The French Trains Set

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The French Rails Set

The Narrow Gauge Railways

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0. Overview

0.1. The Set itself

The Narrow Gauge French Set is a trainset developed for OpenTTD. It features meter-gauge trains from the most prominent railway networks of the country, and intends to provide a cheap alternative to standard gauge rail transport over short to medium distances across various geographical conditions (from flat land to mountainous areas).
It is designed to fit best with the forthcoming French Set (currently under development), which will include the most important rolling stock from SNCF and other companies that historically operate, or operated in the past, across France.

This Set models the actual development of French secondary railway. It provides vehicles from 1880 to the present day, with the widest range being concentrated between 1910 and 1940, the years when secondary networks thrived.

0.2. System requirements

The OpenTTD version requires the most recent trunk version of OpenTTD (r23771 or above), or OpenTTD 1.2.0-beta1.
For the push-pull feature to work correctly, OpenTTD r24371 or above is required.

1. Getting started: narrow gauge railways in France

Before we get deeper into the Set's characteristics, it is useful to take a step back and outline a brief historical description of what the Set attempts to recreate. Those players who aren't interested in realism can safely skip this chapter altogether.

1.1. A cheaper way of transport

In the second half of the XIX century, the need to connect remote areas not reached by the existing railways was felt as an increasingly compelling issue. Narrow-gauge railways often provided the optimal solution: their lower cost and greater flexibility, made possible by a lighter axle weight and a narrower minimum curve radius, were their main advantages. In most cases, metric gauge was chosen.
Soon, more or less expanded networks of these lines started popping up a bit everywhere around the country. Some were rural lines, connecting small villages around flat of mildly hilly area; others were mountain lines, characterized by massive bridges and tunnels that little had to envy to those found on standard gauge main lines; others, instead, looked more like tramway lines, often running along the towns' main streets.
Each company had their own unique rolling stock, although a few standard locomotive designs began to spread across multiple railway networks. The vehicle types ranged from small tramway-like twincab steamers, cheap to run and easy to service, to the elegant Ten-Wheelers capable of running at high speeds across the plains, as well as the massive Mallet types that could pull heavy freight trains across winding mountain lines. A few mountain networks started experimenting electric traction, in some cases even earlier than standard gauge networks; to power those pioneering locomotives, third rail and catenary were tested, both with encouraging results. A few rackrail lines were also used when the steep would not allow simple adhesion locomotives to be effective.

1.2. The golden age

Around the turn of the century, this system was already consolidated and became crucial for the economy of the country. A few narrow gauge networks had become so large that they would encompass multiple regions, often with 500 km of track or even more, and would service important cities such as Lyon, Grenoble, and Nice. Some of them shared the same stations with the main standard gauge lines, and in a few cases double gauge was installed, so that both standard and narrow

gauge trains could share the same tracks.

As technology advanced, the first gasoline- and diesel-powered vehicles became available, slowly but steadily replacing steamers on the shortest, flattest rural lines, to cut running costs down. The first attempts looked very much like buses running on rails, soon to be replaced by larger units designed specifically for a railroading purpose. This gave those networks a real chance against the increasing automobile traffic. Those railcars, together with more modern diesel multiple units, were painted in bright liveries that replaced the dark colors typical of steamers and early coaches. Soon, steamers would be relegated to freight service only, which was important as well, to haul basic materials such as coal from the mines, fresh produces from the countryside to the cities, or fish from the seaports, the latter using special refrigerated wagons.

With the advent of tourism, the first *bains de mer* trains were seen on the coastal networks, hauling bathers to the beaches of the Atlantic and the Mediterranean in the summer.

1.3. The decline

The occupation of France and the war of Resistance fought during WW2 saw the railway playing an important role: narrow gauge networks were no exception to this rule. It was not infrequent that pieces of infrastructure, especially bridges, were damaged in war actions against the occupant; the rolling stock also suffered from damages or destructions. After the war, some networks were turned out to be in a very poor state and would have needed a thorough work of reconstruction, had the idea been to put them back in shape.

However, the always-rising automobile traffic made those railways appear not only redundant, but especially too costly to maintain. Passenger volume was sharply declining; the aging steamers needed to be replaced by new, more efficient engines; and even freight traffic, once very important, started to drop, affected by the competition of road trucks.

As a result, the Fifties and the Sixties saw the demise of many of those railways, which turned out to be not only unprofitable to run, but also outdated, like a remote vestige of a past that France, together with post-war Western Europe, wanted to soon put behind, driven as it was by the technological and social progress of those years. With few exceptions, narrow gauge networks closed down one by one, sometimes after a long series of closures limited to single branches. The tracks were removed and the station buildings were sold to the municipalities.

1.4. Exceptions and rebirth

Among the lines that escaped this fate were the Corsican one, which was the only railway network in the island; the few electric mountain lines, still profitable due to electric traction, and less affected by road traffic competition because of their geographical locations; and a handful of networks scattered here and there across the country, where modern, cheaper railcars helped keeping costs down to a minimum. A few new diesel multiple units were designed and built for those networks across the years. In the present days, those networks are still active, and haul passengers in regular service, using trains that share many technological solutions with their standard gauge siblings.

Most of the original rolling stock was demolished or sold abroad as soon as the various networks were closed. However, a small number of old locomotives went through the years more or less unscathed, and is now being used as a touristic attraction on the few surviving metric-gauge networks. This makes it still possible to experience a faint glimmer of the atmosphere coming from the roaring years of narrow gauge railroading in the country.

2. The contents of the Set

2.0. Two modes of play

To avoid overcrowding the in-game purchase list, the Set can be played in two flavors, each giving a slightly different gaming experience:

- *Basic*, featuring most of the historical companies with a good representation of their rolling stock. It will provide a variety of vehicles, ranging among cheap, fast, and powerful.
- *Alpine*, giving a narrower selection of vehicles from companies operating on mountainous areas, mostly around the Alps. The focus is on power and tractive effort rather than speed; like in reality, early electrification will be a key to negotiate steep grades. This is the only game mode that gives access to rackrail trains and tracks.

By default, the *Basic* mode is active in Temperate climates, and *Alpine* is active in Arctic climates. The player, however, is free to override this and choose the combination they prefer (the Set is not compatible with Tropic or Toyland climates).

For those players who don't care about historical correctness, or think of realism itself as a BAD FEATURE, there is the *Toy* mode.
When this mode is selected, the Set disregards all references to historical railway companies, greatly simplifies the purchase list by dropping most of the available vehicles, paints all vehicles in company colors (also known as "2cc"), and ignores all remaining realism-oriented features such as constraints on vehicle coupling, braking force, axle weight, push-pull effects, and many more.

It is strongly discouraged to change the set mode while a game is in progress.

2.1. Featured historical companies

The Set models a selection of the countless metric-gauge networks scattered around the country. For each network, a number of representative vehicles is available, ranging from locomotives and railcars to coaches and wagons.

The list of chosen companies can be found in the summary table below; their geographic location is highlighted on the map.
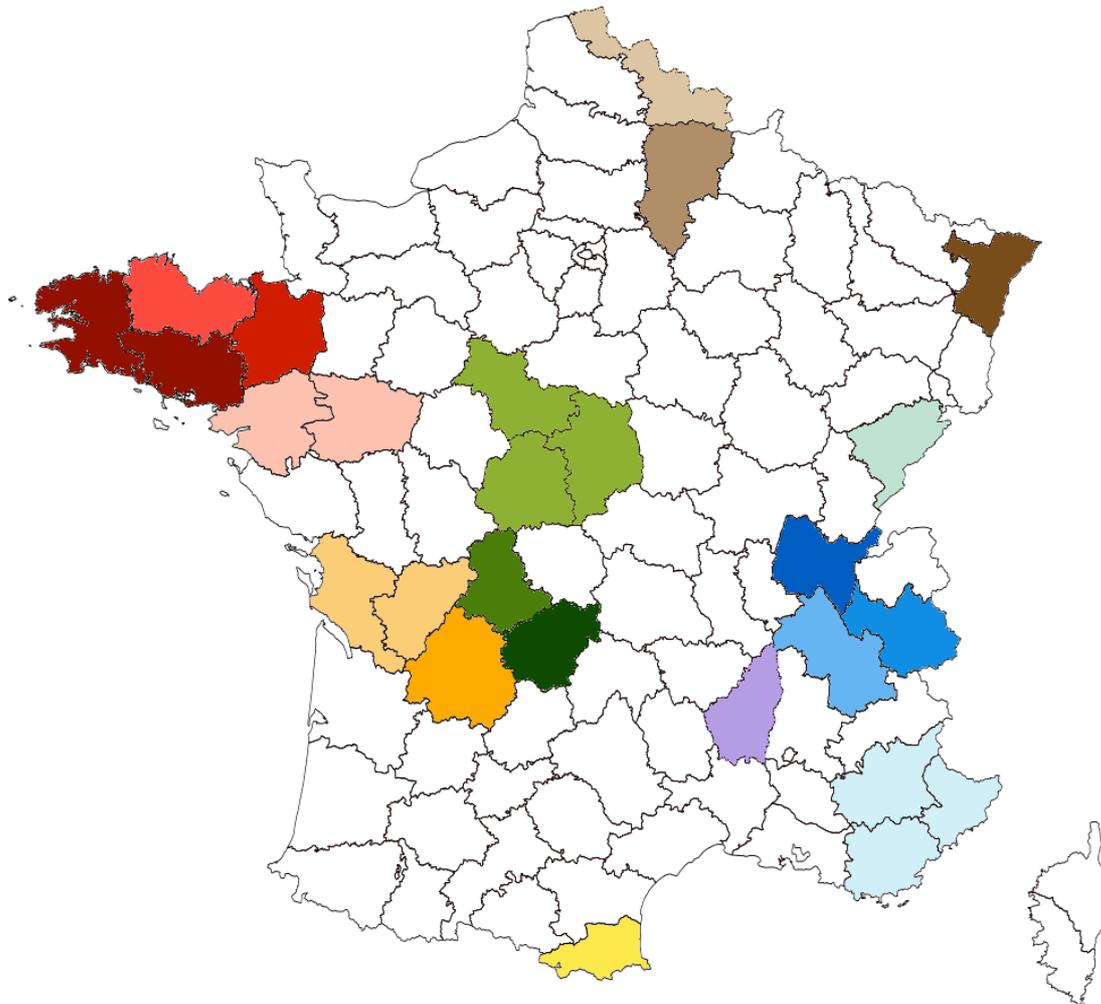
Departments			Company name	Loc	Main hub	km	Opened	Closed	Distinctive rolling stock	B	A
			Alsace-Lorraine	NE	Strasbourg	80	1883	1938	Early mountain steamers	X	
			CF du Cambrésis	NE	Cambrai	120	1880	1960	Large late steamers	X	
			CF de Guise-Hirson	NE	Guise	39	1910	1919	Powerful mountain steamers	X	
			Réseau Breton	NO	Carhaix	426	1891	1967	Early fast steamers	X	
			Tramways d'Ille-et-Vilaine	NO	Rennes	510	1897	1950	Small steamers	X	
			CF des Côtes du Nord	NO	Saint-Brieuc	452	1905	1956	Small steamers, early railcars	X	
			Petit-Anjou	NO	Nantes	317	1893	1948	Small steamers, early railcars	X	
			PO-Corrèze	CE	Tulle	95	1904	1969	Mountain steamers, large diesels	X	
			Tramways de Corrèze	CE	Tulle	177	1904	1960	Small steamers	X	
			CF Dépt. Haute Vienne	CE	Limoges	345	1908	1949	Early electric railcars	X	
			CF du Blanc à Argent	CE	Romorantin	191	1901	-	Small steamers, modern railcars	X	
			CF du Doubs	CE	Besançon	89	1910	1945	Early railbuses	X	
			Réseau du Vivarais	SE	Lamastre	201	1890	1968	Mountain steamers, early railbuses	X	X
			Tramways de l'Ain (*)	SE	Bourg-en-Bresse	485	1897	1954	Small steamers, early electrics	X	
			St-Gervais - Vallorcine	SE	St-Gervais	37	1905	-	Early and modern mountain MUs	X	X
			CF du Montenvers	SE	Chamonix	5	1909	-	Rackrail steamers and railcars		X
			Tramways du Mont-Blanc	SE	Chamonix	12	1913	-	Rackrail railcars		X
			Tramways de l'Isère (**)	SE	Lyon	153	1897	1964	Small twincab steamers	X	X
			CF de la Mure	SE	La Mure	67	1888	2010	Mountain steamers and electrics	X	X
			CF Économiques du Nord	SE	Annemasse	50	1982	1959	Early mountain electrics		X
			CF de la Provence (***)	SE	Nice, Toulon	879	1876	-	Fast steamers and railcars	X	
			Tways des Alpes Maritimes	SE	Cagnes-sur-mer	149	1906	1935	Early electric railcars	X	X
			Réseau de la Dordogne	SO	Périgueux	159	1911	1949	Early railbuses	X	
			CF Économ. des Charentes	SO	Angoulème	755	1898	1948	Small steamers, early railbuses	X	
			Ligne de Cerdagne	SO	Villefrance-de-Co	62	1910	-	Early and modern mountain EMUs	X	X
Corsica			CF Corses	CO	Ajaccio	360	1888	-	Mountain steamers, modern railcars	X	

Last two columns: "B" : Company available in "Basic" mode; "A" : Company available in "Alpine" mode

(*) Known as CF Économiques du Sud-Est before 1920
(**) Became Tramways de l'Ouest du Dauphiné in 1921, and Voies Ferrées du Dauphiné in 1938.
(***) Known as CF du Sud de la France before 1925.

The historical companies recreated by the Set are the following, divided by regions:

The North-West

- With its 426 km of track, the *Réseau Breton* was one of the largest metric-gauge networks in the country. It was opened in 1891 and its fast locomotives hauling long, bogie-mounted carriages over flat and mildly hilly areas were unique to this network. It also operated a profitable freight service. On the map, it operated in the four departments highlighted in red (all shades: light, medium and dark). It closed down in 1967.
- The *Côtes du Nord* network was about as large as the Réseau Breton, but opened later (in 1905). It's named after the department it's active in, marked in pale red on the map. Its trains, together with the Réseau Breton's, were among the first to carry tourists to the seaside towns across Brittany. The Côtes du Nord network closed down in 1956.
- The *Petit Anjou*, a somewhat smaller network, opened in 1893 and closed in 1948. It operated in the Loire-Atlantique and Marne-et-Loire departments (pale pink area).
- The *Tramways d'Ille-et-Vilaine* was another local network; from its main hub of Rennes, it operated in the department of the same name (mid red area). It opened in 1897 and was closed down in 1948. At the time of its maximum expansion, it reached 510 km of track.

The Center

- The *Blanc-Argent* network, active in the departments of Indre, Cher and Loir-et-Cher (olive green area on the map). The first branch was opened in 1901, and one small branch survives until our days. This network was among the first to receive modern, fast diesel railcars in 1950, derived from standard gauge-derived technology.
- The *Paris-Orléans* (PO) company, known for its nationwide standard gauge network, also operated a small narrow gauge network, called *Chemins de fer de Corrèze*, or simply *PO-Corrèze*, between 1904 and 1969. Its characteristic engines were the 020-020T "Mallet" used to haul any type of cargo. It was located in the Corrèze area (dark green on the map).
- Located in the same region, the *Tramways de la Corrèze* also opened in 1904, as a more local-focused railway network. It eventually fell under control of the PO-Corrèze.
- Boasing its 345 km of rails, the *Chemins de Fer Départementaux de la Haute-Vienne* was by far the longest electrified local network in the country. It linked the city of Limoges to its surroundings, servicing a large number of towns in the department of the same name (medium green in the map). Damaged during WW2, it closed down shortly after, in 1949.
- The *Chemins de fer du Doubs* ran a small local network around the city of Besançon, in the department of the same name (mint green in the map). It opened in 1910 and became famous as one of the first to adopt diesel railbuses, some of which adopted a characteristic livery in two tones of blue. It closed down in 1945.

The North-East

- First opened in 1881, the *Chemins de fer du Cambrésis* was one of the first local tramway-like network in the country. It was active in the *Nord* and *Aisne* departments (light and medium brown areas on the map). Although its size was only moderate (120 km of rails), it was one of the very few to receive large post-WW2 steamers. Its last branch was closed down in 1960.
- The *Elsass-Lothringen* network (renamed Alsace-Lorraine after WW1, when the two regions returned to France) was one of the main standard gauge networks in the country. However, it also exploited a small narrow gauge section, with rather interesting steamers. It operated in Alsace (dark grey area on the map).
- The *Guise-Hirson* line was a small branch operated in the *Aisne* department (medium brown area on the map), operated by another large standard gauge company: the *Compagnie du Nord*. Only 39 km long, the type of locomotives it operated made it nevertheless interesting: among others, it used two powerful 150T steamers. Opened in 1910 and destroyed shortly after, during WW1, it was rebuilt using standard gauge and eventually closed down in 1978.

The South-East

- The *Réseau du Vivarais* is another rather large network operating in southern France. It was opened in 1891 and, due to the winding, steep nature of its track, featured mostly Mallet engines. Some of them were the mighty Swiss-made 030-030T specifically designed to handle steep lines. Closed down in 1968, a small part of it was shortly reopened as a touristic line, named *Chemins de Fer du Vivarais*. It's located in Ardèche (marked with purple on the map).
- The *Tramways de l'Ain*, known as *CF Écoomiques du Sud-Est* before 1920, was based in Bourg-en-Bresse. Its 485 km of track reached many locations within the department of the same name (dark blue area). Opened in 1897, it electrified some of its lines in the late 1920s, and adopted rolling stock similar to what one could find in nearby Switzerland. It closed its lines down in 1954.
- The *Tramways de l'Isère*, known as *Tramways de l'Ouest du Dauphiné* after 1920, was another local network, based in Lyon, and active in the department of the same name (light blue area). It opened in 1897; its typical early twincab steamers manufactured by Pinguély contributed to make it unique. The network closed down in 1964.
- The *Chemins de fer de Provence* is another railway company that's active today. It used to have a very large network, with its 879 km in 1910, of which only a small part survives now. It featured innovative railcars from the mid 1930's. Today, it boasts the most modern narrow gauge rolling stock across the country. It's active in the Alpes-Maritimes, Var, and Alpes-et-Haute-Provence departments (sky blue area on the map).
- The *Chemins de fer de La Mure*, also called SGLM, was a mountain railroad constructed to haul coal from the southeastern mines on the Alps. It opened in 1888, with steamers specifically designed for mountain lines, and was electrified in 1906. It was converted n 1997 to a touristic railroad, operating until 2010, when an avalanche damaged a part of the track. Some of its electric engines had been in use for about 80 years. It's located in the Isère department (light blue area on the map).
- The *Paris-Lyon-Méditerranée* (PLM), one of the largest players in France, built in 1901 a steep mountain line to connect a few towns around the Mont-Blanc region. The initial rolling stock featured third-rail powered EMUs where all the wagons lied on powered trucks, to increase tractive effort. The line is still active today, exploited with modern rolling stock. It's located in the Haute-Savoie department (mid-level blue color), and reaches the Swiss town of Martigny.
- The *Chemins de Fer du Montenvers*, and the *Tramway du Mont-Blanc*, were two of the most representative rackrail networks built in the country. They opened in 1909 and 1913 respectively, and are still active today. Their initial rolling stock, featuring steamers powering two "fake axles" to which the gears were attached, were replaced in the 1950s by electric railcars, also rackrail-powered. Both companies are in Haute-Savoie.
- Also in Haute-Savoie, the *Chemins de fer Économiques du Nord* had a 50-km line linking the town of Annemasse, close to the Swiss border, to the town of Sixt; the line opened in 1892 and was electrified in 1933 with catenary. It featured unique rolling stock, including an interesting EMU design. It closed down in 1959.

