PEPPERCORN K1

Contents

 Release Version 1.0

Introduction

Thank you for purchasing the Peppercorn K1 Add-on for Train Simulator.

We are very proud of this add-on as it has brought together all of the techniques, detail and features that we have developed over the past 3-4 years and also given us the opportunity to improve upon many that we already use.
The model has more detail than we have added before; we have created a much more realistic cab environment in terms of texturing and are very pleased with the layers of filth both inside and outside on the worn BR livery; we have new and updated particle effects including visual priming, and steam leaks in the cab on the worn locomotive; our custom wheel slip code has been improved and the detection of the weather is now dynamic rather than having to be set on a per-scenario basis.
We've also added some neat new touches such as an in-built head out view for the cab and a shovel to control coaling the engine.

On top of that we have included unique new rolling stock that fits perfectly in the NE region, but some of which can also be used anywhere on the UK network in the BR era.

Overall we feel that this is our best add-on to date and we are very excited to be taking all of these techniques and innovations forwards into our future creations.

Most of all we think the K1 is a really enjoyable locomotive to drive and we hope it gives you many hours of pleasure doing what we all love to do – to drive trains!

All the best,
Victory Works

Click on the links below to read about future projects, see Work in Progress pictures and read more about the research, detail and passion that we put into our Train Simulator add-ons.

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Features

- Simple, Standard and Advanced driving modes
- Xbox controller support ***SIMPLE AND STANDARD MODES ONLY***

- Peppercorn BR Class K1 Locomotive and Tender in 3 authentic liveries
  - BR Lined Black (BR lettering and pre and post 1956 logos)
  - BR Lined Black - Worn (BR lettering and pre and post 1956 logos)
  - LNER Green Lined livery (Preservation era)
- All 70 members of the class with correct shed codes, logos and fittings
- Optional parts for running in all original areas and also preserved running including overhead cable warning flashes (red and yellow)
- 3 optional headboards for rail tours
- Custom sound sets inside and out recorded from the remaining K1
- Realistic cab with multiple views including head out and a fully modelled firebox and coal level
- Fully operable tender controls including a shovel... for shovelling!
- Custom, realistic wheel slip physics and effects with auto detection of weather conditions ***ADVANCED MODE ONLY***
- Simulated steam chest ***ADVANCED MODE ONLY***
- Cylinder cock management ***ADVANCED MODE ONLY***
- Boiler management with priming damage possible ***ADVANCED MODE ONLY***
- Realistic injector control ***ADVANCED MODE ONLY***
- Improved dynamic steam and smoke colour and quantity
- Realistic boiler water gauges effected by gradient, acceleration and speed and with blow down test
- Visual priming effect from chimney when overfilling the boiler
- Opening windows with rain effects, and roof hatch
- Dynamic lamp setting on both locomotive and tender
- Cab light effects including firebox glow, cab light and speedometer light
- Guards whistles when leaving a passenger pick up

- British Railways (ex-LNER) rolling stock
    - Brand new rich and detailed sound set created by Steam Sounds Supreme
    - Selectable wheel types, different visual components and non-mirrored sides to provide variation in appearance
    - Animated handbrakes with sound

    - Double 13 ton bolster wagons with 4 steel loads
        - Girders
        - Small pipes
        - Large pipes
        - Roof trusses
    - Single 13 ton bolster wagon
        - Empty
    - Ex-LNER Gas Tank wagons
        - 2 tanks
        - 3 tanks
    - BR Palbrick brick carrying wagons (can be loaded or empty)
        - Type A
        - Type B
    - BR 22 ton Plate wagons
        - Steel plate
        - Empty
    - BR Trestle AA wagons
        - Steel plate
        - Empty
    - Ex-LNER/Private Owner Mineral wagons
        - 5 plank wagons
            - BR grey
                - Coal
                - Limestone
                - Stone
            - Ex-Private Owner worn livery - Coal
                - Weardale
        - 7 plank wagons
            - BR grey
                - Coal

    - Limestone
    - Stone
- Ex-Private Owner worn liveries - Coal
    - A H Stabler, Darlington
    - Bradleys, Weardale
    - Brodsworth Main, Doncaster
    - Lofthouse Colliery, Wakefield
    - Nunnery Silkstone, Sheffield
    - Roberts Davy, Sandside
    - Strakers & Love, Durham
    - Weardale

- 8 scenarios for the Weardale & Teesdale Network Route Add-On
- 40 Quick Drive consists with appropriate stock

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Background

In 1945 Edward Thompson, Chief Mechanical Engineer of the London North Eastern Railway, created a design for a new 2-6-0 locomotive based on the existing Gresley K4 Mogul. It featured his preferred 2 cylinder design and a shortened version of the existing B1 boiler.

Between March and December 1945 a prototype, the K1/1, was built by rebuilding K4 No. 3445 MacCailin Mor. Successful testing took place however no more K4's were converted and in February 1949 the rebuilding programme was officially cancelled.

However based on this design an order for seventy brand new engines was placed in 1947. The locomotives were built between 1949 and 1950 and incorporated some changes made by Arthur H. Peppercorn who was the Chief Mechanical Engineer for 18 months before the LNER and the other Big 3 railway companies merged to become British Railways. A larger 4,200 gallon tender was also selected.

