_____ADVANCED CABLE CREATOR MANUAL_____
## version 1.0

CONTENTS

INSTALLATION

1. Import ACC to your project from the Asset Store or Package Manager.
2. Once Unity show a list of files just click `Import`.
3. Wait until Unity complies the scripts.

Now you can start using ACC.

QUICKSTART

1. Create a new **Cable Trail** object by selecting **GameObject > NOT_Lonely > Cable Trail** in the main menu or click the right mouse button in the Hierarchy window and select **NOT_Lonely > Cable Trail.**
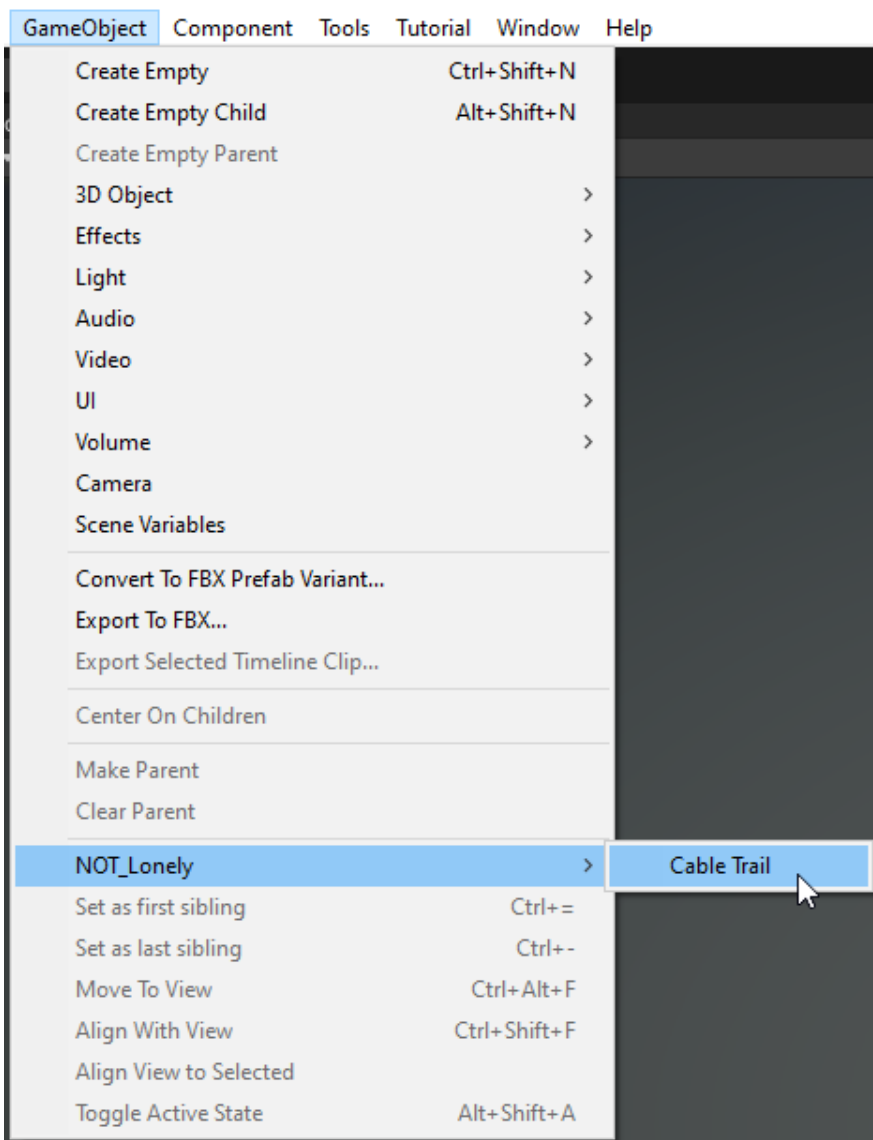

2. A **Cable Trail** object will appear in the scene straight forward to the scene view camera.

3. To change the cable length and position you can use two different ways:
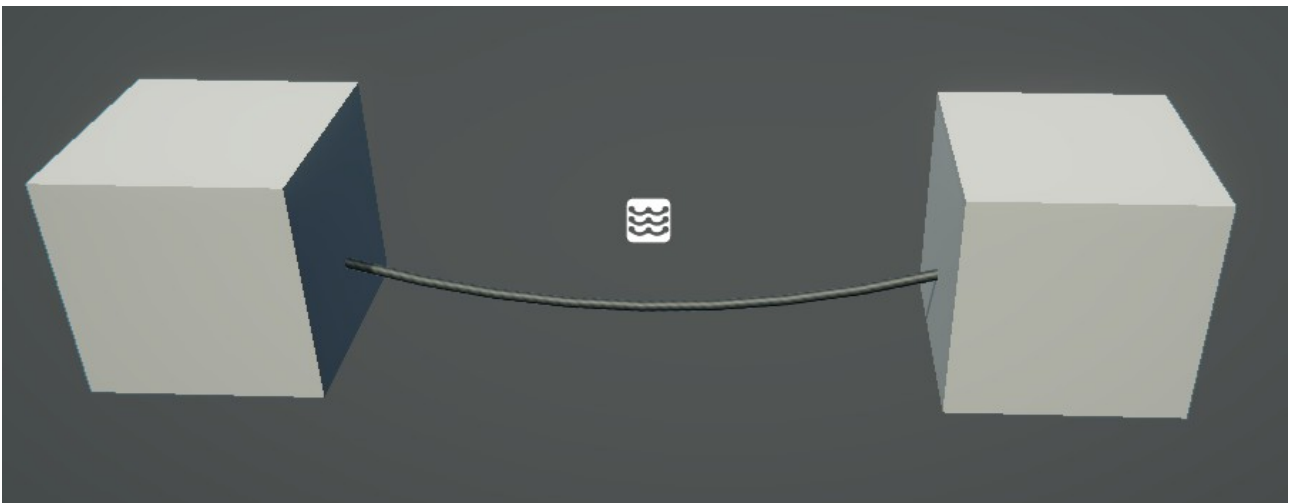   a) move the control point handles in the scene view
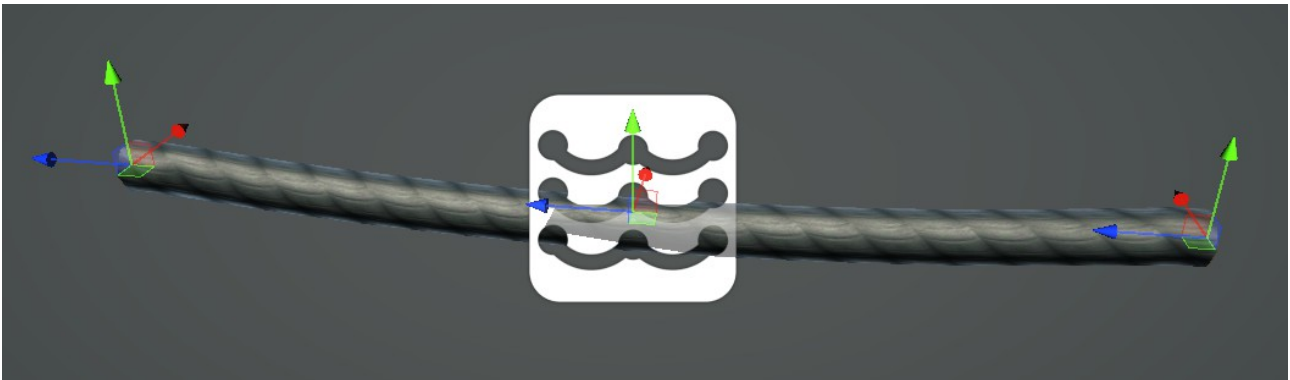
A Cable Trail controlled by scene view position handles.

