



## Tools for Asset Repair by PEV

Image by Alberte Zato

### Using PEV's Mesh Text Viewer for asset fault finding

This is the last in this short series of tutorials on using my PEVSoft Trainz tools.

#### Introduction

The mesh is the primary data object in the display of 3d objects in Trainz. The sim supports two mesh formats, the Progressive Mesh (PM) and the Indexed Mesh (IM). The progressive mesh is the more complex with data included to simplify the mesh for distant viewing (Level of Detail adjustments). Auran have changed how LOD is handled by supporting multiple IM meshes, and in the process they have obsoleted the PM mesh.

As Trainz has evolved through its various versions some of the mesh properties used by the render engine have become more significant, and in a couple of cases these properties now cause errors that prevent an asset from being committed into the Trainz Asset Database.

The mesh is basically a string of numbers with a few identifiers scattered through it so deciphering with a hex viewer is nigh on impossible. Fortunately Auran published the mesh format and the creation of a parsing program was done ages ago by Jack Emmerichs (user JFE). My work follows on (with Jack's permission) from where he started.

The Mesh Text Viewer program displays the contents of the mesh in English and adds the names of the various properties coded into the mesh. With a little experience you can see what is causing some of the annoying errors that Content Manager throws at you. To assist I have

attempted, here, to deal with a few of the common errors that are caused by the data in the meshes.

So, for example, you may download an asset from the Download Station that has these errors (plenty of assets do) and you can't get it to commit into the sim. How do you know what's causing the rather cryptic error messages that Content Manager presents to you? Read on...

To repair an asset, read the error messages carefully and act upon them one by one.

## Errors caused by: missing textures.

Content Manager presents the user with the *"Cannot find texture 'name' in mesh 'name'."* message when a texture is missing from the asset.

The message is displayed when attempting to commit an asset into TS2009/10. In the case of the listing below, the env\_metal.texture.txt and env\_metal.tga were located incorrectly, so the mesh could not find the texture, as the error message rightly pointed out. Using the Mesh Text Viewer we get the listing from which I was able to confirm that the env\_metal.texture was required by the mesh. So I copied it into the correct folder.

As you can see from the listing from Mesh Text Viewer the texture name also has the path of the file. Ignore this.. Trainz always looks for the textures in the folder where the mesh is located. Anywhere else will cause the missing textures message.

```
80  Chunk ID: MATL   Size: 316   (next chunk: 404)   Version: 102
92  Material Name Size: 44
96  Material Name: *throttle_housing*A3FC19C5*.mtl #1*m.reflect
140  Property Count: 0
144  Two Sided: 0
148  Opacity   :    1.000
152  Ambient   1.000, 1.000, 1.000
164  Diffuse   1.000, 1.000, 1.000
176  Specular  1.000, 1.000, 1.000
188  Emissive  0.000, 0.000, 0.000
200  Shininess :    0.100
204  Number of textures: 2
208  Texture Type: 1 = TEX_DIFFUSE
212  Texture Name Size: 88
216  Texture Name: C:\Program
Files\GMax\gamepacks\Trainz\PEVAssets\EMU_cab\Levers\throttle_housing.texture
304  Texture Amount :    1.000
308  Texture Type: 9 = TEX_REFLECT
312  Texture Name Size: 84
316  Texture Name: C:\Program
Files\GMax\gamepacks\Trainz\PEVAssets\EMU_cab\Levers\env_metal.texture
400  Texture Amount :    0.100
404  Chunk ID: GEOM   Size: 9736   (next chunk: 10148)   Version: 200
```

## Repair Strategy

Where a commonly used texture.txt and image are missing, they can be copied from other assets. Textures such as env\_metal, env\_glass, black, red and so on are examples.

If the missing texture is a minor one for the object it may be possible to view the mesh in my Trainz Mesh Viewer and see where on the object the texture is missing. The missing texture portion of the mesh will be rendered white. Make a small image of an appropriate colour to fit the missing portion. Don't forget that a texture.txt is needed as well.

If the main texture for an asset is missing it is difficult, if not impossible, to create an appropriate texture from scratch. Such an asset would most likely be a write-off.

