Livery Pack – Jubilee Leander

V1.0.4

The excellent Leander by Chris Barnes

Contents

Welcome!

This pack is part of a community project started by members of the UKTrainSim community. Our aims are simple:

- Build up a bank of resources for the community by combining skills and working together
- Make the packs simple and straight forward to use

What is in this pack?

- TPR Leander Locomotive (TPR Leander in scenario editor)
- TPR Leander Tender
- AI/Basic TPR Leander Locomotive
- Quick driver consists so you can get in and drive straight away

What DLC is needed?

The only item of DLC required is the Stanier Jubilee Steam Locomotive from Steam. Without this the pack can NOT be used.

Do I have the latest pack installed?

Every time you install a UKTS Freeware Pack it will automatically check to see if a more up-to-date version is available and warn you if you are trying to install an obsolete pack.

A small utility called "*UKTrainSim Freeware Pack Updater*" is also installed with every pack. This utility will allow you to quickly and easily check if updates for any of your packs are available. It also lists packs that you do not have with straight forward links to click and download them.

How do I use the content in this pack?

A gallery of images showing the items available in each pack can be accessed by visiting:

http://www.uktrainsim.com/FreewarePacks/galleries

A YouTube video has also been created which shows you how to enable object set filters and find the content in each pack.

View YouTube Tutorial Video

Object Set Filters required for this pack

The following Developer and Product Filters must be enabled to use the content of this pack when creating scenarios:

- RSC → JubileePack01

How can I get involved?

There are many ways members can take part in the project:

- Donate a new asset to the pack
- Donate a re-skin to the pack
- Research buildings, objects etc. to assist object creators
- Take pictures that can be used as texture resources
- Assist with the organisation of the packs
- Create tutorials to assist other members

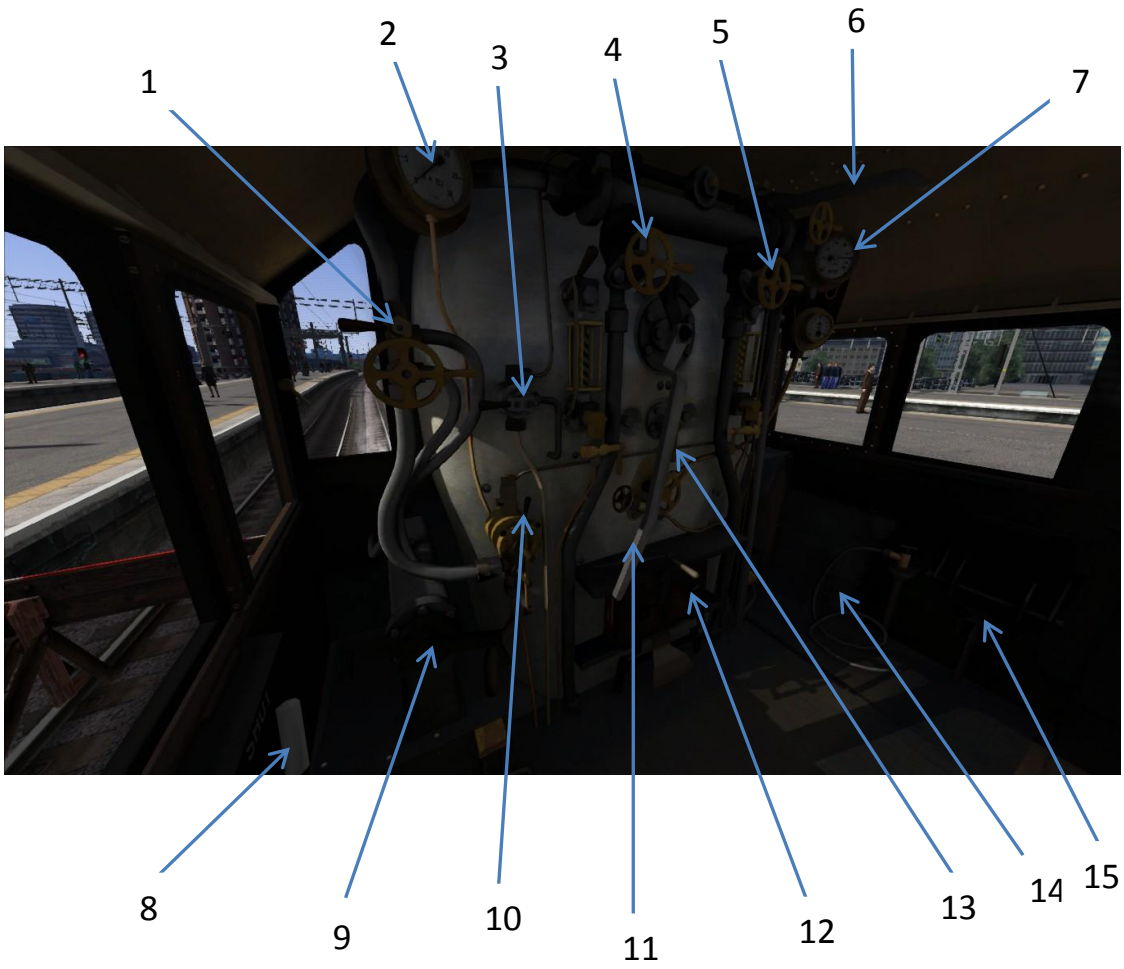
If you have questions or want more information please visit the Get Involved page on the UKTrainSim Freeware Packs web site.

