

# RIGGING ROAD TEST v3.0

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*This project was devised over 15 years ago after an exhaustive stint as Head of 3D Commercials at Framestore. We made everything from humanoids to photoreal animals. I then wrote the first draft of this document to help students I began teaching get the most out of their rigs. Strangely it's still relevant. I still stumble across rigs, that - had they followed this - would have sat into a pipeline easier, and given animators less hassle.*

*Completely aside of whether a rig is animatable, has good/clear controls and effective blendshapes etc, if you want to be a SOLID rigger, it needs to conform in other ways. The rig can be a bit like a central bottleneck within the cgi process. If it's inefficiently conceived it can bring a production down, and make animators and rendering TD's lives a misery. Conversely with a little pre-thought, it can spark the beginnings of a beautiful delivery. The points below form a simple checklist similar to a car having its M.O.T. Once it passes, it'll be the talk of the animation department. These guidelines are Maya-centric but the points are mostly valid in any bit of kit.*

### MOVEMENT\*

Move your rig using the global translate by a large factor - like 10000 units in Z. Go find your character, does it still look the same? Rigs tend to tear up when moved insane amounts, this can happen for many reasons i.e. skinned geo containing a small amount of unassigned weighting.

### AXIS MOVEMENT

Select all parts of the rig which move the character around (which aren't the global translation) such as feet, hands, hips and head. In 'local' mode not 'world', translate forwards, backwards, side to side. Are they moving together and in line with the worlds axis? although all the values may read '0' if their parent nodes have minor rotations, full 90 degrees rotations and scalings etc animation down the line can become a complete nightmare.

### ROTATION\*

Rotate your character in all directions. Is it solid? Or do elbows and other IK systems spin out? Watch out for thin rope-like parts of your rig too (a worm on a spline rig). Sometimes these things are spinning on their 'roll' axis but it can be difficult to detect until you've rendered and comped.

### SCALE\*

Your rigs MOSTLY should be scalable, and is often an afterthought. Early in productions no one tends to care. But imagine the scenario where your character needs to interact with another non-scalable character made by a different rigger. Big problem, production gets halted, pressure is on and mistakes get made! If you incorporate scaling as a challenge to begin with, it's an easier nightmare to face as you go. Every animator/supervisor at some point goes 'I wonder if this rig scales?' then cringe as they watch the rig contort in the most hideous of ways.

### SPEED\*

One of my rigs once got called 'expensive'. Thanks very much I said. Turned out not to be a compliment. The animator said that any drag in a rig in it's most basic mode is a bad rig. Get some test animation from your animators. Have a pipeline which loads this motion temporarily onto your rig. Press play. Is it realtime? if not, why not? and could it be realtime? Hide some of the more complex stuff and press play, is it realime? If it's made no difference, consider having slider options to physically break connections to the core animation rig. When skinning, are you using geometry with history removed? Is the skin weighting slowing performance down? If so, make a second version of the geo, slice into segments like sushi and constrain to your rig joints. Have a visibility slider to reveal this new 'proxy' setup, whilst your animators work. NOW press play? load 5 of the same characters. Still realtime? Yes? Your animators will thank you.

## THE ZERO TEST\*

Select all of your controls, and set the TRANS, ROT to 0 and SCALE to 1 in your channel box. Does the rig shift? If so your rig isn't 'zeroable' (yes... it's a word) and therefore animators might struggle to quickly get back to an original default pose, and FX departments can't zero out your rig in order to apply clothing in the preroll of the timeline etc.

Consider giving your animators shelf buttons to make organised selections of your rig.

## FRAMEABLE\*

With nothing else loaded and your rig freshly loaded in, press 'f' to frame it. Does it centralise around full screen around your rig? Or does it zoom back and offset your camera into an odd distant location? You may have unnecessary or unhidden groups which are invisible to you, which are way off in the distance, making your character difficult to frame, and if nothing frames well, it all gets very tricky when you're navigating around a complex scene full of rigs, cameras and props.

