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Introduction to Wobble

No this isn't a tutorial on eating more cakes to get that personal wobbliness factor – more a case of demonstrating some techniques I use for introducing an element of 'wobbliness' to my max / NWN models.

First thing to say is that this is a very subjective thing – a lot of the views are .

I'm not using any modifiers or techniques that are not already being commonly used by custom content people so don't be expecting any amazing new modeling techniques – I can pretty well guarantee you will not come across a single new max command herein. I do give a few tips here and there on how to accomplish some of what I am describing.

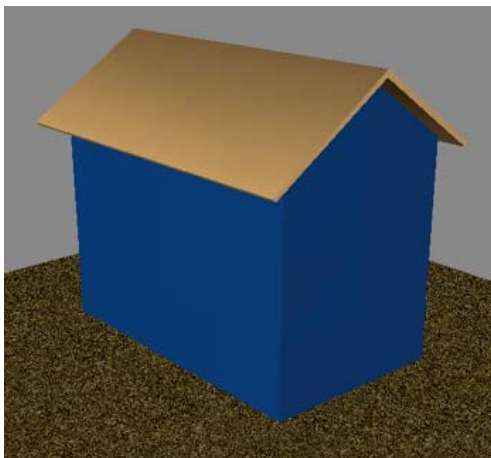
Secondly a lot of the views are pretty subjective – particularly the 'what looks good'

Instead this is intended as a guideline to what, meaning which meshes, and how to introduce wobbliness to models.

Why wobble ?

Using standard rectangular shapes makes for very unrealistic looking buildings – particularly for fantasy settings like NWN. By introducing randomness to meshes – particularly for more natural materials like thatch and stone, can help make an environment more believable and less ordered.

Wobbling vertices too much generates a lot of polys and introduces a lot of other headaches – particularly inviting a visit from the NWN shadow daemon – and should therefore be restricted to where it can deliver the best punch for the poly cost.



Untextured Model without any Wobbliness



Same Model – Wobbled & textured

What to wobble ?

The most effective meshes to wobble are those that form the outline of the model – particularly roofs and building edges / walls as these will be the most obvious – particularly set against fog or skyboxes.

Wobbling also consumes polys like anything – so it's better to target what to wobble them rather than wobble the whole model.

This also helps to emphasise one material against another, contrasting natural stone / thatch against dressed stone or timber.

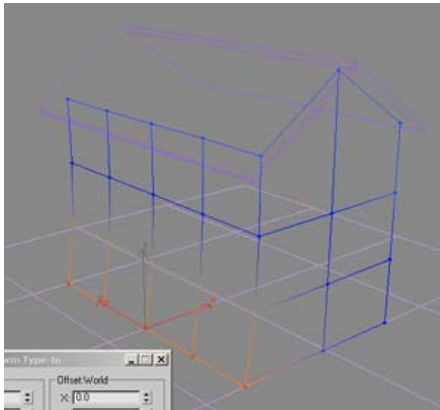
I thought I'd break this down to some typical elements with a few examples.

Walls:

Firstly I tend to make my walls from grided meshes at least 3 or 4 units high for a single storey building this leaves enough room for moving vertices. Width obviously depends on the size of the building. Large grids can always be rationalised later by using an 'optimize' modifier – but striking the right balance from the start is always a good idea.

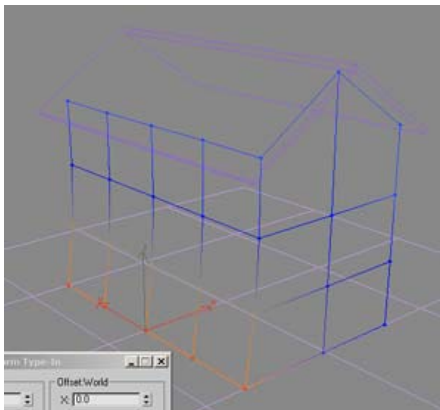
1. Splayed and Bowing Walls

Stone walls are wider at the base – builders used larger stones at the base as it helped structurally. For this reason you should tend to splay the base of wall meshes and use a mesh that consists of a grid at least 3 units high. *Soft Selection* on vertices can help with adjustments to vertices – although you may need to play around with the pinch setting (I normally use 0) to get the right 'bend' to the mesh.



