RenderWare Graphics

Viewers

Clump View and World View

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Table of Contents

1.   Introduction

There are three main viewer applications that ship with the RenderWare Graphics SDK. Clump View and World View are explained in this document. *RenderWare Visualizer* is explained in the *RenderWare Visualizer* document. The new viewer can be used to display `.bsp`, `.dff`, `.spl` and `.rws` file formats.

Clump View

Clump view is used to view animated hierarchies of RenderWare Graphics geometry. Such animated hierarchies are known as clumps and are stored in files with the `.dff` extension. A separate clump would typically be used for each animated entity that needs to be moved independently within a RenderWare Graphics application.

World View

World view is used to view sections of static RenderWare Graphics geometry. Such static geometry sections are know as worlds and are stored in files with the `.bsp` extension. Typically, a separate world would be used for each level in a RenderWare Graphics application.

Generating Artwork

RenderWare Graphics `.bsp` and `.dff` files can come from any source but are usually generated using one of the RenderWare Graphics export plugins for 3ds max and Alias|Wavefront Maya. The RenderWare Graphics viewers form an integral part of the tool chain needed to get great looking artwork into RenderWare Graphics. The artist will usually run though a cycle of:

- Creating assets in an art package.

- Exporting to `.bsp` or `.dff` files.

- Viewing the exported files using Clump View or World View.

- Tweaking as necessary in the art package and re-exporting.

PVS

When your camera is placed inside your modeled world, chances are that large parts of the geometry are not visible. This may be because they are behind the camera or they may be blocked by other geometry. It makes no sense for the game platform to render models that can't be seen so RenderWare Graphics checks visibility from each part of the model. It stores this information in a database known as Potentially Visible Sets (PVS). This is calculated once per model.

To view the PVS in the world viewer, open your model and press *W* and then *T* to change to wireframe (turning off triangle rendering) and then *G* to generate a PVS. Your model should be displayed in cyan wireframe for the sector the camera is in and other colors for the non-visible sectors.
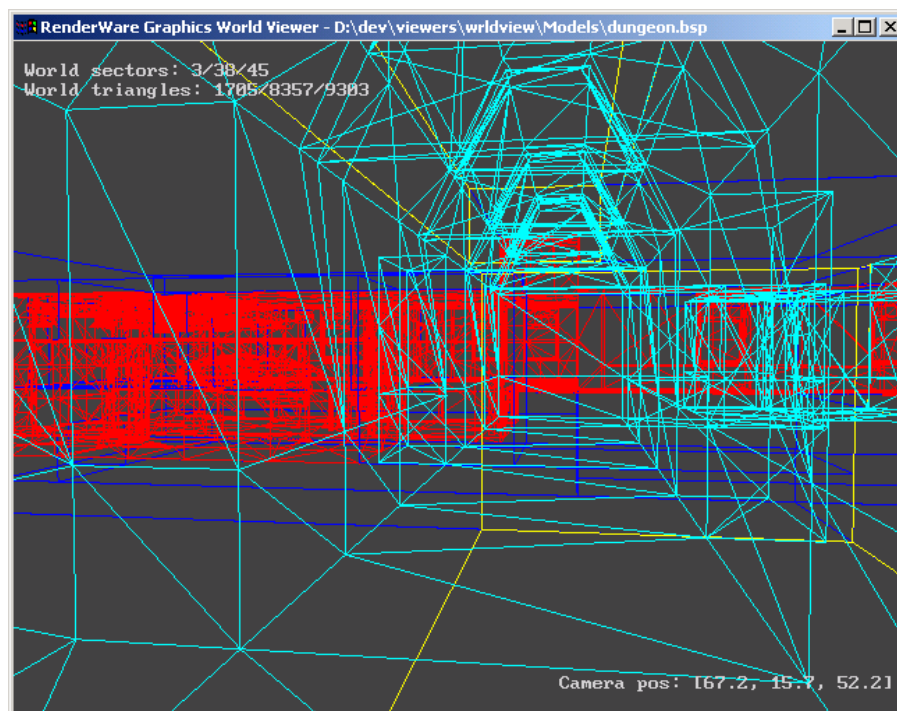
Platforms

Just as RenderWare Graphics is available on many different platforms the RenderWare Graphics viewers are available on many different platforms. You will have Clump View and World View binaries for whichever platform your application is targeted at.

