

VWD CLOTH AND HAIR

Version 1.1

ABSTRACT

VWD Cloth and Hair is a hair and cloth simulation program which has been designed to work with Poser, DAZ Studio and Carrara. It makes it possible to create realistic stills and animations from existing cloth and hair props.

The program has been designed by Gérald Contesse from Virtual World Dynamics. Documentation written by Wim van de Bospoort and Gérald Contesse. Cover image by Wim van de Bospoort.

VWD CLOTH AND HAIR

User Guide

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Chapter 1 - Introduction

VWD Cloth and Hair (VWD for short) is a cloth and hair simulation program which will work with Poser (10+), DAZ Studio (4.9) and Carrara. It allows you to create cloth simulations from both conforming and dynamic clothing as well as conforming and prop hair. The simulation. You can create both static simulations and dynamic simulations.

VWD is called from the hosting application (Poser, DS or Carrara) and will deliver its output back to its host. The program will work natively with Poser, but needs a bridge to connect to DAZ Studio and Carrara. Both are available at Renderosity.

I will use Poser in this user guide but VWD's functionality is the same for all hosting applications. You can use your existing scene and poses and use VWD to simulate the clothes and hair by starting a script. This script will open the full VWD program with all its functionality.

The program allows you to setup the behaviour of the different sections of the cloth and hair such as elasticity, stiffness, stretching and much more. It also adds Wind Force and Force fields if desired. Once you have set up and run the simulation, it can send the simulated items back to the hosting application.

VWD is a very complex program and it takes some time to fully understand all the functionality. This user guide attempts to make that easier. The guide has been setup as a tutorial and has been divided into chapters describing the workflow and describes the parameters which are needed for that part.

The Fundamentals chapter explains the inner workings of VWD and helps to understand what is going on under the hood. The Best Practices chapter contains a series of practical tips on how to refine your workflow, how to improve the end result and how to solve some problems you might encounter.

The image on the front page is using both hair and cloth simulations as well as wind force.

I hope you will start to appreciate this great program and what it can do for you.

Chapter 2 - Installing VWD Cloth and Hair

VWD Cloth and Hair comes in 2 versions: Lite and Full. The difference between the two is that the Lite version is limited stills and the Full version will allow you to create animations. It is currently Windows only.

The installation for both versions is the same. The file needs to be unzipped in a folder. If you unzip it in Posers own runtime in the ScriptsMenu folder (example: Program Files\Smith Micro\Poser 11\Runtime\Python\PoserScripts\ScriptsMenu\VWD) the VWD scripts will be available in the Python Menu in Posers user interface. Alternatively you could create shortcut for it in the Poser Scripts macro tool (Window!Poser Scripts) or you can run the scripts directly by using File!Run python scripts and browse to the location where you unzipped the VWD files.

Keep the folder structure for VWD as it is. The files and folders are all relative from the folder where you started the script.

The script lets poser prepare the files for the VWD program and then execute the program itself. There folders are used for exchange and for saved simulations.

To be future proof, it is best to create a VWD folder on a data drive (for example C:\VWD or a location in your own runtime outside of Program Files. Future editions of Windows may prevent writing data to Program Files.

Chapter 3 - What you need to know

How to use this User Guide

Since there are different ways to install VWD I will make the assumptions you have installed VWD in C:\VWD and start the program with File!Run Python Script and then select StartVWD. If you have installed it as a macro or installed it in ScriptsMenu, run the StartVWD script from there.

I use V4 as the collision figure and different series of clothes for the examples and walkthroughs. Please use a similar figure, clothes and hair to follow the examples. The techniques used are usually the same.

This chapter explains some definitions and concepts which you need to be aware of while creating simulations.

Dynamic and Conforming Clothes and Hair

Most clothing in the Poser world is conforming. This means that clothing will adapt and follow the clothes when a figure is posed. This however can result in unrealistic bends and flows of the cloth since it does not take things like gravity, stretching, wind and other cloth parameters into account. VWD solves that problem.

Dynamic Clothes are static props. In Poser, you can use these with the Cloth Room to add dynamics to them. You start off in Zero pose for the figure, load the dynamic cloth and then set up a pose in a later frame. The Cloth Room will then simulate things like stretching, wind and other parameters and adapt the dynamic cloth to the new pose. VWD does essentially the same, but has a much greater flexibility in how the cloth behaves.

Hair comes in four varieties. Conforming, hair props, prop hair and dynamic hair. Conforming hair is like conforming clothes; they adapt to the figure and follow the pose. This often results in unnatural flow of the hair. VWD will take care of that. Hair prop and prop hair are essentially the same. Hair props are in the Hair library and prop hairs are in the Props library. Hair props always parent to the figure, prop hairs often do as well. For VWD the two are the same and it will add dynamic flow to it. The last variety of hair is dynamic hair. This is not supported by VWD.

Static and Animated simulation

A static simulation is basically what you would use for a still. It is a single frame with the pose you want to use. You can still use animation features like wind and forcefields within VWD, but the result will be a single frame.

Animated simulation is used for animations. This means that a range of frames is exported to the poser scene. You setup your animation in Poser and then add dynamic behaviour to the clothing and hair in VWD.

For dynamic clothing, you use the animation simulation (you have to, because the dynamic cloth loads at a zero pose) but then send the single frame you want to use back to Poser. In the Lite version the Send Animation to Host button is disabled, but the Send pose to Host is enabled.

Setting up your scene.

A cloth and hair simulation is applying real physics to the cloth and hair. It makes things much easier if you think of how a pose or animation would take place in real life – so take into account how much time it would take to get to that pose.

From a standing position into a sitting position in less than a second means that the hair and cloth will have inertia: The movement will follow with a slight delay and will still move when the final pose is reached.

So use a reasonable number of frames to get into the right position from one pose to the other (use 25 or 30 frames per second). And if you want the cloth or hair to drape give it time to settle, so add frames to let gravity do the work.

If you interact with other objects, make sure they are not in the way when the simulation goes to the final pose. Move it away and move it into position to collide after it has reached a pose where it will no longer cause unwanted collisions. Think of sitting in a chair – move the chair into the correct location after the sitting pose has been reached, This will make sure that the cloth collides correctly with both the figure and the chair.

If the cloth or hair has handles, make them invisible in the properties of the cloth or hair. The handles are often geometry and VWD cannot distinguish between the handles and the actual mesh of the cloth or hair

Concepts of VWD

There are several concepts in VWD such as Springs, Softness, Rigidity, etc. which are explained in Chapter 8 – Fundamentals. There is no need to fully understand them to be able to work with VWD, but once you are familiar with how the simulations work, it will make it easier to understand how to improve them.

And Finally...

Do not start your getting acquainted experience with a complex simulation. First get a feeling of how the programs and the parameters work. Also use simple cloth and hair figures in the beginning (not many layers for example). VWD is a complex program in the sense that there are many parameters and they are there for a reason. So, start simple, and once you understand the principles, go ahead and make them as complex as you want.

Chapter 4 - First Steps

This chapter will show you how to setup and run a basic simulation. It is meant to show the workflow, so we will take as many defaults as possible and only focus on how the program works.

The first thing we will do is setup a static simulation with a simple pose and simple cloth. I will use V4 from DAZ and in this case a simple conforming dress and apply a pose to V4.

For this exercise, choose a simple conforming dress with straps and no folds or ruffles or other exterior details. Later chapters will deal with those, for now we want to keep it simple (I have used the Daily Dress 1 from 3D-Age).

Since we make a static simulation and use a conforming cloth, we can apply the pose in frame 1. In case the cloth you use has handles, please make sure they are invisible in the properties.

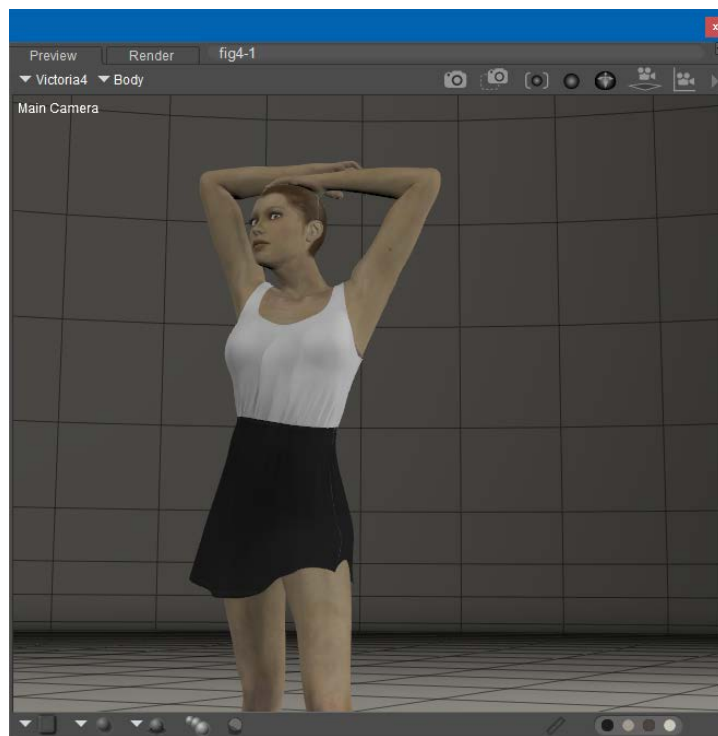


FIG 4-1

As you can see this pose leaves something to be desired with regards to the draping of the dress as well as some poke through. Traditionally you will use the handles or morphs to make it drape better.

VWD CLOTH and HAIR

So, start VWD (StartVWD script) and the program will open up. VWD will appear on the right-hand side on top of Poser. It is a separate program, so not part of Poser itself. You can move it around to a different location if you wish to do so.

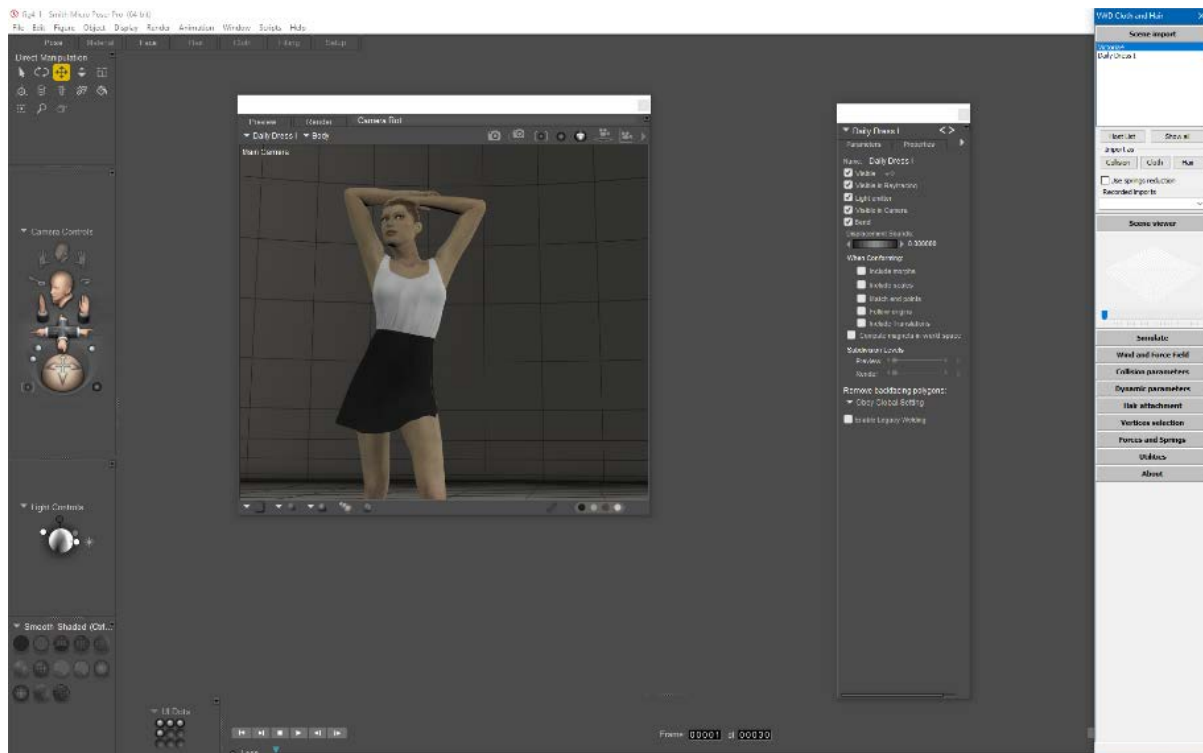


FIG 4-2

VWD has different tabs for the different functions the program it has to perform. For now, we will restrict it to the sections we need for our simple simulations.

*Before we start modifying things, make sure that all the parameters are set at default. Do that by opening the Utilities tab, then select **Restore Default Parameters**, then press OK. This will make sure that we use the same parameters for the simulation.*

We begin the simulation by using the Scene Import tab.

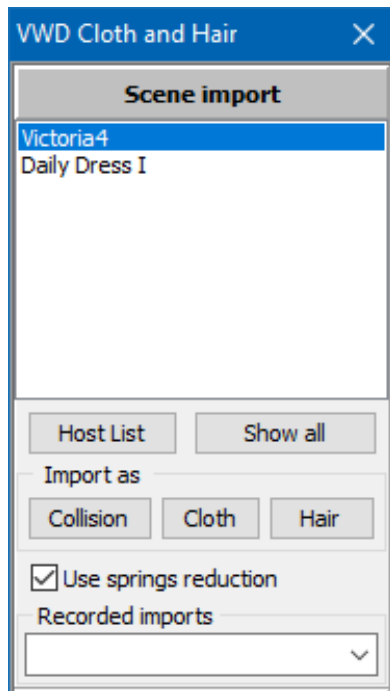


FIG 4-3

The list portion will contain all the props and figures in the scene. If there is no list, use the Host List button to load them. If you have hidden actors in the Scene Viewer, use the Show All to see them again.

There are three types of simulation objects: Collision, Cloth and Hair.

Collision Actors are figures and props which are the target of the simulation. These will not deform or be changed. You can have multiple Collision Actors in a single simulation.

The *Cloth and Hair Actors* are the subjects of the simulation. They will deform during the simulation. You can have only one of them in a single simulation. If you want more you can run multiple simulations and use the resulting simulated object as a collision object in the next simulation.

The difference between Cloth and Hair simulations is that the hair collision object is a special case simulation where the hair remains attached to the skull of the figure.

The *Use Springs Reduction* option is used to reduce memory requirements of needed. The *Recorded Imports* is the ability to re-use previous simulations. These options will be explained later in the manual.

In the background

What will happen when you import any of the props or figures as a cloth or hair object, is that the object or figure is copied into VWD as a separate object file. Once a simulation has finished and you have transferred the simulation back to Poser, that object will be the new cloth. The original has not been touched and is hidden from view. Since it is a new object, there will be no morphs present. In case you want to apply morphs (like open, close, details, you should apply those morphs before you start VWD)

In the Import Scene section, select the V4 figure and press *Collision*. Now the Collision tab will open.

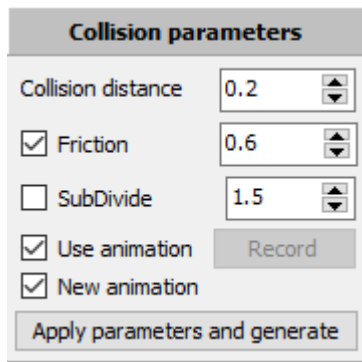


FIG 4-4

For now, we will accept the default parameters and press the *Collision* button again or press the *Apply parameters and generate* button (they do the same here). The Scene viewer will now show the V4 figure in its window.

Next thing we are going to do is to add the dress as cloth object. Select the dress in the Scene Import window and press the *Cloth* button.

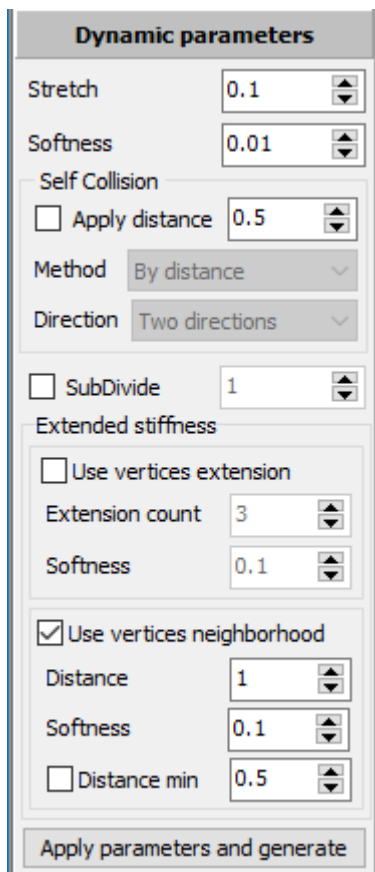


FIG 4-5

A new tab will open.

The Dynamic Parameters tab is where we tell VWD what type of cloth we have. It sets the default stiffness of the cloth and what type of mesh it is. A low polygon mesh may need subdivision, or may have natural folds we want to keep.

For now we will accept the default parameters and press the *Cloth* or the *Apply parameters and generate* button.

We will go into much more detail of the parameters in later chapters in the User Guide.

The dress will appear in the Scene viewer together with the collision figure. Open the scene viewer in a full window by pressing the Scene viewer tab. The cloth object should now be identical to the original cloth.



FIG 4-6

Scene Viewer Navigation

To move around in the scene, use the following shortcuts with the mouse and keyboard:

- | | |
|--------------------------|---------------------------------|
| Right button drag | – Rotate around the figure |
| Mouse wheel | – Zoom in |
| CTRL + Right button drag | – Translate left right, up down |

You can use these also during simulation which makes it easy to check for errors. In later chapters, you will see how you can interfere and make the draping better.

Before we can do our simulation, we need to perform one additional step: We need to define sections of the mesh where the cloth needs to “stick” to the figure (setting the constraints). We want to do this as little as possible to keep the natural drape of the cloth. A constrained section does not move relative to the figure, so only define the area where the cloth touches the figure such as the top of a strap on the shoulders.

There are several ways to do it which we will explain later in the guide. This time we are going to use an almost automatic procedure to do this.