Additional Information from the Author Chris Barnes

Why is TPR Leander different?

TPR Leander is not just another repaint. By using LUA scripting, it has become an entirely unique driving experience in RailWorks and as such, there are several key differences between this locomotive and other addons. To get the most enjoyment out of this locomotive, you will need to know and understand these relatively simple differences in operation. It is intended to work with expert mode and manual firing ONLY, but if you're new to expert controls or manual firing then don't worry, this chapter aims to get you started with the basics and a tutorial scenario has been included on the Oxford to Paddington default route. It is also recommended that you have a go at the default How to drive a Steam Locomotive tutorial scenario, unless you are already used to driving steam locos with the expert difficulty setting. Note – this locomotive is not compatible with the F4 HUD, so you will need to get used to controlling the locomotive with the keyboard or, for some controls, by grabbing and moving the in cab controls.
If you do not want to drive with expert controls and manual firing, you are able to drive the AI version of TPR Leander like the default RSC Jubilee, as explained in **Using TPR Leander in scenarios as AI**.

The Controls



1	Small Ejector
2	Brake pressure gauge
3	Sander lever
4	Live Injector Steam Spindle
5	Exhaust Injector Steam Spindle
6	Whistle lever
7	Boiler pressure in PSI
8	Cylinder Drain Cocks lever

9	Reverser
10	Brake lever
11	Regulator handle/virtual throttle
12	Firedoors
13	Blower
14	Damper lever
15	Exhaust injector trimmer (Live injector trimmer under seat on left side.

How to drive and fire TPR Leander

Regulator

The first and probably most important new feature is the operation of the regulator. In real steam locomotives, the steam chest is basically the pipe from the boiler to the cylinders through which the steam travels, and the regulator is a valve at the entrance of the steam chest pipe. How open the valve is determines the rate at which steam can enter the chest. In all models, the steam chest pressure is directly proportional to the regulator percentage, so that when the regulator is 0% (closed), the steam chest pressure will be 0PSI, and at 100% regulator (fully open), the steam chest pressure will be maximum at the specific reverser setting and speed at the time. The default model, unfortunately, is far too simplified and doesn't model the characteristics of a real steam chest at all, but it is also part of the core physics. In light of this, for Leander, you will NOT be controlling the regulator as the game knows it, but a virtual regulator, which can be controlled with the usual A and D keys, or by grabbing and moving the regulator handle in the cabview. When operating the regulator, rather than think of it as working like a car throttle, but more like when you open the taps in your kitchen sink. The more you open the tap, the greater the rate of water filling the sink. The more you open the virtual regulator, the greater the rate of regulator **increase**.

