-[M] key to increase the REAR damper and [Ctrl]-[Shift]-[M] to reduce it. This allows more or less air into the fire.

6. Front damper

Use the [M] key to increase the FRONT damper and [Shift]-[M] to reduce it. This allows more or less air into the fire.

Damper notes: *The dampers control the flow of the main source of air to the fire. Opening the dampers or turning them on increases the flow of air. The more air supplied to the fire, the more oxygen there is and therefore the hotter the fire will burn, so make sure the dampers are wide open in situations where a hot fire is required and closed when you need to cool down the fire to stop the safety valves from going off.*

Note on using the water injectors

On the Clan Class 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 would run out of water and explode.

There are two types of injector fitted to the Clan Class 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 and 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 control 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 control is opened to release steam into the steam cone and mix the steam and water in the combining cone of the injector using the Venturi effect. This in turn raises the pressure of the water, lifts it up the water feed pipes at the side of the boiler and delivers it into the boiler via the check valve. Both controls have to be operated otherwise no water will reach the boiler!

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 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 again, 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,

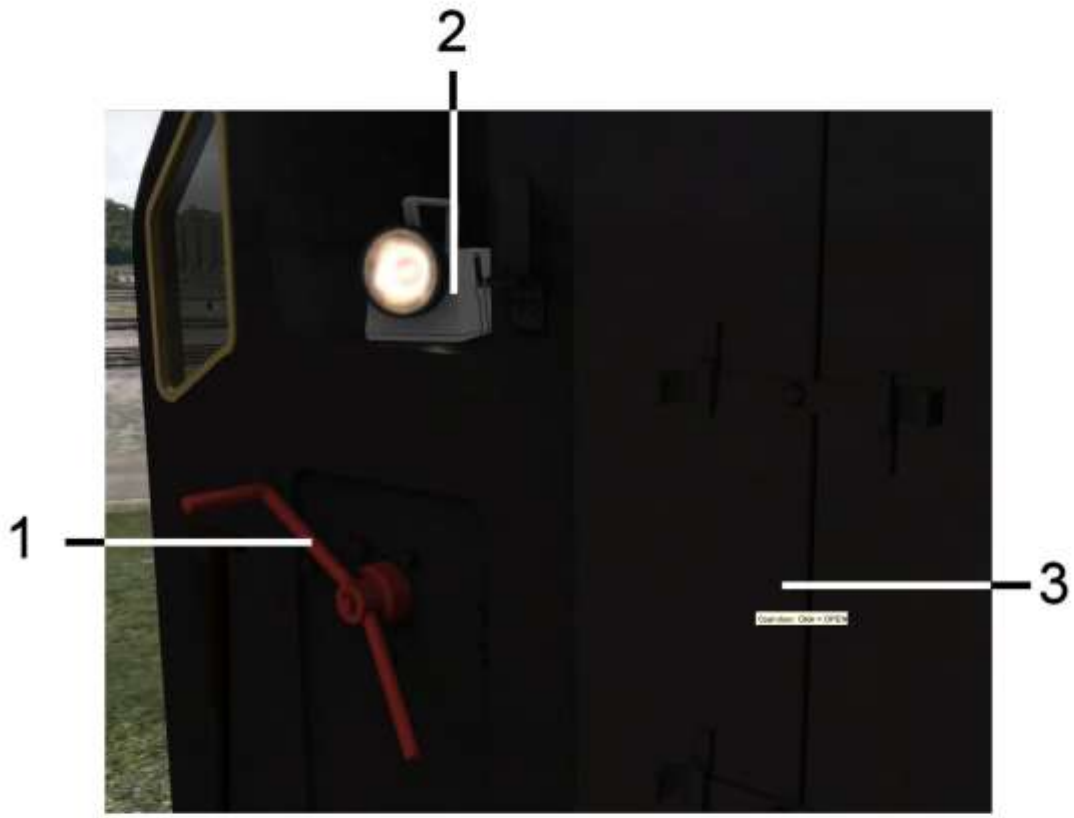
otherwise the injector will blow back and a lot of steam will blast out of the overflow pipe with lots of noise. Operating the live steam injector is exactly the same.

Normally only one injector system is used to maintain the boiler water level, but it's good practice for the fireman to use each one alternately to ensure even wear and to check that both are operating correctly. You would only use both injectors if you needed to get water into the boiler in a hurry – if you used most of it going up to the summit of a climb, for instance.