Press the *Vertices Selection* Tab

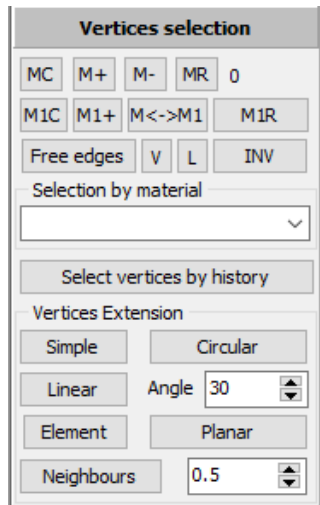


FIG 4-7

Do not be intimidated....

The top section is like a simple calculator. We will use that later to make complex selections possible. In our current simulation, we will not use it.

This whole section is devoted to selecting vertices. It allows you to select by material, by dragging, different types of marquees and by extending current selections. There is also the option to reuse previous selections.

In this case, we will use the *Free Edges* option. When using this option, VWD will look for the edges of the cloth. We can use this to setup the constraints for the cloth.

When we opened the Vertices selection tab, the view in the Scene Viewer changed: the cloth is now showing the vertices of the cloth in blue. This means we are in vertices selection mode.

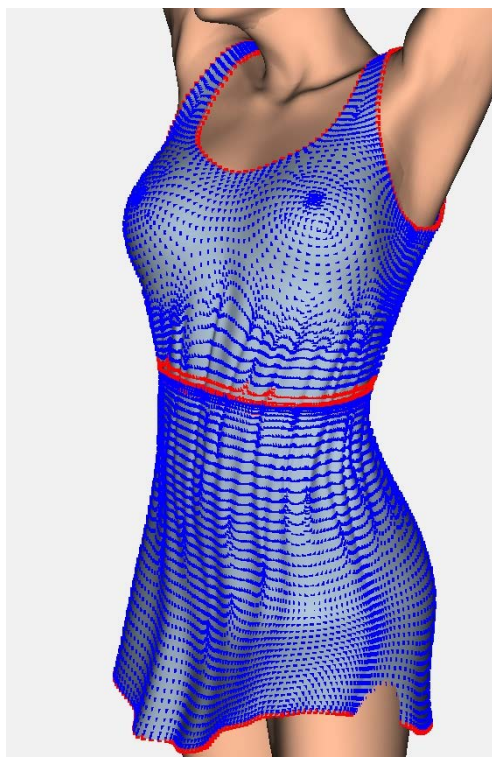


FIG 4-8

Press the *Free Edges* tab. You will now see that some of the vertices on the edges have turned to red. If it is very faint, press the Simple button one or two times. It will extend the selection with its neighbours. Move around in the view port to look at the selection.

If you press the button again, it will go back to the original selection.

The straps, middle section are good places to have constraints to the cloth. However, the bottom of the dress is included as well in the selection, and that is not what we want. The bottom of the dress should flow freely, so we must exclude it.

We need to manually adjust the selection.

Manual Vertices Selection

There are a few things you should know now. To select vertices by hand, you drag a marquee around it. If you want multiple selections, you need to keep the CTRL key pressed to add to the selection. To subtract from a current selection, keep the ALT key pressed when dragging. Without ALT or CTRL key pressed, dragging will remove the current selection and start a new one.

When you drag the mouse on the mesh, it will not only select the vertices you see, but also the vertices behind it. You can turn this behaviour off with the V button in the vertices selection tab.

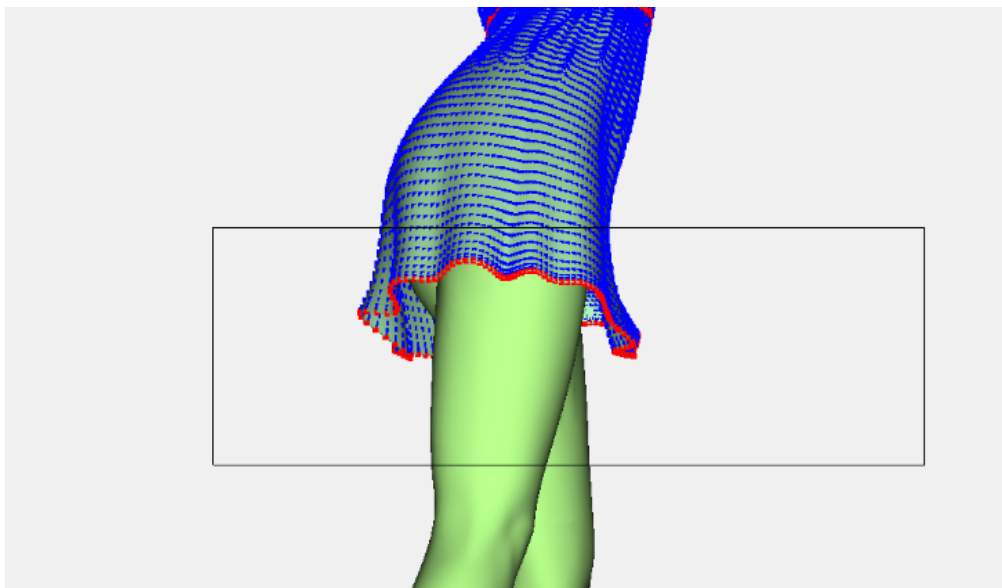


FIG 4-9

To finish off our dress we use the ALT key and drag the marquee around the bottom section of the dress and release the mouse.

Now only the top portion of the selection remains.

The last thing to do before the simulation, is to use the selection and “nail” it, this makes the selection the constrained part of the cloth object.

Press the Forces and Springs tab to open it.

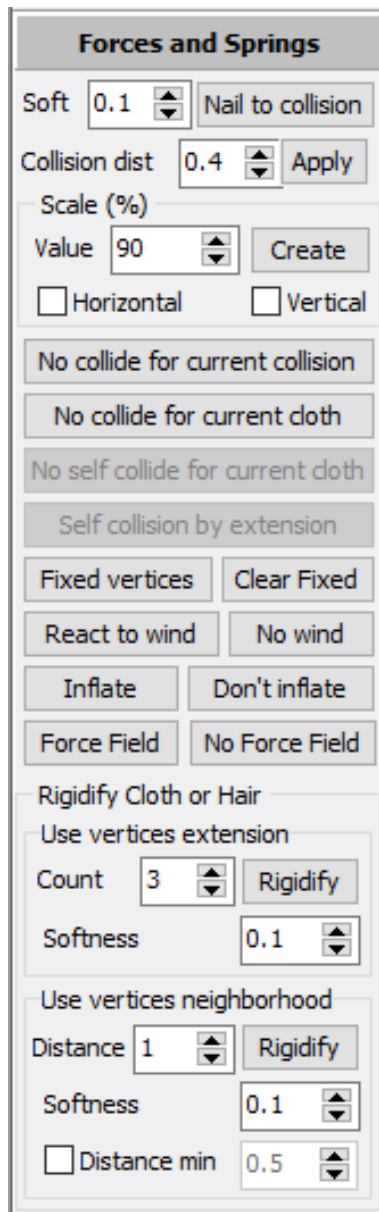


FIG 4-10

Another intimidating set of parameters.

The Forces and Springs tab deals with what to do with the selected vertices. Here we define the behaviour of the cloth.

We can make parts of the cloth constraining, or we can define a part of the cloth as elastic or even ignore collisions all together.

Here we can also make portions of the cloth fixed, where the selection will remain fixed in relation to the collision actor.

The Rigidify section defines the stiffness of the cloth itself.

And there is a section which tells the cloth how to react to external forces such as Wind and Force fields.

In a later chapter, we will go into much more detail how these parameters are applied.

For this exercise, we use the *Nail to Collision* button. Leave all the parameters at default, so press it and we are done with setting up the simulation.

Now we are going to perform the actual simulation. Press the Simulate tab to open it up. The clothing mesh will change colour again and a new set of parameters opens in VWD.

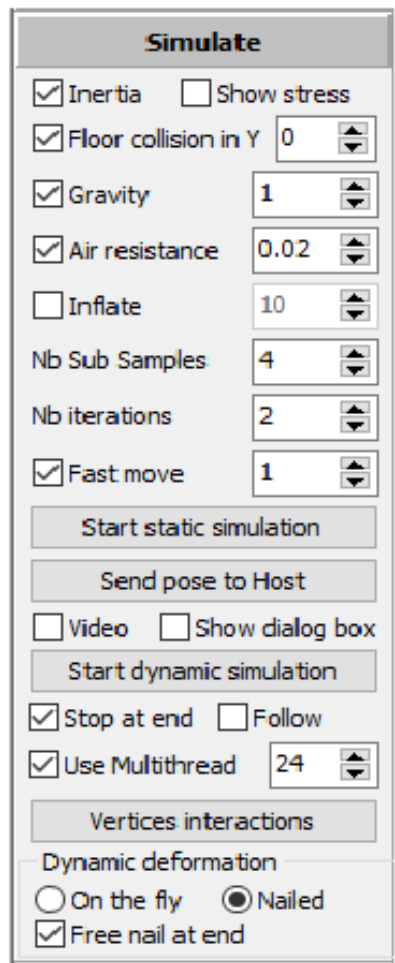


FIG 4-11

The Simulate tab deals with performing the simulation.

It contains parameters for external factors such as the floor, gravity, air resistance and a few parameters to adjust to the actual pose, such as accuracy, speed in which it moves and the type of simulations. Some simulations need more calculations to have a realistic flow.

In this exercise, we take the default parameters again and since we are doing a static pose we will do the static simulation.

Press the *Start Static animation* button and the simulation will run.

A static simulation has no begin or end to the simulation, so once the cloth has settled, press the *Stop static simulation* (same button, the button text has changed).

Once stopped, press the Send Pose to Host button and close VWD and see the result of the simulation.

MultiThreading

The use Multithread option can be used to decrease the CPU usage of VWD. It is very computing intensive, so lowering the number of threads may be useful when you want to use the computer for other things while a simulation is running.

In some cases VWD may run into an endless loop. This sometimes happens with very low polygon meshes. Turning multithread off may help in these cases.

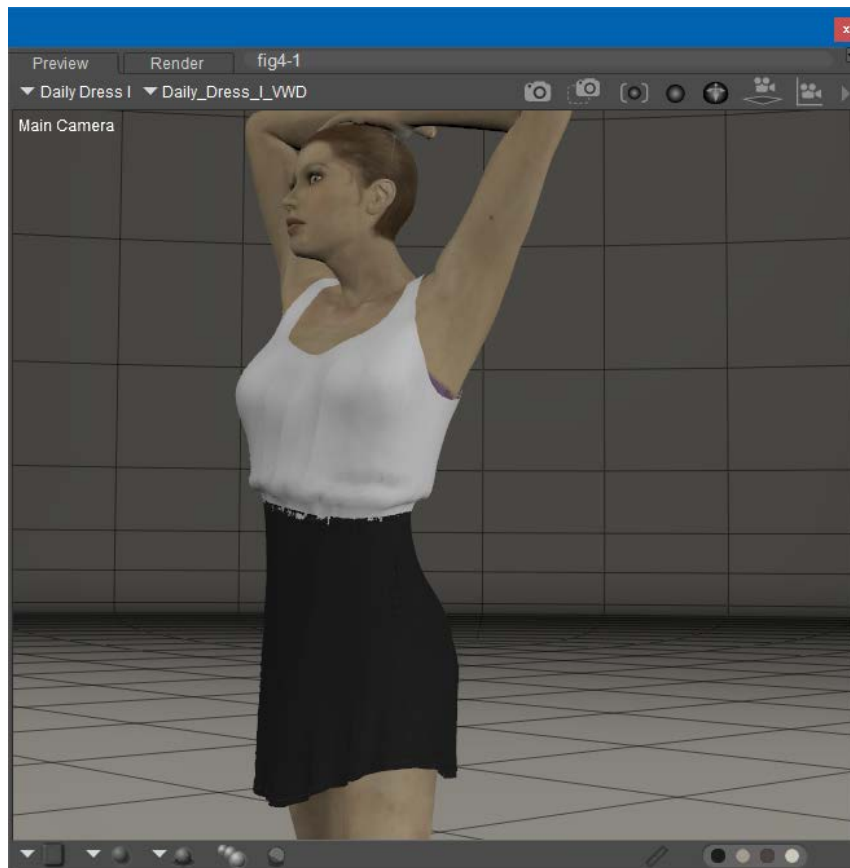


FIG 4-12

As you can see the flow of the dress is much more natural. VWD also deals with poke through (within limits) and will automatically apply gravity and collision with the ground.

You can also run the simulation without constraints which allows you to have something like a strap going down the shoulder.

In the next chapters, we will go into much more detail on how to make simulations better.

Chapter 5 - Cloth simulation

This chapter will deal with simulating clothes both conforming and dynamic. The workflow for setting up simulations is the same as in the previous chapter, so I will not show those in detail, but will highlight the changes you need to make to follow the examples.

Dynamic Cloth and Dynamic simulation

The difference between a dynamic cloth and conforming cloth is that the dynamic cloth does not have any rigging attached to it. It is just the mesh and possibly some morphs. This means that this type of cloth will load in the default position: Zero Poser.

To be able to use it we will need a dynamic simulation which means we must simulate the steps to go from zero pose to the actual pose. There are a couple of things to consider here. The cloth in the simulation will follow the movement of the figure and adjust the cloth to that. That means that the frames in between the zero pose and final pose must follow real physics, so no arms moving through the body or head or other body parts penetrating each other. The simulation will still work, but the cloth might get stuck to another body part or even tear away. Simply adjust the in-between poses for this.

VWD will automatically pick up all frames and simulate them if you choose the dynamic simulation. This will work with both the LITE and Full version of the program.

A dynamic simulation is not only useful for dynamic clothes, but for Conforming clothes as well. Although conforming clothes follow the pose, they do not use collisions, so a conforming cloth will penetrate the floor or props when you use a sitting or lying down pose. In this case use a dynamic simulation.

In the following example, I will use a dynamic cloth (valentine dress from Biscuits, available at Renderosity free stuff) and a floor pose for the figure.

Be careful with a pose like this, the arms should not penetrate or rest completely against the body. VWD will no longer be able to determine what is the outer skin and fold the cloth around the arms instead of the torso.

I also use additional frames at the end to let the cloth settle (come to a rest) after the pose. In this case the Pose is at frame 50 and the final frame is 70.

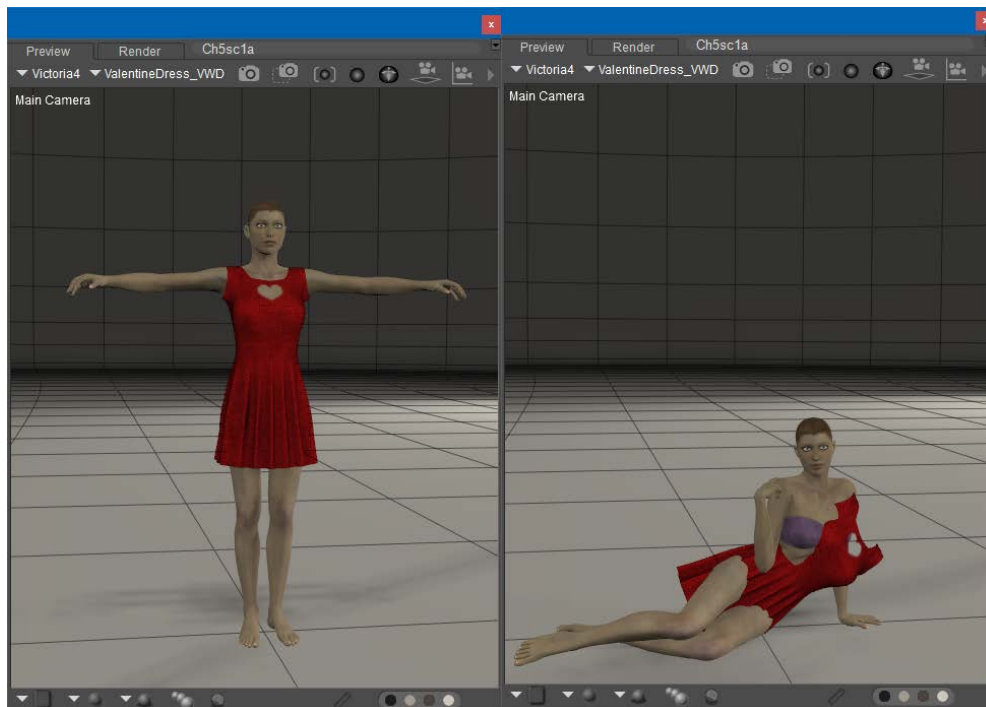


FIG 5-1

As you can see, it needs a simulation.

VWD will always start a dynamic simulation from frame 1. So, start VWD, and make the figure a collision actor.

Collision distance is distance where a collision will be detected. A lower value means you need smaller steps (more iterations) and a slower simulation.

Friction is the smoothness of the surface. A lower setting means that the cloth will slide off easier.

SubDivide splits a polygon when it is has a length larger as the value on the right. So a lower value means it gets subdivided more. Be aware though that subdivision on collision actors will turn off animation for that actor. So if you want to subdivide a figure in an animation, use the subdivision in Poser.

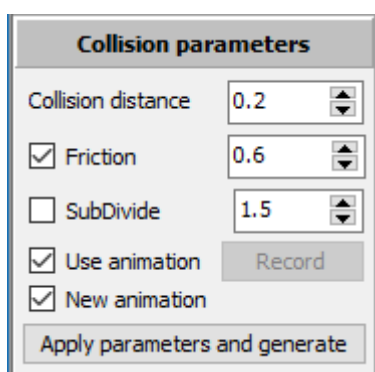


FIG 5-2

Use Animation is used for dynamic simulations, make sure it is on.

New Animation is an option to increase simulation speed. If turned off, VWD uses the previous animation and does not need to load it from the host application.

Press apply and then select the cloth as cloth actor.

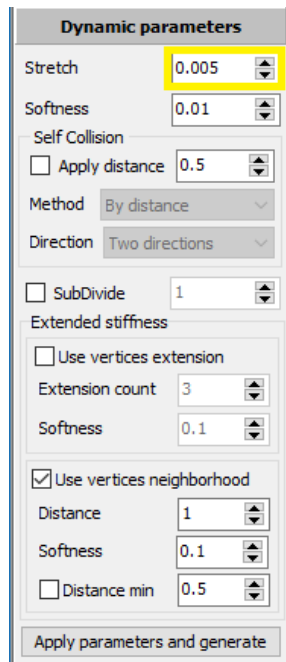


FIG 5-3

Stretch is how much a spring can deform due to outside forces. For a full explanation, see the Fundamentals Chapter.

