Wagon Blueprint

Release version 1.01 (2007-12-11)

1 Introduction

The Wagon XML Blueprint is used for non powered vehicles. It is the equivalent of the Engine Blueprint used for Powered vehicles.

2 Wagon Blueprints

2.1 Name

Self explanatory, this is the descriptive name of the Vehicle

Browse Information

2.1.1 Display Name

This is the name of your vehicle as seen when using the World Editor in Scenario Tool mode. Localisation fields are available for multiple languages.

2.1.2 Other

This allows for other languages to be specified if they are not in the list provided.

2.1.2.1 Lang ID

A numeric identifier for the additional language, if more than one is implemented.

2.1.2.2 String

Specify the location of the language file here.

3 Rail Vehicle Component

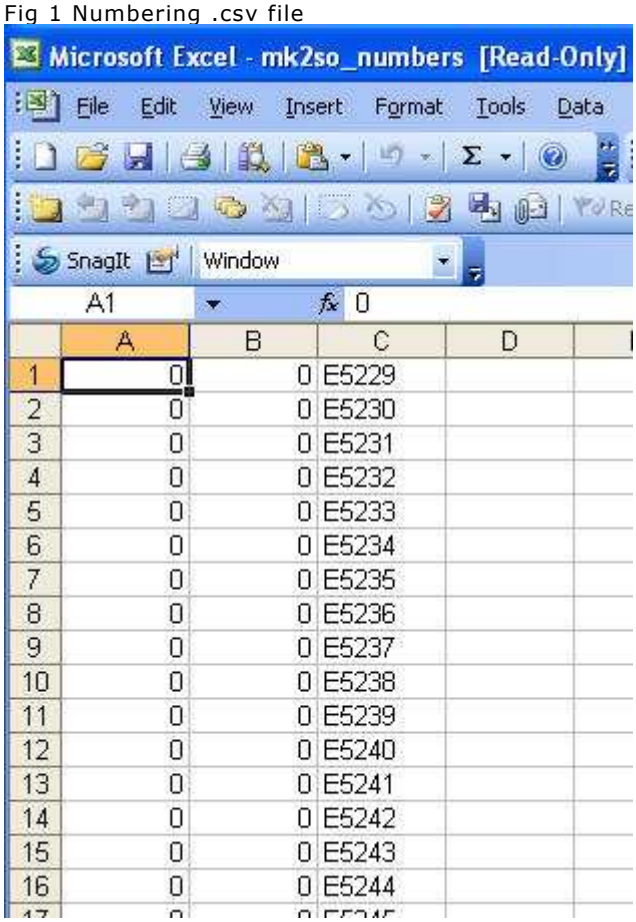
3.1.1 Numbering List

Each rail vehicle can have feature unique numbers when placed multiple times in Rail Simulator. To allow for this you must specify a .CSV file containing all the possible numbers to vehicle can have.

If you name your vehicle, you can specify just one number in this file.

The .CSV must be in the format shown below with zeros in the first two columns and the actual numbers which can include letters, in the third column

Fig 1 Numbering .csv file



	A	B	C	D
1	0	0	E5229	
2	0	0	E5230	
3	0	0	E5231	
4	0	0	E5232	
5	0	0	E5233	
6	0	0	E5234	
7	0	0	E5235	
8	0	0	E5236	
9	0	0	E5237	
10	0	0	E5238	
11	0	0	E5239	
12	0	0	E5240	
13	0	0	E5241	
14	0	0	E5242	
15	0	0	E5243	
16	0	0	E5244	

3.1.2 Front Coupling Blueprint ID

3.1.2.1 Provider

Name of developer folder

3.1.2.2 Product

Name of product folder

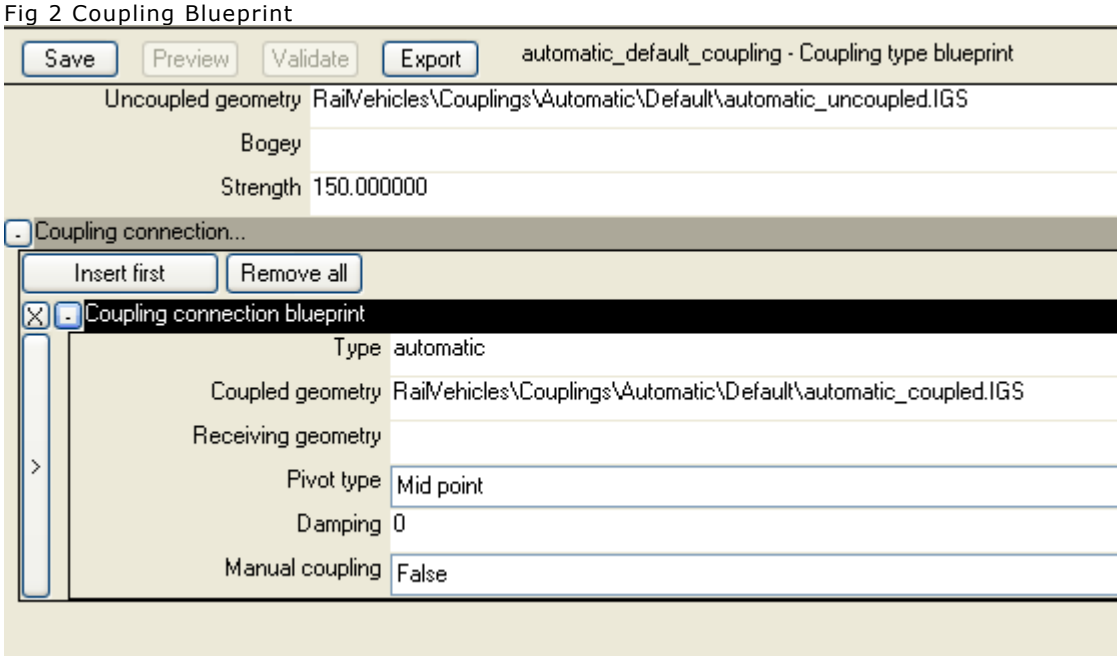
3.1.2.3 Blueprint ID

The link to the .xml Blueprint defining the front Coupling.
The following Coupling Types have been developed by RSDL.