IMPORTANT: *You need 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

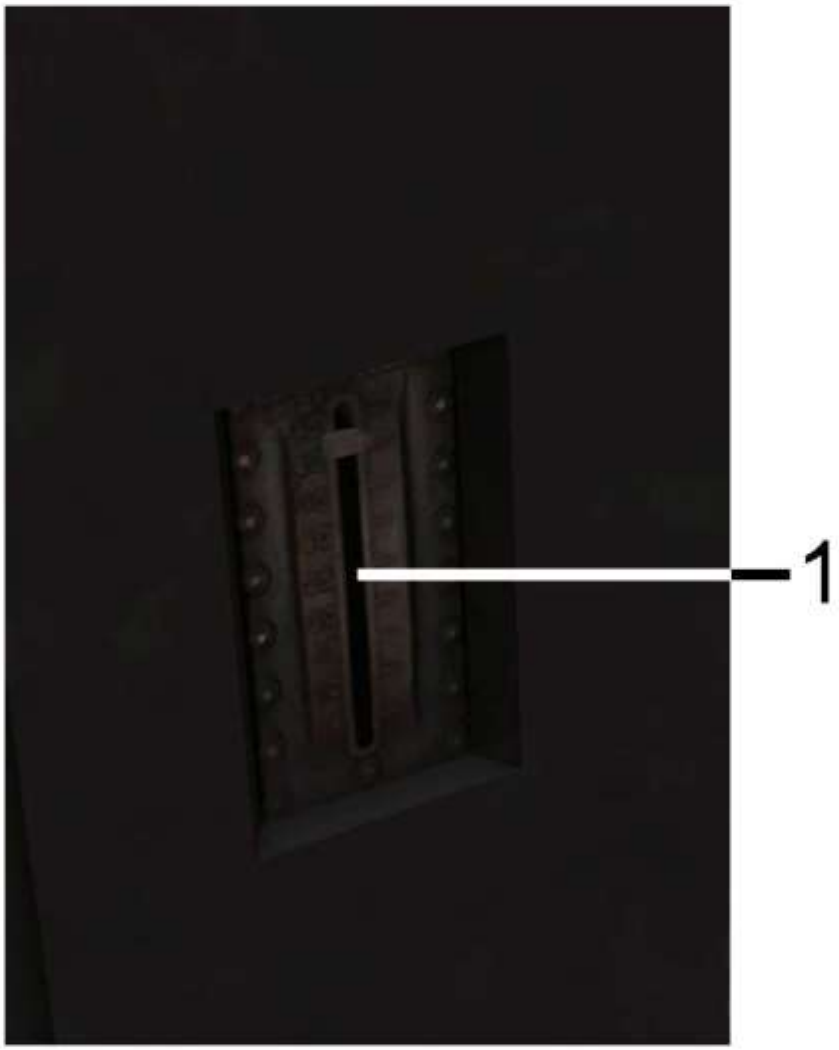
Use the [/] key (forward slash) to set the brake ON and OFF. We advise against using the mouse on this control as it is less accurate than using the keystroke. The brake has to be ON for all servicing to be carried out. If it will not release, either the smokebox door or the sandbox lids have not been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

2. Bardic lamp

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

3. Tender coal doors

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



1. Tender water level indicator

Where fitted, this show the water level in the tender.

CAB VIEWS

Move view to left and right of 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.

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 chapter of this manual.*

Because the Clan is an Advanced loco the HUD cannot be used fully to control 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 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 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.

Reverser – forward/reverse position from neutral in %.

Train brake – in Advanced mode, 50% is a dead zone where the smaller the percentage compared to the dead zone, the greater the rate of vacuum creation in the train pipe. The

larger the percentage compared to the dead zone, the greater the rate of vacuum destruction and therefore brake application

Boiler pressure – PSI up to a maximum of 220 PSI. Aim to keep the pressure between 210 and 215 PSI under normal running conditions, especially when attacking a climb.

Steam chest pressure – displayed in PSI. The steam chest pressure can be seen on the steam chest pressure gauge in the cab. This pressure is what 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. The steam chest pressure can never exceed or match the boiler pressure, but it can get pretty close in the right circumstances. The higher the pressure the better, generally speaking. Note that this is not the steam chest pressure as modelled on the Just Trains BR Standard Class 6 Advanced; it is part of the host software and, while called Steam Chest Pressure, it is actually a meter for the Work Done (force x distance).

