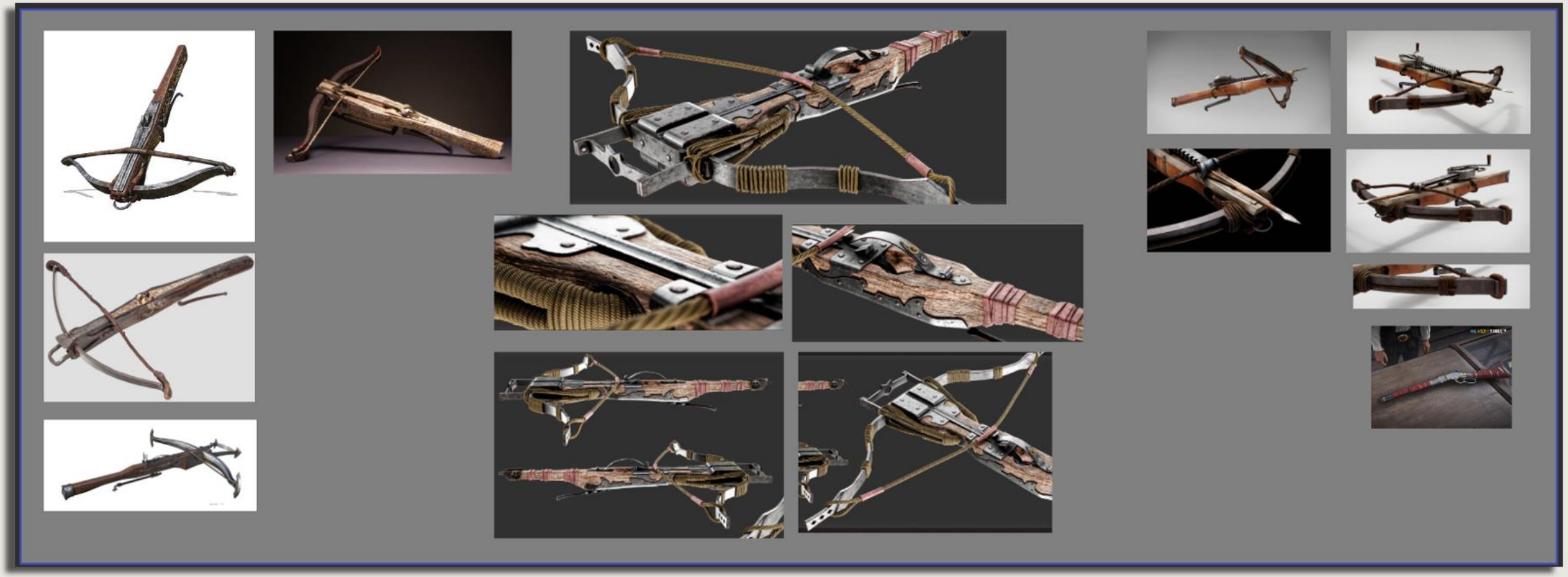
Wooden Crossbow

"A medieval bow of a kind that is fixed across a wooden support and has a groove for the bolt and a mechanism for drawing and releasing the string."

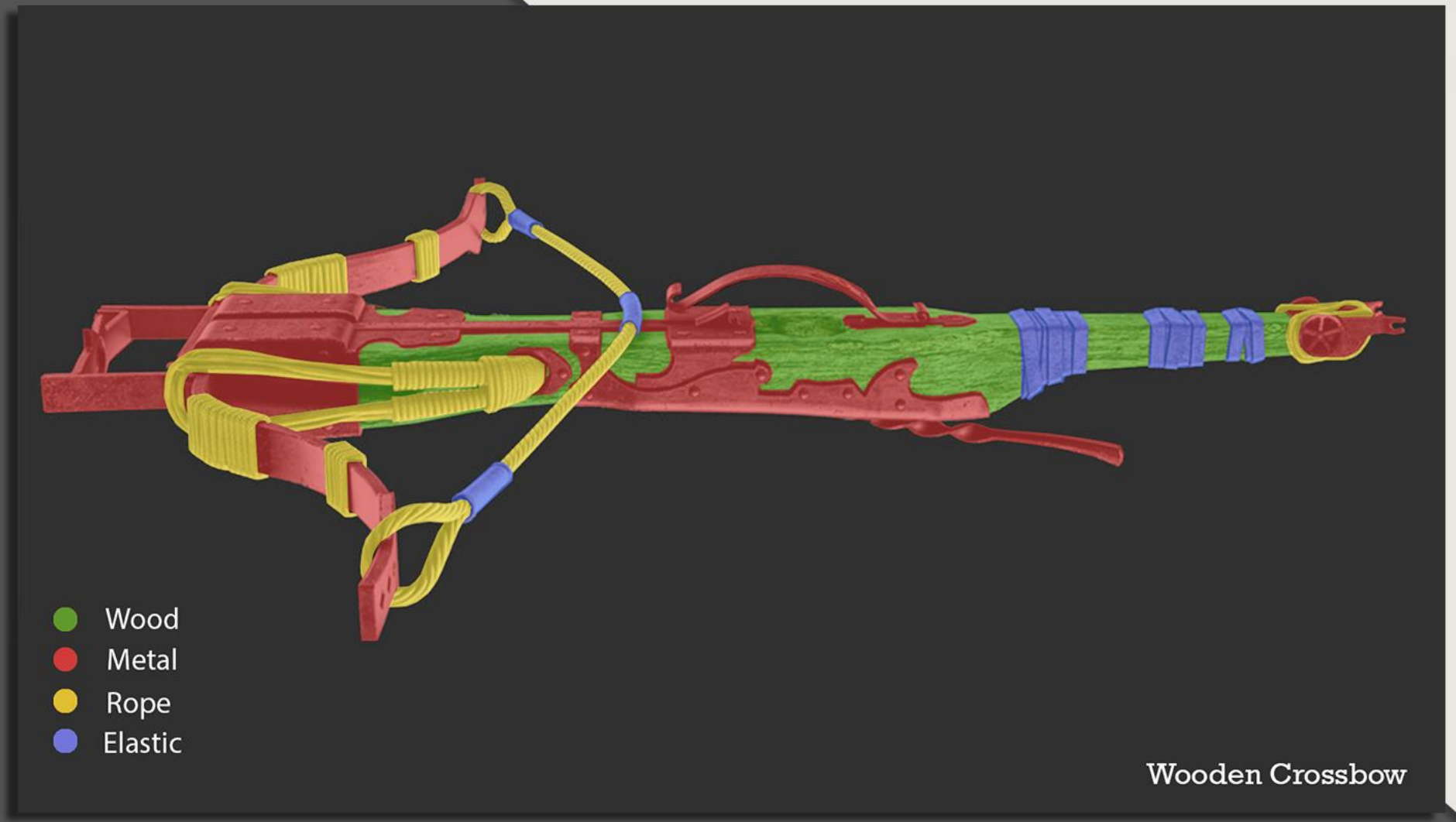
As an environment artist, I should be able to make realistic hero assets while maintaining a low poly count. This asset pushedme out of my comfort zone and gave me a deeper understanding of the workflow.