In addition PC based viewers are shipped with all RenderWare Graphics SDK versions. The PC based viewers are very useful for getting a quick look at your artwork without needing to access a console target across the network. They should never be used as a complete replacement for running on the target platform as many aspects of your artwork can only be fully evaluated on the actual hardware (performance, material appearance and colors in particular).

2. Running the Viewers

General

The PC RenderWare Graphics viewers are shipped with all versions of the RenderWare Graphics SDK. They can be installed at the same time as exporters as part of the of artist install in the main setup program. Viewers for other platforms come only with the relevant RenderWare Graphics SDK. All versions of the viewers install to the same place. They live in `rwsdk\viewers` in the RenderWare Graphics directory.

PC

The PC viewers come in two different build types, OpenGL and D3D8. The different versions should give the same results but you may find that a particular one runs faster or is more compatible with your system. Try them all to find which works best for you.

The Clump View binaries are named `clmpview_opengl.exe` and `clmpview_d3d8.exe`.

The World View binaries are named `wrldview_opengl.exe` and `wrldview_d3d8.exe`.

As with most Windows applications there are various ways to run the viewers. You can drop a file of the relevant type on to the icon, you can double click the icon to run the app and then drop a file onto the window or you can associate the file type with the application and then double click on the file.

There is a known problem with dropping files onto the viewer icon. If the file's path name contains spaces the viewer will fail to load it. This will be fixed in a future release.

However you run the viewers you will be presented with a Device Selection window. This window allows you to select the display device and screen mode for the viewer to use. The default will normally be fine.

PlayStation 2

On PlayStation 2 the viewer binaries are named `clmpview_sky2.elf` and `wrldview_sky2.elf`. To run the binaries you need to use a PC application that sends the viewer binary and your art assets to a PlayStation 2 development kit. This application is called `pc-ps2d.exe` and ships with the RenderWare Graphics PlayStation 2 SDK. It lives in `rwsdk/bin` in the RenderWare Graphics directory. You will normally want to add this directory to your path.

Open a command line prompt in the Clump Viewer or World Viewer directory and run `pc-ps2d` as follows:

```
pc-ps2d <hostname> wrldview_sky2d.elf yourfile.bsp
```

or

```
pc-ps2d <hostname> clmpview_sky2d.elf yourfile.dff
```

Set the `<hostname>` to the name or IP address of your PlayStation 2 development kit. Set `yourfile.*` to the name of the `.dff` or `.bsp` you wish to view. If the viewer doesn't start correctly on the development kit then check the output in the command prompt window. Common problems include typing mistakes in the viewer or art asset name and running an incompatible flash version on the development kit.

GameCube

Running the RenderWare Graphics viewers on GameCube is a fairly complex operation. The following guidelines may help but we recommend you obtain the help of an experienced GameCube programmer to speed things along.

The GameCube viewer binaries are named `clmpview_gcn.elf` and `wrldview_gcn.elf`. To run these binaries on GameCube you need to use the `loadrun` command line tool. This tool ships with the GameCube SDK rather than the RenderWare Graphics SDK. The viewers should always be run from a PC directly connected to the GameCube development kit so this SDK will most likely be installed already.

Copy your `.dff` or `.bsp` artwork and textures to a new directory ("models" for instance) on whichever drive is setup for DVD emulation. If you can't access the emulation drive it may be in use and you'll need to use the `stop` command first.

Use the `setdvdroot` command to point the DVD emulation at the right directory:

```
setdvdroot models
```

Open a command prompt in the Clump View or World View directory. Use the loadrun command to load the viewer:

```
loadrun clmpview_gcn.elf -a yourfile.dff
```

or

```
loadrun wrldview_gcn.elf -a yourfile.bsp
```

Xbox

Running the RenderWare Graphics viewers on Xbox is a fairly complex operation. The following guidelines may help but we recommend you obtain the help of an experienced Xbox programmer to speed things along.

The Xbox the viewers are named `clmpview_xbox.xbe` and `wrldview_xbox.xbe`. To run the binaries you first need to use the `xbExplorer` application to copy the binaries to the Xbox development kit. `xbExplorer` ships with the Xbox XDK rather then the RenderWare Graphics SDK.

First use the *File→Target* command in `xbExplorer` to set the name of the target Xbox development kit.

Use `xbExplorer` to copy the whole Clump Viewer directory to the `XE:` drive of the target machine.

Use `xbExplorer` to copy the art assets you wish to view to the Clump Viewer directory.