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 760 pounds.

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

Steam usage rate – how much steam the engine is using. This must be below the steam generation rate otherwise you will waste steam, but on gradients make sure that the usage rate is as close to the generation rate as possible. 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.

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 ensure that you give the brakes a ‘breather’ to prevent overheating from overuse, by releasing and re-applying periodically.

Small ejector – open or closed. This creates the vacuum needed for the brakes to function.

Tender water level – displayed in gallons (maximum capacity of 4,250 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. 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’.

Dampers – on/off. Dampers are flaps which regulate 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 and rear dampers and the fire door.

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] – Toggle open/close
Live injector steam valve	[O] – Toggle open/close
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
Front damper wheel	[M] – Turn anticlockwise and open [Shift]-[M] – Turn clockwise and close
Rear damper wheel (Hengist only)	[Ctrl]-M] – Turn anticlockwise and open [Ctrl-[Shift]-[M] – Turn clockwise and close
Blower valve	[N] – Increase opening [Shift]-[N] – Decrease opening
Stoking	[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	[Ctrl]-[8] – Toggle to place/remove
Left lamp	[Ctrl]-[1] – Toggle to place/remove
Middle lamp	[Ctrl]-[2] – Toggle to place/remove
Right lamp	[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
Rocking grate	[Ctrl]-[R] – Repeatedly tap to rock grate
Regulator handle tapping	[Ctrl]-[A] – Tap to increase opening [Ctrl]-[D] – Tap to decrease opening

Whistle

Click on the handle or press the space bar to sound the whistle. For a short blast on the whistle, press the [B] key.

Reverser lock

The reverser must be unlocked by pulling the locking latch back with the [E] key before it can be moved.

Brakes

Tender handbrake – use the [/] key to turn ON/OFF.

Train brake – use [;] (semi-colon) to take the train brake OFF and [‘] (apostrophe) to apply the train brake.

Small ejector (for brake operation)

Press and hold the [J] key to increase and [Shift]-[J] keys to decrease the small ejector.

Large ejector (for brake operation)

Press and hold the [U] key to increase and [Shift]-[U] keys to decrease the large ejector.

Cylinder cocks

Use the [C] key to open/close the cylinder cocks. When the handle is in the backwards position, the cocks are open.

Firebox doors and firing

Use the [F] key to open the firebox and [Shift]-[F] to close it.

Shovelling coal

Use the [R] key to start shovelling coal and [Shift]-[R] to stop.

Water to boiler EXHAUST feed

Use the [K] key to open the water feed to the exhaust injector from the tender and [Shift]-[K] to close it.

Turn the exhaust injector to the boiler ON/OFF with the [I] key.

Live feed

Use the [L] key to open the water feed from the tender to the live injector and [Shift]-[L] to close it.

Turn the live injector to the boiler ON/OFF with the [O] key.

Blower

Use the [N] key to increase the blower and [Shift]-[N] to reduce it.

Dampers

Use the [M] key to increase the FRONT damper and [Shift]-[M] to reduce it.

Hengist only: Use the [Ctrl]-[M] key to increase the REAR damper and [Ctrl]-[Shift]-[M] to reduce it.

Sanders

Use the mouse to operate or use [X] for the front sanders and [Shift]-[X] for the rear sanders:

LEFT = rear sanders ON

UPRIGHT = sanders OFF

RIGHT = front sanders ON

Fire ash pan doors

Open and close the ash pan by using [Ctrl]-[7].

Rocking the fire grate

Click on the right-hand side rocking handle socket 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 to drop the fire on the right side. Click on the socket to return the rod to the backplate, then click on the left socket and repeat the process. You can use [Ctrl]-[L] and [Ctrl]-[R] to rock the rod after it has been inserted into the socket.

External light operations

Master switch to show or hide the lights:

Press [H] to show a light and press [Shift]-[H] to remove it. 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 (will not show if you have the bottom centre lamp showing)

Note: *The key operations that control the displayed light are mapped to the number pad keys, NOT the numbers along the top of the keyboard. The [num lk] key must be ON.*

Shed plate and Hot/Warm state operation

You can set the Clan Class Advanced locomotive to either a Warm or a Hot state and you can also set individual shed plates to display. These are controlled by the loco number via the Scenario Editor.

Double-click on the engine (not the driver icon) to bring up the correct menu.