Softness defines how rigid the springs are. This is also explained in the Fundamentals chapter.

Self-Collision is used when the cloth drapes onto itself. Use it when cloth folds. You can tell VWD which parts should self-collide in the Forces and Springs tab.

SubDivide. If the dress has a low polygon count subdivide the dress to make the folds look more natural. Lower value means more subdivision.

Use Vertices Extensions and *Use Vertices Neighbourhood* are explained later.

Self-Collision

There are two different methods of Self collision: By Normals and by Distance.

By Normals is when vertices push against each other. If you choose this option, there are 3 options available. You can select whether the collision occurs against the interior of the vertices, the exterior of the vertices or in two directions. In most cases you would choose for 2 directions. †

The Distance option is useful when a collision occurs between edges (like a ribbon). In this case a normal collision does not very well. The distance option uses a sphere to calculate the distance.

In both cases the distance value is used to determine whether a collision takes place or not.

For this cloth simulation, we change just one parameter: *Stretch*. Set it to 0.005.

After you press *Apply Parameters and Generate*, the new prop will be created.

The Scene Viewer will now have both the figure and the cloth. Make the Scene Viewer full screen and use the mouse to zoom in and move the camera to front view.

Select the *Use Vertices Selection* tab. This time we use a different selection method.

Do not select any button but draw directly in the Scene Viewer, make a marquee around the top of the dress as shown in the picture. Once you release the button, the selection will turn red.

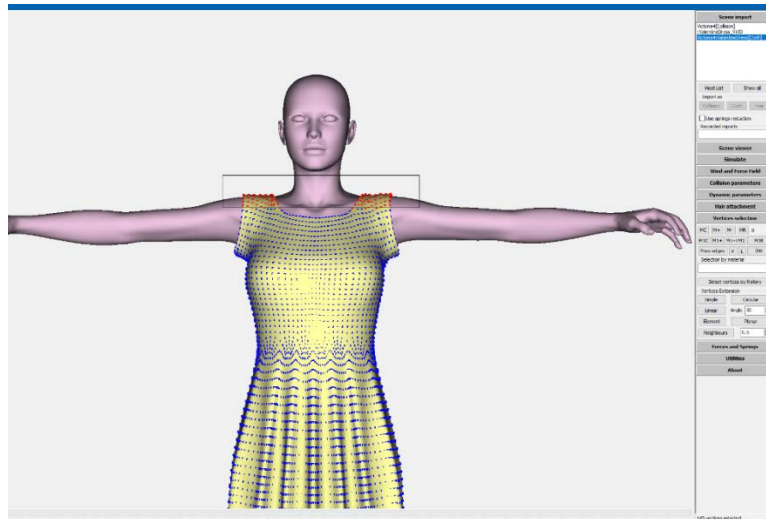


FIG 5-4

Once you have made the selection open the Forces and Springs tab and select Nail to Collision.

We could run the simulation now, but we can make some additional improvements to the simulation.

In the same manner as we did the top of the dress, select now the waist section.

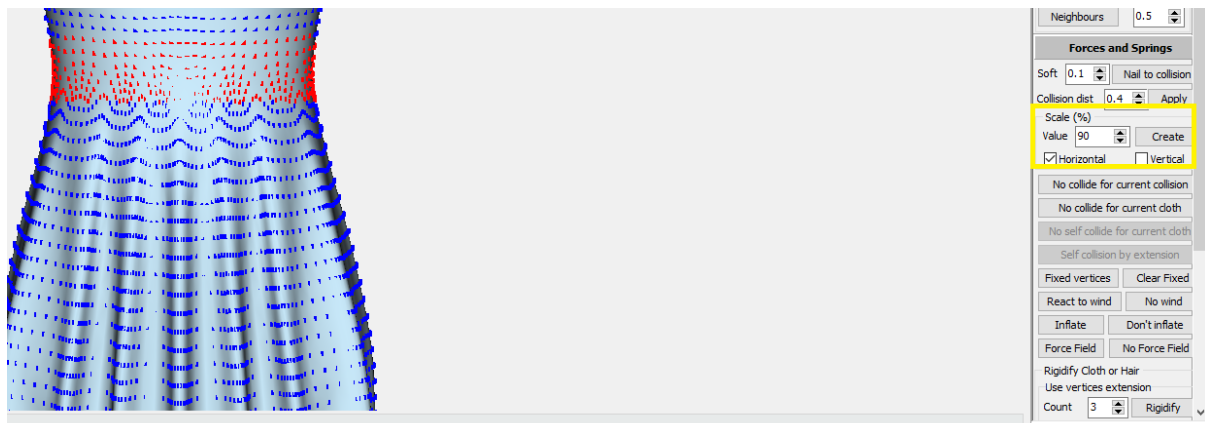


FIG 5-5

In the Forces and Springs tab, in the Scale section, check horizontal, leave the percentage at 90 and press Create. What this parameter does it to let the cloth behave like elastic, it will cling the waste part of the dress to the waist of the figure.

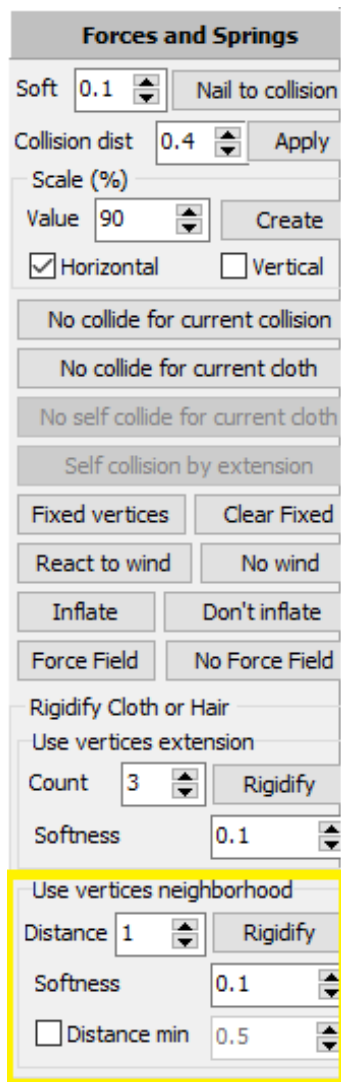


FIG 5-6

The last thing we are going to change is the rigidness of the cloth. This will preserve the shape of the dress, in this case we want to keep the folds.

Select the skirt part of the dress in the Scene Viewer and then in the Use Vertices Neighbourhood, press *Rigidify*.

In VWD there are 2 methods of finding neighbours; The first is by selecting the vertices next to the active one (selection by *Use Vertices Extension*) and the other is by selecting the neighbours by distance which is in the *Use Vertices by Neighbourhood*. In the case of folds, we want the distance option since the folds themselves do not have adjacent vertices and we want to keep those. *Distance min.* is there to reduce the actual springs it will generate by skipping those below that distance.

It is possible to create multiple settings to the same selection. Just choose the new setting and apply it. VWD will add them together.

To finish the simulation, keep the distance at 1 and press *Rigidify*.

Press the *Simulate* tab to make the final steps for the simulation.

This time we are going to use a dynamic simulation.

For this simulation, we are going to change some parameters. There is quite a lot of movement in our animation from zero pose to the final pose. The calculations are done for each frame, but if the figure moves fast the movement in each frame will be large.

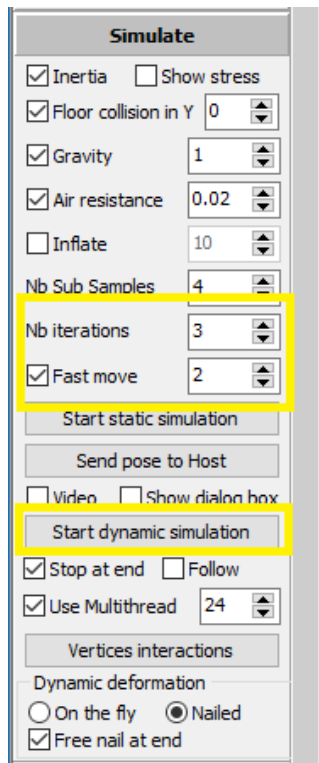


FIG 5-7

The *Fast move* will compensate for that and will check at a larger distance for collisions.

The *Nb Iterations* value defines number of calculations for each frame. More calculations mean a more refined simulation.

Increase these values does have an impact on the time it takes to run the simulation, so use it only when needed.

In our simulation, we use both these options. Check *Fast move* and set the value to 2 and set the *nb iterations* to 3.

Now we can run the simulation by pressing the *Start dynamic simulation* button.

The dynamic simulation is finished when the simulation gets repeated and the *Start Dynamic Simulation* button has changed to *Send Animation to Host*.

Press the *Send Animation to Host* button. VWD will close and the new simulation is imported into Poser. Go to the last frame and see the result.

In the LITE version, use *Send Pose to Host*.

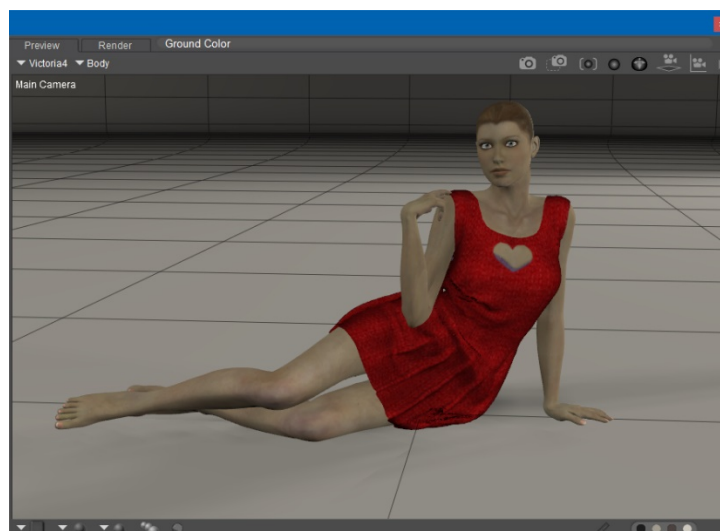


FIG 5-8

Before going into a bit more complex simulation we need to know some more concepts and methods.

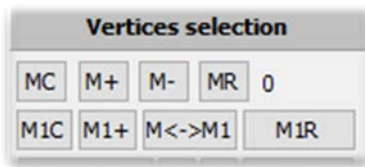
Selection Methods

There are several ways you can select vertices in VWD. You need to do this to define the behaviour of the mesh during the simulation. Make a selection, then in Forces and Springs define the behaviour.

The easiest selection method is drawing a marquee (rectangle) around a set of vertices: Draw a rectangle and the vertices will turn red. This will select **both** the vertices you see and the vertices behind it. This is the default behaviour. You can restrict the manual vertex selection by pressing the V button (see below).

To add a manual selection, press the CTRL key and select a new marquee. To remove a portion of the selection, hold the ALT key and drag a marquee.

An alternative direct method of selection is the use of the SHIFT key. In Vertices selection mode, the SHIFT key acts as a button. Press the SHIFT key and move the mouse and you will see highlighted vertices. Release the SHIFT key and the last selected vertex remains selected. You can combine it with the CTRL or ALT key, so SHIFT + CTRL adds to the selection and SHIFT + ALT removes from the selection. This method is most effective when used with the Element and Planar selection methods described below. It makes it possible to make quick selections of complex surfaces.



On top of the Vertices Selection tab there is the calculator. This is a simple method to add and subtract selections. There are two memory slots: M and M1.

MC and M1C = clear the memory slot.

M+ and M1+ = add current selection to memory slot.

M- = Subtract selection from memory slot.

MR and M1R = Recall from memory slot.

M<->M1 = swap memory slot 1 and 2.

Once you have your new selection in a memory slot, press the MR or M1R to make it the current selection.

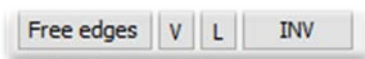


FIG 5-9

The *Free Edges* button searches for the borders and selects a single row of vertices.

The V button will make sure that only the visible vertices are selected.

The L button turns de marquee into a lasso, so you can make irregular selections.

The INV button inverts the current selection.



Simple increases the selection by one vertex.

Linear tries to select a straight line; Select a vertex and another one with the SHIFT key and Linear will try to make a straight line.

Circular does the same thing but will create a circle around the mesh.

Planar selects the vertices in the plane where the current selection resides.

Element selects the current vertices group which is defined by edges.

Neighbours selects adjacent vertices within the defined distance.

The last two selection methods are the Selection by Material and the Select from History. The Selection by material uses the material zone of the cloth object to make a selection. When the cloth has different material zones, this is the easiest way to make selections when there are zones like frills, borders, buttons and other special features in the cloth. Simple select it from the drop down and the vertices will be selected.

Selection by History lets you choose a previous simulation and use the selections from it. This is useful if there are complicated selections in the cloth. Press the button and from the list select the cloth you want to use and a list will appear with all the previous selections. You can either select it directly or copy it to a memory slot.

The calculator is a very useful tool. You can add selections together and subtract selections from other selections. For example: You can select the different material zones and add them up with M+. then do a MR to get the complete selection and assign behaviour to it.

Another example is to use Free Edges on the cloth, store it in memory, then use the material zone selection select those parts of the cloth you do not want in the edges selection and subtract those from the memory slot. That way you will only keep the edges of the material zone you want.

Forces and Springs

Forces and Springs is the section where we define the behaviour of the cloth or hair. Behaviours are things like elasticity, sheer, stiffness, and keeping shape. This section also defines addition factors (like Wind or Forcefields) and allows to exclude portions of the simulation.

Softness defines how rigid the spring is. A higher value bends the spring more easily, creating more folds. See the Fundamentals chapter for a more thorough explanation.

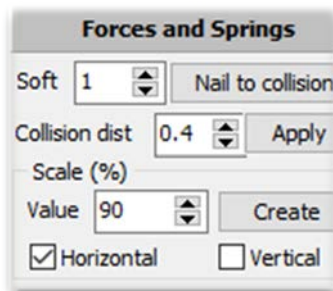


FIG 5-10

Nail to collision is the place where we define constraints (like in the Poser Cloth room). When this button is pressed, the selected vertices will keep their position relative to the collision actor. They move with the pose, but keep their place. Think of this like gluing a portion of the cloth to the figure.

Scale is the setting where you can define the elasticity of the cloth. The sim will pull that selection closer together. You can specify here also in which direction the elasticity will take place (*horizontal* and/or *vertical*). This can be used to tighten the cloth close to the body of the figure.

Collision distance. This tells WVD how close this part of the cloth has to be against the collision actor.

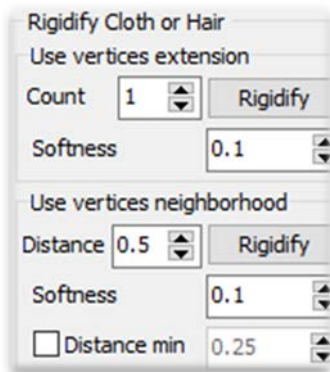


FIG 5-11

Rigidify (or stiffening) is how much the cloth keeps its shape. It defines how the springs are interacting with each other. In these two options, you choose the how these springs are selected.

Rigidify by vertices extension means that the springs are selected by following the vertices. The value tells how many vertices. It does not bridge gaps.

Rigidify by vertices neighbourhood looks at the distance select the vertices. It will bridge gaps, so this is useful for folds. The units used here are inches.

The *Distance Minimum* is sets a threshold below which no selections are made. This is helps to reduce the number of springs which have to be created.

Exclusions and External Forces

This is the section where we can tell VWD to make exceptions for the simulations. If there are vertices which are not really part of the cloth (like bones or handles), we can tell the program to ignore then in the simulation.

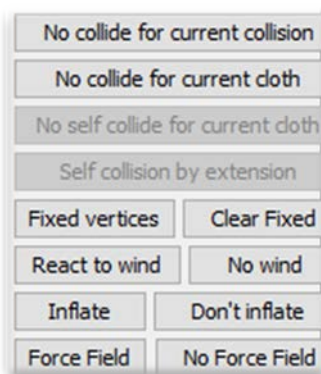


FIG 5-12

No Collide for the current Collision is used for the Collision actor and tells VWD to ignore the current selection in the simulation. Helper bones in the figure would be an example.

No Collide for the current Cloth is used for the Cloth or Hair actor and tells the program to ignore the current selection in the simulation. Cloth handles are an example of this.

No Self-Collide for the current Cloth disables self-collisions for the current selection. Using this to exclude sections where self-collision is not needed. It can reduce computing time.

Self-Collide by extension will more accurately simulate cloth which is very close together (like double layered clothing). It is computing intensive, so use with care.

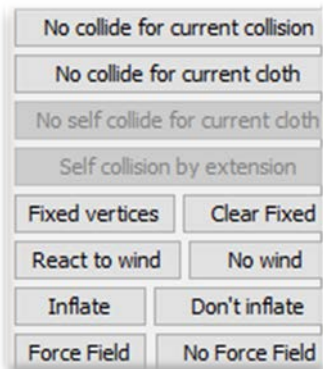


FIG 5-13

Fixed vertices makes the current selection not move relative to the collision actor. Use this for portions of the cloth which are fixed and attached to the collision actor.

Clear Fixed will undo the Fixed Vertices for the current selection.

React to Wind will define the current selection to react to Wind Force. Make sure you have the entire cloth not to react to Wind before you do this. The default is to have the entire cloth react to Wind.

No Wind defines the selection not to react to Wind.

Inflate will set the current selection to move in the normal direction. This is useful for details like belts, pockets where these details have to be on the outside of the mesh. You can define the Inflation distance in the Simulation settings.

Don't Inflate sets the current selection no to react to Inflate.

Force Field sets the current selection to react to a Force Field. A Force field has to be defined in the Wind and Force Field tab. By default no vertices are active in a Force Field.

No Force Field turns off Force Field for the current selection.

A more complex cloth simulation

The following example shows how we can use the selections and behaviour of different sections of the cloth.