The South-West

- The *Compagnie du Midi*, another major railroad player known for its standard gauge lines, opened in 1910 an interesting mountain line: the *Ligne de Cerdagne*. Equipped with third rail since the beginning, it uses yellow-painted EMUs that earned the name of "little yellow train" or "canary". The original rolling stock is still in use, although rebuilt. The network is located in the Pyrénées-Orientales department (yellow area on the map).
- The *Chemins de fer Économiques des Charentes* ran a very extensive network, measuring 755 km, in the *Charente* and *Charente-Maritime* departments (marked in pale orange on the map), including short lines on the small islands of *Ré* and *Oléron*. It was among the first networks to utilize the then-innovative small Billard railbuses. The network closed down in 1948.
- A metric-gauge network was also started in the *Dordogne* region in 1888 (marked as deep orange on the map). Among other things, it was an early adopter of the Billard railbuses, in their unique sky blue livery. The network disappeared in 1949.

Corsica

- Corsica has a fully metric gauge railroad still connecting its major cities, called the *Chemins de fer Corses*. Its first branch was opened in 1888. Part of the lines was damaged during WW2 and never rebuilt, but the remaining section is still active today. Railcars were used to haul passengers since the Thirties; until the mid '90's it also had an important freight traffic.

2.2. The rolling stock: powered vehicles

Diversity was the rule across the different French narrow gauge networks. Each of them bought specific rolling stock to suit their needs in terms of traffic and characteristics of the track, resulting in a somewhat heterogeneous mix of locomotives, railcars and wagons. This trainset recreates the main types of vehicles used, differentiating them across the real companies that owned them.

2.2.1. The steamers

030T Tramway	
Light steam locomotive	
Available from	1881
Available until	1922
Speed (km/h)	35
Power (hp)	125
TE (kN)	35
Axle weight (t)	5.5
Modes	B A T

A generic model of the many tramway-like engines used in the early years all across the country. Trains pulled by such engines were usually short and often ran on tracks laid directly on the main streets of villages and towns. In the Set, this loco can pull tramway-style 2-axle coaches and light freight wagons.

030T	
Light steam locomotive	
Available from	1881
Improved in	(1922)
Available until	1930 (1950)
Speed (km/h)	40 (45)
Power (hp)	220 (360)
TE (kN)	38 (54)
Axle weight (t)	7.5 (9.5)
Modes	B A T

This was by far the most common locomotive type to be seen on French narrow gauge networks. Numerous manufacturers all across the country built engines of this type, and production went on for about 50 years, adopting many technological improvements as time went by. To reflect this, a second generation is introduced in 1922 as a separate engine ID, with increased top speed, power, and tractive effort. Both generations are available in the colors of 9 local companies; in the game, the engine will adapt its looks and specs to the historical company it's refitted to. For example, the *Tramways de l'Isère*'s variant features the typical twincab look until 1915.

It is also possible to configure the earlier generation of this locomotive as a "shunting" engine, allowing it to tow any consist regardless of livery, but at a greatly reduced speed.

In the Alpine set mode, this engine is only available in the colors of the *Tramways de l'Isère*.

The earlier generation of this engine is also featured in the *Toy* set mode, using "2cc" company colors.

031T	
Universal steam locomotive	
Available from	1888
Available until	1935
Speed (km/h)	45
Power (hp)	260
TE (kN)	49
Axle weight (t)	7.5
Modes	B A T

This engine type was developed to address the need for slightly better performances than the 030T's could give. It was essentially a 030T with a longer firebox, requiring an extra rear axle to support the additional weight. This particular model, only available in the Basic set mode, is inspired by the variant used on the flat lines of the *Réseau Breton* as well as on the eastern section of the Corsican network. With a slightly higher max speed and tractive effort than the earlier 030T, it's a good choice to haul relatively long passenger consists in the earlier part of the game.

031T	
Mountain steam locomotive	
Available from	1886
Available until	1932
Speed (km/h)	40
Power (hp)	280
TE (kN)	63
Axle weight (t)	10
Modes	B A T

Before electrification became feasible, early mountain networks required some compact-sized yet powerful steamers to pull their consists up their steep lines. In Alpine mode of the Set, this role is filled by a specific variant of 031T, built by Fives-Lille for the *La Mure* mountain railway: with its stronger power and remarkable tractive effort, it's going to be able to negotiate steeps up to a certain degree while maintaining an acceptable speed. On the other hand, its greater weight means it requires slightly heavier rails to run at full speed. Historically, this locomotive type almost always traveled "flipped", that is, as a cab-forward engine, due to the steep lines it was used on: traveling like this helped the water distribute more uniformly in the boiler.

121T	
Fast steam locomotive	
Available from	1889
Available until	1931
Speed (km/h)	50
Power (hp)	170
TE (kN)	58
Axle weight (t)	9
Modes	B A T

When the *Chemins de Fer du Sud de la France* (later known as *Chemins de fer de la Provence*) opened its main line along the Mediterranean coast, it ordered a batch of 6 fast locomotives to pull its passenger trains around the seaside town of St-Raphaël. These engines were so advanced and well designed, that one of them was displayed at the 1889 Expo in Paris; nevertheless, no other network ordered any

additional units of this design. Because of their greater maximum axle weight, these locomotives couldn't run at full speed on the lightest, earliest tracks.
The Set includes the 121T in the *Basic* mode only.

130T			
Universal steam locomotive			
Available from	1890		
Available until	1935		
Speed (km/h)	45		
Power (hp)	260		
TE (kN)	40		
Axle weight (t)	7.5		
Modes	B	A	T

In the quest for slightly better performance than the basic 030T, a variant of the Corsican 031T was developed: the idea was to move the supporting axle to the front of the engine, in order to gain stability around the sharp curves typical of mountain lines. The early *Vivarais* network was a notable user of this locomotive type, alongside Corsica itself. In the Set, the 130T is only available in the Alpine mode, and only in the *Vivarais* livery.

030			
Freight steam locomotive			
Available from	1888		
Available until	1930		
Speed (km/h)	45		
Power (hp)	270		
TE (kN)	45		
Axle weight (t)	8		
Modes	B	A	T

When it connected Nice to the inland town of Meyrargues, the *Chemins de Fer du Sud de la France* looked for a locomotive type that would be strong enough to negotiate the winding track on that hilly region, and could operate over a long range. These specific requirements led the company to opt for a tender locomotive, a rather unusual choice for a local network operating metric-gauge lines. These small Bourbonnais-type engines pulled freight trains mostly, but could occasionally be found at the head of passenger consists. They were heavily employed until the arrival of the more modern Mallets and the fast 230Ts. The Set includes this engine in the Basic mode only.

120T			
Fast steam locomotive			
Available from	1892		
Available until	1934		
Speed (km/h)	55		
Power (hp)	205		
TE (kN)	26		
Axle weight (t)	7.5		
Modes	B	A	T

This was a common engine type to be found on somewhat flat networks, where large amounts of power and traction were not needed. Although unable to negotiate steep slopes, this locomotive can

pull a few passenger coaches on a flat track at higher speeds than any other narrow gauge engine of its time. It's available in the Set in the *Réseau Breton* and *Chemins de Fer de Corrèze* liveries.

021T	
Rackrail steam locomotive	
Available from	1892
Available until	1955
Speed (km/h)	25
Power (hp)	250
TE (kN)	29 (216 rr)
Axle weight (t)	8
Modes	B A T

At the turn of the century, new mountain lines were being opened to service many towns and villages across the Alpine region. Due to the limitations imposed by the technology of the time, the best solution to get past steep grades was often to equip a narrow-gauge railway with a rack. Specific locomotives such as this one were fitted with one or more fake axles sending the power to pinions, which would engage on the rack and drive the train upwards. Such a system guaranteed a very strong tractive effort; however, due to the limited resistance of the materials used, the maximum speeds reachable when driving on such rackrail tracks were extremely limited.

The Set includes the engine used on the *Chemins de Fer du Montenvers*, which featured two fake axles powering one pinion each for rackrail traction. On normal tracks, only one axle was powered, hence the very low tractive effort when the rack is absent.

Its in-game max speed of 25 km/h is much greater than in reality, and has been chosen purely for gameplay reasons.

This engine is only available in the Alpine set mode, and can only pull a limited number of coaches. If used in combination with its driving trailer, this engine supports push-pull mode.

020 020T	
Universal steam locomotive	
Available from	1895
Available until	1940
Speed (km/h)	40
Power (hp)	370
TE (kN)	71
Axle weight (t)	11
Modes	B A T

The earliest narrow gauge Mallet engines were developed in the early 1890s to deal with steep and winding tracks. Their rear set of drivers was fixed to the chassis, while the front set was free to swing sideways by a small extent; this system allowed the locomotive to develop superior power while still being able to negotiate the tight curve radius of a mountain track.

Due to its higher weight and limited number of axles, this locomotive is one of the first that won't run at full speed on the cheapest tracks.

In the Set, this type of locomotive belongs to the Basic set mode and is available in the liveries of the four railway companies that owned them; the Corsican, *Corrèze*, Brittany, and *Tramways d'Ille-et-Vilaine* networks.
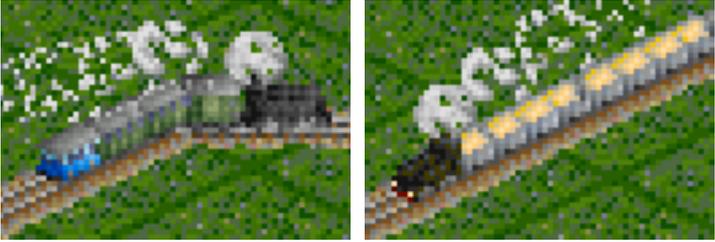
020 020T	
Universal steam locomotive	
Available from	1890
Available until	1930
Speed (km/h)	40
Power (hp)	250
TE (kN)	55
Axle weight (t)	8
Modes	B A T

With its winding tracks, the *Vivarais* network was one of the first to order a Mallet type engine. As a forerunner of what would turn out to be a quite widespread system, this engine was still quite underpowered, but ended up being used on steep tracks with moderate success, until the arrival of larger, more modern locomotives built using the same system. In the Set, this model is available in the Alpine set mode only, replacing the other variant mentioned above.

030 030T	
Mountain steam locomotive	
Available from	1903
Available until	1952
Speed (km/h)	40
Power (hp)	590
TE (kN)	95
Axle weight (t)	8
Modes	B A T
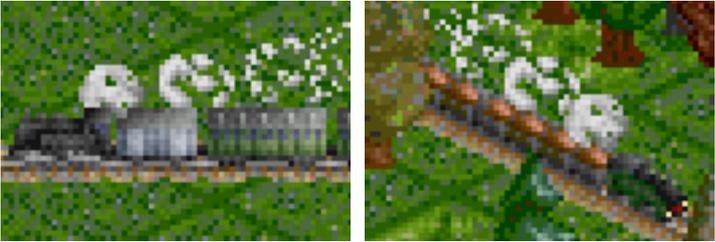
Basically an enlarged version of the earlier Mallets, these engines were among the largest narrow gauge steamers ever built in Europe. The *Vivarais* network initially placed an order for four units to the Swiss manufacturer SLM; about 30 years later, it bought another batch of similar locomotives, this time built by SACM in Belfort. The *Réseau Breton* also had a batch of similar locomotives, used to pull heavy freight trains. Each of these three variants is modeled in the Set.

This engine is available both in the Basic and Alpine set modes (the latter limited to the *Vivarais* variant); it's also available, in the "2cc" company colors, in the Toy set mode.

040T (T37)	
Freight steam locomotive	
Available from	1903
Available until	1937
Speed (km/h)	40
Power (hp)	310
TE (kN)	60
Axle weight (t)	8
Modes	B A T

The *Elsass-Lothringen* company, under German rule until WW1, ordered twelve small yet powerful steamers to pull mostly freight trains around the hilly region of Alsace. The specific model was named "T37" by the network. Quite a unique engine type, it ended up being the only narrow gauge steamer to enter the SNCF classification after the nationalization of railway networks in 1938. It's a somewhat slow, but powerful and cheap choice when a bit of extra power is needed. In the Set, it's available in

the typical Prussian olive green livery of the EL until 1918; after that date, to match the region's return under French rule, this engine switches to the black *Alsace-Lorraine* livery.

230T	
Fast steam locomotive	
Available from	1904
Available until	1950
Speed (km/h)	55
Power (hp)	325
TE (kN)	62
Axle weight (t)	10
Modes	B A T

Together with the 120T, this design gave birth to the fastest narrow gauge steamers built in the country. Locomotives of this type were ordered by the *Réseau Breton* and the *Chemins de fer du Sud de la France* (the forerunner of the *Provence* network), and used to pull bogie-mounted passenger coaches around the seaside towns of Brittany and Côte-d'Azur, respectively. They were especially used to carry tourists and bathers to the seaside resorts. In the Set, the 230T is available in the Basic mode, as well as the Toy set mode, the latter featuring "2cc" company colors.

150T	
Freight steam locomotive	
Available from	1911
Available until	1938
Speed (km/h)	40
Power (hp)	610
TE (kN)	90
Axle weight (t)	10
Modes	B A T

An impressively large steamer for narrow gauge railways, this steamer was ordered by the *Compagnie du Nord* for its short *Guise-Hirson* line, close to the Belgian border. It can be an alternative to Mallets where a slightly higher tractive effort is needed. In the Set, this engine only appears in the Basic mode.

040T	
Freight steam locomotive	
Available from	1922
Available until	1955
Speed (km/h)	40
Power (hp)	390
TE (kN)	79
Axle weight (t)	8
Modes	B A T

Light freight service was an important source of income for many metric-gauge networks. To address this need, new small yet powerful locomotives were introduced, featuring four driving axles to minimize axle weight. Many were delivered to private industrial networks linked to mines or factories. However, a batch of those engines was also ordered by *Tramways d'Ille-et-Vilaine* to replace their aging, underpowered Mallets on freight operations. Elsewhere, such small engines came in handy to

negotiate steep hills while keeping costs down: as a result, the *Tramways de l'Ouest du Dauphiné* bought a few of them. In the Set, this vehicle can also be configured as a "shunting" engine.

The 040T is available in Basic as well as Alpine set modes, the latter restricted to the *Dauphiné* livery. It is also available in "2cc" company colors in the Toy set mode.

141T				
Universal steam locomotive				
Available from	1948			
Available until	1962			
Speed (km/h)	50			
Power (hp)	450			
TE (kN)	80			
Axle weight (t)	7.5			
Modes	B	A	T	

As most of the French narrow gauge networks were switching to diesel traction, a few large, late steamers were still being designed for the colonies' networks. Some of these never left the country and were used as an alternative to modern railcars or diesel shunters.

2.2.2. The diesel locomotives

"X" type				
Diesel shunter				
Available from	1936			
Available until	1976			
Speed (km/h)	45			
Power (hp)	180			
TE (kN)	45			
Axle weight (t)	6			
Modes	B	A	T	
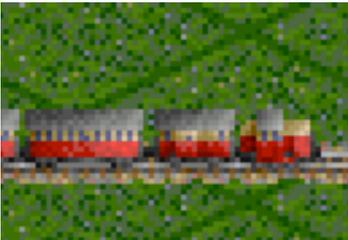
In the late Thirties, many narrow gauge networks had already switched to diesel traction for their passenger service, adopting railbuses and railcars. It didn't take long to apply the same concept to freight trains. As many aging steamers were being demolished, a common practice between the late Thirties and the early Sixties was to reuse their chassis to construct shunters: boiler, firebox, cylinders and rods were replaced by small diesel (or sometimes gasoline) engines and mechanical transmissions. This cheap, ingenious solution turned out to be popular, and new shunters kept being built well after WW2 across the whole country.

B&L "LT" type				
Diesel shunter				
Available from	1937			
Available until	1970			
Speed (km/h)	50			
Power (hp)	240			
TE (kN)	65			
Axle weight (t)	8			
Modes	B	A	T	

The Brissonneau-Lotz company was well known as a pioneer of diesel-electric traction. When railway companies decided to turn their retired steamers into diesel shunters, they sometimes chose this

technology. This resulted in engines that were more refined, efficient and powerful than the cheaper mechanical transmission alternative. The higher initial cost, however, made this solution less popular.

B&L "ZT" powered van	
Diesel locomotive	
Available from	1938
Available until	1962
Speed (km/h)	55
Power (hp)	300
TE (kN)	74
Axle weight (t)	7
Modes	B A T
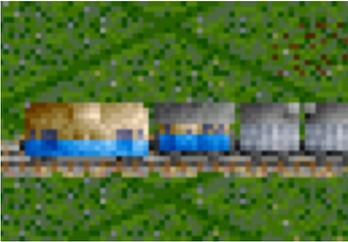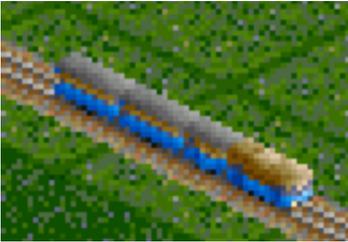
Impressed by how successfully its early railcars had taken over its passenger service, the *Chemins de fer de Provence* decided to go the same route for its freight traffic: they placed an order for a few locomotives to the same constructor they bought their railcars from. These engines were used on the coastal line around the city of St-Raphaël until it got closed down.