- 3 Link Chain
- 3 Link Default
- 3 Link German
- 3 Link Screw
- Automatic
- Bar
- Buckeye

3.1.2.4 Coupling Blueprint

Fig 2 Coupling Blueprint



3.1.2.4.1 Uncoupled Geometry

Place the location of the artwork for the coupler in its **Uncoupled** state. This will be an .IGS file.

3.1.2.4.2 Bogey

Non Functional

3.1.2.4.3 Strength

The strength of the coupling in kN. Determines how easy it is for the coupling to break

3.1.2.4.4 Type

Specify the coupling type (eg 3 Link, Automatic, Bar or Buckeye)

3.1.2.4.5 Coupled Geometry

Place the location of the artwork for the coupler in its **Coupled** state. This will be an .IGS file.

3.1.2.4.6 Receiving Geometry

Place the location of the artwork for the coupler in its **Recieving** state. This will be an .IGS file.

3.1.2.4.7 Pivot Type

This is the 'Coupling Pivot', 'Midpoint' or 'Receiving Point' between the two couplers

3.1.2.4.8 Damping

Non Functional

3.1.2.4.9 Manual Coupling

Specify if manual coupling allowed. Instances such as detaching a wagon that uses a Bar Coupler would be marked as 'No'

3.1.3 Rear Coupling Blueprint ID

As per 3.1.2.3 Front Coupling Blueprint ID

3.1.4 Front Coupling Pivot

Using the preview window, align the end of the arrow point to where the coupler will spawn from.

e.g. For a 3-Link, this is the point where it hangs on the hook.

3.1.5 Rear Coupling Pivot

Same as front coupling pivot, but for the rear.

3.1.6 Front Coupling Receiving Point

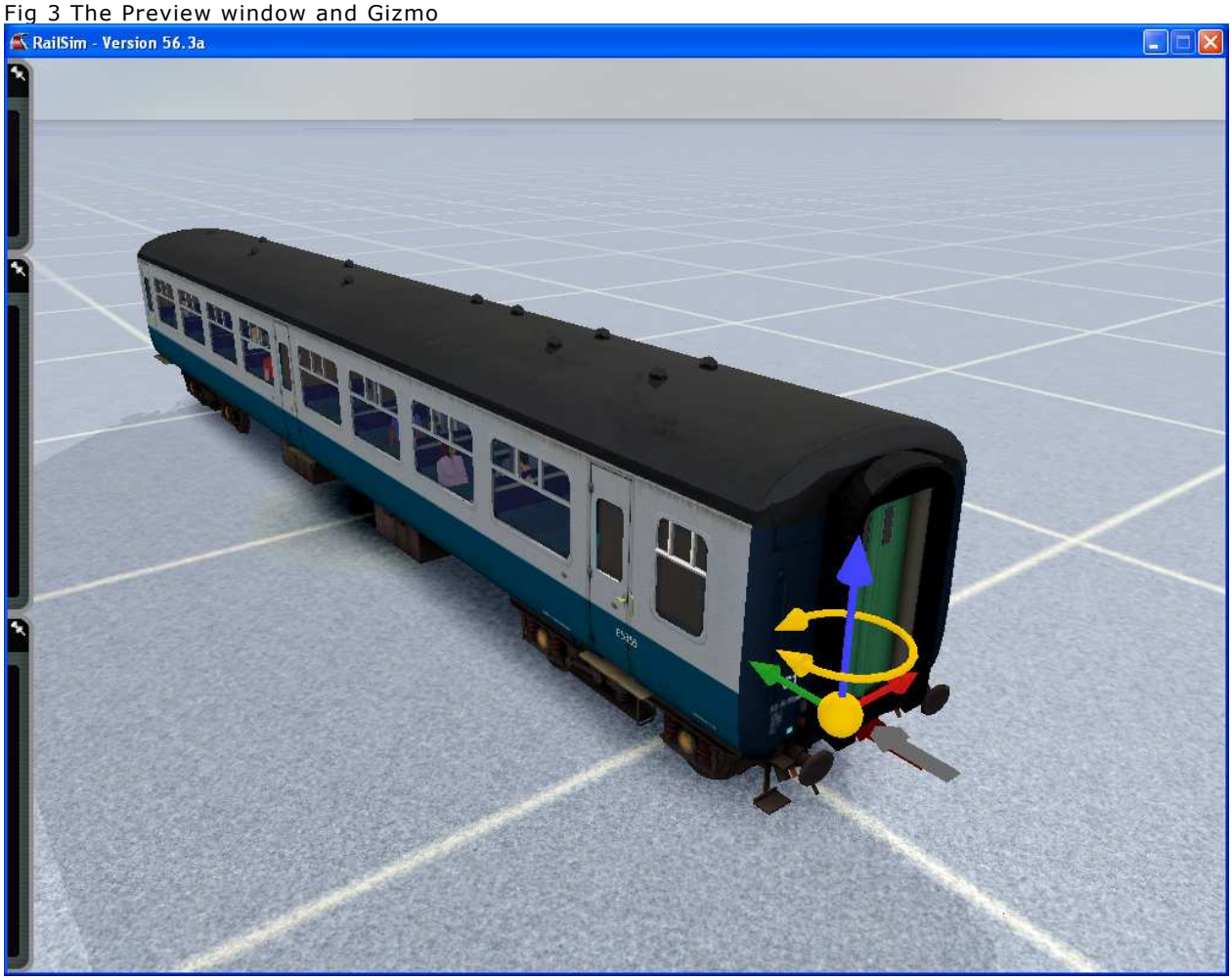
Using the preview window, align the end of the arrow point to where the receiving coupler will attach to.

