

Blender Exporter for MSTS/OR

by

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Version 3.4

This is a script addon for the Blender 3D program. It provides a means to create .S shape files for Microsoft Train Simulator or Open Rails.

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CONTACT

I am using the Blender forum at Elvas Tower for support and update announcements

<http://www.elvastower.com/forums/index.php?/forum/203-blender/>

Or you can reach me directly at:

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INSTALLATION

This exporter is a script addon for Blender.

It is compatible with versions of Blender from 2.63 up, last tested on 2.76b.

Copy the 'scripts' folder tree from the installation zip to your USER folder.

On a windows Vista or 7 machine your USER folder will be at:

C:\Users\{username}\AppData\Roaming\Blender Foundation\Blender\2.6x
(where 2.xx represents the current version of Blender)

See the blender manual for more info on locating your USER folder.

If you are upgrading from a prior version of the exporter, it is safe to just overwrite the prior files with these new ones.

The directory structure should look like this:

```
...2.xx
  \scripts
    \addons
      MSTSDLevels.py
      MSTSExporter.py
```

In your USER PREFERENCES enable the following two ADDONS:

Import-Export:	Export OpenRails/MSTS Shape File(.s)
3D View:	MSTS Distance Level Selection

EXAMPLES

Included in the package are:

Building\UnionStop - an example of a simple model that uses two different textures.

Loco\L1 - a more complex example that includes animation and LOD levels.

GETTING STARTED

- look for the export script in Blender's File - Export menu.
 - the object to be exported must be called MAIN
 - all children of MAIN will be exported as part of the model
 - MAIN must be in the root of the scene (ie not a child object of something else)
 - cloned objects, object modifiers and particle systems are fully supported
 - externally linked objects are fully supported
 - if an object is not textured in Blender, the default texture, blank.ace, will be applied.
-
- step by step to export a cube as a scenery object to MSTs
 - open Blender
 - rename the cube object to 'MAIN'
 - click on File - Export OpenRails/MSTs
 - and export as CUBE.S into your route's SHAPES folder
 - create a CUBE.SD file and put it in your route's SHAPES folder
 - create a BLANK.ACE and put it in your route's TEXTURES folder
 - add the cube to your route's .REF file

NOTE: The cursor will count up during export as an indicator of progress. However, the program may appear to hang when exporting large files. Before you begin the export, toggle ON the system console (under the window menu) to see progress.

NOTE: The exported shape is centered about the blender global center (0,0,0). Scaling is applied before exporting.

NOTE: The exporter creates the .S file only. All other related files must be created manually by other programs. For example:

- for scenery objects, you must create the .SD file yourself and add an entry to the .REF file.
- for rolling stock you must create the .ENG or .WAG file
- you must convert the texture images to .ACE files and place them in the correct directory.

OPTIMIZATIONS

The script includes a number of optimizations for higher frame rates and better GPU and CPU usage including:

- Primitive consolidation which reduces batch calls by consolidating tris from different objects when they use the same material
- Large primitives, vertex_sets, and subobjects are split as needed to prevent them from exceeding MSTS's loading limits.
- Complex hierarchies are simplified and collapsed to prevent exceeding MSTS's hierarchy depth limits and to improve effectiveness of the primitive consolidation

RETAIN NAMES - This setting, on the File - Export panel, disables most of the above optimizations. All object names and hierarchy are retained in the shape file for users wanting better compatibility with external utilities such as Polymaster.

MATERIALS

All applicable material settings are collected into the MSTS Materials panel of the materials tab as follows:

Transparency: Controls the effect of the texture's alpha channel

Solid Opaque - Alpha channel is ignored, it has no effect.