B&L BB600cv	
Diesel locomotive	
Available from	1951
Available until	-
Speed (km/h)	60
Power (hp)	600
TE (kN)	132
Axle weight (t)	11
Modes	B A T
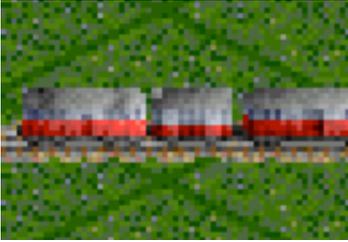
The first truly powerful diesel locomotive on narrow gauge lines, a few units of this engine type were built in the early Fifties for the largest surviving networks. They featured the dependable diesel-electric transmission type their builder, Brissonneau-Lotz, was well known for. They were employed or both passenger and freight traffic, and a few units are still running today.

The Set includes this vehicle in the Basic and Alpine set modes; the former includes liveries for the Provence and Corsican networks, while the latter has it in the *Voies Ferrées du Dauphiné* livery. It is also available in the Toy set mode, sporting a "2cc" company color livery.

In the Basic set mode, when built after 2005 and used in combination with a driving trailer of the same era, this locomotive supports push-pull.

CFD BB400		
Diesel locomotive		
Available from	1963	
Improved in		(1994)
Available until	-	
Speed (km/h)	50	
Power (hp)	414	(600)
TE (kN)	94	(147)
Axle weight (t)	8	(13)
Modes	B A T	

In the early Sixties, the workshops of *Chemins des fer Départementaux* designed an all-purpose diesel engine that could be cheap enough to keep medium-to-low-traffic lines profitable, light enough to run on the oldest, lightest tracks, yet strong enough to replace steam traction on steep lines. Additionally, it

could run on either standard or narrow gauge tracks by simply replacing the trucks. This engine type would soon become the Corsican railways' workhorse and, with a few enhancements, is still in production today.

It came with two types of motors; a basic, 400hp one, and a more powerful one, producing 600hp. The latter is available in the Set in 1994, as a separate variant of this locomotive.

The earlier generation of this vehicle is available with the liveries of the Corsican, *PO-Corrèze*, and *Provence* railway networks for the Basic set mode; it is also available in the Alpine set mode, as a *Vivarais* engine. The later generation is only available in the Basic set as a Corsican engine. The Toy set mode also includes this engine, in "2cc" colors.

HGm 2/3	
Rackrail diesel locomotive	
Available from	1967
Available until	-
Speed (km/h)	30
Power (hp)	650
TE (kN)	45 (250 rr)
Axle weight (t)	9
Modes	B A T

As the early rackrail steamers began to age, the need for a replacement arose on those lines that kept the rack system. Alongside modern electric railcars, a few companies ordered some small diesel shunters equipped with a pinion, to be used on rack lines. An example of this was the Swiss-built engine used on the Chemins de fer du Montenvers, used to haul passenger trains during the peak season, and even some occasional freight trains. In the Set, this engine is only available in the Alpine set mode. When used in combination with the driving trailer, this locomotive supports push-pull.

CFL 150	
Diesel shunter	
Available from	1973
Available until	-
Speed (km/h)	50
Power (hp)	250
TE (kN)	47
Axle weight (t)	8
Modes	B A T

Eventually, the small, early diesel shunters built on the retired steamers' chassis started to age in their turn, and a modern replacement was needed for those light, mostly industrial lines where the traffic was not heavy enough to justify the power and costs of the large Brissonneau-Lotz or CFD diesels. This small German-built model, very widespread and available in many sizes of narrow gauges, helped keep those low-traffic lines still profitable while, at the same time, improving reliability and exhibiting a more modern look.

This engine is available both in the Basic and Alpine set modes. It is also present in the Toy set mode, featuring a company-colored livery (in one color only).

2.2.3. The electric locomotives

Thury			
Electric locomotive			
Available from	1903		
Available until	1940		
Speed (km/h)	35		
Power (hp)	500		
TE (kN)	100		
Axle weight (t)	13		
Modes	B	A	T
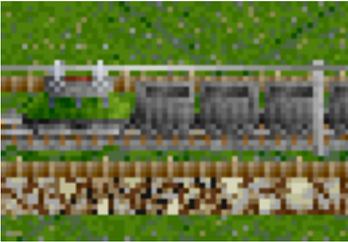
These revolutionary "Bo-Bo" engines were developed with the goal of replacing steam traction on the *La Mure* mountain line, where they would be used to haul long, heavy coal trains. They were one of the very first applications of electric traction on railway transport, at a time when the main railway companies were yet to conduct their preliminary feasibility tests. These engines' high cost and low maximum speed were more than offset by their power, dependability and durability.

In the Set, this engine is available both in Basic and Alpine set modes, opening up possibilities for an early electrification. It is also available in the Toy set mode, sporting one company color.

Sécheron			
Electric locomotive			
Available from	1932		
Available until	-		
Speed (km/h)	40		
Power (hp)	920		
TE (kN)	177		
Axle weight (t)	15		
Modes	B	A	T
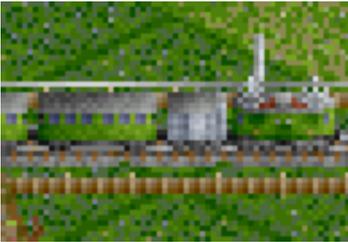
With their massive power, these engines were stronger than any other narrow gauge locomotive of the time (and later). They were designed to replace the *La Mure* line's first batch of engines; their excellence in performing this task is proven by the fact that most units have been active for more than 80 years. They were first used to haul heavy coal trains until the closure of freight traffic on the network, and ended their career at the head of touristic trains.

The Set includes these engines both in the Basic and Alpine set modes, as well as the Toy set mode, where it's available with a one-company-color livery.

Jeumont			
Electric locomotive			
Available from	1928		
Available until	1960		
Speed (km/h)	50		
Power (hp)	240		
TE (kN)	85		
Axle weight (t)	8		
Modes	B	A	T

Its geographic location, very close to Switzerland, probably inspired the *Tramways de l'Ain* network to electrify some of its lines. The choice of system fell upon 10kV 25Hz alternate current, already being

used across the border, and considered as state of the art in the late 1920s. A bunch of electric locomotives were ordered for mixed trains, which remained in service for about 25 years, until the closure of their lines. This vehicle is only available in the Basic set mode.

Alsthom-Buire van	
Electric locomotive	
Available from	1933
Available until	1958
Speed (km/h)	50
Power (hp)	400
TE (kN)	65
Axle weight (t)	8
Modes	B A T

When the *Chemins de fer Économiques du Nord* electrified their tracks between Annemasse and Sixt, located in the Alpine region bordering with Switzerland, much attention was paid to which types of new rolling stock would be purchased. The choice fell on the technology proposed by Alsthom; it consisted in a 400-hp electric engine, used to power a new type of railcars (also included in the Set) and this small freight locomotive, equipped with a mail compartment. This design, however, failed to become widespread, due to the small number of lines it could run on; as a result, only two units were finally built. In the Set, this locomotive is available in the Alpine mode.

2.2.4. The diesel railbuses and railcars

Turgan-Foy	
Diesel railbus	
Available from	1903
Available until	1930
Speed (km/h)	30
Power (hp)	20
Axle weight (t)	2
Capacity	12 pass
Modes	B A T

Around the turn of the century, many companies experimented small, tramway-like cars powered by a cheap gasoline engine to replace costly steamers on the shortest, less frequented branchlines. Most of the times, these vehicles turned out to be one-of-a-kind railbuses, whose specs and looks varied from company to company. The railbus used by the *Chemins de fer de la Drôme*, built in 1903 by Turgan-Foy in two units, is included in the French Set to represent these early attempts. Its very weak power and tractive effort naturally relegate it to the shortest, flattest lines. It's only available in the Basic set mode.

De Dion-Bouton JM	
Diesel railbus	
Available from	1923
Available until	1957
Speed (km/h)	50
Power (hp)	50
Axle weight (t)	4
Capacity	20 pass
Modes	B A T

To meet the rapidly growing demand, some automobile manufacturers came up with their own standardized railbus designs, most of which had the look and feel of buses placed on rails. De Dion-Bouton was one of these pioneers, with their first gasoline-powered "JA" model, and especially with its replacement, the diesel-powered "JM". This model was highly successful, thanks to its simplified maintenance (it shared parts with many trucks or buses of the time), low running costs, and relatively high speed. It also had a special turntable mounted under the chassis, which allowed raising the vehicle over the rails and manually reversing it, making it very practical. On the other hand, its weak tractive effort made it unsuitable for hilly or mountain lines. In the Set, this vehicle is available in five different companies' liveries, to recreate its widespread presence. It can be fitted to carry passengers or tourists, and can mount a small mail compartment, at the expense of a few passenger seats.

In the Set, the JM railbus is available in the Basic set mode, in the liveries of a handful of historical companies. It is also available in the Toy set mode, in the "2cc" company colors.

Renault NK	
Diesel railcar	
Available from	1924
Available until	1951
Speed (km/h)	45
Power (hp)	40
Axle weight (t)	5.5
Capacity	36p + 16m
Modes	B A T

Not all of the early attempts to replace steam with diesel led to the simple transformation of buses into rail vehicles. A few automobile manufacturers, such as Renault, preferred to go the other way around, designing a vehicle that exhibited train-like looks and could offer higher capacity and better comfort. However, the somewhat underpowered engines of the time limited their success, relegating them to very flat lines and making them unsuitable to pull more than one trailer.

Renault's NK model is available in the Basic set mode only, in the livery of the *Côtes du Nord* network. When traveling alone, this railcar reverses direction at stations (driving back in reverse).
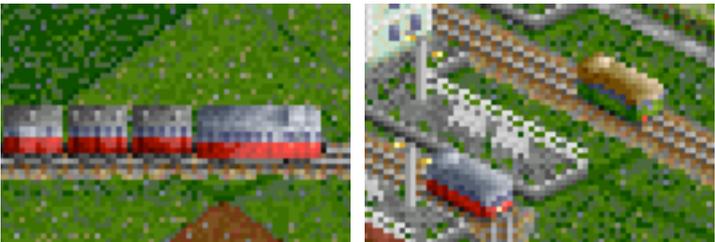
Brissonneau-Lotz ZM	
Diesel railcar	
Available from	1934
Available until	1965
Speed (km/h)	65
Power (hp)	135
Axle weight (t)	5
Capacity	32p + 10m
Modes	B A T

In the mid 1930s, more and more of the local networks were developing plans to end steam traction on passenger service, to reduce costs. With its powerful diesel-electric engine, the model proposed by

Brissonneau-Lotz was among the most advanced on the market. It was chosen by a few railroad companies, such as the *Petit-Anjou* and the *Côtes du Nord*, in slightly different variants. On the latter network, some of these vehicles were later demotorized and used as trailers for more modern railcars.

In the Set, this engine is only available in the Basic mode. When traveling alone, this railcar reverses direction at stations (driving back in reverse).

Brissonneau-Lotz ZM (2)	
Diesel 2-part railcar	
Available from	1934
Available until	1967
Speed (km/h)	75
Power (hp)	270
Axle weight (t)	5
Capacity	60p + 10m
Modes	B A T
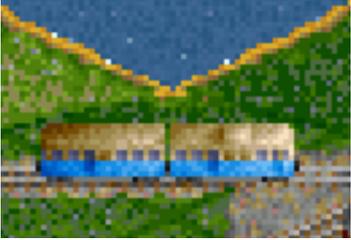
When the *Provence* railroad company decided to modernize its rolling stock for its seaside line between Toulon and St-Raphaël, it looked for a high quality railcar that could both be quick and have a large capacity. Impressed by its latest diesel-electric technology, the company placed an order for a double version of the Brissonneau-Lotz railcar. These vehicles, very comfortable and ahead of their time, were extensively used to carry tourists to the *Côte d'Azur* seaside resorts, and ended their career in Spain after the closure of their line.

Like its shorter sibling, this engine is only available in the Basic set mode. This railcar always reverses direction at stations, driving with the trailer in the front.

Renault ABH	
Diesel railcar	
Available from	1934
Available until	1996
Speed (km/h)	60
Power (hp)	265
Axle weight (t)	8.5
Capacity	44p + 16m
Modes	B A T

For its Nice-Digne line, the *Chemins de fer de Provence* chose a different kind of rolling stock than for its seaside line. It turned its attention to Renault, which, after its experience with the NK type, was designing a new type of railcar. The ABH, a high-quality vehicle derived from Renault's successful standard gauge models, remained in production for almost 20 years in eight subseries. It became widespread in metropolitan France, Corsica, and many French colonies in Asia and Africa. Its higher quality came with slightly higher weight, making it unsuitable to run on lines equipped with the cheapest, lightest types of rail.

In the Set, the ABH railcar is present in three variants: the ABH1 used in Provence, the ABH6 of the *Côtes du Nord* company, and the Corsican ABH8. Each variant features multiple historical liveries and can be combined with matching trailers.

It is available in the Basic set mode, as well as in the Toy set mode, the latter only in its post-war ABH8 variant painted in "2cc" company colors. When traveling alone, this vehicle reverses direction at stations: if built after 1960, a Corsican ABH8 can do push-pull service with a modified Billard R210 railcar trailer.
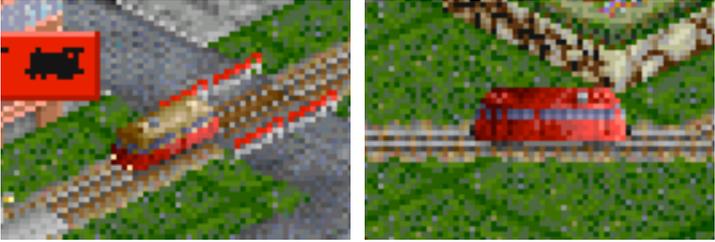
De Dion OC	
Diesel railcar	
Available from	1937
Available until	1965
Speed (km/h)	70
Power (hp)	180
Axle weight (t)	5.5
Capacity	44 pass
Modes	B A T

In their quest for efficiency, the *Côtes du Nord* railways ordered yet another series of railcars, with a larger capacity than the earlier rolling stock. Equipped with a mechanical transmission, these railcars were probably not groundbreaking, but they were large and proved to be a valid choice on the flat lines of the northern coast: their low axle weight allowed them to run even on the light, cheap tracks often used at that time. After a first series in the late Thirties, the *Réseau Breton* ordered another batch of these railcars, delivered after the war with a slightly more modern, angular look.
In the Set, the OC is available in two series: *Côtes du Nord*'s OC1 and *Réseau Breton*'s OC2. Vehicles of different series can't be coupled together; OC2s can reverse at stations. These vehicles are only available in the Basic set mode.
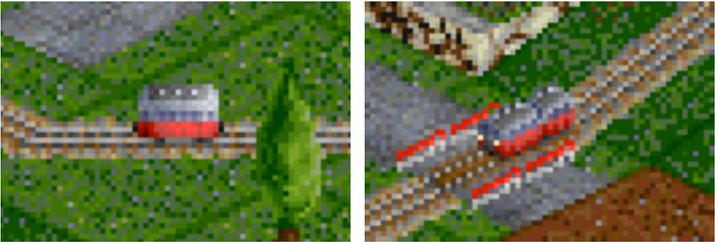
De Dion ND	
Diesel railbus	
Available from	1934
Available until	1960
Speed (km/h)	55
Power (hp)	125
Axle weight (t)	5
Capacity	32 pass
Modes	B A T

Although proud of its Mallet steamers, the *Vivarais* network also felt the need for a cheaper alternative to steam operation on less crowded lines. The first railbus used there was the De Dion ND model: cheap and not very powerful, it was built on a simple architecture, featuring a front bogie and a rear axle, the latter powered by a diesel engine. The constructor even delivered a few matching trailers to enhance its somewhat limited capacity, including one-axle trailers for mail or goods. In the Set, this vehicle is only available in the Alpine mode.

Billard A80D	
Diesel railbus	
Available from	1936
Available until	1984
Speed (km/h)	50
Power (hp)	80
Axle weight (t)	4
Capacity	30 pass
Modes	B A T

In 1936, a few secondary railway companies joined forces with the Billard Workshops in Tours to design together a new mid-size railbus to modernize their rolling stock fleet. The result was the A80D model; its name was derived from its characteristics, since its diesel engine (hence the final "D") could

develop 80 hp. Sturdy, light and cheap to maintain, this railbus met a large success. Many units were delivered to a large number of local networks, where they sharply cut the overall costs. Billard also built a line of railcar trailers, called R210; derived directly from unpowered A80Ds, these trailers would be long used with many generations of railcars.

The Set includes this railbus in the Basic set mode in various liveries. Refit options will change through time, mimicking its mutations across the country. It's initially available in the colors of the *Dordogne* and *Charentes* networks; then in the *Vivarais* and *PO-Corrèze* liveries; and finally in the Corsican and *Provence* versions. Additionally, it is also available in the Toy set mode, in a "2cc" company livery.

When traveling alone, in multiple units, or with railcar trailers, this vehicle supports push-pull.

Billard A150D	
Diesel railcar	
Available from	1938
Available until	1978
Speed (km/h)	50
Power (hp)	150
Axle weight (t)	4.5
Capacity	44 pass
Modes	B A T

To complement their tiny De Dion railbuses, the *Vivarais* network needed larger railcars that could negotiate its lines' tight curves and steep slopes. The Corsican network, because of the difficulty of its Ajaccio-Bastia main line, had a similar need; both companies placed an order for a new railcar that could get the job done. The result was the Billard A150D, more powerful and capable than its smaller sibling. These vehicles quickly became the backbone of both network's passenger service, and assured service for a long time.

In the Set, this vehicle is available in the Basic mode, in the liveries of the Corsican and *Vivarais* network, as well as the *Provence*, the latter being available later. It is also available in the Alpine set mode, in the *Vivarais* livery only.

When traveling alone or in multiple units, this vehicle supports push-pull.