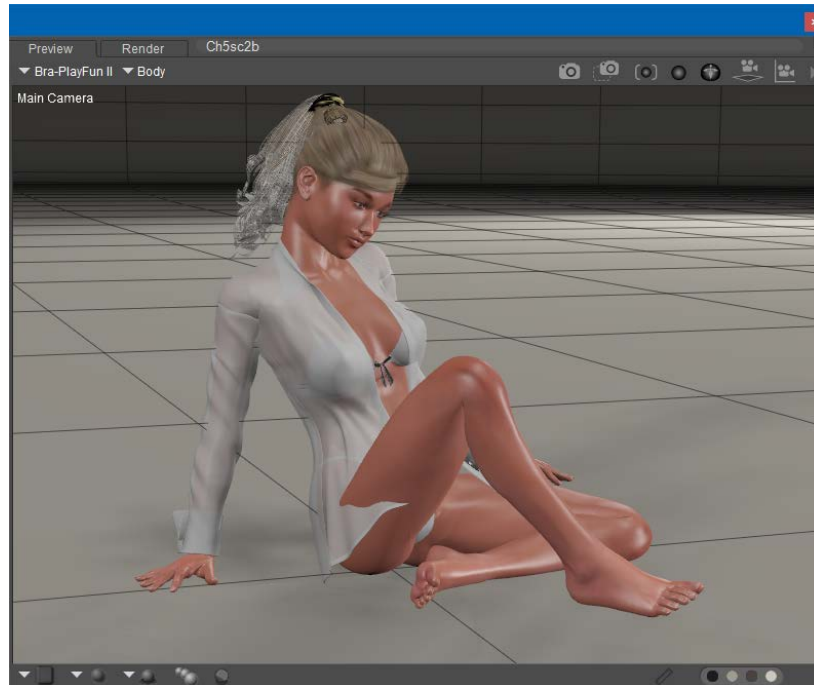


FIG 5-14

In this example I have use a morphed V4 figure in a sitting pose. The figure wears a conforming bra and panty and a shirt. In this example I will simulate the shirt so it is free flowing against the body. Shirt, bra and panties are from 3D-Age.

As you can see in the screen cap we need to use a dynamic simulation to get the shirt to flow correctly. Going from zero pose to the new pose is quite a distance, so I set the pose at frame 80 and used 20 frames to settle the cloth.

In the simulation, we are going to use different material zones, combine some of the to make selections, and define behaviours. In this case I am going to use the figure, the panty and the bra as collision actors and the shirt as the clothing actor.

The bra has a back strap which penetrates the shirt, so we have to deal with that as you can see in the following picture.

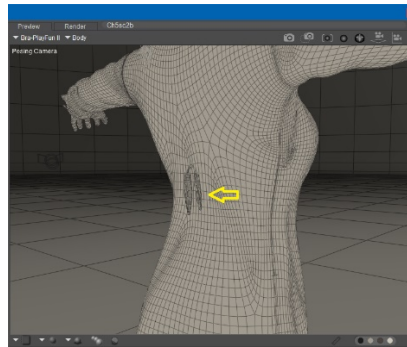


FIG 5-15

Start VWD and first restore all the parameters to default state (Utilities, Restore default Parameters). Now select V4 as the collision actor and use default parameters. Then do the same for the bra and the panty, all collision actors and default parameters.

Then select the shirt as cloth actor. Here we are going to change the stretch to a low value. Self-collision is not needed with the current pose, so we leave this off. The default for spring generation (Use vertices neighbourhood) is fine as well, so press apply to create the clothing actor.

Open up the scene viewer and turn the figure around, you can see the bowknot of the bra penetrating the shirt. So we are going to fix that.

Select the bra in the list on top. You can now see the vertices of the bra.

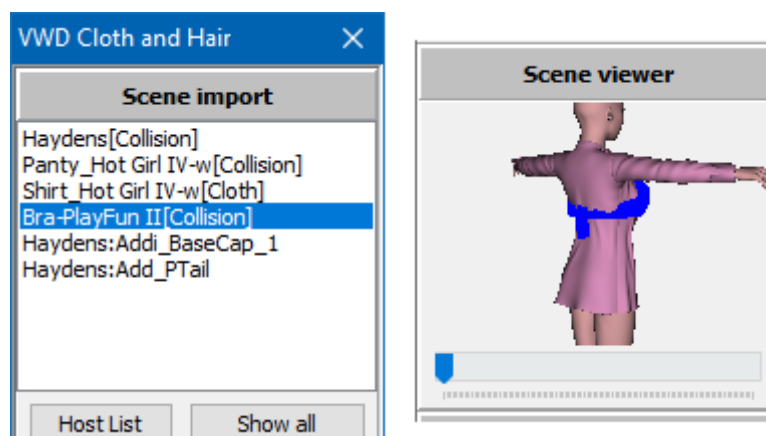


FIG 5-16

Select the vertices tab and draw a marquee around the bowknot.

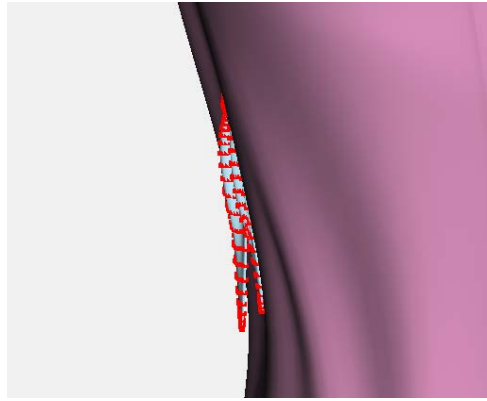


FIG 5-17

Now press the No Collide for current Collision button.

Select the shirt again from the list and then press the *Selection by Materials* in the Vertices Selection tab. We want to set a constraint on the collar, so select TopCollar from the list.

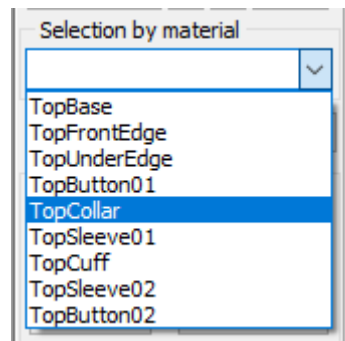


FIG 5-18

The scene viewer will now show in red that the collar is selected. In Forces and Springs, press the Nail to Collision button to set the constrained.

A new Window will appear:

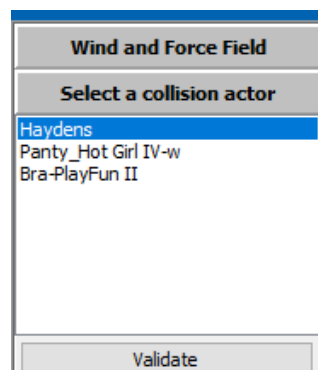


FIG 5-19

This is where VWD wants to know which of the collision actors it should be constraint to. In this case, choose the V4 figure and Press *Validate*.

The next thing we want to do is make the buttons keep their shape. We can do this setting the rigidity of the buttons high. In the shirt, there are two different material zones for the buttons, so we can combine them and then apply the rigidity.

First, clear the memory slot by pressing MC, then from the material selection, choose the shirt buttons and press M+, then select the cuff buttons and press M+ again. Now select MR and you will see that all the buttons are now selected. With this selection active, set the Rigidity to 5 and press Rigidify.

Now we do the same thing for the collar and cuffs but at a lower rigidity. So clear memory again and add all collar and cuff zones, then press recall, set rigidity to 3 and press Rigidify. Then set a rigidity of 2 to the front edge and a rigidity of 1 to the rest of the short (Base, UnderEdge, Sleeve).

There is one additional behaviour we need to apply. The shirt has loose fitting sleeves and the arms are down. This means there will be a very small area around the arm pits where a lot of cloth has to fold. The easiest way to avoid “spilling over” – this is where the cloth jumps from one side of the arm to the other – is to set constraints around the arm pits. The best way to do this is to select the area around the arm pit and the shoulder blades. Do this on both sides, and make sure you have not selected other areas (CTRL drag is add to selection, ALT drag is to remove from selection). Once you have selected do a Nail to collision with softness set at 0.2. This will make sure that the cloth remains where it is while the rest of the cloth can move around.

Now we have defined the behaviour of the cloth and we can simulate.

Go to the Simulate tab and set Fast move at 2, No of Iterations to 3, then press Start Dynamic Simulation.



FIG 5-20

Here is the end result. Shirts with loose sleeves are pretty hard to do. In the Best Practices chapter, there are some tips to fix problems with this type of clothing.

Inflate

Sometimes Rigidify is not enough to keep things in place. Some details may get buried in the cloth. There is a solution for this.

The Inflate function applies a strength in the direction of the normal. By doing this the selection is moved to the outside. This can be useful for things like belts, belt loops, buttons and other details which have to remain on the outside.

In the following example I used the C19Jeans from Ali. The next picture shows how the simulation would go without inflation.



FIG 5-21

The buttons are denting into the cloth. The button on the left cannot even be seen.

The simulation has the buttons with rigidness of 5, a constraint on the belt, rigidness of 1 on the cloth, rigidness of 2 on the pockets.

I can add inflation to the buttons by selecting them, and then apply Inflate in the Forces and Spring section.

The next thing we need to do is turn on the Inflation in the Simulation settings. Give it a value of 25 and do the simulation. The inflation unit is a small value (0.02 Newton) which makes 25 about 50g pressure.



In the new simulation, the buttons are now completely visible and this is a much better result.

Chapter 6 - Hair Simulation

In Poser, there are several types of hair: conforming hair, hair props, prop hairs and dynamic hair. Prop hair and hair props are identical to VWD (the difference in Poser is how they are saved). Conforming hair, prop hair and hair props are all supported in VWD. Dynamic hair is however not supported in VWD.

Hair simulation is for the most part identical to cloth simulation and you need to take the same kind of preparation as in the cloth simulation – so make sure that if you do a static simulation, that the hair does not penetrate the figure too much. Use the built-in morphs to do that if they are present. If not, use the morph brush or magnets to move the hair strands. You can also use a dynamic simulation to drape the hair properly.

A very simple hair animation

I am using SAV's Sonia hair. It is a conforming long hair and I can use the morphs to make it approximately fit the pose. Now we can use a static simulation.

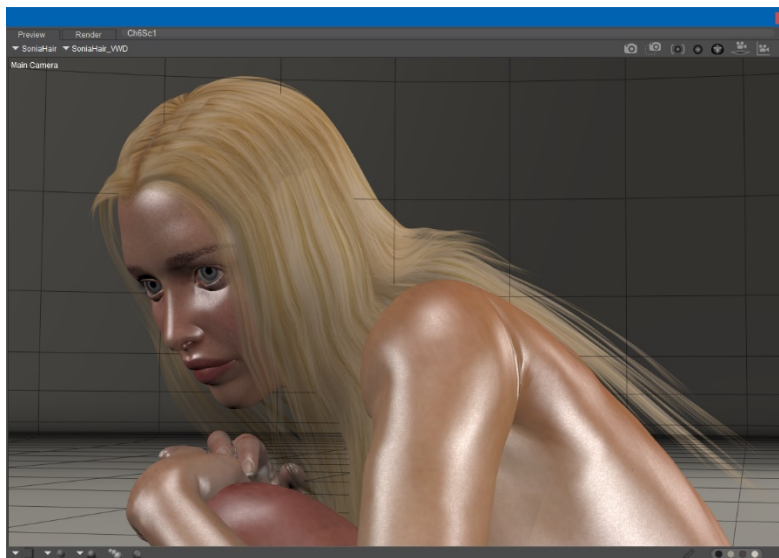


FIG 6-1

Start VWD, reset everything to the default parameters (in Utilities tab), set the figure to Collision Actor and accept the defaults. Now Select the hair and Press the Hair button. Here we are going to use the default settings, so press the Apply parameters button.

Now we are presented with a new tab: The Hair Attachment tab.

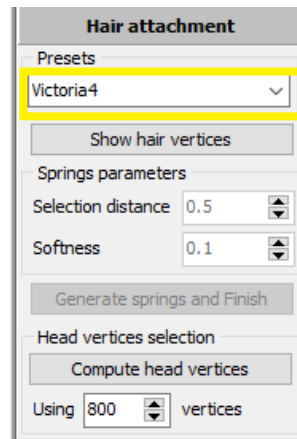


FIG 6-2

From the Presets drop down list select the figure to which the hair will collide, in this case Victoria 4. Open the Scene Viewer and you will see that the part of the skull is now selected. This is where the hair will attach to the skull. Here we are going to take the default parameters.

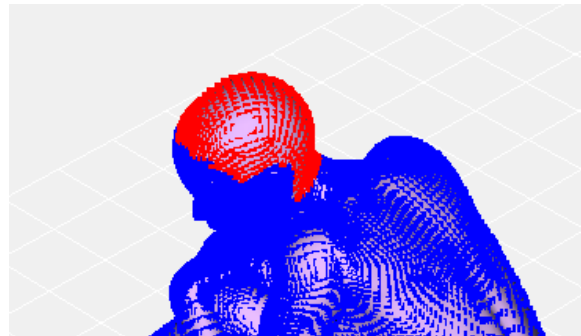


FIG 6-3

Now press the Show hair vertices button. In the Scene Viewer we will now see the hair and part of the hair vertices selected. Again, we take the defaults and press the Generate spring vertices and Finish.

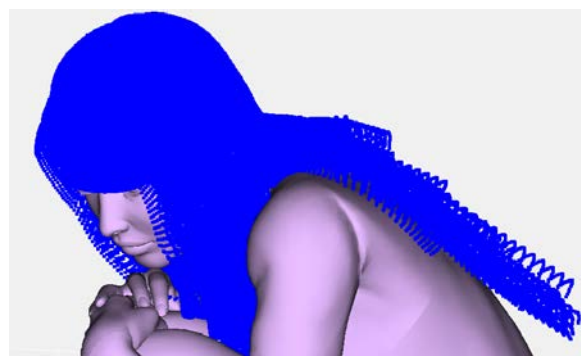


FIG 6-4

In this simple example we are not going to make adjustments to the hair behaviour and just take the defaults. Press the simulate tab.

Since there is no movement from the collision actor (we use a static pose), we can untick the fast move box. Press Start Static simulation.

You can now see how the hair falls on the back of the figure, and reacts to gravity. Once you are fine with how it looks, press Stop static simulation. Now press the Send pose to Host button.



FIG 6-5

The differences are subtle here, but add to the realism.

Simple simulation with prop hair

In this simulation, I use Biscuits Adora Hair from Biscuits. This is a more complex hair to simulate since the hair consists of many strands and cause many collisions.

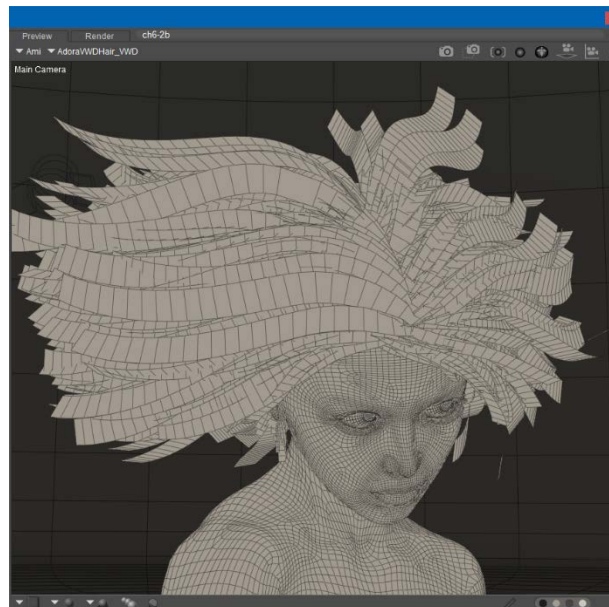


FIG 6-6

Start by setting the figure as a collision actor, then add the hair as Hair object.

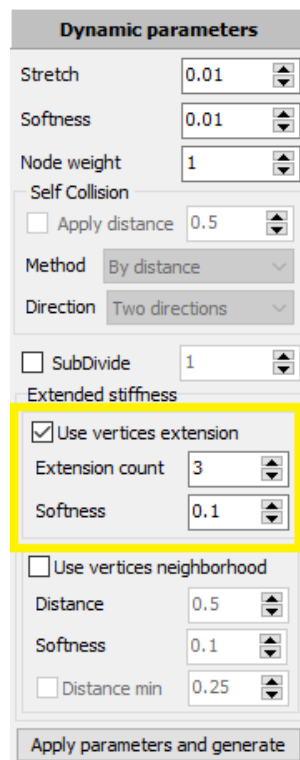


FIG 6-7

For this hair, we are going to use the *Use vertices extension* option. Check that option and turn the *Use vertices neighbourhood* option off.

The neighbourhood option would bind the strands together, but in this case, we would want to have the strands separately, and the vertices extension option will do this.

Keep the other parameters at default and press *Apply parameters and generate*.

In the next step, we select V4 in the presets, But before we continue, press the Simple button (in the vertices selection tab) 3 times. This will increase the selection on the head. The reason to do this is the add more attachment points to the forehead to match the actual hair mesh.

Now press *Show hair vertices* and the scene viewer will show the hair.

To make the next step easier, store the current selection in the memory slot (M+).

Finally press *Generate springs* and *Finish*.

For this type of hair we need to make some adjustments to the behaviour of the hair. We want to keep the shape of top part of the hair, especially the parting and we want to keep some of the volume of the hair. We can do this by stiffening the hair in that region. The previously saved selection will help us with that.

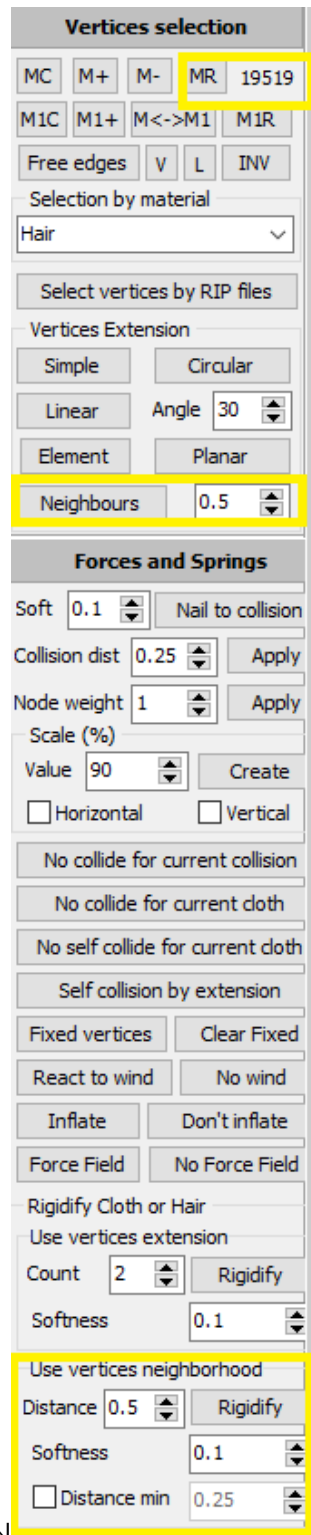


FIG 6-8

Open the Vertices selection and the Forces and Springs tabs.

