

Goldsmiths University
Introduction to Modelling & Animation
(IS74021A)

Assignment 3: Character Report

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Introduction

For this project, the brief specified designing and modelling a character in Maya before animating it using the basic principles of animation.

The character that I planned to design was inspired by commuting with a heavy backpack. The backpacker will be implemented in a cartoon style, thus the limbs are long and the backpack is large.

This report will be covering the influences behind the final design as well as the workflow behind the modelling and animation for the character.

Reference Images



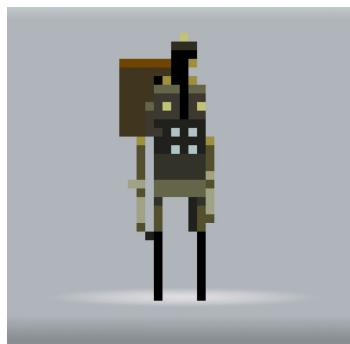
(Lets Go Insure, 2019)

The first reference picture is a photo of a real backpacker showing realistic proportions.



(Fandom, 2019)

The second image is the character Finn from Adventure Time. This is a cartoonish version of a backpacker that has a small body with long, thin limbs that curve at the joints.



(Giant Bomb, 2011)

This image is the Scythian from Sword & Sworcery. This character has a large package on her back and long, exaggerated limbs that curves.



(Fanbyte, 2019)

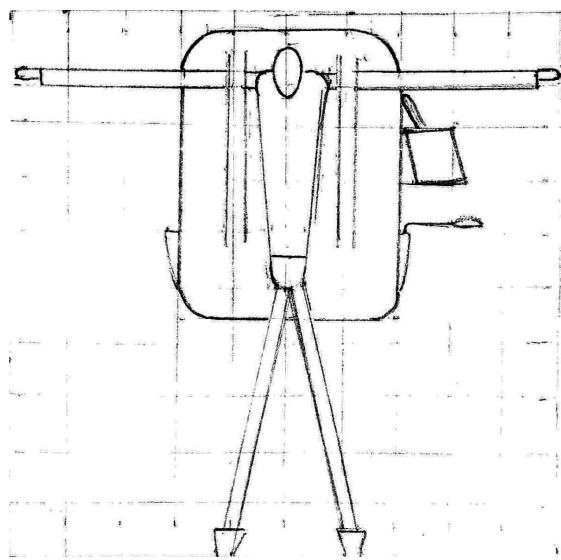
This last reference image is of Bridges carrying out deliveries in Death Stranding. The luggage on his back is comically oversized and, as a result, his body is bent over and legs bent while walking.

Final Design

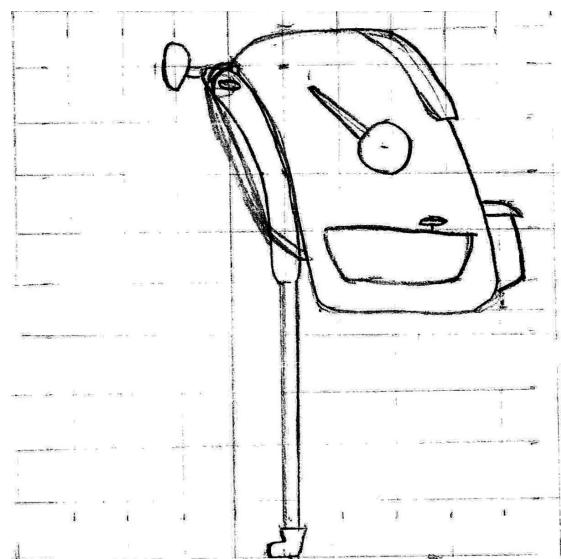


The backpacker has a small body, hunched over from the weight of the large and exaggerated backpack. To sell how much is stuffed into the backpack and add more motion, there will be small items overflowing onto the outside of the bag.

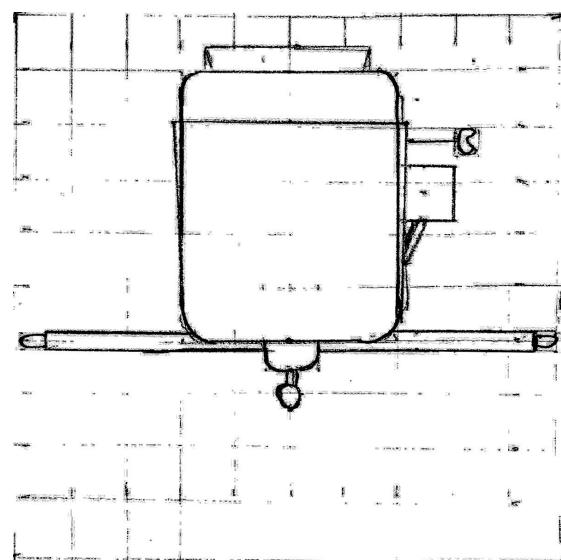
The limbs are also long with small extremities which bend like Finn from Adventure Time which would involve the utilisation of spline IK.



Front reference



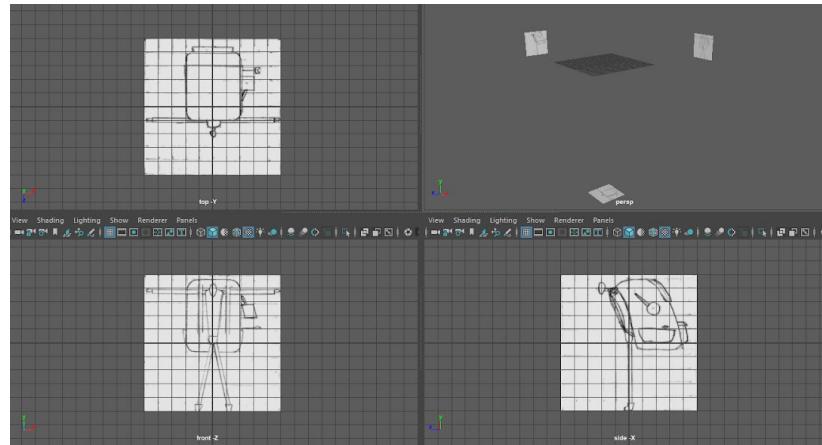
Side reference



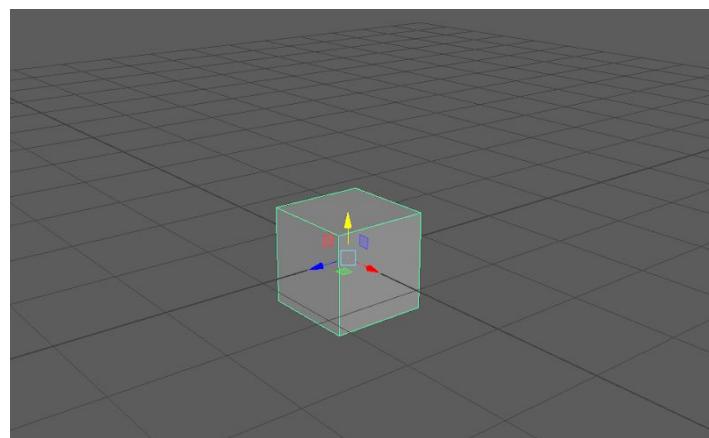
Top reference

Modelling Workflow

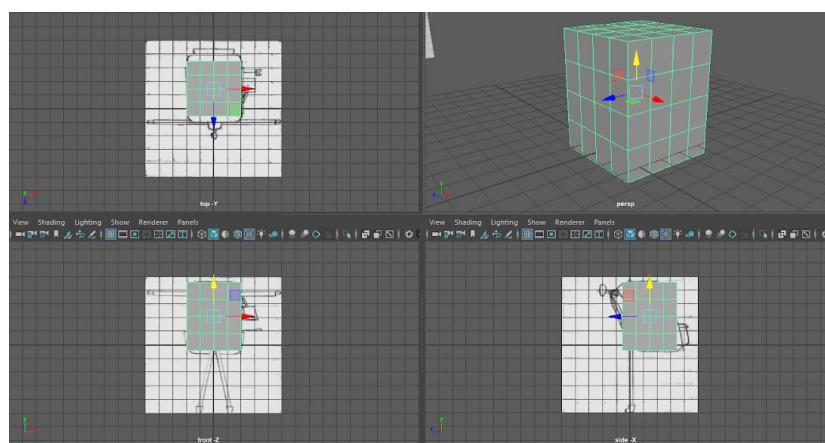
Backpack



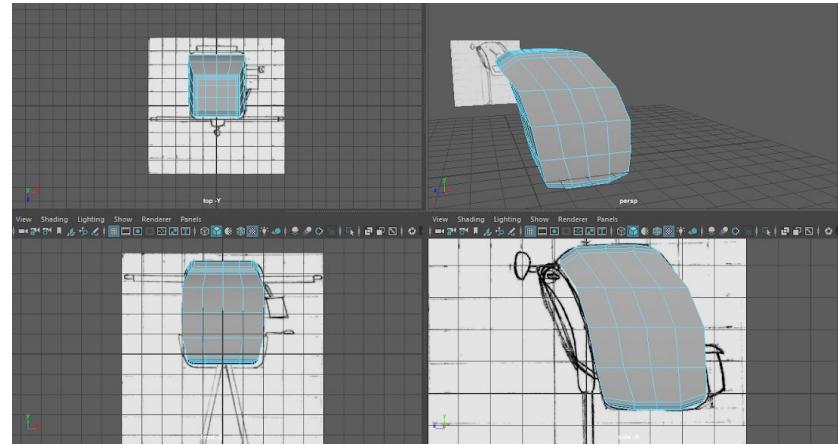
The design references are imported as reference planes in the project scene.



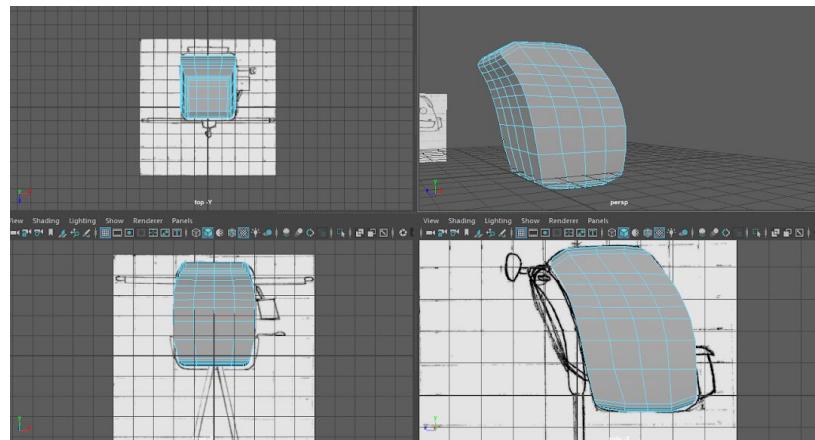
Create a new cube.



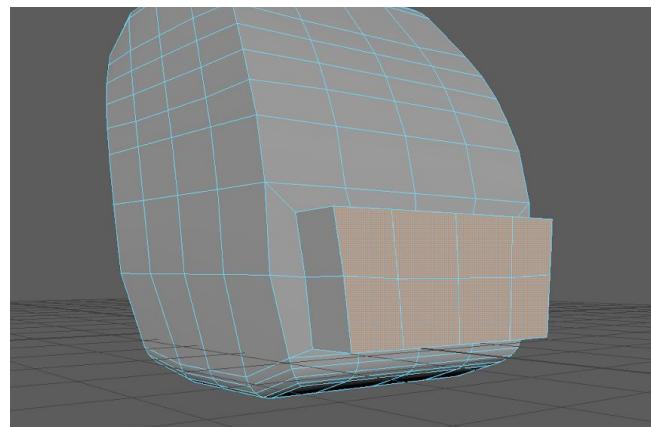
Cube dimensions are adjusted to fit the references ad subdivisions added.



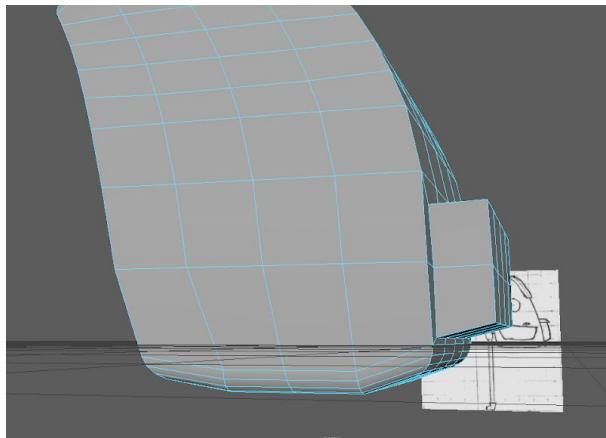
Edges of the cube adjusted to the shape of the backpack references.



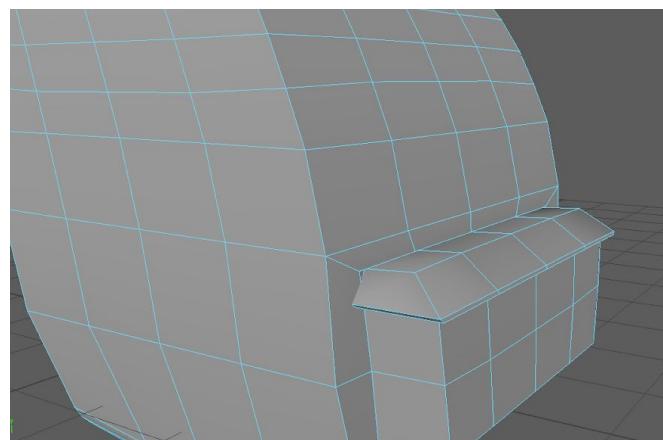
Horizontal edges are bevelled to smooth out the curves of the shape.



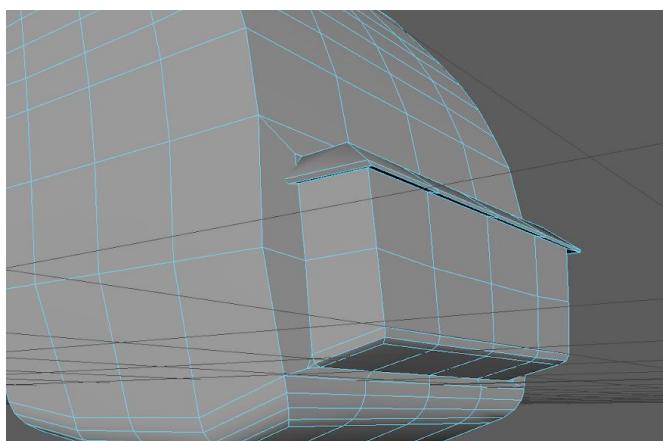
The main pocket is extruded out of the back.



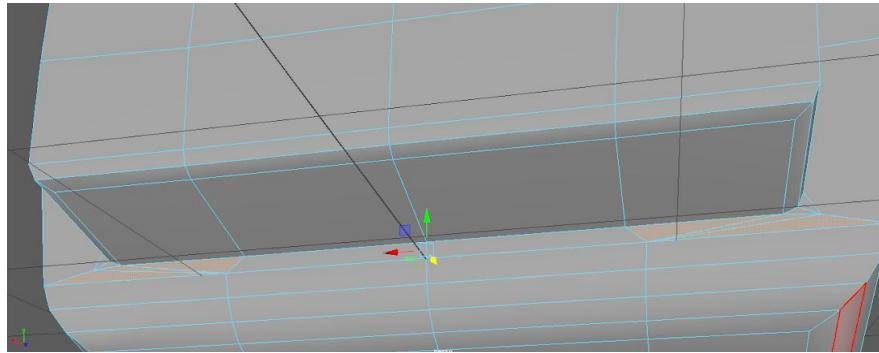
Bottom of the pocket is given a slope.