Billard A150D2	
Diesel 2-part railcar	
Available from	1939
Available until	1967
Speed (km/h)	45
Power (hp)	150
Axle weight (t)	4
Capacity	54 pass
Modes	B A T

The A80D's large success ignited interest in a new design, which would essentially be made of two A80Ds connected together by a powered bogie. The idea was to be able to carry a larger number of passengers without doubling the running costs. Ordered by the *Vivarais* network, this railcar also saw the tryout of luxury service on narrow gauge lines: a bar was installed in one of these units, to be used for high-end service as the *Flèche des Cevennes*. The burst of WW2, as well as the competition by other constructors' high-capacity narrow gauge railcars, somewhat limited the success of this interesting design, which turned out to only be built in four units (only one of them still survives today).

This railcar is available both in the Basic and Alpine set modes, in the *Vivarais* livery; a *Provence* livery is also available later, in the Basic mode only.

When traveling alone or in multiple units, this vehicle supports push-pull.

Verney X210	
Diesel railcar	
Available from	1950
Available until	1989
Speed (km/h)	85
Power (hp)	180
Axle weight (t)	6.5
Capacity	54 pass
Modes	B A T

As diesel technology evolved, the first truly modern railcars made their appearance on French narrow gauge lines. They were developed by Verney and were initially acquired by *PO-Corrèze*, in a push to keep costs down while assuring a high-quality service. After that network got closed down, these railcars were moved to the *Blanc-Argent* line, where they assured service for about 25 years longer. Their high top speed, large capacity, and strong engine made them a perfect replacement for the aging railcars of previous generations.

In the Set, these vehicles are only available in the Basic mode, together with matching XR700 trailers. When traveling alone or in multiple units, these railcars will reverse at stations.
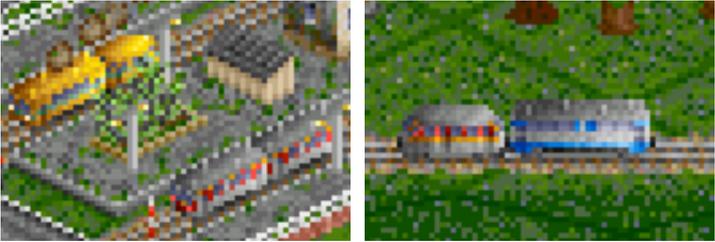
CFD SY	
Diesel railcar	
Available from	1972
Available until	-
Speed (km/h)	85
Power (hp)	330
Axle weight (t)	6
Capacity	48 pass
Modes	B A T

In the early 1970s, Provence and Corsica saw most of the earliest railcars start to age considerably: a replacement was urgently needed. It was the *Provence* company that first placed an order to the CFD locomotive works in Montmirail for a new set of railcars, with Corsica following just one year after. These modern engines were very innovative if compared to the traditional rolling stock: their motors were mounted under the chassis and the driver's cab was open, allowing the passengers to have a 360-degree view on the surroundings.

In the Set, this vehicle is available in the Basic mode, with multiple liveries for each of the two companies that ran them. It is also available in the Toy set mode, in "2cc" company colors.

Socofer X240	
Diesel railcar	
Available from	1983
Available until	2015
Speed (km/h)	85
Power (hp)	240
Axle weight (t)	7
Capacity	52 pass
Modes	B A T

To improve its service on the surviving narrow gauge line, the *Blanc-Argent* network ordered a new kind of railcar in 1983. Displaying some familiarity with popular standard gauge railcars of the time,

this vehicle not only looked modern, but also gave more comfort to its passengers. It was couplable in multiple units, and also with the Verney railcars of the previous generation.
The Set includes this vehicle in the Basic set mode only.

Soulé X97050			
Diesel 2-part railcar			
Available from	1983		
Available until	2015		
Speed (km/h)	85		
Power (hp)	240		
Axle weight (t)	9.5		
Capacity	98 pass		
Modes	B	A	T

To increase capacity on the surviving narrow gauge lines, the *Provence* company once again was the first one to order a new kind of rolling stock: a double railcar built by Soulé-Garnéro. Only built in one unit, it soon took charge on the important services such as the *Alpes-Azur*, the southern leg of the Geneva-Nice line (later limited from Grenoble). Corsica rapidly followed, placing an order for a batch of technically very similar, but visually different, double railcars.
This railcar is included in the Basic set mode, initially in the *Provence* livery only, the Corsican livery being available a few years later. It's also part of the Toy set mode, in "2cc" company colors.

CFD X74500			
Diesel 2-part railcar			
Available from	2002		
Available until	-		
Speed (km/h)	85		
Power (hp)	410		
Axle weight (t)	8		
Capacity	74 pass		
Modes	B	A	T

In the early 2000s, the Blanc-Argent line had to finally withdraw its railcars dating back from the 1950s, and decided to introduce a new type of rolling stock to keep its lines alive. Its aesthetics inspired by the contemporary standard gauge railcars, this 2-part vehicle had a peculiar asymmetric design, with the smaller part containing the engine: such a solution allowed to keep the vehicle's max axle weight below the limit of 8 tons, imposed by the old tracks of the line. It was couplable with earlier railcars of the same network. In the Set, it's only included in the Basic set mode: this engine always reverses at stations.

AMG 800			
Diesel 2-part railcar			
Available from	2008		
Available until	-		
Speed (km/h)	100		
Power (hp)	1200		
Axle weight (t)	12		
Capacity	108 pass		
Modes	B	A	T
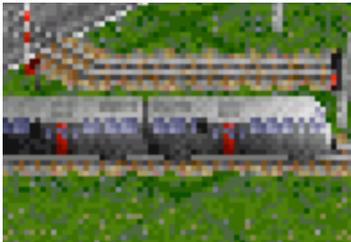
Boasting modern looks, high speed and large capacity, the AMG 800 represent the state of the art in terms of French narrow gauge railroading. They were specifically developed for the Corsican network,

with tilting bogies to better adapt to its winding tracks, and large, panoramic windows for the passengers' comfort. The *Provence* network later ordered a smaller batch of very similar railcars.

These engines' strong specs, however, came at a price: their axle weight, higher than any earlier railcar's, requires heavier rails than those traditionally found on old-school metric gauge lines.

In the Set, this vehicle is present in the Basic mode, both in the Corsican and Provence liveries. It is also present in the Toy set mode, featuring "2cc" company colors.

2.2.5. The electric railcars and multiple units

2-axle tramway type	
Electric railcar (catenary)	
Available from	1909
Available until	1940
Speed (km/h)	45
Power (hp)	120
Axle weight (t)	10
Capacity	30 pass
Modes	B A T
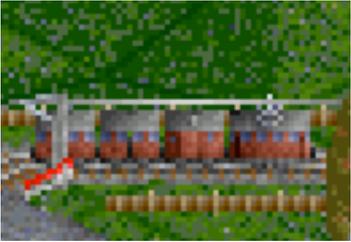
In the beginning of the XX century, many local tramway companies decided to electrify their networks. Some of them were extensions of existing urban tramway lines, such as Limoges'; others were fully independent networks that linked towns and villages together on hilly or mountainous areas. Simple 2-axle powered railcars were often employed as the most basic rolling stock, to which short passenger coaches, mail vans, or even cargo wagons could be attached.

The Set includes such kind of vehicles for two of the most interesting companies that employed them: the *Chemins de Fer de la Haute Vienne* and the *Tramway des Alpes Maritimes*, both active in the first decades of the 1900s.

This vehicle is available in the Basic and Alpine set modes, the latter only featuring the yellow *Alpes Maritimes* livery.

Bogie tramway type	
Electric railcar (catenary)	
Available from	1912
Available until	1940
Speed (km/h)	55
Power (hp)	280
Axle weight (t)	6.5
Capacity	41 pass
Modes	B A T
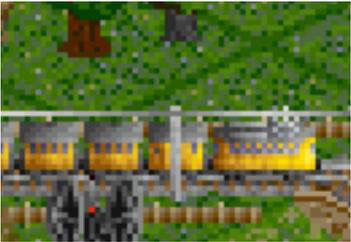
It didn't take long for local tramway companies to copy the rolling stock already being used by existing urban networks; soon larger, more powerful railcars, mounted on two bogies, appeared on those interurban lines. They were used on longer sections of lines, usually servicing the countryside or far-away towns. In the Set, they're available in the same liveries as their shorter counterparts, and they're part of the Basic and Alpine set modes.

Thomson-Buire railcar	
Electric railcar (catenary)	
Available from	1913
Available until	1955
Speed (km/h)	35
Power (hp)	260
Axle weight (t)	11.5
Capacity	35 p, 16 m
Modes	B **A** T
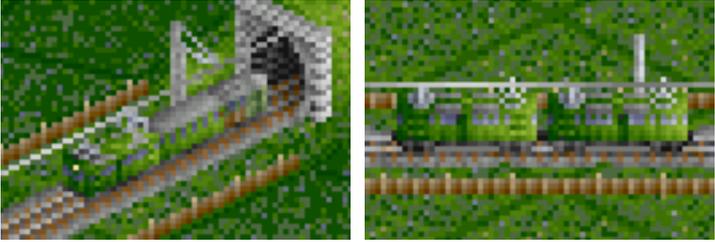
The increasing coal traffic on the "La Mure" mountain line soon required the combined effort of most of the new electric locomotives; this made it necessary to order new rolling stock, specifically designed for passenger service. Budget constrains led to the choice of a somewhat already-outdated design, featuring a wooden chassis covered with metal sheet. Their limited max speed was not a handicap on the winding mountain lines it would run on, but made them impractical anywhere else, and their stronger tractive effort only confirmed these engines' suitability for mountainous routes. After the closure of a few passenger-only branches, these vehicles were also used to pull freight trains and to perform shunting service.

In the Set, this vehicle is available in the Alpine set mode only. When traveling alone, this railcar reverses direction at stations, driving back in reverse.
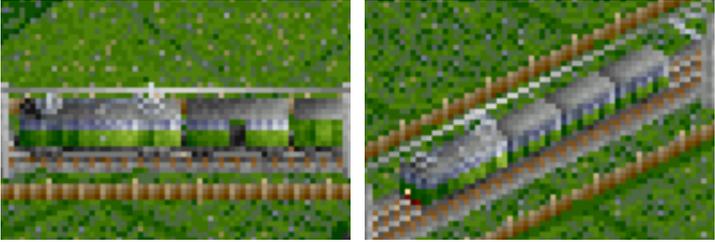
Alsthom-Buire railcar	
Electric railcar (catenary)	
Available from	1932
Available until	1962
Speed (km/h)	65
Power (hp)	400
Axle weight (t)	9
Capacity	40 p, 16 m
Modes	B **A** T

Specifically designed for the Annemasse-Sixt mountain line on the Swiss border, these large railcars used to feature the state-of-the-art technology in terms of narrow gauge railroading. They shared the same electric motors as the freight locomotives of their line, but with longer gear ratios: this resulted in a good amount of power with high max speed, allowing them to shine in their service. They were coupled with specifically-built passenger cars, offering a good level of comfort: each railcar could pull a maximum of three coaches. Occasionally, they were also used with older rolling stocks, such as older coaches and freight wagons. They all ended service in 1959, when their line was closed down.

This vehicle only appears in the Alpine set model. When traveling alone, this railcar reverses direction at stations, driving back in reverse.
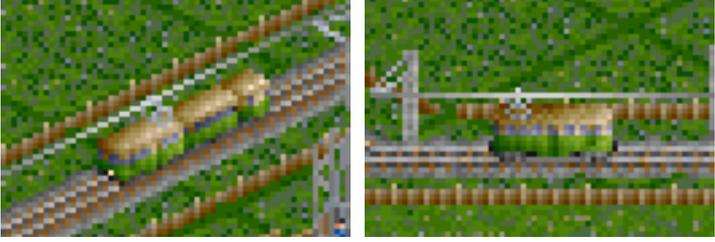
Jeumont railcar	
Electric railcar (catenary)	
Available from	1933
Available until	1962
Speed (km/h)	60
Power (hp)	120
Axle weight (t)	5.5
Capacity	36 p, 10 m
Modes	**B** A T

When the *Tramways de l'Ain* network electrified its lines, it placed an order for electric railcars with similar looks and specs as those already running in nearby Switzerland. The result was this sturdy

vehicle; with its relatively high speed, it was used for about 20 years, until the closure of the tramway network. In the Set, this railcar is available in the Basic set mode only.

SLM Bhe 4/4 railcar		
Electric rackrail railcar		
Available from	1953	
Available until	-	
Speed (km/h)	30	
Power (hp)	640	
Axle weight (t)	8	
Capacity	84 pass	
Modes	B	A	T

In the early Fifties, the existing rackrail-equipped mountain lines faced a stronger demand for passenger service, especially tourists, at the same time as their steam locomotives started to age. Dieselization wasn't practical at that time, since the technology didn't allow to build locomotives powerful enough to replace steam while being at the same time light enough to run on those lines. Third rail was ruled out by the heavy snowfall, which would make it too expensive to maintain. The choice therefore fell on a catenary-powered AC electrification, also being experimented on the neighboring standard gauge lines connecting Aix-les-Bains to Annemasse (and Geneva). New rolling stock was ordered, with the Swiss firm SLM designing the chassis, body and bogies, and Örlikon supplying the engine. These electric railcars proved to be so sturdy and reliable, that they are still in service today, some 60 years after construction.

The Set includes these railcars both in the *Chemins de fer du Montenvers* and the *Tramways du Mont-Blanc* liveries. This railcar is only available in the Alpine set mode and always supports push-pull.

2.2.6. The 3rd-rail electric multiple units

Z200 EMU		
Electric multiple unit (3rd r)		
Available from	1901	
Available until	1965	
Speed (km/h)	36	
Power (hp)	110	
Axle weight (t)	15	
Capacity	36 pass	
Modes	B	A	T

Due to its particularly steep and winding tracks, the St Gervais-Vallorcine mountain line, located around the Mont-Blanc, needed specific rolling stock, which could be sturdy, resistant to heavy-duty service under bad weather conditions, easy to operate, and with a strong tractive effort. The result was a rather unique electric multiple unit, which could mix up passenger coaches, vans, and freight wagons, all mounted on interchangeable, 3rd-rail powered 2-axle trucks. This very interesting design combined the best possible traction (since every car of the train could be powered) with a very flexible system allowing for mixed consists, hauling virtually any kind of cargo.

The Z200 EMU is available both in the Basic and Alpine set modes.

Z100 EMU	
Electric multiple unit (3rd r)	
Available from	1909
Available until	-
Speed (km/h)	60
Power (hp)	300
Axle weight (t)	8
Capacity	40 pass
Modes	B A T

The construction of the *Cerdagne* line in the Pyrénées mountains was undertaken by the *Compagnie du Midi*, one of the main national railway operators at that time, as well as a pioneer of electric traction. When it came to designing the line's rolling stock, which would have to deal with steep and curvy tracks, it was decided to use this small mountain line as a testbed for electric traction. The original rolling stock was formed by 3rd-rail powered bogie-mounted electric railcars that could be linked in multiple units, and which could also occasionally pull unpowered passenger coaches or freight wagons. Most of the original rolling stock is still active today.

This vehicle is available in the Basic and Alpine set modes. Under certain conditions, imposed by OTTD limitations, this railcar supports push-pull.

Z600 EMU	
Electric multiple unit (3rd r)	
Available from	1958
Available until	2005
Speed (km/h)	70
Power (hp)	536
Axle weight (t)	11
Capacity	42 pass
Modes	B A T

As soon as the 1930s, the PLM company, which exploited the St Gervais-Vallorcine line, began thinking about modern rolling stock to replace the sturdy but basic Z100 series. The war halted this effort, so the second generation railcars didn't appear until the late 1950s. Unlike their predecessors, the Z600 series consisted in more conventional bogie-mounted third rail vehicles. They came with matching trailers, to form consists of variable lengths; the most common sight was two Z600 units sandwiching a trailer. Tourists soon appreciated their much better comfort, and these vehicles kept being in service for about 50 years.

The Z600 is available in both the Basic and Alpine set modes. When two Z600 are at both ends of a consist, it will do push-pull, reversing at stations.

Z800 EMU	
Electric 2-part railcar	
Available from	1996
Available until	-
Speed (km/h)	70
Power (hp)	1340
Axle weight (t)	9.5
Capacity	96 pass
Modes	B A T

Plans for a replacement for the Z600 series started to be laid out in the late 1980s. Studies were shared with the Swiss Martigny-Châtelard network, the Swiss neighbor of the St Gervais-Vallorcine

line: both railways would jointly develop a common type of rolling stock. This is how the Z800 came to life. A very versatile vehicle, it was equipped both with 3rd rail shoes and pantographs for catenaries; it also had a pinion to work on rackrail-equipped rails. The Z800 is available in Basic and Alpine modes.

Z850 EMU	
Electric 3-part railcar	
Available from	2006
Available until	-
Speed (km/h)	80
Power (hp)	1600
Axle weight (t)	8.5
Capacity	104 pass
Modes	B | A | T
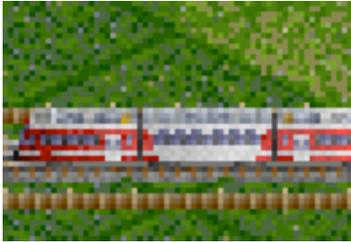
The small batch of Z800 quickly proved insufficient to replace the whole Z600 series. Faced with a need of additional rolling stock, the St Gervais-Vallorcine network preferred to explore a new type of multiple units rather than buying an additional batch of Z800. Built by Stadler, the Z850 followed a 3-part schema of a powered vehicle placed between two trailers. They could circulate on 3rd rail-equipped tracks as well as under catenary, but they lacked a pinion for rackrail tracks. It was possible to couple up to 3 units of the same type.
In the Set, this vehicle is included in both the Basic and Alpine set modes.

Z150 EMU	
Electric 3-part railcar	
Available from	2003
Available until	-
Speed (km/h)	80
Power (hp)	466
Axle weight (t)	7.5
Capacity	86 pass
Modes	B | A | T

For almost a century, the *Ligne de Cerdagne* on the Pyrénées mountains relied on its original rolling stock, dating back from 1909. In order to raise the commuter service's comfort level, SNCF turned to Stadler to build new railcars that would complement the existing vehicles on that line. The choice fell upon a three-part model, with a short middle module containing the engine, and two passenger trailers on each side. Z150 railcars are now being used for day-to-day commuter trains, while the historic Z100 vehicles can be relegated to touristic rides. The Set includes these vehicles both in Basic and Alpine modes.

2.3. The rolling stock: coaches and wagons

The French narrow gauge networks employed a variety of wagons. The aim of this trainset is to reproduce the most common, or significant variants, to provide the best gaming experience with the most popular industry sets for OTTD; the standard industries, ECS, and FIRS.

