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1. What is EG2

Extended Gameplay for Transport Fever 2, EG2 for short, is a complete overhaul of how railroads work in TpF2. It is a sequel to Extended Gameplay and Immersion mod from Transport Fever.

The goal to reach is giving the player more things to worry about, and thus optimize, during the game. So is achieved by using game's own assets (models, tracks etc) to the fullest advantage and messing with numbers and scripts to assure cohesive gameplay experience.

The principle EG2 takes most seriously is gameplay, not historical accuracy, so when possible, such accuracy was kept, but otherwise gameplay decisions took precedence.

2. Core Features

1. Randomized Vehicles

Almost every rail vehicle in the game, once it is introduced, will also introduce several variants over its lifetime. Such variants are going to be adorned with a prefix, or suffix, to the name. Along with that suffix comes a change to the vehicle statistics. Maybe a bit more capacity, maybe a little less weight or emissions. Variants are introduced every three game years and, obviously should influence your equipment choices.

In order to achieve this, EG2 uses its own auto-balancing algorithm which makes sure that a vehicle is within a range of parameters allowable for a given era. Stats that are tracked are: allowable axle-load, capacity, power, speed, number of axles, physical size or tractive effort.

In order to give the player feedback about changes done to a vehicle, a short summary is appended to each rail vehicle. This shows changes from an eventual suffix/prefix, but also other stats which describe how a vehicle compares to other ones.

In order to facilitate randomness, EG2 uses a 'seed' setting in the mod-selection menu. This value ensures that for each load of a given save-game the vehicles are going to be 'randomized' the same way. Before you start a new game, just slide it whenever to get a new set of vehicles.

2. Mod Vehicle Compatibility

EG2 was designed with extra vehicles being introduced via mods. However it also aims to resolve the problem of vehicles introduced mods tending to disrupt the game balance by quite some. The main problem lies with cargo carrying vehicles – such as wagons. Each mod author is following their own logic behind it and it usually ends up with vehicles being either 'too good' or 'too bad' for a given era. EG2 resolves this by overriding just about everything a mod author has added, and hammering the vehicle back to the EG2 progression. This is to keep the vehicle from being nothing more than eye-candy or from totally monopolizing your equipment choices. Short summary is also added to each vehicle to show you its performance.

3. Realistic Train Capacities

EG2 generates its hierarchy of freight and passenger cars by tracking their physical size and era-appropriate axle-load (that is, the maximum weight a rail can support). Internally EGI keeps a

list of densities of cargo and allocates the vehicle's cargo bay to such cargo. The weight used for each unit of cargo is 1800kg. Modifications are done with respecting maximum permissible axle-load in a given era. This algorithm is used on both game's vanilla vehicles, but also on those introduced by mods.

4. Extended Difficulty Settings

EG2 offers four distinct difficulty settings which are meant to be used on top of game's own difficulty.

1. Easy

Easy difficulty is meant for fresh players, and for those who seek 'a virtual model railroad' feel with a minor financial twist to it. Or just for those who want to play the game as 'vanilla' as possible, but with more wagons or locomotives to choose from. On this difficulty level:

- cargoes register as having $2/3^{\text{rd}}$ of weight
- all costs are reduced 50%
- trains accelerate 4 times faster than in base game
- trains brake at 2.5 m/s^2 (which is pretty darn fast)
- you get two minutes to get a refund when you bulldoze things you built
- you get full refund for stuff bulldozed within that time
- farm fields are free to remove.

2. Medium

Medium difficulty is meant for just about anyone who wishes to play TpF2 with a little twist to its core mechanics. If you are unaware of how the game works, this is the skill to start from.

- cargoes have regular weight
- all costs are standard
- trains accelerate 3 times faster than in base game
- trains brake at 1.5 m/s^2
- you get full minute to get a refund when you bulldoze things you built
- you get 75% refund for stuff bulldozed within that time
- farm fields cost 10000\$ to remove.

3. Hard

Hard difficulty is meant for experienced players who seek extra challenge. When coupled to a 'Hard' setting in the game's own difficulty setting, basically creating Hard/Hard, the game becomes a constant fight between having no funds and spending any income for a hastily created extension.