The water in your sink will empty through the sink hole. Imagine if this hole could enlarge or shrink down to nearly no hole, and the rate of water flowing through the sink hole will be effected accordingly. In the case of the steam chest, the rate of steam emptying out of the steam chest is determined by three main factors: 1) the reverser setting, or "cut-off"; 2) the speed of the cylinder stroke or driving wheel movement; 3) the cylinder drain cocks. The reverser is used to expand the steam, reducing the amount of steam into the cylinders, as less force is required on the pistons to turn the wheels as they gather more speed, and as such makes the locomotive more economical to run as less steam is used. Therefore, the longer the cut-off or greater the percentage of reverser setting, the greater the rate of steam leaving the steam chest. As the locomotive gathers speed, its wheels turn faster and the rate of cylinder strokes increases. As steam is used for every stroke of the cylinder, the greater the speed, the greater the rate of emptying the steam chest. Lastly, cylinder drain cocks, which are opened not only to exhaust any water out of the cylinders, but to ensure that the steam chest doesn't fill with steam unintentionally while the steam locomotive is standing still for long periods of time. As steam is deliberately wasted through the cylinder cocks, having the cylinder cocks open increases the rate of steam emptying out of the steam chest.

Now in terms of the game and TPR Leander, we have 2 changing rates of steam movement, the rate of steam entering the chest and the rate of steam leaving the chest, as described in the last couple of paragraphs. We therefore have an overall net rate, and this net rate determines the position of the "game regulator". If the rate of steam entering is **GREATER** than that leaving, the regulator setting will **INCREASE**, and continue to increase to 100% unless the rate entering is the **SAME** as that leaving, in which case the regulator setting stays the **SAME**, and if the rate of steam entering is **LESS** than the rate of steam leaving, then the regulator setting will decrease. Even if the virtual regulator (the handle in the cab) is still open, if the net rate is less than 0 then the regulator setting will fall to 0%. If you have not understood a word of that, then don't worry, the best way to learn is to load TPR Leander up, press F5 for the detailed loco HUD and watch the regulator percentage as you move the regulator handle or press A and D.

Controlling the regulator on TPR Leander requires a lot of care and concentration. Open the regulator handle a fraction, and carefully watch the regulator percentage increase, shutting the regulator once the percentage has reached about 30. You will then begin to move, even with the regulator closed, which I can assure you will be a weird sensation the first time you try it! The regulator percentage will fall as you start moving, so pump the regulator a few times by opening and shutting it in quick succession. You will need to combine your control of the regulator handle with the reverser to fine tune the regulator percentage as you gain speed (the use of reverser is explained . It is not recommended you open the regulator handle more than half way to start with, as you will open the second valve, which allows a much greater amount of steam into the steam chest and will probably result in wheelslip, but once you have reached 25mph and want to race off to 75mph, whack the regulator wide open and drive it with the reverser.

What if the locomotive wheelslips? What action should you take? Well, first thing to do is to turn the sanders on by holding down X. Sometimes, the sanders will not stop the wheelslipping, so the next step is situational. If you are slipping whilst moving off at slow speed, shut the regulator immediately, then carefully open the regulator, making sure the regulator percentage on the F5 HUD does not race off to more than 50%. To control the regulator, you will probably need to pump it, so open, then as the percentage builds up, shut it quickly and open it slowly again. However, if you are powering at speed and wheelslip occurs, especially on the hill, then you should use the reverser to control the wheelslip, as described on page 10-11. Wheelslip in RW is pretty harmless; you will just lose a lot of adhesion. In real life, however, the consequences of wheelslip can be absolutely disastrous, causing serious damage to the locomotive and potentially seriously injuring crew members on board, as happened during the infamous Durham Slip involving Peppercorn A2 Blue Peter.