Realistic, historical capacities have been chosen for all of the Set's rolling stock. Whenever possible, coaches and wagons will carry the same amount of cargo as they could in reality; when the data was unavailable, the best guess was used. A parameter allows the player to cut in half, or raise by 50%, the historical capacities for passenger coaches and freight wagons.

An added touch of realism is the concept of braking force. The Set includes vehicles with and without brakes, the latter type being available only in the early years. A train won't start unless it's got sufficient braking force to suddenly stop in the event of an emergency. Vehicles without brakes are cheaper to buy and to maintain; however, a minimum number of vehicles with brakes is always needed. The exact number depends on consist length and the engine's braking force. To keep costs down, consists should be built with the highest possible number of non-braking wagons.

2.3.1. Passenger coaches and mail vans

Standard 2-axle coaches were the most common form of passenger transportation around French narrow gauge lines for at least the first 50 years of their existence, until railbuses started to become a feasible alternative. Such coaches usually were very basic, capable of carrying a low number of passengers in a limited comfort; rare exceptions were the "saloon cars", used in the early years as luxury coaches on some networks. The interior of coaches could be arranged either in one or two common areas, or in multiple small compartments. Passengers would board the former through platforms on either end; the latter type, on the other hand, often had many side doors, each leading to a specific compartment.
The Set includes numerous coach variants, ranging from small tramway-like wagons to larger versions.

Bogie-mounted coaches were introduced around the turn of the century, to improve capacity and comfort. Their design usually mimicked their smaller, 2-axle counterparts'. In the Twenties, even larger bogie-mounted coaches were developed, similar in looks and comfort to the standard gauge wagons.

The French Set includes refitting options to various classes for most passenger coaches. As such, a passenger coach can often be refitted to 1st, 2nd, or 3rd class, or a mix of those three. Low-class coaches will haul more passengers, cost slightly less in terms of maintenance, and their "cargo aging" will be

quicker, to recreate those coaches' lower comfort. By default, a newly bought passenger coach will initially appear in its lowest available class.

Refitting between classes is not free, as it implies partially or entirely refurbishing the wagon. Due to the more luxurious trim, a refit to a higher class will be more expensive than a refit to a lower class.

The difference in "cargo aging" between the classes will only be truly visible over long distances. Due to the way cargo aging works in the game, there will be little to no difference between the profit generated by a 3rd class car and a 1st class car when traveling a short or medium distance: on the other hand, passengers will pay more for extra comfort when traveling across a long distances (about 60 tiles or over). It is therefore advisable to use lower classes for tramway, local or short distance services, and higher classes for long distance services.

When available, luxury "saloon" coaches provide extra comfort for a lower number of passengers. Additionally, if a "saloon" car is placed at the end of the train, it will gain a bonus in terms of an even slower "cargo aging", thanks to the unobstructed view behind the train the passengers will enjoy. As it goes with classes, this bonus will be more effective when traveling across long distances.

Only standard 2-axle coaches can be refitted to "saloon" configuration, and only on a limited set of liveries.

A common sighting in these network's consists were mixed coaches, which could transport a limited number of passengers, while keeping some space for a baggage or mail compartment.

Specific mail wagons were also available. Most of the times, these looked very similar to their 2-axle passengers counterparts; however, in 1904, a specific, higher capacity mail van was introduced on some networks. Some of these special vans later got refurbished to become large capacity goods wagons.

Some situations required the train to travel with the engine in the tail of the consist, pushing the wagons instead of pulling them. An early example of this were the rackrail-equipped mountain lines, where, for safety reasons, the locomotive had to be attached on the side of the lower station, regardless of the direction of travel. This required the introduction of control cars, or driving trailers. While not infrequent on standard gauge lines, such system was limited to rackrail mountain lines on narrow gauge networks. It wasn't until 2005 that the *Chemins de fer de Provence* introduced push-pull trains driven by a diesel locomotive.

As the railway companies started switching to diesel or electric traction, railbuses and railcars slowly replaced steam locomotives. Some of the redundant coaches and wagons were converted and used as trailers for the railcars, changing their livery accordingly; similarly, a few old passenger coaches were demolished up to their chassis, and employed as flat cars for freight trains.

Specific railcar trailers were also introduced, whose size and shape would mimic the railcars they'd be attached to. Such trailers were used to carry not only passengers, but also mail and, in some cases, even light freight. In a few cases, these trailers were equipped with a small driving cab, and could be used in push-pull service in conjunction with certain railcars. It was the case, for example, of the *Train de Balagne* of the Chemins *de fer Corses*, linking Calvi with Île-Rousse.

In the Set, all of the coaches come in special styles and liveries, to best match the type of locomotive or railcar they're attached to, as well as the timeframe they were built in. The livery selection is automatic

and takes place as soon as the vehicle is attached to a consist. This may also affect the coach's capacity and "cargo aging", as well as its refitting options in terms of classes.

2.3.2. Freight wagons

Most of the freight narrow gauge trains were composed by light, small 2-axle wagons capable of hauling a limited quantity of cargo. The most widespread types included low-sides open wagons, flat trucks, and closed vans. Tank wagons were quite rare if not totally absent, and have been added to the Set mostly for playability reasons.
A few railway networks had a refrigerated variant of the closed van, which allowed some preservation of the cargo it transported. This variant is also present in the Set: certain perishable cargo types will allow refitting to it. A refit to this variant comes at an extra cost to mount the icebox or the refrigerator unit; moreover, it raises maintenance costs and slightly hampers capacity, but the "aging" of the transported cargo will be considerably slower.

Bogie-mounted flat trucks, obtained from the chassis of old passenger coaches, were introduced around the turn of the century, to haul larger pieces of cargo such as wooden logs, steel beams, machinery, or vehicles.
The "La Mure" mountain network used a 3-axle heavier open wagon specifically designed for its tracks, which also has been added to the Set.
After WW2, a few more modern wagon types were introduced; the Set includes a heavier hopper wagon, historically used on the "La Mure" network and suitable for minerals, as well as a silo wagon, used on the *Provence* network, suitable for pulverized goods such as grain, cement, and certain kinds of food such as flour.

Just as the coaches, even the freight wagons come in various liveries, chosen automatically when the wagon is attached to a consist, and following real painting schema used along the years. Around the turn of the century, most freight wagons were grey, each company adopting a specific shade. The 1920s saw the introduction of a more brownish tone for new wagons.
When building a train of the "La Mure" railway, 3-axle variants of the low-side open wagon and the closed van will be used instead of the standard 2-axle design.

Freight wagon capacity follows the *stowage factor* concept. Each freight wagon has its own volume documented in the purchase list (for flat trucks, an approximation is made assuming an average sized crate is placed on top of the flatbed), as well as the maximum charge, in tons, it can sustain. The effective maximum load will be determined by a combination of maximum charge, volume, and "stowage" factor for the chosen cargo type, i.e. the amount of space (in cubic meters) one ton of that cargo occupies.
For example, a small low-sided wagon with a maximum charge of 10 tons and volume of 9.84m^3 will be able to hold 10 tons of iron ore, but only 8 tons of coal, or 2 tons of fiber crops.

Freight wagons in the French Set support OpenTTD's *autorefitting* feature. When a freight train is sent to a station where some cargo is already waiting, its wagons can be automatically refitted, for no extra cost, to the cargo type that's waiting at the station. This way, the cargo can be immediately loaded, without having to send the train to a depot first.

This feature will only produce results if the cargo waiting at the station can normally be hauled by the wagons attached to the train, without requiring a major modification to the wagons themselves. In case the waiting cargo requires a minor work on the wagons, refitting can still be automatically performed at a station, for a cost: an example of this would be a low-sided wagon switching from coal to grain, requiring some cleanup and the installation of a tarp. Conversely, if refitting includes performing important work on the wagon it will have to be performed at a depot, for a higher cost: this would be the case, for example, of a normal closed van turning to a refrigerated van to transport fresh food.

2.3.3. Braking force

Any consist needs adequate braking force to cope with emergency situations requiring a sudden unscheduled stop. Braking force essentially comes from two factors:

- The engine strength, which can be used to slow the consist down (the technique is called *contre-vapeur* for steamers);
- The action of mechanical brakes across the engines and wagons, usually in the form of brake shoes applying friction on each wheel's surface.

Both factors come into the play and determine the minimum number of wagons to be equipped with brakes for a consist to get the green light.

Indeed, some early freight wagons in this Set appear in two variants: a cheaper one without brakes, and a more expensive one with brakes. The two variants are visually different until 1924, with the latter adopting a brakeman's cabin. In 1925, the introduction of vacuum brakes makes the cabin obsolete, so newer vehicles of either type will look exactly the same.

Any other vehicles in this Set will always be equipped with brakes. As for engines, they're divided into "strong" and "weak" in terms of braking power: this information is available in the purchase list. Stronger engines allow consists to be made from fewer braking wagons than weaker engines.

The table on the right shows the minimum number of wagons equipped with brakes required in a consist, given its length

# weak engines	1		2	1		1+
# strong engines		1		1	2	2+
Consist length						
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	1	0	0	0	0	0
4	1	1	0	0	0	0
5	2	1	1	0	0	0
6	2	1	1	0	0	0
7	3	2	2	1	0	0
8	3	3	2	2	1	0
9	4	3	3	2	1	0
10	4	4	3	3	2	1
11	5	4	4	3	2	1
12	5	5	4	3	3	2
13	6	5	5	4	3	2
14	6	5	5	4	4	3
15	6	6	5	5	4	3
16	7	6	6	5	5	4
17	7	6	6	5	5	4
18	7	7	6	6	5	4
19	8	7	7	6	6	5
20	8	7	7	7	6	5
21	8	8	7	7	6	5
22	9	8	8	7	7	6
23	9	8	8	8	7	6
24	9	9	8	8	7	6
25	10	9	9	9	8	7

(excluding any engines) and the number and type of engines.

For example, a train pulled by a 030T steamer (a "weak" engine) will require no braking wagons at all if it's got one or two wagons. If it's got three or four wagons, at least one needs to be equipped with brakes; if the wagons are five or six, at least two need to have brakes; and so on.

As another example, a train pulled by two large Mallet 030 030T steamers in multiple traction will require no braking wagons at all if it has seven wagons or less; this is because the two engines can effectively stop the train just by using their power.

One thing to remember is that the last wagon in a consist must be equipped with brakes, whenever braking wagons are required. This was always the case in reality: brakes in the last wagon are very important, because they can "pull" the rest of the consist to a stop.

This is what happens if we try to start a train with no braking wagons at all:
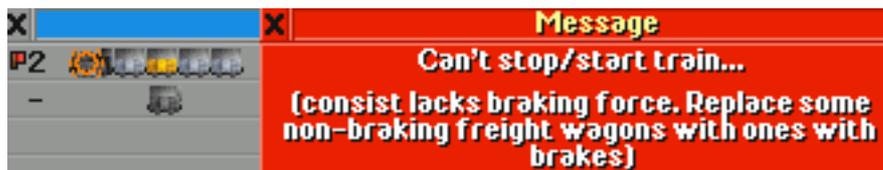
The flashing loose wheel icon appearing on top of the engine warns us our train is lacking braking force. If we try to start the train anyway, an error message suggests us to change some of the wagons.

If we now replace a non-braking wagon with a braking one, but forget about the "last wagon" rule, we still won't be able to start the train:

We've placed a braking wagon in the 3rd position, so the last wagon will have no brakes: the flashing loose wheel icon now shows up on top of the last wagon. If we try to start this train, an error message suggests us to move the wagon with brakes to the tail of the train.

The concept of braking force can be disabled altogether with the "Realistic Features" parameters in the Set. This will remove non-breaking vehicles, and will place a brakeman's cabin in the last wagon of a freight train, until the popularization of vacuum braking (1925).

2.3.4. Axle weight

Another realistic concept introduced in the Set is a consist's *maximum axle weight*. In reality, each vehicle's total weight is discharged on the rails through its wheels; the exact weight distribution depends on the axles' relative positioning, as well as the way weight is arranged on the vehicle itself. *Cæteris paribus*, a larger number of axles results in a lower axle weight, at the same time increasing total weight and adding friction. The optimal number of axles in any vehicle is therefore an important design choice, and needs to balance many factors such as vehicle weight, intended speed, and type and condition of the rails it will run on.

In the early years, the main aim of narrow gauge lines was to provide transportation at the lowest possible cost. Following this principle, the selection of rail types often fell on the cheapest types, allowing for a very limited maximum axle weight and unable to sustain heavy traffic: sleepers were loosely spaced, and a small quantity of simple sand was used as ballast. Similar to urban tramway lines, those tracks only allowed a maximum axle weight of around 8 tons, enough for the early small steamers and the short carriages they pulled.

As time went on, more powerful engines were developed, and the most prominent networks upgraded their tracks using heavier rails, capable of supporting higher weights. The Réseau Breton, some lines of the Corsican network, as well as the mountain lines of La Mure and Cerdagne, equipped their tracks with such higher quality rails, featuring more tightly spaced sleepers and ballast made of gravel.

In the later years, the few remaining networks rebuilt part of their tracks using modern technologies, including concrete sleepers and better quality of ballast, to be able to sustain the modern railcars' weight and maximum speeds.

Each vehicle in the Set has its own maximum weight, approximated to half a ton, and documented in the purchase list. When used in conjunction with the French Rails Set, maximum axle weight becomes a critical factor and needs to be taken into account when choosing the types of rails and engines to be used on each line.

In the early years, most locomotives have a maximum axle weight of 8 tons or less, which makes them compatible with the cheapest, lightest available tracks. Some modern, heavier rolling stock will need tracks with heavier rails to run at full speed.

In 1961, a special, high-capacity 2-axle hopper wagon is released. It's specifically designed for heavy tracks and, when fully loaded, it will reach an axle weight of 15 tons. To make it compatible with weaker tracks, it can be refitted to a lower capacity, for a price.

When attempting to add a vehicle to a consist in a depot whose tracks can't support its weight, a flashing icon will appear on top of that vehicle, as a warning that the consist won't be able to travel at full speed.

This feature therefore introduces the challenge of planning whether to invest in more expensive, better quality tracks, to take advantage of those modern vehicles; or to stick to cheaper tracks, running lighter, less powerful trains on them. When any vehicle enters a section of track whose maximum admitted axle weight is inferior to its own, the speed of its whole consist will be greatly reduced to prevent track damage or derailing.

The following screenshot shows what happens if we try to run a train pulled by a locomotive with an axle weight of 11t, such as the 020-020T Mallet steamer, on cheap tracks with axle weight of only 8t:

Our poor train will be limited to a max speed of 25 km/h. It does so not to damage the tracks too much, just as it would do in reality. To allow it to run at its whopping full speed of 40 km/h, we would need to upgrade those tracks to a type with max axle weight of at least 11t.

The concept of axle weight can be disabled altogether with the "Realistic Features" parameters in the Set. This will allow any vehicle to reach its max speed on any compatible track type.

Similarly, this concept is disabled if the French Rails Set is not active in the game.

Following is a summary table of all the engines used by each included historical company, as well as the available passenger wagons' classes (and capacities) through the years:

Company name	Loc	Steamers	Diesel/Elect	Railcars, MUs	2-axle passengers	Bogie passengers	Coach type
Alsace-Lorraine	NE	040T (T37)			1st: 30 ; 2nd: 40	2nd: 42 ; 3rd: 58	Standard
CF du Cambrésis	NE	030T, 141T			Before 1922: 20 / 1st: 30 ; 2nd: 40	Before 1922: 33 / 2nd: 42 ; 3rd: 58	Tramway
CF de Guise-Hirson	NE	150T			1st: 26 ; 2nd: 38	2nd: 42 ; 3rd: 58	Both
Réseau Breton	NO	031T, 120T, 230T, Mallets				Bains de mer: 35 / 1st/2nd: 42 / 3rd: 58	Standard
Tramways d'Ille-et-Vilaine	NO	030T, 040T, 020 020T		JM	20	33	Tramway
CF des Côtes du Nord	NO	030T		JM, NK	26	33	Tramway
Petit-Anjou	NO	030T		JM	1st: 16 ; 2nd: 24 / 1st/2nd: 21	33	Tramway
PO-Corrèze	CE	120T, 020 020T	BB400	A80D	Saloon: 15 / 1st/2nd: 28 / 3rd: 40	2nd: 42 ; 3rd: 58	Standard
Tramways de Corrèze	CE	030T			20	33	Tramway
CF Dépt. Haute Vienne	CE			Tramway type electric	20		Tramway
CF du Blanc à Argent	CE	030T			1st: 16 ; 2nd: 24 / 1st/2nd: 21		Tramway
CF du Doubs	CE			JM			

Company name	Loc	Steamers	Diesel/Elect	Railcars, MUs	2-axle passengers	Bogie passengers	Coach type
Réseau du Vivarais	SE	130T, Mallets	BB400	ND, Billards	Saloon: 15 / 2nd: 26 ; 3rd: 37	Until 1920: / Mix: 44 ; 3rd: 56 / After 1920: / Mix: 42 ; 2nd: 52	Standard
Tramways de l'Ain	SE	030T	Jeumont	Jeumont, JM	20	33	Tramway
Tramways de l'Isère	SE	030T, 040T	BB600		20	33	Tramway
St-Gervais - Vallorcine	SE			Z200, Z600, Z800, Z850	1st: 24 ; 2nd: 32		Standard
CF du Montenvers	SE	021T	HGm 2/3	Bhe 4/4		3rd: 60	Tramway
Tramways du Mont-Blanc	SE	021T	HGm 2/3	Bhe 4/4		3rd: 60	Tramway
CF de la Mure	SE	031T	Thury, Sécheron	Thomson-Buire	1st/3rd: 30 / 2nd/3rd: 32	1st/2nd: 56 / 2nd: 64	Standard
CF Économiques du Nord	SE			Alsthom-Buire		32	Tramway
CF de la Provence	SE	030, 230T	ZT, BB400, BB600	Brissonneau, Renault, modern		1st: 40 ; 2nd: 54	Standard
Tways des Alpes Maritimes	SE			Tramway type electric	20		Tramway
Réseau de la Dordogne	SO			A80D			
CF Économ. des Charentes	SO	030T		A80D	20	33	Tramway
Ligne de Cerdagne	SO			Z100, Z150		46	Standard
CF Corses	CO	031T, 020 020T	BB400, BB600	A150D, ABH, modern	Saloon: 15 / 2nd: 26 ; 3rd: 38	Until 1920: / Mix: 44 ; 3rd: 56 / After 1920: / Mix: 42 ; 2nd: 52	Standard

3. The dynamics of the Set

3.1. Choosing a livery for a consist

Historically, many narrow gauge networks shared very similar locomotive and MU designs. This peculiarity has been recreated in the Set: as a result, certain engines are available in multiple "liveries". When this happens, a newly-built engine will always appear in the livery of a "default" company, but it will be refittable to the liveries of other companies as well.