e.g. For a 3-Link, this is the point where the coupling ring from another vehicle will hook onto this vehicle.

3.1.7 Rear Coupling Receiving Point

Same as front coupling pivot, but for the rear.

Fig 3 The Preview window and Gizmo



3.1.8 Mass

Mass of the Vehicle in imperial Tons

3.1.9 Ease of Derailment

This value is used to calculate how easy it is for the vehicle to derail. The parameter works by moving the centre of gravity up and down. The value (which can be set between 0 and 1) translates into -2m to 2m, so setting the value to 0 moves the centre of gravity down 2m (which would make it impossible to tip over) and 1 would move it up 2m making it very easy to derail.

3.1.10 Front Pivot X

Length from centre of your vehicle to the front Buffers. Use this parameter to adjust the gap between vehicles when they are coupled together.

3.1.11 Front Pivot Y

This is the vertical positions of the centre join between coupled vehicles.

3.1.12 Back Pivot X

Rear version of the Front Pivot details as above.

3.1.13 Back Pivot Y

Rear version of the Front Pivot details as above.

3.1.14 Collision Centre X

The horizontal alignment of the collision box centre

3.1.15 Collision Centre Y

The vertical alignment of the collision box centre.

To calculate this value:
Take the height of Vehicle
Subtract the driving wheel diameter from it
Halve the result
Then add the driving wheel diameter back in
Enter the value obtained

e.g for Black 5 = ((3.86 – 1.828)/2) + 1.828 = 2.844m

3.1.16 Collision Width

This will be the actual width of vehicle in Metres at its widest point

3.1.17 Collision Height

This value is calculated by taking the height of your vehicle and subtracting the driving wheel diameter.

e.g for Black 5 = 3.86 – 1.828 = 2.032m

3.1.18 Collision Length

The Collision Length should be slightly smaller than the real dimensions of the vehicle, so that tight corners don't cause Collision Boxes to overlap. This value should be over the buffer beam, but not the buffers. The front/rear pivot points take the buffers into account.

If your collision length includes the buffers the vehicle will struggle to couple up as it will bounce off other vehicles.

3.1.19 Drag Coefficient

This figure is related to the Air Resistance of the Vehicle. This value is scaled by the square of the speed and so has most impact at higher speeds. This term combines the cross-sectional area and the traditionally quoted drag coefficient which itself is dependent on the profile the vehicle presents to the wind.

3.1.20 Rolling Friction

This figure is for the friction of wheels and axle boxes. This term produces a constant force and so has most impact at lower speeds.

Notes on Resistance.
The overall resisting force is calculated as follows
*Resistance = Rolling Friction Coefficient * Gravity * Mass + Velocity^2 * 0.5 * Drag Coefficient* Air Density*

The figures used in the vehicle blueprints were largely estimated relative to BR Mk2/Mk3 Coaching stock, for which accurate figures were available.
Source; 'Railway Magazine' August 1979 p388.

Fig 5 BR Mk2/3 Coaching Stock Resistance

Speed	Resistance lbs/ton
10mph	3.6
20mph	4.2
30mph	5
40mph	6.1
50mph	7.7
60mph	9.6
70mph	11
80mph	14
90mph	17
100mph	20
110mph	24

It was found that Drag Coefficient = 2.76 and Rolling Friction Coefficient = 0.00082 gave a close match to the BR figures.

3.1.21 Dry Friction

This parameter determines the point at which wheelslip starts on dry track. Increasing or decreasing the figure changes the Max Tractive Effort achievable before the wheels start to slip.

3.1.22 Wet Friction

This parameter determines the point at which wheelslip starts in wet conditions. Increasing or decreasing the figure changes the Max Tractive Effort achievable before the wheels start to slip.

3.1.23 Snow Friction

This parameter determines the point at which wheelslip starts in snowy conditions (Winter Season). Increasing or decreasing the figure changes the Max Tractive Effort achievable before the wheels start to slip.

3.1.24 Sand Friction Multiplier

Sanding on happens on non-powered vehicles when wheelslip occurs.

This parameter determines the effect that Sanding has on Wheelslip. For example a value of 2.0 means that turning the Sanders on, doubles the Tractive Effort available with no wheel slip. Therefore with This value set to 2.0, if the Wet Friction figure is half the Dry Friction Figure, then using the Sanders in wet conditions gives the same adhesion as in dry conditions with no sanding.

Notes on "Wheelslip".
The physics works out the maximum force that can be put down by the vehicle, based on the current slip value and the friction properties on the line. If the force provided by the vehicle / brakes exceeds this value then it starts the wheels slip, either locking under braking or spinning under power. This will then reduce the traction available on the next frame and the wheels will spin up further to a max value. Depending on the type and density of the precipitation, the friction will be reduced according to the values set in the snow and rain properties.