## FLUSHING YOUR SCENE\*

Most rigged scenes have invisible 'dag' nodes, utilities and expressions which are not connected to the final rig, and are no longer needed. These are often the reason that - down the line - scenes and productions tend to fail and crash. Flush them out by selecting your rig and associated elements in your outliner and "exporting the selection" only. This will only save the selection and associated expressions, shaders and utility nodes required to drive your rig. This new rig scene should be tested thoroughly before using it in production. In my time I've made someone's rigging scene half of its original size, and far less buggy in the process.

## ILLEGAL CHARACTERS

Avoid the characters and spaces in your filenames and rig node names. An object/scene called **john-lassiter's model+rig & animation**

*should be*

**jlassiter\_model\_rig\_animation**

or camel cased to

**johnLassiter\_modelRigAnimation**

## ID NAMING

Is there some code in your control names that isolates them from all other nodes in your scene? Are they consistent throughout your scene? These are examples of good names of controls I might expect to see within a scene.

a) CTRL\_global, CTRL\_left\_leg, CTRL\_right\_foot

b) glb\_ctr, lleg\_ctr, rft\_ctr

c) tripod\_PUP\_main, tripod\_PUP\_leftleg, tripod\_PUP\_rightfoot

These three sets are all conventions I might see on a rig to denote the same parts of the anatomy. Using the 'wildcard' function in Maya, I can select these controls easily by isolating the common word in each. a) \*CTRL\* b) \*\_ctr\* c) \*PUP\*

This wildcard process is a nice way for a TD or animator to quickly select all of the controls they are either motioncopying, or animating. Be careful not to name your groups or locators, which are not 'controls' with the same characters.

## CONSISTENCY

If you're creating more than one humanoid character, try to use the same naming, shapes and style of rig. When saving out the rigs, make sure they look the same as Animators load them up. i.e. ALL IK controls visible/active (fingers to fk). Same choice of controls visible. etc

## ALLOW FOR CREATIVE BREAKAGE

Don't always lock and hide away vital controls you don't think an animator should be playing with. Sometimes I need to move an elbow out of its rotational socket to get it in the right place to make an action work 'to camera'. Sometimes animators need to work like 2D animators... and cheat.

## OUTLINER / LAYERS

Try and keep your rig under a single node in the outliner. Maximum 2. Any more and it interferes with the flow of a production. Things get messy really quickly. BUT separate your geometry, controls, joints etc in the layers editor. It makes it easy for quick selections, and navigation, prefix your layers LXR\_ or something, as they become a node just like object names.

## 24 vs 25 vs 30 FPS\*

As a rigger, you could be working on a US tv show, a UK commercial, an interactive GIF project and a film. They each carry their own frame rate. Have a vigilant process to manage these framerates as you work. Because Maya shamefully doesn't. You can load a 24fps scene into a 25fps environment and get no warning whatsoever.

Entire productions can go awry if the correct fps is not set correctly. Go into your modelling scenes and rigging scenes and convert them all the right chosen delivery speed of your film. MODELLERS don't care, they don't need to. PREVIZ department care deeply, but often don't realise how easy it is for others in a pipeline to retime a whole production. ANIMATORS are often sloppy and just want to make shit move. The issue can create disruption a bit like a virus, slowly contorting your scenes about imperceptibly to the eye. And it's often discovered at 4am before delivery day by the LIGHTERS who are the ones who get their wrists slapped.

## LAYOVER\*

Check that your rig scenes align with your supplied model scene, by intermittently loading your model scene over the top of your rigging scene. During IK work and other complicated rigging processes, your models tend to shift. If this happens, either fix the rig, or request a publish of a new modelling scene (less recommended)

## COLOURED CONTROLS

Differentiate the colours of your controls, make it attractive and bold. A standard we're starting to see stick, is using RED for RIGHT sided controls (R in both names acts as useful reminder) GREEN for LEFT controls, YELLOW for centralised controls. For wing controls I used a complete spectrum of rainbow colours from my controls and wireframe geo. It allowed animators to know the flow of the controls when the wing was twisted and folded.

## GRABBABLE

Imagine the rig in the most contorted shape possible. When it leaves your hands, it doesn't stay in a T POSE for long! Are your controls clearly visible and easily swipable on a mouse click given most scenarios? ie Hands often have defaulted, rarely used secondary controls, occupying the same overall space, that often click too easily when the animator is tired and bleary eyed.