Research and Planning



After going through a couple of references narrowed down my choice to the crossbow in the middle.

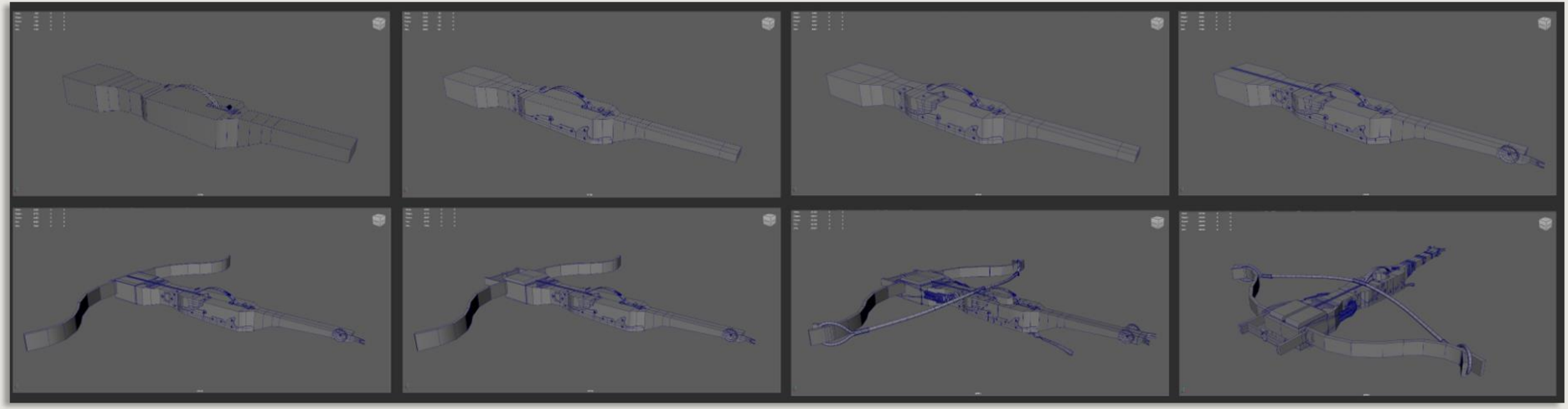
Research and Planning



After finalizing the asset,
I created a material blockout page.
This would inturn help me in three
modeling phase to break down
the complex shapes into smaller
and easier ones.

I continued with the modeling phase,
but initially encountered some issues
with proportions, as my references
were not in a complete
orthographic view.