3.1.25 Bogie

All wheels on Rail vehicles in Rail Simulator are considered to be mounted on bogies. For vehicles that don't have bogies (eg Standard BR Van), the bogie size should be set the same as the vehicle body, so effectively the entire wagon is the

3.1.25.1 Bogie Pivot X

The distance in metres from the centre of the vehicle to the centre of the Bogie

So for non-bogie vehicles this will be 0.

3.1.25.2 Bogie Pivot Y

This is the height above the rails that the bogie rotation takes place.

3.1.25.3 Bogie Blueprint set ID

There should be one entry per bogie on the vehicle.

1 for non-bogie stock
2 for most S/D/E engines, bogie wagons and passenger coaches
3 for many Steam engines and some diesel/electric engines
more if you need them…

3.1.25.3.1 Provider

Name of product

3.1.25.3.2 Product

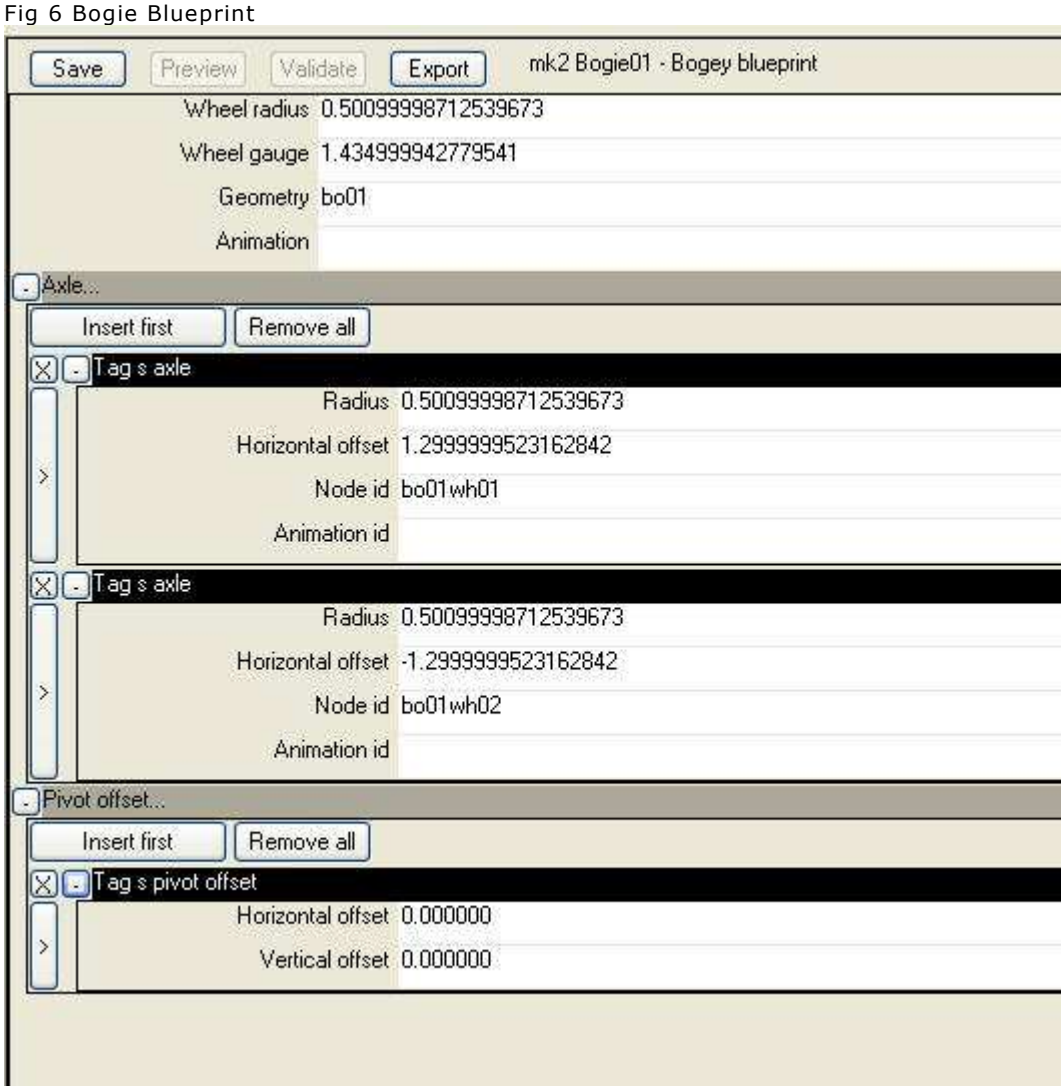
Name of product

3.1.25.3.3 Blueprint ID

The location of the relevant Bogie Blueprint.xml

3.1.25.4 Bogie Blueprint

Fig 6 Bogie Blueprint



3.1.25.4.1 Wheel Radius

Wheel Radius in Meters

3.1.25.4.2 Wheel Gauge

Distance between wheels in Meters (1.435 for Standard Gauge)

3.1.25.4.3 Geometry

Geometry ID specified within the model

3.1.25.4.4 Animation ID

Animation ID specified within the model
E.g. hydraulic pistons on the HST bogies

3.1.25.4.5 Axle

One entry for each axle on the Bogie

3.1.25.4.5.1 Radius

Wheel Radius in Meters

3.1.25.4.5.2 Horizontal Offset

Distance from Axle to centre of Bogie in meters

3.1.25.4.5.3 NodeID

Node ID specified within the model

3.1.25.4.5.4 Animation ID

Animation ID specified within the model

***NOTE** – If you have animation on an axle (like wheel linkage on steam engines) do not assign the NodeID to that axle. Axles with NodeID's will be rotated via code rather than animation, and Axles with AnimationID's will be rotated via animation and not Code. If you assign both to an axle, the code rotation will override the animation.*

3.1.25.4.6 Pivot Offset

This is intended mainly for Steam Engine pony trucks. You can use this to offset the rotation of the bogie pivot point.