On your PC edit the `clmpview.ini` file by adding the name of the `.dff` or `.bsp` asset to the end (see the Automatic File Opening section for more details). Use `xbExplorer` to copy the `.ini` file to the target machine.

Finally, find the CLMPVIEW_XBOX entry on the Xbox dashboard to run the viewer.

You can kill the viewer by pressing the two triggers and the black button simultaneously.

Texture Format and Location

The viewers that ship with the RenderWare Graphics SDK understand only the `.bmp` and `.png` image formats by default. RenderWare Graphics art assets do not store texture file name extensions, the extensions are added automatically at load time. The viewers will first look for files with the `.png` extension and then `.bmp`. This means if you used a different image format when creating an art asset you can simply convert it to `.bmp` or `.png` and the viewer will still load it.

If you have no option but to use an image format other than `.bmp` or `.png` then talk to the programmers on your project as it is possible to extend the viewers (and RenderWare Graphics in general) with other image formats.

The location that you store textures relative to the `.bsp` or `.dff` file you load is important. For the viewers to find the textures the maps need to be in sub-folder named either "textures" or with the same name as your `.bsp` or `.dff` file. So if you have a `C:\projects\Renderware` folder and your `.bsp` is called `cool.bsp` then make a sub-folder called either `C:\projects\Renderware\textures` or `C:\projects\Renderware\cool` for your texture maps.
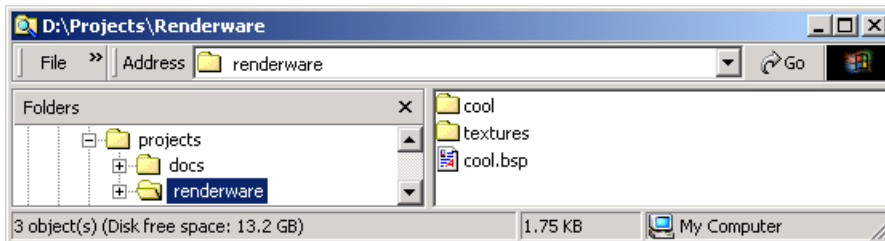
Effect File Location

If the artwork loaded references platform specific effect files then the viewers will look for the effect files in the same locations as the textures. Since effect file references include extensions no extensions will be added to the file names searched for.

Automatic File Opening

By editing the `wrldview.ini` or `clmpview.ini` text files that come with the viewers it is possible to automatically load a file when they start. To load a file on startup, simply add a new line to the `.ini` file with the path name of the file to be loaded, either relative to the World View or Clump View executables, or absolute, e.g. `./models/world.bsp` or `c:/projects/models/dice.dff`.
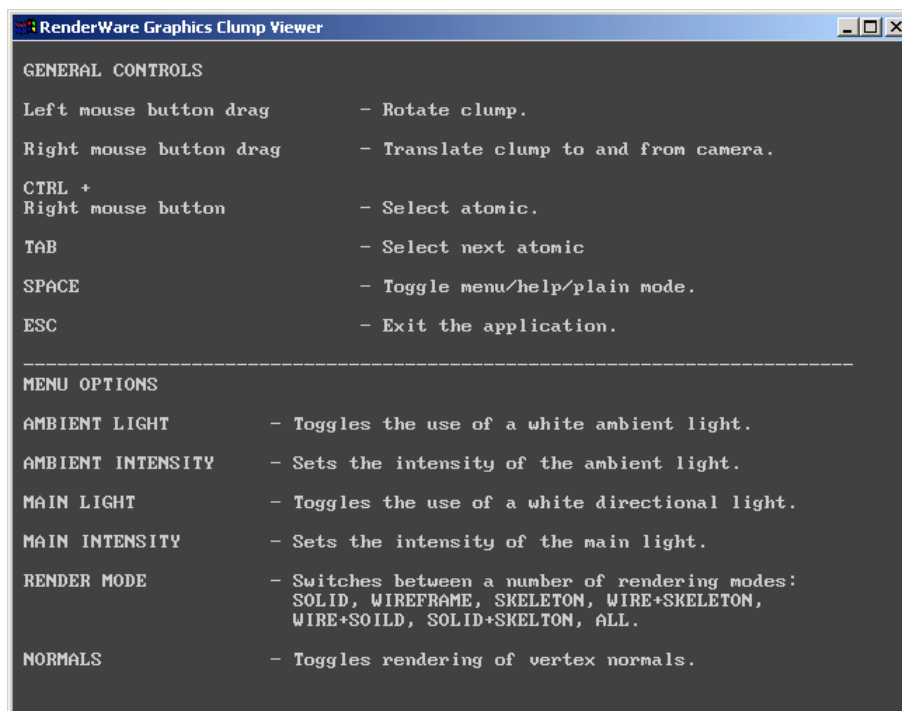
3. Using the Viewers