Transparency On/Off - Transparent if alpha value below a threshold

Alpha Blended - Alpha value blends from transparent up to opaque

Alpha Sorted - Alpha blending with scene depth sort

Lighting: Selects one of MSTS's special shading modes

Normal - Sun facing surfaces are lit and opposite are shaded

Specular 25 - Strong specular highlight

Specular 750 - Small specular highlight

Full Bright - Shaded surfaces appear lit

Half Bright - Shaded surfaces appear partly lit

Dark - Sun facing surfaces appear fully shaded

Cruciform - Indirect ambient lighting only

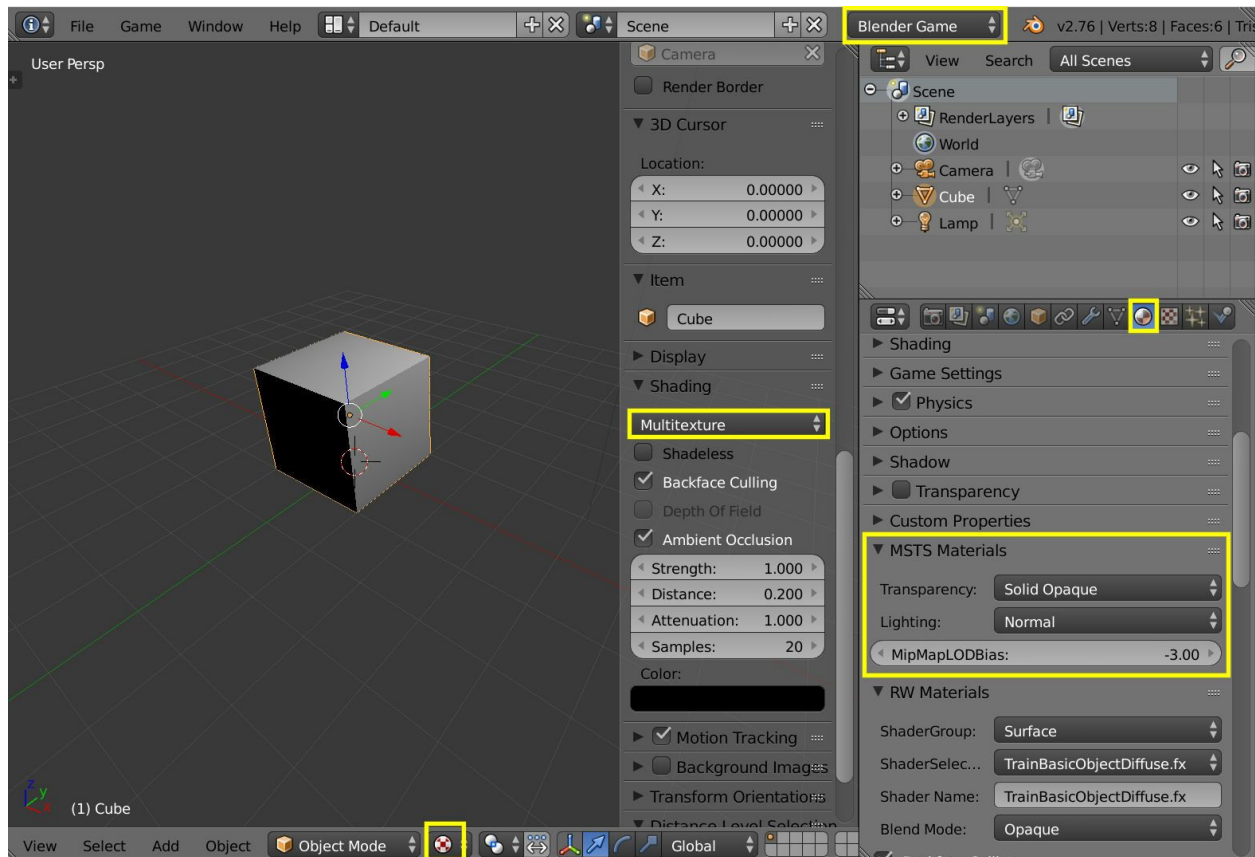
Emissive - Surfaces emit light at night

MipMapLODBias: Controls sharpness of the applied textures. Values range from -8 to +8. Negative values sharpen the image, but can cause excessive moire patterns. Positive values result in texturing blurring, and less moire.