Blockout

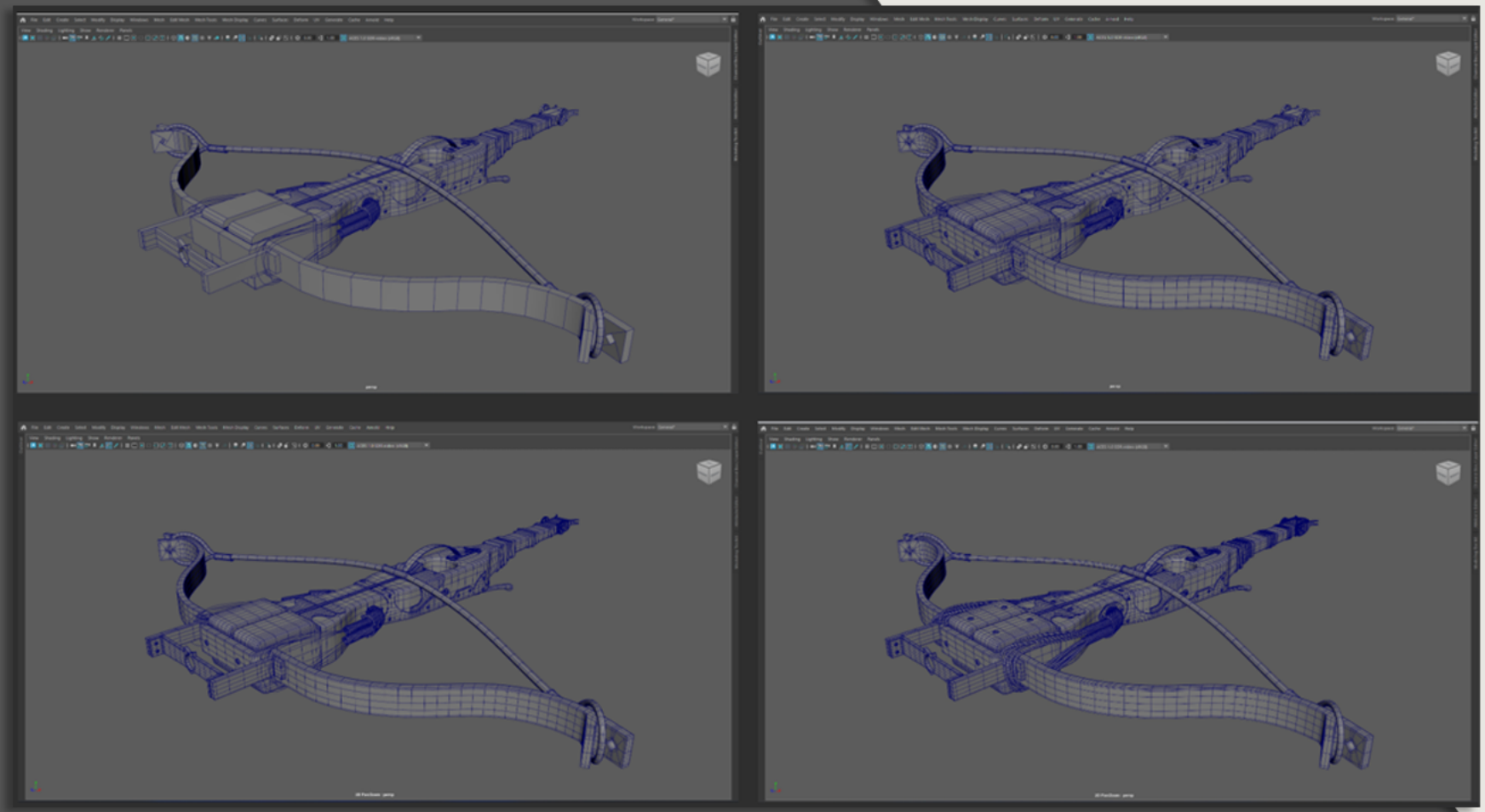


As seen in the first images
, I struggled with the proportions
and the overall shape (first few images).
My goal for the blockout was to keep a clean
lowpoly mesh that I could later use
for baking

The metal around the body was a bit tedious,
as i had to achieve the shapes while
maintaining a clean topology.
The head of the crossbow was fitted
with another complex section but since
this was the blockout phase I simplified it
into 2 separate shapes.

The rope bundles were made using a
helix primitive combined with
a bend modifier.
The individual rope strands were made
with a curve followed by the sweep
mesh tool in Maya.