- cargoes register as being 2.3 times heavier
- all costs are raised by 50%
- trains accelerate two times faster than in base game
- trains brake at 0.75 m/s^2
- you get 45 seconds to get a refund when you bulldoze things you built
- you get 50% refund for stuff bulldozed within that time
- farm fields cost 100000\$ to remove.
- Locomotive tractive effort is lowered by 25%

4. Fever

Fever difficulty is meant for the few brave souls who know the game through-and-through and can optimize their network to a level where they can pinch every penny from everywhere. Trains on this difficulty are extra-sluggish because of their weight. Gravity works against you at every corner and just about every part of the game wants to make you suffer. When combined with game's innate Hard difficulty this mode can just prove to be impossible to beat.

- cargoes register as being 3.5 times heavier
- all costs are doubled
- trains accelerate at 175% of rate of base game
- trains brake at 0.33 m/s^2
- you get 30 seconds to get a refund when you bulldoze things you built
- you get 25% refund for stuff bulldozed within that time, don't make mistakes
- farm fields cost 10000000\$ (ten million dollars!) to remove.
- Locomotive tractive effort is lowered by 45%

5. What is wrong with Tractive Effort?

In EG2 there exists a very sophisticated algorithm to guess the number of wheels a locomotive uses to propel itself and its load. Then the locomotive's weight is appropriately modified and tractive effort – the force that actually pulls the train – is set. In order to save you from the physics behind it. This value does not really matter in this game if your train is rushing above about 5km/h. Sometimes 7km/h. In extreme cases 10km/h. But not always.

First of all – the value on the statistical screen is maximum tractive effort. This value is determined, essentially, by part of the locomotive's weight that rests on the driving wheels. When in actual motion the other limiting factor is locomotive's power.

In order to make tractive effort a bit more important statistic the following has been done:

- TpF2 does not simulate steam locomotives properly (long story ...). So in order to make that distinction a more visible, maximum tractive effort for steam locomotives has been modified. Firstly – its calculated value is lowered by 1.414 (which turns it into “effective” tractive effort, once again, long story) and then the value is modified by a factor decided on the size of the driving wheels. Essentially, big-drivers on express locomotives make for a bad freight locomotives.
- On higher difficulty settings (Hard, Fever) tractive effort is further lowered. This, coupled to generally higher train masses on those difficulties, forces you to be really careful about your track geometry.

Both of those changes are important in three ways.

- a heavy train leaving a station, when pulled by low-te locomotive will take its time. Maybe not much, but having a junction being occupied for two extra seconds does matter on heavily laden junctions
- an underpowered train climbing a hill that is just too steep can actually stall because once it drops below certain speed. Because low-TE makes it even more underpowered
- a low-TE train that is forced to stop on a signal might not be able to start its train even if it has plenty of power, and once again, stall.

In short – changes to tractive effort make steam engines much worse than diesels/electrics and lowering tractive effort on higher difficulties makes for, well, more difficult game.

6. What is wrong with USA vehicles?

A quick glance on its statistics will tell you that EG2 Big-Boy is 200 tonnes lighter and has 1/3rd of the historically accurate tractive effort. This is because up until the beginning XX century American railroads were evolving in lock-step with their European counterparts. But starting at about 1900 US roads started to invest in always more capable locomotives and freight cars. Currently in the US and Canada trains operate at 50% higher axle loads than in Europe.

In human terms – this means that US vehicles are heavier and more capacious than European counterparts. If I kept this difference in, then US freight cars would be an obvious choice, because they can carry more, while US locomotives would be second choice, because they had worse weight/power ratios. To fix this, all vehicles are forced in the same statistical progression, which is Euro-centric. Which also makes the BB a bit less of a locomotive. But one that is also more useful.

5. Extended Track Types

EG2 has split the two track types of the base game into several speed-restricted types. From 40km/h up to 450km/h. As the game progresses a faster track type is introduced. The older one never disappears. Faster track is, obviously, more expensive to lay and maintain.

Each track is limited to 8% gradient (up from 7.5% in the base game) which is available in four 'ticks' – and each tick gives you 0%, 2%, 4%, 6%, 8% incline. This change allows to easily control track gradient when building as each 'tick' forces a specific gradient.