b) drop some scene objects into the **External Control Points** list and then press the Update button below to apply changes.
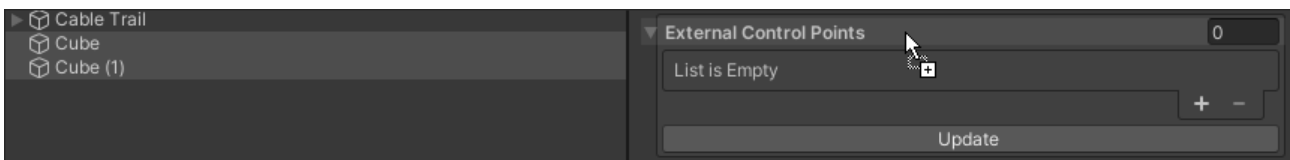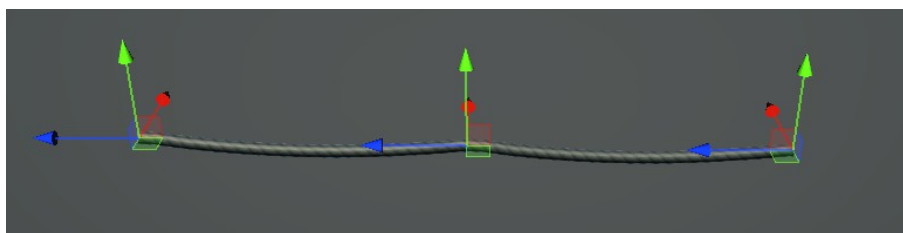

Dropping scene game objects into the External Control Points list.

A Cable Trail controlled by two cubes.

4. Add an extra cable trail section by clicking the Add New Trail Section button at the bottom of the **Cable Trail** inspector.


5. Cable trail section can be removed by selecting one of the Cables in this section and pressing the **Delete** key on the keyboard.
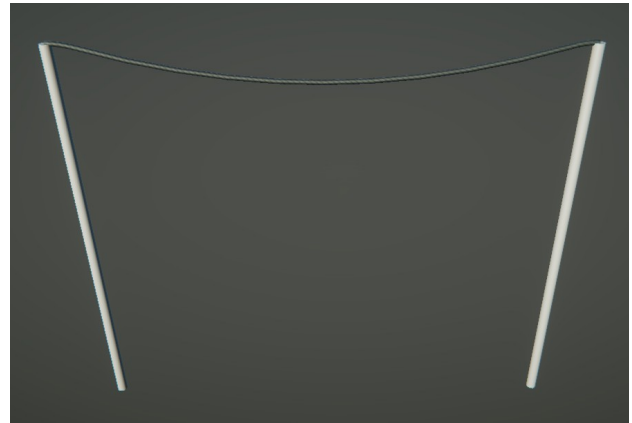
CABLE TRAIL SETTINGS

CONTROL POINTS

Offset

It's an offset vector that adds to the positions of the **Cable Trail** control points. It can be used in a case when you want to create a cable between several objects, set in the **External Control Points** list, but the cable mesh have to be moved off the objects pivots.
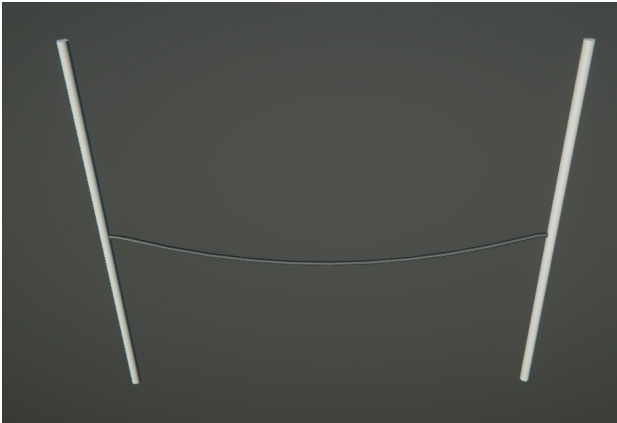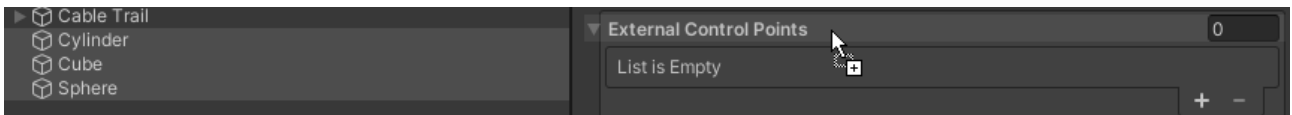

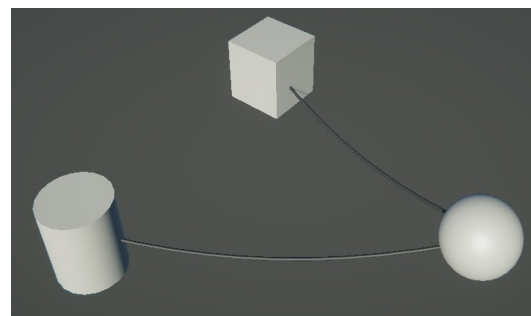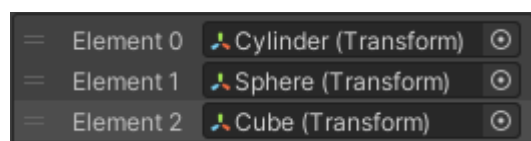Offset is set to 0 by all axis.
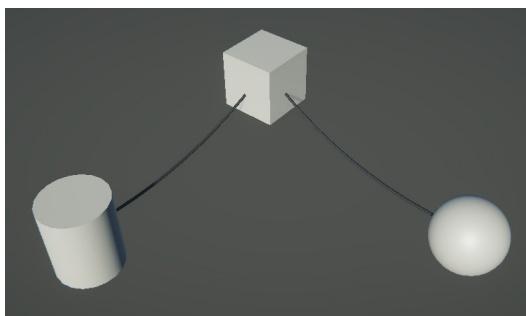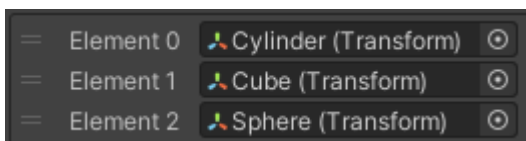

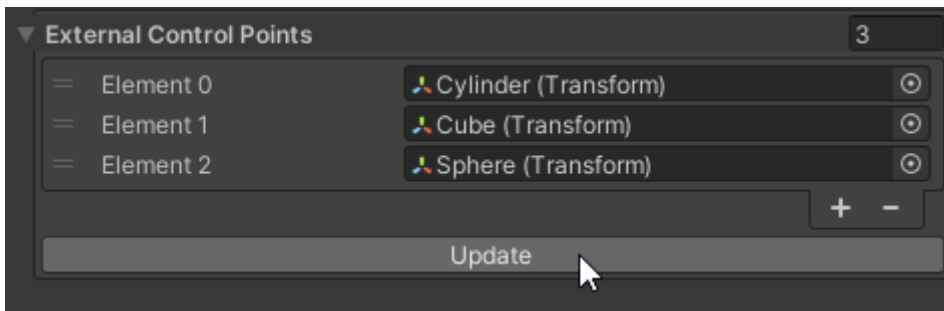Offset is set to 2 by Y axis.