With this additional knowledge, you will be more prepared and will have an idea of what to expect if you try the tutorial, as recommended before attempting the main scenarios. The tutorial will give you further information on how to operate the loco, so that the user may gain as much experience with the loco as possible.

It is worth pointing out that this scripted model that I have devised is also not accurate, since I myself do not fully understand the more complex principles, and the maths in the script is, quite frankly, a bit of a hodge podge. But I firmly believe that it is better than the default control system and that it is a step in the right direction, where continual improvement in future releases will provide the best driving experience for steam locos in RW, unless RSC drastically improve the core physics and make the script redundant.

Reverser

The reverser operates like any other screw reverser on a RW loco, so it does not require locking when not it use like the real one. The reverser is used to control the cutoff, which is represented by a percentage value of 0 to 75 in both forward and reverse. Operating the reverser is much simpler than operating the regulator of Leander. To begin, set the reverser to 75% real cutoff (F4 HUD) or 100% in the F5 HUD, which sets the valve gear in “full forward”. A general rule of thumb is that the longer the cutoff, the more tractive effort or force available for pulling and pushing, and the more steam is used per piston stroke. So when starting off, to gain momentum from a standing start, you need as much tractive effort, before wheelslip, to overcome the friction in the wheel bearings of the

rolling stock. Like shifting up the gears of a car, you wind back the reverser towards 0 to reduce the tractive effort as you accelerate, because less force is required as the change in momentum per unit time is smaller. While the shifting up the gears of cars analogy is good for demonstrating the principle that we use less force as we get faster, unlike the gears of a car, the principle of cutoff is not to change a ratio between the work done by the engine and the work done by the car's drive shaft to the wheels. You can in theory run to speeds upwards of 30mph in full gear on a steam locomotive, until back pressure in the cylinders kicks in. You will just waste an awful lot of water and fuel by doing so, and probably kill the boiler pressure while you're at it too.

So we wind the reverser back as our speed increases. But as soon as you hit somewhere like the Lickey incline, you're going to need to wind the reverser back in the direction of full forward, increasing your cutoff. This is because at short cutoffs, even on shallow gradients, there is not enough tractive effort to cancel out or overcome the additional force of the train's weight; on the flat, weight is not so much of a factor, apart from increasing the overall starting friction of the train; it is the mass of the train that is more or concern, as the weight is approximately perpendicular to the direction of the tractive effort of the loco and train movement. This weight component becomes more significant as soon as you hit a gradient, because the component of weight that is parallel to the direction of train movement increases.

To prevent the loco from stalling, we wind the reverser further forward as we decelerate, until we reach a "sweet spot", where we've reached the maximum speed at a sustainable cutoff (ie. before the boiler pressure drops). We want full regulator on a gradient if possible, but what if it starts to wheel slip, even if the sanders are on? The reverser will give us much finer control of the tractive effort than the regulator, and if we shut the regulator whilst on a steep hill, we risk stalling or not being able to recover from wheelslip as we lose more speed. Therefore, we reduce cutoff again until it stops wheelslipping, then slowly wind the reverser back forward again until it starts to wheelslip. Rinse and repeat, until you find the maximum cutoff allowed before it starts to wheelslip.

Brakes & AWS

TPR Leander is fitted with vacuum brakes only, whereas the real one has steam brakes. Due to problems with the locomotive wheelslipping ingame when the locobrake was applied, and because I do not fully understand the operation of the LMS combined steam and vacuum brake, I've modelled the brakes as they appeared to work during a day's cleaner's ride out turn on 45428 Eric Treacy. Authenticity is further limited as the RSC Black 5/8F/Jubilee cab does not have an animated Large Ejector spindle, so the small ejector of TPR Leander is used as both the small ejector and large ejector.

When light engine (no brake fitted carriages or wagons coupled up), always put the handbrake on whilst standing still – a real world safety measure in case the locobrakes fail or boiler pressure is too low for them to be very effective.