3.1.25.4.6.1 Horizontal Offset

Distance from bogie to centre of pivot point

3.1.25.4.6.2 Vertical Offset

Vertical height from rail level to centre of pivot point

3.1.26 StopGo / Intermediate / Expert Remapper

These are not used on non-powered vehicles

3.1.27 Bogie Audio Control Name

Specify the location of the Audio Blueprint

3.1.28 Coupling Audio Control Name

Specify the location of the Audio Blueprint

3.1.29 Max Comfortable Acceleration

This value determines the maximum acceleration allowed before passengers are upset or cargo is damaged. It is in metres/sec/sec. Its output can be found in the Scenario stats.

3.1.30 Train Brake Assembly

This area defines the vehicle's brakes.

See separate Brake Blueprint Documentation

4 Render Component

4.1.1 Primary and Secondary Blueprint Set ID

Allows up to two Texture sets to be specified, for example sets of digits for use by the numbering system (See 1.3.1)

4.1.1.1 Provider

Provider name

4.1.1.2 Product

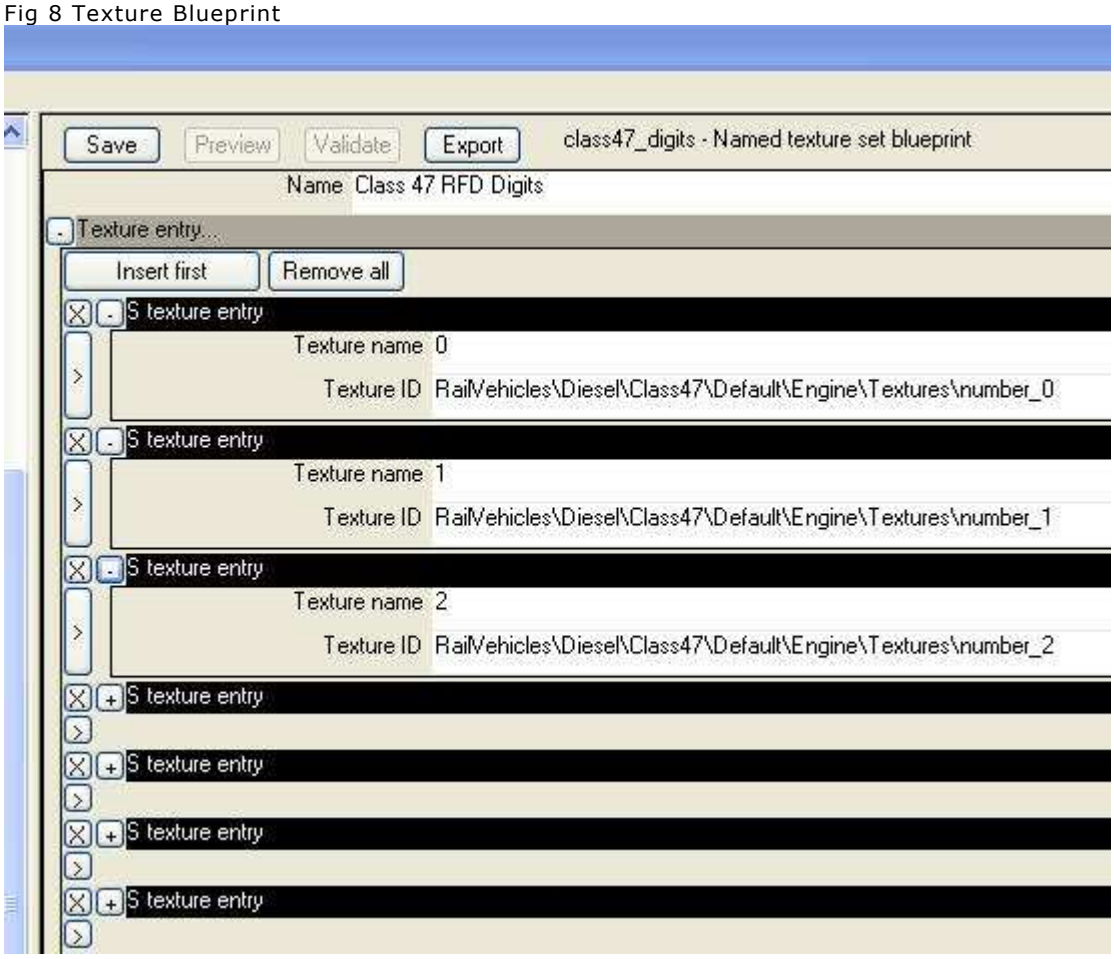
Product name

4.1.1.3 Blueprint

Specify the location of your Texture Set Blueprint. See below for details on these.

4.1.1.4 Texture Blueprint

Fig 8 Texture Blueprint



4.1.1.4.1 Name

This is for reference purposes only and not used in the game.

4.1.1.4.2 Texture Entry

One for each digit or letter in the Texture Set

4.1.1.4.2.1 Texture Name

Name of Texture

4.1.1.4.2.2 S Texture entry

Link to the relevant .ace texture

4.1.2 Geometry ID

Link to the main .IGS file

4.1.3 Collision Geometry ID

You can either specify a different IGS (maybe a simplified version of the main geometry) or you can simply use the same IGS as in 4.1.2.