Minimum radius a track can be laid at is limited to the track's maximum speed. So – you can't force a 100km/h track to allow 50km/h curves. They are always 100km/h wide. This, along with very fine choice of speeds, allows for much greater control over speeds of bendy-mountain railroads. If you are extra dedicated, you can use this mechanic to lay proper transitional curves.

There is a way to side-step this limitation by using the track upgrade wand. If you upgrade twisty 50km/h track to a 450km/h one you will get 450km/h track. But with speed limits of 50km/h track and upkeep of 450km/h track. Be aware what you are doing.

6. Infrastructure Biased Balance

One thing that is in stark contrast between EG2 and base TpF2 is where costs of running a railroad are hidden. EG2 puts much more emphasis on infrastructure costs – especially tracks. You can expect up to half of the cost of your railroads to come from costs of fixed plant. In comparison trains are less expensive. This change was introduced to encourage aggressive re-use of infrastructure instead of running separate line to each destination. The less track you lay, the more profit there will be.

7. Other minor changes

EG2, just like its predecessor, has done other minor changes. Among these are:

- loans are updated every game year. Essentially – when starting at 1850 you get 10.000.000\$ loan. Then you can take an extra 1.000.000\$ every year to get you going.
- vehicles with center coupling (either SA3 or Janney) have been moved close together, so their couplers actually, well couple.
- Baldwin Six Wheels locomotive has gotten its tender back.
- You will get a set of five locomotive models – D 1/3, Baldwin Six Wheels, Borsig, Class V and Class T regardless of your 'vehicles' choice. This is to aid with the 1850+ period.
- Some freight cars were adjusted somewhat.
- Class 75 locomotive has gotten a proper icon, without the missing wheel.

3. Plans for the future

Apart from fixing problems, polishing issues and fixing bugs... the next order on my plan is more diversity when it comes to looks and composition of vehicles – expect each freight car to have 20, randomly chosen colors. I can exchange bogies, wheels, make size modifications and similar. Also – general trucking requires some attention.

4. Compatibility (script mods)

EG2 is widely compatible with many mods, however with some it might be at odds. Biggest candidates are mods with modify capacities of vehicles, add/remove cargo types or tracks. One of them is my own “Extended Trackage” mod. Compatibility with some of those mods might be brought into EG2. With most – you get to test it.

5. Adding/Removing from games

I strongly suggest to start a new game with EG2. However – adding EG2 is safe. Removing, once you start laying track and using vehicles – between disruptive to impossible. I also strongly suggest to load EG2 as the last mod in your mod list.

6. Change log

Version 1.3

- Balance - 'Massless' affix no longer spawns on locomotives
- Balance - Traxx, BR218 and Nohab are more spaced power-wise
- Balance - 'Heavy' affix - can now spawn on tankers
- Balance – Added a fictional freight steam locomotive to european vehicle set – loosely based on DRG BR 95 it is a 1'E1' tank engine using BR 75'4 as a base.
- Immersion, Balance - 'Heavy' affix makes vehicles bigger (physically) and more capacious
- Immersion – Fixed Heusinger/Walschearts valve gear animations on all vehicles it was broken
- Immersion – Readjusted the UP9000 locomotive – especially its tender, as it was all kinds of wrong – especially when it comes to truck and tender size.
- Immersion – added some particle effects to select steam locomotives

Version 1.2

- Fixed the base game's issue with european gondola from the year 1900 having a very low floor level.
- The 6-axle gondolas are now bigger and more spacious, to make them more visible and distinct.

Version 1.1

- fixed double deck passenger cars not getting proper capacity boost
- fixed BC4 passenger car not being low enough
- fixed some coupling space issues
- adjusted initial (1850-1875) game balance

Version 1.0 – Initial Release

7. Contact

EG2 is comprised of almost 200kb of LUA code at the client side and another 200kb in scripts that I use to create it. There are bugs in it. If you find any contact me. Likewise – if you have suggestions. I can be found at: uzurpatorex@gmail.com or as uzurpatorex on steam