It's best to operate Blender with 'Render Mode' (in top menu bar) set to 'Blender Game'

Set your viewport shading to 'Texture'. If you can see it in the viewport, you should be able to see it in MSTs.

The Material name isn't used by MSTs or included in the exported .s file.



TEXTURING

The mesh must be UV mapped with a single UV layer. Texture images are assigned according to the applied 'Face Texture' on the first UV layer. Multiple images can be applied to different parts of the same mesh. See the section 'Assigning to Faces' in the Blender manual here (http://wiki.blender.org/index.php/Doc:2.6/Manual/Textures/Mapping/UV/Applying_Image)

Recommended practice is to have all texture images in a subfolder called 'textures'.

Set 'Shading' to MultiTexture in the display panel (press N, its in the lower right)

GENERATING LOD's

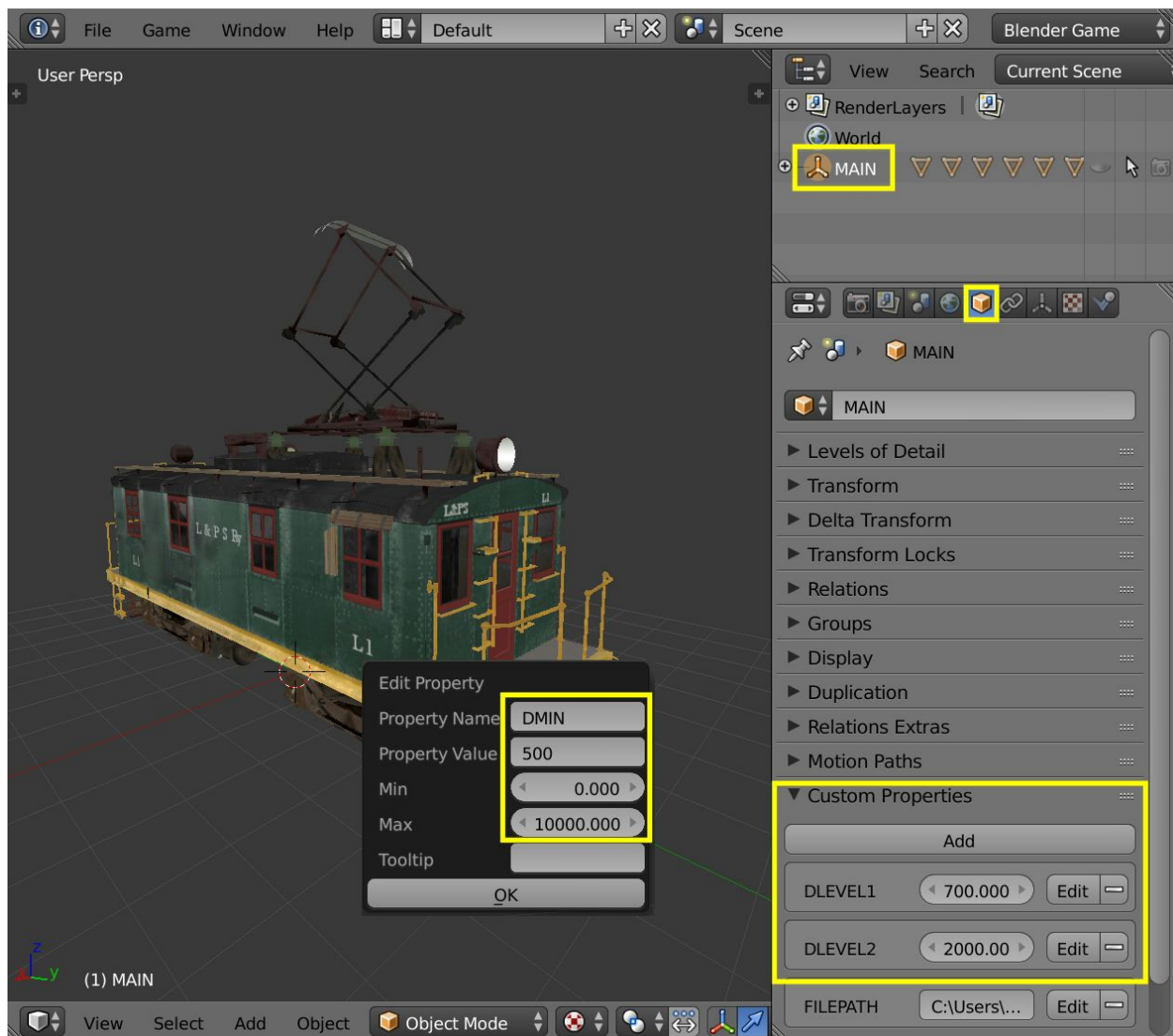
By default, the shape file will be generated with a single LOD set at 1000 meters. You can control this by adding 'Custom Properties' to your 'MAIN' object. See the screen shot below. Click on your MAIN object. Then find 'Custom Properties' at the bottom of the right panel. Click 'add' and then 'edit' it to create custom properties like these:

