

Rendered to the Max

SolidWorksToMax from nPower gives SolidWorks designers a rapid means of turning out ultra-high quality renderings of their models in 3ds Max.



I came across a suite of programs at SolidWorks World that set me thinking. They were designed to take solid models from some of the current range of modellers, including SolidWorks, and convert them so that they could be rendered within 3ds Max - the leading rendering, visualisation and animation software, producing the highest quality photorealistic images. Nothing remarkable in that - except that SolidWorks has its own rendering engine and produces images that, to most of us, appear to be highly satisfactory.

The questions I asked myself were pretty basic; what is the difference between the quality of rendered models produced in SolidWorks and those produced by 3ds Max, and why would it need a separate piece of software to prepare the SolidWorks model for 3ds Max or VIZ?

The basic differences between the two boil down to the fact that, whilst

SolidWorks is a great tool for parametric modelling, it doesn't have great tools for lighting, UVW mapping, texture mapping, materials handling and, of course, rendering - all of which are present in 3ds Max/VIZ, which are specially designed to handle such effects. The SolidWorks tessellation engine is mainly set up to display the model on the screen as rapidly as possible, and to improve the modelling software's rendering performance they would have to sacrifice some of the display performance.

Getting high quality photorealistic images out of SolidWorks is difficult, as it hasn't got the best renderer (neither do any of the other solid modelling programmes, for that matter) nor is the add-on rendering engine that's available able to match up to 3ds Max. They don't have the best lighting and material libraries, a basic ingredient of high quality rendering. 3ds Max, on the other hand, is perfect for setting up the

different types of realistic lighting required, applying materials to the model, often in layered amounts, and sorting out a host of other rendering details.

The most important factor, though, is that the tessellations required to render a model efficiently must be of the highest quality. SolidWorks' renderers and those of most other software developers, deal with polygons (although some of them will be converting to NURBs formats in the future). Long, skinny polygons and other irregular polygons, produced with imperfect or inferior Mesh generation software, will cause rendering artefacts - and the resulting image will have flaws. For the highest quality images, the mesh has to be uniform.

All of this was explained to me by David Gill of nPower, developers of Power Translators, including the SolidWorksToMax translator. He explained how his company's software created

the best mesh for rendering in 3ds Max. There are other companies that translate data for rendering in 3ds max, but they all tend to transfer the data as polygons, which means that they are stuck with the accuracy of the native tessellation engine. Power SolidWorksToMax transfers SolidWorks data as precise NURBS based surfaces and solids. This enables the user to retain control over various parameters within the tessellation engine, so that they can adjust the density of the mesh and the length of the profile edge and arc segments etc., ultimately producing an extremely high quality mesh that will provide the ultimate render.

Power SolidWorksToMax is part of the Design Visualisation solutions of nPower Software - a range of Power Translators that plug-in to 3ds Max for visualisations, animations and rendering CAD models. Capable of handling UGS, CATIA, Parasolid and Rhino models, it can now also handle models and assemblies from SolidWorks. It doesn't yet do the same for Inventor - but that's on its way.

What this means is that SolidWorks users attempting to improve the quality of their rendered output no longer have to spend days or weeks translating their high quality solids into imprecise polygonal models, with, perhaps, intermediate formats being created along the way, and then struggle to produce high quality renderings. They can now transfer models directly into 3ds Max using SolidWorksToMax/Viz to generate smooth, crack-free renderings wholly free of polygonal artefacts - and once transferred, use the Mesh and Polygon editing commands that come with the software, Max Editable Mesh and Editable Poly, to tweak the mesh to produce the best results for each type of rendered image.

It does this by creating a precise NURBS-based 'Brep Object', which represents the precise geometry defined in the SolidWorks model files. The software can then be used to create a mesh to user-defined tolerances, depending on the size of the object in the image. Setting a tolerance of a half a pixel, for example, will produce a very high quality image with very smooth edges free from those infernal polygonal artefacts.

BrepObjects are subject to MAX Meshmodifiers such as twist, UVMap and so on, and can have materials applied at sub-object level. The highest quality renderings build up the image using several layers of materials and lighting effects. Other object clean up tools enable users to sew together faces, flip face normals, trim and un-trim surfaces by curve projections or surface intersections, project curves and apply materials to faces. Power SolidWorksToMax comes with a range of model editing tools that can be used to clean up imported SolidWorks models before they are rendered, if the incoming data is found to be incorrect.

The software is not only able to dramatically improve productivity on rendered models, it can also handle large assemblies. Furthermore, its batch mode for processing groups of models comes with automatic Mesh generation at the same time, once the mesh parameters and tolerances have been set up.

MISSION: POSSIBLE!

Some of the most demanding tasks for modelling tools, and for subsequent ultra high quality rendering of those models, is seen in the film industry, where digital creations need to be produced very rapidly, and where the rendering and animation of the models has to be as life-like as possible. Simon McGuire, a senior concept designer within the film industry, working on high profile films such as Mission:Impossible 3, is very positive about the impact the Power Translators have made; "This is actually the best software I have seen in a long time. Speed is very much the order of the day. And nPower software has greatly increased my productivity. Even more so with CNC machining becoming more and more prevalent in the film industry, being available to export detailed models greatly increases the turn around, especially when we have often little more than a week from design to presentation prototype." CU

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