The K1s were planned to be split between the North Eastern and Eastern Regions. They were all delivered to the Eastfield shed where they were run-in before being allocated. Many K1s would regularly be seen as far north as Edinburgh and they were frequently used on the West Highland line in the early days. Darlington had 30 allocated through the 1950's and early 1960's. Many were later allocated to the Eastern Region with a large number going to March.

K1's were used throughout the former LNER network and proved to be very versatile, working everything from local coal trains to express passenger services.

The K1's were withdrawn and scrapped by 1967 however No. 62005 was used for a short time as an emergency boiler and consequently survived into preservation. It has become very popular on main line rail tours especially on the West Highland Line to Mallaig and has also sported the un-prototypical, but very fetching, LNER Green Lined livery as No. 2005.

Scenarios

8 career scenarios are included for the Weardale & Teesdale Network Route Add-On.

All 3 liveries with light engine and appropriate freight consists are also available in Quick Drive.

Peppercorn K1. 1] Passenger Duties – 35 minutes
Tuesday 3rd October 1950
Drive K1 No. 62049 pulling the 8:20 York to Crook passenger service calling at Darlington, North Road, Heighington, Shildon and Bishop Auckland.

Peppercorn K1. 2] Back In Service – 55 minutes
Sunday 25th April 1954
Due to a shortage of empty mineral wagons your task is to collect ex-Private Owner wagons from the sidings at Lands Viaduct and take them to Shildon Yard to be put back into service.

Peppercorn K1. 3] Bricks Without Straw – 40 minutes
Friday 28th September 1956
A morning duty taking a long rake of coal wagons to Newton Cap and then collecting Palbrick wagons from the brickworks to deliver to the yard at Consett.

Peppercorn K1. 4] Coal to Penrith – 35 minutes
Monday 10th June 1957
Hauling over 900 tons of old unfitted coal wagons from outside Bishop Auckland to Penrith taking the route via Barnard Castle you will have your work cut out for you on the steep gradients of Weardale.

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Peppercorn K1 . 5] March Surprise – 1 hour 10 minutes
Monday 10th March 1958
The north east of England has been hit by a freak snow storm. Collect gas wagons from Bishop Auckland and deliver them to Witton Le Wear, Harperley, Eastgate and Wearhead.

Peppercorn K1 . 6] Pea Souper – 1 hour 5 minutes
Monday 31st October 1960
Drive K1 62064 from Wolsingham Steel Works to the Vickers-Armstrongs factory at Newcastle-upon-Tyne pulling a very heavy steel train in thick fog.

Peppercorn K1 . 7] April Showers – 50 minutes
Sunday 1st April 1962
Collect the empty bolster wagons from Barnard Castle and take them to Whessoe Foundry at Darlington.

Peppercorn K1 . 8] West Durham Rail Tour – 1 hour 5 minutes
Saturday 20th May 1967
Drive preserved locomotive K1 No. 2005 in LNER green livery on the return journey of the West Durham Rail Tour on a beautiful spring afternoon.

Control Modes

There are 3 ways to drive the Peppercorn K1 locomotive.

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 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 and a simulated steam chest. To achieve these extra functions use of a keyboard is required, although this can be used in conjunction with mouse operation or the F4 HUD.

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

The ***Advanced Mode*** features are shown below for each control.

Driving Controls

Listed below are the controls available when driving the Peppercorn K1 locomotive in standard and advanced modes.

Also see the following section, “Driving in Advanced Mode” for additional information.

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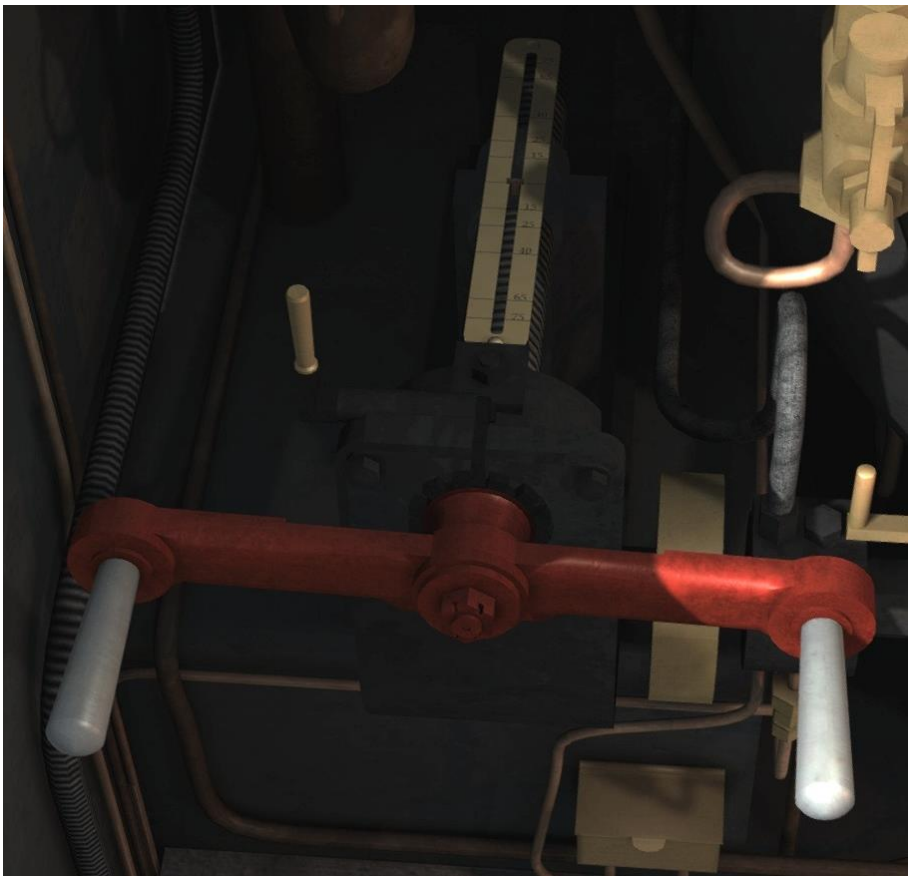
1. Regulator

