

Bulleid Q1 Class



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Introduction

Thank you for purchasing the Bulleid Q1 DLC for Train Simulator.

Considered by some to be the ugliest locomotive ever built, the Q1 has a work horse charm that surpasses its cut-down austerity design and I hope that this add-on has done it justice.

One of the most notable “features” of the Q1 was its light weight and 0-6-0 configuration which lead to it being very susceptible to wheel slip. In light of this I have written a completely custom wheel slip system, which when combined with the simulated steam chest and limited supply sanders in Advanced Mode provides the most realistic and challenging driving experience to date.

Please read the manual thoroughly, especially to get the best from Advanced Mode, and I hope you enjoy driving this “Ugly Duckling”.

All the best,

Pete Gillam (karma99 on Steam and various forums)
Victory Works

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Features

- Simple, standard and advanced driving modes
- Xbox controller support *SIMPLE AND STANDARD MODES ONLY*
- Southern and British Railways liveries, with both pre and post 1956 BR logos
- British Railways livery in both “clean” and dirty conditions
- Dynamic numbering of all 40 locomotives of the class, including all optional fittings for each member – mechanical/hydrostatic lubricators, blackout cover, AWS, windows, side protector glass, etc.
- Custom sound sets inside and out
- Realistic cab with multiple views, including fully modelled firebox and coal
- Fully modelled and animated Stephenson’s Gear [View Animation](#)
- Realistic wheel slip physics and effects *ADVANCED MODE ONLY*
- Simulated steam chest *ADVANCED MODE ONLY*
- Cylinder cock management *ADVANCED MODE ONLY*
- Boiler management with priming possible *ADVANCED MODE ONLY*
- Realistic injector control *ADVANCED MODE ONLY*
- Realistic forward and reverse dampers *ADVANCED MODE ONLY*
- Fully controllable steam sander with limited sand supply (can be refilled) *ADVANCED MODE ONLY*
- Dynamic steam and smoke colour and quantity
- Bulleid steam reverser with exterior animation
- Realistic boiler water gauges effected by gradient, acceleration and speed and with blow down test
- Opening windows (if fitted) with rain effects
- Working tender controls
- Dynamic head disc/lamp setting via tender control box
- “Intelligent” lamp setting and tender warning flashes based on current locomotive/consist
- 6 scenarios for the Somerset and Dorset route
- 16 Quick Drives covering all liveries
- Includes additional stock
 - SR conflats with 5 different containers
 - SR double conflats with 4 different loads
 - 12” Howitzer Railgun
 - SR Warwell wagon with Cromwell tank

Background

The Second World War created a large increase in goods traffic in Britain and the Southern Railway found itself short of suitable motive power. The most obvious option was to produce a further batch of Q class goods 0-6-0s however Oliver Bulleid (Chief Mechanical Engineer) disliked the Q class thinking of it as dated - it bore many hallmarks of Victorian locomotive design - and it was also lacking performance.

The decision was taken to build a new class of 0-6-0 using minimal resources due to wartime austerity and to reduce the weight.

The result was a powerful, acceptably reliable locomotive with the largest fire grate area of any British 0-6-0 but weighing over 14 tons less than comparable engines so that it could operate over a majority of the Southern Railway network.

The need to keep the weight down resulted in a controversial design, being very box like without running plates or splashers and gaining more nicknames than any other Southern Railway locomotive class - Biscuit Tins, Biscuit Barrels, Charlies, Clockworks, Coffee Pots, Frankensteins and Ugly Duckings amongst them.

Although designed as a freight locomotive the class was also used occasionally on passenger services and proved quite capable - some even think that the Southern Railway would have been better off building less Light Pacifics and more Q1s. However the lack of running plate and splashers proved a problem when running at speed in the rain and crew would only lean out of the windows when completely necessary!

Despite their unpopular design, uncomfortable ride at speed (especially running tender first) and poor braking the Q1's provided the required traction needed to see the Southern Railway through the second world war and they then continued into the post-war British Railways era, working hard over the Southern Region until the end of steam in the mid 1960's.

39 of the 40 locomotives were scrapped but the first of the class, no. C1/33001, was added to the National Collection and ran until 2004 at the preserved Bluebell Railway. As of 2014 it can be seen on static display at the National Railway Museum in York. <http://www.nrm.org.uk/>

Scenarios

6 career scenarios are included for the Somerset and Dorset route.

The locomotives in all liveries and with various consists are also available in Quick Drive.

Bulleid Q1. 1] A proper Charlie

Due to a shortage of freight locomotives the Southern Railway has begun to build a new class of 0-6-0 tender engine, the Bulleid Q1 class.

Despite their austerity appearance due to war time limitations of materials and the need to keep weight low they are the most powerful 0-6-0 to date.

Use newly outshopped no. C9 to put together a War Department train at Evercreech Junction and take it to Exeter.

Bulleid Q1. 2] Danger from above

Britain is at war. Many areas of the country are being attacked from the air and your task is to take C18 and move eight ex-WW1 12" Howitzer railguns to Bath to help with the anti-air defence.

The howitzers are very heavy and are un-braked so you will need to allow lots of time to slow down and should not go faster than 40 mph.