Controls

The most important control on both viewers is the menu control. This is
`spacebar` on PC, `SELECT` on PlayStation 2, `START/PAUSE` on GameCube
and `BACK` on Xbox. The first press moves the viewer to an menu page where
various viewer parameters can be changed. The second press takes the
viewer to an online help page. A third press of the menu control takes the
viewer back to the main view.
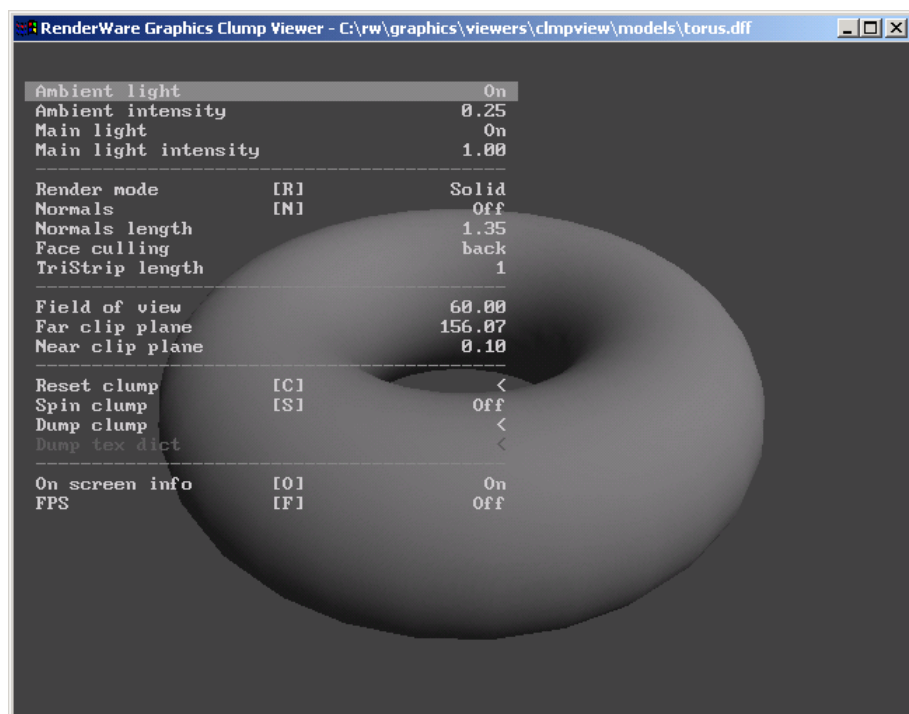
The navigation controls for the viewers are intuitive. The online help page
contains details for the particular platform you're running on. Alternatively
you can view the platform text file (`gcn.txt`, `sky.txt`, `xbox.txt and
win.txt`) you're interested in. The text files live in the same directory as the
viewer binaries.

```
RenderWare Graphics Clump Viewer                                    _ □ ×

GENERAL CONTROLS

Left mouse button drag        - Rotate clump.

Right mouse button drag       - Translate clump to and from camera.

CTRL +
Right mouse button            - Select atomic.

TAB                           - Select next atomic

SPACE                         - Toggle menu/help/plain mode.

ESC                           - Exit the application.

------------------------------------------------------------------
MENU OPTIONS

AMBIENT LIGHT         - Toggles the use of a white ambient light.

AMBIENT INTENSITY     - Sets the intensity of the ambient light.

MAIN LIGHT            - Toggles the use of a white directional light.

MAIN INTENSITY        - Sets the intensity of the main light.

RENDER MODE           - Switches between a number of rendering modes:
                        SOLID, WIREFRAME, SKELETON, WIRE+SKELETON,
                        WIRE+SOILD, SOLID+SKELTON, ALL.

NORMALS               - Toggles rendering of vertex normals.
```

Useful Options

Whilst not a complete list of the options available in the viewers the following is a list of the options you will frequently find useful. The online help gives general information on all the commands.

Light Controls

The `Ambient light` and `Main light` controls allow you to turn on and off the two lights in the scene. The related intensity controls give you fine control over the brightness of the lights. Both lights are white in color.