Use Soft Selection for splaying a wall base
Only a small splay is needed although it depends on size of wall and type of material for extent of splay.

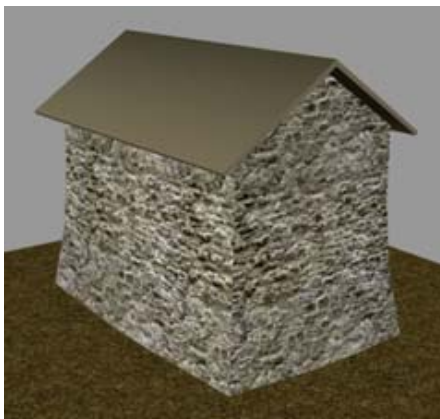
The bigger the splay – the more natural looking the overall structure becomes as it 'grows' out of the ground.



Splaying the body of the wall to 'bow' it out in the centre also helps – again using soft selection – good for stone and timber buildings as it can make the structure look more solid.

The opposite is also true – to make a building look more frail bend the wall inwards (good for tents, fabric even stone again).

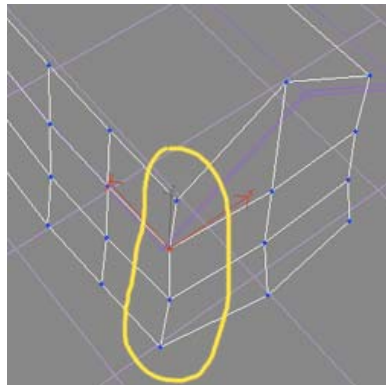
The overall effect of bowing inwards is to create 'tension' – which is why it works well for tents – but it can help to suggest a framed building too.



Splayed and Textured

2. Corners

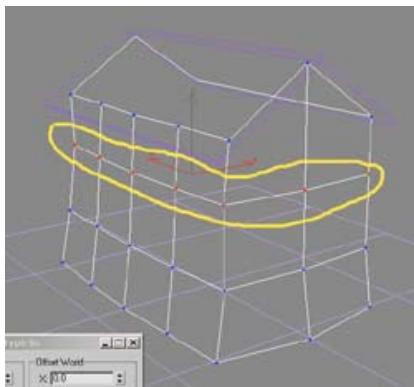
Corners are a place where the wobbliness really helps as the edges are very prominent in game. Concentrating variations and randomness in vertices on corners is probably the most efficient use of the extra polys involved – even if the rest of the wall mesh is relatively flat.



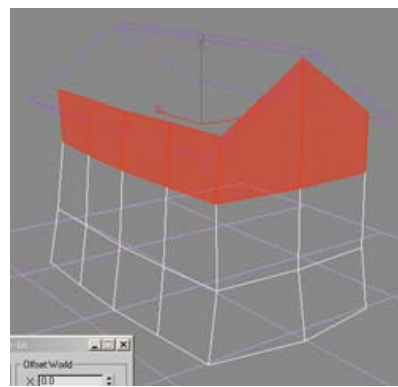
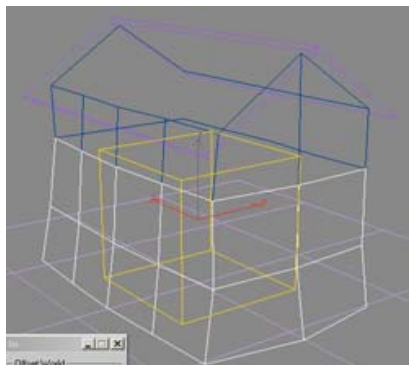
Moving the vertices by hand is the only real way of doing this with the aim being to offset one vertex from the normal - standard placements. Meaning you shift vertically and possibly horizontally in both x and y directions.

3. Split Wall into 2 Textures

I also tend to use at least 2 different textures for walls – a base texture which is partly greened and darkened where it meets the ground to help 'bed' the building into its location, and the normal 'clean' texture for the upper areas. For mapping purposes I therefore break up the wall meshes into 2, with a line of vertices along a common z axis – normally at about 200 to 300 centimeters above the ground. If the vertices are kept level and are tied to the mapping coords (ie uvw mapping of a box 300x300 with vertices at z=300). I then just use the *Edit Mesh* modifier to detach the lower mesh sections before mapping.