Bulleid Q1. 3] Settings things straight

It is 1948 and Britain is trying to return to normal after the end of World War 2.

Follow behind a stopping passenger service as you drive a train of conflat wagons carrying full and empty goods containers from Bath, headed for Southampton Docks. You will be meeting red and distant warning signals so keep a careful eye out and watch your speed.

Bulleid Q1. 4] Coal in the coffee pot

Use Q1 33016 to shunt a rake of coal wagons at Templecombe Upper Yard and take them to Wincanton, then run light engine back to Templecombe Lower Yard and leave the engine in good shape for the next crew.

Bulleid Q1. 5] The Ugly Duckling

January 1958 and the morning passenger service from Templecombe to Bath is without its engine due to a cylinder failure.

Q1 no. 33036 has recently had a repaint and is actually looking quite clean so has been tasked to collect the coaches from Templecombe sidings and run the passenger service as far as Radstock where another engine will take over.

It's a bleak day so be careful out there.

This scenario is particularly challenging in **Advanced Mode** due to the realistic wheel slip and steam sander

Bulleid Q1. 6] Bulleid Sunset

Drive Q1 33037 on 22nd August 1963 on her final duty from Evercreech Junction to Bath Green Park, after which she will begin the long journey back to Eastleigh Sheds to be withdrawn.



Control Modes

There are 3 ways to drive the Bulleid Q1

Simple Mode

This is selected using the menu in Train Simulator and provides a simple stop/go, forwards/backwards set of controls via the simulators built in HUD.

Standard Mode

This is the default mode if you choose to drive in Expert mode using the Train Simulator menu. The locomotive will operate with more complex controls and can be driven just using the F4 HUD or an Xbox controller.

Advanced Mode

This is an advanced mode for those who want a more realistic experience and introduces features such as condensed water in the cylinders, overfilling the boiler, realistic wheel slip, sanding and a simulated steam chest. To achieve these extra functions using a keyboard is required, although this can be used in conjunction with mouse operation of the F4 HUD.

To enter Advanced Mode you can press Control A at any time, and this will also turn it off again.

The **Advanced Mode** controls and features are denoted below.

Hard-core Mode

There is no setting for this but if you use the F3 HUD (or no HUD at all!) and drive in Advanced Mode using only the cab controls via the mouse (no keyboard or Xbox controller) then you can consider yourself hard-core!

The fully modelled firebox and coal was added especially for those who don't use any HUD at all – you now have a realistic way to see the state of the fire mass.

Driving Controls

Listed below are the controls available when driving in standard and advanced modes.

Also see the next section “Driving in Advanced Mode - Advice” for additional information.



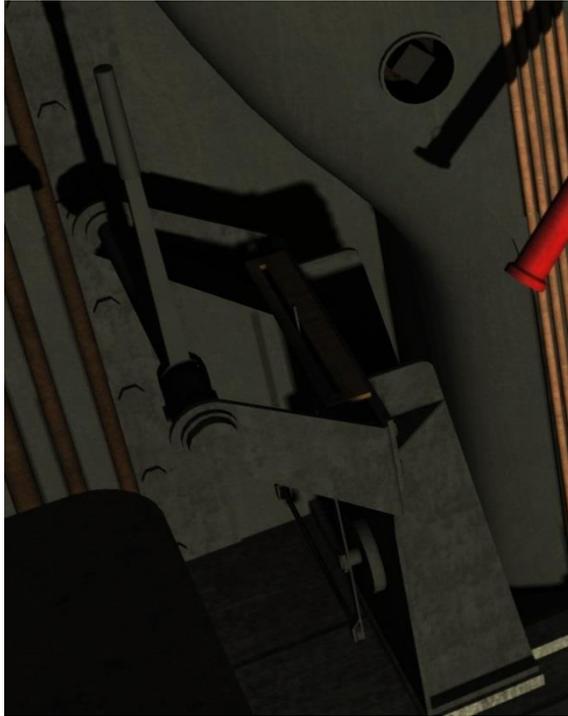
1. Regulator

This controls the amount of steam allowed into the cylinders, hence directly controlling the speed in conjunction with the reverser.

Keys: A,D

Advanced Mode

The steam chest is simulated. This will add a delay and smoothing to the increase and decrease of the regulators power. Please note that the F5 HUD regulator value will not reflect the actual position of the in-cab regulator but the value used to simulate the chest.



2. Steam Reverser

This is like the gears on a car. It is usual to start with the reverser set at 75 percent cut-off (full). As you pick up speed you reduce the cut-off, thereby allowing economic driving as well as good speed whilst hauling a load.

The Q1 has an unusual design of reverser that is powered by steam and is controlled by pushing/pulling the reverser lever to increase or decrease the cut-off rather than the traditional style of mechanical reverser which is pushed to the required position. An indicator arm to the right of the lever shows the actual position of the reverser linkage.

Keys: W,S





3. Cylinder Cocks

Advanced Mode

Never move away from more than a short standing start without ensuring that these are open. When a locomotive sits static for any amount of time, water condensation builds up in the cylinders. Thus when the piston is in motion, and because water does not compress, the cylinder will explode.