Mid-Poly

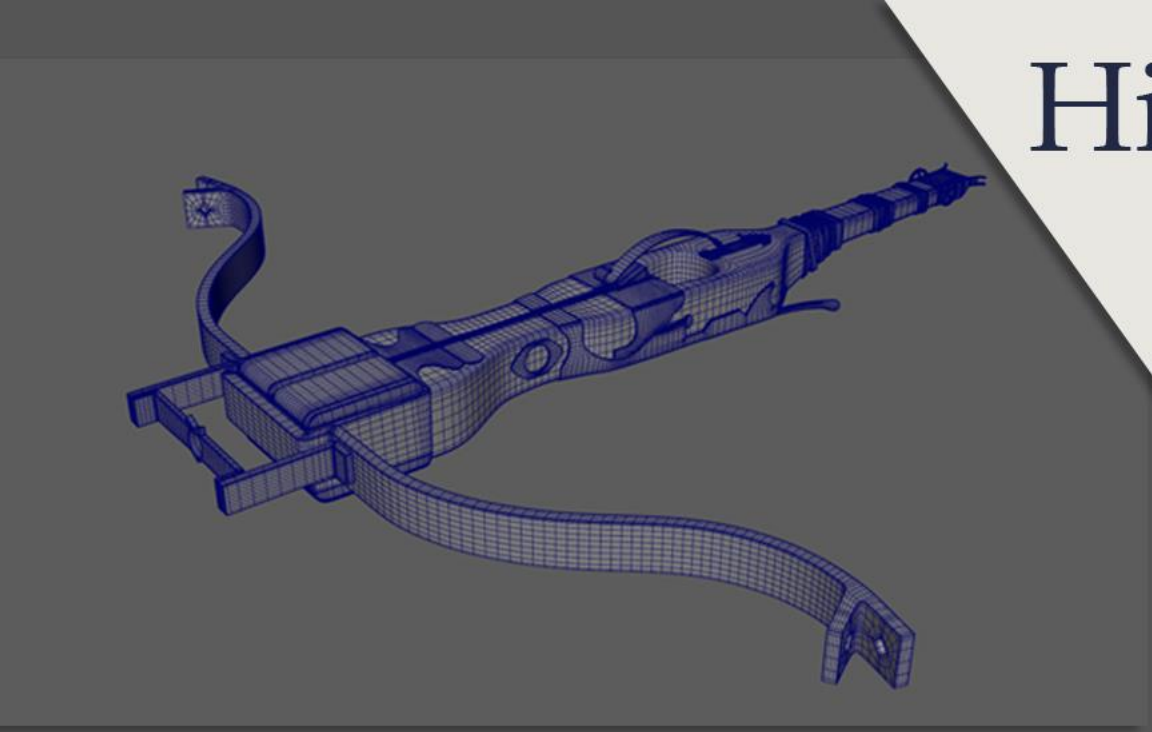


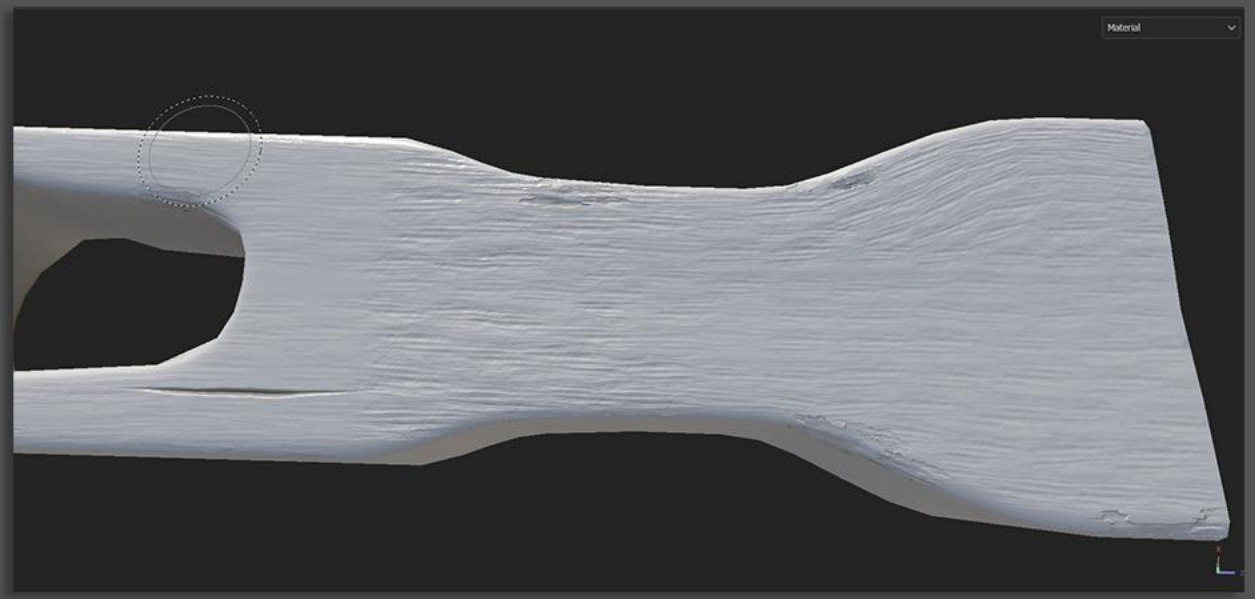
Converting the blockout to a mid-poly was the most crucial stage as I beveled the edges to closely match the reference.

The wood bevels were the most important detail, as it helped me define the the overall character of the crossbow.

The metal bevels turned out quite well, with a nice light falloff.