Before detaching any meshes it will save a lot of hassle later if vertices are all set at the same z value along the join – and that it matches the uvw mapping size (below). That way the texture transition from lower texture to upper texture will be seamless



Detach upper meshes with *Edit Mesh*.

Note: Before detaching any meshes it is always easier to have finished all the vertex moving and wobbling – because changes after this obviously involve more work



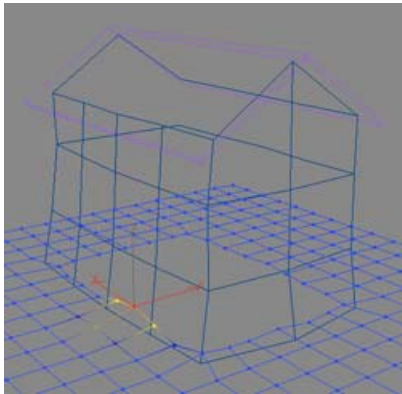
4. Overlap Ground Texture with Wall Texture

Using the same ground texture partly on the wall texture as a faded overlay (particularly using a *Render Clouds / Gradient* in an alpha channel as a mask) can further blur the edge of the building with the ground to simulate grass, mud or moss growing up the walls.

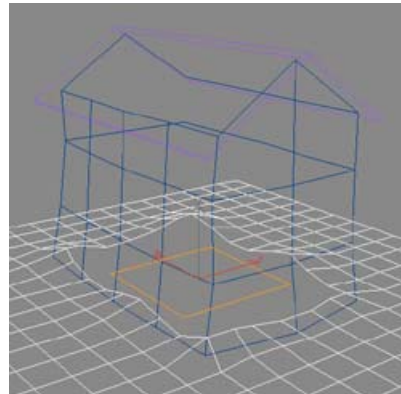
5. Wobble Ground Mesh at Junction with Walls

A building can also be better 'bedded' into the ground by lifting the ground mesh around the walls and adding height variation along its length.

There are many ways to selectively add polys to the ground mesh – but I tend to do it by hand by deleting a few faces and inserting a greater density mesh. You can use a *Tessellate* modifier – but the results are a bit unpredictable. Alternatively you can place a ground mesh with more segments from the start and then use either the *Optimize* modifier once the adjustments have been made or use *Weld* by hand to rationalize and reduce the polycount.



Moving ground mesh vertices up around the base of the walls with *Soft Selection*.



Unless you want to get into major Walkmesh editing – it's best to restrict the ground mesh lifting fairly close to the building



Mesh with *Smooth* modifier applied



Texture Ground Plane

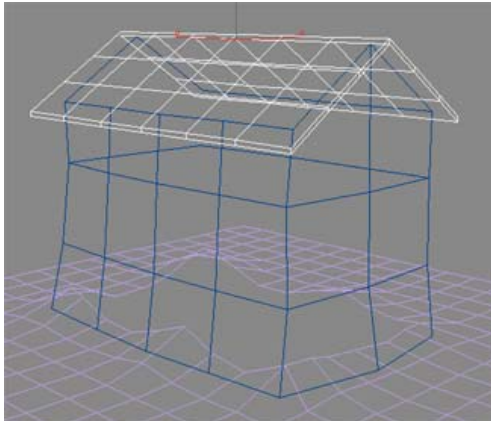
Note: A word of warning on smoothing and wobbling the ground plane or other meshes at tile edges. Because of the way the game uses smoothing of meshes and textures, wobbliness at tile edges can produce unexpected results. It is therefore essential to make tile edge meshes co-planar. The easiest way to do this is to keep tile edge mesh segments flat.

Roofs:

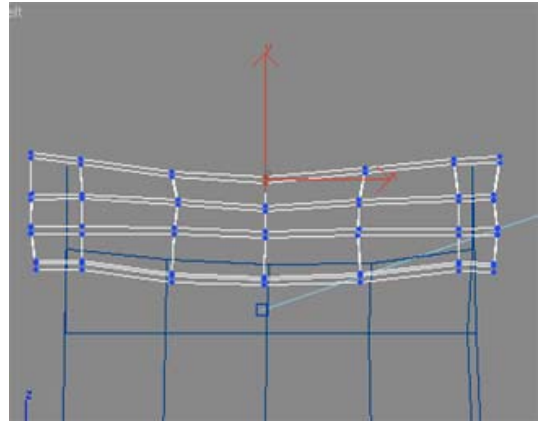
Roofs are similar to walls in that the wobbliness is best done along the edges – mainly the ridge, eaves and verges.