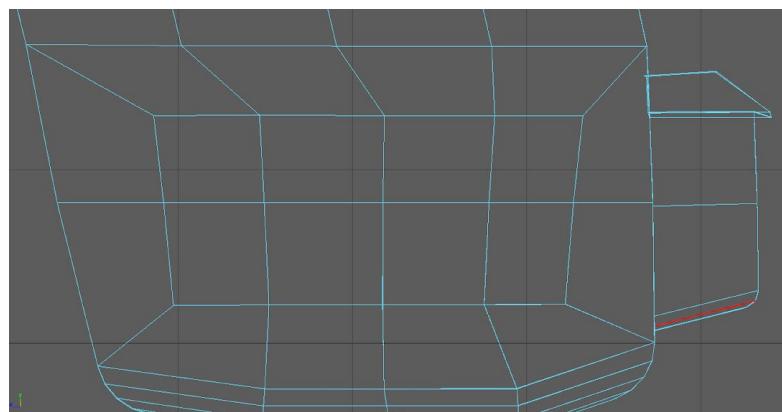
A lid is extruded on the top of the pocket



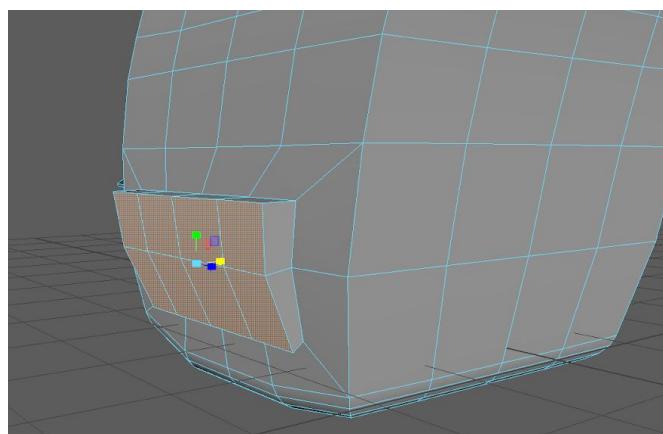
The edges of the lid is bevelled to smoothness.



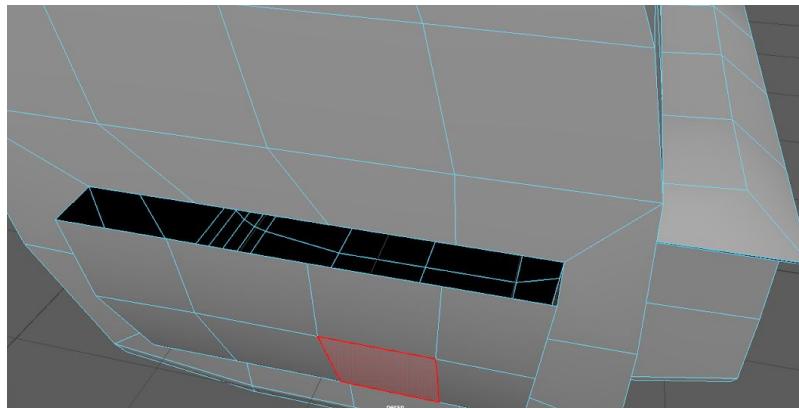
Triangulate the faces the faces with more than 4 edges.



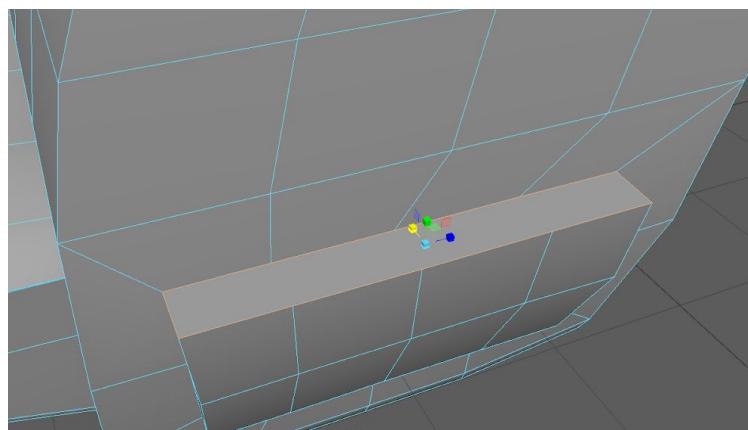
The edges of the sides are aligned ready to make the side pockets.



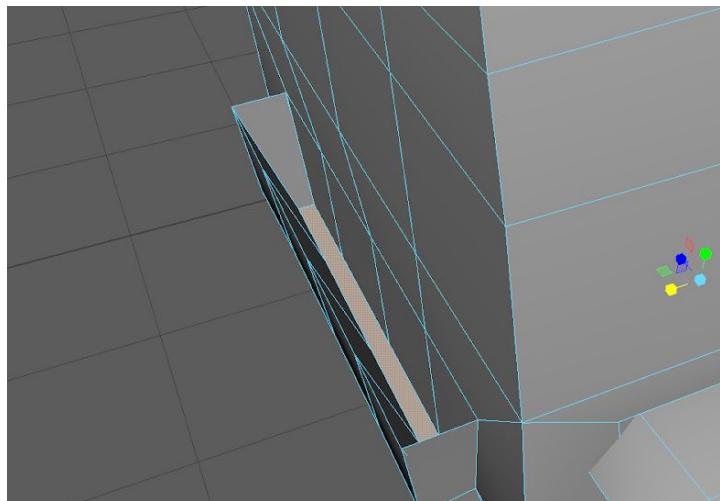
The pocket is extruded and shaped to the curve of the backpack.



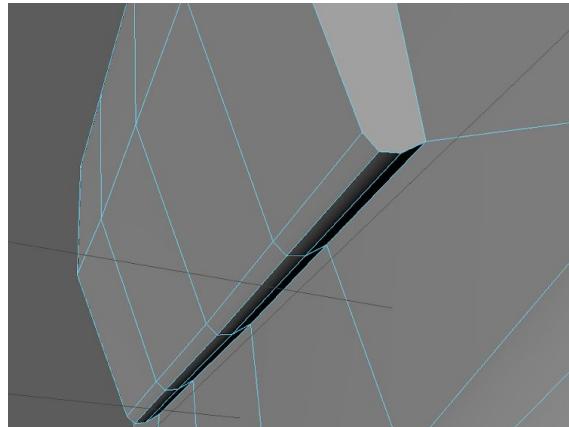
The top faces of the side pockets are removed.



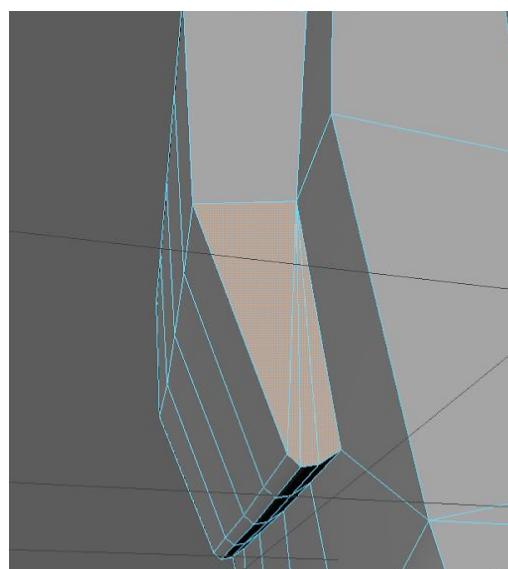
The top gap is bridged.



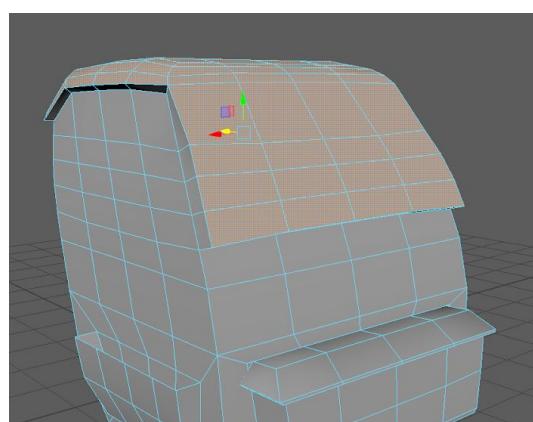
The top face is extruded downwards to form the bottom of the inside of the pockets.



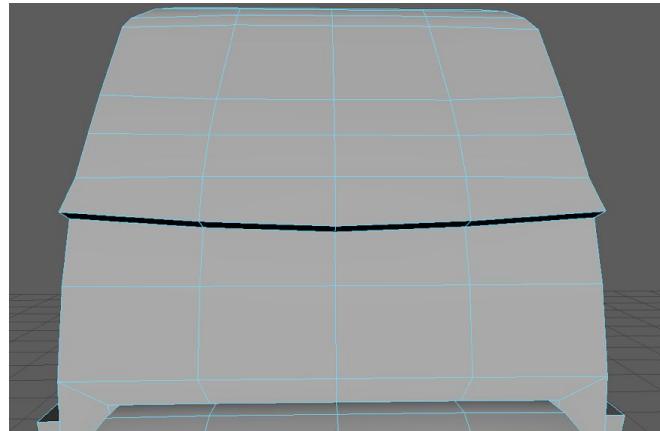
The exterior bottom of the pockets are bevelled.



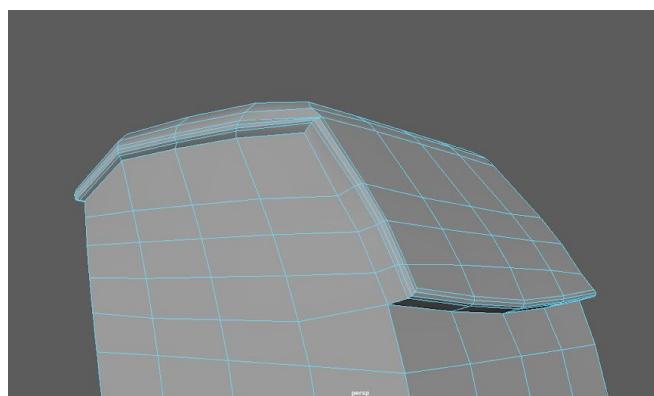
The side faces are triangulated.



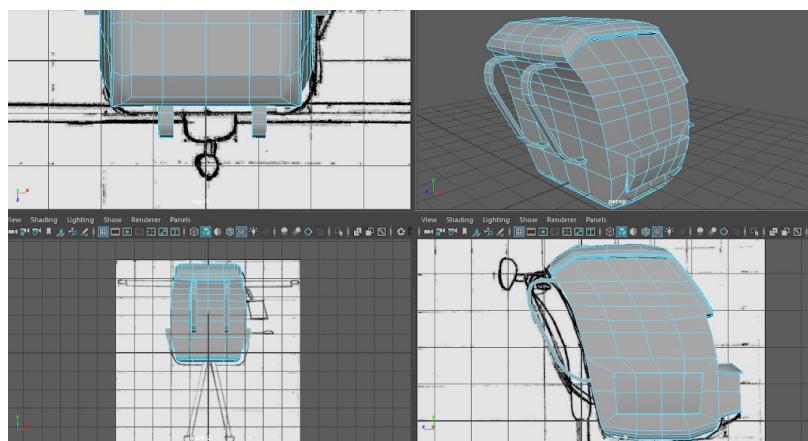
The lid is extruded out of the top of the bag.



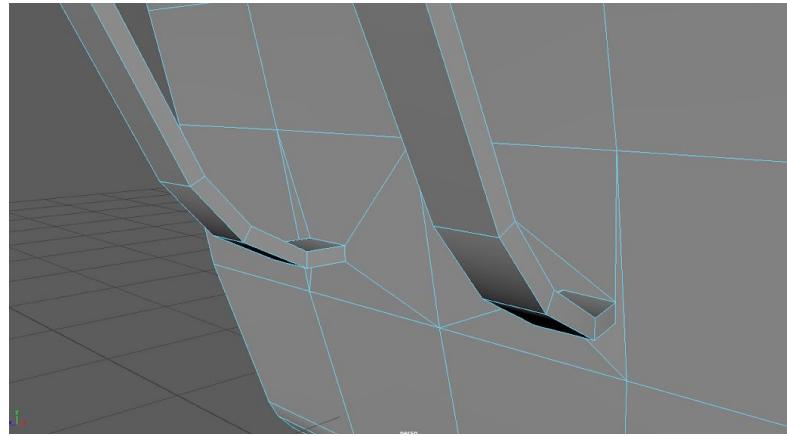
The edge of the lid is curved by adjusting the edges.



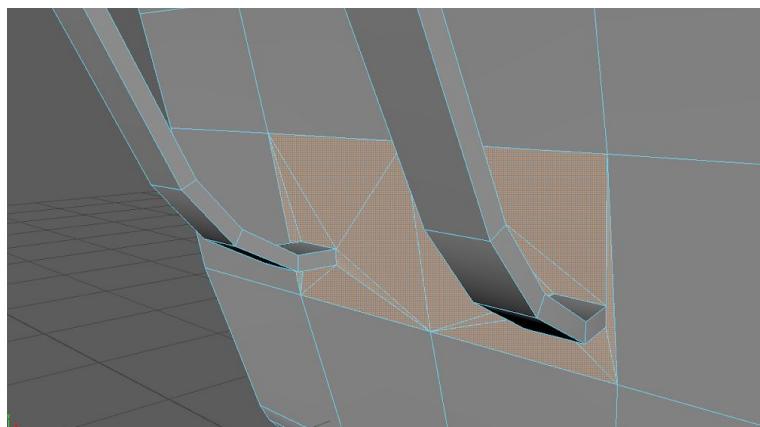
The edges are bevelled for smoothness.



The straps are extruded out of the polygons facing the character's back.

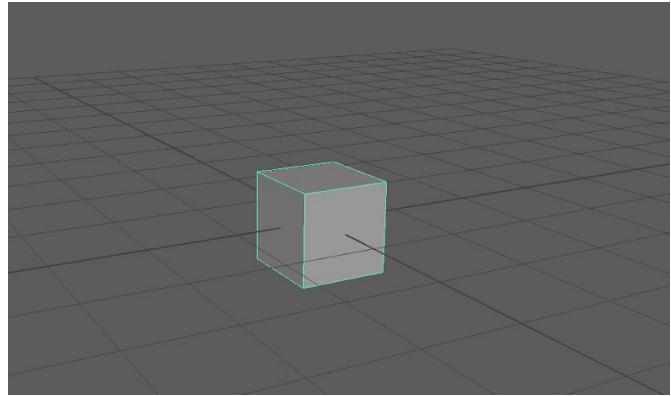


The ends of the straps are bridged to the bag.

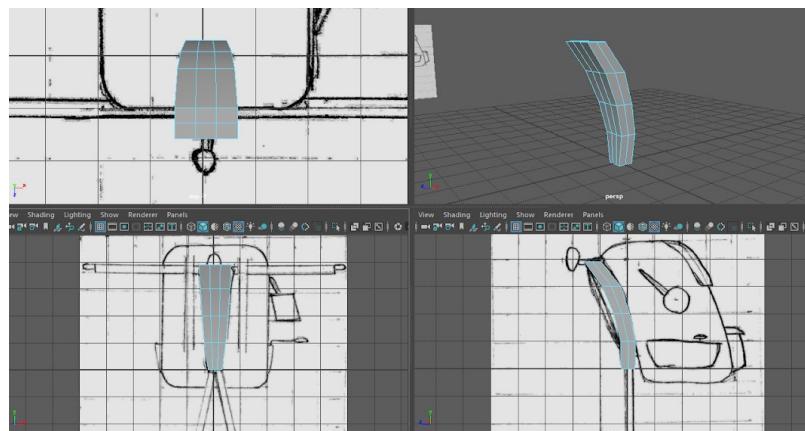


The new faces are triangulated.

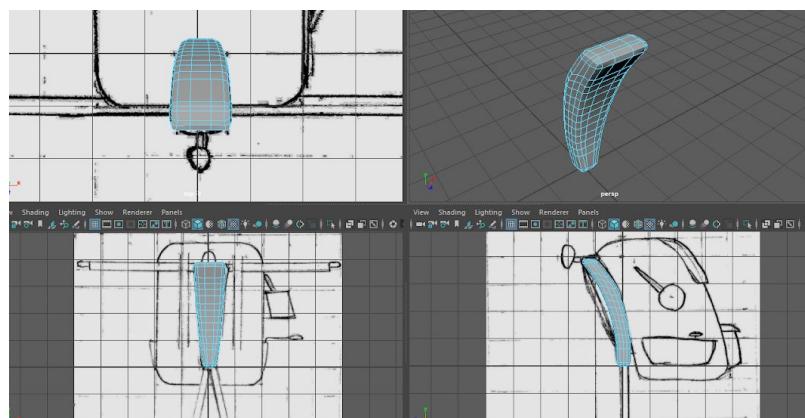
Body



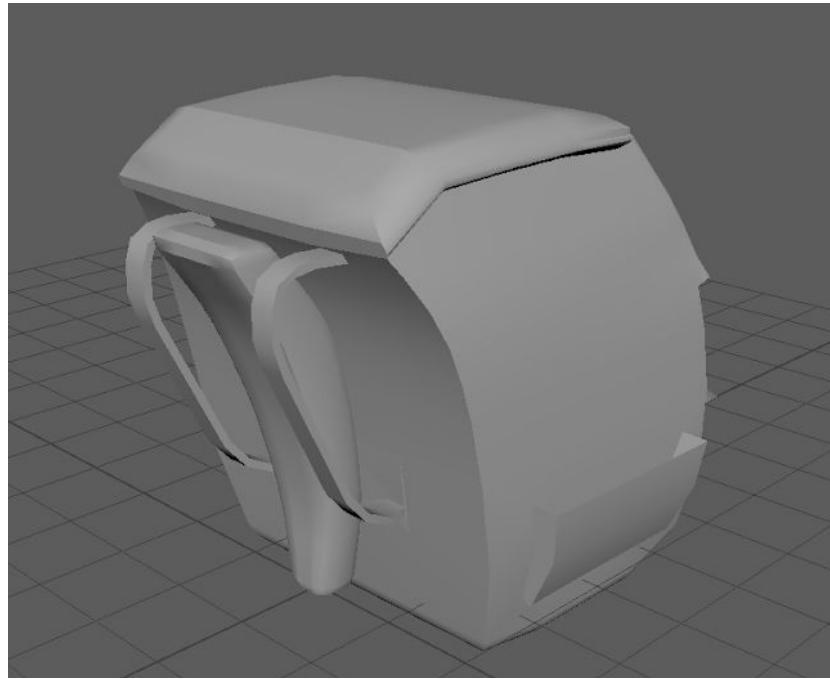
New cube is created.