High Poly



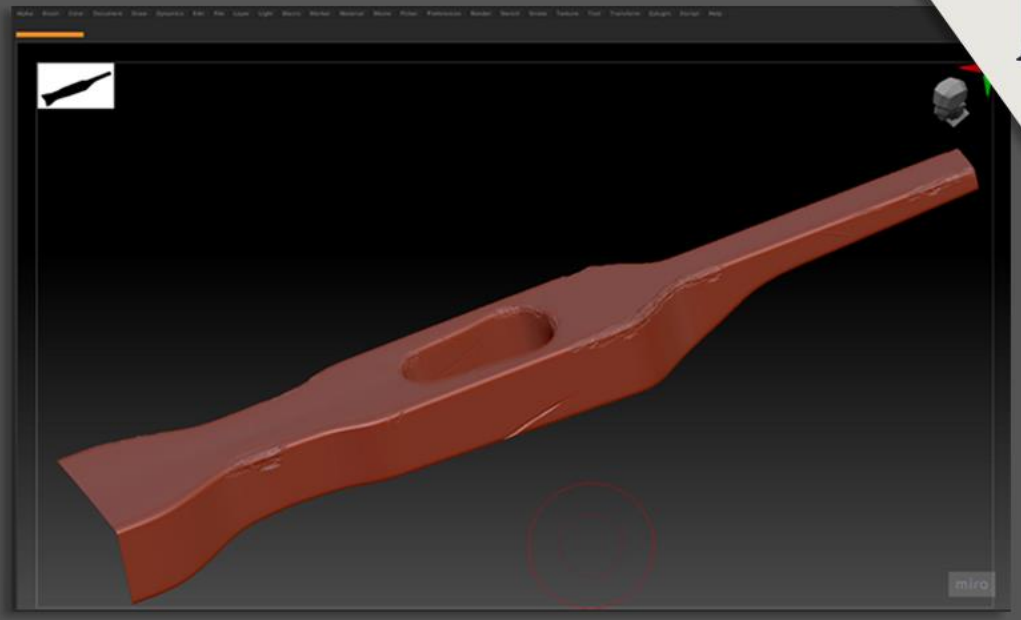


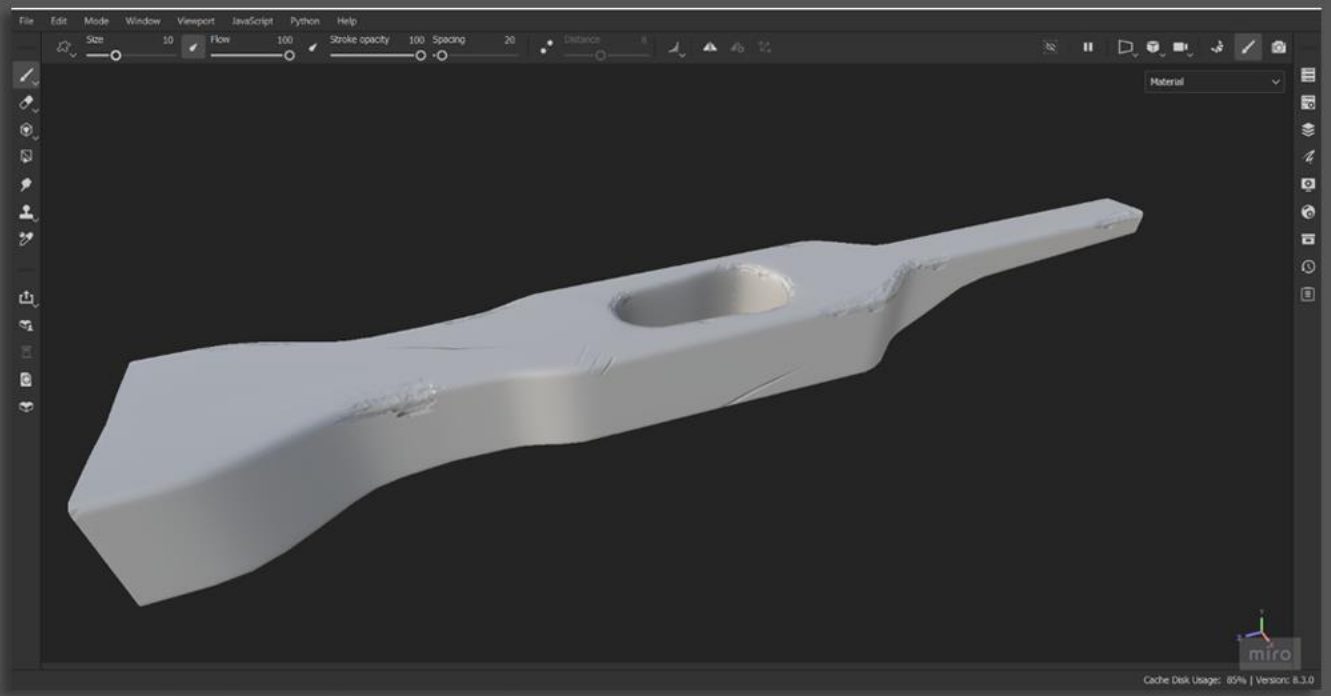
Adding a poly smooth to the mid poly turned out really good with regards to the topology, I did not see any deformations/ mesh errors anywhere.

Zbrush was a relatively new software for me. My initial plan was to add wood,metal and rope details directly in zbrush. I experimented with some test sculpting and then exported it to painter and baked it but the result weren't as expected.

I used an alpha in zbrush to add the wood grain details.with a couple of variations to get a sense of thegrain flow.
While the larger chips and wear and tear details turned out well in the bake, the flow of wood grain didn't look quite right.

Baking Test





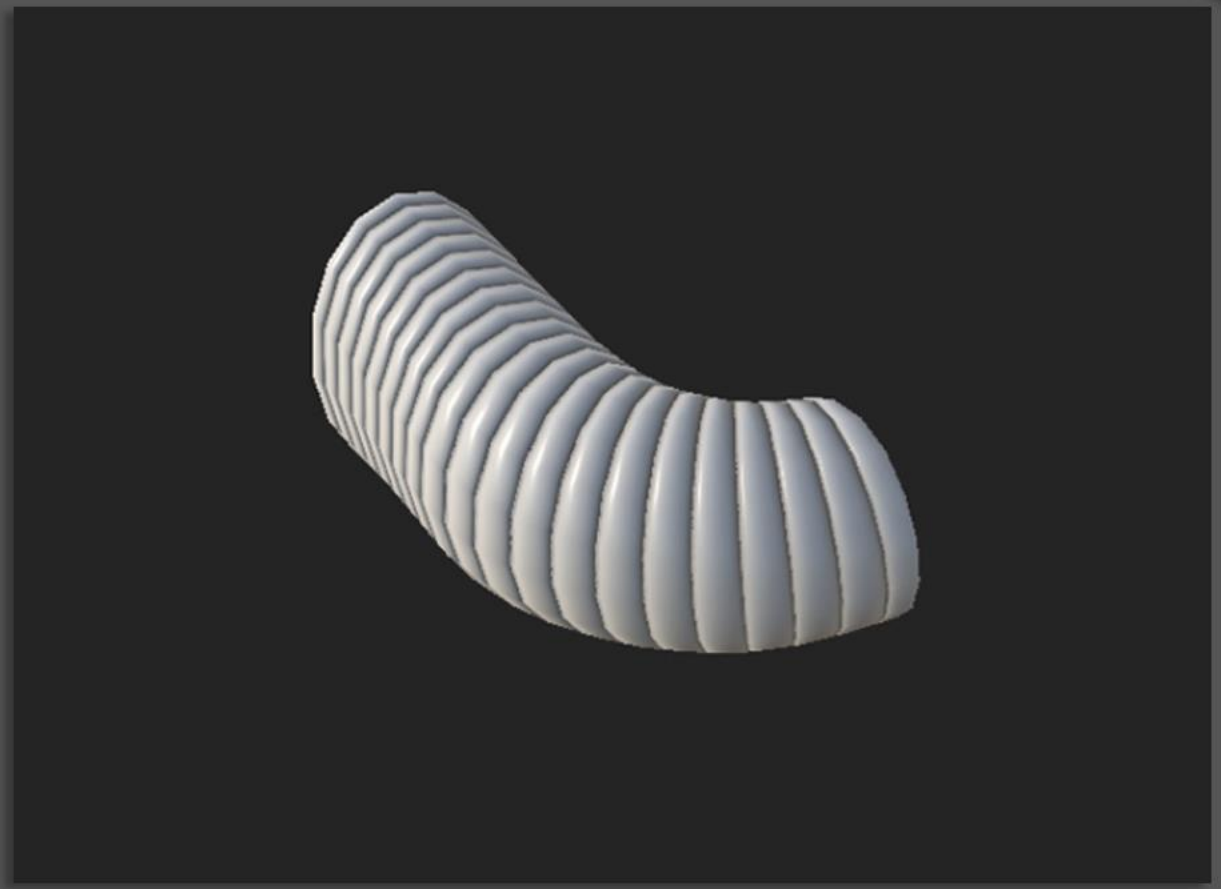
After discussions with Human and a couple collegues, I decided to shift my approach. Instead of focusing on the major details in ZBrush, I decided to create them in Substance Painter and use ZBrush for adding the macro-level details.