The loco number format is: NNNNNSHHH

N = loco number

S = 0 (zero) for Warm state or 1 for Hot state

H = shed code

For single digit shed codes (i.e. 1A) replace the first character with an ‘X’, i.e.

720001X1A.

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

Changing the locomotive number and name plate

Each of the ten Clans that were originally built can be selected to drive. To do this you need to insert the correct locomotive number via the editor.

The locomotive numbers and corresponding names are:

- 72000 Clan Buchanan
- 72001 Clan Cameron
- 72002 Clan Campbell
- 72003 Clan Fraser
- 72004 Clan MacDonald
- 72005 Clan MacGregor
- 72006 Clan MacKenzie
- 72007 Clan MacKintosh
- 72008 Clan MacLeod
- 72009 Clan Stewart
- 72010 Hengist

Use of Southern Region headcode discs (Hengist only)

Southern Region used a unique set of headcode disc layouts to indicate the destination of the train. We have included 15 of the most commonly used routes that can be configured on Hengist.

To set these headcode discs on Hengist you add the appropriate letter to the tenth digit of the locomotive number when in the Scenario Editor.

By default the locomotive is set to show lamps, but by pressing [Ctrl]-[H] or [Ctrl]-[Shift]-[H] it will cycle through displaying lamps, discs with a central HID (High Intensity Discharge) lamp, or all discs.

For information on the disc formations used and the train destinations they relate to, please refer to:

www.semgonline.com/headcodes/sheadcodes/04.html

The numbers in the following list refer to the illustration number on the above web page.

The letters below refer to the letter that you must add to the end of the Hengist locomotive train number to make the desired head disc combination show.

For example, if you look on that web page and wish to have the discs set out as in illustration 1, you need to add the letter ‘L’ in the tenth position in the Scenario Editor.

L: 1
M: 2
N: 3
O: 4
P: 5
Q: 6
R: 7
S: 8
T: 9
U: 10
V: 11
W: 20
X: 13
Y: 14
Z: 15

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 Clan 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 in the smokebox via the regulator rodding and linkage that extends along the left hand side of the boiler. Having 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, 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 beautiful and fairly simple. 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 rather 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 because 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, with the aim of improving water economy and reducing 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 action taking place at the steam chest. This delay has been modelled, and in fact changes depending on how saturated the internal steam pipe system is and how open the three regulator valves are.

What causes reverser creep?

The Clan 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. On the Clan, with 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 lifting arm, 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. Rotating this lifting arm lifts and lowers the radius rod up and down the expansion link.

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, which connects to the crosshead of the cylinder, and about one eighth of the way down this combination lever is where the piston valve rod is connected. The amplitude of longitudinal movement in the radius rod therefore directly changes the amplitude of piston valve movement, thus changing the cut-off. Due to the timing of the piston valve in relation to the cylinder, forward 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 of 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 and so on, 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.

The driver is not able to keep hold of the reverser at all times, however, so a lock was added to hold the reverser in place. It is extremely important that the reverser lock is not underrated, 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 from reverse gear to forwards gear by itself, 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 to stop the wheelslip is to reduce cut-off, 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 Just Trains Clan is the standard British Railways set-up found across the range of Riddles-designed Standard classes. There is an SSJ 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 whilst 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 whilst 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 on 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, then 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 train pipe and reservoir pressure read 0 inches of mercury, or in other words are both at atmospheric pressure, then 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 Clan Class 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.

These checks are shown via messages in the 'Driver Tutorial' scenario for the Clan Class Advanced. It is possible, however, 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 'Shed plate and Hot/Warm state operation' 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 [Shift]-[Ctrl]-[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 [Shift]-[Ctrl]-[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. Next 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 [Shift]-]Ctrl]-[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, particularly on a Clan with its short dome.

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.

You are now ready to drive!

DRIVING THE CLAN CLASS LOCOMOTIVE

General information

Tender water capacity: 4,250 gallons

Ideal fire mass: 760lb

Brake pressure when released: 21 PSI

Maximum boiler pressure: 225 PSI

Recommended maximum trailing load:

9-10 coaches on moderate/light gradients
7-8 coaches on steep gradients
10-13 coaches on the level

Maximum speed: 85 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.

Hengist braking systems

When driving Hengist you need to be aware of the different braking systems compared to the traditional Clan system.