External Control Points

Array of transforms that used as control points. Drop at least two scene transforms here.

Cable Trail will use the order of this array elements for its sequence. Elements of the array can be reordered.

If you added, removed or reordered elements in this array, press the Update button to apply changes.

TRAIL

Amount
The number of **Cable Sequences** (parallel cables) in the **Cable Trail**.
Use these two `<` `>` buttons to change this parameter.
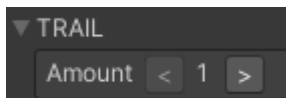
Step Size
Distances between **Cable Sequences** in their local X, Y and Z axes.
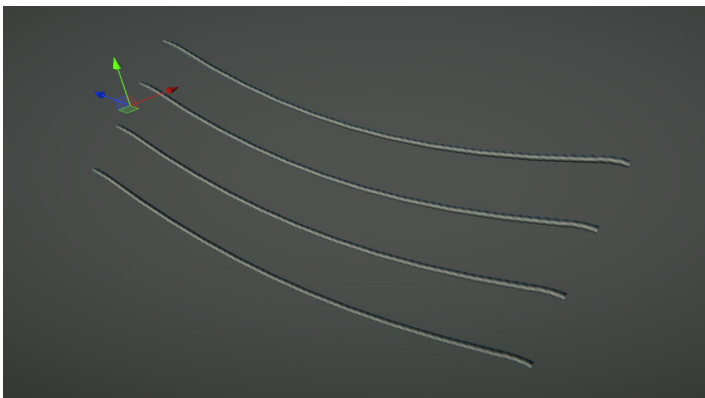
Position Randomness
Randomizes the X, Y and Z positions of the parallel cables. When values above 0 are used, **Step Size** values become maximum step distances in the random range.
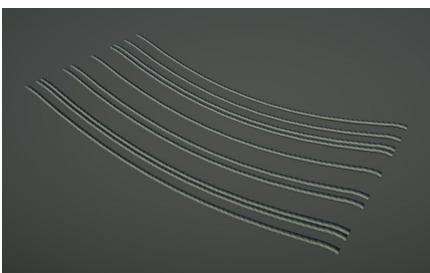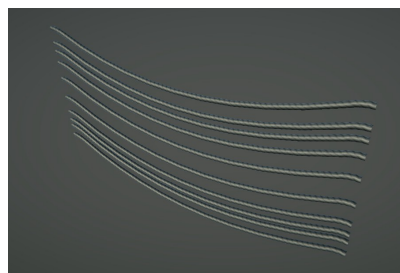
| Step Size X = 0.3 | Step Size Y = 0.3 | Step Size X and Y = 0.3 |
| Position Randomness X = 1 | Position Randomness Y = 1 | Position Randomness X and Y = 1 |

Tip: use the **Position Randomness** values to make a more organic and sloppy look.
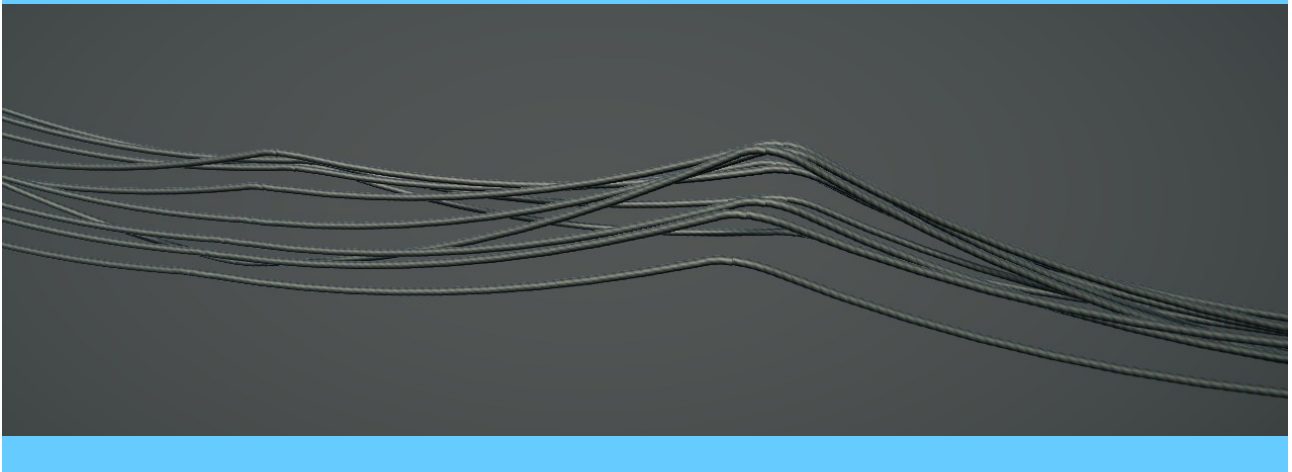
MESH

Radial Segments

Cross section segments of each generated cable mesh. A minimum value is 2.

A two-sided shader is used on the images below for demonstration purposes.
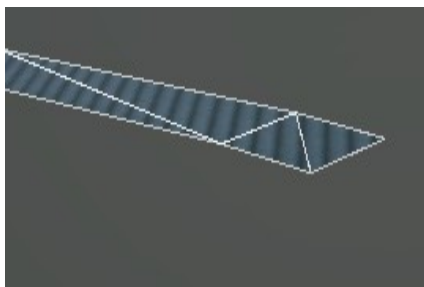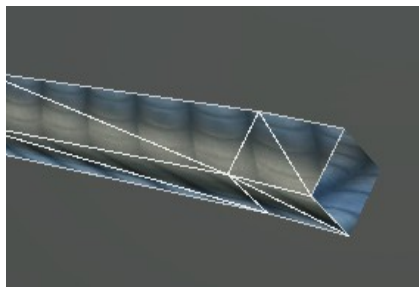
| Radial Segments = 2 | Radial Segments = 4 | Radial Segments = 6 |
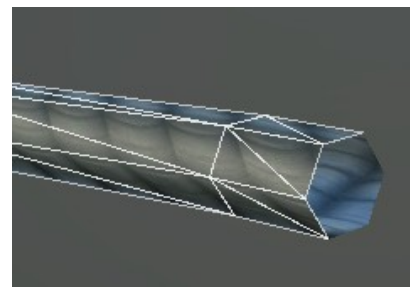
Angle