In zbrush, I added the edge wear and tear in a non uniform manner to avoid repetitive patterns, creating a more natural and varied appearance.
To further push the detail, I layered in some scratches giving the surface a more worn look.

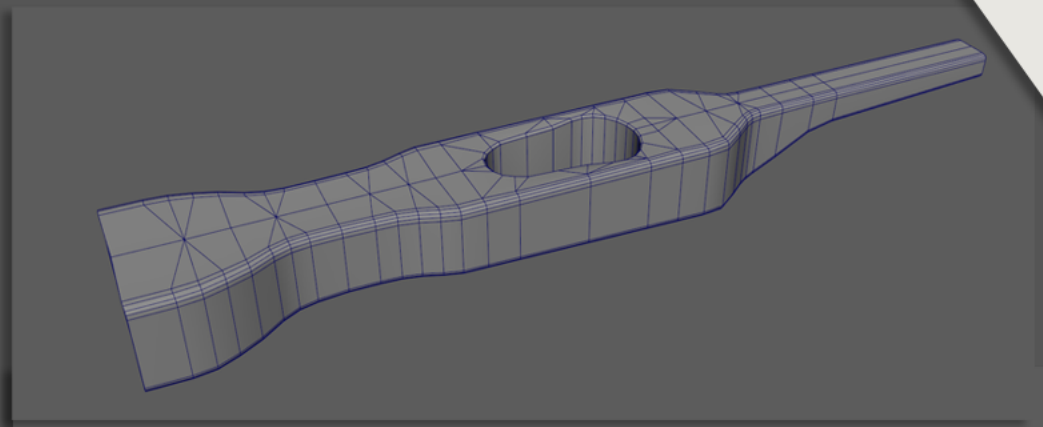
Once the details were finalized in Zbrush, I exported the file to Substance Painter and did a quick bake test, which gave a desired result.

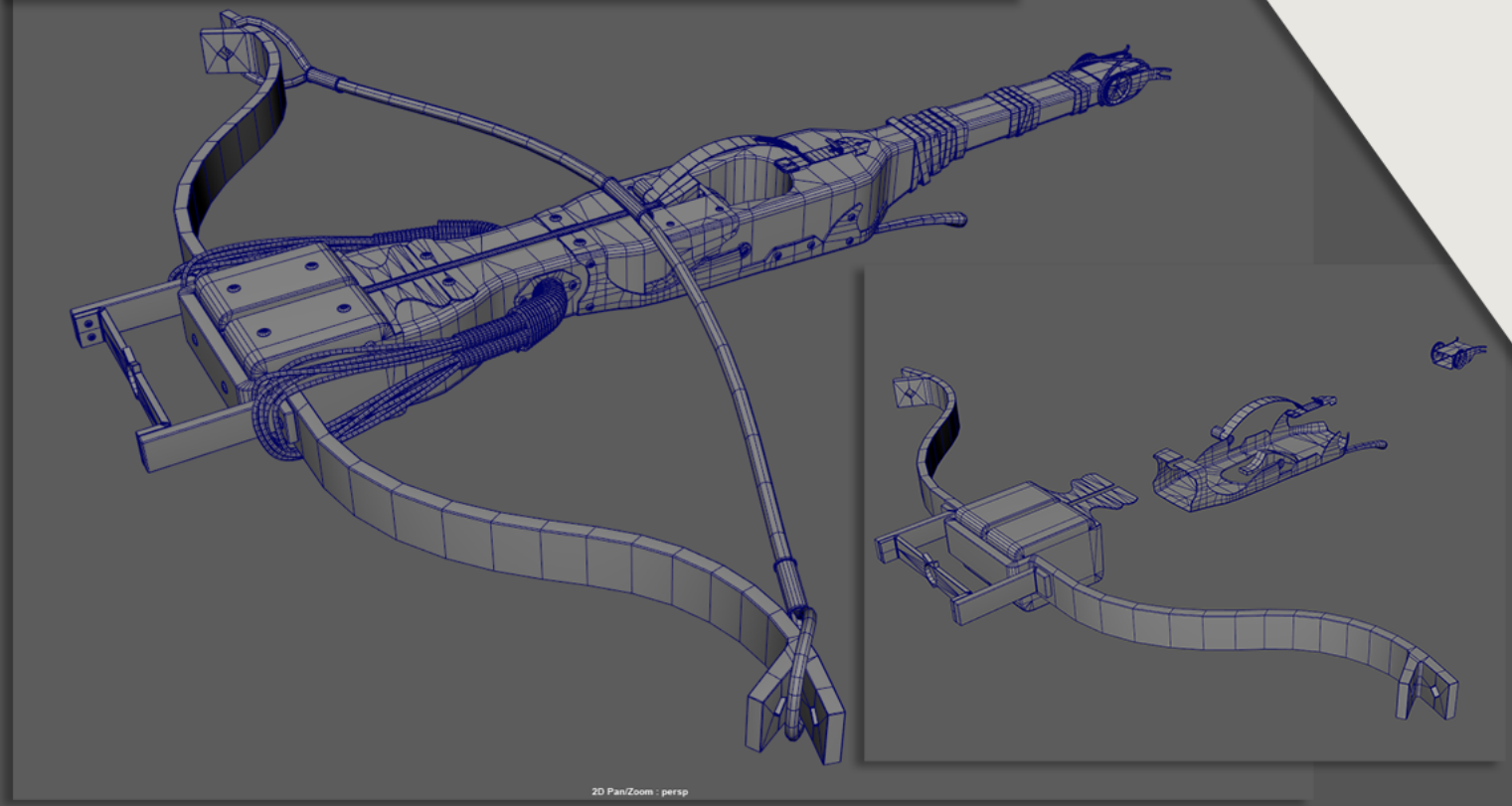
Baking Test

These are a few additional baking tests I conducted for the rope. However, I wasn't satisfied with the bake results, particularly in the front section, which didn't capture the desired level of detail and texture.