The cube is shaped into the shape of the body's references.

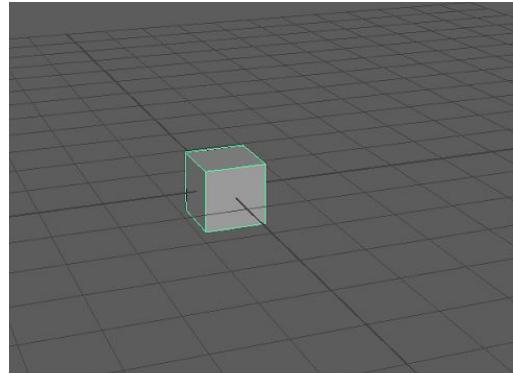


All edges are bevelled to make it smooth.

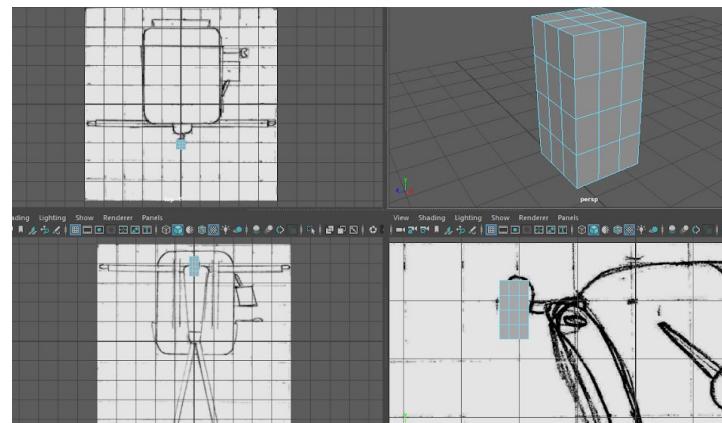


Current body and bag.

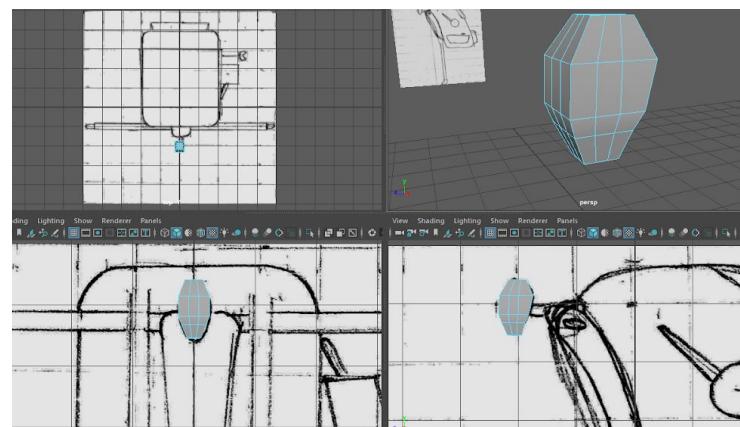
Head



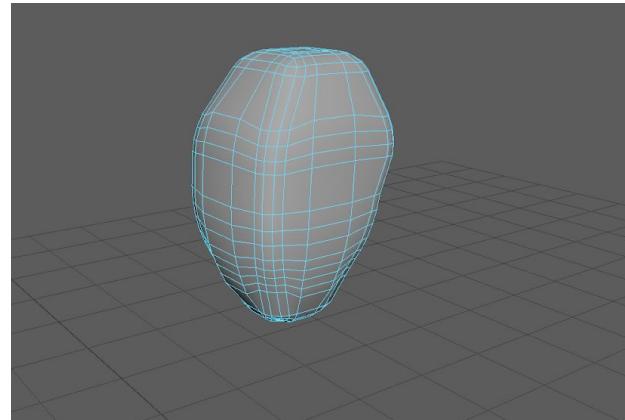
The head is a new cube.



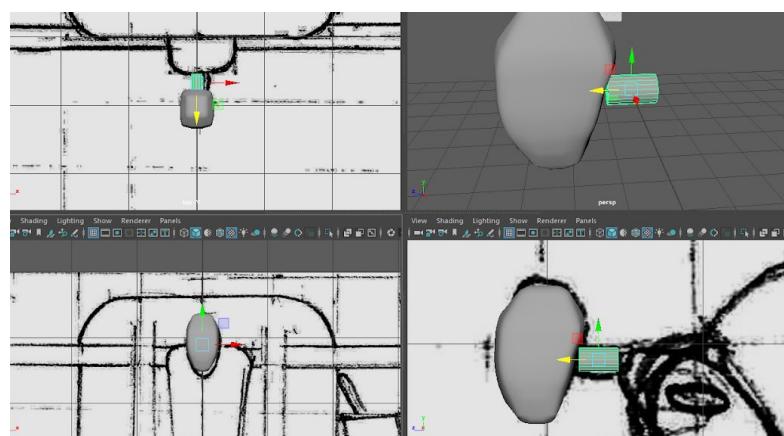
The cube is shaped into the shape of the head references.



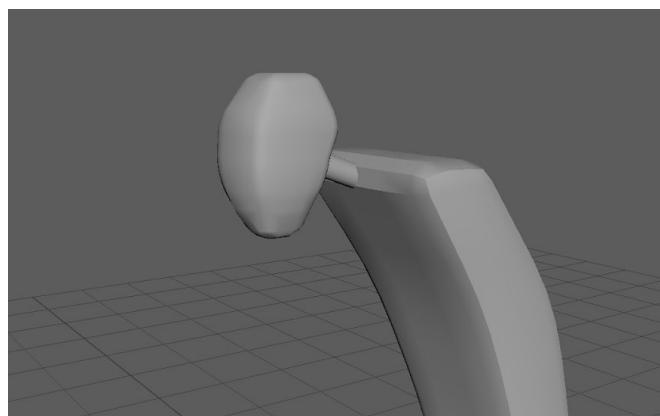
Edges are pulled inwards to form more of the shape of the skull.



The edges are bevelled.

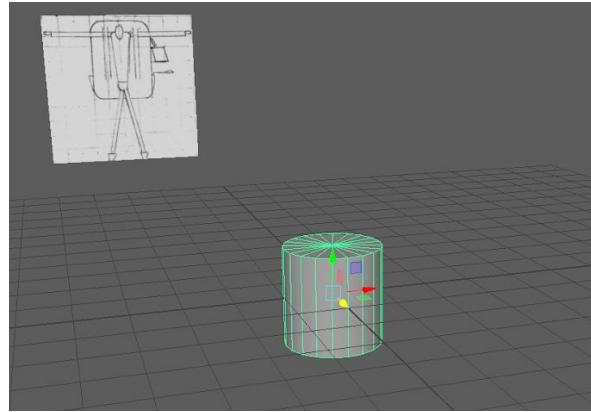


The neck is created from a cylinder.

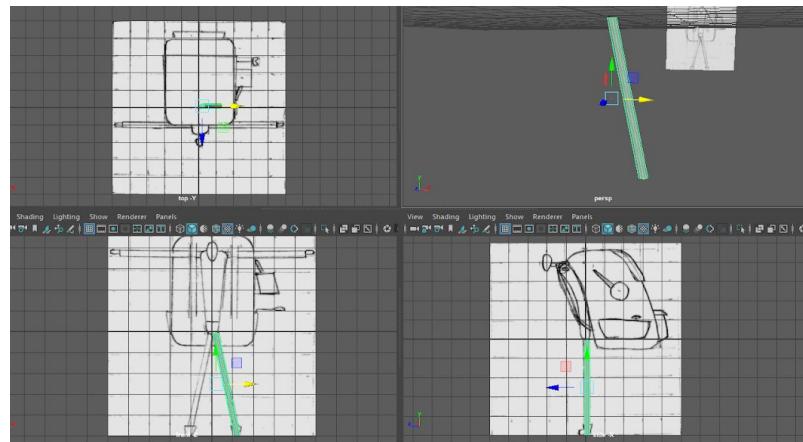


The neck is combined with the head and body to form one object. The history of the objects are deleted.

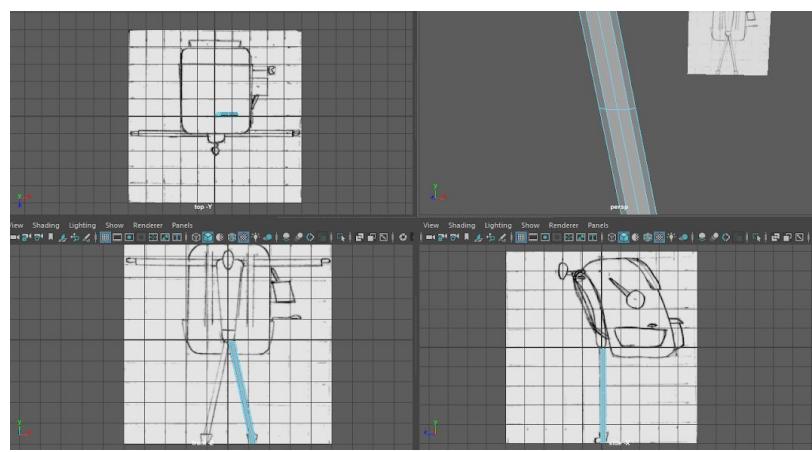
Legs



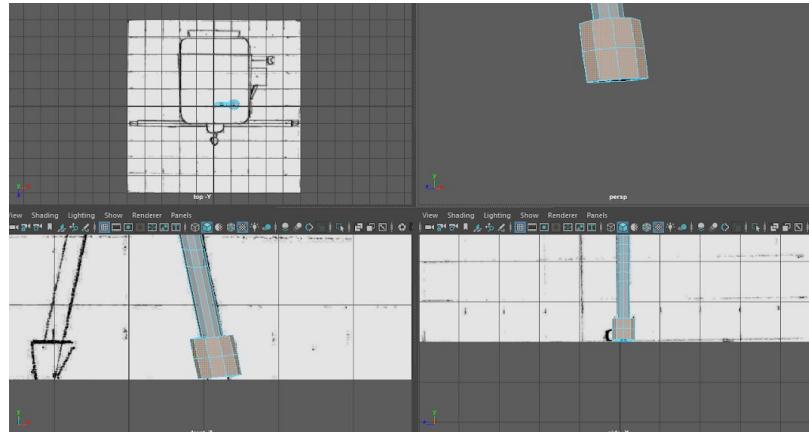
The legs are made from cylinders.



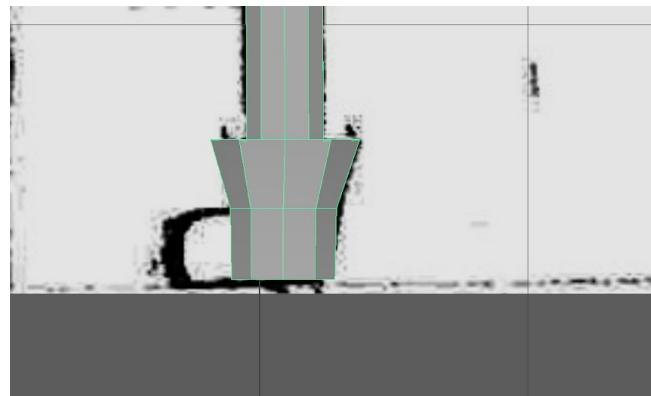
The cylinder is reshaped into the size of the legs in the reference images.



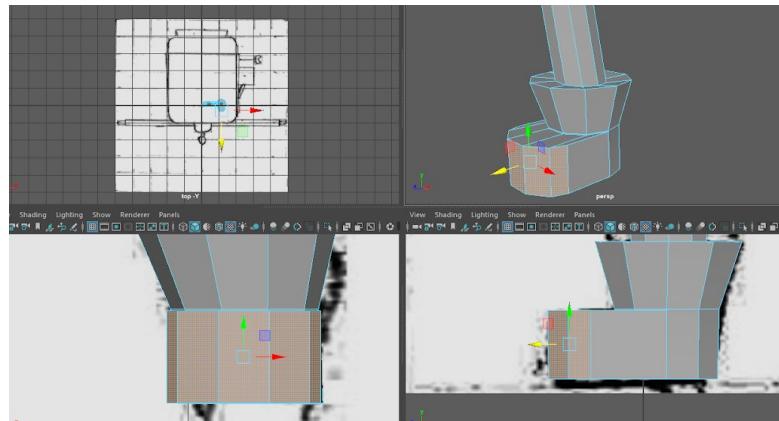
A loop edge is added to the middle of the leg. The edge is bevelled to add equally spaced edges along the leg.



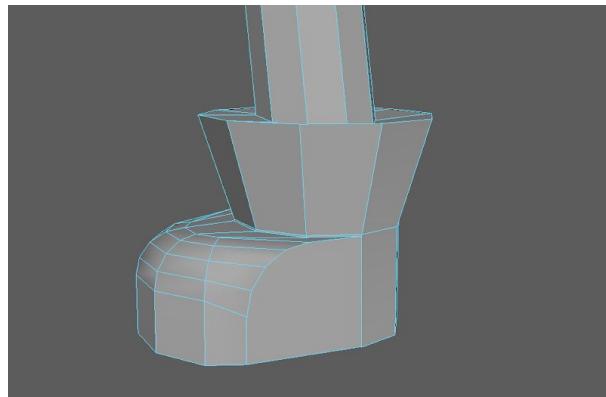
The bottom of the leg is extruded for the boot.



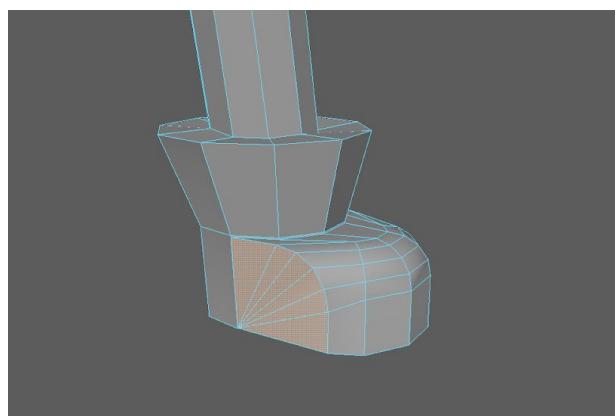
The top of the boot is scaled outwards.



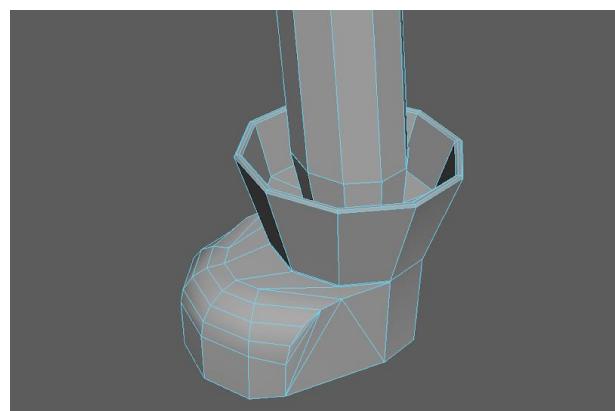
The front of the boot is extruded forwards as the toes of the foot.