1. Sagging Roofs

The best wobble for roofs is the ridge line, especially to 'sag' the roof in the middle – which can also be done to the eaves – to reflect the ageing timbers and structure of an older building.



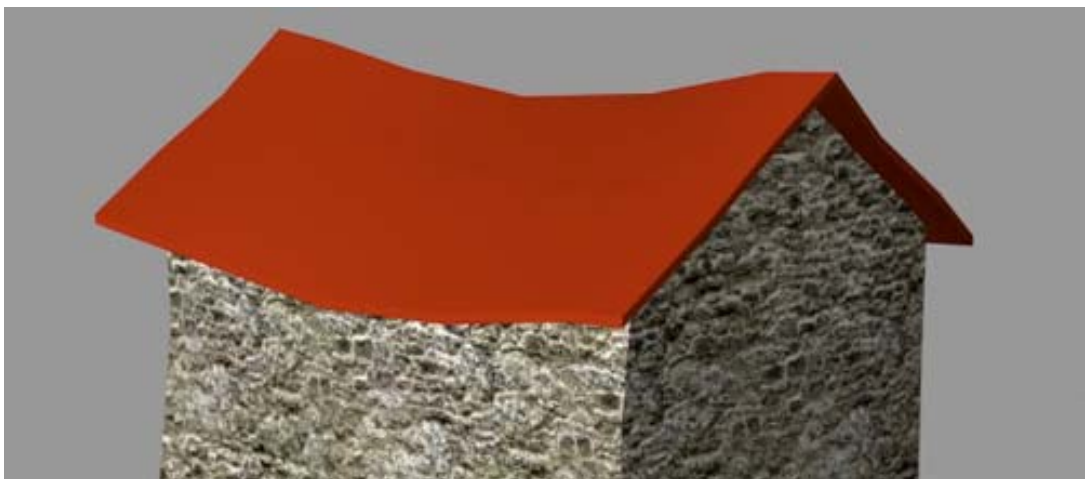
Start with a rectangular mesh (I remove underside polys by hand later whilst leaving some in place for the underside of the eaves which I detach and texture differently).



Moving the vertices to sag the roof in the middle.

Depending on the roof material the verge ends can either sit up as shown (for stiff materials like slate, stone or tile) or can sag slightly for softer materials like thatch.

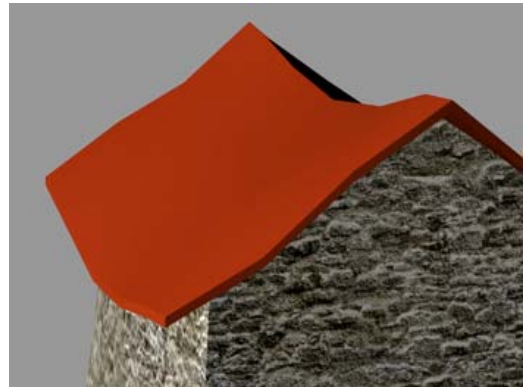
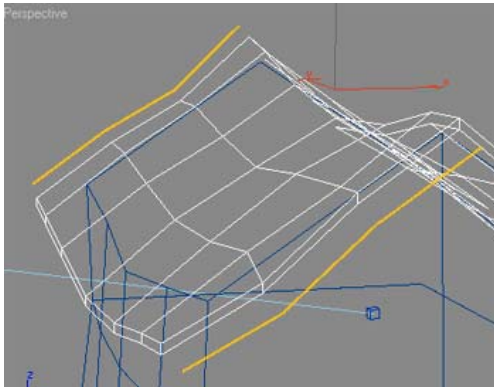
For bigger buildings, having multiple sagging points with evenly spaced high points will help suggest a framed structure or rafters below. The same can be done along the eaves line. Matching the sagging of the roof with the building and any internal walls – as well as using it to reflect structural bays and co-ordinating the location of door or window openings help to make a model look more real as well as natural.