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

In advanced mode the locomotive steam chest is simulated. This will add a delay and smoothing to the increase and decrease of the regulators power to simulate steam moving through the locomotives pipes and valves. 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. Reverser

The reverser is somewhat like the gear lever 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.

Keys: W, S

Advanced Mode

To move the reverser requires the lock to be taken off. To do this, press and hold the E key on the keyboard, move the reverser to the required position, and then release the lock (let go of the E key).

Key: E

3. Cylinder Cocks

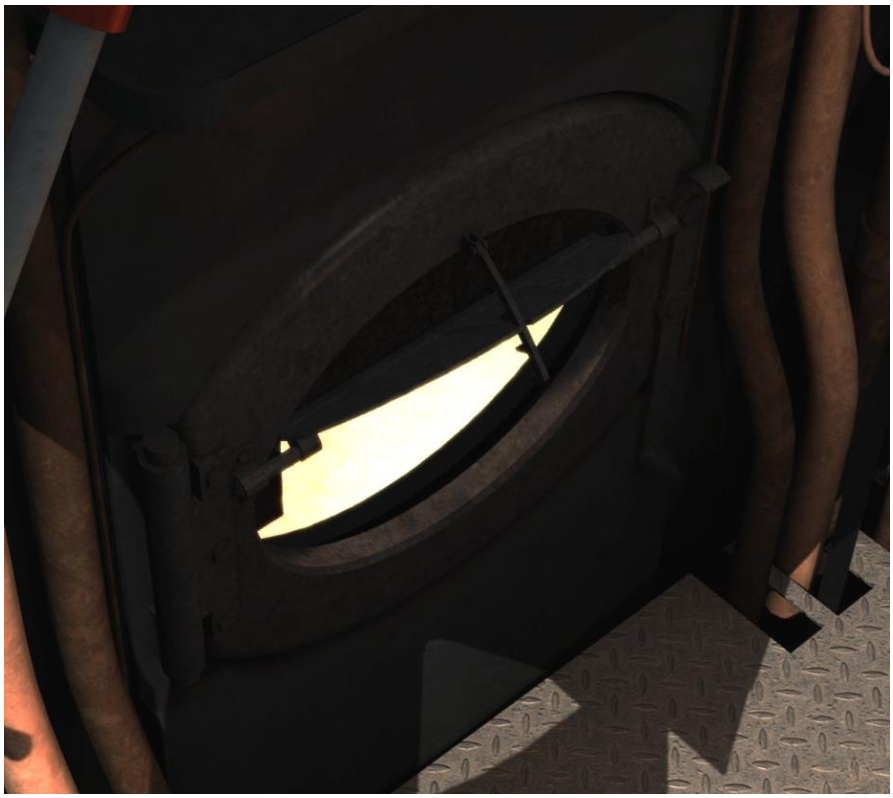
Advanced Mode

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



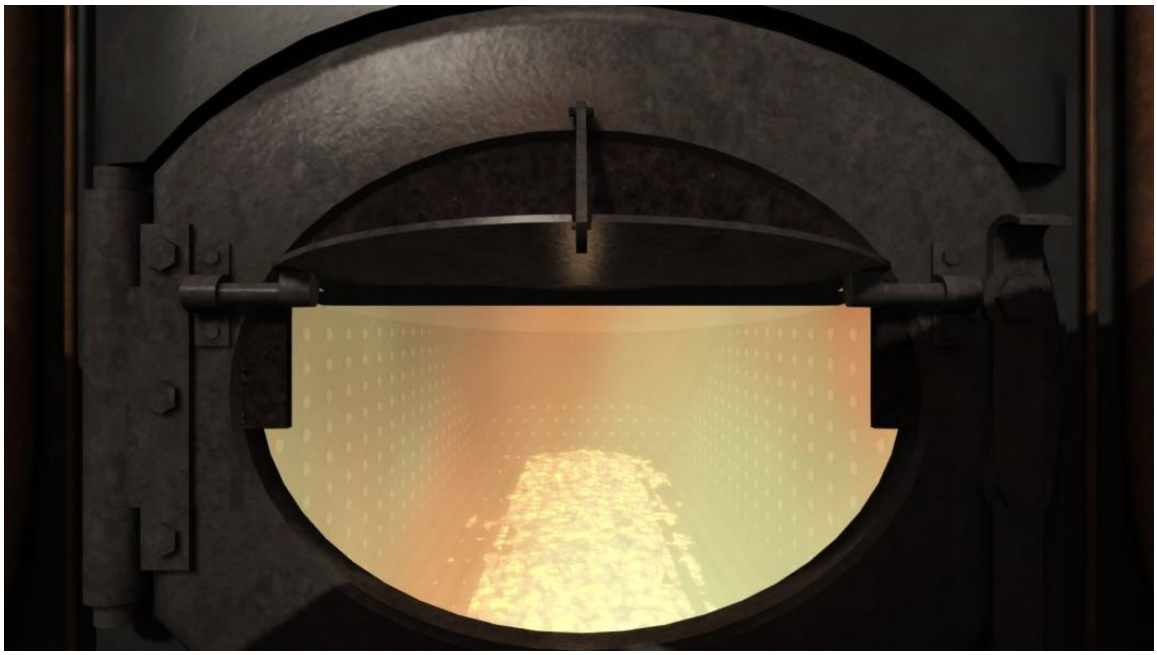
4. Firebox

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

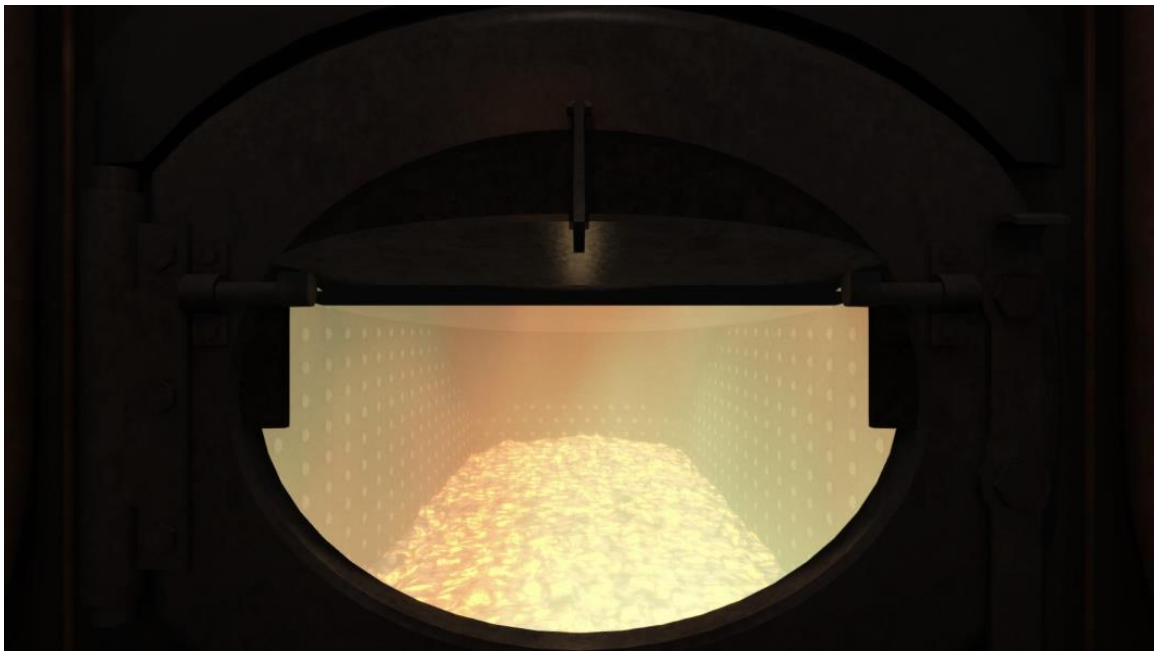
Key: F
Keys: R, Shift R (stoking)

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

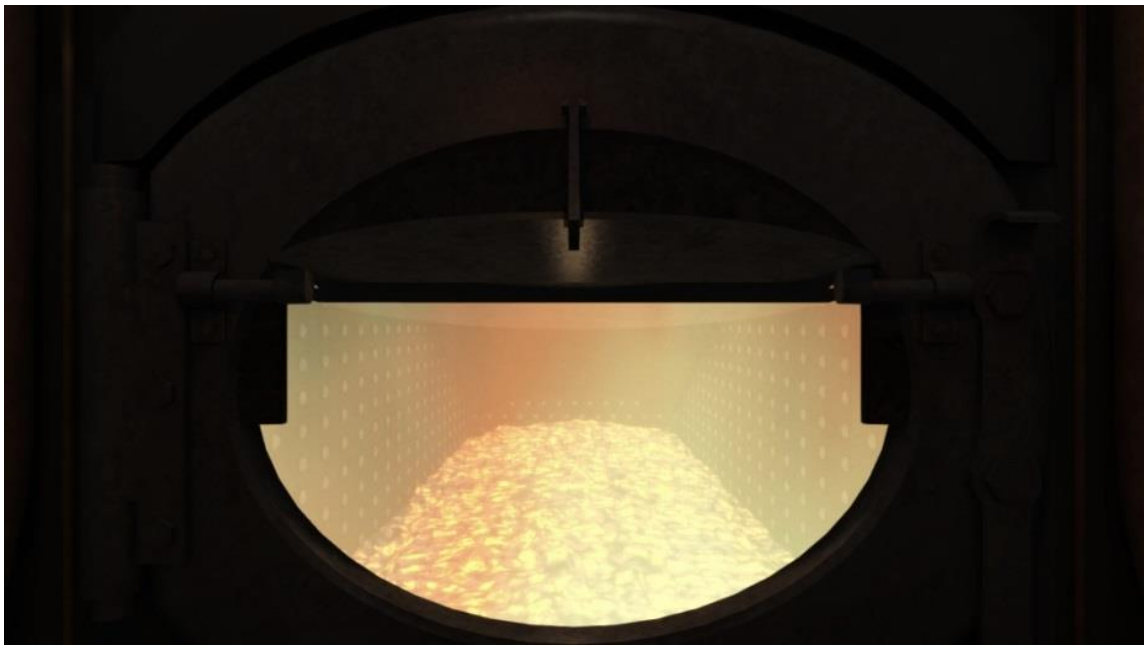
The coal level is slightly exaggerated over its working range so it can be used as a visual indicator of when firing is needed. The coal level rises and falls gradually but the images below will help in visualising how this can help.