NB Both 4.1.2 and 4.1.3 must to be populated

4.1.4 Pickable

This determines if once place, you can pick it again.

Recommend setting at **True** for all objects.

4.1.5 Shadow Type

If you have created a shadow for your vehicle, you can select not to have one supplied by Rail Simulator. If not, there is a primitive one that can be chosen here.

4.1.6 Heat Haze

The Heat Haze effect is currently disabled. It will eventually be used for the tops of funnels or exhaust ports on the vehicle.

4.1.6.1 Matrix

Non Functional

4.1.6.1.1 Element

Heat Haze elements, once defined in this section, need to be positioned manually using the Preview window.

4.1.6.1.2 Width

Width of Heat Haze element in metres

4.1.6.1.3 Height

Height of Heat Haze element in metres

4.1.7 Tex Text

Non Functional

4.1.8 Projected Light Element

The Projected light element is currently disabled

4.1.8.1 S Projected Light

Allows projected light sources to be setup. It is possible to have one per light or one light source for all lights on the front of a loco for example.

4.1.8.1.1 Texture ID

Link to .ace file

4.1.8.1.2 Element

Not Usable. Projected Lights, once defined in this section, need to be positioned manually using The Depot Preview

4.1.8.1.2.1 FOV

Field of View – allows the size of the light beam to be specified. The Higher the value, the more diffuse the beam

4.1.8.1.2.2 Type

Projected Light Night Node / Projected Light Fwd Headlight / Projected Light Rev Headlight

4.1.9 Instantiable

True/False
Non functional

4.1.10 Detail Level Generation Range

When an object is placed it is given a Detail Level between 1 and 10

4.1.10.1 Highest Level

Set to 10 for vehicles (Always Shown)

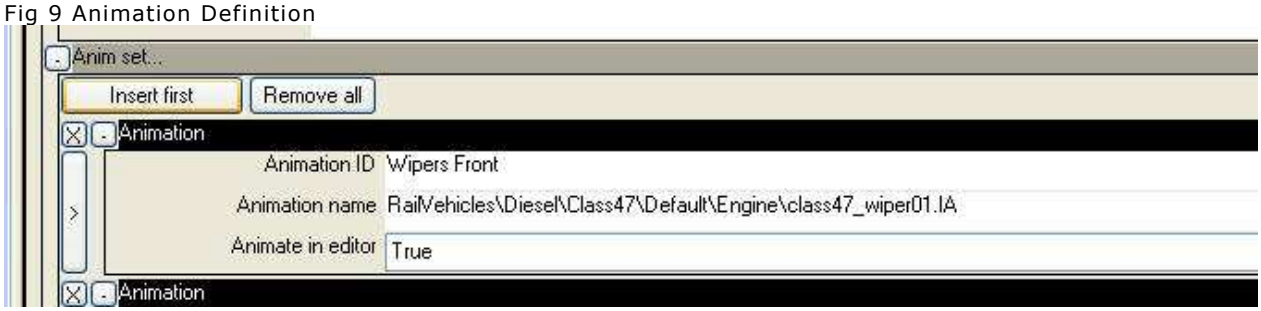
4.1.10.2 Lowest Level

Set to 10 for vehicles (Always Shown)

4.1.11 Anim Set

This is where any animations are specified

Fig 9 Animation Definition



4.1.11.1 Animation ID

This is the name of the animation called by the input mapper blueprint. You will also see this name in the browser list of the Preview window to test the animation is working correctly.

4.1.11.2 Animation Name

Specify the location of the animation file (.IA).

4.1.11.3 Animate in Editor

This determines whether the animation actually plays in the Preview window.

5 Control Container Component

5.1.1 Interior Interface

5.1.1.1 Interior Geometry ID

Specify the location of the .IGS cab view geometry

5.1.1.2 Number of Cabs

Specify the number of cabs the engine features.