Low-Poly



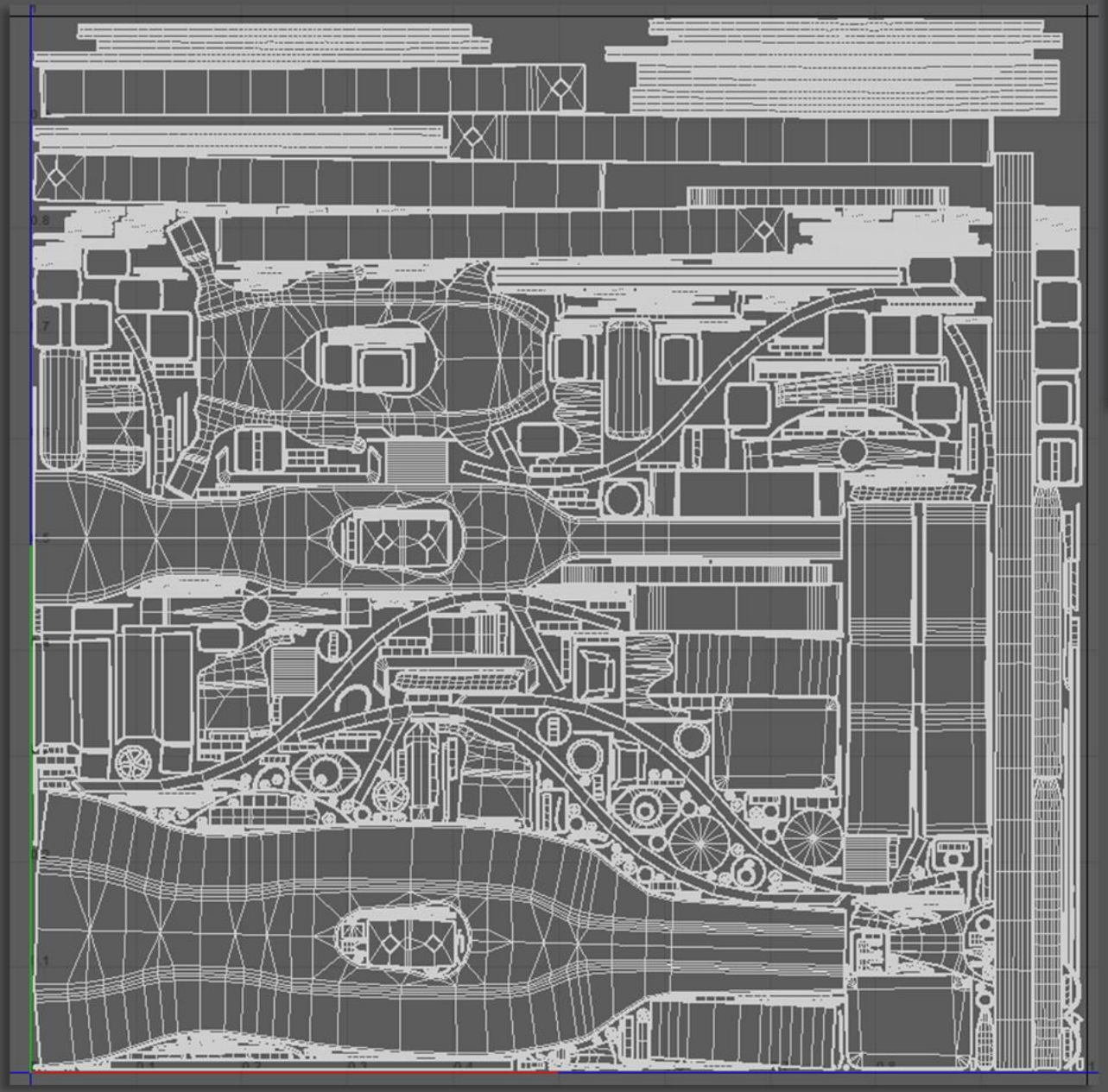


Converting the mid-poly model to low-poly proved to be the most tedious stage. It required carefully removing unnecessaryedges and optimizing the geometry, while ensuring the overall shape and silhouette remains the same.