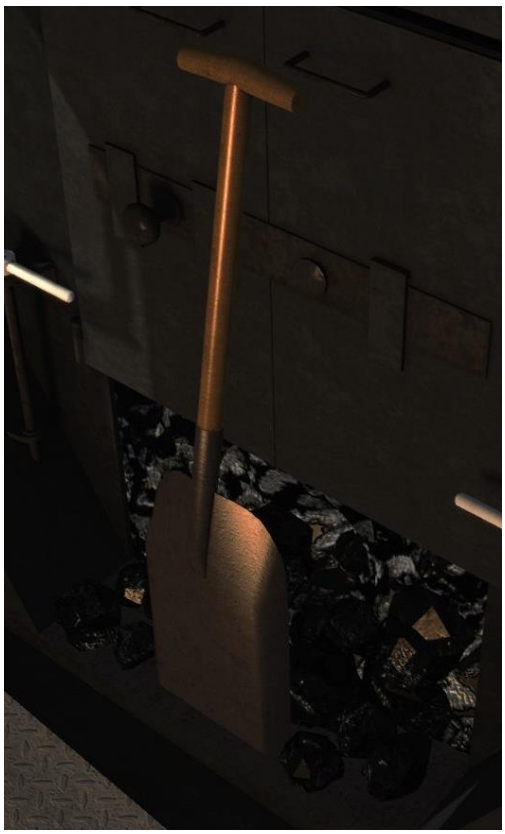
Coal level low *< 40% 795 lbs*
The grate can be clearly seen with a very small amount of coal in the centre.



Coal level average *60% 1192 lbs*
The grate is covered with the coal's centre on the 3rd rivet down on the back wall.



Coal level high *> 76% 1511 lbs*
The grate is deeply covered with the coal's centre almost up to the 2nd row of rivets on the back wall.



The shovel on the tender controls the stoking speed. Pulled fully down, stoking is at maximum.

5. Blower and Boiler Pressure Gauge (right-hand dial)

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. At 226 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 231 psi. Both valves close again when the boiler is under 224 psi.

The left-hand dial in the picture above is the steam chest pressure gauge and shows the steam pressure currently in the system. This will rise and fall with the use of the regulator and in advanced mode will clearly show the steam pressure gradually building and fading as opposed to being instantly on or off.

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.

The damper has 3 notches: closed, half and full. It is fully open in the raised position.