A normalized angle of the cross section, where 0 = 0 degrees, 1 = 360 degrees. Useful to rotate the mesh cross section when using only 2 **Radial Segments**.
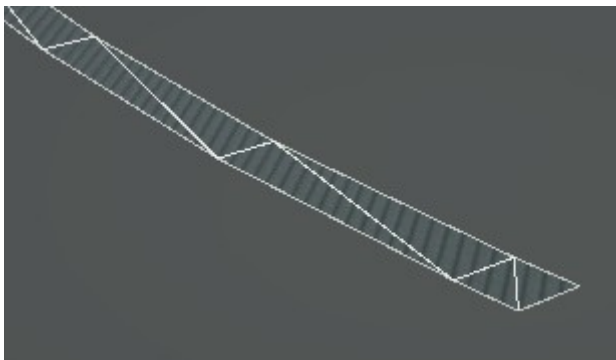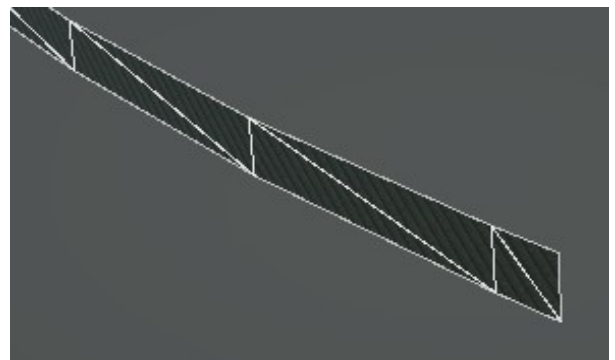
| Angle = 0 | Angle = 0.75 (270 degrees) |

Tip: you can create clotheslines, pennants and other similar stuff, if you set Radial Segments = 2, Angle = 0.25 or 0.75 and use an appropriate texture.
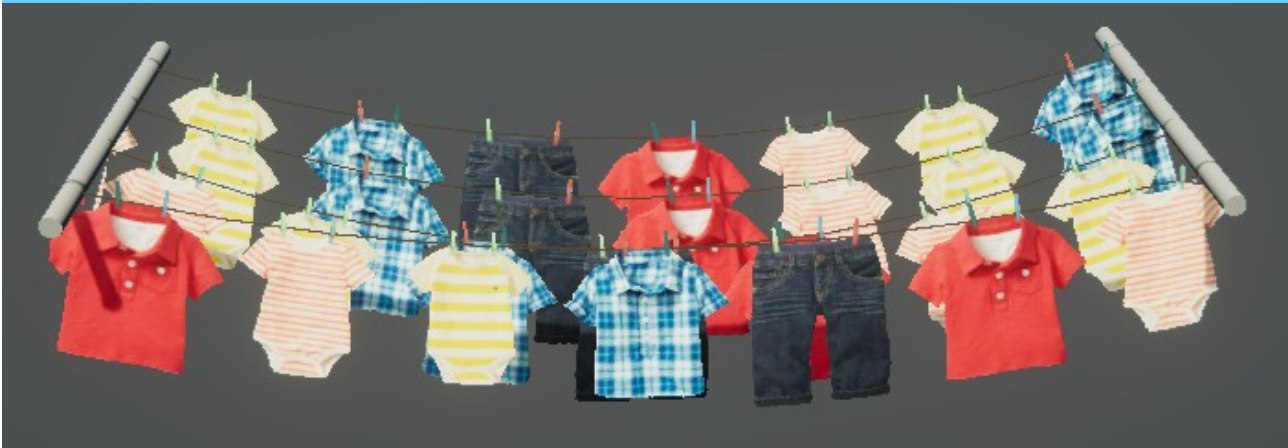
Length Segments

Lengthwise segments number of each half of cable. Set more **Length Segments** for very sagging cables to avoid angularity mesh look.

Length Segments = 4

Length Segments = 10

Invert

Inverts the mesh so you will see its back side instead of front side. Can be useful when you set **Radial Segments** = 2 and want to flip the visible side of the mesh.

Vertex Alpha Brightness

ACC generates a two-sided gradient in the vertices alpha, which can be used for a vertex animation on a shader side to control the amplitude of the vertex motion. If the **Cable Trail** consists of more than one cable by its length, the gradient brightness for each cable will depend on the length of this cable, where the longest cable will have the most bright vertex alpha.

The **Vertex Alpha Brightness** parameter multiplies the alpha gradient and can be adjusted between different **Cable Trails**, to make it able to use the same material on all the cables, but have a different vertex amplitude. It's good for performance. This value range is 0-1.

A debug vertex alpha shader is used on the images below for demonstration purposes.
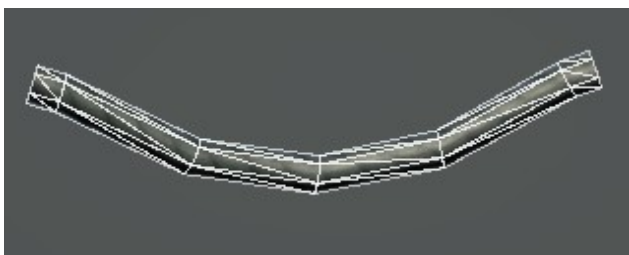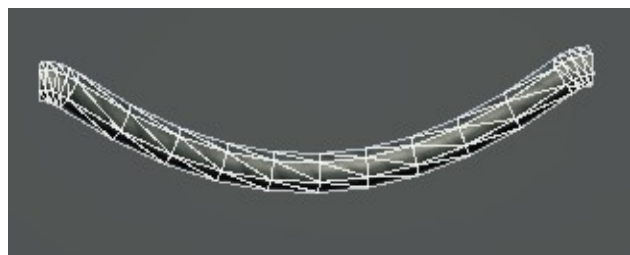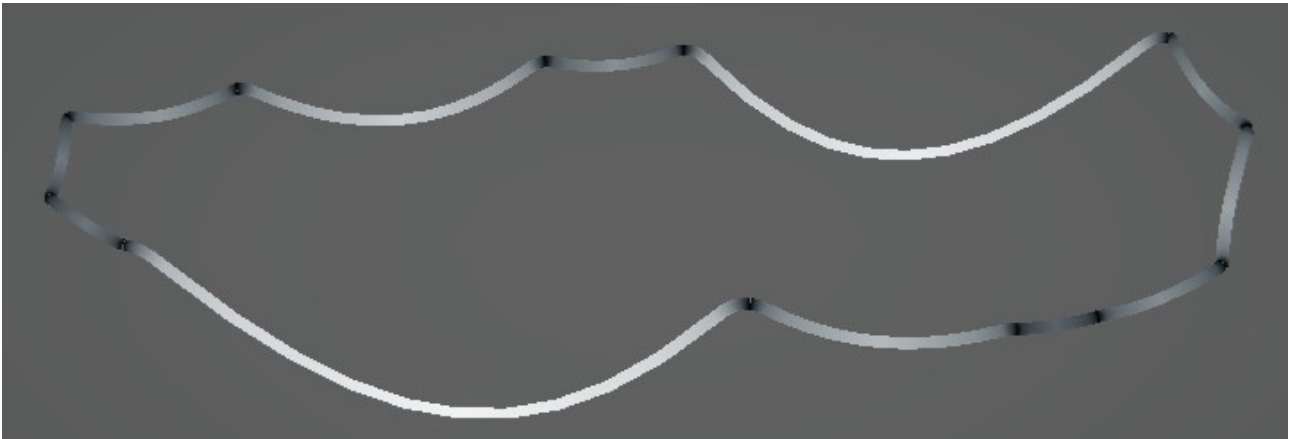

Vertex Alpha Brightness = 1

Vertex Alpha Brightness = 0.3

Texture Tiling Multiplier

Mesh UVs generate and adopt automatically to the proportions of the main color texture from the applied material.
The main texture property name in the shader must be "_MainTex" to make it work. Optionally, you can use the [MainTexture] attribute with any other property name.

Using this **Texture Tiling Multiplier** parameter you can stretch or squeeze the generated mesh UVs along the cable. 1 = use original texture proportions, less than 1 = stretched texture, greater than 1 = squeezed texture.