To release the brakes, open the small ejector as far as it will go, and move the train brake handle to the "Off" position (far right). If light engine, you shall notice that a vacuum of 21 inches of mercury is created in a matter of seconds, but if you couple up to a fitted train, the train pipe increases in length, therefore the creation of a vacuum will take much longer. Once the brakes have been fully released, move the small ejector back so that it's about 2/3 open, and move the brake handle back towards the left, until the brake setting on the F5 HUD reads, "14% Running". If you leave the ejector

off, the vacuum will be slowly destroyed as air leaks into the train pipe, applying the brakes very slowly, so ensure that the ejector is always on enough to cancel out the leak.

When using the brakes, it is important to consider how heavy your train is, particularly if the train is unfitted (eg. Some wagons are not fitted with a train brake). The greater the mass of the train, the greater the brake force required to cause the required change of momentum.

Momentum = Mass × Velocity

Change in Momentum = Mass × (Final Velocity – Initial Velocity)

From the above equations, we can see that it is also important to consider your speed as you approach a stopping point. We could just destroy the vacuum and fully apply the brakes, but as this would be particularly jolting for the onboard passengers and could potentially cause a tyre flat if the wheels lock up, or overheat the brake shoes and tyres (particularly disastrous if this causes the tyres to heat up to the point they spin separately from the wheel), this should only be used for **emergency** braking. For a more professional stop, slow yourself down early by jockeying the brake handle from release to apply. The brakes are very sensitive, so only small adjustments are required. Partially destroy the vacuum to about 15 inches of mercury, using either the gauge in the cab view or the information on the F5 HUD. If you are decelerating too much, very slowly release the brake and let it creep back towards 21 inches. When you reach the station, you want to be travelling at no more than 15mph, depending on how long the platform is. Keep applying, releasing, reapplying and rereleasing, and aim to stop the train with 12 inches on the brake gauge, although 10-11 inches is also acceptable if this is not decelerating the train enough. For a smooth halt, release the brakes slightly just as the train comes to a stop. When the train has stopped, you can either just let the vacuum slowly destroy from 10-12 inches, so that you are ready to leave quickly (making sure the brakes are on hard enough to prevent rolling when you must be stationary), or destroy the vacuum completely to 0 inches, which is more appropriate if you are stopping for a while.

Braking is a bit of an art form and the only way to master it is to 1) learn how your loco responds, as some locos' brakes are more sensitive or "bite" more sharply than others, and 2) keep practising, with different train lengths and at different line speed limits.

AWS (Advanced Warning System) is fitted to TPR Leander, as per the real thing, to comply with the rail regulations in safety since the late 1950s. You may be used to operating AWS on other RW locos, and it's no different on Leander. As the loco passes over a yellow AWS ramp about 200 yards before a signal, either the bell will ring if the line ahead is clear, or the horn will sound if the signal is at caution (yellow/double yellow) or danger (red). If the horn sounds, you must reset the AWS by pressing Q to acknowledge that you, as driver, are going to be responsible for your train and take the right action when appropriate, otherwise in 2 seconds the emergency brakes will apply. The emergency brakes will also apply if you pass a read at danger. On any train, steam, diesel or electric, the AWS can be considered to be a sort of driver vigilance test that is intended to protect the train and all other trains further ahead on the line and prevent accidents from occuring, assuming the AWS is working properly. As a gimmick, you can test to check the AWS works before setting off on the virtual main line. Press U to launch the AWS self test. The horn will sound, and in 2 seconds the brake vacuum should be destroyed to 0 inches, confirming that the system is working. To cancel the test at any time, before the emergency brakes are applied or afterwards, press Q to reset the system, as you would normally.