Keys: M, Shift M

7. Exhaust injector steam

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

Key: I, Shift I

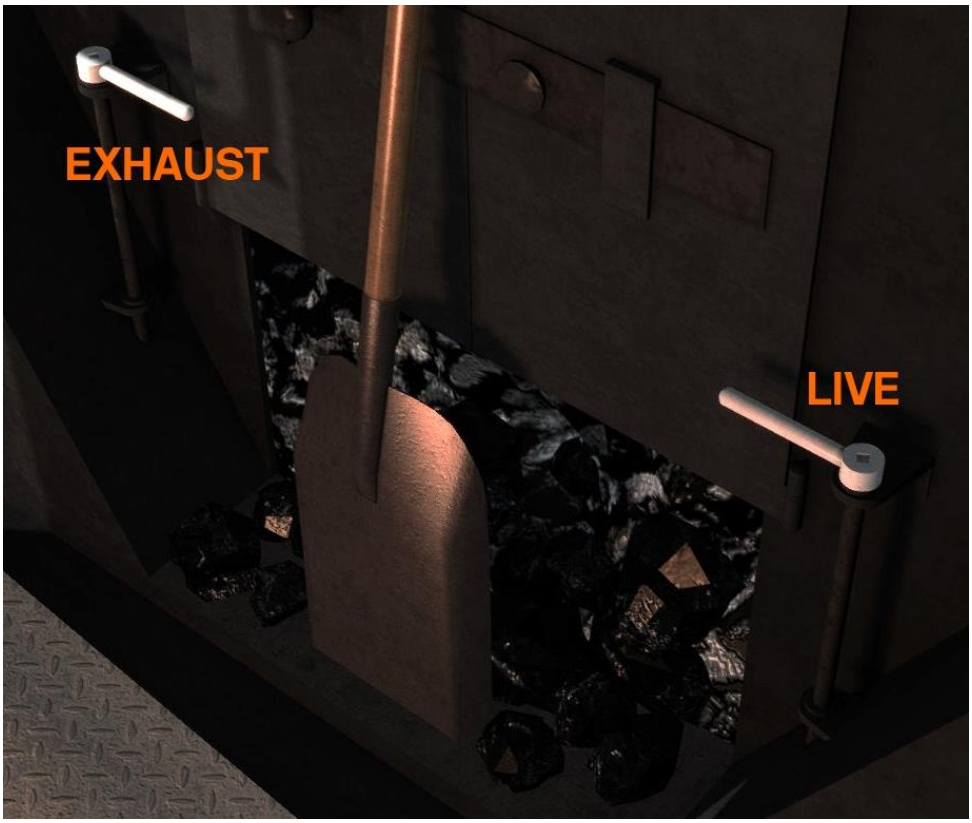
Live steam injector steam

The Live injector works the same 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, Shift O

Advanced Mode

In Advanced mode the exhaust injector will only work when there is exhaust steam to be used, i.e. the regulator is open and the locomotive is in motion.



8. Live and Exhaust water taps

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. Fully open the water control tap.
    - You will hear and see water coming from under the left or right hand side of the cab.
2. Turn the injector steam lever until you hear the injector start working.
    - If you hear a hiss and see a jet of steam under the cab you have too much steam pressure and the water is not entering the injector.
    - If you hear running water and see water running from the pipe under the cab you need more steam to force it into the boiler.

9. Boiler Gauge Glasses

Attached to the boiler are 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.

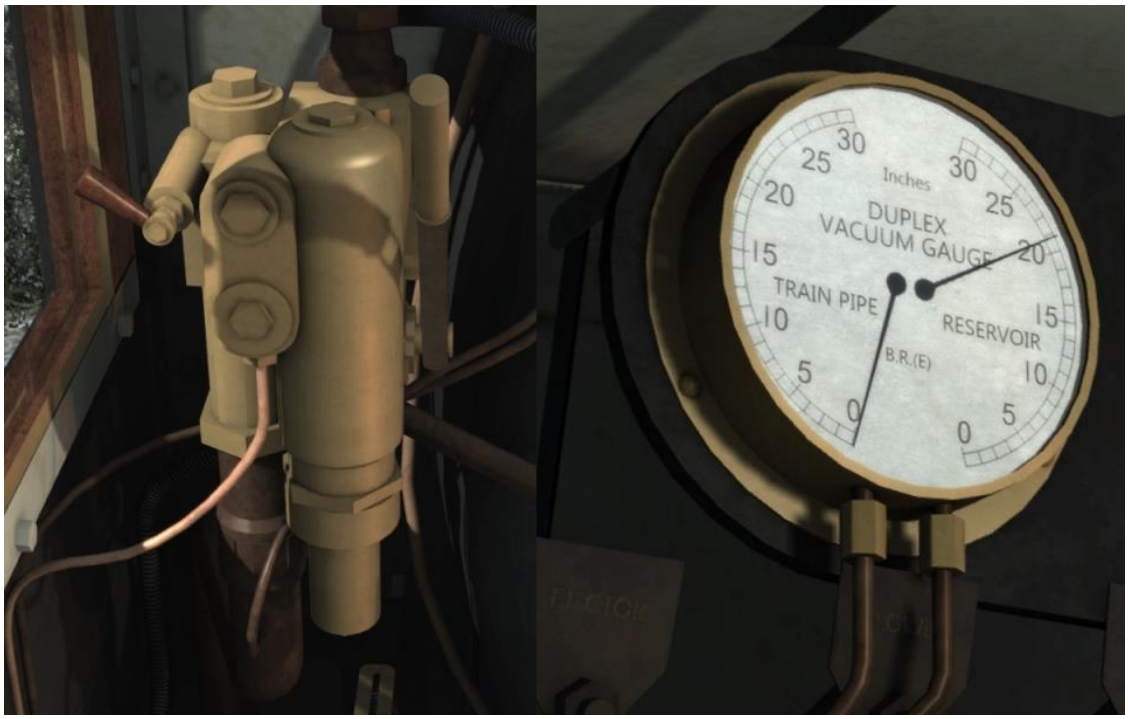
Overfilling the boiler past 102% will cause priming and water will be ejected from the chimney.

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 blow down tests on the gauge glasses by doing the following:

1. Shut off the water supply to the top and bottom of the glass by pulling the levers down and up respectively.
2. Move the tap at the bottom of the gauge towards the centre of the cab, the water will empty from the glass.
3. Return the lever and taps to their previous positions by reversing the above process to refill the glass.



10. Vacuum Brake and Brake Pressure Gauge

The vacuum brake is used to pull the brake shoes 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)

11. Sander

The air powered sander assists in starting and stopping the locomotive without the wheels slipping by placing sand on the rail in front of and behind the driving wheels. It is controlled by the small brass lever located to the right of the reverser.

Keys: X, Shift X

Advanced Mode

Sand is essential in pulling away with minimal wheel slip in wet or icy conditions.

12. Whistle

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

Key: Space

The K1 also has a set of random short burst whistle sounds which can be activated by pressing the B key.