By default, TTD doesn't allow refitting a vehicle with no capacity at all, such a locomotive is. A workaround for this issue is to allow certain locomotives to be refitted to passengers: the choice has fallen on this cargo, rather than a fictitious one such as "locomotive regearing", to enhance compatibility with third-party cargo sets such as ECS and FIRS. Obviously, a locomotive will never be able to carry any passengers at all (that is, other than its driver and fireman).

The following paragraphs show how this works, taking a 1910-built 030T steamer in he Basic set mode as an example. This is how the locomotive looks in the purchase list:
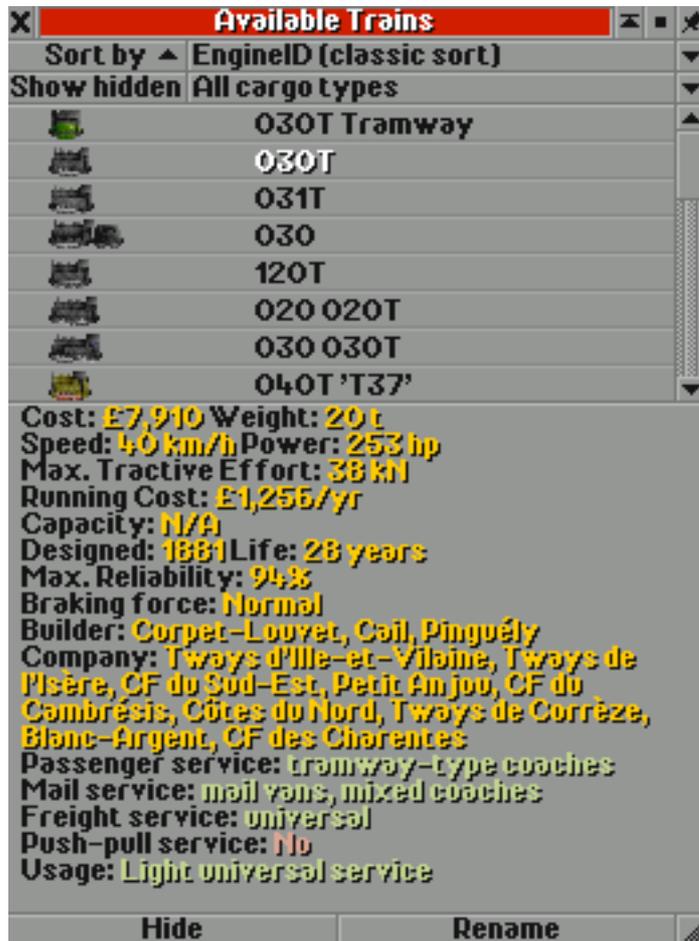
As stated by the "Company" line at the bottom, this engine is refittable to the liveries of nine different companies; a few are main networks, and others are minor tramway companies. The first entry displayed in the "Companies" list is always the engine's default livery.

Please note that, in the Alpine set mode, this locomotive is only available in the livery of one company: the *Tramways de l'Isère*.

Now, after buying the engine, we note that the "refit" button is enabled:

This happens even though the engine can't carry any cargo. That's a sign that it supports multiple liveries, and we can choose any of them through refitting.

The next step is about exploring the available liveries. Clicking on the refit icon displays the following window:

The available liveries are listed there. Since we still didn't do any refit, the engine bears the livery of the first company on the list: in this case, the black-green livery of the *Tramways d'Ille-et-Vilaine*, operating in the North-Western part of the country.

Refitting this locomotive to the "Tramways de l'Isère" livery will make it get its twincab looks, historically used by the Tramways de l'Isère. Some of the specs will change too.

Note: *not all the refits imply a graphic change for the engine*. A few of them only have effects on the coaches or wagons attached to the engine. This is because, historically, a few railway companies shared the same or a very similar color scheme for their engines (black and dark green were the most common colors for steamers; green was very widespread for passenger coaches; grey-red and, later, cream-red was the most common livery for diesel railcars and their trailers). In our example, there will no difference between the 030T's looks in the "Petit Anjou" and the "Blanc-Argent" liveries.

Let's see now how we can change the livery for a locomotive when it's placed at the head of a consist.

As an example, we buy a new 1910 030T and attach a mail wagon, a short tramway-type passenger car and a bogie-mounted tramway-type passenger car, in that order. Then, we try to refit the train. Performing these steps in the mentioned order should yield this result:

We notice the refit list has shrunk, removing all the possible liveries for the engine! Does this mean we can't change livery anymore? Where is the long list we were looking at just before?

Before we panic, let's try to click on the engine:
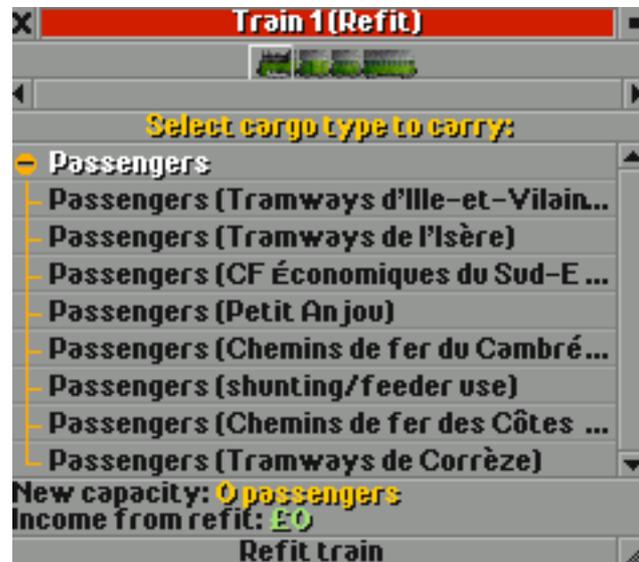
The list of the possible liveries to choose from has reappeared. We just learnt that, since they belong to the engine, the liveries will only show up when we specifically choose to refit the engine itself.

This reminds us that, *in the French Set, it is always recommended to refit each vehicle type separately, as opposed to the whole consist altogether.*
A good approach to refitting is to only select vehicles of the same type at a time. This is the way the Set was designed to work. Refitting vehicles of different types at the same time may lead to undesirable results and should always be avoided.

Let's therefore proceed by steps. The liveries we see on the screenshot above are those we're already familiar with; the only exception is that the Blanc-Argent and Charentes options are now absent.
The reason is that neither of these networks had any bogie-mounted passenger wagons at all. This is mimicked in the Set. Indeed, if we removed the bogie-mounted passenger car from our consist, we'd see the Blanc-Argent and Charentes livery reappear in the list. (You can try this yourself).

Let's now select all the other vehicles, one by one:

The mail wagon can haul mail, gold, and goods. While the first two seem sensible, the third one doesn't seem so. The reason is that some railway networks (namely the Corsican and the *Vivarais* companies) used to refit some old mail vans and employed them as large-capacity goods wagons. This is mimicked by the Set. Unluckily, TTD doesn't allow to easily change a vehicle's list of available cargoes; as a result, the mail wagon has to be able to carry goods all the time. However, when this is historically incorrect, as it'd be in our case, the capacity in terms of crates of goods is severely reduced, making regular closed vans a better choice.

The two passenger coaches can't be refitted to anything else. This is because the wagons used on the *Ille et Vilaine* network were rather basic coaches, not differentiated in any classes.

To see something more interesting, let's now refit the engine to the *Petit Anjou* livery (it's the fourth on the list) and then click on the short passenger coach again:

First of all, we notice the engine has changed its looks, adopting a black livery. The first two wagons also appear different. In reality, 2-axle passenger coaches on the *Petit Anjou* company were of a type with many compartments, each of which was accessible through one of the side doors: hence the different graphics.

When refitted to this company, the short passenger wagon yields three possible refits for passengers: those are the available comfort classes. A more luxurious class implies lower capacity, higher maintenance costs, slower cargo aging and, in a few cases, a lower loading amount (when the coach has

fewer side doors). When a passenger coach supports multiple classes, the lowest class is always the default choice. Refitting to a higher class is always more expensive than refitting to a lower one.

One thing we saw is that refitting the engine resulted in the coaches changing their characteristics as well. This leads us to the following important point:

In the Set, the liveries of all the vehicles in a consist will belong to the same historical company, which is decided by the leading engine.

This was implemented for realism's sake. In the game, all the vehicles can appear in many historical companies' liveries. However, *when in a consist*, they will always adopt the livery chosen for the leading engine; in fact, the leading engine is the only vehicle in the consist with any livery choice.

Therefore, if we want to change our consist's livery, we need to only select the leading engine, and then refit it to something else. For example, let's refit the engine again, this time choosing the *Tramways de la Corrèze* livery:

Voilà. In 1910, the *Tramways de la Corrèze* used 030T's with black boilers and green tanks, and their passenger and mail wagons were painted brick-red. Moreover, the short passenger coaches had open platforms at both ends, rather than multiple doors on the sides. *In the Set, refitting the engine only is enough for all the trailing vehicles to change livery as well*.

Of course, if at this point new wagons are purchased and attached to the train, they will follow the leading engine's livery; in this case, passenger and mail wagons will turn brick-red.

The Set also checks for impossible combinations, and will prevent them to avoid consists that would not be historically correct. In our example, let's remove the bogie-mounted passenger coach from our consist, and then refit the engine to the Blanc-Argent livery (which should reappear). Now, let's try to add the bogie-mounted passenger coach back to the consist:
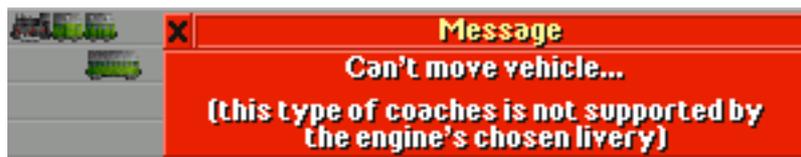
Again, the reason is that the *Blanc-Argent* network had no wagons of such kind.
A similar restriction applies when we try to attach any standard type of coaches (as opposed to "tramway" type) to our tiny 030T:

As another example, consists of the *Réseau Breton* network had no 2-axle passenger coaches at all.

The Set also includes engines that won't be refittable and will always appear in one livery. There can be to two reasons for this: (1) A few vehicles were very specific of a certain network, such as those used on the *La Mure* mountain line; (2) Others, instead, were so widespread that they could be found anywhere in the country, such as the small diesel shunters from the late Thirties. In the latter case, a detailed refit list would be just impractically long, with negligible differences among the variants.

3.2. Multiple traction

The same rules described above apply when coupling multiple engines in the same consist. Indeed, multiple traction was a very common sight on French narrow gauge tracks, especially in the early era, before the introduction of the Mallet engines.

Multiple traction can only be implemented by using "compatible" engines. To be compatible, two or more locomotives must be refitted to the same historical company's livery. They don't necessarily have to be of the same type.
For instance, a 031T steamer and a 120T steamer, both refitted to the *Réseau Breton* livery, can be coupled together. On the other hand, a 120T refitted to the *Réseau Breton* livery won't be compatible with another 120T refitted to the *PO-Corrèze* livery.

Here is what happens if we try the last example out (year 1903):

When two or more locomotives are coupled in multiple traction, all the trailing engines will not be refittable anymore. Only the leading engine will be refittable, and the livery chosen for it will be applied to all the vehicles in the consist (including trailing engines).
Of course, when a trailing engine is removed from the consist and placed as a stand-alone vehicle (or at the head of another consist), it gets back its refitting ability.

In case of two or more locomotives of different types in the same consist, the leading engine's refittability list will be shrunk to the intersection of all the locomotives in the consist's lists.
Suppose a consist includes a leading engine refittable to liveries A, B and C, and a trailing engine refittable to liveries A, C, and D. In this case:

- The leading engine will be refittable to liveries A and C: $\{A, B, C\} \cap \{A, C, D\} = \{A, C\}$
- The trailing engine will never be refittable and always follow the leading's livery.

Universal engines mentioned above can be coupled with many other kinds of locomotives regardless of their livery, with very few restrictions.

3.3. Push-pull trains

Another feature of the Set is the presence of trains capable of reversibility, or *push-pull service*. This is done in four ways, and it only works in certain cases, due to OTTD's limitations.
As a general rule, push-pull behavior is never compatible with multiple traction, except when dealing with railcars and MUs.

3.3.1. Engines being attached to the other end of the consist

In certain cases, when a single-headed engine is attached to a passenger consist either made by a combination of short passenger coaches and mail vans only, or by bogie-mounted coaches only, the train follows a special behavior. Upon reaching a track end, the engine moves to the other end of the consist, but the order of the wagons is not flipped. This simulates shunting when the train reaches an end of the station. As a result, the first wagon will become the last on the way back.
Moreover, if the locomotive is flippable (such as all diesels and most of the steamers), it will drive in the other direction on the way back; for example, a steamer that drove with the boiler in the front will drive with the cab in the front after the consist reverses.

As mentioned, this functionality is only available in certain cases. The way OTTD currently works prevents managing push-pull in a consist made with wagons of different lengths; this is the reason why, for instance, a consist entirely made of 2-axle passenger coaches may support push-pull, but a consist made of a mix of 2-axle and bogie-mounted coaches will not.

When the consist doesn't allow this feature, it will behave just like any default OTTD train.
When a saloon car is attached to the end of the train, it is intended to be a panoramic coach, with a higher comfort level thanks to the view the passengers can enjoy. Because of this, upon reversal of the train, the saloon car will be attached to the new end of the train, effectively swapping its position with the engine, while the rest of the consist keeps its original ordering,
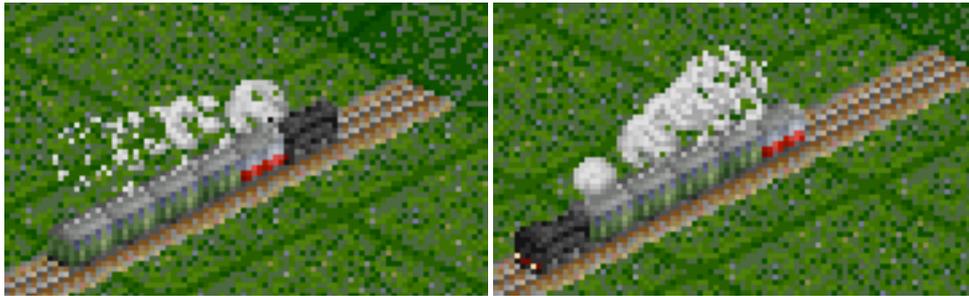
The above screenshots show an example of how this feature works. A *Chemins de fer Corses* train pulled by a 020 020T steamer, traveling with the boiler in the front, is made of a mail van, a 2nd-class passenger coach, and three 3rd-class passenger coaches, in that order. As it reaches the end of the track, the engine is placed at the other end of the train, this time driving with the boiler in the back; attached to the engine is a 3rd-class passenger coach, followed by the rest of the consist, with the mail van in the back.

3.3.2. Push-pull performed by engines and driving trailers

In the French Set, three narrow gauge locomotives support driving trailers. These are the 021T rackrail steamer, the HGm 2/3 rackrail diesel, and any Brissonneau-Lotz BB 600cv diesel engine built on or after 2005.
Whenever a driving trailer is attached to a consist led by any of these engines, and there is no multiple traction, the consist may perform push-pull service. Because of OTTD's limitations, the only types of wagons that support push-pull are bogie-mounted passenger coaches (of any type and year of built) up to a maximum of 9. This means that, if all the vehicles between the engine and the driving trailer are bogie-mounted passenger coaches, the train will travel with the driving trailer in the lead, and the engine in the back, upon reversing; otherwise, it will just follow OTTD's default behavior.
Please note that the driving trailer, when part of a consist, must always be put in the last position; therefore, no more than one driving trailer is allowed in a consist. This rule is always enforced.

3.3.3. Push-pull performed by railcars and their trailers

Many of the railcars included in the French Set are bi-directional vehicles; that is, they can to travel at maximum speed in either direction. In the French Set, by default, these railcars will simply switch the lights and drive back in reverse whenever they reach the end of the line. Even a consist made of

multiple tractions of the same railcar will follow this behavior, so the unit that was leading before the end the track was reached will become the last unit of the consist on its way back.

An exception to this behavior is a consist made of railcars of different lengths (for instance, a Billard A80D coupled with an A150D2), because of OTTD limitations. Even certain trailers, such as the mail van, will break this scheme. In these exceptional cases, the consist will follow OTTD's default behavior upon reaching the end of the line.

The railcar trailer has been added to the Set to provide extra variety on this side. It's a very versatile vehicle, able to carry many different cargo types (not only passengers, but also tourists, mail, and light goods), to reflect the fact that, on those small secondary lines, it could happen that a vehicle designed for generic passenger service might be used for a different aim. Like other vehicles in the Set, its appearance and characteristics will vary according to the railcar it's being attached to. In a few cases, the railcar trailer will be equipped with a small driving cab, allowing the consist to do push-pull service. In this screenshot, an old A80D in grey-red livery is leading a more recent railcar trailer in cream-red livery; upon reaching the end of the track, the consist reverses with the trailer in the lead, pushed by the A80D.

3.3.4. Push-pull performed by multiple units

The French Set includes a few multiple unit trains that can be combined together to form entire consist. OTTD's limitations allowed some of them to always work as push-pull trains, as it is the case with the Bhe 4/4 rackrail EMU; others, instead, have such a level of complexity that makes it impossible to implement this system, such as the Z200 EMU.

In some cases, such as the *Ligne de Cerdagne*'s Z100 or the *St-Gervais-Vallorcine* Z600 EMUs, flexible combinations of powered units and trailers are allowed, as long as there is a powered unit on both ends of the consist. Allowed trailers are usually standard bogie-mounted passenger coaches.

3.4. A special case: the Z200 EMU

The Z200 is the electric multiple unit train the PLM company designed for its mountain line around the Mont-Blanc, linking St-Gervais to Vallorcine and touching the Swiss border.