The cylinder cocks are designed to expel this condensed water and should be opened for at least 4 turns of the locomotive wheels when the locomotive sets off after being stationary for some time.

The amount of stationary time varies depending on the time of day (the assumption that most steam locomotives were working from early in the morning) and also the weather. If you stop for more than a couple of minutes it's safer to open them for a few wheel rotations just to be sure, and always ensure they are open when first setting off in a scenario.

Key: C



4. Firebox

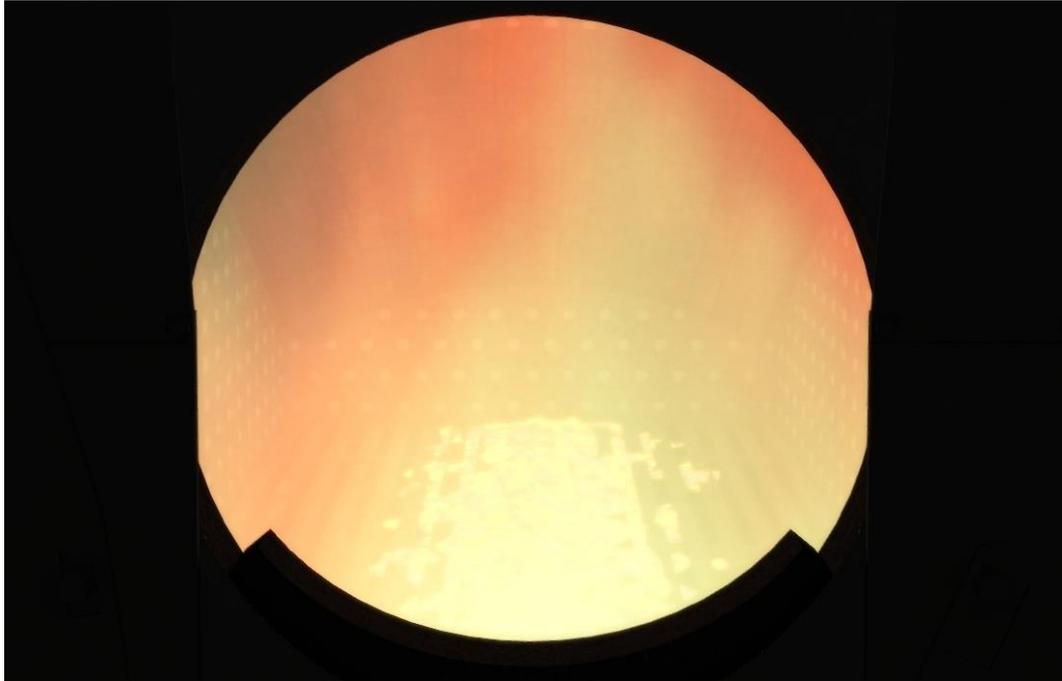
Ensure the firebox doors are fully open to allow maximum stoking. A related tool is the coal box door in the coal bunker. When the firebox door is open, pull the coal box door on the tender open to regulate the input of coal into the firebox.

Key: F

Keys: R, Shift R (stoking)

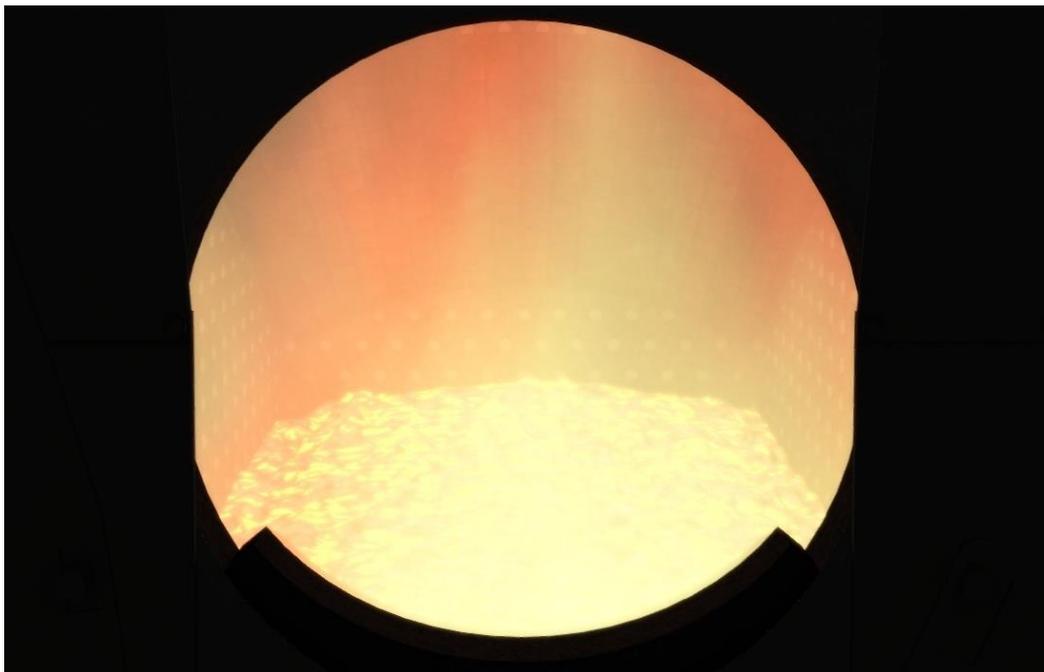
As an additional tool for those who like to drive with minimal or no HUD display the firebox and coal in the Q1 cab is fully modelled with a specific cab view for checking the fire mass.