Hengist has a Westinghouse air compressor fitted that is driven by steam pressure. Its operation is constant and automatic and you will hear it working. This compressor supplies positive air pressure to be used by the air brake control handle to control the brakes of the train, irrespective of whether the stock is vacuum or air braked.

When driving Hengist you will notice that the brakes are different in operation to the vacuum brakes of the traditional Clan versions, and that you don't actually need to use the ejectors to release the train brakes. (This shouldn't be the case for vacuum-fitted stock, but we are unable to bypass this due to limitations of the host simulation.) However, you still need the ejectors set to ON to work the steam brake with the train brake, exactly like on the vacuum-only versions, even if the train is air braked. You can of course leave them OFF and let the train do all the braking and use the steam brake handle independently, but from a realism

point of view that would probably not be allowed on the real-world National Rail Network these days.

Hengist does not have a vacuum brake control handle. It only has an air brake control handle (for the whole train) and a steam brake control handle (for the locomotive and tender), whereas the other Clans in the pack have a vacuum brake control handle and a steam brake control handle.

When driving with vacuum braked carriages/stock you need to use the air brake control to brake the train. That may sound a bit strange but the air brake control acts on a distributor valve which actually applies the vacuum pressure required by the stock to brake. This means that the air brake pressure is not actually braking the train, but is controlling the distributor valve that applies the vacuum pressure braking. So, despite Hengist having an air braking system, when it is pulling vacuum braked stock there still needs to be a vacuum source to brake the stock, so it is vital that that ejectors are set to ON to create the vacuum.

If you are driving Hengist to pull a set of modern air braked carriages/stock, you could drive without the vacuum brake in action, but then Hengist itself and its tender would not be braked because the steam brakes work from the vacuum brake pressure, which in the real world would be illegal because all vehicles in the passenger train must be able to brake under the one train brake control. So, whilst you don't need the vacuum brake to brake the coaches, since they're air braked, you still need it to brake Hengist and its tender.

As per the standard Clans, Hengist and its tenders' steam brakes are controlled by the vacuum brakes, although they can also be applied independently with the graduated steam brake handle.

The three notches to operate the air brake handle are:

- Release
- Graduated self-lap
- Emergency

There is a 'laggy' delay for the Graduated self-lap and Release notches which gets slower the longer the train is.

Moving off

1. Release the train brake (and/or loco steam brake if you are running light engine).
2. Move the reverser to full forward (or full reverse if travelling tender first) (75% cut-off).
3. Turn ON the small ejector (with the [J] key or using the mouse) slightly so that the brakes begin to ease off. Leave the small ejector at 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 this once the brakes are released. Check the brakes are off by verifying that 21 PSI is shown on the left side of the brake gauge.
4. Open the regulator slightly (with the [A] key or by dragging the mouse). Allow the cylinders time to drain water while making a steady departure.
5. Close the cylinder drain cocks, open the regulator as desired and enjoy your journey!

IMPORTANT: *When coasting, 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 out from above the cylinders, even when the steam chest pressure reads 0 (zero). Failure to do this for prolonged periods of time will actually damage the loco and have an effect on performance.*

Dealing with wheelslip

The Just Trains Clan Class Advanced is the first Just Trains Advanced locomotive that uses ActivScript to simulate wheelslip instead of the host simulation. It uses various factors to affect the adhesion model, such as the gradient beneath the locomotive, weather and precipitation, and the season. The purpose of this is to get around the shortcomings and sometimes inconsistent nature of the core simulation, and to provide a much more realistic experience for the end user by correctly animating the wheels.

The wheels will always spin when they are 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-to-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 along 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, then you can try two things to avoid 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

Unless it’s an emergency application, you should not allow the wheels to slide along the rails for prolonged periods of time, 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 quickly release the brake 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. Ensure that the regulator is closed and that the large ejector is closed.
2. Apply the brakes and keep an eye on the brake gauge; the closer the needle on the left side is to 0 PSI, the harder the braking force. To control the pressure you need to apply and release the brakes and use the large ejector until you find a comfortable PSI reading. Most trains should be stopped with the gauge reading no less than 10 PSI otherwise it can be a rather uncomfortable stop for the passengers. Nobody likes their cup of tea spilt!
3. Turn off the ejectors once you have stopped and return the reverser to full forward or full reverse gear.