Texture Offset Randomness

Randomizes the texture offsets between each **Cable Sequence**. The value is in 0-1 range, where 0 means no random, 1 – maximum random. Setting this value greater than 0 will

help to make a more natural look of the parallel cables in the **Cable Trail**.

A pennants texture is used on the images below as a more illustrative example.
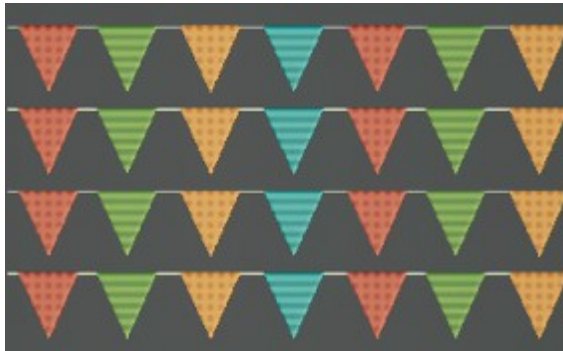
Texture Offset Randomness = 0
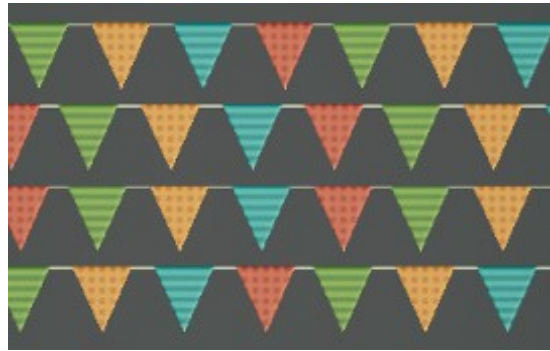
Texture Offset Randomness = 1

UVs Angle

Defines the rotation of the generated UVs. The UVs orientation calculates automatically when you assign a material to the cable, but you can add an additional angle to the generated UVs using this parameter. This parameter only affects cables which use a square texture in their materials. Keep in mind that there will be a visible seam when used angles except 0, 90, 180, 270.
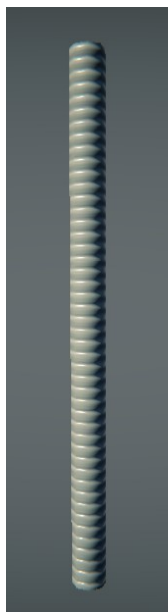
UVs angle = 0
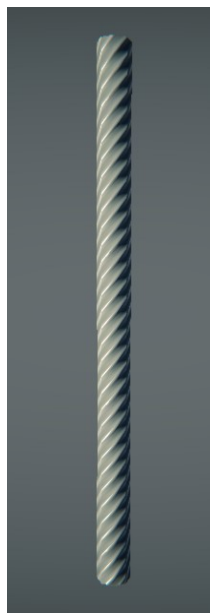
UVs angle = 45
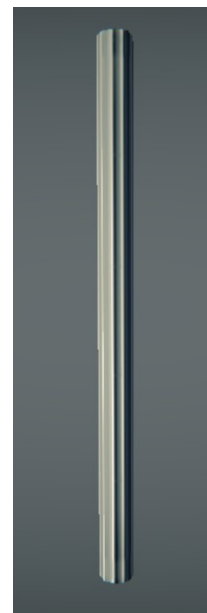
UVs angle = 90

Texture Twist min/max

This is the value that offsets every cable ring UVs to create a diagonal UVs layout. This leads to the twisted-like texture mapping on the cable that makes it look like a twisted cables.

The top cable Texture Twist = 0, the bottom cable Texture Twist = 1.

Materials

The materials array to apply to the meshes in the **Cable Trail**. A random material from this array will be applied to each **Cable Sequence**. If this slot is empty, then a default material with a default shader will be set.

SHAPE

Height Scale min/max

The minimum and maximum amount of the cable sagging. Use different values for the 'X'(min) and 'Y'(max) to randomize the sagging between the cables in the **Cable Trail**.
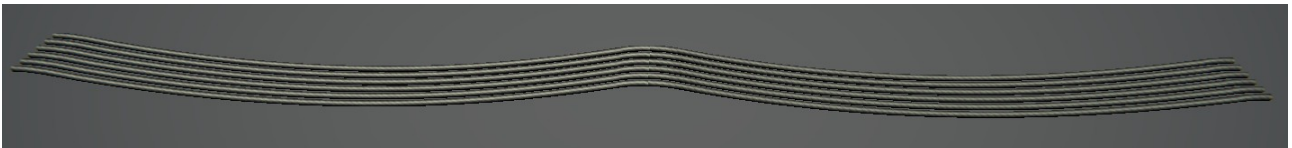
Height Scale min = 0.1, max = 0.1
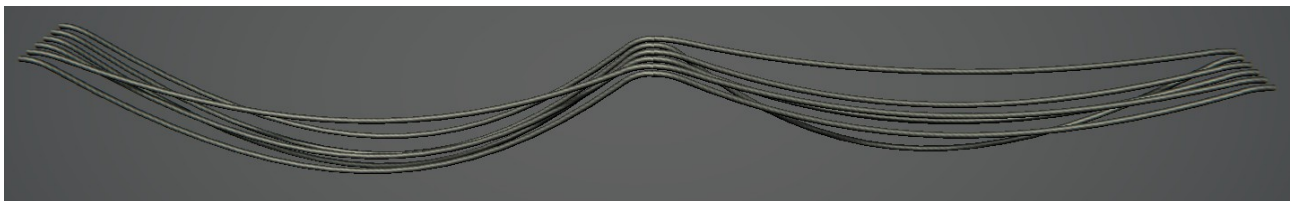
Height Scale min = 0.1, max = 0.5

Tip: using negative values for the Height Scale is not physically correct, but can give you kind of artistic results.
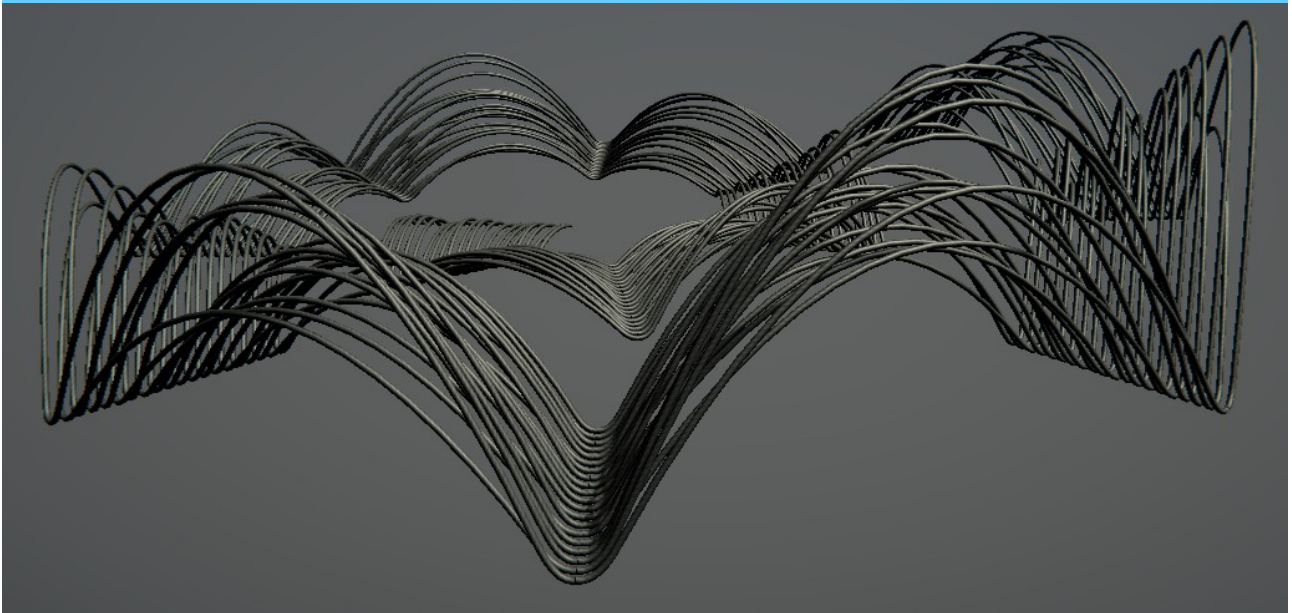
Length Dependency