Roof with sagging ridge, eaves and verges

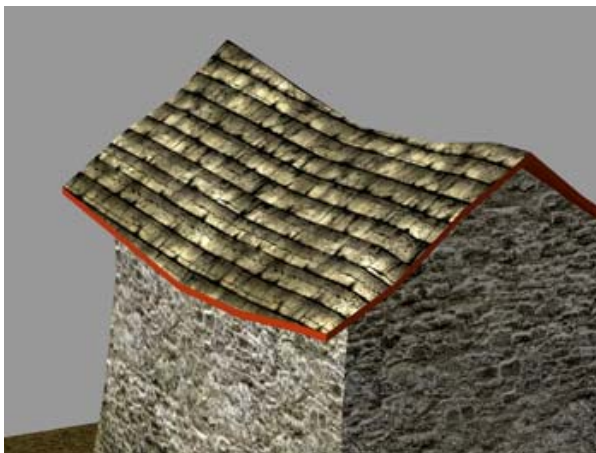
2. Misaligned Verges

Randomizing the verge edge vertices also helps, so that when you view along the building roof, one end looks completely different from the other. This works well in game as the viewpoint changes to an oblique view across the roofline.



3. Wobbling After Texture Mapping

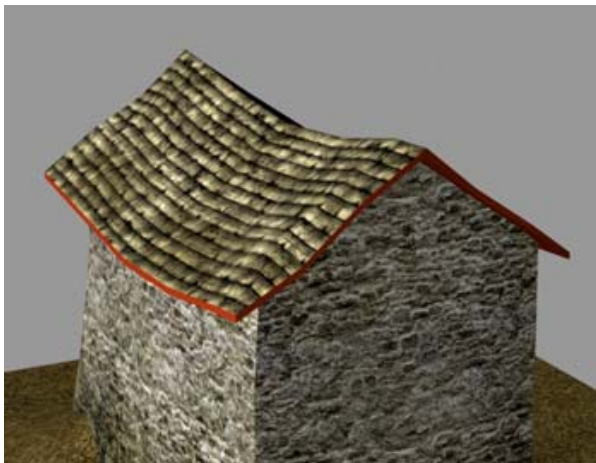
This is a balancing act, combining mesh alterations both before and after a texture has been mapped to a surface. Also performing Reset XForm functions will alter the appearance of mapped materials. As I don't fully understand the logic behind the Reset XForm function – I am unable to predict the exact results – so I tend to make only minor adjustments after mapping and test them.



This is the roof mapped as a plane after the roof adjustments have been made.

Making a relatively extensive sagging adjustment to the mesh can have an adverse affect on the mapping (depending on the texture being used).

In this case the ridge line cuts through the coursing of the tiles in the texture.



A trick to get round this – if you know that it is going to be an issue – is to make some adjustments to the mesh before mapping – then make further vertex adjustments after mapping so that the mapped texture gets adjusted with the mesh.

This will mean textures with a definite 'coursing' in them will better fit the 'wobbled' mesh.

This can become a problem later if further adjustments are needed to a mesh that requires re-mapping as these alterations **will** be lost.

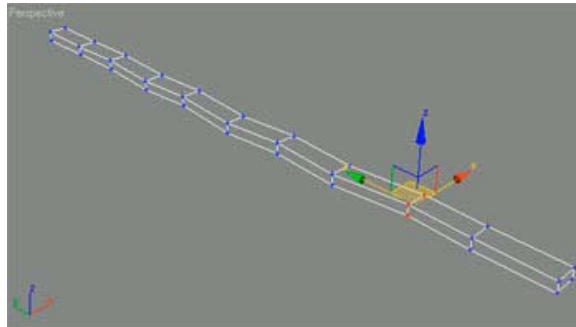
Copings:

As with wall and rooflines, coping and cornice lines can dominate a model. Breaking them up can therefore reap benefits for the overall impact of a model.

1. Breaking up the Building Lines

In a similar fashion to roof lines, copings and cornices can be broken up into segments with their vertices adjusted. In my opinion, adjustments in the z-axis are the most effective.