As mentioned above, this was a very unique train. In a Z200 consist, all the vehicles lied upon a standardized 3rd-rail powered 2-axle truck with two engines, capable of developing the power of 110hp; on top of these motorized trucks, different types of bodies were placed, that were able to transport passengers, mail, or any kind of goods.

The result was an electric multiple unit made of mail vans, passenger coaches, closed vans, low-sided open wagons, and flat trucks, each of which was motorized and featured a brakeman's cabin. Every consist was led by a driving van, allowing the personnel to drive the train, and commanding all the engines of each attached car.

Sometimes, non-motorized 2-axle wagons were also added to the consist, whenever the need for traction was not so compelling.

The Set reproduces this vehicle's peculiarities by allowing each Z200 unit to be refittable to any cargo in the game, while maintaining its power, tractive effort, and other characteristics. By default, when a Z200 unit is bought, it will carry mail; through refitting it will be possible to choose the desired cargo. A refitted Z200 unit can appear as a mail van, a passenger coach, a closed van, a low-sided open wagon, a flat truck, or a tanker, depending on the cargo and the subcargo chosen. This allows great flexibility in building a mixed consist.

The only two restrictions are:

- The unit at the head of the consist has to be refitted to mail. This is to recreate the fact that the driving cabs had a small compartment that could be used for that cargo. When refitted to mail, the leading unit has a lowered capacity, to represent the room taken by the driving equipment;
- To prevent unrealistically powerful consists, a maximum of 10 Z200 units can be coupled together.

Any 2-axle coach or wagon can be attached to a Z200 consist. When attached, such a wagon will take the same looks as a Z200 itself, but won't add any power or traction to the consist. This is to reflect the fact that non-motorized and motorized wagons looked very similar.

In a game, the Z200 can be used to form passenger, freight, or mixed consists. With the traction assured by having all the vehicles powered, it can help climb steep tracks in the early years. On the other hand, the high purchase and maintenance costs of such a consist should limit its use only when traffic is frequent enough to keep it profitable. In case only a moderate tractive effort is needed, a combination of motorized Z200 units and non-motorized wagons can be a good choice.

Like most of the other multiple units in the Set, Z200 vehicles cannot be coupled with any other multiple unit types, nor with any locomotives.

4. The French Rails Set

4.1. Overview

The French Rails Set is the French Trains Set's natural companion. It features specific rail types for OpenTTD designed to match the vehicles in the trainset.

The narrow gauge part of the French Rails Set includes eleven types of rails:

Code	Description	Year	Axle wt (t)	Speed (km/h)	Rails	Sleepers	Ballast	Power source
NAaN	Light tracks	1880	8	60	Very light	Wooden	Sand	None
NAAN	Standard tracks	1881	11	75	Light	Wooden	Sand, gravel	None
NAAE	Standard catenary tracks	1903	11	75	Light	Wooden	Sand, gravel	Catenary
NAA3	Standard third-rail tracks	1902	11	75	Light	Wooden	Sand, gravel	Third rail
NABN	Heavy tracks	1902	15	75	Standard	Wooden	Gravel	None
NABE	Heavy catenary tracks	1902	15	75	Standard	Wooden	Gravel	Catenary
NAB3	Heavy third-rail tracks	1909	15	75	Standard	Wooden	Gravel	Third rail
NABZ	Heavy amphibious tracks	1990	15	85	Standard	Metal	Gravel	Cat+3rd rail
NBBN	Heavy high-speed tracks	1970	15	130	Standard	Concrete	Gravel	None
NRAN	Rackrail tracks	1892	9	30	Very light	Wooden	Crushed stone	None
NRAE	Rackrail catenary tracks	1953	9	30	Very light	Wooden	Crushed stone	Catenary

This rather long list results from the combination of three main rail types (very light, light, and standard) and two electrification systems (catenary and third rail). Light and standard rails can be electrified and, in the Alpine mode, a rackrail can be added to very light tracks. In the later years, standard rails can be equipped with sturdier sleepers and ballast, to achieve higher top speeds.

The availability dates for some rail types are conditioned on the appearance of the first vehicle requiring that particular rail type, hence the randomness in their introduction date.

If the *realistic features* parameter is set to On, each vehicle in the Set requires rails supporting an equal or greater maximum axle weight, otherwise its entire consist will be forced to run at a greatly reduced speed.

Some unique features of this railset are:

- All these new types include their own graphics for tracks, with specific ballast and sleepers inspired by real, historical tracks; wooden fences surround all the rail types except for basic unelectrified, where no fences are provided (as it was historically the case);
- They also include new railroad crossings, whose style changes with time and location, differentiating urban from rural crossings, as well as specific tunnel portals for each type;
- Each catenary-powered rail type features specific poles, each drawn after original pylons (for instance, the heavy catenary-powered tracks use concrete pylons built in 1906 during the electrification of the "La Mure" mountain line): catenary type also varies across track types;
- Each rail type features its unique depot style, all modeled after depots found on real railway networks: some of them will change by year and location of built;
- When in snowy terrain, tracks and depots will be accordingly covered by snow.

All the tracks included in the Set take advantage of the "infrastructure costs" feature of OpenTTD, meaning there will be a maintenance cost associated with having track tiles in the game. The cost is the lowest for the unelectrfied tracks, and becomes higher whenever features such as an electrification system, a rackrail, or concrete sleepers are installed to improve the tracks.

Lastly, in modern versions of OTTD, all these rail types except for modern "high speed" will always allow for 90-degree curves. This is to mimic the fact that, in reality, a narrower gauge allows for sharper curves than standard or broader gauges.

4.2. Rackrail tracks

Rackrail tracks have been included in the Alpine set mode, but their presence in the Set is more an element of historical correctness and of variety (also known as "eye candy") than anything else; its usefulness in the game is very limited.
Since OpenTTD doesn't feature slopes of different grades, there is little to no need for trains that are extraordinarily capable of climbing steep slopes: even in the early years, any normal-adhesion freight engine will be able to pull a reasonably-sized train up a slope, at least in multiple traction.
Moreover, the rackrail tracks' very low historical speed limit (in certain cases, even lower than 10 km/h) makes rackrail trains too slow to be able to compete against contemporary normal-adhesion engines, which, due to the game's dynamics, can easily achieve significantly higher speeds even when climbing uphill tracks.

In the Set, a rackrail engine will receive a boost in its tractive effort when driving on a track tile equipped with rack. This reflects the fact that the adhesion coefficient switches from about 0.3 to a value close to 1 when the motion is provided by a pinion driving on the rack. However, the final TE will still be determined by the weight gravitating on the pinion itself, so the value cannot surpass a certain amount.

4.3. Other track sets

Although the combined use of the French Rails Set together with the French Trains Set is highly recommended, it's not required. OpenTTD players who do not wish to use the French Rails Set together with the French Train Set can toggle the first trainset parameter to "on", which will disable the French Rails Set and display the narrow gauge trains as normal standard gauge trains.

An alternative trackset players might decide to use is the popular NuTracks Set. If that trackset is loaded in a game instead of the French Rails Set, the French Trains Set will pick it up and allow trains to run on NuTracks's narrow gauge rails. Because of NuTracks' lack of a narrow gauge 3rd rail tracktype, third-rail vehicles in this Set will appear on catenary-powered lines.

Because the French Set as a whole will come with its own trackset, eventually including standard gauge railtypes supporting different values for maximum allowed axle weights, there are no plans to achieve compatibility with any foreign track sets other than NuTracks.

4.4. For the developers

Developers of other train Sets that include narrow gauge rolling stock, who wish to code their trains so that they're to compatible with the French Rails Set, are more than welcome to do so. To this aim, the internal labels for each single railtype in the Set are provided in the table above.

This labeling standard follows a logic that stems from discussions with other Sets' developers wanting to achieve similar goals as the French Rails Set (namely the CETS Set and the Japanese Train Set). It has been implemented to provide some compatibility across tracksets sharing similar aims. It is based on a convention that links the first letter to the railtype's gauge size; the second letter to its maximum allowed speed; the third letter to its maximum allowed axle weight; and the fourth letter to its electrification system, if any.

5. Playability notes

5.1. Parameter setting

The French Narrow Gauge Train Set comes with a number of parameters, allowing players to customize their experience.

5.1.1. Place trains on default tracks

By default, vehicles of this trainset will run on proper narrow-gauge tracks, provided the French Rails Set (or the NuTracks Set) are active in a game. Setting this parameter to "on" while either aforementioned set is active will automatically send vehicles to default OTTD (i.e. standard gauge) tracks.
Please note that, if no suitable railset is active, French narrow gauge vehicles will always be sent to default OTTD tracks, regardless of this parameter's value.

5.1.2. Automatic replacement of original liveries

In reality, railroad companies often change their vehicles' color schemes, sometimes for practical reasons, but also to follow the time's fashion and trends. Most steamers were black, a color that makes dirt less visible; early railcars were at least partly red, to make them more visible on their tracks, sometimes built directly on public roads.

In this Set, vehicles will by default keep their original livery for their entire life. The aim of this is to have a more diverse array of engines and wagons, with older ones keeping their original looks alongside newer vehicles.

Setting this parameter to "on" will instead force old vehicles to adopt new paint schemas shortly after they've been introduced. Vehicles can only change their liveries upon a depot visit, and repaint is usually done in waves, the older ones being repainted first. The exact latency between a new livery adoption and a repaint of old vehicles is ultimately random, loosely based to what happened in the real world.

Please note that setting this parameter to "on" might be the only way to get a specific paint schema applied to a vehicle: this will happen in cases in which a new livery gets introduced when a vehicle is not buyable anymore, but still usable.

5.1.3. Disable realistic features

The "realistic features" in the French Narrow Gauge Train Set are: (1) stowage factors for freight wagons; (2) the presence of braking wagons; (3) the concept of maximum axle weight for the tracktypes. Each of these has already been discussed in paragraph 2.3. By default, these features are always active. Setting this parameter to "on" disables all these three concepts: freight wagons' capacities won't change, regardless of what they carry; non-braking freight wagons become unavailable; and all vehicles will run at the max speed allowed by the tracks, regardless of their weight.

5.1.4. Capacity modifier

The Set's aim has always been to mimic real world, including the real capacity of wagons and coaches. By default, all vehicles' capacity is as close to the real capacity as possible. For cases when this is not the best solution gameplay-wise (especially due to OTTD's passenger generation algorithm, which tends to produce them in very high numbers), two parameters allow to cut capacities in half or raise them by 50%, separately for freight and passenger vehicles. Mail is treated as passengers.

5.1.5. Cost modifier

Vehicle's purchase and maintenance costs have been optimized so that the Set is internally consistent. However, players who use other sets alongside this one might want to adjust the values to make them more in-line with other sets; or, perhaps, just to make the game easier or more challenging. Purchase and maintenance costs can be independently halved or doubled.

5.1.6. Set mode

As mentioned before, this Set comes in two slightly different flavors: Basic and Alpine, each of them enabling a slightly different purchase list. This parameter allows choosing between the two, adding a "default" option, which will activate the Basic mode in Temperate climates, and the Alpine mode in Arctic climates.

For those players who dismiss any sort of realism and historical correctness notably as BAD FEATURES, there is the Toy mode, which:

- Greatly simplifies the vehicle list (reducing it to 4 steamers, 4 diesels, 2 electrics, 6 railcars);
- Removes historical liveries, replacing them with "2cc" colors;
- Eliminates any constraint in consist building (you can have a fast passenger railcar hauling a coal train), as well as realism effects such as braking force and axle weight;
- Takes away any sort of push-pull feature.

In a sense, the Toy mode tends to recreate a more plain vanilla TTD kind of experience.

5.2. Compatibility with other train sets

The French Train Set was developed as a stand-alone trainset, with all of its parts fully integrated and designed with coherence and realism as main aims. For this reason, compatibility with other train sets has never been, neither will ever be in the future, a priority for this Set.
Players who wish to use the French Train Set alongside other Sets are welcome to do so, but no guarantee is provided about how coherent and balanced the result will be.

5.3. Suggestions about how to play with the Set

To begin with, there are some settings in OpenTTD that might have been designed in an effort to enhance game difficulty. Unfortunately, their implementation turned out to be so implausible and unrealistic that they eventually detract from the gaming experience: a player would most likely be better off if they turned them off. For this reason:

- *Infrastructure maintenance* should be turned *off* at all times. An otherwise very interesting concept, it was unluckily implemented in OTTD in a way that lacks credibility and realism, because of a serious design mistake: costs grow over-proportionally with the railroad network size. As a result, this feature is completely oblivious of those economies of scale real-world transportation companies heavily rely on. Such a flaw makes this potentially interesting feature quite pointless.
- *Inflation* should also be turned *off* at all times. Just like infrastructure maintenance, it's a very interesting concept that should belong to any business simulation such as OTTD, but its implementation in the game is flawed by the fact that it grows costs more than revenues. What happens in reality, instead, is that inflation first impacts consumer prices (i.e. a railroad company's revenues); its effects on wages (which correspond to a company's costs) are usually observed later.
  Another flaw in OTTD's implementation of inflation is its being constant all across the years, instead of fluctuating. Therefore, because of the compounding effect, year 2020 prices in a game started in 1880 will be astronomically high.
  Both these glitches are carryovers from the original Transport Tycoon implementation.

Fortunately, it's not all bad: OpenTTD also introduces a huge interesting game-enhancing features, affecting difficulty, vehicle behavior and availability, and infrastructure building. To get the best experience out of playing with the French Set, there is a list of recommendations as to how to turn a few of those switches.

To enhance the trains' behavior:

- *Realistic settings for curves and mountains* give a more accurate behavior to trains when driving on slopes. Curves hardly affect narrow gauge trains, because their maximum speed is usually low enough to allow them to negotiate curves at full speed. Slopes, however, play a more prominent role, and their presence will be an important factor in the engine choice for each line.
- The *freighttrains* switch also plays a role in simulating a correct behavior for trains. Setting a multiplier of 3 for them will make full freight cars heavier, therefore requiring more powerful engines, or multiple tractions, to pull long freight trains. Setting higher values will make it very challenging for trains to climb slopes; one will be forced to resort to multiple traction at all times in early years, until the appearance of the stronger Mallet type engines.
- *Wagon speed limits* should be enabled too. It will limit the freight trains' maximum speed, keeping things more realistic. It will also dampen the advantage of the 3-axle open wagons, which were specifically designed for mountain lines, therefore having a lower maximum speed.
- The *multihead* switch should be enabled, with a value of 0, to prevent trains from driving faster than they should. As mentioned, multiple traction was a very common sighting in

French secondary railway networks, especially on mountainous regions when the steep tracks required extra tractive power.

Then, to get the best experience in terms of vehicle availability:

- *Start year* should be set to 1882. The first two narrow gauge steamers are available in 1881, but since OpenTTD randomizes the vehicles' introduction date, starting the game one year later is always a safe choice. Initiating a game so early constitutes an interesting challenge, as the player will start with the earliest and weakest locomotives and will have to either use their ingenuity to lay tracks that avoid excessive steep slopes, or resort to multiple traction. The game will lead the player through the gradual evolution that the narrow gauge rolling stock had until the modern days.
- Turning off the *persistent engines* switch will allow for the normal cycles of introduction and obsolescence of every vehicle in the Set, and will make the playing experience more interesting and challenging. The player will start off with steamers, then gradually switching to diesel traction, using railcars and MUs for passenger hauling.

Finally, the following switches will enhance the Set when it comes to infrastructure building:

- *Higher bridges* should be allowed. Many narrow gauge lines were built in impervious mountain regions, and required engineering works such as long tunnels and long-spanning bridges to reach certain areas. This switch will allow players to build realistic mountain narrow gauge networks.
- The *larger stations* switch should not be a compelling requirement for the narrow gauge part of the French Set, since most stations on those secondary lines were very small and usually had no more than two tracks. However, some railway networks had larger, more complex stations in the city they were headquartered in, so this switch could be useful to at least recreate those stations.
- The *signals on traffic side* switch should be turned *off*. In France, road traffic drives on the right, but the train traffic runs on the left (except for Alsace); therefore, if the railway signals are mounted on the road traffic sign, they will not reflect their actual position in reality.

When laying tracks, feel free to lay them directly into cities or villages. Historically, many narrow gauge lines shared the same space with rural roads, and in certain cases turned into urban tramways when they entered towns. Although OTTD doesn't allow laying railway tracks the same way as tramway tracks, having a single-track narrow gauge line running straight through the heart of a small town might be a more realistic sight than one could imagine.

Finally, keep in mind that the French narrow gauge lines were made of a single track 95% of the times. Double tracks were seen only at stations, which were the only points when trains traveling in opposite directions could cross.
If, however, there is the strong need to create a double track line, players should keep in mind that, in France, *trains run on the left!*

6. Consist examples

6.1. Passenger trains

6.1.1. Seaside trains

Many narrow gauge networks made a fair share of their income from hauling bathers to the most renowned seaside locations. This was especially true around the turn of the century, before automobile traffic became widespread.
The *Réseau Breton* was one of them, with its thick network servicing many seaside towns of Brittany.

It was the reign of "fast" steamers, capable of the then-remarkable speeds of up to 55 km/h: bogie-mounted coaches were provided for tourists, combining a good capacity with some comfort. Specific *bains de mer* coaches were built in the 1920s and used on those touristic trains.
It wasn't a rare sight to spot some mixed passenger/freight trains as well.

The *Chemins de Fer du Sud de la France*, later known as *Chemins de Fer de Provence*, also serviced important seaside towns on the *Côte d'Azur*. They used two generations of fast steamers, the first following an original design, and the second similar to those found in Brittany. Their wagons used to be left in natural teak color, and then repainted in a dark red livery with black around the windows.

Steamers were replaced by faster, more efficient railcars as soon as the mid-Thirties. Articulated railcars were used on the seaside line; different railcars built by Renault were employed on another famous seaside train, the *Alp'Azur*, which was the southern leg of the Genève-Nice connection (the northern part of this connection running on standard gauge tracks). This service ran from 1959 to 1989, with railcars of different generations.

6.1.2. Mountain trains

Allowing for tighter curve radius and taking less space, metric gauge was seen as a natural candidate for the construction of railroad lines over hilly or mountainous areas. Especially in the Alps, many networks were built to carry tourists to their ski resorts, or to towns and villages scattered around the area.
Though mainly a freight network, the *La Mure* company also hauled passengers around this area.


In recent times, a touristic service was introduced, using vintage locomotives and coaches. Trains got repainted in red, to mimic their Swiss neighbors.