This is the ratio of the cable section sagging to its length. So the longer the cable is, the more sagging will add to it. If set to 0, all the cables will be affected by **Height Scale** only.
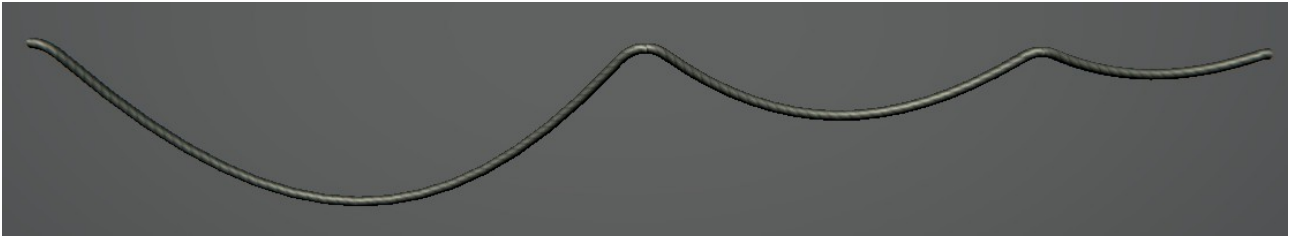
Thickness min/max

The thickness of the generated cables. Use different values for the 'X'(min) and 'Y'(max) to randomize the parallel cables thickness.
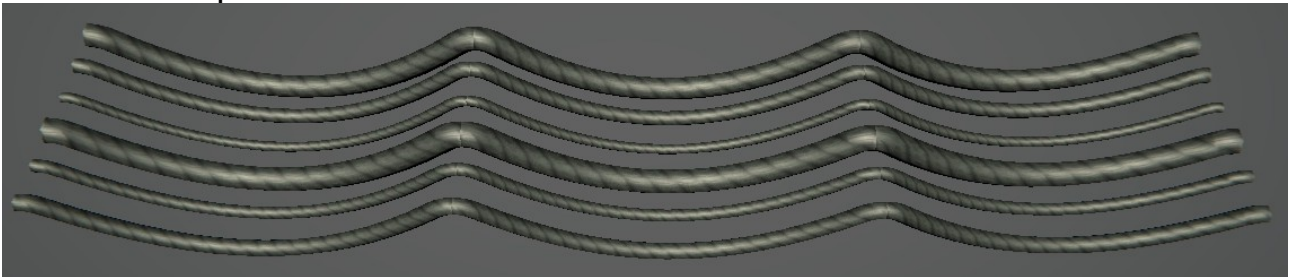
Thickness min = 0.05, max = 0.15

Horizontal Curvature

ACC adds some additional curvature to the both ends of each cable **Section** in the **Cable Trail** to get rid of sharp joints between the cables when the **Cable Trail** is twisty. The amount of curvature on the joints in the horizontal plane can be adjusted by the **Horizontal Curvature** parameter. Values less or equal 1 are optimal.
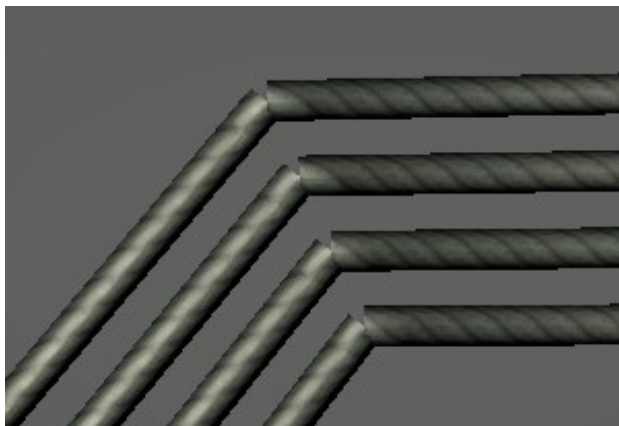
Horizontal Curvature = 0
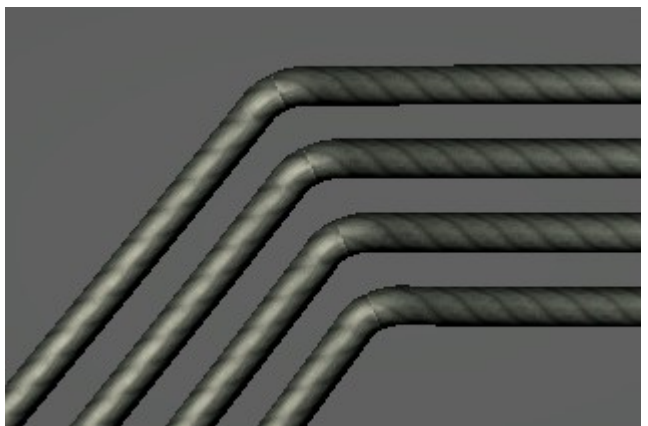
Horizontal Curvature = 1

Vertical Curvature

The same as **Horizontal Curvature**, but works in the vertical plane.

Vertical Curvature = 0
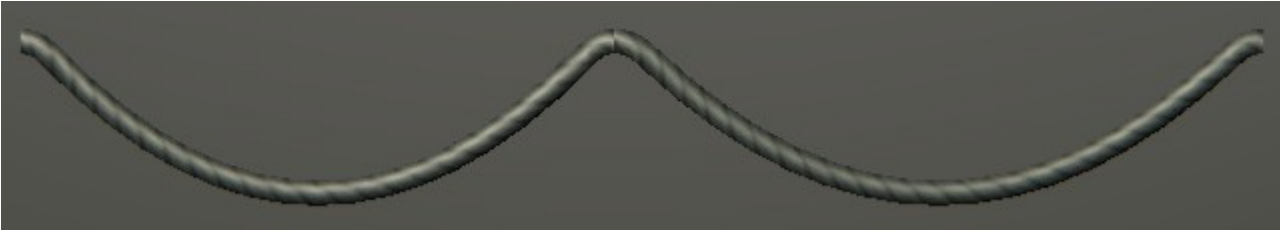
Vertical Curvature = 1

Noise

Amount of position randomness applied to the cable vertices.
Settings this value greater than 0 can help to achieve a more crumpled cable look. It's useful for the corrugated loose cable trails.
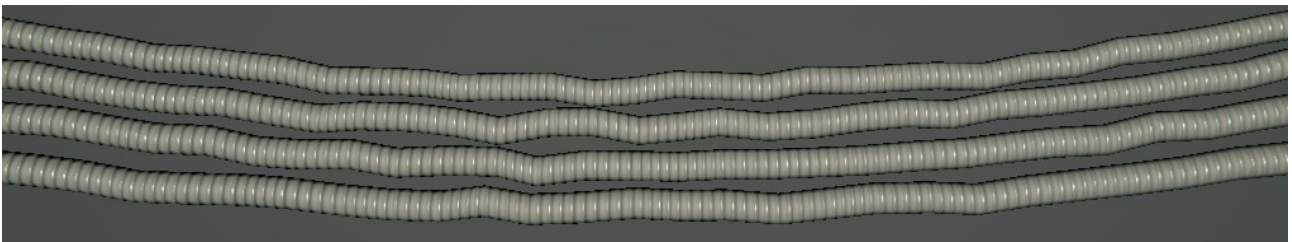
Some Noise applied to accentuate the loose cables look.