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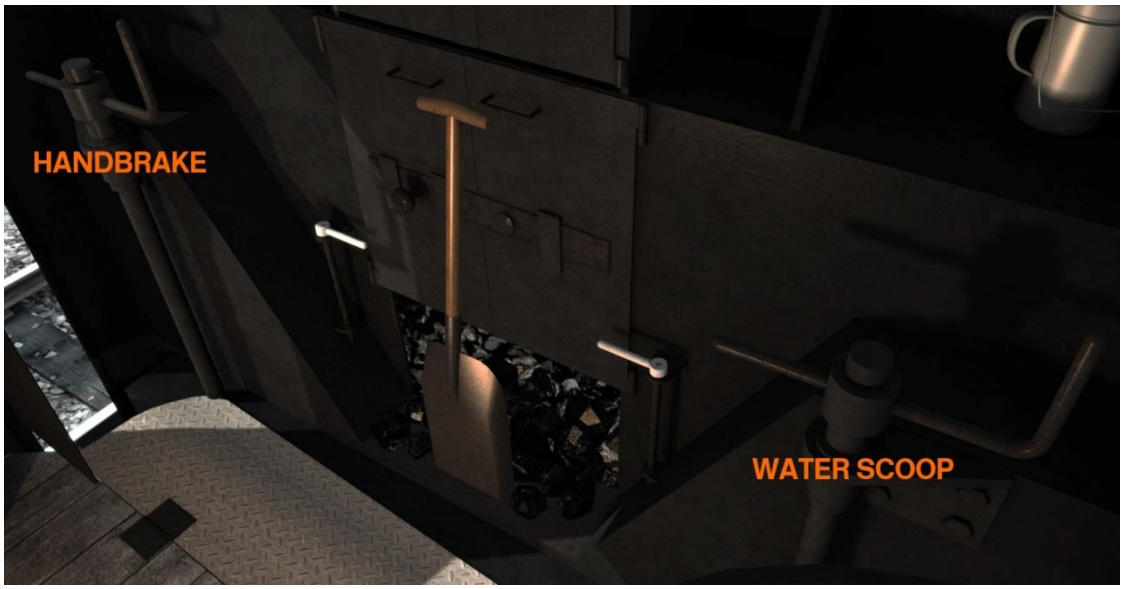


13. Handbrake

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

Key: /

14. Water scoop

This lever operates a screw that raises and lowers the water scoop on the tender. This would have been used to fill the tender from water troughs in the tracks while travelling at speed.

Key: Ctrl-T

15. Speedometer

The speedometer above the AWS box shows the locomotives current speed. It has a light which can be turned on/off using the switch next to it or by holding Control and pressing the 7 on the number pad.

Keys: Ctrl + Number pad 7

16. Switch panel

The K1 is fitted with the British Railways 4 lamp system for the locomotive and tender – 1 lamp at the top and 3 below – to show the standard BR head codes (see Appendix).

The codes can be pre-set using the scenario locomotive number or changed by the driver at any time using the switch panel.

A panel is provided to allow changing the lamps as well as selecting their direction, turning the associated electric lights off/on and turning the cab light off/on. The switches can be clicked on and from left to right are as follows:

- **Top lamp – Ctrl + 1**
- **Left lamp - Ctrl + 2**
- **Middle lamp – Ctrl + 3**
- **Right lamp - Ctrl + 4**
- **Locomotive direction - Ctrl + 5**
- **Electric lights – H, Shift H**
- **Cab light - Ctrl + 6**

They can also be activated by holding the Control key and pressing the relevant number on the number pad. H and Shift H control the locomotive lights.

The lamps are intelligent in that they will not show for the locomotive or tender if something is coupled to them.

Keys: Ctrl + Number pad 1 to 6, H, Shift H

17. AWS (Automatic Warning System)

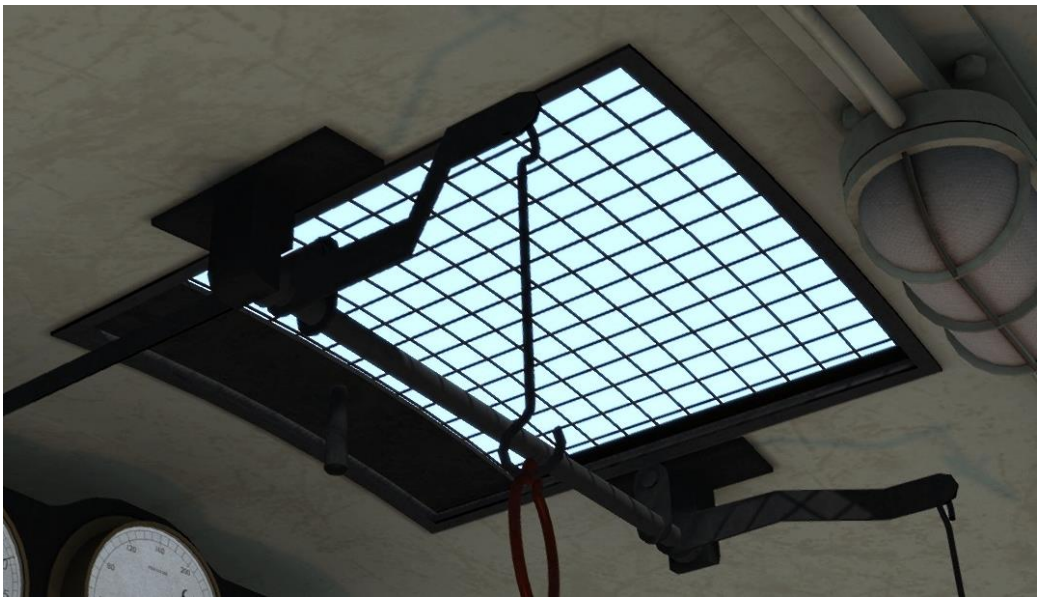
The British Railways AWS system uses a magnetic pick up which indicates a signal being either clear or at danger and issues a bell or buzzer tone to the locomotive crew. If a warning buzzer is heard it needs to be acknowledged or the brakes are automatically applied.