Recommended reverser settings

These settings are only a guide, and are only achievable with a hot fire with full boiler pressure and a reasonable load:

0-5 MPH	75 cut-off
5-15 MPH	65 cut-off
15-25 MPH	55-60 cut-off
25-35 MPH	50 cut-off
35-45 MPH	40 cut-off
45-65 MPH	25-35 cut-off
65+ MPH	20 cut-off

Filling the boiler with water

1. Turn on both injectors by pressing [I] and/or [O] or by dragging the mouse.

2. Turn on the water feeds by holding [K] and/or [L] for around three seconds or by dragging the mouse.

3. When the boiler water level reaches the desired amount (look in the water level sight glasses) press and hold [Shift]-[K] and/or [Shift]-[L] or drag the mouse to stop the water feed.

4. Turn off the injector(s) by pressing [Shift]-[I] and/or [Shift]-[O] or by dragging the mouse.

IMPORTANT: *Remember that, unlike most steam locomotives in Train Simulator, the Clan Class 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 climbing 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 descending 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. You must under no circumstances (and this is even more important at higher reverser cut-offs) open the regulator beyond around 20% (10% if you are waiting to move off). The first operation is to open the cylinder cocks and leave the loco to run with a low regulator setting, the cylinder cocks open and, if possible, the boiler pressure safety valves lifting. Once the boiler water level has returned below 1.00 (or is visible in the gauge glass) then you can shut the cylinder cocks and continue as normal.

Providing steam heat

The Just Trains Clan Class 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 Clan Class Advanced collection includes the feature unique to Just Trains which enables you to dispose of the loco at the end of the working day, as per its real-life counterparts. Drive the R.A.T. scenario to try the disposal of a BR Clan for yourself.

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 on the floor in front of the firebox doors. The rocking grate rod will move from the boiler backhead into that socket. Drag your mouse up and down the rod for around five seconds to drop the fire on the right side. Click on the socket to return the rod to the backplate, then click on the left socket and repeat the process. You can use [Ctrl]-[L] and [Ctrl]-[R] 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 completed, you can close the smokebox door by pressing [Shift]-[Ctrl]-[6].

SCENARIOS

All of the scenarios in this pack utilise the West of Scotland Lines – The Port Road.

This route is available to purchase from the Steam website (www.steampowered.com).

The Boat Train

Drive 72003 “Clan Mackintosh” on the 13:40 boat train from Stranraer. This is the “Stranraer-Larne boat train” and is today hauled by just one locomotive, the pilot loco having failed on shed! Thankfully we have been given permission to knock some of the weight off by leaving some coaches behind, good job it’s not yet the main season eh! You will be in control from Stranraer to Dumfries, where a crew change will take place.

Date: June 1964
Rating: Hard
Duration: 130 minutes
Start time: 13:37
Season: Summer
Start location: Stranraer

School Special

A Dumfries Secondary School is heading away to Tarff for a weekend away, you are to haul the train with 72009 “Clan Stewart” before returning the empty stock to Castle Douglas.

Date: June 1964
Rating: Medium
Duration: 73 minutes
Start time: 10:19
Season: Summer
Start Location: Dumfries

Up Thames Clyde Express

It’s a wintery morning in Dumfries, the Up Thames Clyde Express to London has just arrived low on water and coal. Your timings are diesel timings, can you get to Carlisle on time?

Date: November 1964
Rating: Medium
Duration: 68 minutes
Start time: 10:36
Season: Winter
Start Location: Dumfries

ADDING THE CLAN CLASS ADVANCED TO YOUR OWN SCENARIOS

By default the Clan Class Advanced is only available via the supplied scenarios, but you can make it available for other routes, without having to create a scenario, in the following way:

Adding the locomotive

Start Train Simulator.

From the Main Menu click ‘Build’.

Select the ‘Route’ on which you want to use the Class 6 Advanced.

Click ‘Scenario Editor’.

Click ‘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.

Click ‘Create’.

Enter the name you wish to give your new scenario and 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 Just Trains from the drop-down list and ensure that ‘BR_Clan’ 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 ‘JT BR Std 6MT Clan Pacific’ entries – these are the locomotives from this Clan Class 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 6MT BR1 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.

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 Clan Class Advanced locomotive and you will now be the driver of the engine.

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

CREDITS

Clan Class Advanced locomotive and tender

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Sounds, dynamics, scripting	Tom Williams, Chris Barnes
Scenarios	Mark Walker

Mk.1 coaches

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Robert Tarling

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