JOINTS

Joint Object

Put a prefab from the Project folder here. This object will be placed on the cable joints.
If you have an object already set in this field and want to change it with another one, just put another object here and press the Update Joint Object button to the right of the field.

Rotation

Joint objects automatically follow the cable path curvature, but sometimes you may need to change their orientation. You can do that with the **Rotation** parameter.
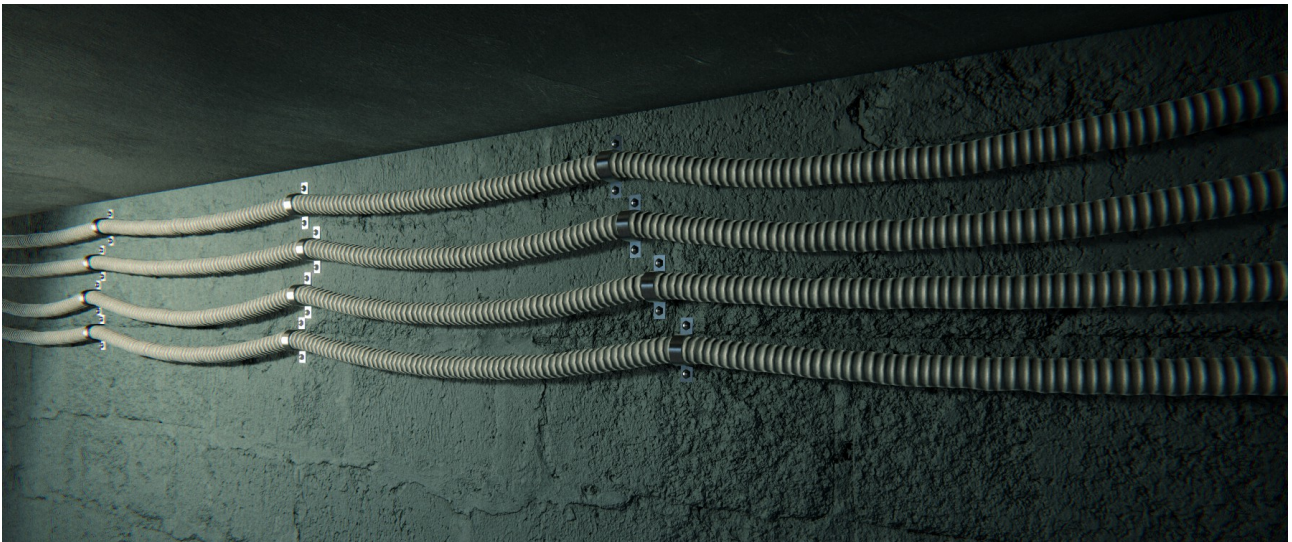
The Rotation parameter is set to 90 for the Z axis, so the Joint Objects are aligned correctly with the wall.

Tip: automatic rotation of the **Joint Object** can be disabled by selecting this object in the scene and unchecking the **Auto Update Rotation** checkbox. You will be able to rotate it manually after this action. It's useful in some use cases to prevent a wrong rotation.

Use Uniform Scale
Joint object scale is locked to the cable **Thickness,** but can be multiplied by **Scale** parameter. If **Use Uniform Scale** enabled, **Scale** will be locked between all axes.

Scale
A scale multiplier for the **Joint Objects**.
The final scale = **Joint Object** transform scale * cable **Thickness * Scale**.
Due this it's better to make the initial size of your Joint Object inner part (this one where a cable goes through) = 1 unit.
You can do this in a 3D-modeling program or simply parent your joint model to an empty object with a transform scale = 1, and scale the joint up so the inner part size of it is equal 1 unit.
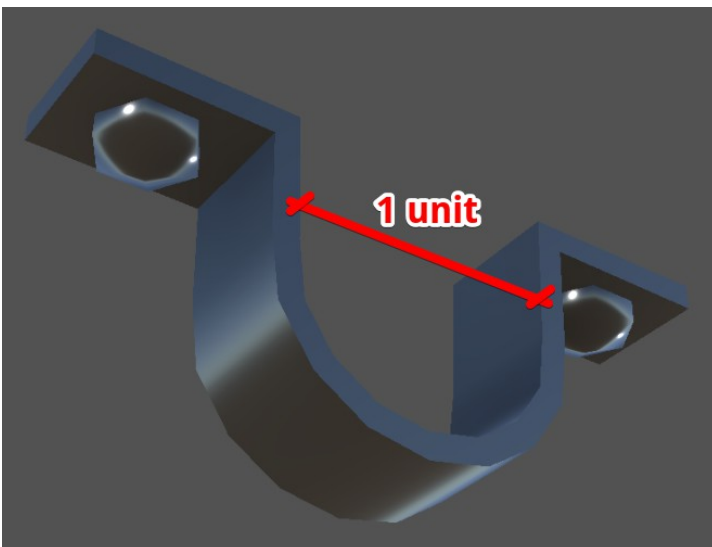
Optimization

All options in this section will be applied to the combined mesh on the `Combine Meshes` button press.

Generate Lightmap UVs
If checked then a second UV channel will be generated for the lightmapping. Disable this option if you don't plan to bake the lighting for this cable.

Backside
If **Radial Segments** set to 2, you can enable this ckeckbox to generate a backside of the cable mesh. It's useful if you don't want to use a double-sided shader.

Save Path
A project relative path to save the combined meshes. It sets to the **ACC** folder by default. To make it work properly, this path must start with **Assets/**.

Combine Meshes
Pressing this button will combine all the cable and joint meshes into a single mesh. Once used this button the original **Cable Trail** object will be hidden and a combined object will appear in the scene on its place. This will allow you to bake a lighting on the cables, and decrease the CPU overhead that spends on Unity's batching.
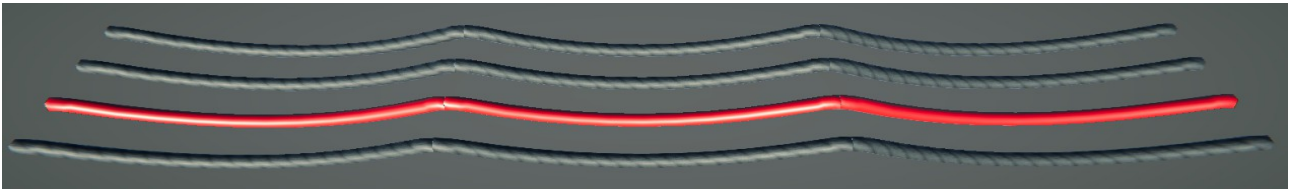
Editor Performance