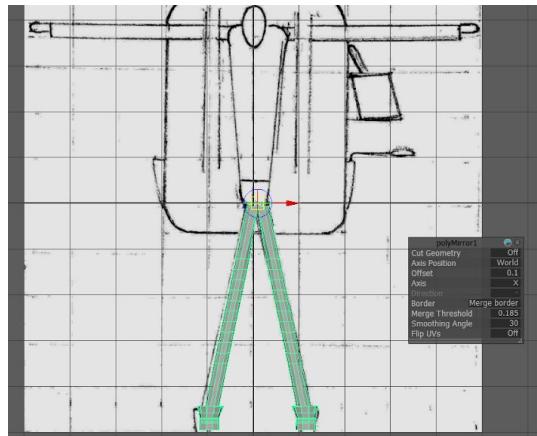
The toe of the boot is bevelled.



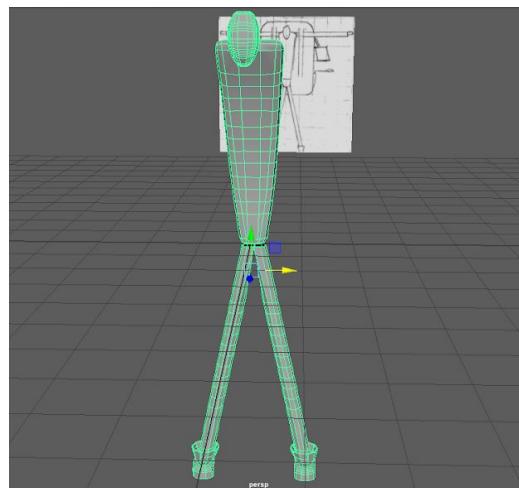
The faces on the side of the boot is triangulated.



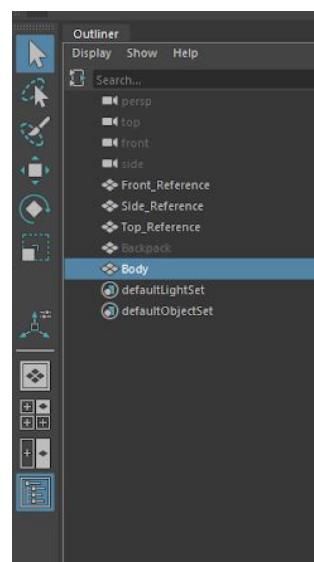
The top face of the boot is extruded inwards and the edges of the rim are bevelled.



The leg is mirrored and the history is deleted.

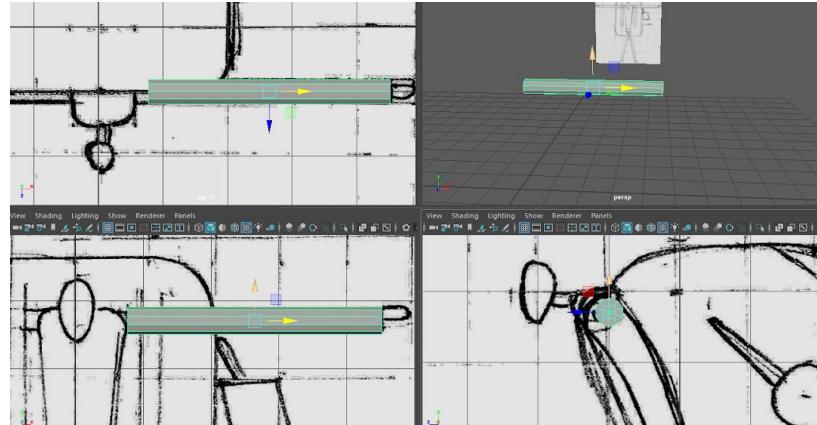


These legs are combined with the rest of the body.

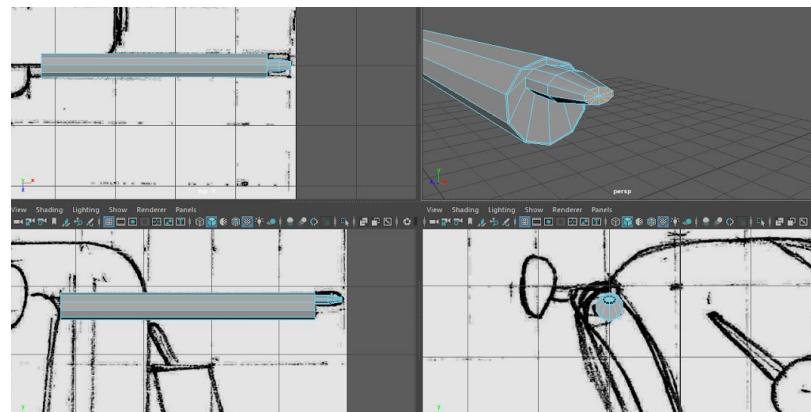


After objects are combined, the history is deleted.

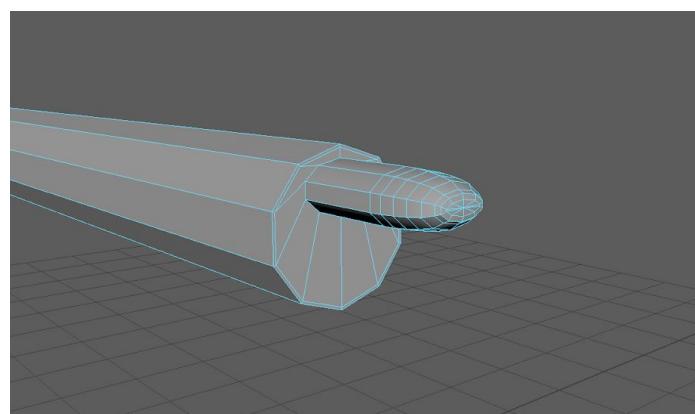
Arms



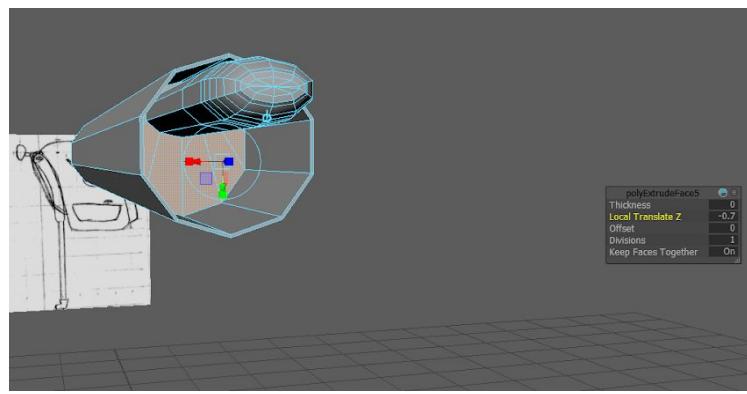
The arms are made from cylinders.



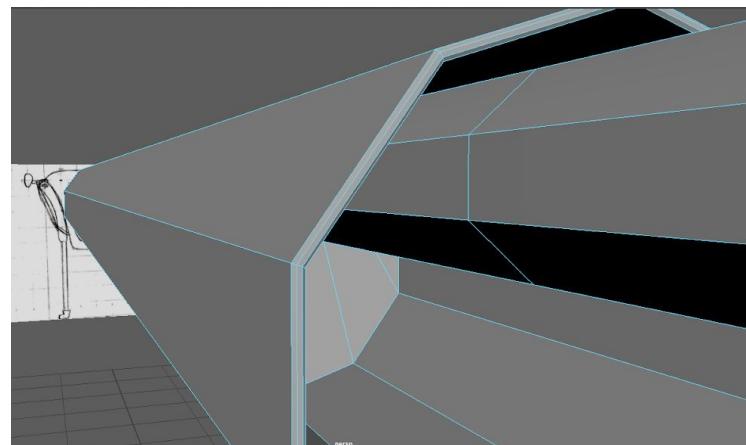
Hands were extruded from the ends of the cylinders.



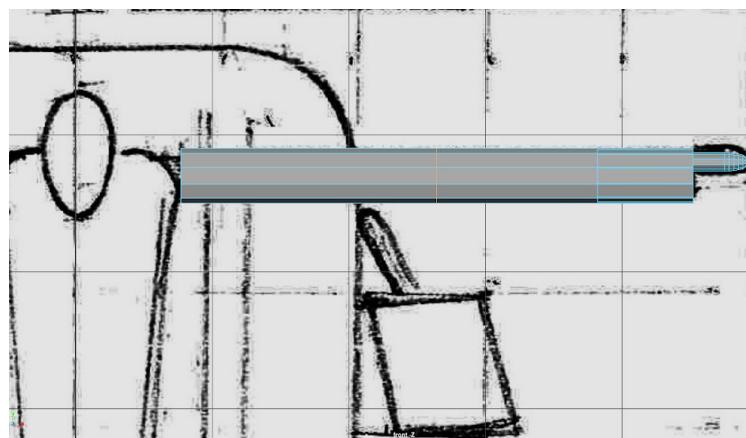
The edges of the hand was smoothed using the bevel tool.



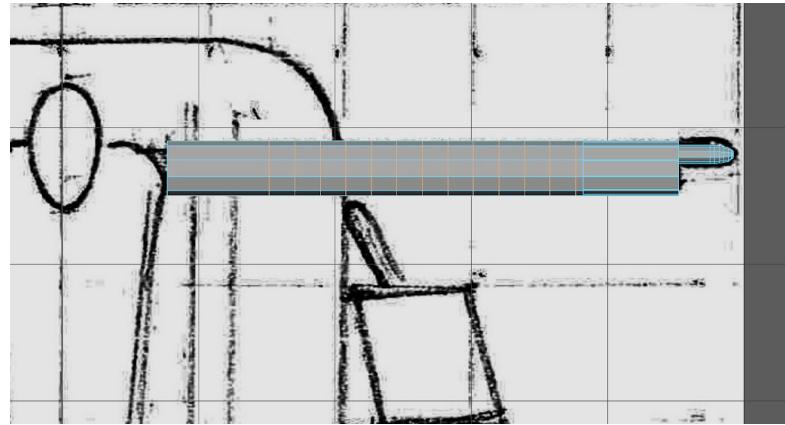
The face of the arm surrounding the hand is extruded inwards to form a sleeve.



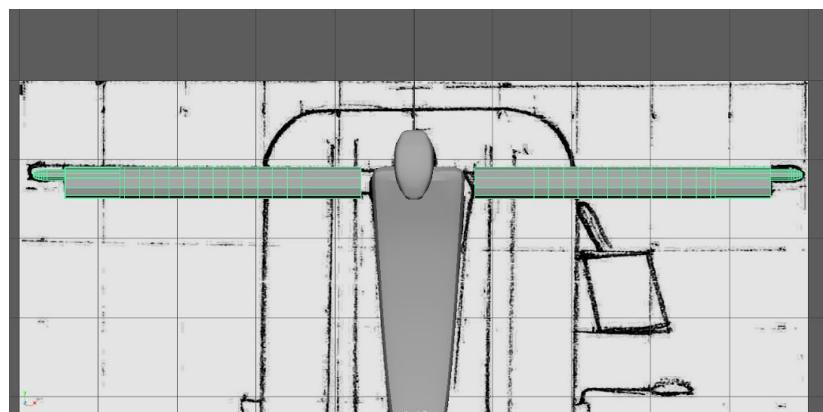
The edges of the sleeve are bevelled.



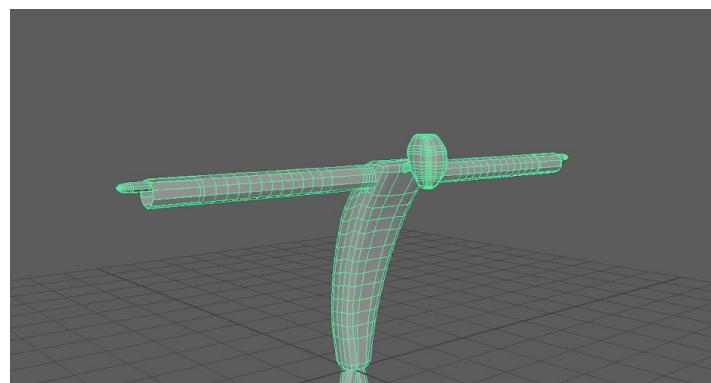
A loop edge is added to the elbow of the arm.



The edge is bevelled to add equally spaced edge loops along the arm.



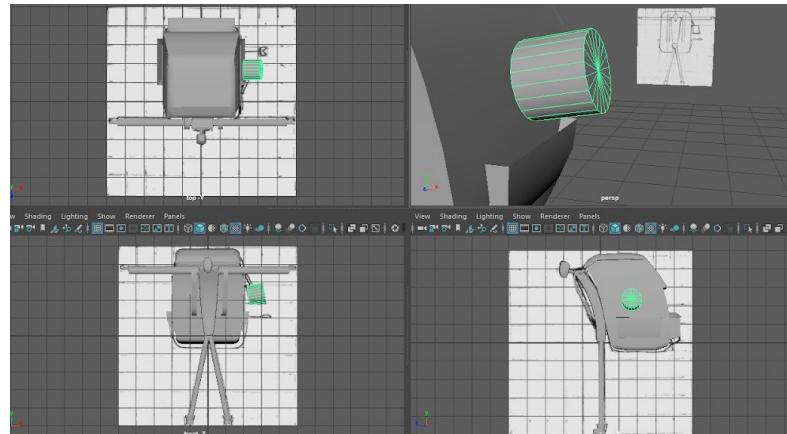
The arms are mirrored.



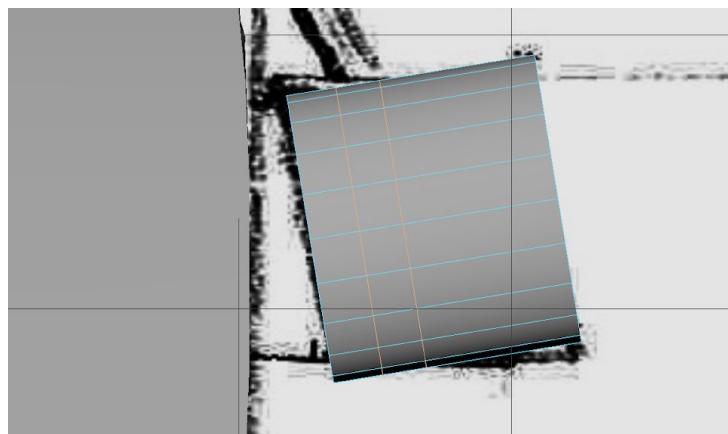
The arms were combined and the history was deleted.

Decor

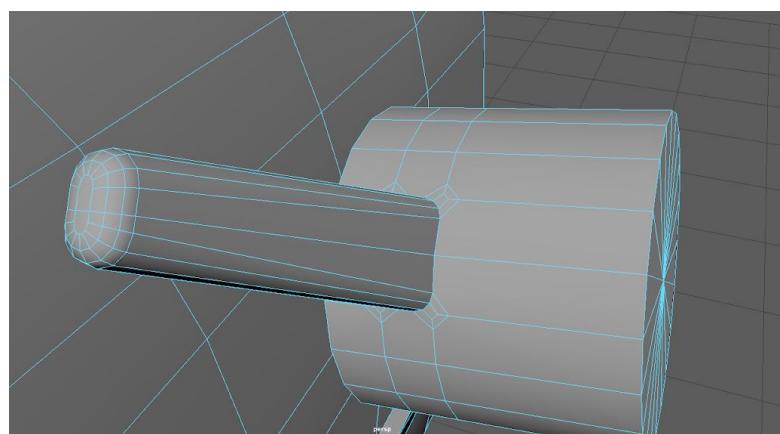
Pan



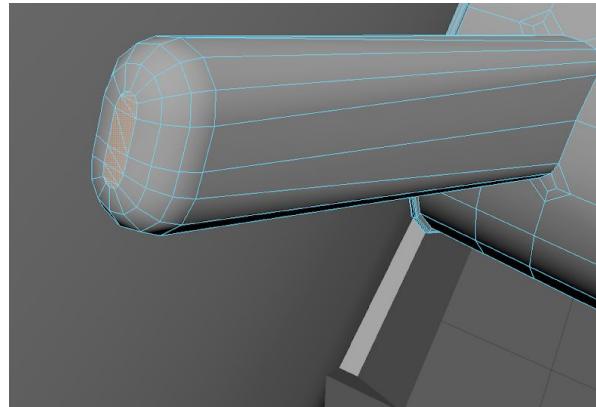
The pan is made from a cylinder which was adjusted and positioned within the reference images.