The coal level is slightly exaggerated over its working range so it can be used as a visual indicator of when firing is needed. The coal level rises and falls gradually but the images below will help in visualising how this can help.



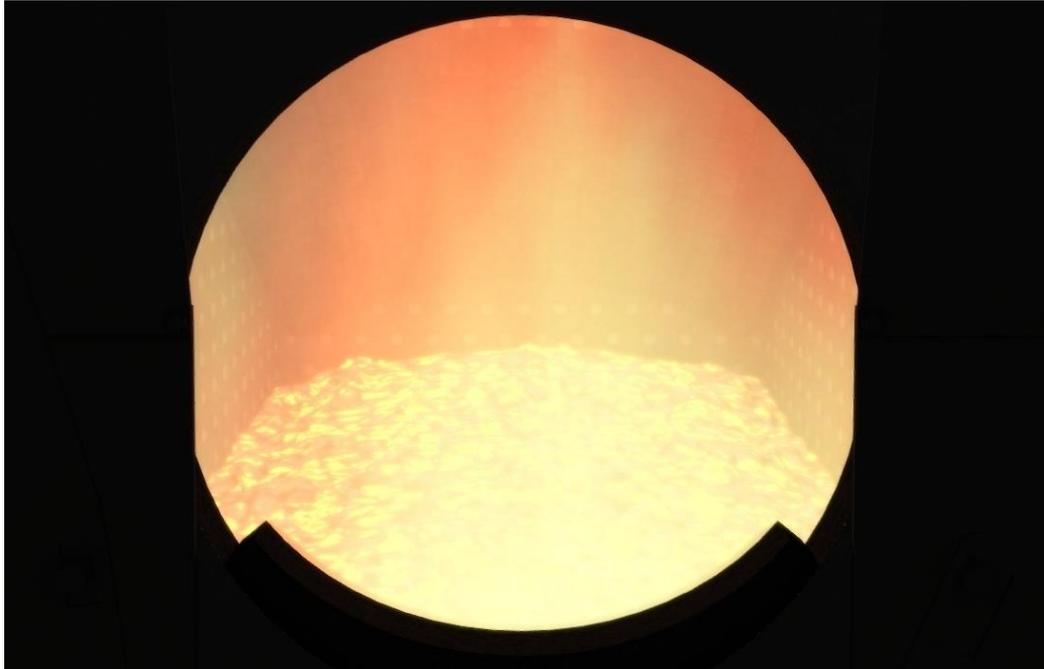
Coal level low < 50% 961 lbs

The grate can be clearly seen with a very small amount of coal in the centre.



Coal level average 73% 1404 lbs

The grate is just covered with the coal's centre just on the 3rd rivet down on the back wall

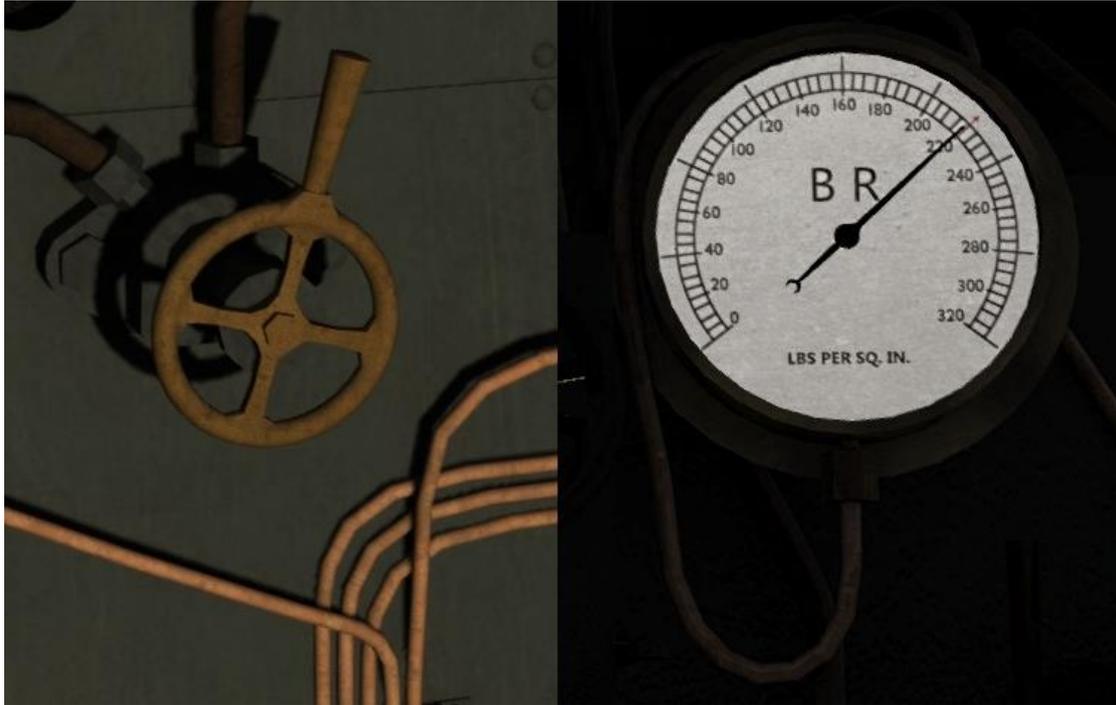


Coal level high > 85% 1635 lbs

The grate is deeply covered with the coal's centre almost up to the 2nd row of rivets on the back wall