Show Meshes
Disable this checkbox if you have a low FPS count, when editing the **Cable Trail**. If disabled, then you will see the cable gizmos instead of the actual cable meshes. Make sure that the **Gizmos** toggle is enabled in the **Scene View**.
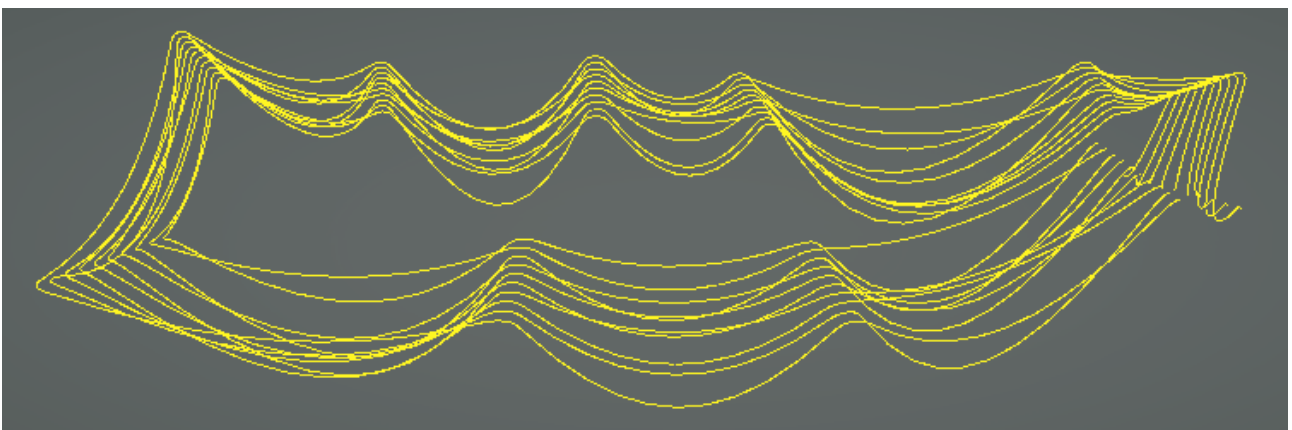
Cable Sequence

Cable Sequences are the parts of the **Cable Trail**, and represent the parallel cables.

One of the four Cable Sequences is marked in red at this screenshot.

You can select any **Cable Sequence** in the **Cable Trail** hierarchy to override some settings for this sequence.
For instance, this can be helpful, when you need a certain **Cable Sequence** to have a certain sagging, while other sequences will use the **Cable Trail** settings.

To do that, you need to select the required **Cable Sequence**, check the **Shape** checkbox in its settings to enable the override mode for this group of parameters and adjust the **Height Scale** property. If any group of settings is overridden, the sequence object name will have the "(Overrides are used)" text in it.
The most of parameters available for overriding in this manner.
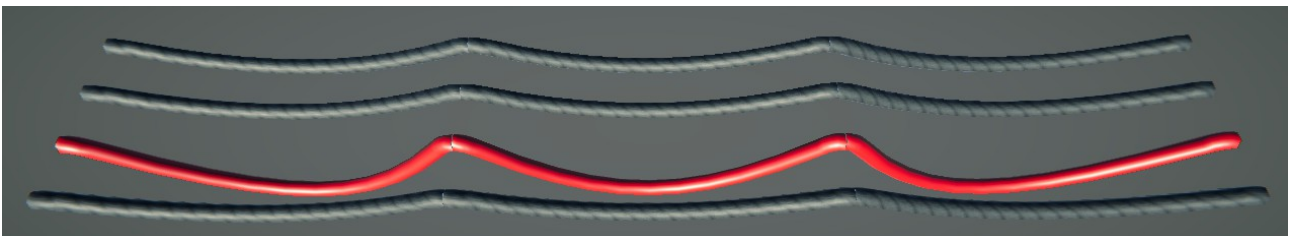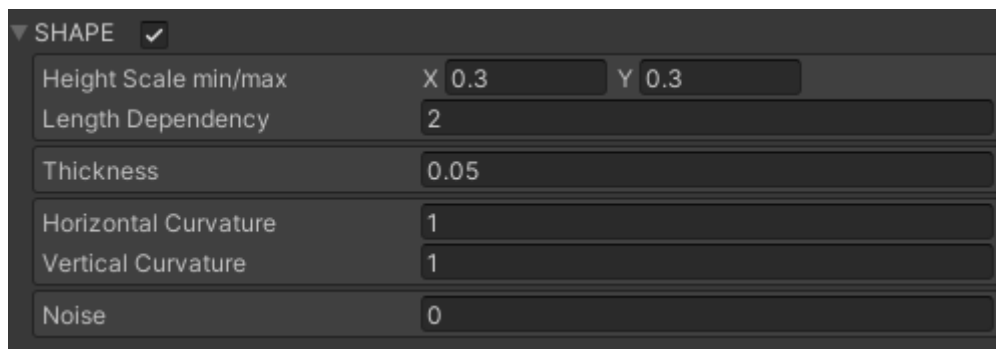
The Cable Trail Height Scale set to 0.1, the red Cable Sequence Height Scale set to 0.3

CABLE

Cables are the parts of the Cable Sequences and represent the individual cable sections.
The **Cable** settings can be overridden in the same way as the **Cable Sequence** settings (look the Cable Sequence chapter above).
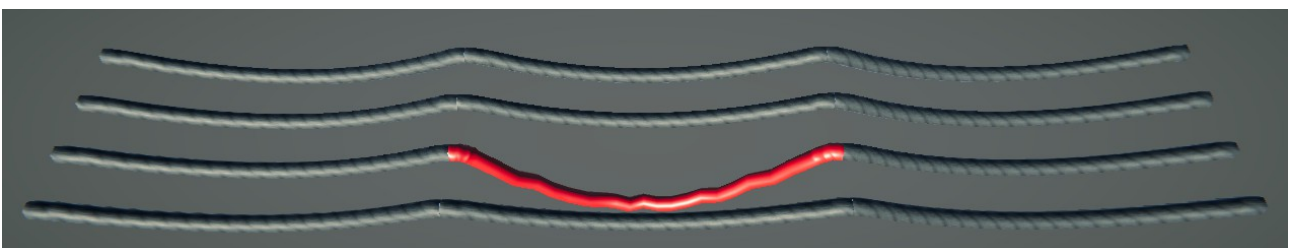
One of the three Cables in the Cable Sequence is marked in red and has some properties overridden.

UTILITIES

Update All Cables
When you moved some **External Control Points** objects in your scene and want to update all your **Cable Trails** at once, you can go to the main menu and choose: **Tools > NOT_Lonely > Advanced Cable Creator > Update All Cables.**
This action is the same as the `Update` button press in the **Cable Trail** UI, but for all the **Cable Trails** in the scene at once.

Cable Combiner
You can combine multiple Cable Trails into a single mesh using this utility. It can be found at **Tools > NOT_Lonely > Advanced Cable Creator > Cable Combiner.**
This utility repeats the functionality of the **Optimization** section in the **Cable Trail** UI, but it's not constrained to work for selected **Cable Trail** only.
To use it, just drop any number of **Cable Trails** into the **Cable Trails** list, adjust the combining settings and press the **Combine** button.

The most up-to-date manual can be found here:
https://not-lonely.com/upload/acc/AdvancedCableCreatorManual.pdf

If you still have any questions, please contact: support@not-lonely.com