Firing

Firing TPR Leander is no different to firing any other steam locomotive in RW, which means it doesn't simulate firing a steam locomotive at all well, such are the limitations of RW, but nevermind! To open and close the fire doors, press and hold F to open or Shift-F to close, or grab and drag the fire doors handle left and right in the cab view. The fire doors must be fully opened for the simulation to allow coal to enter the firebox. To shovel coal into the firebox, press R to increase the rate of stoking or press Shift-R to decrease the rate and ultimately stop stoking. Whilst moving, it is ideal to open the dampers by holding down M, allowing the fire to breath and burn more hotly. Close them again with Shift-M when the steam generation rate is too high. Only use the blower to build up pressure while the regulator is shut, because in RW, once the regulator is open the blower has no effect on the steam generation rate. It has been suggested to me that in RW, you can use them to prevent a fatal blowback while the firedoors are open in a tunnel, but as I have yet to verify that, I would personally recommend you keep the firedoors tightly shut whenever in a tunnel. Feel free to try both techniques though.

Your firing technique should be dependent on the route you are driving and the load you are hauling. If driving at a rather sedate 25mph on a mostly flat preserved railway route, firing should be kept to a minimum, as it isn't necessary to have full working pressure, which at speeds where you'll be coasting most of the time, will irritate you by constantly setting off the safety valves. In real life, setting off the safety valves is a waste of coal and water, as you lose steam that was made by building up the fire, so try to avoid it if you can. You will be warned prematurely that the safety valves are about to go off as the valves will begin to feather, so you will have time to try and reduce boiler pressure before the safety valves pop.

However, if you want to become a master of Beattock, Shap, the Long Drag, or get any speed out of the locomotive, you are going to need to fire it hard. Knowing your route is useful for preparing the fire for upcoming gradients and tunnels. When you need to work hard, the best thing to do is saturate Leander's fire by holding R to get the maximum stoking rate, and just leave it to build up to about 1500 Ibs, and keep the dampers fully open at all time. If you are decelerating up a gradient, the steam generation will start to drop, and if you have a fire of more than 1500 Ibs then back off the firing. Whenever not firing, always shut the door so that cold air from the cab is not drawn through the fire by the vacuum, caused by the exhaust. When coasting, it's a good idea to leave it open to prevent the fire from getting too hot, and shut the dampers.

So firing is one of the more simple operations of RW steam loco operation (it's a lot more hard work and strategic in real life). The injectors are also simple to operate when you know how.

Injectors

The injectors on a steam locomotive are used to inject water into the boiler at high pressure. Water from the tender is fed to the injector, which is mixed with high pressure steam in the combining cone, heating the water up and effectively pushing the heated water through the delivery cone, opening a valve and entering the water feed to the boiler, at a pressure that exceeds the boiler pressure. TPR Leander has 2 injectors, an exhaust injector and a live injector. The exhaust injector uses steam from the cylinders to force the water into the boiler, whereas the live injector uses steam directly from the boiler instead. Operating the injectors is very straightforward, and in some ways is made simpler by the scripting used to make a more authentic experience. For both the

exhaust and live systems, you use three different controls: the water feed on the tender, which is either on or off and is toggled by tapping K for exhaust and L for live. You then have a trimming system, which controls the rate of water entering the injector. To increase this rate, press Ctrl-K for the exhaust, Ctrl-L for the live. To decrease this volume, press Shift-K for the exhaust and Shift-L for the live. These can also be controlled by grabbing the trimming handles and dragging them left and right, underneath the seats in the cab. Finally, you have the exhaust and live injector steam spindles, which are either on or off and are toggled by pressing I for exhaust, O for live.

When you start a scenario, set the trimmers first, then turn on the tender feed. To check you've done this right, look below the cab on the right for exhaust and Left for Live – you should see water pouring out of the overflow, next to the cab steps. Then turn on the injector steam, so that you should have a wisp of steam where the water was pouring from. When you've finished with the injectors, turn off the injector steam, then simply turn the tender feed off, leaving the trimmers as they are so that you don't need to keep setting them up every time you use the injectors. Remember, it is always water first, THEN steam to start the injectors, and to turn them off, steam THEN water. If you have no water flowing out of the overflow and you turn the steam on, you will get a violent rush of steam out of the overflow, telling you that you've forgot the water or did it the wrong way round.