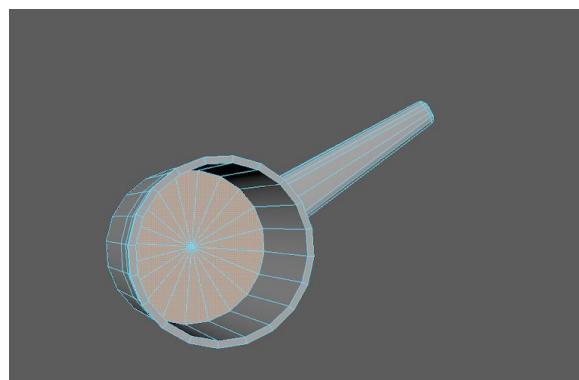
2 edge loops were added to the pan, where the handle would be positioned.



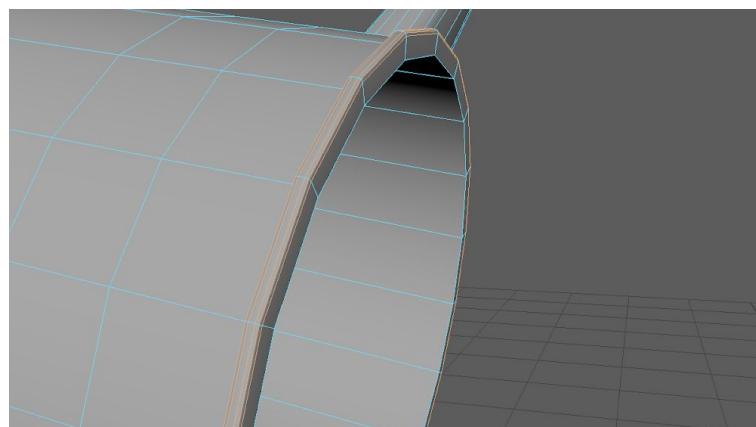
The handle is extruded from the base, with the edges bevelled for smoothness.



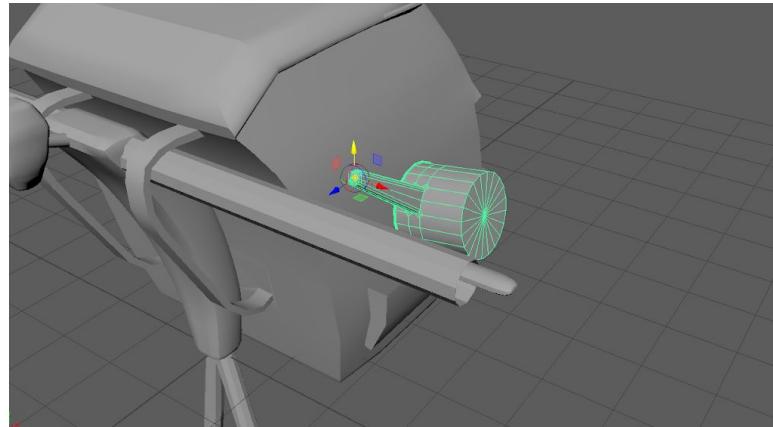
The end polygon is triangulated.



The top face was extruded outwards to form a lip before being extruded inwards to form the inside of the pan.

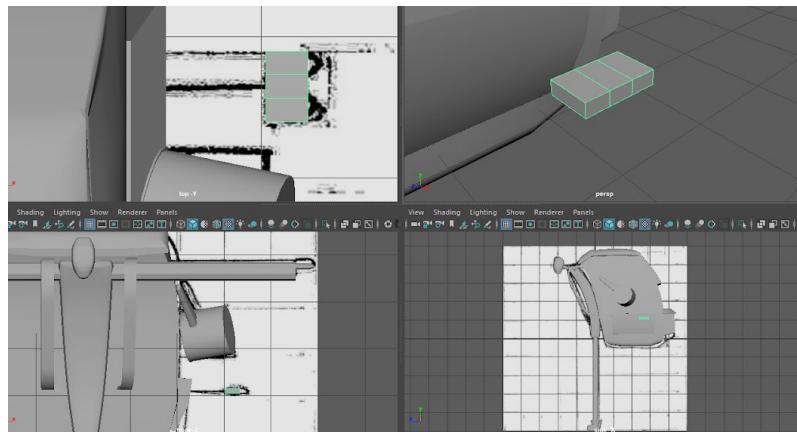


The lip is bevelled.

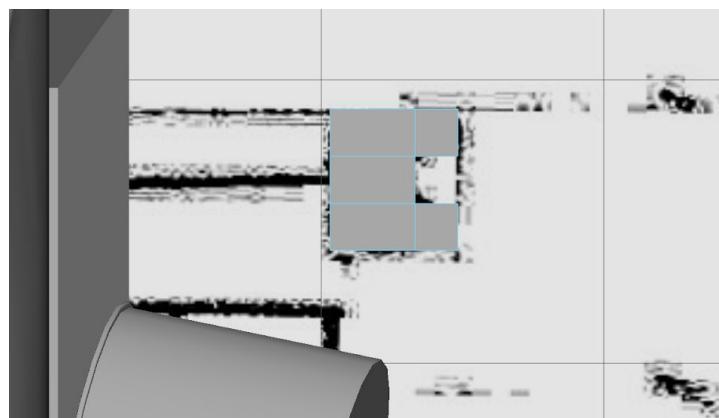


The pivot point is changed to the tip of the handle to aid with animating later.

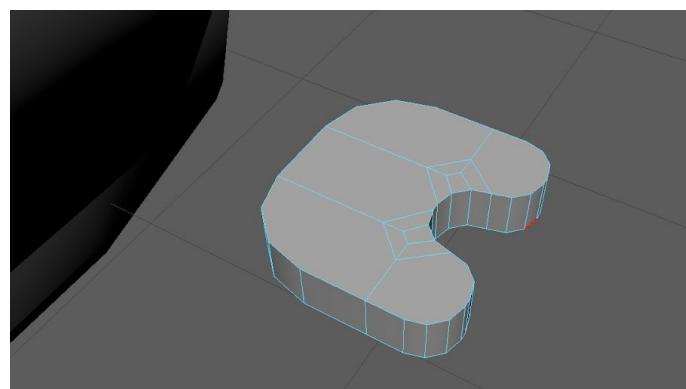
Controller



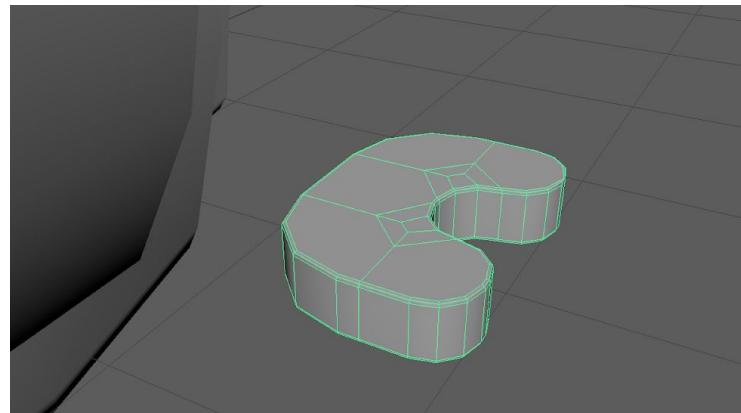
The controller is made from a thin cube that has 3 width segments.



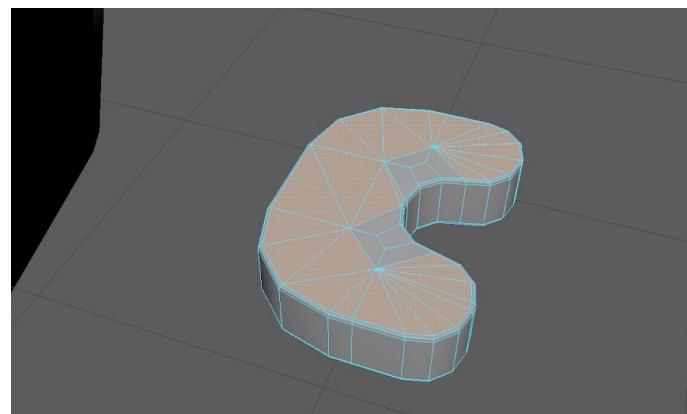
Grips are extruded from the side segments.



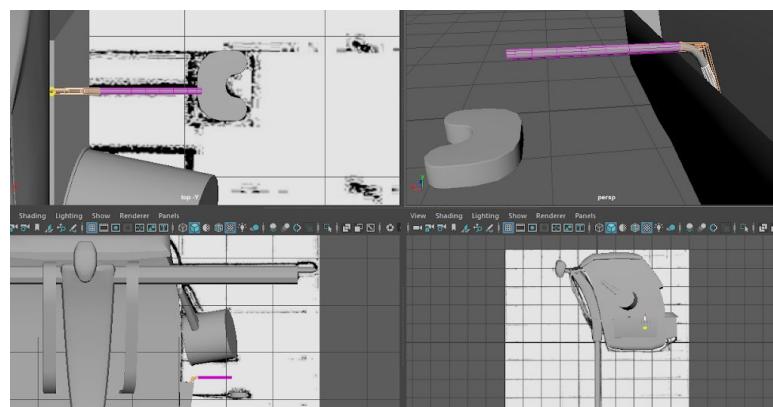
To make the shape rounded, the corner edges are bevelled.



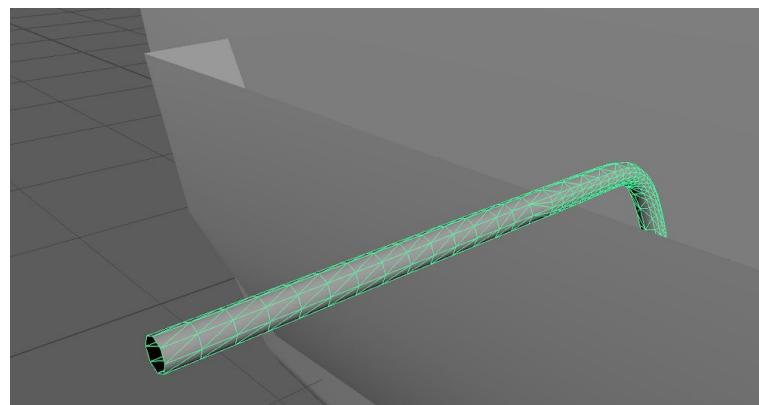
The edges are bevelled to smooth the sharp edges.



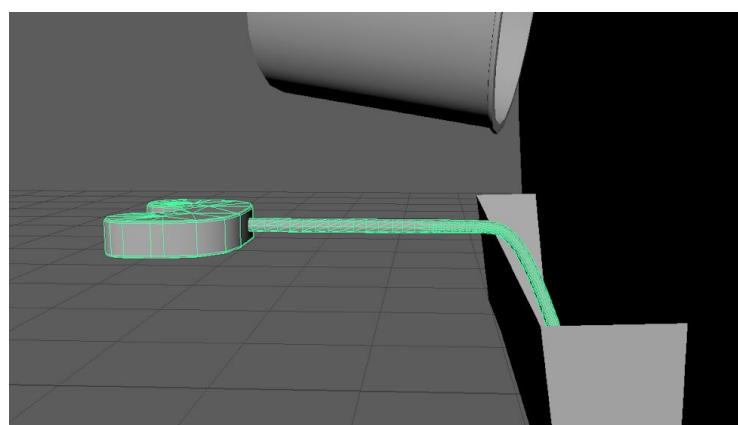
The top polygons are triangulated.



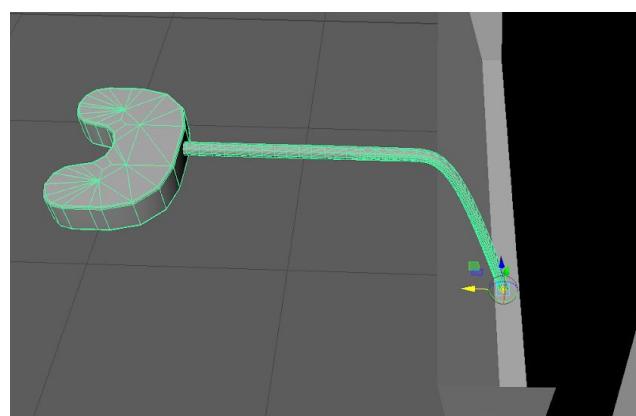
The cable is made from a nurb primitive cylinder.



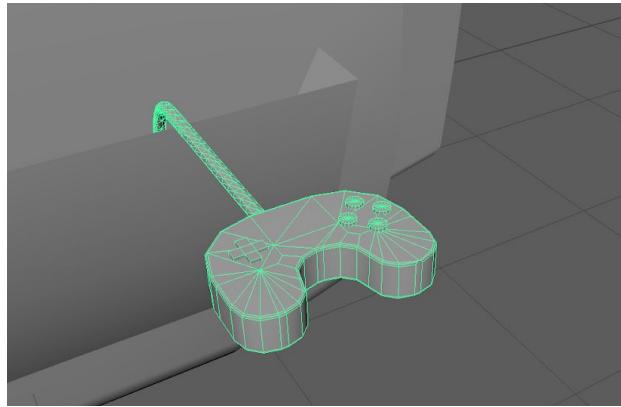
The nurbs object is converted to polygon.



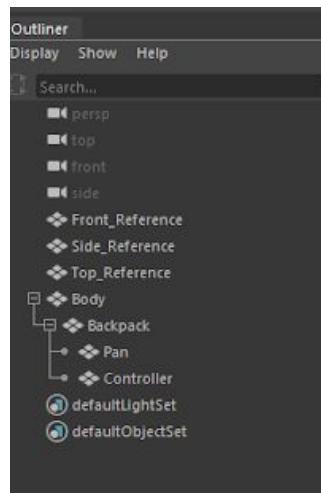
The controller and the cable are combined.



The pivot is changed to the end of the cable.



The controller is decorated with buttons(made from cylinders) and D-pad (made from cube).

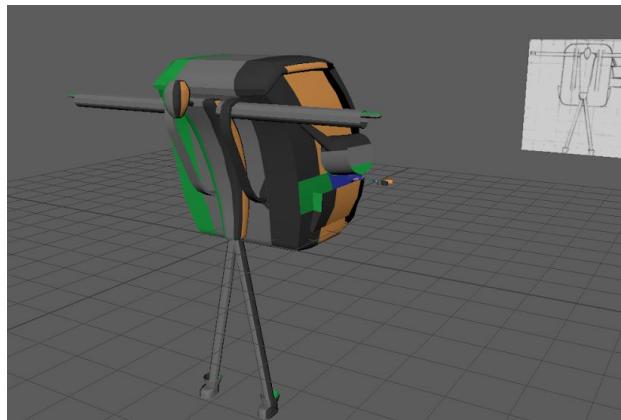


The objects in the scene are grouped in a hierarchy.

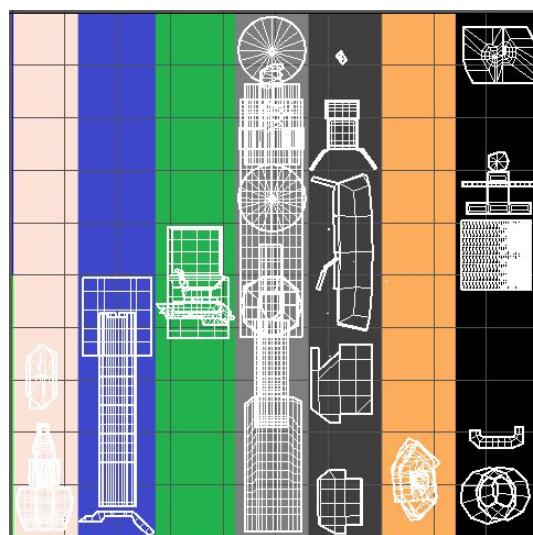
Textures



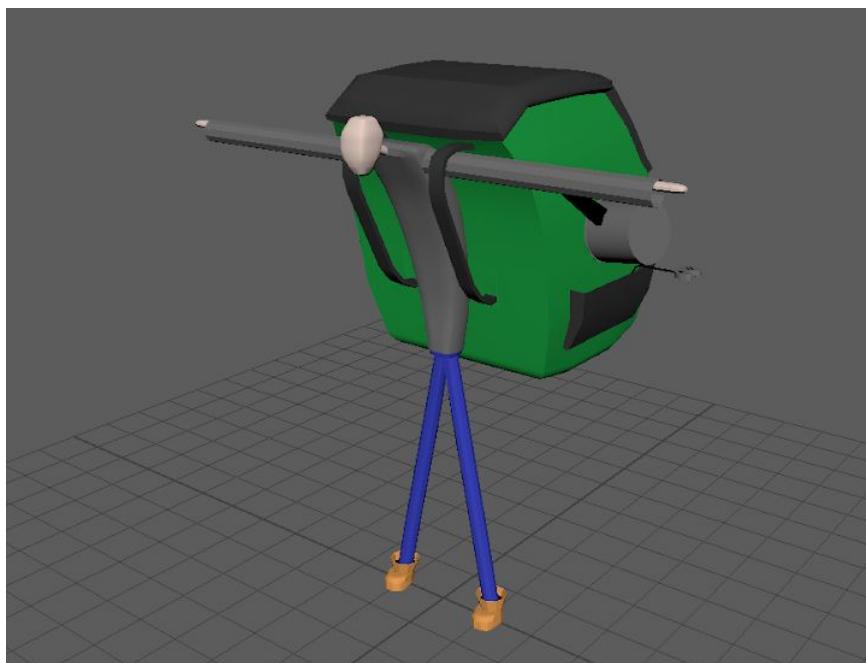
A simple texture map is made in a graphic editor.