Press the MR button to recall the selection we have saved previously.

The selection is too small, so we press the Neighbours button to increase the selection.

Next thing is to rigidify this selection. In this case, we need to bind the strands together, so we need distance.

So, press the Use vertices neighbourhood while keeping the defaults.

There are some additional changes we need to make to make the strands a bit more rigid.

Select the hair from the material selection dropdown and then set a count of 1 or 2 to the *Use vertices Extensions* rigidify. (We want the individual strands).

Then run the simulation with the following settings:

Set the number of sub samples to 8, iterations to 5.

Since we are using a static sim, there is no need to set the fast move.

Now run simulation. The hair will bounce a few times, so give it time to settle. Once you are satisfied, stop the simulation and do a Send Pose to Host.

You can experiment with the softness and collision distance to adjust the hair to your liking.



FIG 6-9

And this is the result after rendering the simulated hair.

Dynamic simulation with curled hair

In this simulation, we are going with curled hair (Hr-136 from Ali) in a walking sequence where the head is making a turn.

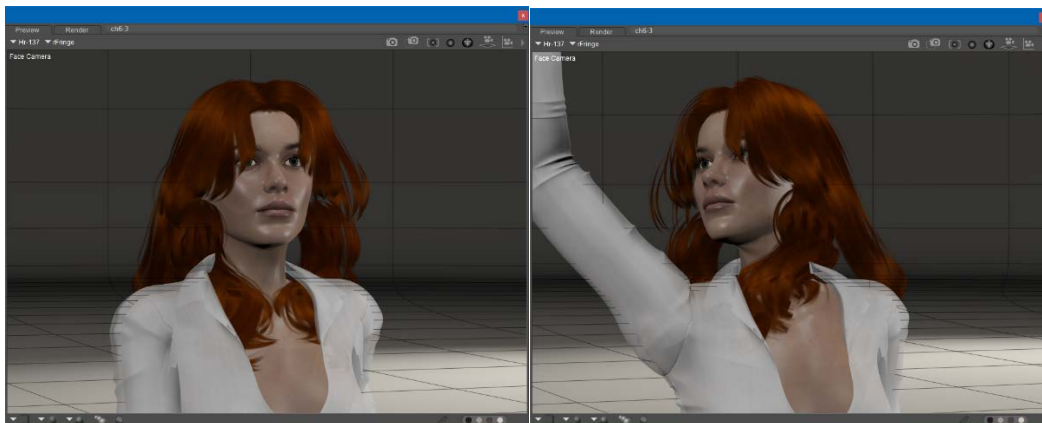


FIG 6-10

FIG 6-11

So there is a forward and rotational movement in the hair. The challenge is here to keep the curls somewhat in shape and to have the hair drape naturally to the body when the head is turned.

There is an additional problem here as you can see in fig-12. The fringes overlap in the front and we need to take care of that since VWD will consider that as a connecting mesh and will give strange results when it is simulated.

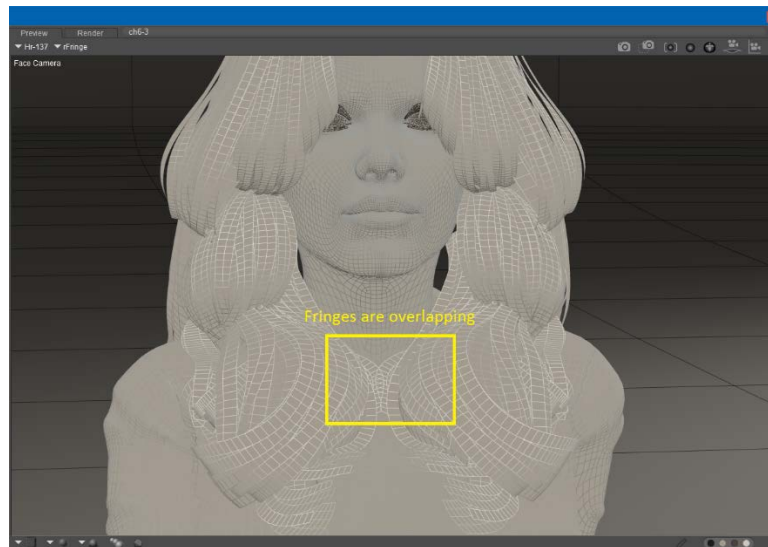


FIG 6-12

We can correct this with either a morph in the hair (when it is available) or use the morph brush to pull them apart.

Setting up the simulation is straight forward again. Reset all default parameters and use V4 and the shirt as collision actors, default settings. For the Hair actor, we need to make some changes. Set the stretch value lower to prevent to keep the hair at the same length, and use the Neighbourhood option the set the springs since this is layered hair and not strand based layers. Select the V4 figure as the main collision actor. From the presets select Victoria 4 and press show hair vertices. Save the selection in a memory slot (M+) and press Generate Springs.

Now we need to keep the hair and curls in shape. So in the Vertices selection tab, choose MR to get back our previous selection and zoom in on the hair in the scene viewer. What we want here is to keep the shape on the top of the head (the parting curve). Press Neighbours twice so we have the top curve selected. Then in the Forces and Springs tab press the Use vertices neighbourhood Rigidify to make it more rigid.

This particular hair has three layer materials/groups. We are going to use that to keep the shape by setting each layer at a different rigidness. For the shape of the curls, we need rigidness vertically, with the flow of the hair, so we choose the Use Vertices extension option to set the rigidity. Select the lowers layer from the material selection and set it at 3, the middle layer at 2 and the top layer at 1.

Now we are going to simulate the hair. The movement of the head is quite fast, so set Fast Move on and at 3, set iterations at 4 and subsamples at 5 to get a smooth curve.

Now press the Start dynamic simulation button and after it is finished.



FIG 6-13

These are some frames from the animation.

Chapter 7 - Dynamic Deformation

There is an additional form of simulation we can use in VWD: Dynamic Deformation. You can use it to modify an existing simulation. It can be used to move cloth a certain direction, let it interact with an object or it can be used to correct the current simulation when it penetrates body parts.

You can start Dynamic Deformation during or at the end of a simulation by pressing the SHIFT key. When you are running a dynamic sim, a short dialog will come up to confirm that you want to stop the dynamic simulation and start a dynamic deformation. A small yellow circle will appear. With it you can select a vertex and move it around.

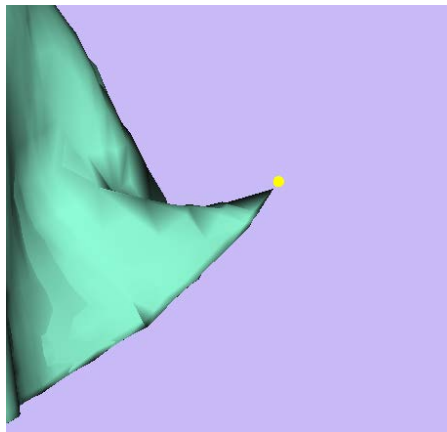


FIG 7-1

You can move it either left, right, up and down (SHIFT + Left Button and move) or forward and backward (CTRL + SHIFT and move down or up).

When you release the mouse button, the simulation will resume. The dynamic deformation has turned off Inertia. By checking the inertia button (or pressing the I key), you can speed up the simulation.

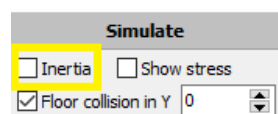


FIG 7-2

Inertia

Inertia in VWD means that the movement is taken into account in the calculation. If inertia is turned off, the speed will be reset with each calculation. In practice, it means that with Inertia turned on it will cover more distance hence speeding up the simulation. Inertia turned on usually gives more realistic results.

Use the rotate view to change direction when you move the cloth. It is easy to cause unwanted folds (reversed normals), so rotate and pick it up where the unwanted fold is and move it to a better location.

The vertices which you pick up are not nailed, so they will drape again. We can change that behaviour with the Dynamic Deformation options.

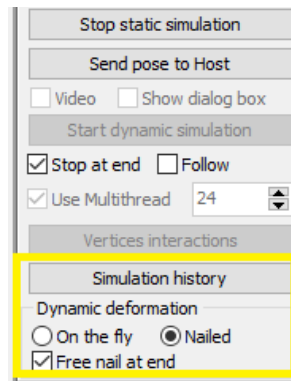


FIG 7-3

The *Free nail at end* is checked by default, meaning it will not keep the vertices constrained at where you have moved them. If you turn the option off, vertices will be constrained at that position (nail point). The vertex will turn into small red circle.

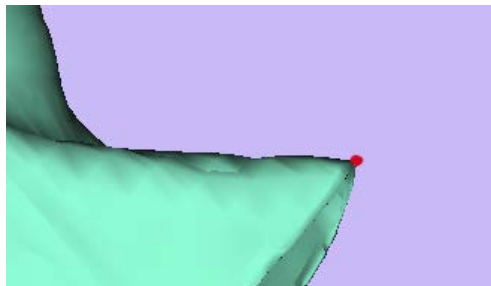


FIG 7-4

You can add as many nail points as you want.

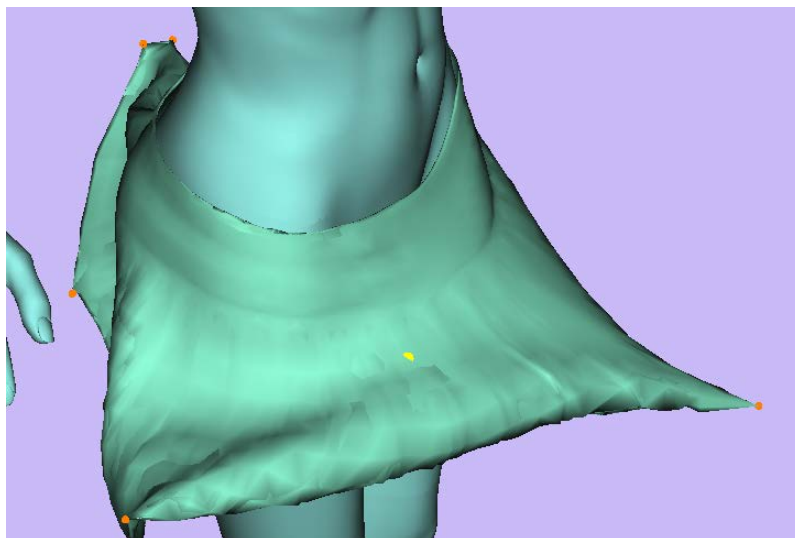


FIG 7-5

To free the nail point turn on the *Free Nail at end* option, then hover over a nail point. The red circle will become bit larger, now click on the nail point and the constraint will be released.

Sometimes it is hard to see the nail point because it is hidden. You can use the H (Hidden), A (Lines Display) or O (Opacity) keys to toggle different display option to make selection easier. Select the figure from the scene import list and press the desired key. The figure will change to the new display mode and will make it easier to see the nail points of the cloth.

But there is an alternative method of selecting the nail points. If you use the mouse wheel with the SHIFT key pressed, it will rotate through the nail points. If you have the one you want, press the left mouse button and the nail point will be released.

There is another dynamic deformation option: The *On the Fly* option. When you turn this on, the dynamic deformation calculated while the skirt is moved. The Nailed option moves the vertex first, then starts to simulate. The *On the Fly* option calculates while you move. With this option the cloth will collide normally and will not cause reversed normals or abnormal folds, but it is not really suited for large movements.

Chapter 8 - Wind Force and Force Field simulations

Wind Force is the method where you add wind to the simulation. We can do this in VWD by adding a Wind guide and then setting the force and direction of the wind. During simulation you can change the strength and direction of the wind and the simulation will use these values. Wind Force can be used in both static and dynamic simulations. Both the clothing and hair actors can be used with Wind Force.

Wind Force, cloth and hair simulation

In this simulation, I am using the Dragonlady dress and Dragonlady hair from SAV. First, we are going to sim the dress, then the hair. The hair is the last one since it might collide with the dress.

We will set up the simulation first, then add the wind force and then simulate both together. I created a scene with the figure in zero pose and the final pose at frame 30 and then I added a few frames to settle and to let the wind play. Then we can choose one of the settle frames for the final image. The reason for doing a dynamic sim is because I want to give the wind enough time to influence the cloth in the final pose.

The dress consists of 2 layers (the ribbon is layered on top of the dress), so we need to use the Vertices by neighbourhood option to generate the springs. If we don't part of the dress will fall off since the vertices are not welded between the two layers. The dress has a lot of folds as well, so the number of generated springs will be high. VWD has the option to Reduce Springs, turn that on (on top of the dynamic parameters tab).

Simulation for this cloth is simple. Restore the default parameters, turn on the Reduce Springs option, and set stretch for the cloth actor very low, and use the Vertices by neighbourhood for setting the springs.

Reduce Springs

This option will optimize the springs creation by eliminating unneeded springs and duplicate springs. The unneeded springs may have been created when multiple rigidifications have been applied to the same vertices.

Next thing is to make a constraint – select the top of the strap near her neck, add that to memory, then select the ribbon material and then remove the flap on the back (we want that to flow freely) and then add it to memory. Do a Memory recall to get the complete selection and press Nail in the Forces and Spring tab.

One more thing to do here is to make the pin a fixed item, so select the pin from the material selection and set rigidify to 5 or higher and press rigidify. We will leave the rest of the cloth at default.

Now it is time to set the wind force. Press the Wind Force tab to open it.

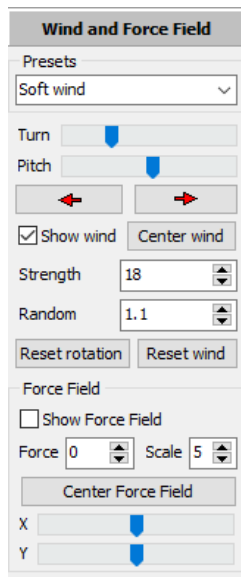


FIG 8-1

The first thing we do is make the wind proxy visible. We do that by checking the *Show wind* option. The proxy is placed at the centre of the Scene viewer window (see fig 7.2). We can reposition it by either using the left/right arrow buttons in the Wind Force tab or by moving preview (CTRL-drag) and pressing the Center wind button.

You can rotate the proxy with the Turn and Pitch dials to set the direction of the wind.

The Strength value is how strong the wind is. A setting of 20 or above is pretty much a storm.

The Random value makes the strength of the wind fluctuate which makes it more realistic in animations.

The Presets dropdown gives a set of predefined values for strength and randomness.



FIG 8-2

Once you have set up the Wind Force, you can start the dynamic simulation. Increase the number of iterations a bit and run it.



FIG 8-3

This is the result in Poser.

Next, we need to simulate the hair. This hair has many strands and some ornaments, so we have to make some adjustments when we simulate the hair.

Start VWD, add V4 and the VWD dress prop as collision actors (default parameters).

For the hair, add it as Hair actor, but use the Use Vertices Extensions option with default parameters. Turn On Reduce Springs as well. Use V4 as preset and press simple once to make the cap a bit larger. Then Show hair vertices, save the selection to memory, then press the generate springs button.

Now we want to set the ornaments to be rigid, so select the Dragon, Base Dragon, Pin and Gem with the material selection and memory slots (clear it first, then add each one and after that a Memory Recall). Set Rigidness at 5.

We also want to keep the top with the braid in shape, so select the tressa, tressatop, and Top and set rigidness at 3.

Now we need to add the wind force. Do exactly the same as with the dress simulation. But put the wind force proxy a little bit higher (move viewport, center wind) so the hair catches most of the wind. The values remain the same (strength 18, random 1.1, facing towards the figure, turn a bit to the left).

Now simulate the hair.



FIG 8-4

And this is the final result. If you have added randomness and settle frames, you have variations in the wind and you can choose the best one for your render.

Force Field

A Force Field is like a magnet, it can repel and attract vertices. We can do this by adding a Force Field Guide, setting its position, scale, direction and strength in the Wind and Force Field tab before you do a simulation. Like the Wind Force you can use it in static and dynamic simulations and you can vary the parameters during the simulation.

In contrast to the Wind Force there is no default selection for the Force Field, you need to add it in the Springs and Forces tab.

The Force Field is intended for situations where a cloth or hair actor has very tight folds or layers. By applying a forcefield to it, you can “blow” it apart.

In the next example I use a dress where the folds are very close together in the skirt section. It is a twostep process. In the first step, we use the forcefield to push the folds away from each other and then in the next step we will use the new dress to make the animation.

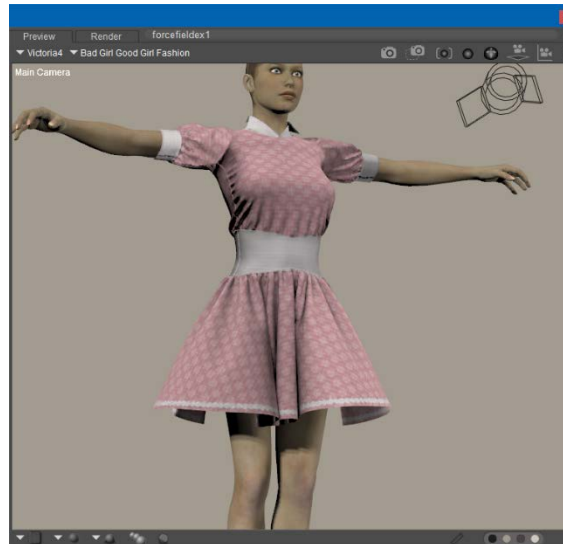


FIG 8-5

This is the dress we are going to use. The folds on the skirt are very tight together and to improve the simulation, we are going to give it a better shape for the simulation.

Start VWD and select the dress as a cloth actor.

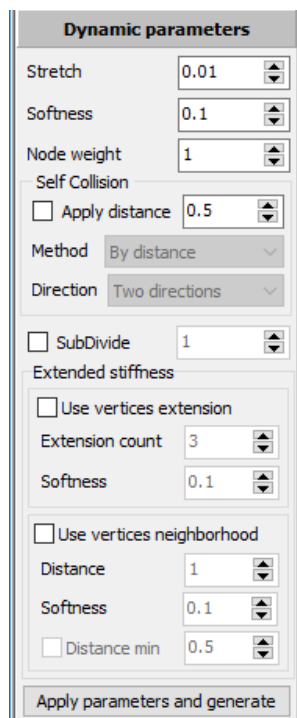


FIG 8-6

Before applying the parameters set the stretch and Softness very low.