DLEVEL1 = 700 creates a LOD for 0 to 700 meters

DLEVEL2 = 2000 creates a LOD for 700 to 2000 meters

Note: When creating the custom property, you will need to override the default Max value, setting it to something above the default of 1.

Warning: It is easy to accidentally add these to the Scene properties instead of the Object properties. ENSURE YOU ARE ON THE OBJECT TAB in the properties panel.

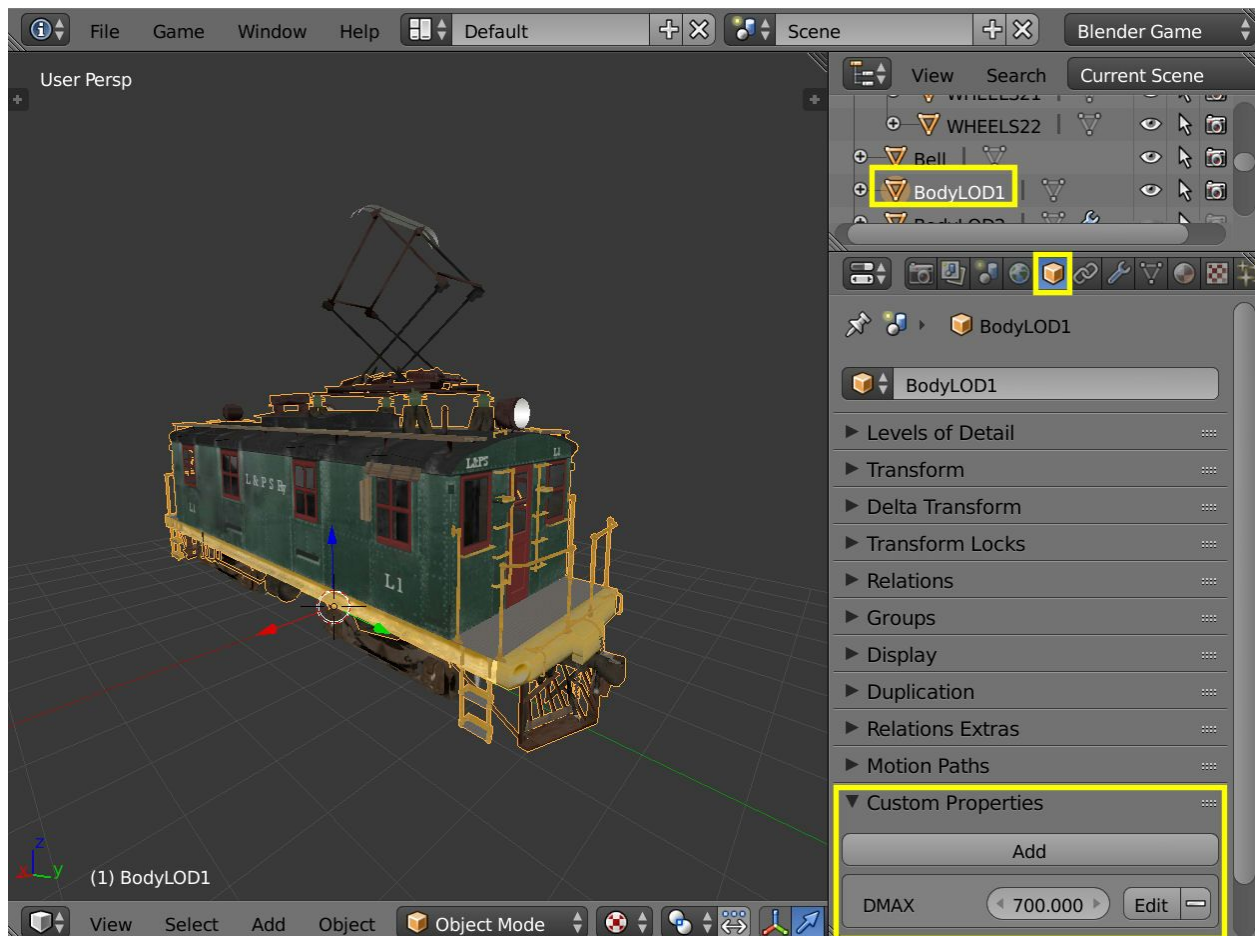


You control what meshes are included in each DLEVEL by setting their visibility limits. This is done by adding custom properties to them. Click on a mesh object and add custom properties like these to any mesh object