If you have downloaded an asset that contains early Auran binary textures, you will also be confronted with missing textures message. In this case the texture files will have a

\*.texture file name. Use my Images2TGA tool to open the .texture file. It should tell you the size of the texture in pixels and also tell you the file is uncompressed. Since only DXT compressed textures are supported in TS2009/10, use my Images2TGA tool to convert the textures to TGA images. The \*.texture.txt files will be automatically generated. The required compressed textures (that we never see) will be produced when you commit the asset into Trainz. If you use the "OpenWith" menu in Content Manager for TS2009/10 and open with Images2TGA.bat, it will convert all \*.textures it finds to TGAs...much easier.

## Errors caused by: Unsupported texture types

The listing below from Mesh Text Viewer illustrates an attempt to use texture slots in GMax/3dsMax that are not supported by Trainz. Pre-TS2009 versions simply ignored unsupported texture types. However TS2009 introduced checking of texture types and meshes such as this example are rejected by the Content Manager 2.

Unfortunately the error message presented to the user is misleading. In this case it says *"Cannot find texture 'mainkfc.texture' in mesh 'kfc.im'."* .. but it's present in the folder isn't it..

```
80   Chunk ID: MATL   Size: 480   (next chunk: 568)   Version: 102
92   Material Name Size: 44
96   Material Name: *KFC-Australia*16A5E8E7*7 - default*m.onetex
140  Property Count: 0
144  Two Sided: 0
148  Opacity   :    1.000
152  Ambient   0.973, 0.973, 0.973
164  Diffuse    0.973, 0.973, 0.973
176  Specular   0.573, 0.573, 0.573
188  Emissive   0.000, 0.000, 0.000
200  Shininess  :    0.320
204  Number of textures: 5
208  Texture Type: 1 = TEX_DIFFUSE
212  Texture Name Size: 60
216  Texture Name: R:\TRS2004Copy\World\Custom\Trains\KFC-Oz\mainkfc.texture
276  Texture Amount :    1.000
280  Texture Type: 2 = TEX_SPECULAR
284  Texture Name Size: 60
288  Texture Name: R:\TRS2004Copy\World\Custom\Trains\KFC-Oz\mainkfc.texture
348  Texture Amount :    1.000
352  Texture Type: 3 = TEX_SHINE
356  Texture Name Size: 60
360  Texture Name: R:\TRS2004Copy\World\Custom\Trains\KFC-Oz\mainkfc.texture
420  Texture Amount :    1.000
424  Texture Type: 4 = TEX_SHINESTRENGTH
428  Texture Name Size: 60
432  Texture Name: R:\TRS2004Copy\World\Custom\Trains\KFC-Oz\mainkfc.texture
492  Texture Amount :    0.200
496  Texture Type: 5 = TEX_SELFILLUM
500  Texture Name Size: 60
504  Texture Name: R:\TRS2004Copy\World\Custom\Trains\KFC-Oz\mainkfc.texture
564  Texture Amount :    1.000
568  Chunk ID: GEOM   Size: 34288   (next chunk: 34864)   Version: 102
```

Here the SPECULAR, SHINE, SHINESTRENGTH, and SELFILLUM textures are not supported by Trainz. (The TEX\_ prefix identifies the texture type number as a texture name constant in the game code.)

Trainz only supports DIFFUSE, BUMP, and REFLECT texture types. All other effects are achieved by judicious use of the alpha channel on these three texture types, the numerical settings for the ambient, diffuse, and specular colours for the material, and the correct use of the material names.

In the example above the material name ends with "m.onetex" telling Trainz there is only one texture when in fact there are five. Notice also that all slots point to the same texture, another no-no. Each slot must point to a separate texture, as in the example in the first listing.

### Repair Strategy.

My PM2IM program removes the unsupported texture references from both PM and IM meshes. The resulting IM mesh is supported by TS2009 onwards. If the above example had been a PM mesh the unsupported textures would have been automatically removed in the conversion to IM.

## Errors caused by: missing attachments

Missing attachment points are a common occurrence in assets imported into TS2009/10. Fortunately this time the error message from the Content Manager clearly defines the problem. Again open the mesh in Mesh Text Viewer and go to the attachment portion of the mesh (close to the end of the listing.)

In many cases I have found that the missing attachment/s are caused by typos in the config.txt or in the attachment name in the mesh. So compare the names of the

attachments specified in the config.txt with those in the listing. If you find a discrepancy alter the name in the config.txt to match that in the mesh.

If an attachment specified in the config.txt is missing from the mesh, consider if you can live without the item that it hosts. If not then use my AttachmentMaker program to add the appropriate attachment/s.