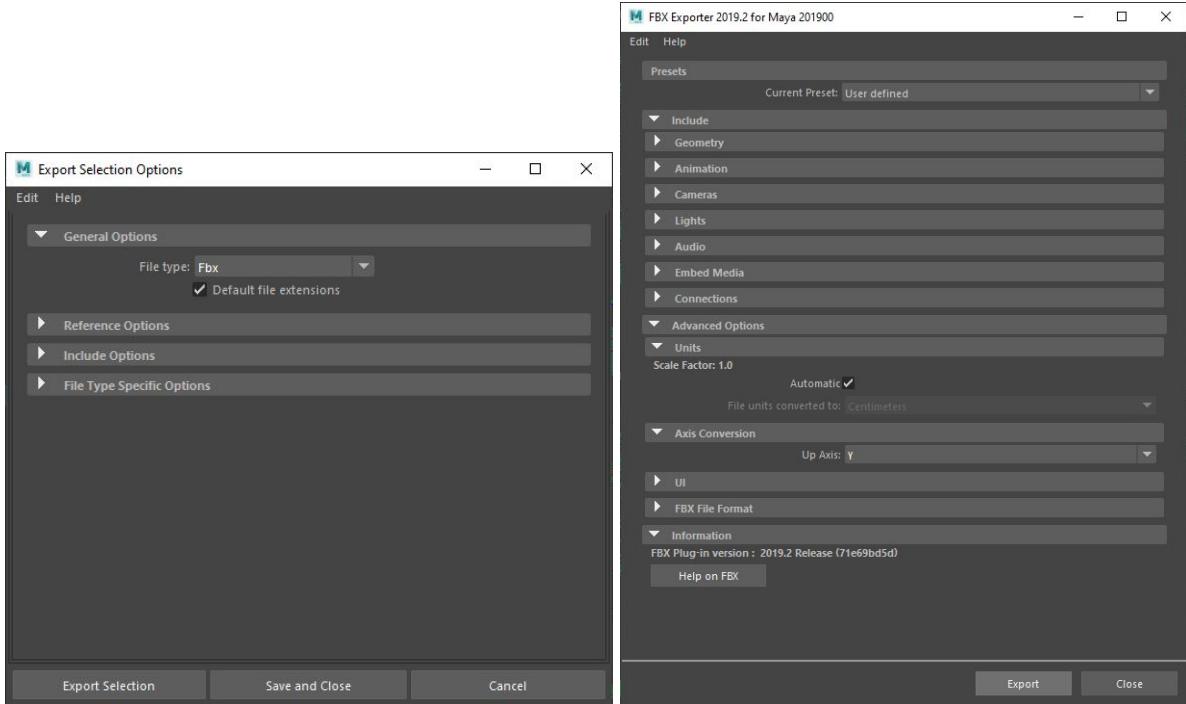
A lambert material is made from the texture map.



UVs are arranged with the texture map.



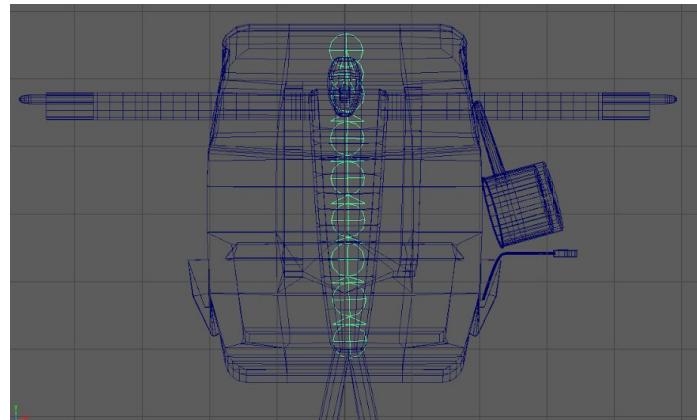
Export



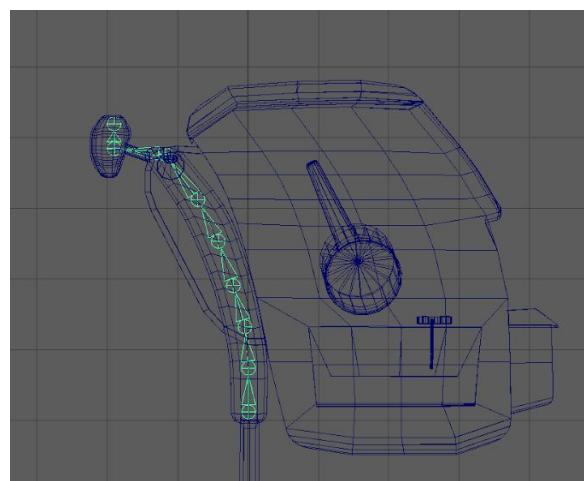
The selected character model is exported as an FBX.

Animation Workflow

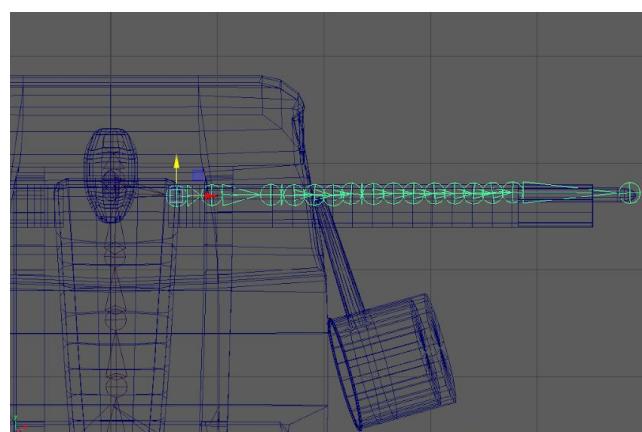
Rigging



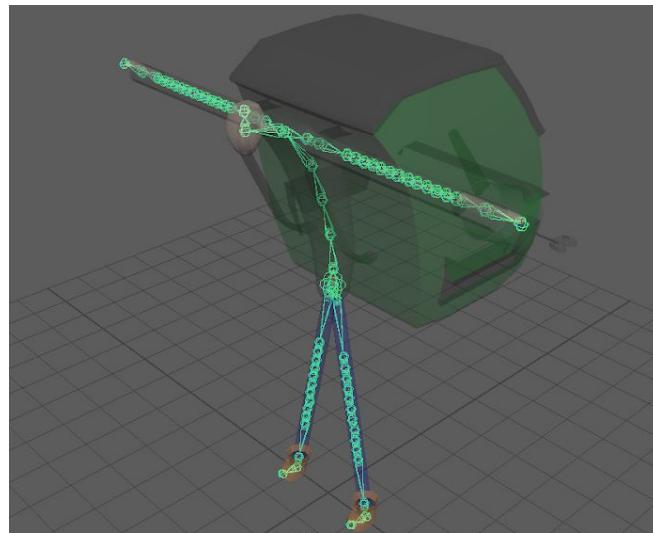
A chain of joints are created going up the character's back.



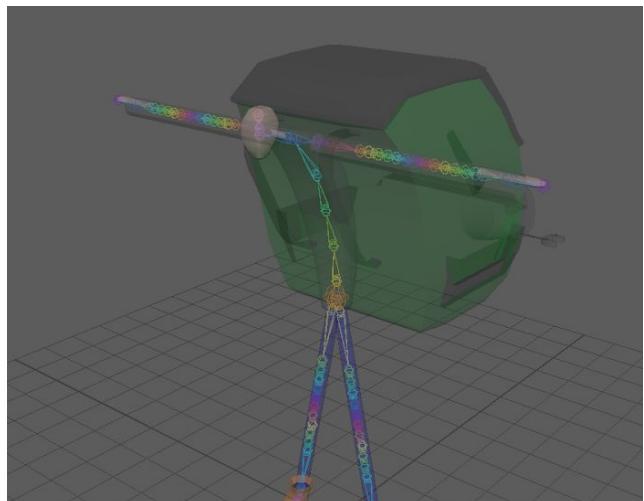
The joints are adjusted to curve with the shape of the spine and neck.



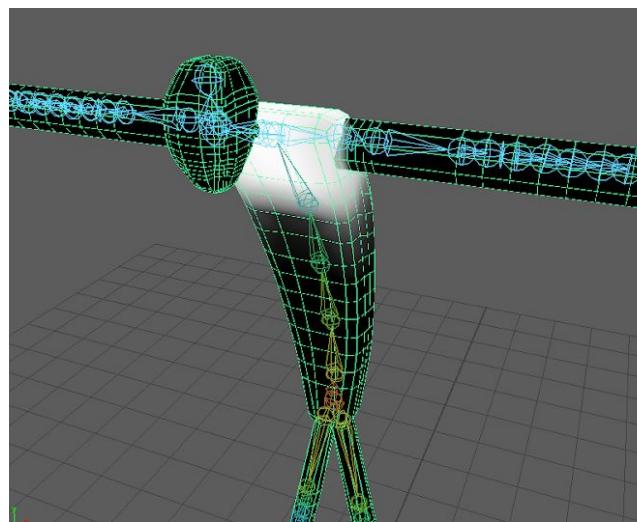
From the shoulders, a chain of joints are added for the arm. There are lots of joints to allow for a curved bend.



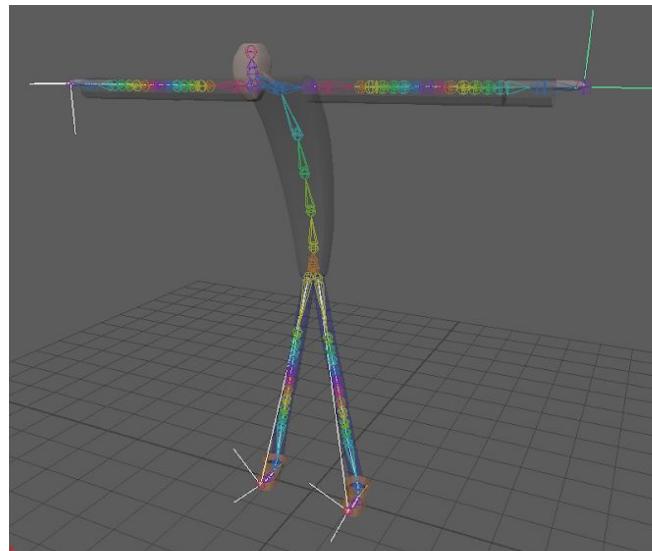
This is repeated for the other arm and the legs.



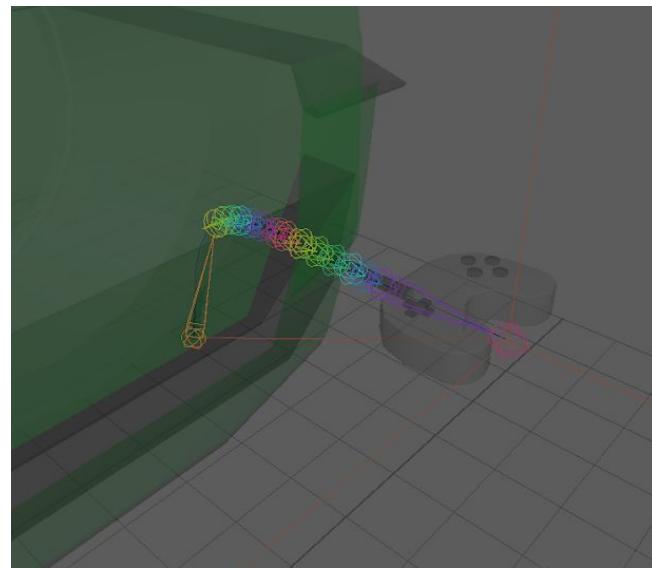
The body is set as the skin for the skeleton.



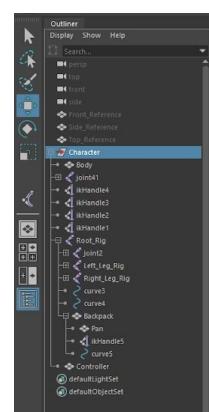
For each joint, the weights are adjusted using the weighting paint tool.



Spline IK is applied to the arms and legs.

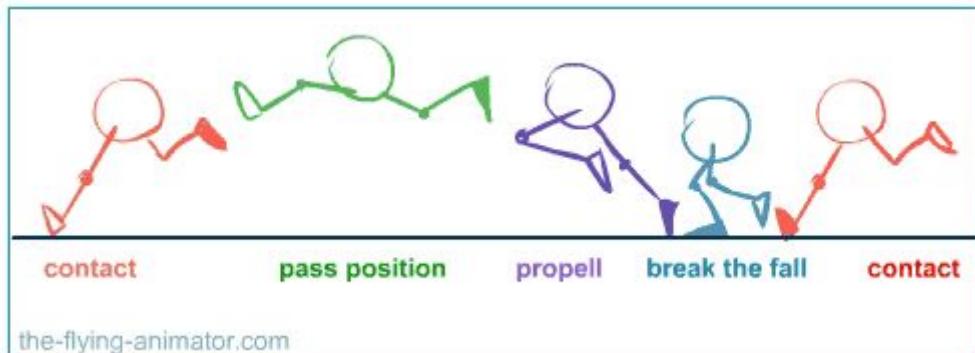


The process of adding joints and spline IK to the limbs is applied to the cable of the controller.

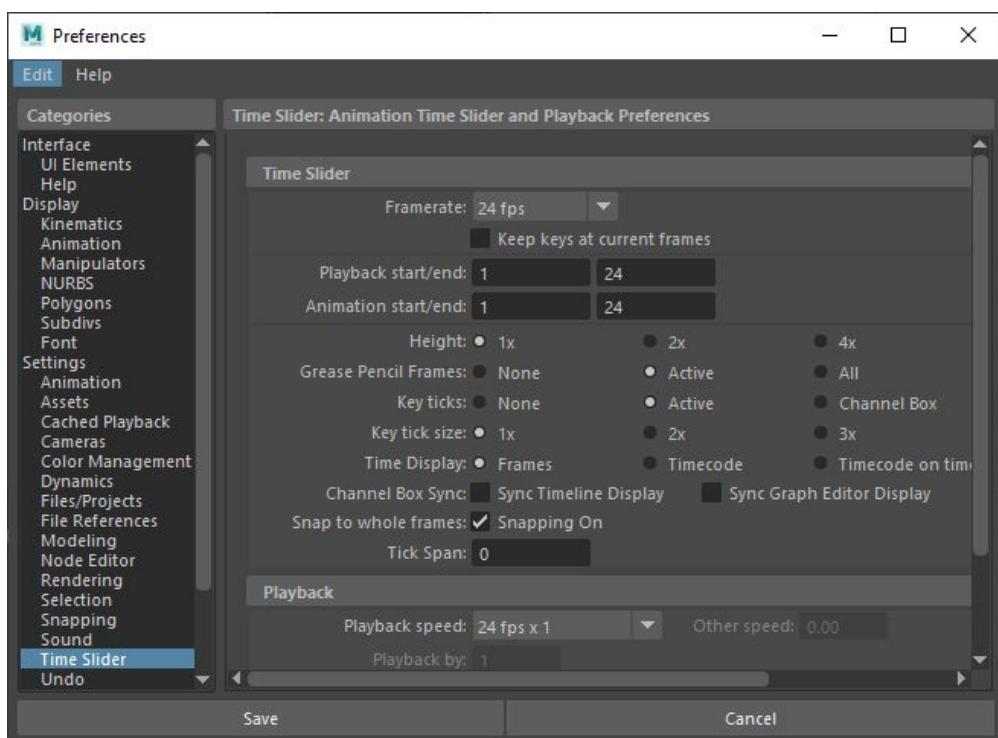


The hierarchy is updated.