5.1.2 Interior Camera Blueprint

5.1.2.1 Blueprint Set ID

5.1.2.1.1 Provider

Name of provider

5.1.2.1.2 Product

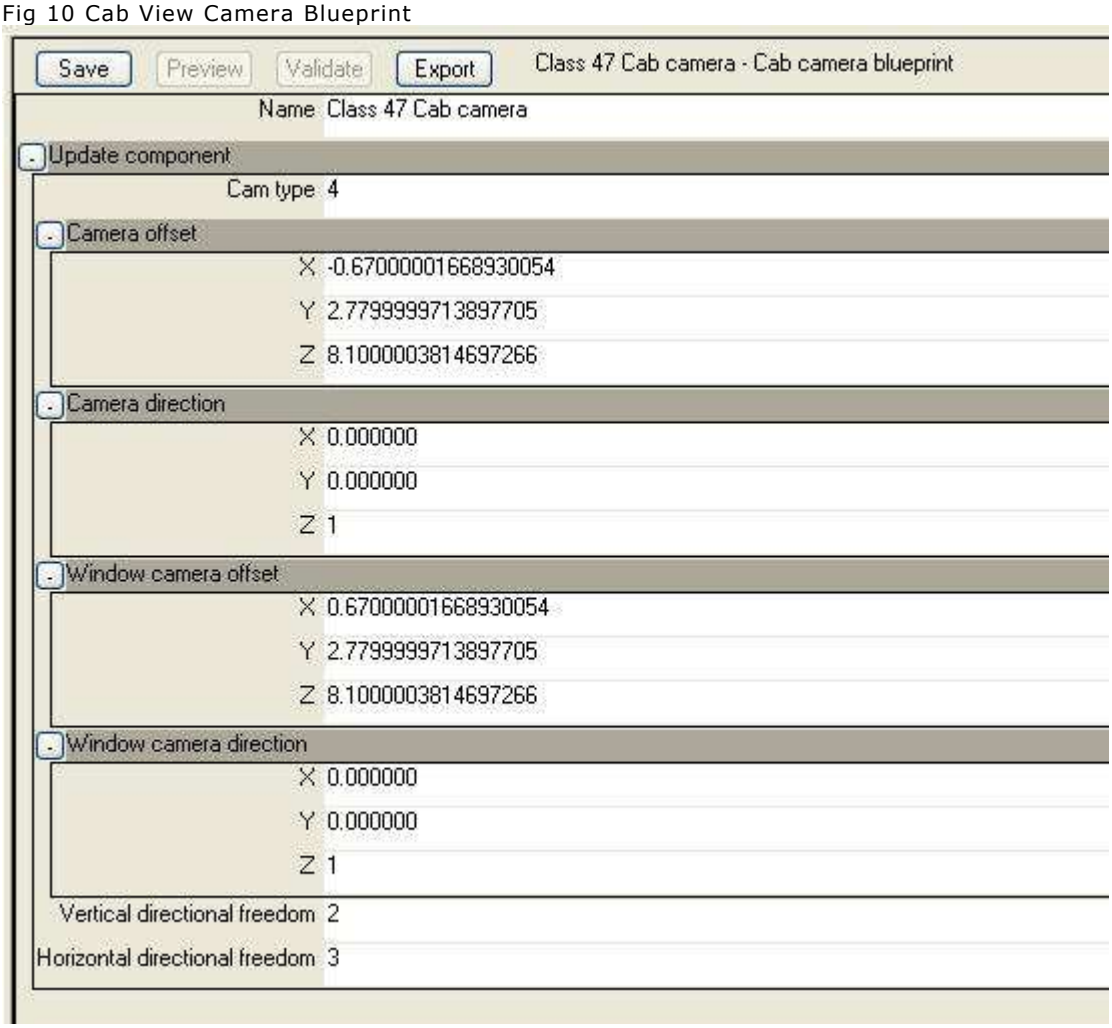
Name of product

5.1.2.2 Blueprint ID

Specify the location of the Cabview Camera blueprint here

5.1.2.3 Cabview Camera Blueprint

Fig 10 Cab View Camera Blueprint



5.1.2.3.1 Name

This is for reference purposes only and not used in the game.

5.1.2.3.2 Cam Type

This is the type (1-8) of camera being used.

5.1.2.3.3 Primary Side

Left/Right. Determines which side of the cab the default view start.

5.1.2.3.4 Camera Offset X, Y and Z

x, y and z co-ordinates for position of Driver's side Cab View Camera in metres

5.1.2.3.5 Camera Direction X, Y and Z

x, y and z co-ordinates for direction of Driver's side Head Out Camera in metres

z=1 looking straight ahead

5.1.2.3.6 Window Camera Offset X, Y and Z

x, y and z co-ordinates for position of the second man's side cab view Camera in metres

5.1.2.3.7 Window Camera Direction X, Y and Z

x, y and z co-ordinates for direction of the second man's cab view Camera in metres

z=1 looking straight ahead

5.1.2.3.8 Vertical Direction Freedom

Degree of vertical movement that the Cab view camera is allowed

5.1.2.3.9 Horizontal Direction Freedom

Degree of horizontal movement that the Cab view camera is allowed

5.1.2.4 Cab Occlusion

Specify the location of the Cab Occlusion Audio blueprint here.