The coaling door controls stoking speed



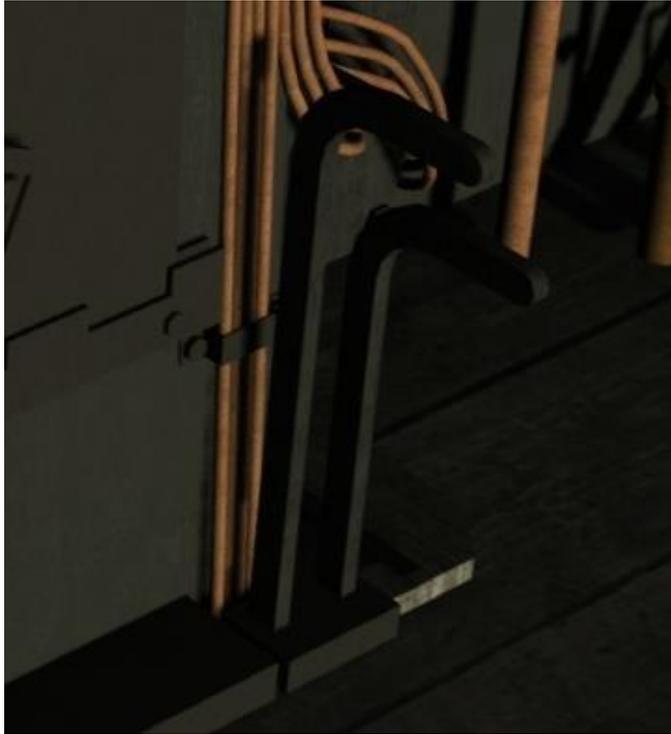


5. Blower and Boiler Pressure Gauge

The most useful application of the blower is when the regulator is at idle. Since there is no throughput of steam when at idle, air flow is minimised and therefore the fire loses heat. In some circumstances (such as when the safety valve is going off) this is acceptable but if you need to get some pressure into the boiler while the regulator is closed then fully opening the blower will force air over the fire, increasing temperature and then boiler pressure. It is good practice to turn off the blower again when you open the regulator to save on unnecessary steam usage.

Keys: N, Shift N

The boiler runs best at around 220 psi. Over 230 psi the first safety valve will open and the excess steam will vent quickly and noisily. If the boiler is still continuing to gain pressure a second larger valve will open at 240 psi. Both valves close again when the boiler is under 230 psi.



6. Dampers

Another tool related to the firebox. This helps control the heat of the firebox, closing it will reduce the air flow through the fire, thereby lowering heat and steam production. Opening it will allow more air in, hence producing more heat and steam.

Keys: M, Shift M

Advanced Mode

There are 2 damper levers; the left hand is for the front damper and the right hand for the rear damper. Each has 3 notches: closed, half and full. To get the maximum amount of air to keep a Q1 running well you need to set the damper **in the direction of travel** to half and close the other one. Any other combinations will provide less or no air to the fire.



7. Exhaust injector steam (right)

This takes steam from the cylinders and recycles it to blast water from the tender into the boiler. It is preferable when you are running low on steam.

Key: I

Live steam injector steam (left)

As the Exhaust injector but uses live steam from the boiler, rather than exhaust steam. This is the preferred method when you have lots of steam and need to fill the boiler quickly.

Key: O



8. Live (right) and Exhaust (left) water cut offs

These levers provide on/off control of the water from the tender for the appropriate Live or Exhaust injector control. There is also an overall water cut off control which will shut off the water to both the above cut offs.



9. Live (left) and Exhaust (right) water control taps

Once the tender cut offs (above) are open these are used to adjust the flow of water for the appropriate Live or Exhaust injector control