Now unselect both the Use vertices by extension and the Use vertices neighbourhood option. We do not want to change the stiffness of the clothing or have any stretching.

Apply the new parameters.

The idea is to change the skirt itself and not the top part. To do that we need the vertices Selection tab and select the skirt from the material selection list. With these vertices selected, choose the Force Field button. We are now telling VWD to only use this selection with the forcefield.



FIG 8-7

We also do not want to have the rest of the dress affected. Select the skirt again and invert the selection (INV). Now press the Fixed vertices button. All the selected vertices will now stay in place (and not fall down when the sim is executed).

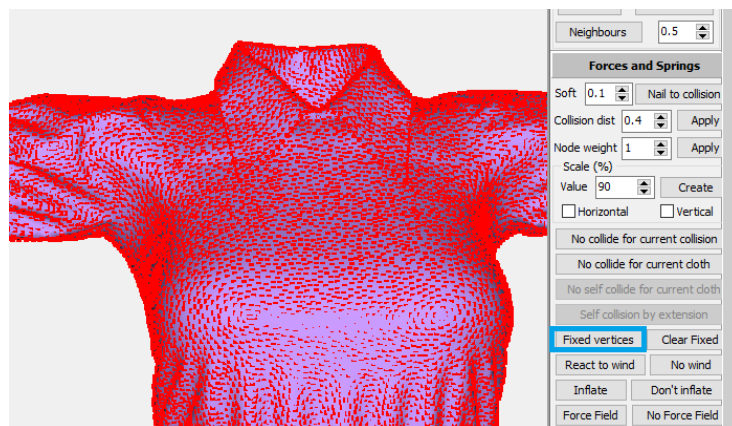


FIG 8-8

Now we need to set up the Force Field. Open the Wind and Force Field tab and press the Show Force Field option. Now position the Force Field with Center Force Field and the X and Y sliders somewhere in the middle of the skirt just below the waste. Set the Force Field strength to 5. Use the A key to make the dress partly see through. You can use both positive (repel) and negative strength (attract). The unit of strength is the 0.125 Newton.

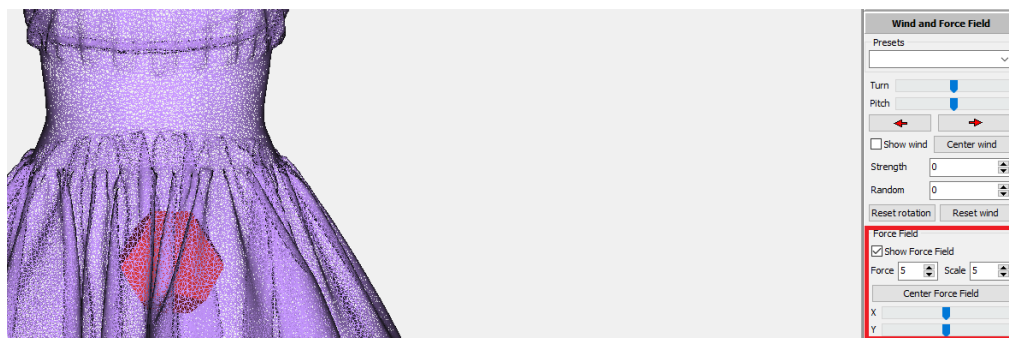
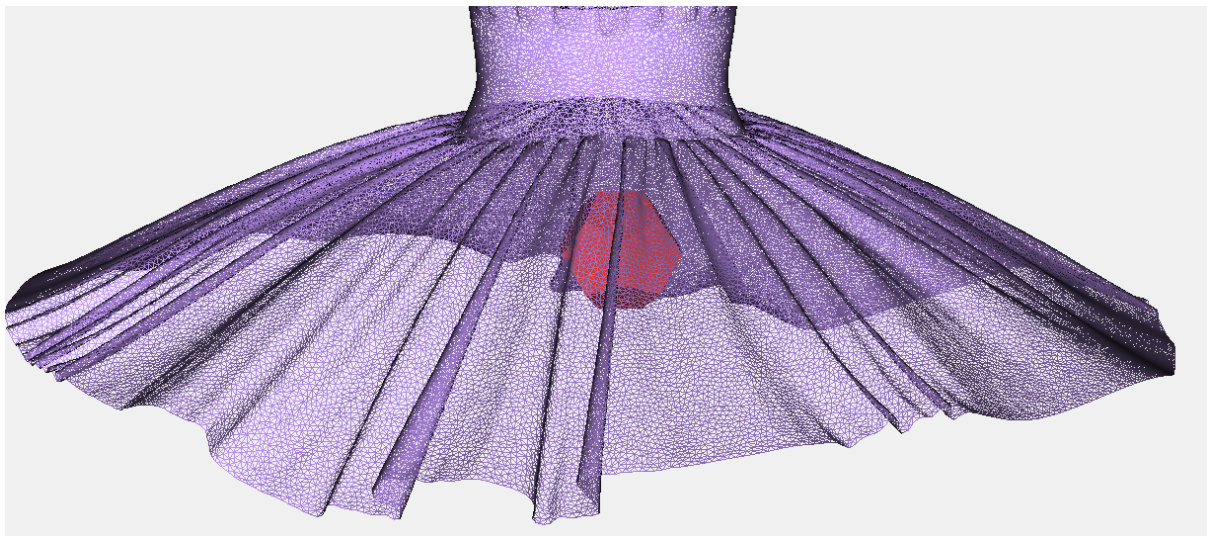


FIG 8-9

<p>Simulate</p> <p><input type="checkbox"/> Inertia <input type="checkbox"/> Show stress</p> <p><input type="checkbox"/> Floor collision in Y 0</p> <p><input type="checkbox"/> Gravity 1</p> <p><input type="checkbox"/> Air resistance 0.02</p> <p><input type="checkbox"/> Inflate 10</p> <p>Nb Sub Samples 4</p> <p>Nb iterations 2</p> <p><input type="checkbox"/> Fast move 1</p> <p>Start static simulation</p> <p>Send pose to Host</p> <p><input type="checkbox"/> Video <input type="checkbox"/> Show dialog box</p> <p>Start dynamic simulation</p> <p><input checked="" type="checkbox"/> Stop at end <input type="checkbox"/> Follow</p> <p><input checked="" type="checkbox"/> Use Multithread 24</p>	<p>Turn off all external forces: Inertia, Floor collisions, Gravity, Air resistance and Inflate.</p> <p>To let the dress make its new shape, we need to use a static simulation and it run until the shape is what we want it to be – the folds must separate from each other in this example</p> <p>If inertia is Off, the simulation will be slow, but we need to have the accurate calculations in the beginning to separate the folds. When they start to separate you can turn the Inertia on again to speed up the simulation.</p> <p>You can adjust the position and strength of the Force Field while the simulation is running.</p>
--	--

FIG 8-10

And this is the result when the simulating the dress with the Force Field.



Stop the simulation and send the pose to the host and close VWD.

Now there is one last thing we need to do: Give the simulated object a new name. If it keeps the old name, VWD will delete next time we simulate it. In this case I renamed it from Good_And_Bad_Dress_VWD to Good_And_Bad_Dress_NEW.

The final step is to set up your final pose and run a new simulation, now with the new object as cloth actor.

Chapter 9 - Props and Vertices Interaction

This chapter deals with props and how they can interact with cloth in a dynamic way.

Earrings

The first example is Earrings. Earrings are a special case since the top of the earring will penetrate the collision actor. They also have a very small collision field and the parts are rigid and move independently.

This is the earring we are going to use:

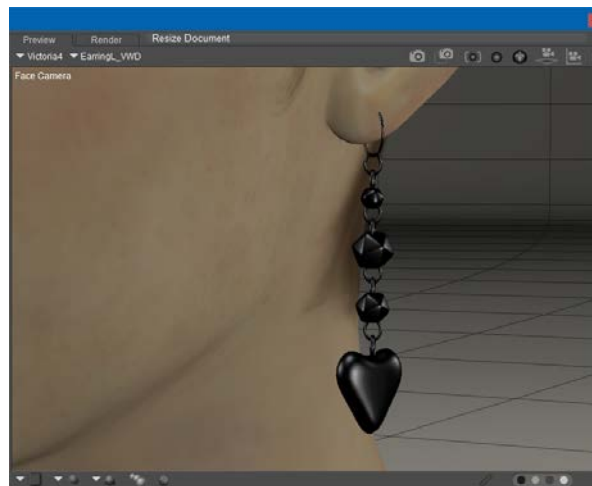


FIG 9-1

Start VWD, select the figure as collision actor using default values. Now select the earring as cloth actor and use Vertices Neighbourhood but here we are going to use a very small distance: 0.1. We also want a softness of 0.01 to preserve the rigidity. Generate the springs with these values.

The next thing we are going to do is to define the areas which interact with each other. Open the Simulation tab and select Vertices Interactions near the bottom of the tab.

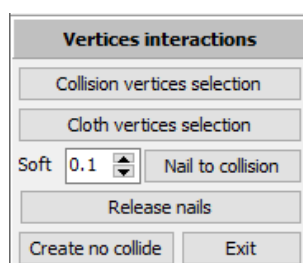


FIG 9-2

Collision vertices selection is the place where we define the Collision actor.

Cloth vertices selection is the place where we define the cloth actor

Soft describes how rigid the nails are.

Nail to collision generates the springs

Release nails can be used during the simulation to release the nails (constraints)

Create No Collide makes the cloth and collision selections defined to NOT collide with each other. This can help with very tight collisions.

Exit leaves the tab without changes.

Select the Vertices interaction and turn on the scene viewer. Zoom in on the ear. The first thing we do is to define the collision area in the collision actor. Select V4, then use the SHIFT key to select a vertex closest to where the earring penetrates the ear. After selecting that vertex, press Neighbours (0.5) in the Vertices selection tab and the ear lobe will be selected.

Now press Collision vertices selection to lock the selection. Now select the earring again from the import list and press the INV button, all earring vertices are now selected and press the Cloth vertices selection button.

Last thing to do here is the set Softness to 0.01 and press the Nail to collision button.

Now we need to define the part of the ear ring which should not have any collisions with the collision actor (the part which attaches to the earlobe). Press SHIFT and select a vertex on the upper ring, then press CTRL SHIFT and select the second ring in the chain. Now press Element to select those rings and press No Collide for current cloth button in the Forces and Springs tab.

To make the earring more rigid select all spheres (SHIFT select them and press element) and use a vertices neighbourhood selection with 0.5 and a softness of 0.002. This makes the spheres and the connections to it more rigid. Last thing we do is the select all the rings and set a use vertices rigidify of 3 to make to prevent deformation.

And finally simulate it (static or dynamic).

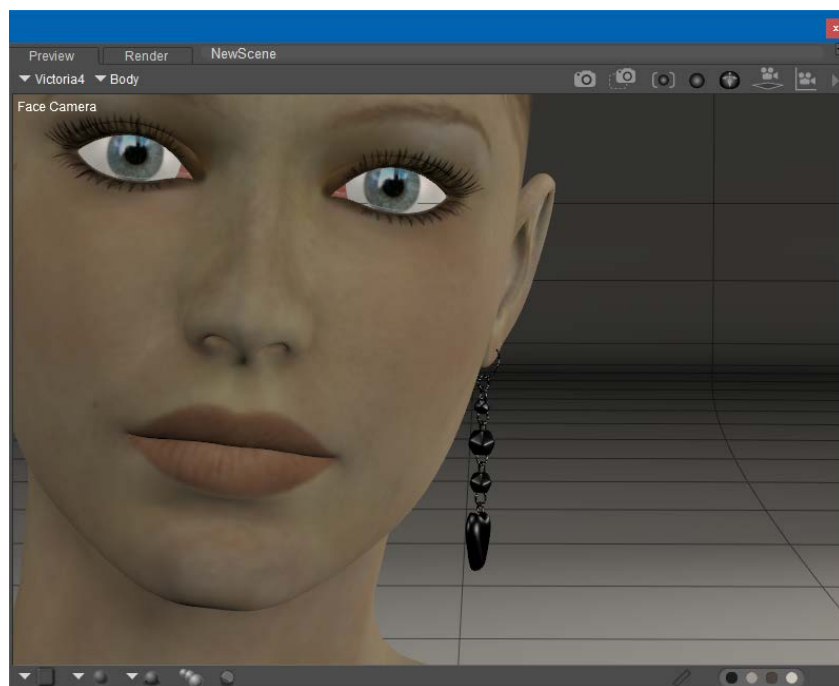


FIG 9-3

As you can see the earring is now influenced by gravity and the parts move independently.

Sitting on a couch

The following simulation shows how to approach a simulation where the figure sits on a couch. There are several challenges here. What we want is couch to dent in to react to the weight of the figure. If we would simply run a simulation with both the figure and the couch as a collision object, the couch would not deform.

What we do is to run 2 simulations: First with the figure and the couch as collision actor, then a second one with both the figure and deformed couch as collision actor with the dress as cloth actor.

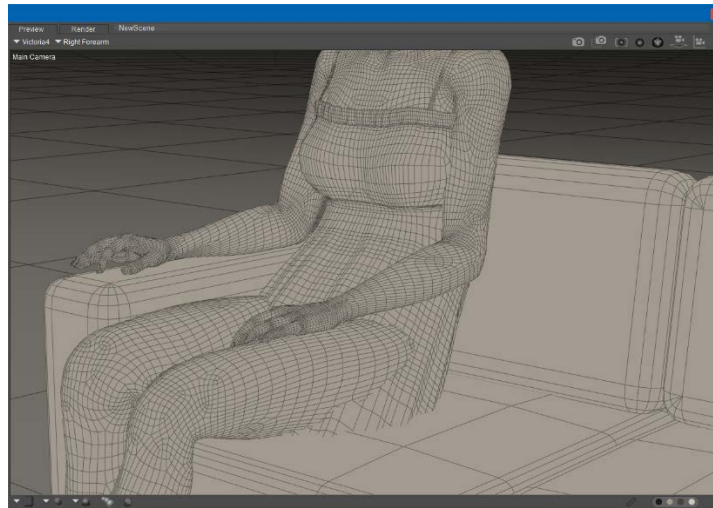


FIG 9-4

This is the pose and the actor we are going to use. This is V4, the V4MS dress from Kobamax and the couch from 2ndWorld. The picture shows a wireframe to show another thing we have to address: The low polycount of the couch. The back is a single plane and we want both the seat and the back to have a realistic deformation.

After we setup the pose and the actors for a dynamic simulation (I used 100 frames here), we can start VWD.

Restore the default parameters and load the figure as collision actor. There is one change we want to make here and that is to set the collision distance to 0.4. We want to reserve a little room for the dress to fit in in the second simulation.

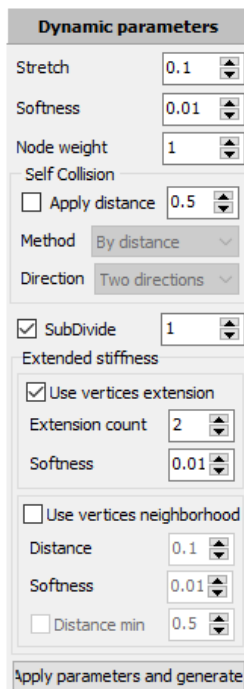


FIG 9-5

Load the couch as cloth actor.

Here we are going to make some changes as well. Use the vertices by extension option with a value of 2 and a softness of 0.01. It has to bend, but remain rigid.

We can change the *subdivision* here if needed. The actual number depends on the polygon count, we want to have enough to bend realistically. The value of subdivision is a bit different as us used in other software: It represents a distance where a polygon is cut into multiple parts. A lower value means more cuts and higher density. In this case a value of 1 is more than enough.

Disable the Use vertices neighbourhood option and press Apply parameters and generate.

After generating the springs, we are going to make one other change. Select the figure and then use the vertices selection tab and select the right arm and hands where it will touch the arm rest. Then select No collide for current collision in the Forces and Springs tab.

Go to the simulation tab and disable Inertia, Floor collision, Gravity, Air resistance and Inflate. We do not want any other forces acting on our couch, just the collision with the figure. Then start the dynamic simulation, then send the simulation back to poser.

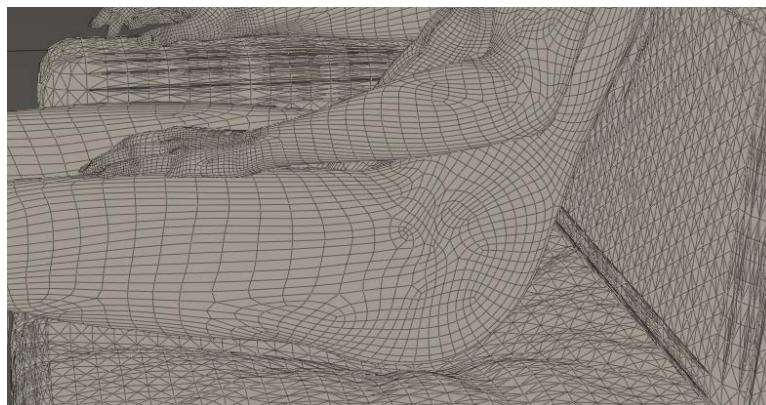


FIG 9-6

You can see now realistic bends in the couch.

Next thing to do is to create the second simulation, which is pretty basic.

Start VWD, restore default parameters, load V4 as the collision actor. Now add the deformed couch (Couch_VWD) as collision actor as well. All default parameters.

Now add the dress as cloth actor and run the simulation again. This time the cloth will collide with the now deformed couch and will fit in nicely between the figure and the couch. For this particular cloth I used the following parameters:

Load both V4 and the simulated couch as collision actors, reset the V4 collision distance back to 0.2. Load the dress as cloth actor with *use neighbourhood vertices*, *nail* the top section and do a dynamic simulation. Do not forget to turn on the external forces such as gravity, air resistance, collide to floor and inertia.

