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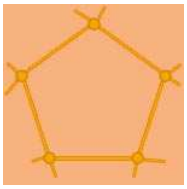
High Polycount / High Resolution Topology

If using traditional "mainstream" 3D applications, such as Maya, 3Ds Max, Lightwave, or XSI, this is the most free modeling convention, used in high-resolution modeling, which yields to most, if not all, of things which would have been considered atrocious to in other techniques. If using ZBrush, there are a few more things to keep in mind. This should be the last technique learned and perfected.

The models that are made with such topology are, in the professional realms, good for one purpose only: baking textures and generating normal maps (as well as parallax, steep parallax, and horizon maps) to simulate detail. These textures and maps are then used on the lower-polycount model, either for animation or game-content.

The only other use that has crossed my mind is abstract 1-shot renders, where all the objects are solids, modeled the same way they are rendered, never used for anything else, and not ever rigged and posed. This is such a narrow-profile area that never yields any professional results, and can be equated with the use of filters in Photoshop to generate some "cool", wierd-loking array of colors.

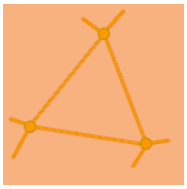
Below are some notes on different things you can do with high resolution modeling.



N-gons

Yeah... (Sigh) You can use these, but not if you intend using ZBrush! Otherwise, just be careful and try to limit it. As long as your model looks ok with in the place where you have an n-gon from *all* intended viewing angles, it is ok to use it. If you intend to export this to ZBrush, you might wanna turn it into one quadrilateral and one triangle, since ZBrush 3.1 doesn't guarantee your model won't get screwed up if there are n-gons. If it doesn't, you will have trouble using symmetry anyway, because the point pairs will be misinterpreted.*

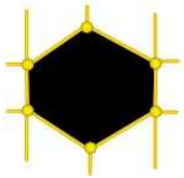
*Information about ZBrush symmetry problems from N-gons was given by Stephen Minkin.



Triangles

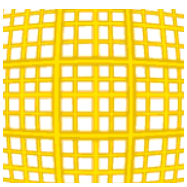
Triangles are OK in most places on your high-polycount model. Still, if you're using ZBrush, watch out! The newer versions may be able to digest these, but you will get terrible pinch-points around them! The pinch-points are something which cannot be "smoothed-out" properly, and are only caused by incorrect topology. They cannot be completely fixed in ZBrush when you're working on your piece of geometry. Ever.*

*Information about triangles causing pinch-points was given by Stephen Minkin.



Holes

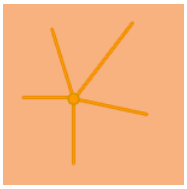
The detail simulation with high-polycount modeling is a technique that allows, and even sometimes encourages the use of holes. It is a benefit to be able to use holes when you're managing a part-by-part workflow,- detailing and projecting parts of your model separately from the rest, one part after another. It would be sort-of useless, and often undesired to cap your holes with this process, since projection algorithms wouldn't "know" what to do with all that cap geometry and generate some errors, making your normal maps or textures a mess.



Dense / High Polycount Areas

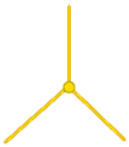
Modeling your high polygon model is the only time you can pay almost zero attention to your polycount. The limit is only the one presented by your machine's hardware and how optimized is the 3D software that you are using. Subdividing, detailing, and retaining changes made to any subdivision level is a feature unique to ZBrush, Mudbox, and Blender with its Multires feature* so far. Other software don't use the highly efficient Catmul-Clark algorithm fine-tuned to save detailing layers associated with each subdivision level. The other common subdivision algorithms, such as NURBS, Doo-Sabin, and Lace, mostly exist to generate smooth-flowing shapes, but can be only used to smooth-down a high resolution shape, not edit the resulting high-polycount geometry.

*Blender's Multires feature was pointed out by Benny. More info can be found here.



5-or-more-edged Vertexes

Vertexes that are surrounded by (define one end of) five edges are generally fine, unless you're making the high-res in ZBrush. There, these areas can get mistreated when edited with a strong 3D brush. If this happens, and it is bound to at some point, it will cause a pinch-point to happen, which is like a unedtiable ugly sharp rigid pike sticking out of your model. Pinch-points cannot be fixed inside ZBrush.



3-Edged Vertexes

These are totally OK to use here. They have never been a problem for me in high-res modeling.

KEEP IN MIND: Never try to model in high polycount if you don't know how to model in low polycount! If your model does not look good without subdivision and high-res detail, you shouldn't even start on the hi-res workflow. A high-res model without a low-res counterpart with proper topology is worthless.

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