DMAX = 700 object will be excluded from DLEVELs above 700 meters

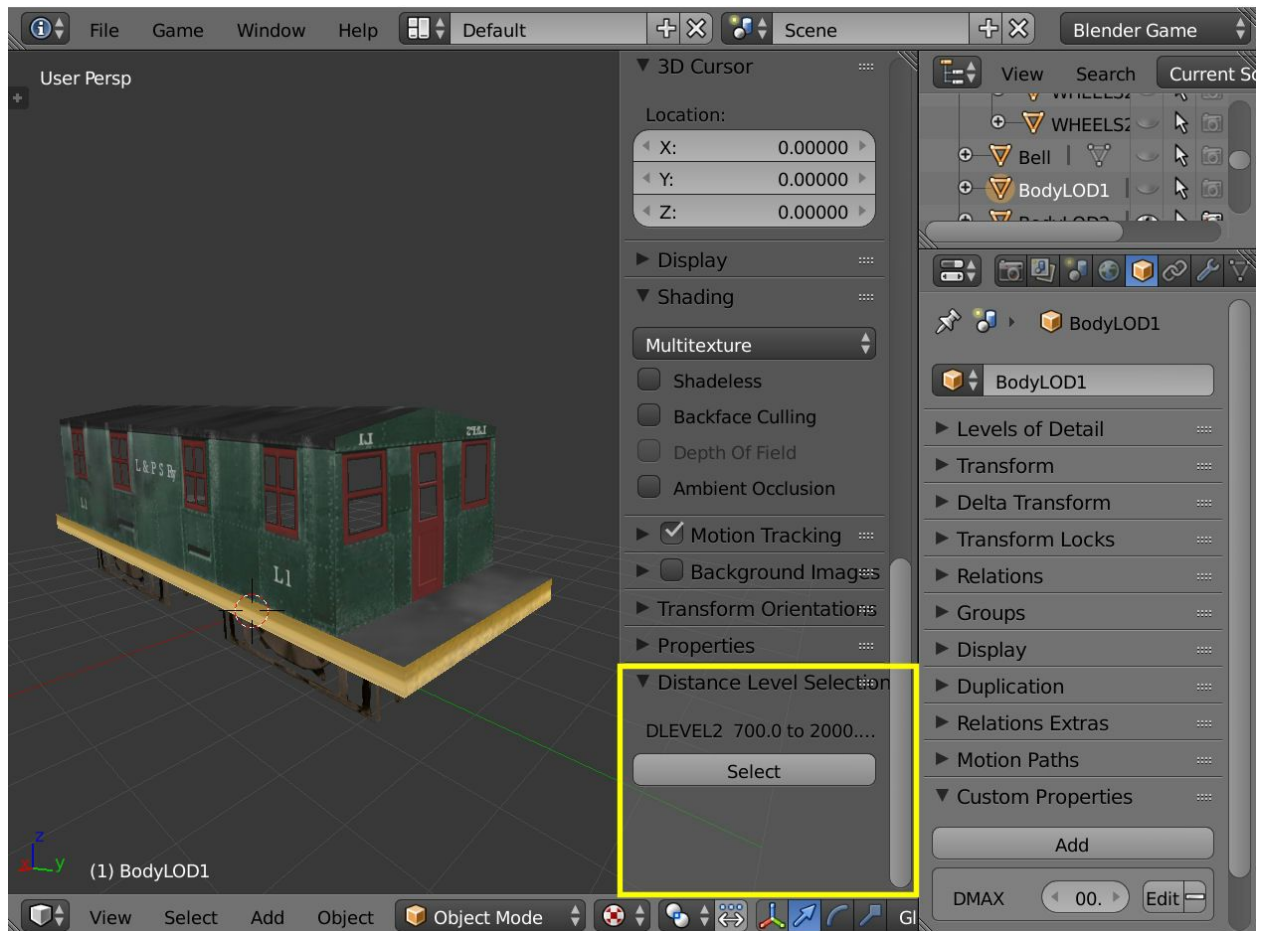
DMIN = 100 object will be excluded from DLEVELs below 100 meters

Note: If an object has no DMAX or DMIN setting, it will inherit the values of its parent, recursively. You can assign DMIN and DMAX settings to an 'Empty', and then attach all the meshes that belong on that level without needing DMIN/DMAX settings for each one.



DISTANCE LEVEL SELECTION

You can preview how each LOD will look using the Distance Level Selection control. Press 'N' to bring up your display panel. You'll find the control in the lower right. Pressing 'Select' cycles through each LOD, hiding objects that are not visible in this LOD.



OPTIONAL RAILWORKS NAMING

I like to build models that I export to both Railworks and MSTs. This exporter recognizes and converts railworks style object names to MSTs. For example, a wheel in Railworks would be named 'bo01wh01'. This will be automatically converted to WHEELS11 to be compatible with MSTs.

Also, in Railworks, LOD levels are defined by a prefix on the object name. For example 1_2000_Chimney specifies a part of the first LOD visible out to 2000 meters. The exporter will use this designation instead of DMIN and DMAX to define which load it belongs. And it will trim the prefix from the name before export.

To use the Railworks LOD prefixes instead of DMIN and DMAX, ensure that each successive LOD is positioned as a child of the previous one, and has the exact same name suffix.

Not every part requires a prefix. Parts without a LOD prefix will adopt the LOD values of their parent.

For example

MAIN

1_0200_Boxcar	near boxcar model out to 200 meters
2_2000_Boxcar	distant model visible from 200 to 2000 meters
1_0200_bo01	
1_0200_bo01wh01	wheels that disappear at 200 meters
1_0200_bo01wh02	
1_0200_BoxcarDetails	detail elements that disappear at 200 meters
HandWheel	
BrakePlatform	these also disappear at 200 meters

Note the DLEVEL definitions must still be applied to MAIN as described in the previous section.

END OF DOCUMENT