The listing below shows an attachment list for an interior asset with the first couple spaced to show each attachment's data.

```
13912  Chunk ID: ATCH   Size: 1676  (next chunk: 15596)  Version: 100
13924      Attachment Count: 25

13928  Attachment Name size: 16,  Name: a.red_mushroom
13948      Orientation: [1.000,  0.000,  0.000]
13960              [0.000,  0.981, -0.196]
13972              [0.000,  0.196,  0.981]
13984      Position:   [0.004, -0.626, -0.472]

13996  Attachment Name size: 16,  Name: a.blue_button1
14016      Orientation: [1.000,  0.000,  0.000]
14028              [0.000,  0.981, -0.196]
14040              [0.000,  0.196,  0.981]
14052      Position:   [0.165, -0.560, -0.487]

14064  Attachment Name size: 16,  Name: a.blue_button2
14084      Orientation: [1.000,  0.000,  0.000]
14096              [0.000,  0.981, -0.196]
14108              [0.000,  0.196,  0.981]
14120      Position:   [0.164, -0.502, -0.498]

14132  Attachment Name size: 16,  Name: a.blue_button3
14152      Orientation: [1.000,  0.000,  0.000]
14164              [0.000,  0.981, -0.196]
14176              [0.000,  0.196,  0.981]
14188      Position:   [-0.156, -0.560, -0.487]

14200  Attachment Name size: 16,  Name: a.blue_button4
14220      Orientation: [1.000,  0.000,  0.000]
14232              [0.000,  0.981, -0.196]
14244              [0.000,  0.196,  0.981]
14256      Position:   [-0.156, -0.502, -0.498]

etc down to

15460  Attachment Name size: 16,  Name: a.horn_button
15480      Orientation: [1.000,  0.000,  0.000]
15492              [0.000,  0.981, -0.196]
15504              [0.000,  0.196,  0.981]
15516      Position:   [-0.001, -0.272, -0.545]
15528  Attachment Name size: 16,  Name: a.green_button5
15548      Orientation: [1.000,  0.000,  0.000]
15560              [0.000,  0.981, -0.196]
15572              [0.000,  0.196,  0.981]
15584      Position:   [-0.169, -0.272, -0.544]
15596      Eof
```

## Repair Strategy

As already mentioned, compare the listing attachment names with those in the config.txt, and fix any non-matches in the config.txt.

Or, add missing attachments with my AttachmentMaker tool.

## Specular Lighting Problems

Mesh Text Viewer can help in sorting out object lighting factor issues. Each material has AMBIENT, DIFFUSE, and SPECULAR lighting settings that control how the mesh looks in Trainz. Early exporters from GMax and 3dsMax used default values for these colour properties that cause an un-natural shine to appear on the object in TS2009/10. The settings were all white (1.000 red, 1.000 green, 1.000 blue) as the listing from the Mesh Text Viewer shows below.

```
80  Chunk ID: MATL    Size: 316  (next chunk: 404)  Version: 102
92  Material Name Size: 44
96  Material Name: *throttle_housing*A3FC19C5*.mtl #1*m.reflect
140  Property Count: 0
144  Two Sided: 0
148  Opacity   :    1.000
152  Ambient   1.000, 1.000, 1.000
164  Diffuse    1.000, 1.000, 1.000
176  Specular   1.000, 1.000, 1.000
```

We have found that changing the ambient and diffuse colours from white, unlocks a default render property that allows better use of these factors. It seems to give us more control over the specular factor, allowing object shine to be controlled. Keep this in mind when making new assets for TS2009/10.

## Repair Strategy

If you can re-export the mesh, more suitable values of these colours for TS2010 would be

```
Ambient      0.750, 0.750, 0.750
Diffuse       0.750, 0.750, 0.750
Specular      0.830, 0.830, 0.830
```

If you only have the mesh, then use my PM2IM program with the "Zero Speculars" option set to make the specular values 0.00, 0.00, 0.00. (black). Please note that the latest version of my PM2IM tool allows you to adjust the SPECULAR setting to any colour you wish. This gives you control over specular effect when the object is rendered in the game. You should experiment with colours to find what suits you best.

## PEV's Trainz Tools.

All of the tool programs mentioned above are available for free download from  
<http://www.members.optusnet.com.au/~villaump/pevsoft.htm>