5.1.3 Carriage Interior Interface

5.1.3.1 Blueprint Set ID

5.1.3.1.1 Provider

Name of provider

5.1.3.1.2 Product

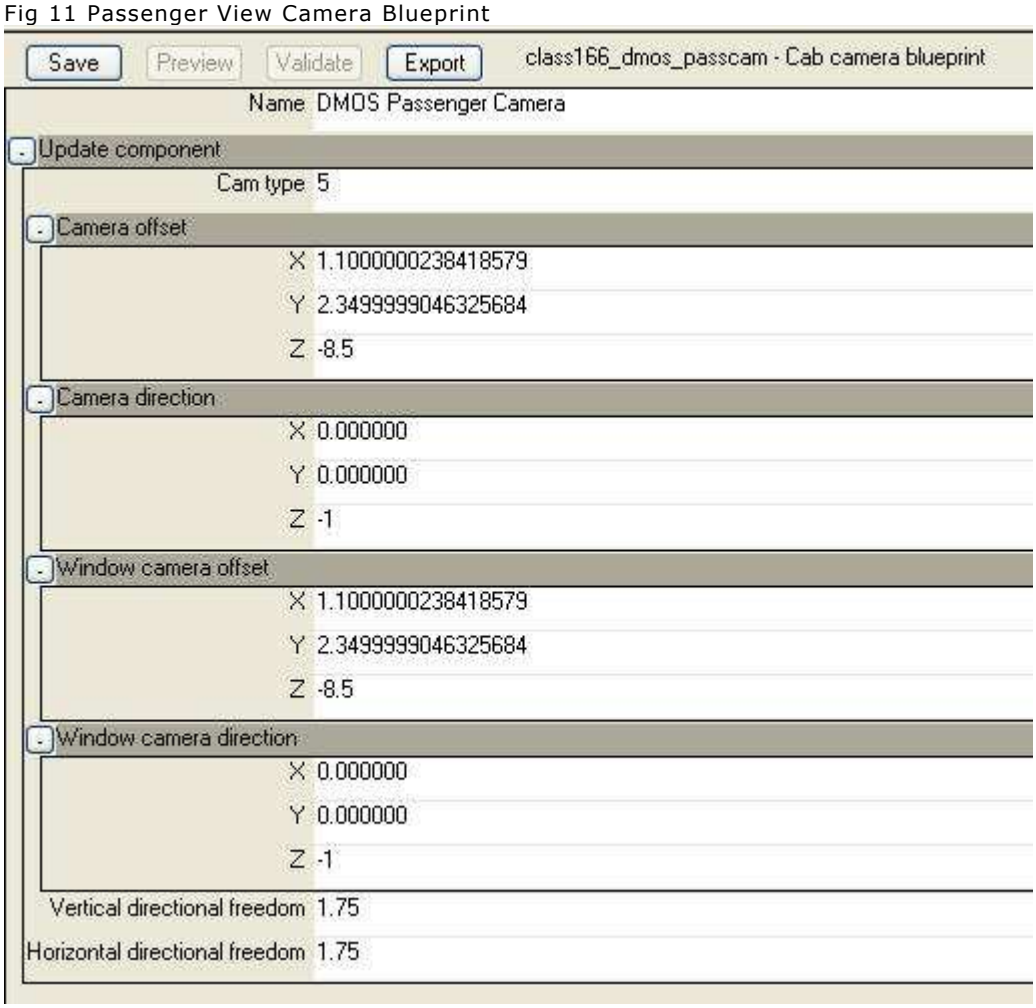
Name of product

5.1.3.2 Blueprint ID

Specify the location to the Passenger View Camera Blueprint

5.1.3.3 Passenger View Camera Blueprint

Fig 11 Passenger View Camera Blueprint



5.1.3.3.1 Name

This is for reference purposes only and not used in the game.

5.1.3.3.2 Cam Type

This is the type (1-8) of camera being used.

5.1.3.3.3 Camera Offset X, Y and Z

x, y and z co-ordinates for position of the default Passenger View Camera in metres

5.1.3.3.4 Camera Direction X, Y and Z

x, y and z co-ordinates for direction of the default Passenger View Camera in metres

z=1 looking straight ahead

5.1.3.3.5 Window Camera Offset X, Y and Z

x, y and z co-ordinates for position of a second Passenger View Camera in metres

5.1.3.3.6 Window Camera Direction X, Y and Z

x, y and z co-ordinates for direction of a second Passenger View Camera in metres

z=1 looking straight ahead

5.1.3.3.7 Vertical Direction Freedom

Degree of vertical movement that the Passenger View camera is allowed

5.1.3.3.8 Horizontal Direction Freedom

Degree of horizontal movement that the Passenger View camera is allowed

5.1.3.4 Cab Occlusion

Specify the location of the Cab Occlusion Audio blueprint here.

5.1.4 Control Values

This is where all the Controls for the vehicle are specified

See Cab Controls Blueprint Documentation

6 Container Component

Child Objects such as the Driver model, Passengers, Sounds, Particle Emitters for exhaust and steam emission are added to the locomotive.

NB Objects once defined in this section need to be positioned manually using the Preview window.

6.1.1 Children

6.1.1.1 Child name

Each child requires a unique name. This will also be visible to choose in the Preview window.

6.1.1.2 Blueprint Set ID

6.1.1.2.1 Provider

Name of provider

6.1.1.2.2 Product

Name of product

6.1.1.3 Blueprint ID

Specify the location to the Child Blueprint

6.1.1.4 Matrix

Non functional

7 Cargo Component

A MU can have its Passenger Doorways defined here, as Passenger Doorway Defs.

Passenger seat Def is not currently used, but was intended for automatically generating passengers as the train loads or empties.

For a Passenger Vehicle, this is where "Passenger Doorways" are defined.

For a Freight Vehicle, this is where "Cargo" is defined.

7.1.1 Container Cargo Def

7.1.1.1.1 Position & Element

This is the point (adjusted via the Preview window) where the container will be loaded.

7.1.2 Bulk Cargo

7.1.2.1 Trigger Box

Size of box used to trigger the Loading Point. The bigger the box, the easier it is to line up with the Loading Points.

7.1.2.1.1 Width

Specified in meters

7.1.2.1.2 Height

Specified in meters

7.1.2.1.3 Depth

Specified in meters

7.1.2.1.4 Element

Not Used. The cargo position has to be positioned (if different from the models origin of 0,0 in the Preview window.

7.1.2.2 Capacity

Maximum Capacity in gallons for liquids, lbs for solids

7.1.2.3 Bulk Freight Type

Select what the freight type is, here.

7.1.2.4 Animation ID

If there is an animation for when the wagon is loading this freight, specify the name of that animation (as set when modelling the geometry) here.

7.1.2.5 Blueprint Set ID

7.1.2.5.1 Provider

Name of provider

7.1.2.5.2 Product

Name of product

7.1.2.5.3 Blueprint ID

Specify the location to the Cargo Blueprint

7.1.3 Passenger Doorway Def

This is for Multiple Units doorways. There must be one entry per door on the DMU vehicle.

7.1.3.1 Door Side

Choose which side the doors for this reference are located.

7.1.3.2 Offset x / z

Position of each door

7.1.3.3 Rate per Second

This is the number of passengers that can use the door per second.