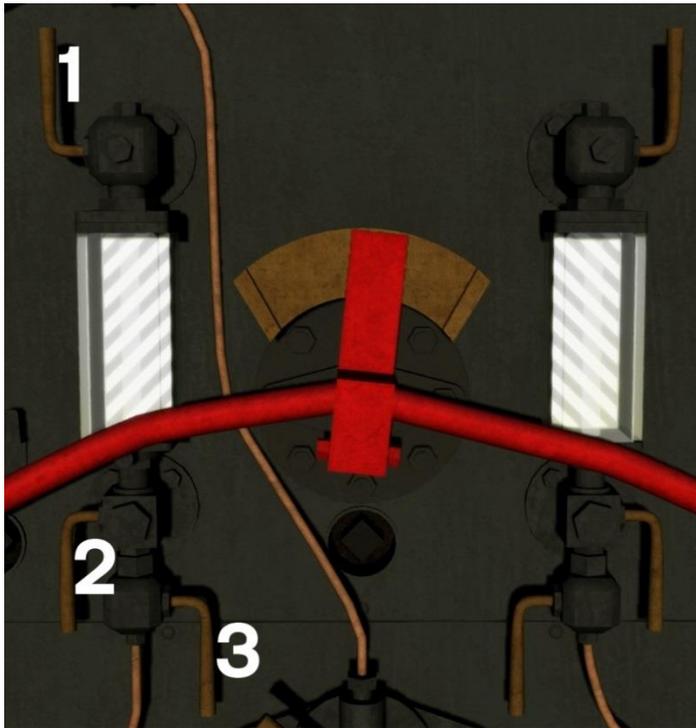
Keys: K, Shift K / L, Shift L

Advanced Mode

In Advanced Mode you will need to operate the injectors as the real thing and balance the water and steam to use them properly.

The correct procedure is as follows – for either Live or Exhaust injectors use the appropriately named controls:

1. Pull the tender water lever up
2. Fully open the water control tap under the fireman's seat
 - You will hear and see water coming from under the right hand side of the cab
3. Pull down the injector steam lever
4. Reduce the water control tap until you can no longer see/hear water coming from under the cab, but instead can hear the injector working and see a **cloud** of steam
 - If you can hear or see a **jet** of steam then you have reduced the water too much



10. Boiler Gauge Glasses

Attached to the boiler are two strong glass tubes indicating the current level of water in the boiler. If this reaches the bottom then the fusible plugs will melt and relieve the boiler pressure whilst providing a warning to the locomotive crew.

The water level is not static when the locomotive is in motion and will wobble around appropriately. It is also affected by gradients, acceleration and deceleration.

Advanced Mode

Overfilling the boiler (past 110%) at high pressure can force water into the cylinders and cause the same problems as having condensed water from standing still. If you overfill the boiler open the cylinder cocks immediately and leave them open until the water level in the glass falls.

You can also perform a blow down test on the gauge glasses by doing the following:

1. Shut off the water supply to the top and bottom of the glass by moving the levers (marked 1 and 2) to the horizontal position
2. Move the blow down lever (marked 3) to the horizontal position, the water will empty from the glass
3. Return the levers to their previous positions by reversing the above process to refill the glass

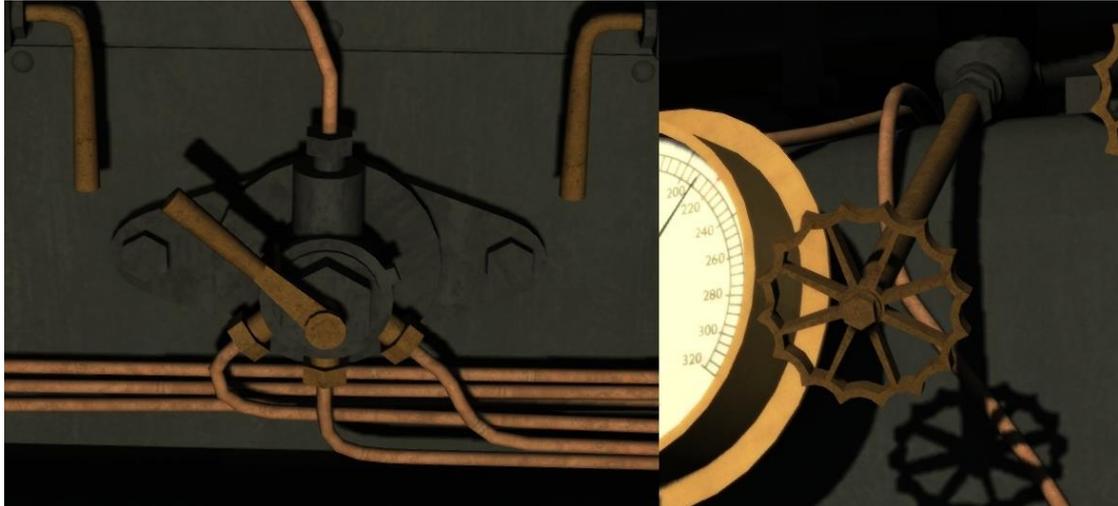


11. Vacuum Brake and Brake Pressure Gauge

The vacuum brake is used to pull the brake pads away from the wheels by creating a vacuum in the pipes connected to them. The brake has 3 settings, brake off which forces a vacuum into the pipes and takes the brakes off, brake on which lets air into the pipes and applies the brakes, and brake running which holds the vacuum steady at its current pressure.

The brake pressure gauge shows the current pressure in the system, from 0 (on) to 21 (off).

Keys: ' (apostrophe), ; (semicolon)



12. Sander (left of image) and Sander Steam (right of image)

The sander assists in starting and stopping without the wheels slipping.

Keys: X, Shift X

Advanced Mode

The sander lever is a simple on/off control but the amount of steam controlling the sand can be adjusted using the sander steam control dial and the amount of steam (and therefore sand) will affect the amount of additional grip provided.