The mesh will need to be broken up into individual blocks after mapping to allow pivot adjustments to be made for shadow control. That is assuming you are turning shadows on.

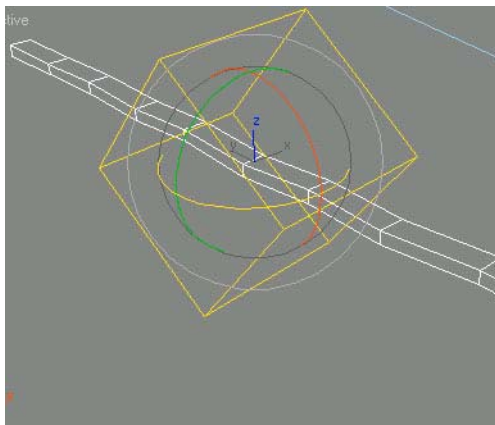


2. Rotate Mapping



Using standard box uvw mapping over long meshes quickly shows tiling / repeating textures.

Rotating the uvw mapping gizmo can help reduce the perception of tiling on narrow forms, mainly because the diagonal distance across a texture map is longer than the square side – so the texture will effectively span a larger distance.



Repetitive Structures:

Any structure that has repeating elements (ie castle battlements and crenelations) can certainly benefit from randomizing.

Each instance of the element can be given the wobbliness treatment individually, or at least provide maybe 4 of 5 different versions that can be placed around the structure.

Further variation can be added by moving and rotating each instance slightly.

Ideally when viewed along the structure no 2 instances of the repeating item should be the same form in the same relevant position.

Common Techniques & Max Modifiers:

A number of max modifiers are useful for specifically adding and managing the extent of wobbliness in models. These are a few of the more useful ones:

1. Smooth Modifier

Moving vertices around obviously introduces the problem of 'faceting' a mesh.

The smoothing modifier is therefore essential to blend the shading of meshes and eliminate the facet affect.

Smoothing is also invaluable for creating circular features such as towers whilst keeping polycounts low.

There are problems associated with smoothing though. The main one is the affect that can be produced along tile edges where a smoothed mesh spans 2 tiles. If the mesh segments along the join are not co-planar (ie not a continuation of the exact same plane) once smoothing is applied a rounded edge will become apparent between the tiles.

2. Optimize

The techniques described above will drastically increase poly counts for models and tiles. With a peak maximum limit of approx 1500 polys per tile (and an average maximum nearer 750) reducing poly counts is therefore part and parcel of adding wobbliness to models.

The easiest means of reducing the polycount of a given mesh is to use the *Optimize* modifier and scaling the *Face Threshold* to provide the right balance of polys to detail.

Optimize is far from a panacea for keeping poly counts low. Sometimes the results are far from predictable – and occasionally I find that mesh edges are affected.

I therefore tend to reduce polys by hand with the following technique.

3. Edit Mesh - Weld

Welding vertices is probably the most controllable means of reducing poly counts.

With a mesh selected, I normally select a group of vertices that can be joined and use the *Weld* feature with a large enough distance set to cover all vertices I wish to combine.

As with most of the modifiers here – it is always better to carry out these modifications before starting to map a model – as changes to meshes after mapping will severely distort textures.

4. Noise

If you have a shape that you want to randomise – such as stone, the noise modifier is a quick shortcut.

With the mesh or selected vertices / faces highlighted, adding a *Noise* modifier allows you to randomise the location of vertices and produce a much more natural form.

The tool allows you to restrict and scale the alterations to particular axes – and is most effective when the resultant movement is minor.

The Cost of Wobble:

As mentioned in the various sections above – wobbliness has its cost.

1. Polycount

The main impact of wobbliness is on the polycount.

This can be managed to some extent by limiting the expansion of polys to those specific areas where you get the biggest impact. These are mainly along a models edges – in the case of buildings the roof, wall edges and corners.

Other areas include around door and window openings and other edges.

2. Shadows

All the variations in meshes and the randomness introduced with wobbliness plays havoc with the shadow logistics in NWN.

Essentially so long as a line can be drawn from a meshes pivot point through each face unobstructed from the inside then a shadow can be cast. This is not such a simple task once a mesh has become more complex.

High-poly meshes eventually need breaking down into smaller elements where the pivots can be much more easily controlled.