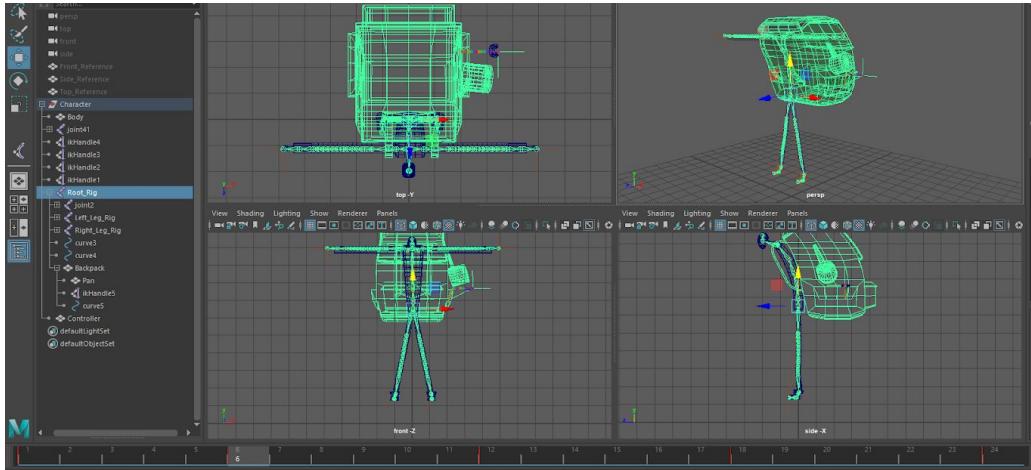
Key Poses



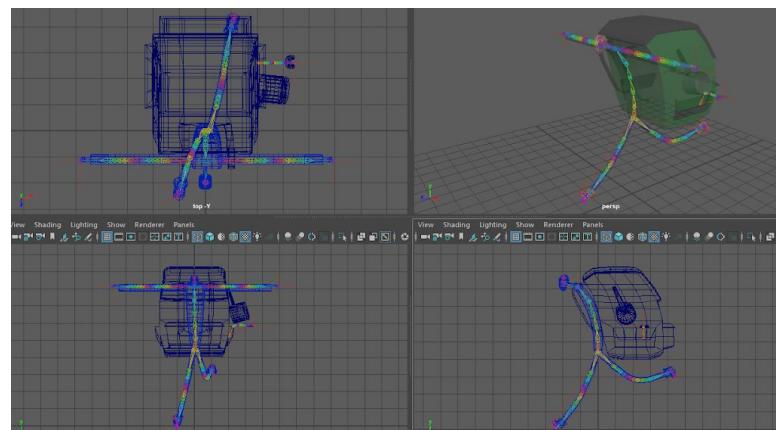
I used this image (*The Flying Animator*, 2019) as a reference for the key poses of the character's running animation.



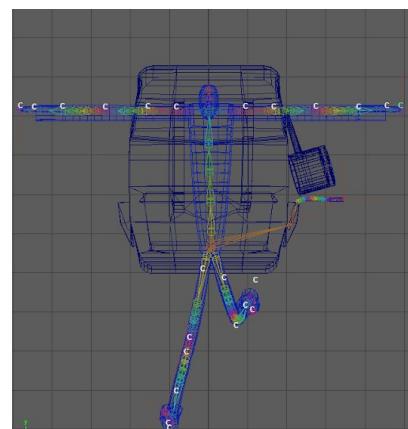
The animation is setup to run at 24 fps for the duration of one second.



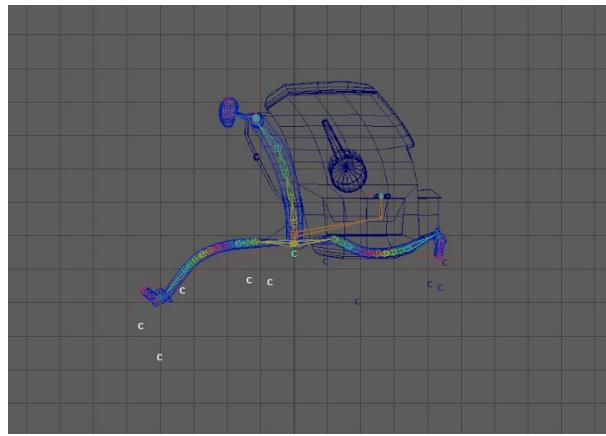
The first key frames are the translations of the body up and down.



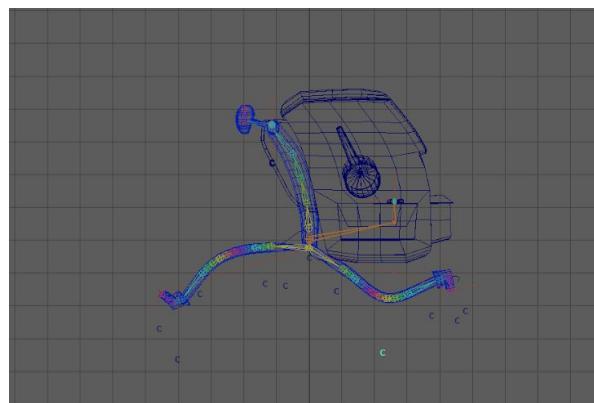
Using the control vertexes in the curves of the limbs, I set the starting pose for the legs. However, I soon realised that I could not set any key frames for the curves.



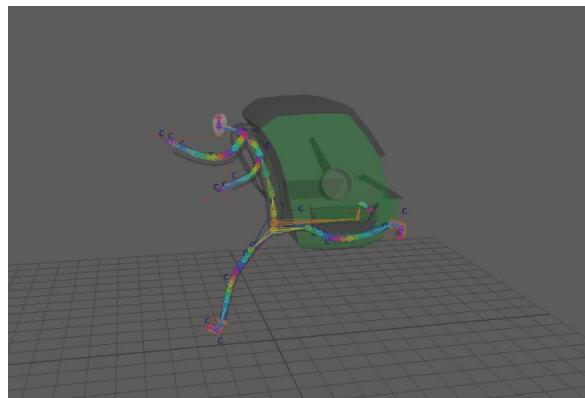
The solution was to assign each control vertex to a cluster which could individually be controlled and set to a key frame.



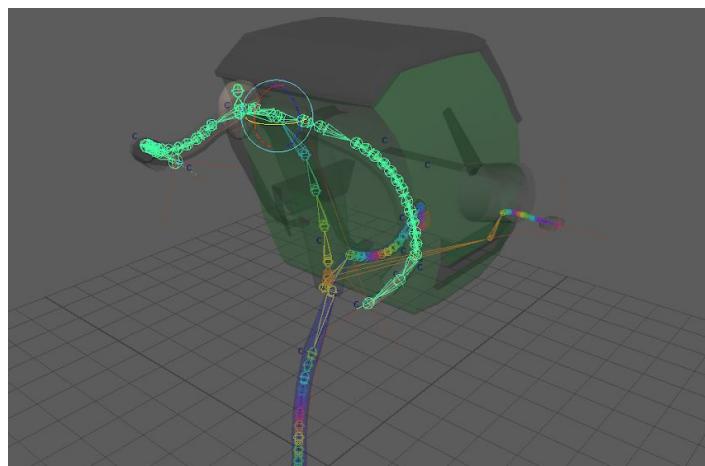
I set the poses for the right leg, referencing the image when required.



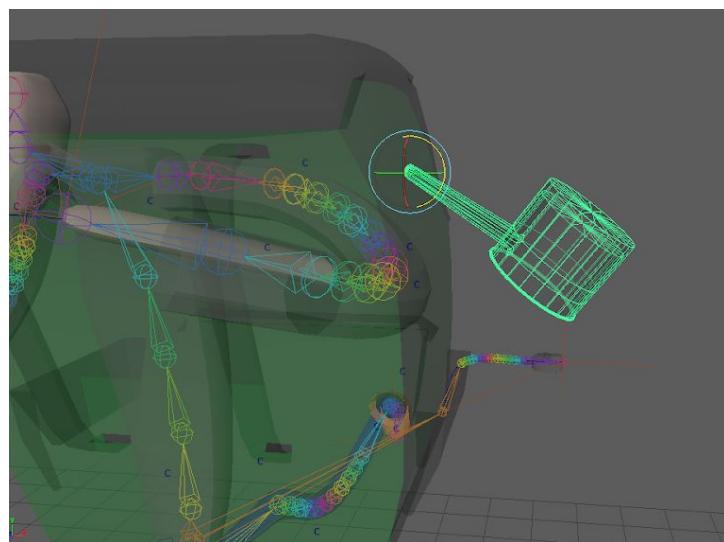
I applied this to the other leg as well.



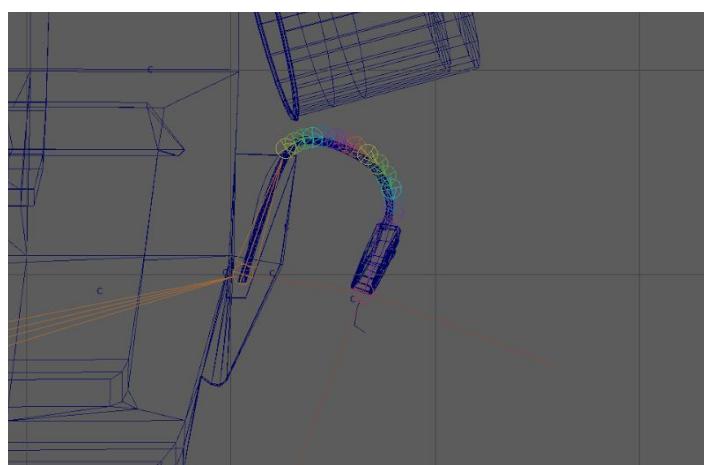
Using the clusters, I set the key poses for the arms.



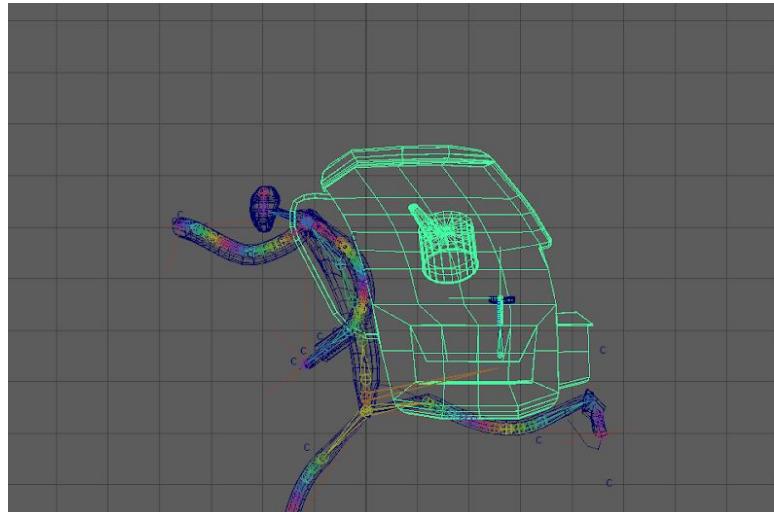
The shoulders are rotated so that they lean into the arm that is moving forwards.



The pan is rotated so that is bobs up and down with the backpack.

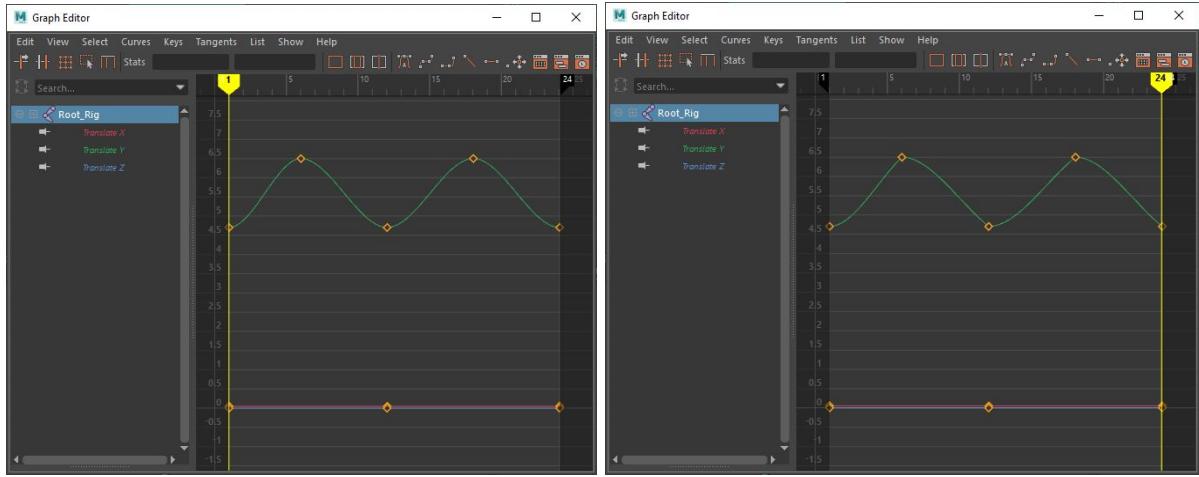


The controller is also animated to bob up and down like the pan.

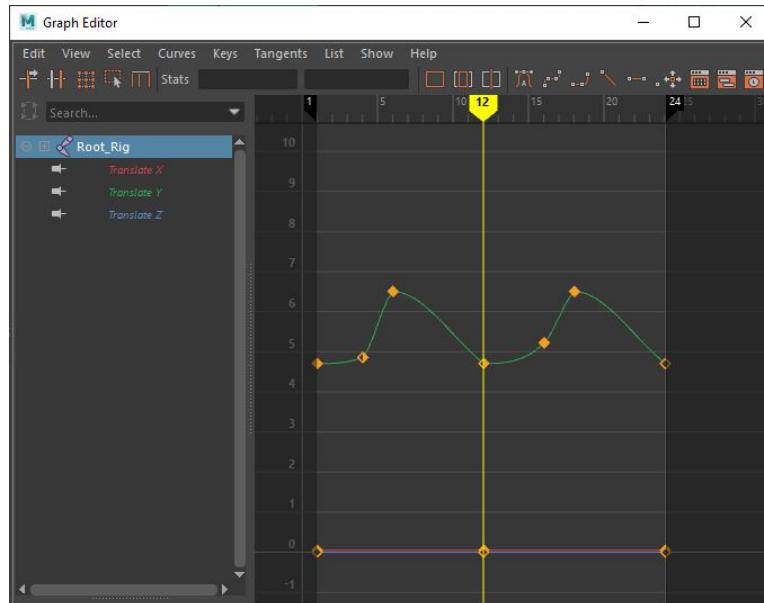


The backpack jumps up and down like there is a delay after the body drops down.

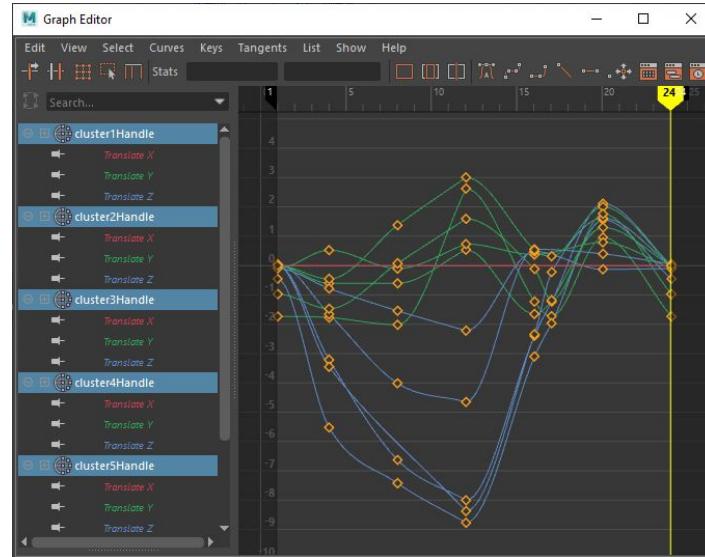
Timing



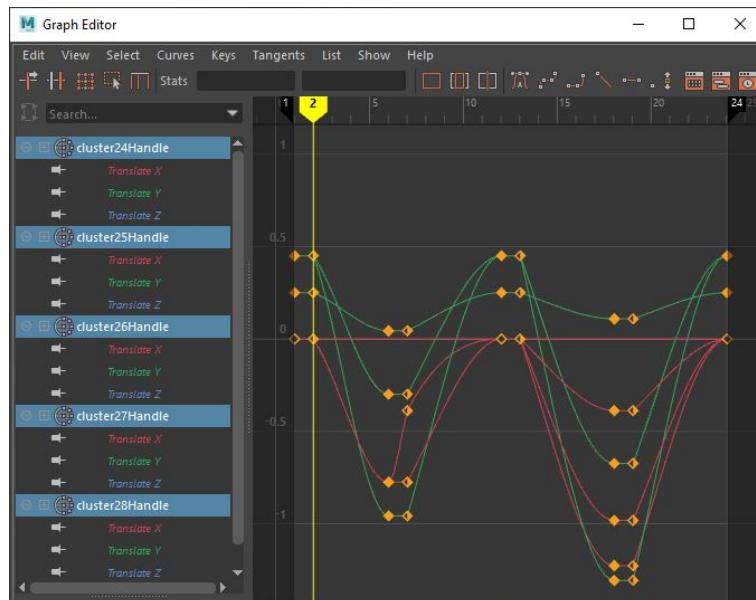
In the graph editor, the tangents into the body's transforms are changed to linear to simulate impact with the ground.