In Advanced Mode the amount of sand is also limited to a realistic amount (approximately 15 minutes on full) so should be used when required, not just left on for the entire journey. Although locomotives never actually carried spare sand if you do run out it can be refilled by the following procedure:

1. Stop the locomotive
2. Press E to open the sand boxes
3. Hold Shift-E to refill the sand, you can see it filling by looking into the sand boxes
4. Once full, press E to close the sand boxes



13. Whistle

Steam locomotive whistles are powered by steam from the boiler and are used to signal a train's approach, warn of danger and often to signify departure.

Key: Space



14. Handbrake (on the tender)

A hand operated screw that applies the brakes to the tender without the need to release the vacuum in the brake pipes.

Key: /



15. Windows (if fitted)

Working in the cab of any steam locomotive is hot work. To aid in the comfort of the crew you can open the windows. Click and drag with the mouse.

You can also open the small door on the tender rear view tunnel and the centre doors to the coal bunker.

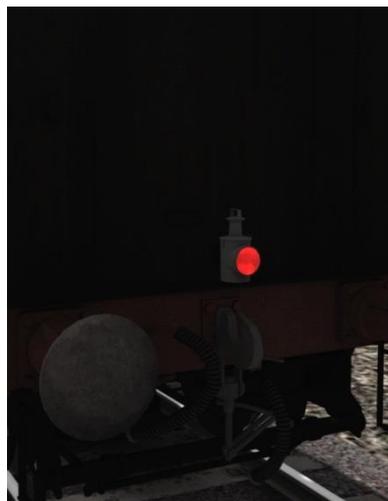


16. Head code settings control

In the cupboard on the left hand side of the tender (as you look back at it) is a control panel for setting the locomotive head code.

Each of the red X buttons can be clicked to turn them into a white disc which will then appear on the locomotive. The centre button selects either forward or reverse running.

If you turn on the lights (H key) then the discs will become lamps – also if you are running light engine then a rear red lamp will be added to the locomotive or the tender as appropriate.





17. Automatic Warning System (AWS)

When the Q1's became part of British Railways from 1948 some of them were fitted with the standard AWS system. This system added a magnetic pick up which would indicate a signal being either clear or at danger and would issue a bell or buzzer tone to the locomotive crew. If a warning buzzer was heard it would need to be acknowledged or the brakes would be automatically applied.

If the Q1 you are driving is one of those fitted with AWS and you are driving on an AWS fitted route you will hear a bell ring if you pass a clear (green) signal and the AWS Sunflower indicator will remain all black. If you pass a signal at danger (red, yellows or distant red) a buzzer will sound and you will have 3.7 seconds to clear the warning or the train will be brought to a stop.

Press key Q or press down the lever on the right hand side of the AWS box to acknowledge the warning – the AWS Sunflower will change to a segmented yellow and black and will remain this way until the next clear signal is passed.

Note: For AWS to function the route that the Q1 is running on needs to have been fitted with the relevant scenery markers. This is not the case for the Somerset and Dorset so the included scenarios will not trigger any AWS alerts.

Driving in Advanced Mode - Advice

Advanced Mode ONLY

The following is a summary of how to drive successfully in Advanced Mode. It does not contain hard figures – e.g. set the reverser at 25% and the regulator at 30% - as these are the things you will learn by driving the locomotive.

However there are some realistic features that are incorporated that require some specific knowledge for the best operation.

Before you start

Dampers – make sure you have the dampers set for running in the appropriate direction (see [Controls Section 6](#))

Head Code - If you wish to, set the appropriate head code (see [Controls Section 16](#))

Fire – Assuming you are not using the auto-fireman and not about to run downhill for a long way you will want to start making building the fire as soon as possible (see [Controls Section 4](#))

Gauge Glass Test – If you have time at the start of a scenario then you can perform gauge glass blow down tests to pass the time (see [Controls Section 10](#))

Setting Off

Cylinder Cocks – If you are just starting or have been stationary for a while, ensure that the cylinder cocks are open. As you drive off, listen for the change in pitch as the water empties or count 4 full revolutions of the wheels and then close them (see [Controls Section 3](#))

Wheel Slip – Due to the accurate wheel slip and simulated steam chest you will need to use the regulator like a real driver would. Primarily on starting (when the reverser cut off is high) this means you must manage the steam entering the pistons to make sure that the power being applied to the rails does not exceed the amount of grip available.

If you open the regulator and just leave it open the pressure will continue to build as will the amount of power being applied to the rail. This will likely cause wheel slipping.

As a real driver would you need to “pump” the regulator to gradually build the pressure in the cylinders as you accelerate. This means opening the regulator for a moment and then closing it again, the residual steam will continue to work and cause the locomotive to carry on accelerating. Continually doing this will allow the locomotive to build speed and pressure gradually and avoid wheel slip.

Once a slow speed is reached you can then leave the regulator open and accelerate and adjust as needed to maintain a constant speed.

The speed at which you can stop pumping varies and is based on how much grip is available – an icy rail will need a much higher speed to allow full power than a dry rail.