Face Culling

This control allows you to set whether *front, back* or *no faces* are culled out when RenderWare Graphics renders the scene. For most artwork the default value of *back* should be fine. If you're using a specialized tri-stripper which ignores winding order you'll need to set the face culling to *none*.

View Controls

The `Field of View`, `Far clip plane` and `Near clip plane` give you control over the camera parameters used in the viewers. These values, along with the camera position, should default to values that give you a good view of the entire world or clump.
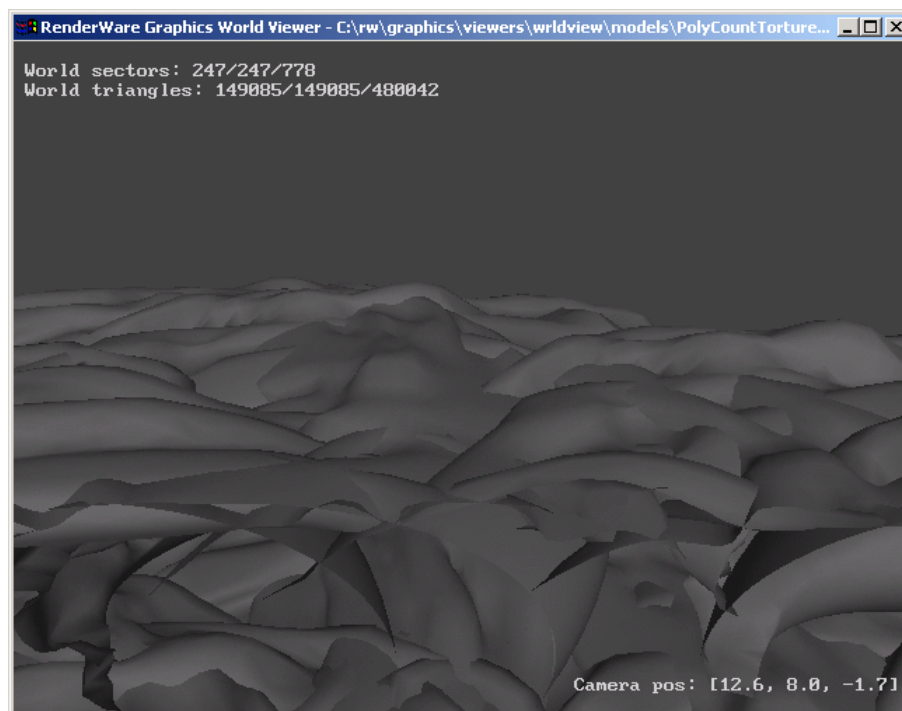
Depending on the scene you may find that adjusting the near clip plane can reduce Z bleeding between polygons.
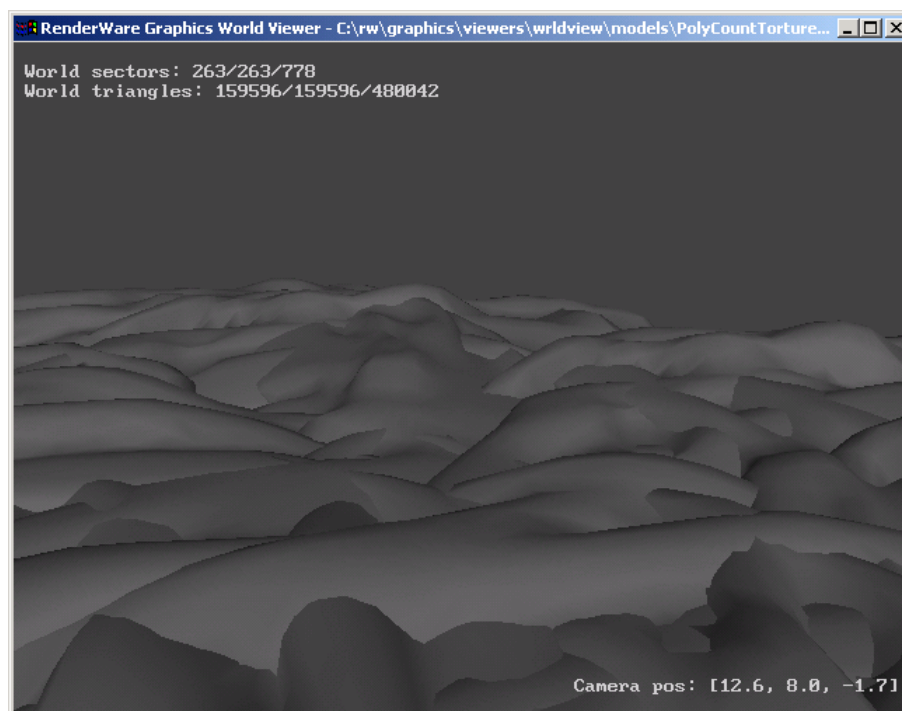
Dump Tex Dict