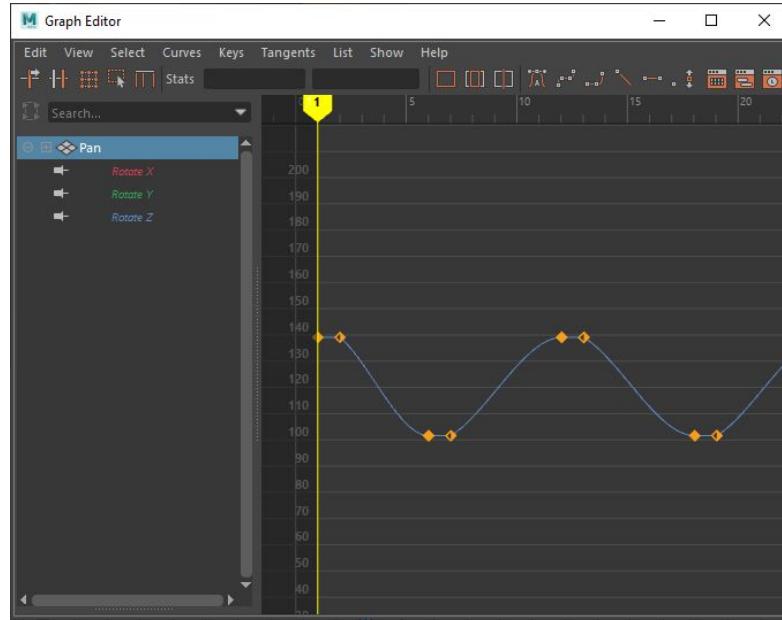
The time the body spends on the ground is delayed until the contact foot is ready to propel the body into the air again.



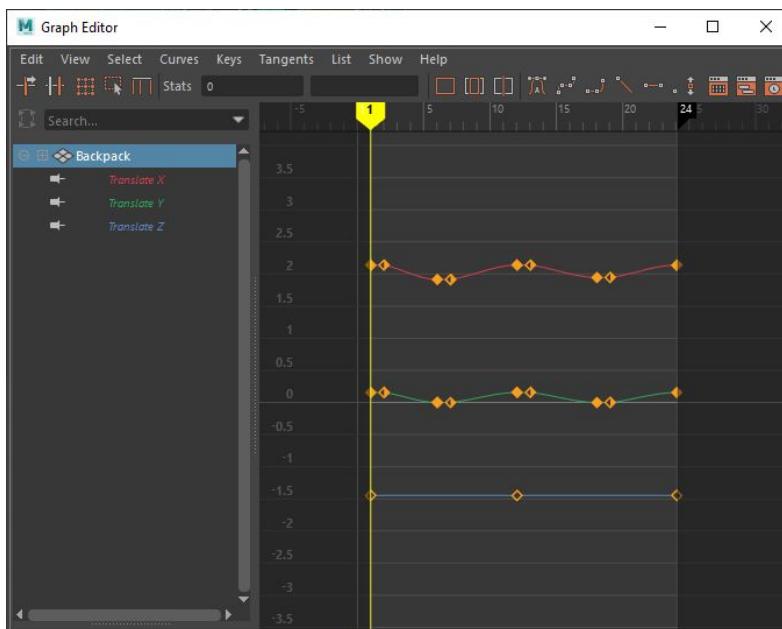
The timing of each leg pose is adjusted to line up better with the movement in the reference image as well as the rest of the body.



The controller is given gaps where the movement pauses before swinging back in the other direction.

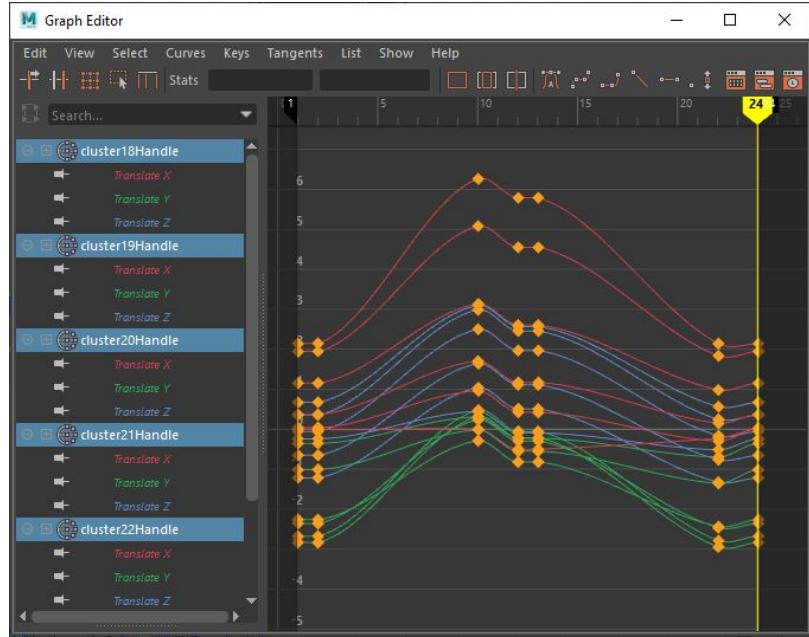


The pan is also given these pauses to simulate the forces at work on the pan.

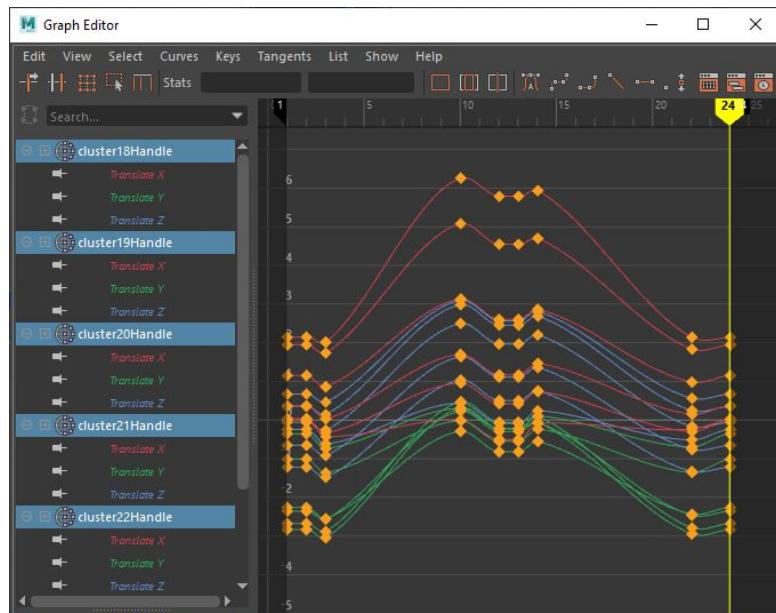


The backpack has pauses and a slight sideways movement.

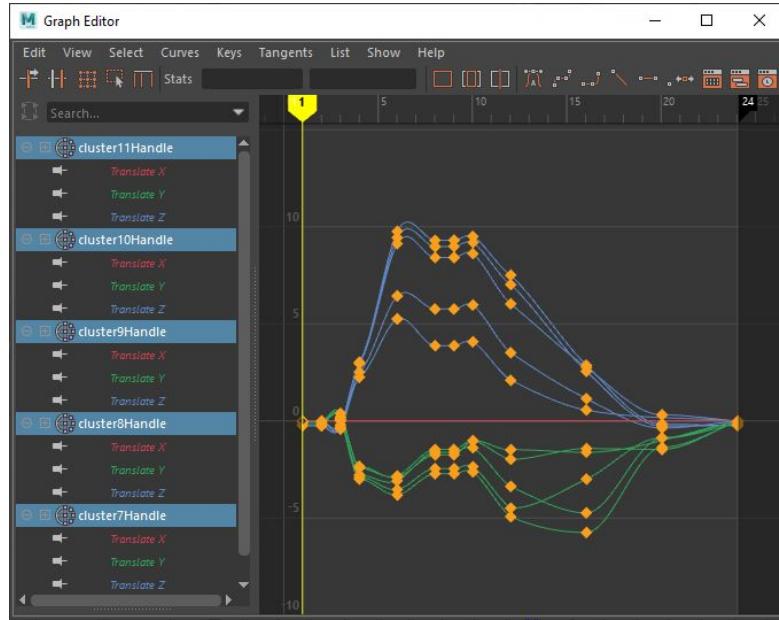
Anticipation & Follow Through



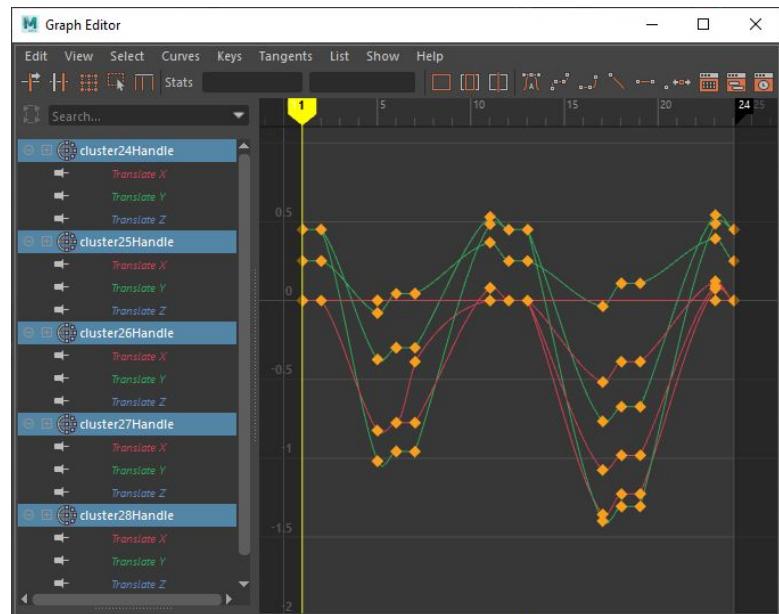
For the arms, they overshoot their destination before correcting themselves and pausing for a frame.



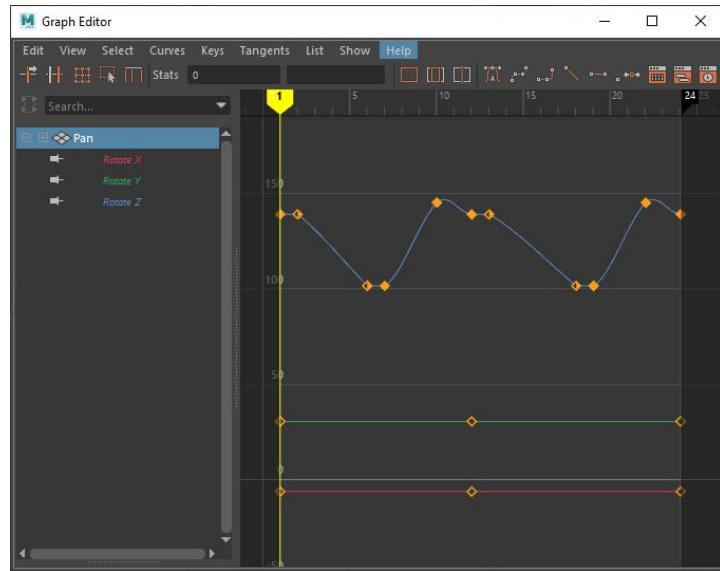
The arms are given a frame of pull-back for anticipation.



The same overshoot and pull-back techniques are utilised in the legs.



The swing of the controller is changed to overshoot a frame before correction, with the motion slightly out of sync with the backpack.

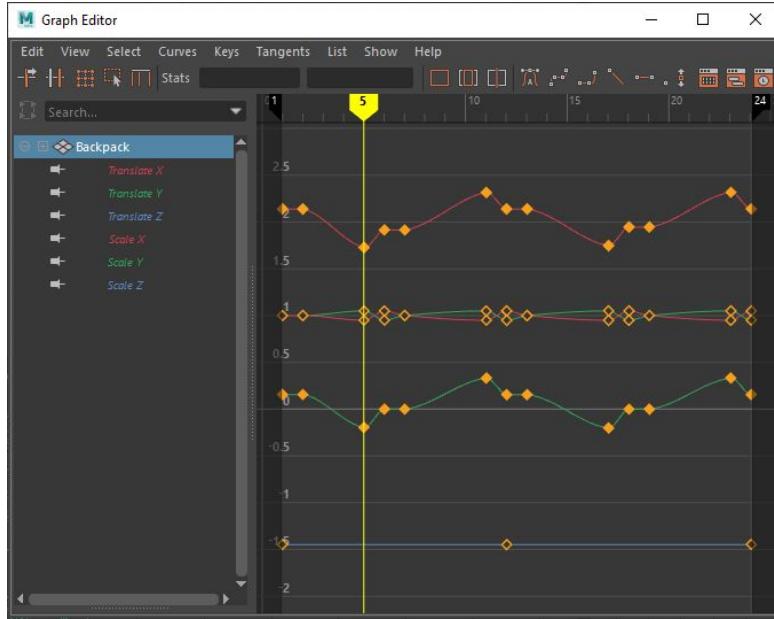


Overshoot is also added to the swing of the pan.

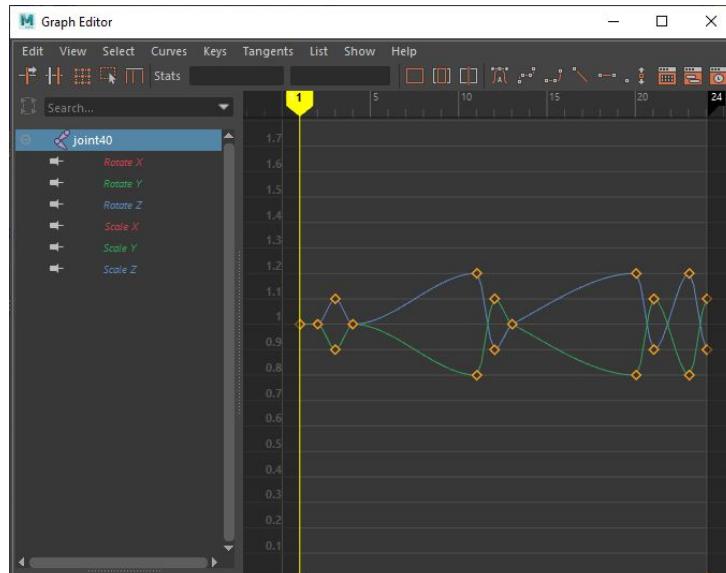


The backpack is also given some overshoot.

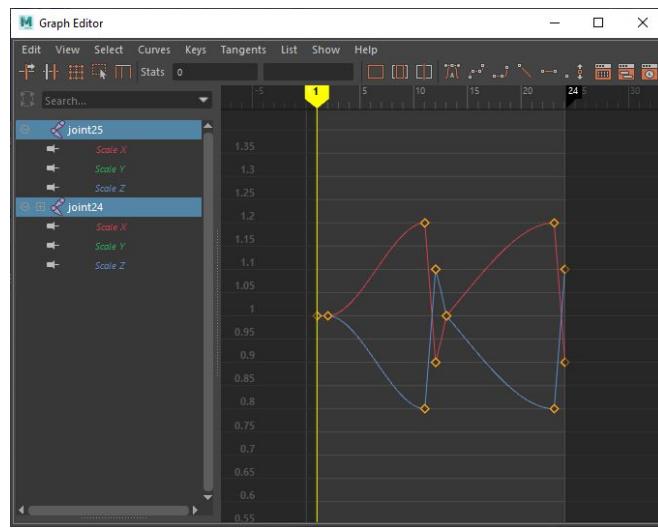
Squash & Stretch



The backpack is given squash and stretch along the object's y axis between a scale of 0.95 to 1.05.



The feet squash and stretch with the transitions between poses on the object's z axis (0.8 to 1.2)



The hands squash and stretch the most along the x axis to sell the swing of the arms (0.8 to 1.2).

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