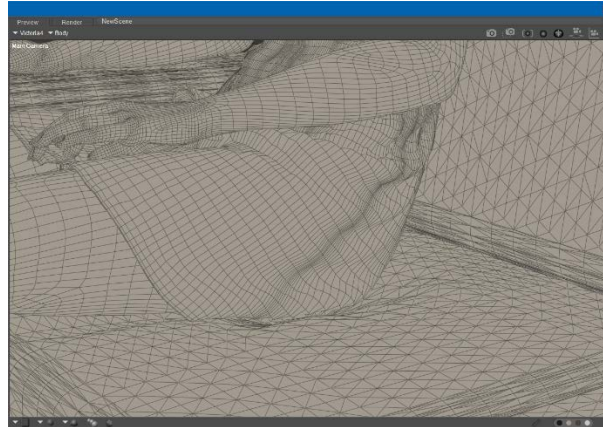


FIG 9-7

You can see in the result that the dress fits nicely in between the figure and the couch. Of course, you can fine tune the parameters to make the result look more realistic.

Creating a Pillow

The following example shows how you can create a pillow with poser primitives. It uses the *Cloth reduction vertices* option in Vertices Interaction in the Simulation tab. It will move the selected vertices towards each other.

Start a new scene and load 2 Hi-Res squares and position them above each other as shown here:

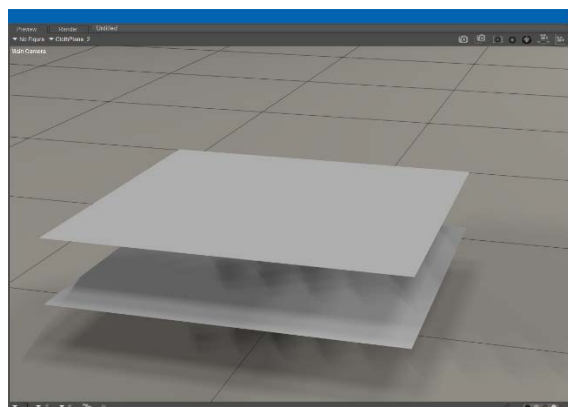


FIG 9-8

The Create reduction vertices options work only within a single cloth object, so we need to make these two squares a single object. We do this by exporting both squares and importing it again: File!Export!Wavefront Obj, single frame, select both squares, turn off all options and click OK. Name it pillow and save it. Now delete the two squares and import the object: File!Import!Wavefront Obj, deselect all options, press OK and load the pillow.obj file. We now have a single object we can use to create the pillow.

Start VWD, Select the pillow and import it as a cloth actor. Set softness and stretch on a low value (0.01) and check the Use Vertices Extension, set it at 3 and softness at 0.01. Apply these parameters.

Open the Simulation tab and press on the vertices interaction button.

The Create reduction vertices works by defining two different groups of vertices. VWD will reduce the distance between these groups, effectively bringing them together.

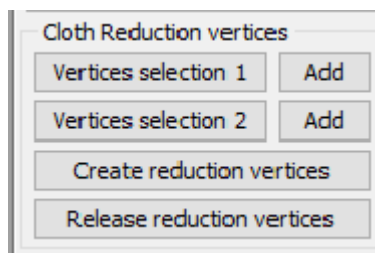


FIG 9-9

Vertices selection 1 defines the first group, use the Add button to add more selections to the group.

Vertices selection 2 defines the second group, use the Add button to add more selections to this group.

Create reduction vertices will apply the reduction to the two groups

Release reduction vertices will remove the reduction of the groups.

Open the scene viewer and zoom in on the pillows edge. We want to select the entire edge of the top and define it as the first group and the edge of the bottom part as the second group. When these groups move towards each other, a pillow like shape will appear.

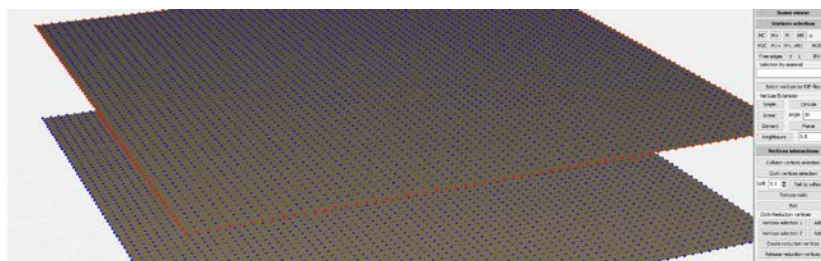


FIG 9-10

In this case the selection of the edge vertices is very simple: Simply press free edges, then removed the edges from the bottom part. Then press Vertices Selection 1. For the second group, do the same and remove the top part and press Vertices Selection 2.

Now press Create reduction vertices.

There is no need to change anything else, so we can set up the simulation. Turn Off all external forces such as Inertia, Floor collision, Gravity and Air resistance.

Do a static simulation.

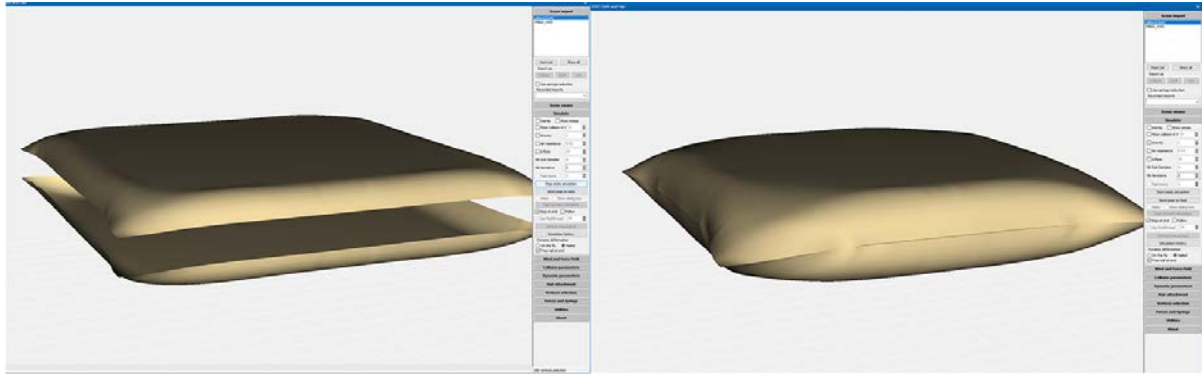


FIG 9-11

After it looks good, stop the simulation and press the Send to Host button.

Although the new pillow looks good, the seams are not welded. If you want that, simply export it again and import it with the welded option checked.

You can now use the pillow for new simulations.

Chapter 10 - Tools and Utilities

There are a number of tools and utilities to improve the workflow in VWD.

Utilities Tab

Delete All Exchange Files

This will delete all the files in the Exchange folder. This folder is used by VWD as a temporary folder where objects, VWD data and scenes are stored during the simulation. You can clear it out after you have saved your final scene to your own location.

Keep Last Recorded Inputs

The Recorded Inputs will be cleaned. Only the last recorded version of each simulation will be kept, older versions are deleted.

Change Colour for current Mesh

This will change the UI colours to a dark variant to match the default DAZ Studio style.

Restore Default Parameters

Restores all parameters to their defaults. You can also click with the ALT key depressed on a Tab to reset the parameters within the Tab.

Mouse and Short Cuts

A list with all the shortcuts for Mouse and Keyboard.

Compute Spring Lengths

- If no vertices are selected, it will calculate the average spring length of all springs.
- If two vertices are selected, it will calculate the distance between these two vertices.
- If more than two vertices are selected, it will calculate the average spring length of that selection.

The calculation will show the average, the minimum and maximum length in inches. These calculations may help you to determine to see which parts need to be rigidified.

Miscellaneous tools

Status bar

The bottom-part of the VWD screen shows the progress of what VWD is being calculated in VWD. It may run out of memory when too many springs are generated. If you get that error, reduce the number of springs. You can do that by either turning on the option to Reduce Springs in the Cloth tab, or by modifying the rigidification method. For a full explanation on how springs are generated, see the section on Springs in the Fundamentals chapter.

Recorded Imports

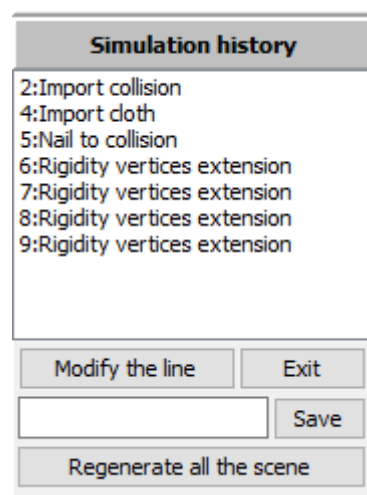
Every time you do a simulation, the settings for the simulation are saved as a Recorded Import. It gets the name of the cloth or hair object with a date and timestamp. You can use these recorded imports to do a new simulation with the same settings.

You do this by loading a scene with the same collision and cloth and/or hair objects as which were used in the simulation. Then start VWD and select the one you want from the drop down list in the Scene Import tab. Do this instead of loading the collision, hair or cloth objects.

After you have loaded a Recorded Input, you can start the simulation.

Simulation History

The simulation history is extremely useful and will improve the workflow. It can be found in the Simulate tab.



If you select the *Simulation history*, you are presented with a list of all the actions you have performed for the current simulation. If you select a step, the corresponding tab will open and you can now edit the parameters. After you have done this, press *Modify the line* and the new settings are now active. You can save the simulation here with a name of your own choosing. Before you can use the new settings, you

need to press the Regenerate all the scene. This will restart VWD completely and import the simulation with the new settings. If you do not want to do this, press Exit.

You can also use the Simulation History with the Recorded Inputs. Load a recorded Import first, then press the Simulation History.

Vertices by RIP files

RIP files are the saved simulations in VWD. You can use the RIP files to apply a simulation with Recorded Imports, but you can also use the RIP files to pick up vertices selections. Apart from the ability to re-use complicated selections, it is also useful for cloth makers to distribute more complicated simulations. They could provide a RIP file where the user can take up the selections and apply his own settings for these selections.

Chapter 11 - Best practices and tips

Video Tutorials

Some of the examples in this user guide have been derived from video tutorials.

Many video tutorials can be found in the YouTube channel of Virtual World Dynamics at <https://www.youtube.com/channel/UCOpGh2GKgryXyMlbcTQ45dg>

Another set of VWD tutorials from Biscuits can be found at Renderosity: <https://www.renderosity.com/mod/freestuff/?uid=572568>

All of these are definitely worth watching.

Preparing a figure for use in VWD

Although VWD works with all figures, there is some preparations you can make to get the best simulations.

Dawn

Set subdivision of the figure at 1 before simulating. This will make the simulated cloth flow more smoothly and will avoid poke through. A higher setting may slow down the simulation and you may run out of memory

Pauline

Pauline also needs to be subdivided to 1. You also need to remove the control handles on the face. There is a pose file to do that for you in the Pose library for Pauline.

Genesis

All the Genesis figures need to be subdivided as well.

Parenting a VWD cloth or hair

VWD will create a new prop derived from the original prop of figure. It does not parent the new prop to the figure. This means you cannot move the figure unless you parent the new prop to the figure. Parent the prop to the body of the figure to avoid scaling problems.

If you are going to parent the prop, do this before you make any modifications to it like spawning a morph. A spawned morph will contain scaling information as well and the parenting also takes scaling into account. This means that with a scaled figure, the scaling will double if you parent it. Parenting before the spawn will avoid that problem.

Saving a simulated prop to the library

After you have made a static simulation or a dynamic simulation with Send Pose to Poser, you can save the prop to the library, or – if you parent it – save the clothed figure in the library.

However, with a dynamic simulation exported as an animation, the new prop will be a Poser dynamic cloth and cannot be saved as such except in a (partial) scene.

There is however a way to save the simulated cloth from the final frame without the need for a new simulation. You can spawn a morph in the new cloth prop (Object!Spawn Morph Target)/ Make sure you parent it to the figure before spawning it) and then save the cloth with or without figure to the library. After spawning, set the dynamics dial to 0 and set the new morph to 1 and save it.

Cleaning up the simulated cloth

The result of the simulation may have sharp folds. You can either apply a subdivision to it or use the morph brush to smooth them out. The best result is when you use both. Use the morph brush with the Smooth setting and a low strength on the folds.

Smoothing will also correct reversed normal which may occur when the cloth is folded. In VWD you need to set Self Collide in this case, but some reverse normal might still occur. The morph brush treatment will cure this.

See attached pictures for an example where the morph brush has cleaned up the folds.



FIG 11-1 BEFORE



FIG 11-2 AFTER

Spline Breaks

If you set up a pose for a dynamic simulation and your final pose (or morph) is not at the last frame, it is possible that your movement or morph "overshoots". Poser uses by default spline interpolation; it tries to smoothen the curve. This is unwanted behaviour in the simulation, since it might cause unwanted collisions.

To get rid of this overshooting, set a spline break at that frame. The easiest way to do that is to go into the Animation editor, select the figure in that frame and press the spline break button. This will fix the morph or rotation at that frame.

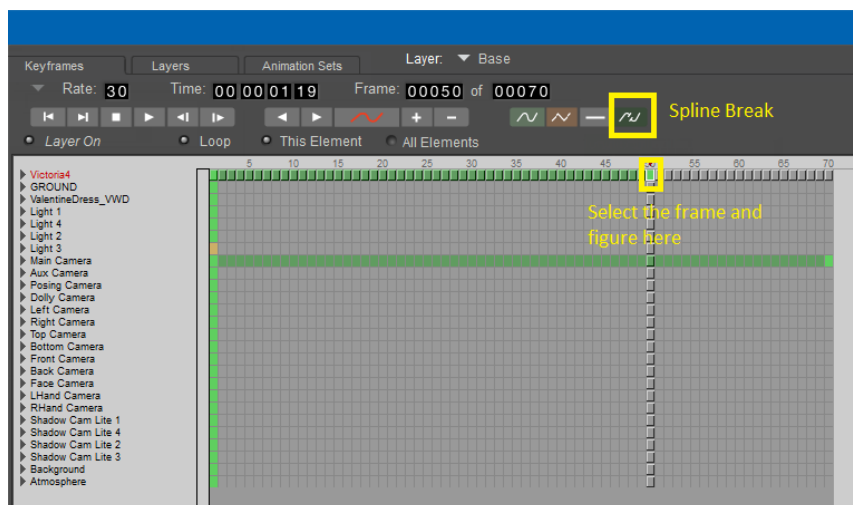


FIG 11-3

Simulating loose clothing

Loose clothing - like sleeves which are not tight to the body or a robe which drapes over other clothing – can be hard to simulate in VWD. The problem occurs when arms are bent in the elbow and the arm pit region. If the bends are too strong, there is not enough space to move the clothing to when it collides.

There are several things you can do to make the simulation successful:

- Adjust the pose to leave more space for the cloth
If you decrease the bend, there will be more space for the cloth to move. Another possibility is to add a keyframe where you change the angle in which the cloth collides (forward, then bend, instead of rotate and bend at the same time).
- In a case like a loose sleeve use the morph brush to tighten the cloth (tighten brush). This reduce the folds in that area.
- If these solutions do not work, make the area where the faulty collision occurs, a constrained area. (Nail option). This will ensure that the cloth stays in place.
- Another option is to make the area of the cloth not colliding. Select the area where the problem will occur and use the No Collide for Current Cloth in Forces and Springs.

Fitting Clothes to another Figure

It is possible to use VWD to fit clothes from one figure to another for further use in VWD. VWD will snap the cloth to the outside of the figure if there are poke throughs of the cloth.

We can make use of this feature to fit the cloth to another figure. The way to do this is to scale the cloth. If you want to fit a conforming cloth, do not conform it. Use the translation dials and the scale dials to make an approximate fit. You can use the pose dials of the figure as well to make arms and legs fit better. If you change the figures pose, this will be your new zero pose for the figure for that cloth.

Here is an example of fitting a v4 dress to Dawn.

Make sure you have set subdivision to 1 on Dawn. Load the dress and but do not conform it. Now use the scaling and translations on the dress to make an approximate fit.

This shows the cloth before and after scaling and translation

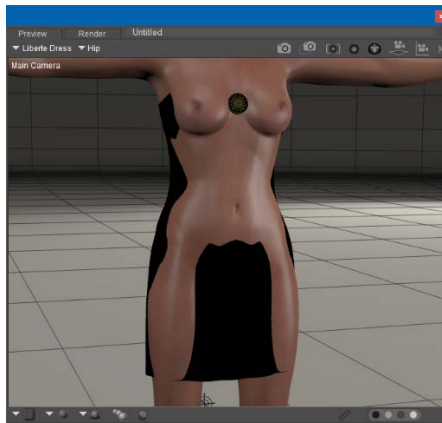


FIG 11-4

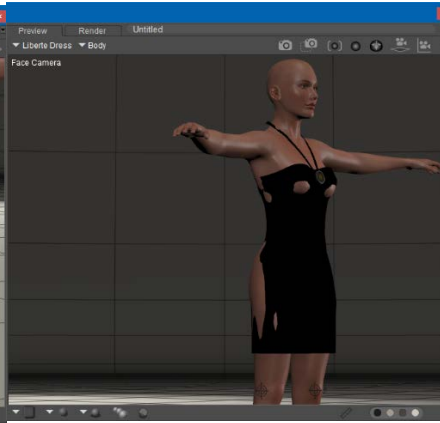


FIG 11-5

Start VWD and import Dawn as collision actor, use 0.1 as distance. Then import the dress and in this case set *use vertices extension* at 3, then apply it with the rest at default settings.

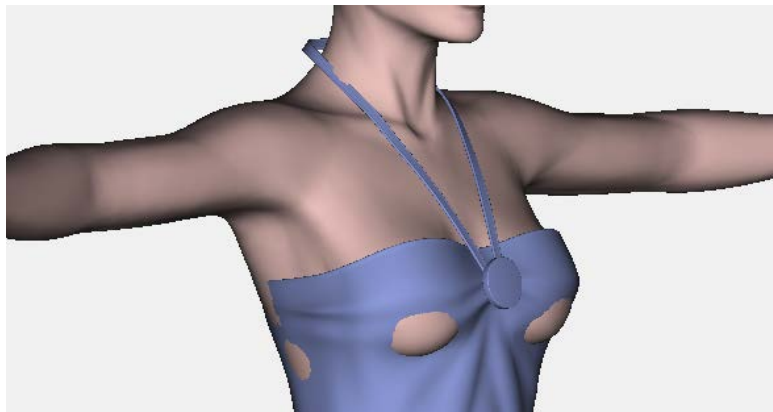


FIG 11-6

In the sceneviewer we can see that the strap is rather far away from the neck, so we select the strap, then apply a scale of 90 on the strap. There is also an accessory to which we apply a rigidity of 5 to keep it in shape. Now we can optionally set the entire dress with an additional rigidity of 1.