Texture dictionaries are platform specific libraries of textures. The textures are stored in a format optimal for that platform. Using texture dictionaries rather than explicit textures speeds application start up. The viewers can be used as a way of generating texture dictionaries.

When the `Dump tex dict` command is used, the viewer will create a texture dictionary file in the same directory as the source artwork. The filename of the dictionary will be based on the name of the source artwork with the platform name appended. For instance if you are viewing a file c:\models\apple.dff on a D3D8 viewer the texture dictionary will be c:\models\apple_d3d8.txd.

Mesh Visualization

Setting the `Render mode` to meshes in Clump View or enabling the `Mesh` option in World View will render your scene using a different color for each mesh. You should find there is a separate mesh for each material in your world or for each material in each object in your clump. Since the frequency of mesh changes affects the efficiency of triangle stripping and therefore your runtime performance it's important to be aware of the meshes in your scenes and attempt to minimize the number that are generated.
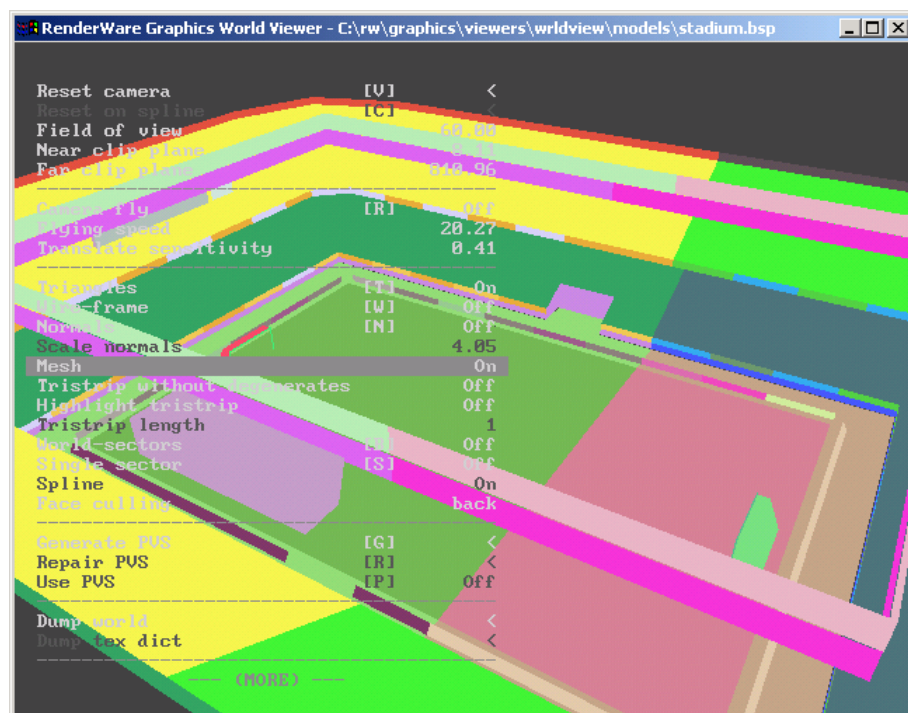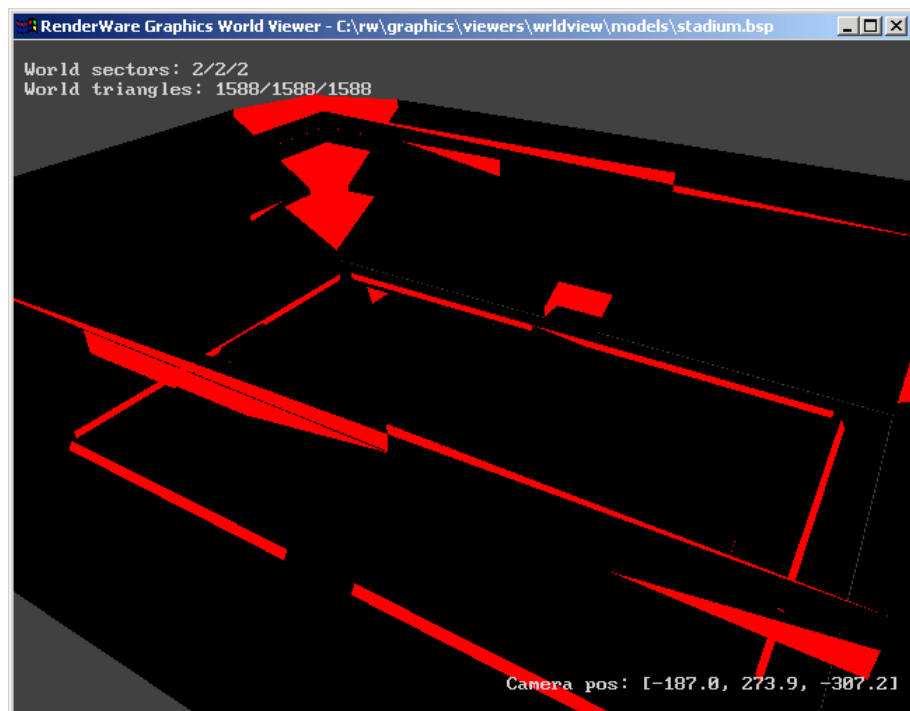