If 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, yellow 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 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.

Key: Q

Note: For AWS to function the route that the K1 is running on needs to have been fitted with the relevant scenery markers. This is not the case for the Weardale and Teesdale Network route so the included scenarios will not trigger any AWS alerts.



18. Windows, window ledges and roof hatch

To provide ventilation for the crew or to protect them from the elements you can open and close the windows and the roof hatch. Click and drag with the mouse.

19. Tender logos, headboards and nameplate

You can cycle through the available tender logos by using Control and the number 8 on the number pad.

You can cycle through 3 different headboards by using Control and the number 9 on the number pad.

You can show/hide a nameplate by using Control and the number 0 on the number pad.

All of these can also be set specifically using the locomotive scenario number (see Locomotive Numbering).

Keys: Ctrl + Number pad 8, 9, 0

Driving in Advanced Mode

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

Head Code - If you wish to, set the appropriate head code (see Controls Section 19).

Fire – Assuming you are not using the auto-fireman and not about to run downhill for a long way you will want to start 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 – In wet or icy conditions 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 sander helps to provide grip for the wheels on the rail and should be used when starting in wet or icy conditions (see Controls Section 12).

Under Way

Water Filling – You will need to use the water levers and the injector steam levers 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.

Locomotive Numbering

When a K1 is added to a scenario the number will be randomly chosen from a list of all 70 members of the class.

These are pre-set with the correct configurations for each number as they were historically outfitted. However if you wish to change any of the components then the setups are listed below.

The number has 13 digits (7 for the LNER livery) and they can be set as follows:

BR and BR Worn liveries, e.g. 6200151AT#YNG

1 to 5. 5 digit locomotive number, e.g. 62001
6 to 8. 3 digit shed code, e.g. 51A
9. Tender logo
- **T –** British Railways text
- **R –** Pre 1956 “Cycling Lion”
- **P** – Post 1956 “Ferret and dartboard”

10. Overhead electric cable warning flashes
- **#** – None
- **R** – red older style
- **Y** – yellow modern style

11. RA6 rating shown on cab side – **Y**es, **N**o
12. Air brake pressure gauge in cab – **Y**es, **N**o (note: this would only be fitted to preserved versions of the locomotive)
    - Using a lower case **y** or **n** will add a nameplate to the side of the smokebox
13. Head code – letter of the head code class (see Appendix)
    - You can also use **X**, **Y** or **Z** to add a headboard with the head code class A
        - "The Jacobite" – **X**
        - "The Waverley" – **Y**
        - "Siddle Tours, West Durham" – **Z**

LNER livery, e.g. 2005YYG

1 to 4. 4 digit locomotive number, e.g. 2005
5. Overhead electric cable warning flashes
    - **#** – None
    - **R** – red older style
    - **Y** – yellow modern style
6. Air brake pressure gauge in cab – **Y**es, **N**o (note: this would only be fitted to preserved versions of the locomotive)
    - Using a lower case **y** or **n** will add a nameplate to the side of the smokebox
7. Head code – letter of the head code class (see Appendix)
    - You can also use **X**, **Y** or **Z** to add a headboard with the head code class A
        - "The Jacobite" – **X**
        - "The Waverley" – **Y**
        - "Siddle Tours, West Durham" – **Z**

Note that the BR Worn livery does not have the headboards or nameplate options.

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.

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Appendix: Head codes

The following are the standard BR head code classes that you can set using the scenario numbering system.

Class A

Express passenger, newspaper, or breakdown train; express diesel car; snow plough on duty; light engine proceeding to assist disabled train.

Class B

Ordinary passenger, branch passenger or "mixed" train; rail motor (loaded or empty); ordinary passenger or parcels diesel car; breakdown train not on duty.

Class C

Parcels, fish, fruit, livestock, milk or other perishable train composed entirely of vehicles conforming to coaching stock requirements; empty coaching stock (not specially authorised to carry a class A code).

Class D

Express freight, livestock, perishable or ballast train with not less than 50 per cent vacuum braked vehicles piped to the engine.

Class E

Express freight, livestock, perishable or ballast train with 20 per cent vacuum braked vehicles piped to the engine.

Class F

Express freight, livestock, or ballast train not fitted with continuous brake.

Class G

Light engine(s) with not more than two brake vans.

Class H

Through freight or ballast trains not running under class C, D, E or F conditions.

Class J

Mineral or empty wagon train.

Class K

Pick-up branch freight, mineral or ballast train.