Use the injectors to top up the boiler, not allowing the water level to fall below 0.5 preferably. Be aware that using the injectors uses steam, so that boiler pressure can fall with use of the injectors, and that if the boiler pressure falls to something like 50PSI (very unlikely), the injectors will no longer work, in which case you're stuffed. Should this ever happen, stop the train, and turn up the blower to its maximum position, keeping an eye on the water as you do. The pressure should hopefully return back to about 100PSI, where you can use the injectors to fill up while continuing to use the blower to restore pressure to working levels. In real life, the blower uses steam to operate and the boiler water level would probably reach dangerously low levels in the time before sufficient boiler pressure is raised, so, erm, I'm not really sure what you are supposed to do in this scenario in real life, probably drop the fire!

If you know your route well, you can use the fact that injectors use steam to your advantage. When slowing down to approach a station, or backing off the regulator, you can use the injector to prevent the boiler pressure from rising to unwanted levels – you don't want the safety valves going off at any time, especially in a crowded station! First, practise with operating the injectors until you don't have to think too much about it. Once you've done that, learn your route, be strategic and get the most out of the loco without being wasteful.

TPR Leander is the first steam loco model in RW to feature dynamic water gauges. As you accelerate/decelerate, the visual water level in the water gauges in the cab will move up and down as the water sloshes from one end of the boiler to the other. Whilst TPR Leander was in development, the gradient also affected the water level, and while it worked, it also would frequently cause some downright bizarre water levels, and so was removed until I find a more reliable method. The dynamic water level in the gauges is purely cosmetic and does not affect the actual water level in any way, so don't be alarmed if you brake suddenly and the water level drops to zero. Likewise, regularly check the actual water level as shown on the F5 HUD.

Using TPR Leander in scenarios as AI

Due to the complex scripting, TPR Leander cannot be used as AI in scenarios, or played with anything other than expert controls and manual firing. I apologise for this, as I haven't been able to better optimise the script so that this is possible, although I hope it encourages more users to have a go at expert driving and firing, which I personally think is a more involving and enjoyable way to play.

Because of this, as seen in the **What is in this pack**, there is a second TPR Leander with no advanced scripting, so that it can be used as an AI train in scenarios. It can also been used by those who do not wish to learn the controls for TPR Leander or learn how to fire in RW, as it will drive identically to the default RSC Jubilees.

To use TPR Leander for AI trains in scenarios, select "TPR Leander AI" instead of "TPR Leander" and couple to the tender "TPR Leander Tender". The tender is the same for both versions. It is worth mentioning that whilst the AI version utilises the original RSC Jubilee Pack 01 LUA script, the particle textures are the same as the normal version. It is unlikely that you will need more than one TPR Leander AI loco in the same scene in a scenario, but should this be the case, please consider the potential framerate hit due to the high definition particles and particle density.

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- The soundset may not be used in any other pack without the written consent of Matt Walmsley and Edward Fisk (if the LMS ejector sound is also wanted).
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Credits

These packs would have been impossible without members of the community generously donating their time, energy, skill and expertise to the project.

My thanks go to Mike Simpson for his indispensable RWTools, David Richardson for his design skills and Matt Peddlesden for his support. Kariban and Kromaatikse have done incredible work with rolling stock physics and many others have offered help and assistance along the way. Without you all this would not have been possible.

Donations for this pack were received from:

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Jim Nobbs – UKTS Freeware Pack Administrator, UKTS FP Installer setup, head of the TPR project.

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Testers

Chris Barnes

Connor Barret

Edward Fisk

Pete Gillam

Simon Hall

Sean Harris

Tom Harrison

Jim Nobbs

Matt Walmsley

Ben Yates

Version History

1.0.3 – 5th December 2012

- 1st Release

1.0.4 – 23rd December 2012

- Improved sounds thanks to 92212 including:
    - A complete overhaul of the bogie and rail joint sounds
    - New and improved coasting clanks
    - New drain cocks sounds
    - New low speed drain cocks open with regulator shut sound
    - Greatly improved balancing of volume within the sound pack
    - Wheelslip Sounds