## INITIAL SCALE

Has your department decided on the ultimate scale of your character before supplying it? Most rigs/models are never made to scale. If they are scalable then there's less of a problem, but planning the scale of your props is a mighty useful exercise. Same with axis. Dont rig Mickey in +x and Minnie in +z and hope to be able to motion copy animation easily. Just sayin'

## ZERO GEO

Geometry should be zero'd out before rigging. I place all my axis (such as eye rotations) onto accompanying locators before flushing rotational information. But rigging gets easier (such as blendshapes) when everything can be reset globally.

## UP VECTORS

Set them away from the joints (in front of knees / behind elbows) create a light grey spline line connecting the elbow like joint to the control. With multiple characters, makes it easy to trace.

## GLOBAL/LOCAL MANIPULATOR

Your rig should have one large GLOBAL controller, and a couple of LOCAL controllers directly connected. A GLOBAL puppet so that the whole Gollum performance can be moved to a mountain top. Spiderman can be rotated and shoved on a skyscraper...

## SET DRIVEN KEYS

If you're using set driven keys for in-rig performances make sure they don't show up in the graph editor when you 'select by hierarchy' your entire rig. Find a way to ghost them and shift them in time into minus frame range.

## SPLINES AS CONTROLS

Some bad rigs require keyframes to be added directly onto geometry and joints. This makes it difficult later on down the line when it comes to selecting all of the keyframes in one go or porting animation from one rig to another. Use splines every time.

## GEO AND RIG SEPARATED

The geometry which makes up a character should never be grouped to puppets and joints. Geometry should live separately to the ctrls, in its own GEO folder in your rig/outliner. Some would argue all geo needs to be 'weighted' even if 100% to a joint. It makes caching further on down the pipeline easy.

## MA's VS MB's

Whilst an mb file is smaller, if your scene breaks you can't attempt to salvage it. Whilst rigging or doing other technical aspects, consider using .ma as your save of choice. You can open the .ma file in a word processor and physically see your scene. In the past I've done global renaming to a Maya scene using a .ma and notepad! If attempting this, keep a backup, in case it goes wrong. If your main character only occupies a small part of the uv area, you might need inordinately large texture maps in order to get good none pixelated textures come render time.

## A NICE RENAME AND CLEANUP

When you're happy with your rig, tested it as above, expand your rig fully in the outliner so you can see every node used. Delete anything redundant. Empty groups, etc. Then make sure \*everything\* has a clean name of some kind. Your rig should look like a story. Something that a CG SUPE at the earliest hour could open up, months ahead of your completion and know what's going on. Even the shaders assigned to the GEO should be clean and named.

## PLAN FOR CHANGES

Your first rig won't be the last, invite feedback, and ask all the animators to 'exercise' it. You'll be thrown new versions of geometry, adding blendshapes, new controls etc. So use the key parts of this document, denoted with an asterisk\* each time you publish a new rig to ensure consistency. Animators only spot avoidable problems at the most inopportune moments of production. So don't be the reason for the bottleneck.

## PREPPED FOR CACHING > LIGHTERS

Assume animators are the least technical people in a production. So between you and lighting, there they are with the potential to mess up pipeline. Make the Process for delivering to lighting easy. This usually involves cach-ing out the geometry. a) Clever pipelines allow you to click weighted geo AND translating geo, all converting down to point cloud data. But, assume you're alembic caching, and therefore all your vertices need weighting so they have a relative point in world space. the difference between parenting/constraining a solid object to a control for speed. Or taking the time to skin it with weights set to 100%. b) Check/change names of geo, KEEP those names throughout, then create a set containing all of your geo. Animators then only need select this, cache, and leave. Lighters often literally just have to hit update. Depending on the renderer.

## PUBLISH TEST...

Ive been on productions where riggers fix something, and break 3 other things they weren't aware of. If multiple people rely on the rig. If timing is crucial. If you leave on time and animators work into the night. Choose from here which things are important and tick things off during each publish. Update your rig on the animators scenes yourself, to make sure it doesn't explode on you.

## FEEDBACK

Hope this helps. Send your comments to [daffy@daffy.london](mailto:daffy@daffy.london)