The weight of the consist will also affect how long it takes before this speed is reached (simply because a heavier load takes longer to accelerate) which means you are more likely to have to manage the wheel slip for longer, therefore making it more likely.

In summary, as you set off do not throw the regulator to full and leave it there! Pump it gradually, increasing the power slowly until you can leave the regulator open. And be aware of the weather, a wet or icy rail provides a lot less grip. This brings us to:

Sander – The Q1’s sander is powered by steam (some locomotive have a gravity fed system) which can be adjusted to decrease the amount of sand, and therefore extra grip, which is being applied. The default setting is full. However due to the amount of sand being limited you may wish to reduce this to conserve sand. However the best way to conserve sand is to turn off the sander when not in use (see [Controls Section 12](#))

Under Way

Water Filling – You will need to use the water levers on the tender, the water taps under the fireman’s seat and the injector steam levers at the top of the back head to fill the boiler (see [Controls Section 9](#))

Due to the water gauge glasses wobbling around and being effected by gradient and acceleration it is normal procedure to try and keep the boiler between half and three quarters full to avoid overfilling the boiler and causing priming to occur.

Scenario Creation – Important Note

If you add the Q1 to a scenario in which it is raining or the locomotive is double heading then you should change the first 2 digits of the automatic loco number.

If raining, the first digit should be changed to a **W** to tell the wheel slip script to reduce the adhesion of the rails (snow in a scenario also effects this parameter but can be detected by the loco itself)

If more than 1 locomotive is in the consist then the second digit should be changed to the number of total locos – therefore the default is always 1.



Locomotive Numbering



When a Q1 is added to a scenario the number will be randomly chosen from a list of all 40 members of the class.

These are pre-set with the correct configurations for each number as they were historically outfitted. However if you place them in a scenario where double heading or rain is involved, or if you wish to change any of the components then the setup is listed below.

Southern version

The number has 6 digits in total, e.g. D1#12H

They are as follows:

- 1 .D/W – A **D**ry or **W**et scenario (see previous section)
2. Loco count – The no. of locos in the consist (see previous section)
3. Head code – As well as being set using the tender controls the head code can also be pre-set. The Southern region codes (which are different to the standard BR codes) go from A to Z and can be found in the next section. Use a capital letter for loco first running, and lower case for tender first
- 4 & 5. Loco number – e.g. 12. If the number is a single digit then the second should be # to create an empty space
6. Hydrostatic or Mechanical lubricator

British Railways version

The number has 11 digits in total, e.g. D1#10MNNNYA

They are as follows:

1. D/W – A **D**ry or **W**et scenario (see previous section)
2. Loco count – The no. of locos in the consist (see previous section)
3. Head code – As well as being set using the tender controls the head code can also be pre-set. The Southern region codes (which are different to the standard BR codes) go from A to Z and can be found in the Appendix. Use a capital letter for loco first running, and lower case for tender first
- 4 & 5. Loco number after the 330 – e.g. 05 for 33005
6. Hydrostatic or Mechanical lubricator
7. Y/N – **Y**es or **N**o to having AWS fitted
8. Y/N – **Y**es or **N**o to having Side Windows fitted
9. Y/N – **Y**es or **N**o to having a Side Protector fitted
10. Y/# - **Y** to show Overhead Warning labels on loco and tender
11. A/B/C – Shed codes: **A** Guildford, **B** Tonbridge, **C** Eastleigh



Rolling Stock

The Q1 DLC comes with the following rolling stock which is included in various Quick Drive consists and can also be added to scenarios by ticking the *Victory Works / BulleidQ1* box in the asset filter



SR Single Conflat with 5 Containers

- Green Furniture Logo
- Cream Furniture Logo
- Green Furniture
- Brown Door To Door
- Southampton Docks
- Empty



SR Double Conflat with 4 Loads

- Spitfire fuselage
- Large gun barrel
- Planks
- Tree trunk
- Empty



WW1 12" Howitzer Railgun



SR Warwell

- Cromwell tank
- Empty

Modification Policy

You are free to create modifications (including but not limited to re-skins, sound updates, “enhancement” packs, etc.) within the guidelines of Dovetail Games current policies (for example, no inclusion of 3D model files) however if they are made public then they must be provided **free of charge**. They can be hosted on a site that asks a nominal membership fee for quicker downloads (e.g. UK Train Sim) but cannot be sold in any way without the express permission of Victory Works.

If you wish to discuss terms for selling modifications please contact us via email at victoryworks@live.co.uk

To summarise – free mods are fine, as long as they adhere to DTG’s current policies. If you wish to sell mods then you **MUST** get permission first.



Acknowledgements

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- Jim Ashman for his invaluable advice as an ex- Southern Region driver with hands on knowledge of the Q1
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- Everyone at Dovetail Games
- Southern E-Group for their great website <http://www.semgonline.com>
- My wife for all her support and my father for instilling in me a love of steam trains from an early age and especially for his memories of seeing Q1’s working the Southern network



Appendix: Southern Head Codes

The codes are selected using the indicated letter (see section “Locomotive Numbering”). The meanings are extensive and can be found at <http://www.semgonline.com/headcodes/sheadcodes/04.html>