The *Vivarais* network also operated passenger trains on the hilly region of the *Ardèche*. In the early years, trains were hauled by steamers, sometimes in multiple tractions. The network also had a special "saloon" car, providing extra comfort for a selected clientele: that wagon, a variant of the 2-axle coach, was usually placed at the end of the train, to provide for a better view.

Steamers were replaced by more economical railcars in the 1930s.
Soon after WW2, a high-quality service across the Vivarais valley was launched, operated with Billard railcars equipped with a small bar: this service was called *La Flèche des Cevennes*.
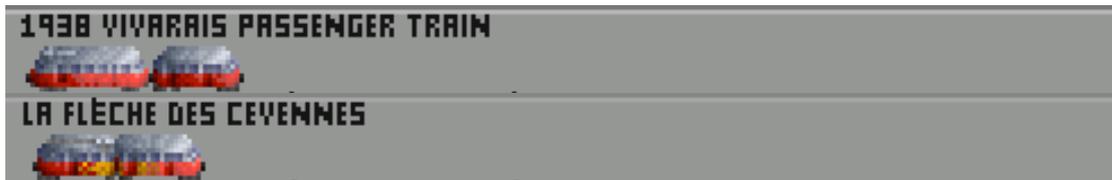
Other mountain networks opted for early electrification. The line from *St-Gervais* to *Vallorcine*, operated by the PLM company at the beginning and later by SNCF, equipped its tracks with a third rail and used Z200 trains right at the turn of the century. New generations of rolling stock were introduced in 1958, 1996 and 2006, respectively.
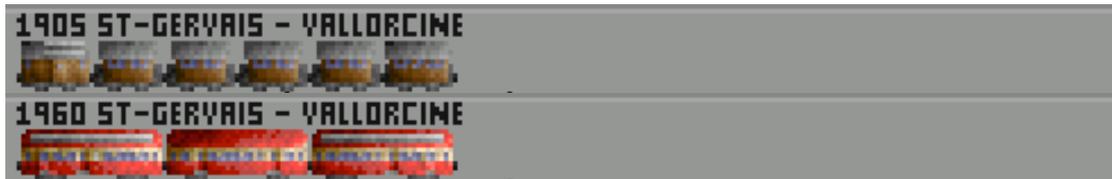
Another line that chose electrification was the *Annemasse-Sixt*, operated by the Nord company, very close to the Swiss border. They opted for a catenary system, and used railcars since the 1930s.

The *Tramway des Alpes Maritimes* also ran a thick network of electrified lines on the mountains by the French Riviera. Their rolling stock was very simple.

Finally, the *Ligne de Cerdagne* on the Pyrenées mountains was another notable network that opted for early electrification. They chose a third-rail system and operated what became famous as the Little Yellow Train, also nicknamed *Canary*: the original rolling stock still survives today, albeit rebuilt.
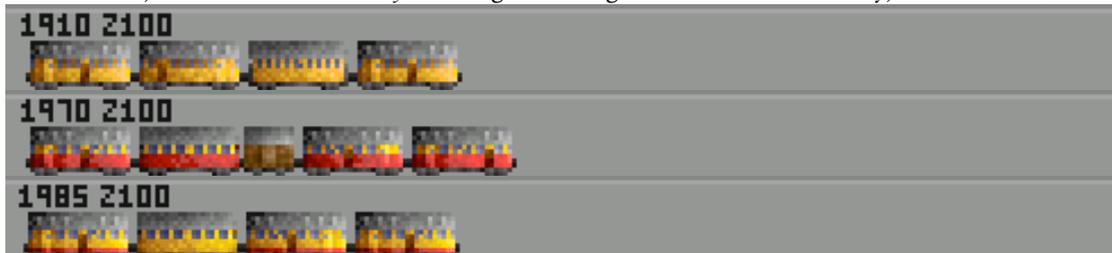
6.1.3. Corsica

Being the only railway system in the whole island, the *Chemins de Fer Corses* had since the beginning an important passenger traffic. In the early years, most trains were pulled by small steamers, and were typically composed by two bogie-mounted coaches sandwiched between two mail vans.
Longer variants were also common, especially used on longer-distance trains, or for rush-hour services.

As it was the case in many other networks, the 1930s saw the introduction of diesel railcars, which soon relegated steam traction to freight service. Railcars have been used ever since, often in conjunction with trailers.

6.2. Mixed trains

In the earlier years, trains that would carry both passengers and cargo of any sort were a very common sight on secondary metric-gauge lines all around the country. Traffic density was often so low that it wouldn't justify running freight and passenger service separately: whenever this was the case, a few cargo wagons were therefore added to a passenger consist.
One could spot mixed consists virtually in any network across the country, even in the most prominent ones such as the *Réseau Breton* or the railways of Provence:

Mixed trains were also common on mountain lines. Freight wagons were often attached to electric railcars as well.
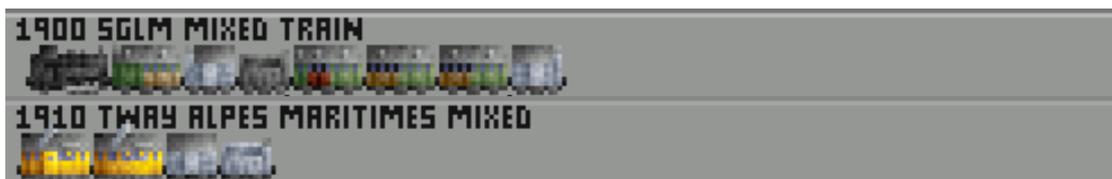
Of course, such mixed trains were very frequent in the most locally-focused networks, such as the *PO-Corrèze*, the *Petit-Anjou* or the myriad of interurban "tramway" companies operating pretty much everywhere.

Corisca was no exception to the rule either. This network was specifically interesting, because privately-owned, sponsored closed vans were often attached to consists. In the Set, they appear with their bright red or yellow liveries, to mimic those that existed in reality.
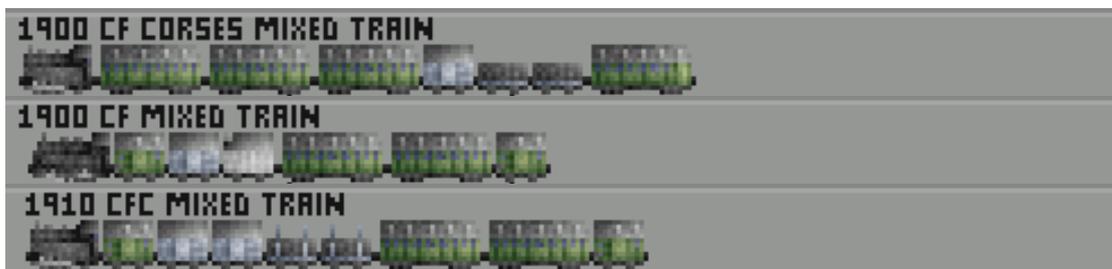
6.3. Freight trains

Proper freight traffic was also a large source of income for those small networks, especially in the early years, before road trucks finally proved to be a cheaper, more flexible means of transportation.

A prominent example of freight transportation across metric railways was found on the *La Mure* network. It built its lines around rich anthracite coal mines; early electrification helped reduce costs, making coal transport very profitable. It employed different generations of locomotives and wagons.
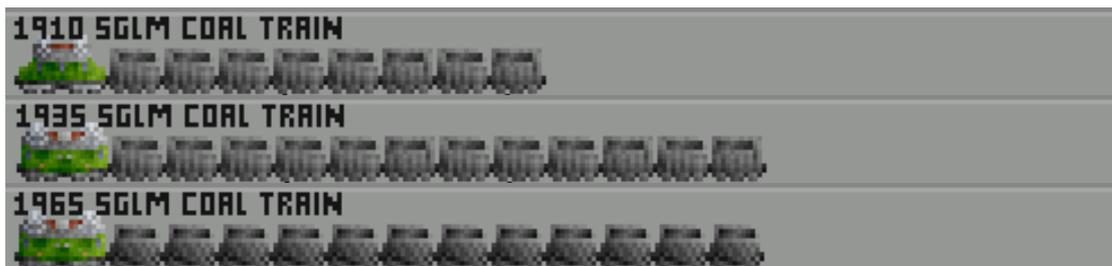
Other examples of freight transportation on metric gauge lines were refrigerated wagons for fish on the *Réseau Breton*, and specific tankers for wine on the Corsican network.
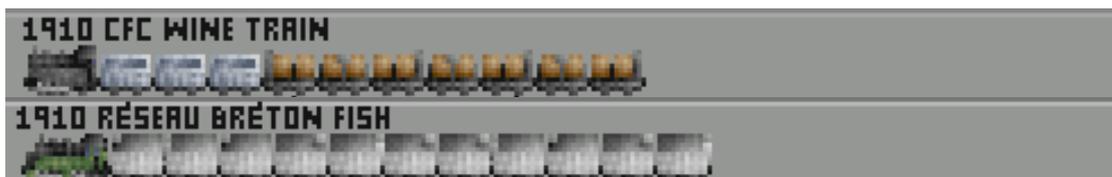
Most freight trains on such narrow gauge lines, however, tended to be heterogeneous, and often merged multiple kinds of cargo in the same consists. Following are a few examples of freight trains observed in real-life Corsica.

7. Acknowledgments

The development of this Set would not have been possible without the valuable help of Michael Blunck, to whom goes my warmest gratitude for his impeccable technical help, his to-the-point suggestions, as well as his willingness to teach me and allow me to use his great "m4nfo" program, with which the French Set has been coded. The patience with which he has listened to my complicated ideas and has addressed my out-of-the-world requests has earned him my biggest appreciation!

I would also like to thank Martin Pink (aka Mart3p) for his early work in coding a very preliminary version of the Set. His suggestions helped me refine my drawing abilities. He also generously shared some graphical ideas of his, granting me permission to take inspiration from his great sprites.
Those sprites include a few cargoes loaded on the flat wagons, recognizable as wooden crates, plywood planks, sheets of metal, cable drums, and metal coils.

Special acknowledgments also go to (in alphabetical order), Walter Bamberger (aka Wallyweb), Loïc (aka Lt Gable), Daniel Plaumann, François Schmitt (aka Arikover), Paul Schweizer (aka The Irish), and James Vassie (aka JVassie), for our long-lasting talks and idea exchanges about the French Set. Looking forward to continuing working with all of you!
And, of course, my thanks also go to everyone who's reading this and who is going to contribute to this Set's completion through playtesting, bug hunting and, more than anything else, constructive yet merciless *criticism*!

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9. FAQ

- *I tried this set. It's not so bad, but the choice of vehicles is very limited. There are fewer and fewer trains being introduced since WW2. Also, really fast trains are totally missing, as well as strong freight haulers.*
  Yes. This set only contains narrow gauge trains, which had their golden age *before* WW2. Some vehicles will still be available in the later period, but there will be less variety. Standard gauge is obviously totally missing.

- *Whatever, but this is supposed to be a set of French trains. Where are the Orient-Express, the Flèche du Nord, the TGVs?...*
  True, those are missing, but there is still the *Flèche des Cevennes* if you want a luxury train.
  Just kidding! Standard gauge will be there in due time. Have patience…

- *I can't understand why you started with those funny-looking trains hardly anyone knows of. Couldn't you include the most famous ones first instead?*
  When I was making my first baby steps as a coder, I needed to start somewhere. Michael was, and still is, greatly helping me, but I couldn't ask him to code the whole set for me: I needed to learn things myself. That's why this set started very much like a "Jacopo learns to code" attempt: I felt it was wiser to start with a slightly smaller, simpler trainset than the massive French Standard Gauge Trains Set I have in mind.
  Indeed, I do feel the French Narrow Gauge Trains Set, with its fewer vehicles and less complex cross-dependencies, has been a perfect environment for me to get more familiar with m4nfo and trainset coding in general. I still hope you do enjoy the final result.

- *Ok, I get it. (Sigh) Is there anything I could do to help speed up the development of this damn set?*
  Well, probably not right now. Once a preliminary version of the Standard Gauge set is out, please test it thoroughly, explore all the possibilities that come up to your mind, and then pummel me with criticism, bug reports, and suggestions about how to do better. The more constructive criticism I get, the better I can enhance the future versions. In other words, don't be shy to hammer me!

- *Whoa, these trains of yours are really small…*
  Of course. This et is about narrow gauge rolling stock. What did you expect?

- *No, I mean, REALLY small. I sometimes need my magnifying glass to spot them!*
  Well, they've been drawn in scale, so that the difference with forthcoming standard gauge rolling stock will be immediately visible (as it was in real life). Wait until you see the standard gauge trains, and then we can talk about it.

- *Man, this train set seems to be obsessed with realism. But I just want to build stuff and play my game. Is there a way I can forget about all that historical crap?*
  Well, you don't have to build a historically correct railway network if you don't feel like. After all, every locomotive comes in a default livery: you can always stick with it and forget about refitting. Or, play with refitting until you get the variant that most pleases your eye. Think of it as graphic variety.
  If you still can't stand it, then opt for the Toy set mode. It sounds like it's right for you.

- *Yeah, but unless I choose to go all the way with the Toy mode, there are still pesky restrictions about constructing a consist, attaching wagons…*
  True. But usually, the engines' default liveries are those that allow the most freedom in consist building. You should be ok if you stick to them. And you can always safely attach two or more engines of the same type to form a multiple traction train if you don't use refits. Unless you try to create consists that seem to come from the outer space, you should be OK.

- *But other train sets allow for much more freedom!*
  So what?

- *But even the original TTD allowed me to build any consist I wanted!*
  So what?

- *But…*
  This is how I see it. Moreover, leaving some constraints that enforce a bit of realism helps giving some slower engines a real chance, since players won't always be able to go for the "fastest, most powerful" available engine all the time.

- *Dude, what's your problem? Did you watch too many Japanese cartoons when you were a kid or something?*
  As they say in France, I'm a rivet counter (*compteur de rivets*). Deal with it. :p
  (by the way, no one could ever beat *Captain Tsubasa…*)

- *Hey, I spotted a bug! Engine X appears weird in conditions Y and Z.*
  Excellent! Make sure you post it on the thread. I'll be happy to have a look at it and correct it.
  (If only I could hear these words more often…)

- *This engine's livery appears weird. And I don't really like the graphics of that EMU.*
  Okay, so why don't you post that on the thread as well? If the graphics can be enhanced, I'd be more than willing to go back to the drawing board.

- *Nice train set here, but the lack of standard gauge vehicles is really a drag. When do you think the standard gauge rolling stock will be released?*
  Well, as everyone else, I've got a day job too. This is just a fun hobby of mine. As such, I can't really promise anything in terms of timing, other than the fact that it *will* be released, some time in the future.

- *How about including vehicle X in the set?*
  The vehicle list has been designed to provide a good balance between variety and playability. Some engines or railcars have been left out because of various reasons: limited added value to the Set; too strong similarity to other vehicles already included; low number of units built historically; or gauge other than metric. Usually, if a vehicle didn't make it to the Set, it was a combination of all these. And at this point, there is little to no chance anything else will make it to this set. I now need to draw my attention to standard gauge trains…!

- *I actually think this set contains way too many vehicles… if you put so many narrow gauge trains, what will we see in the standard gauge set? A list that it takes hours to scroll through?*
  Well, sometimes I come across interesting engines or railcars, and I can't resist the temptation to draw them. If you think there are too many vehicles, you can just stick to those you prefer. Or, again, switch to the Toy mode.

- *I'm trying to use your rackrail steamer, but I can't really find a way to make it useful. It's way slower and more expensive compared to the other rolling stock.*
  Yes, this is true. Unluckily, for rackrail engines to be really useful in the game, we'd need to have slopes with different degrees of steepness. This way, rackrail engines would be the only ones capable of climbing the steepest hills. However, OpenTTD is designed as to only have slopes of the same steepness, so we have to live with this.
  The rackrail engine's very limited max speed is actually already "too" high: historically, the engine included in the Set drove at 8 km/h when using the rack. Moreover, its TE can't be boosted above the limit imposed by its weight. Finally, due to the delicate and complex system of traction through pinions, the rackrail engine's purchase and maintenance costs need to be above average. OpenTTD itself is unluckily not suitable for rackrail engines.

- *You're talking garbage. I've got an idea that will make rackrail really useful in a game!*
  Seriously? I've tried to think about other possible solutions, but to no avail. If you think you've got a better solution that gives rackrail engines a true advantage and preserves

historical correctness, while not breaking any other aspect of the game in the meantime, I'd be more than happy to hear it. Feel free to post on the thread.

Just, "raise the slope steepness for all trains to 10%" won't be taken as an answer, because such a solution would seriously affect all of the other trains in a game.

- *I'm playing this set together with XYZ Set, and am noticing major mismatches in terms of prices / running costs / capacities. Why is the French Set so misaligned?*
  Interesting question. As for capacities, they're very close to historical, so there's little chance I will change them in the set: you've got parameters to slightly alter them, though. As for prices and costs, although my aim is *not* to make a trainset to be played with foreign sets, if the quantities here are so not in line with other important, well-developed sets out there, it's more than likely that the French Set requires extra balancing. Don't hesitate to report such a discrepancy on the thread!

- *Can I play with this set together with tracksets other than the French one you also released? I don't really like it.*
  Well, NuTracks is supported, except for its lack of narrow gauge 3rd rail or rackrail. You can use that one if you prefer. Otherwise, don't forget the Set has a specific parameter that disallows the use of the French Rails Set. When set to "on", the narrow gauge trains in this set will always appear as regular (electrified or not) trains, to be used on the RAIL and ELRL track types.
  On the other hand, the French Trains Set is *not* compatible with the "Japanese Track Set" set. The main reason is that the latter still uses a legacy system to assign labels to tracks.

- *I have the opposite problem. I like your tracks, but I couldn't care less about your trains. Is there a way I can use this trackset with other sets' narrow gauge rolling stock?*
  Well, I'm not sure about that. The French Rails Set's railtype labeling system is shared with other Sets, so it is more than likely that trains with those Sets will be able to run on the French Rails as well.

- *Hey, I can recognize my graphics there! You stole my sprites!*
  Jeez, I really hope I didn't… All of my graphics are original, except for a few cargoes on top of the flatcars, which were inspired by Mart3p's graphics for his industrial station set; he gave me permission to use his sprites as a base.
  As for the other graphics, if it's too close to yours, we can definitely talk about it. If you feel some of your artwork ended up in this Set without your permission, don't hesitate to post it on the thread.

```
?ERROR: Read past EOF
READY.
SYS64738
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