Triangle Strip Visualization

Setting the `Render mode` to `TriStrips` in Clump View or enabling the `Tristrip without degenerates` option in World View will render your scene using a different color for each triangle strip.
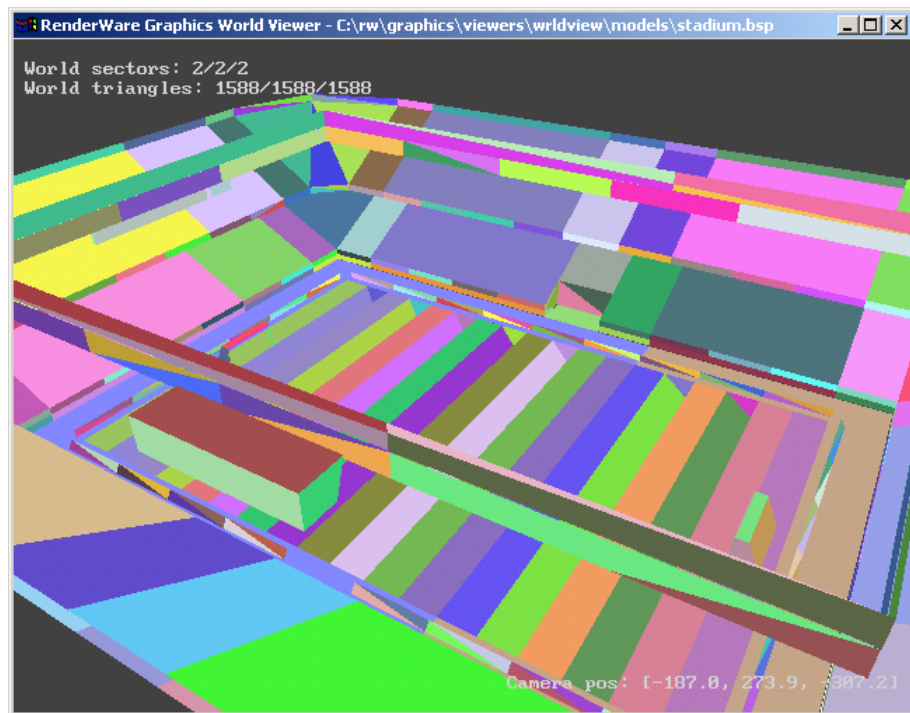
Setting the `Render mode` to `TriStrip lengths` in Clump View or enabling the `Highlight tristrip` option in World View will render your scene in a mode that allows you to visualize the lengths of triangle strips. Triangle strips of length less than or equal to the `TriStrip length` setting will appear in a shade of red. The shortest triangle strips will appear bright red and the longest dark red. Tri-strips longer than the `TriStrip length` setting will appear black.

The number of triangle strips in your scene greatly affects the performance at runtime. The visualization tools built into the viewers enable you to assess the quality of the triangle stripping in your artwork and identify the areas where improvement is possible. If you need guidance on improving the triangle stripping in your scenes please refer to the RenderWare Graphics Artist Guides for 3ds max and Maya.