Now we can simulate it

Do a static simulation with all external forces off, so turn off inertia, floor collision, Gravity, air resistance and inflate. This will ensure that the dress stays in place and will not start to drape to the pose.



FIG 11-7

And this is how the dress looks rendered in Poser. There is one additional step which you have to make: Give the simulated dress a new name. Now you can use this new fitted dress to make your final pose and simulation.

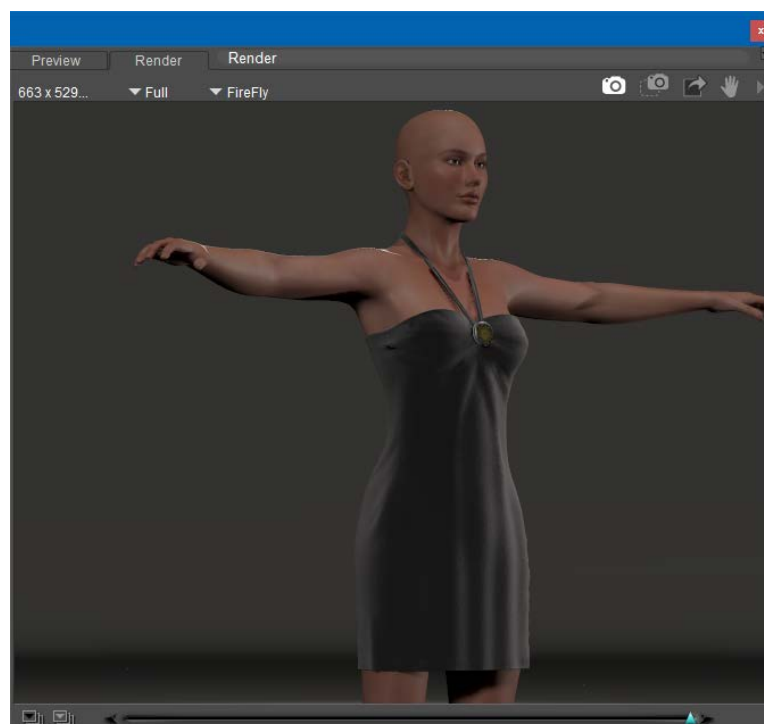


FIG 11-8

Chapter 12 - Fundamentals

This chapter will explain the fundamentals of VWD. A good understanding will help you determine what parameters to use in the simulations.

Springs

A mesh (in VWD) is always composed of nodes (vertices) and triangles. Each segment of each triangle becomes a spring at the creation of a cloth in VWD. A spring is a soft binding between two or more nodes. The more the spring is rigid (inflexible), the less these nodes will move relative to each other. This spring generation allows VWD to keep the nodes in a structured shape.

This rigidification could be enough but by keeping only these springs by themselves would generate a too soft cloth. To solve that problem, it is necessary to add new springs onto the structure of the mesh by binding more neighbouring nodes together (*rigidification by extension*) or to bind them by means of a sphere with a defined radius (*rigidification by neighbourhood*). All these springs together will generate the behaviour of the cloth.

Softness, Stretch and Rigidity

A spring has softness, stretch and rigidity. The following picture shows a spring (the red triangle) and its relation to softness and stretch.

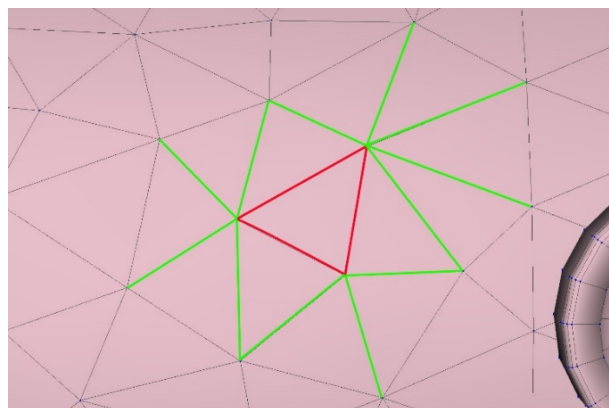


FIG 12-1

The red lines represent the **stretch**, this is how much the triangle will deform. The green lines represent the **softness** of the spring, this is the first level or rigidity (how stiff the spring is). A low value for stretch means little deformation and a low value for softness means low softness or more stiffness.

Here is an example of stretch at 1.000 and one at 0.001, you can see how the polygons are deformed. The forces acting on the spring (like gravity and wind) in combination with the stretch value define how much deformation takes place.

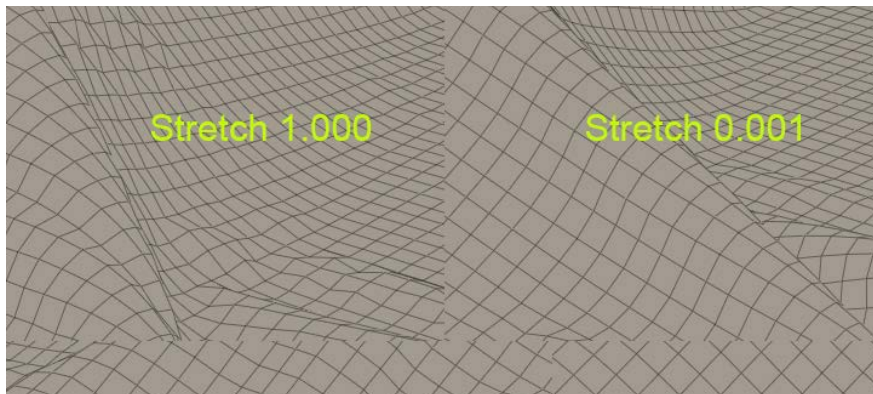


FIG 12-2

The following example shows softness at 0.0001 and at 1.0000, You can see that with a higher value for the softness, more folds will appear.

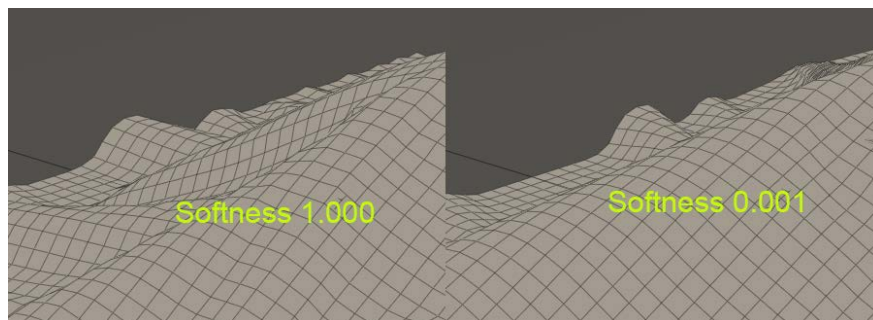


FIG 12-3

The second level of rigidness is defined by adding another relation between the spring and other vertices which are further away.

This is the initial selection of a vertex.

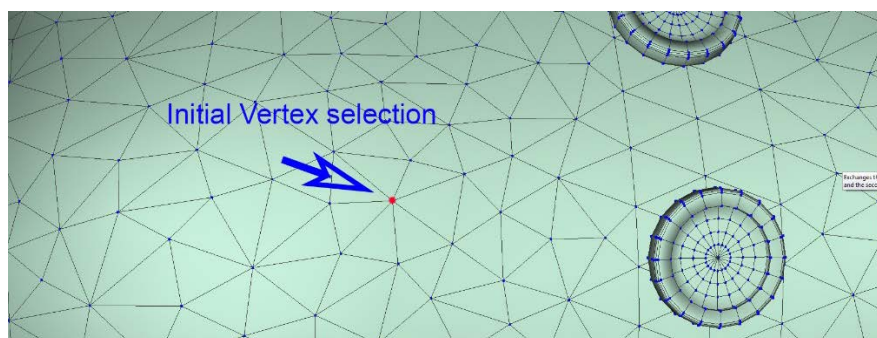


FIG 12-4

With rigidness extensions, we define a new relation with vertices which are further away. This allows us to control the stiffness and to keep the shape of the cloth.

In this example, we use Rigidify by extension with a value of 2.

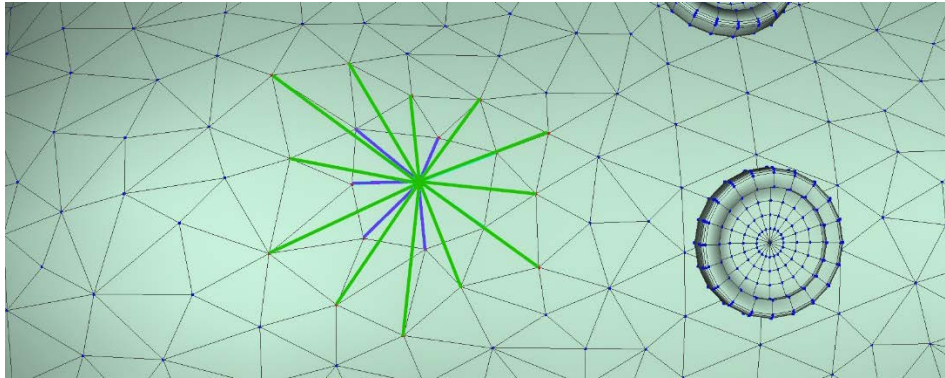


FIG 12-5

The blue lines represent the first level of extension, the green lines represent the second level. All the nodes in the lines are now selected and part of the rigidness.

The next example is when we use Rigidity by Neighbourhood. The circle here represents a sphere.

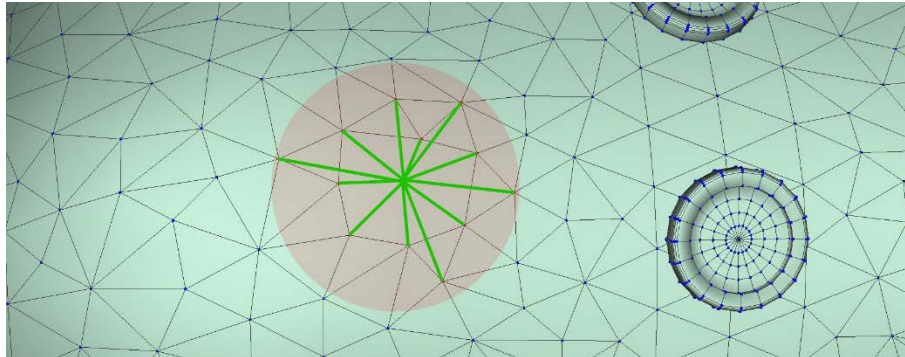


FIG 12-6

The green lines show how the rigidness is extended. All points within the sphere are selected. In this particular example the difference is not too significant with the rigidify by extension.

In the next example, we have another initial selection. Here it is placed close to a button which we want to have a different behaviour as the cloth.

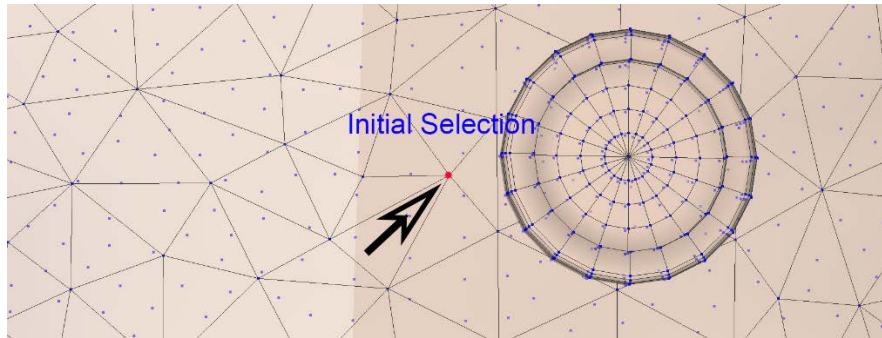


FIG 12-7

This is what we will get if you choose Rigidify by extension with a value of 2.

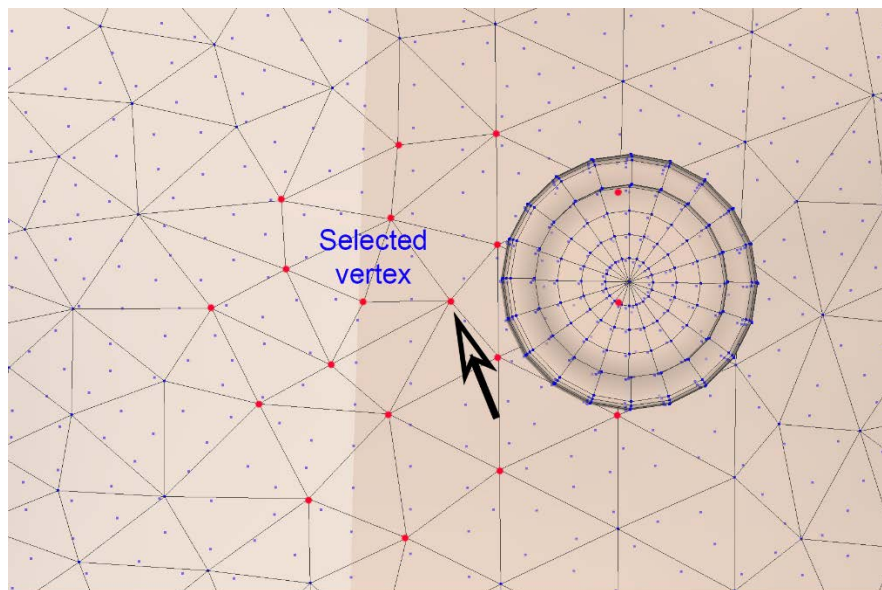


FIG 12-8

All the vertices in red are now selected. The button vertices do not connect to the cloth, so they are not part of the selection. If the cloth extends beneath the button, they will be selected.

Compare this to what happens if we use Rigidify by Neighbourhood.

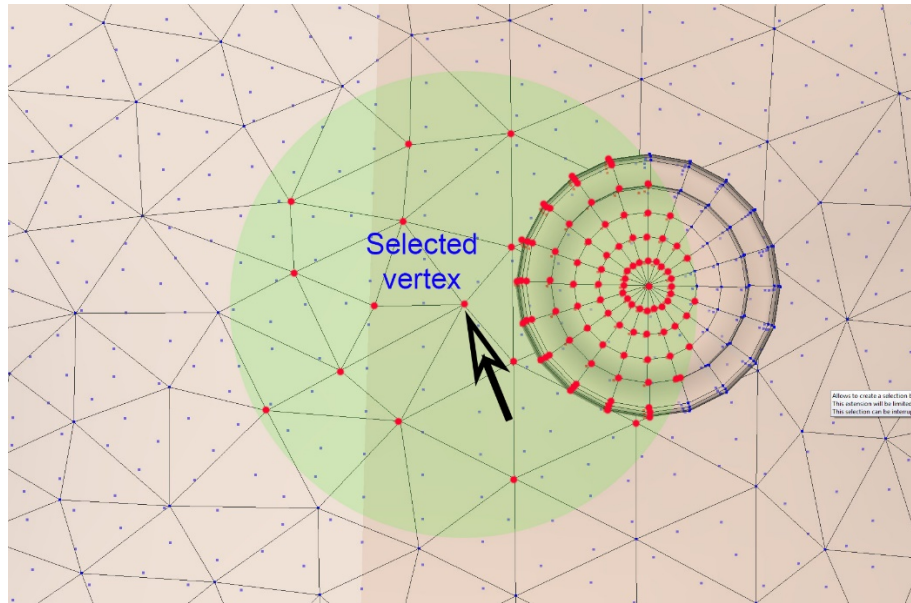


FIG 12-9

All the vertices in the button are now selected, which is not what we want here, so Rigidify by vertices extension is what we need here.

In case you have details in the cloth where you do want to keep the shape, the Rigidify by neighbourhood is exactly the thing you want, especially if vertices are not welded.

In all cases a spring will be generated for all selected vertices.

Chapter 13 - Shortcuts

There is a large set of shortcuts and keyboard modifiers available in VWD

Keyboard shortcuts

T	Vertices selection and the Wind and Forces will open
S	Simulation tab will open
G	Gravity On/Off
I	Inertia On/Off
L	Lasso select tool On/Off
V	Select Visible vertices only On/Off
F	Follow On/Off. When On VWD will keep its view centered on figure
H	Hidden Lines On/Off
A	Lines Display Mode On/Off
O	Opacity On/Off
X	Current selection will be set with Fixed vertices
C	Clear Fixed vertices
R	Restore Default Parameters
+	Add to Memory slot 1
-	Subtract from Memory slot 1
↑ (numeric kb)	Front View
↓ (numeric kb)	Back View
← (numeric kb)	Right View
→ (numeric kb)	Left View
5 (numeric kb)	Top View
Space	Start/Stop animation
←	Previous Frame
→	Next Frame
↑	Start Frame
↓	End Frame
Right button + ALT	If clicked on header of tab, resets the parameters in that tab
CTRL Left button in Scene Import	Only show this actor in the Scene Viewer. Use Show all to see all the actors again

Mouse/Keyboard modifiers

Selection methods, active when vertices are shown in the Scene Viewer.

No buttons + SHIFT	free selection of polygons while SHIFT is pressed. They replace previous selection
No buttons + SHIFT + CTRL	Free selection of polygons while both keys are pressed. These are added to the current selection

No buttons + SHIFT + Alt	Free selection of polygons when both keys are pressed. These are subtracted from the current selection
Left button	Select vertices with marquee or lasso, replaces current selection
Left button + CTRL	Select vertices with marquee or lasso, adds to the current selection
Left button + Alt	Select vertices with marquee or lasso, subtracts from the current selection

Movement in Scene viewer

Right button	Rotate view
Right button + CTRL	Pan view
Middle button	Set centre of rotation
Wheel	Zoom
Wheel + Alt	Slow Zoom
Wheel + CTRL	Set centre of rotation

Dynamic Deformation, active during simulation.

SHIFT	Turn on Dynamic deformation
SHIFT + Left button	Move current vertex parallel to the screen. Use rotate to go to different directions
SHIFT + CTRL + Left button	Move current vertex forward (move mouse down) or backward (up)
SHIFT + Mouse wheel	Select "nail" points. The wheel rotates through the list
CTRL Left button in Import list	Only display selected actor

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