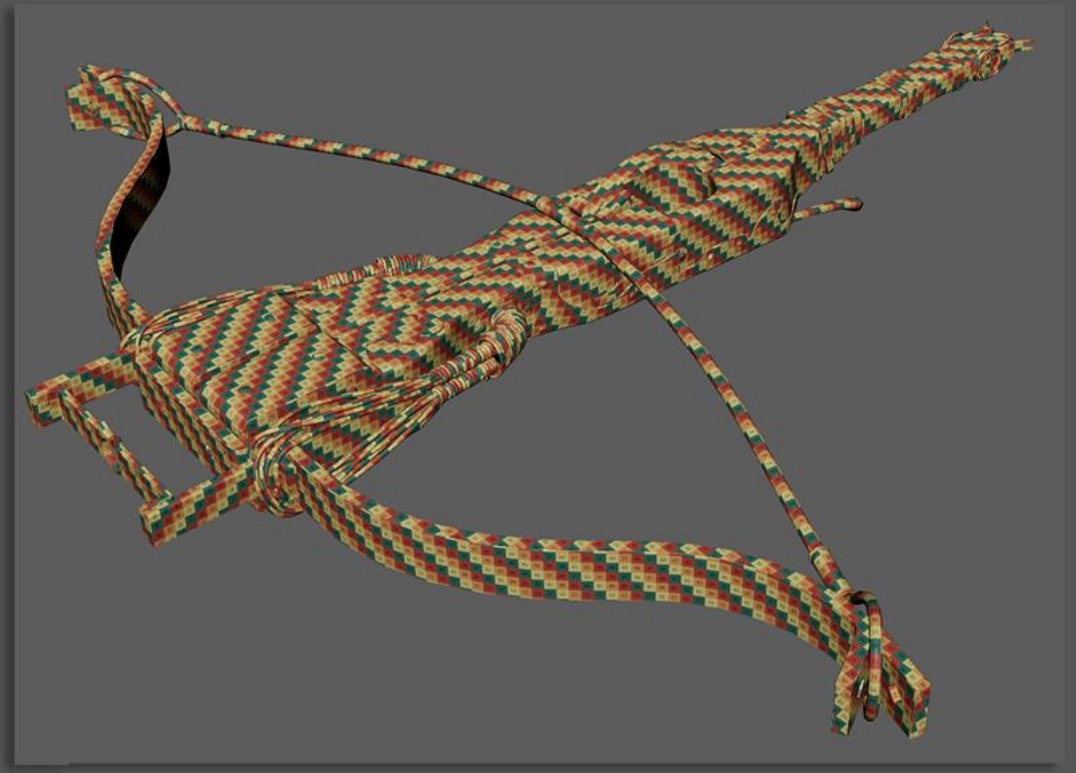
Converting the wood handle was relatively easy compared to the metal components. The metal parts were the most difficult, particularily with the topology and surface shading. Defining the edges of different metal parts while using weighted normals took considerable time.

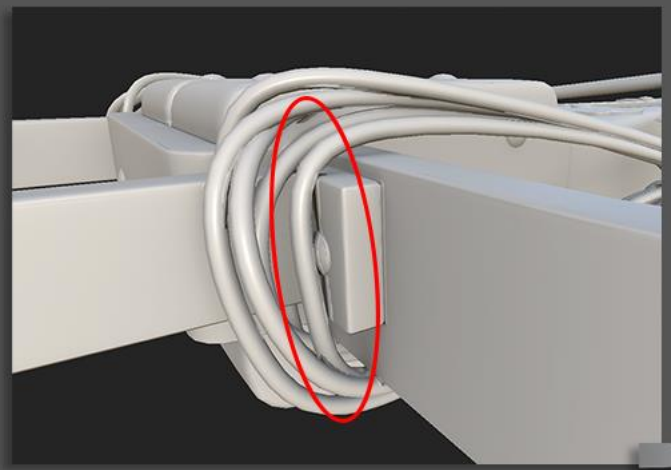
The ropes on the other hand was optimized by delteingbackfaces and removing unecessary edge loops while keeping the shape and curvature intact.

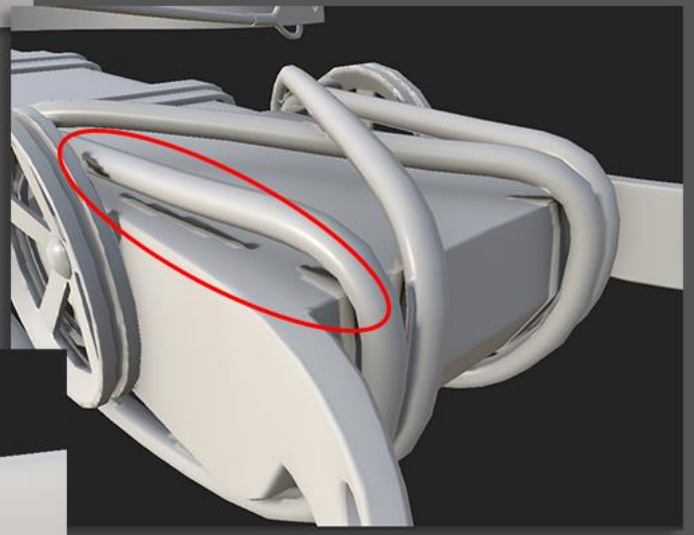
UV Unwrap

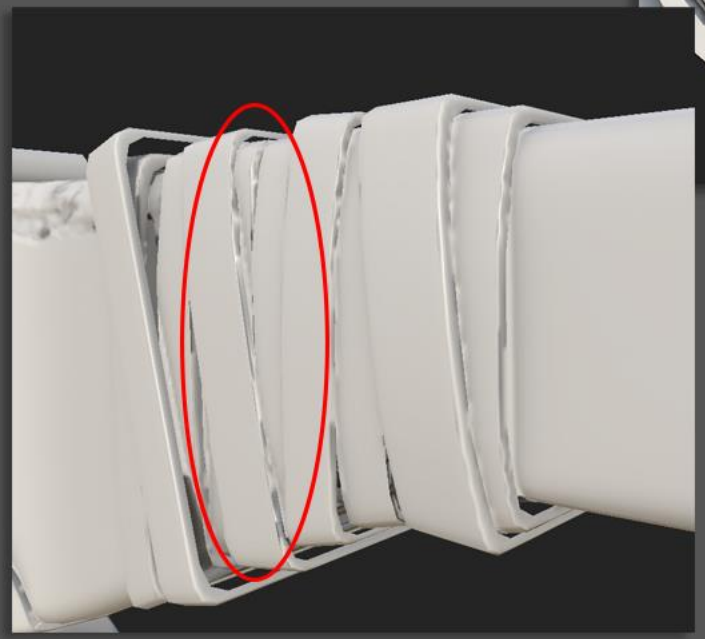


After completing the low poly model, I started unwrapping from the largest piece that is the wooden handle, made my way to the metal parts, then the leather and finally the ropes. The UVs unwrapped pretty well, even the bigger chunks. I knew the unwrap was successful as there was no stretching when I applied a checker map texture.







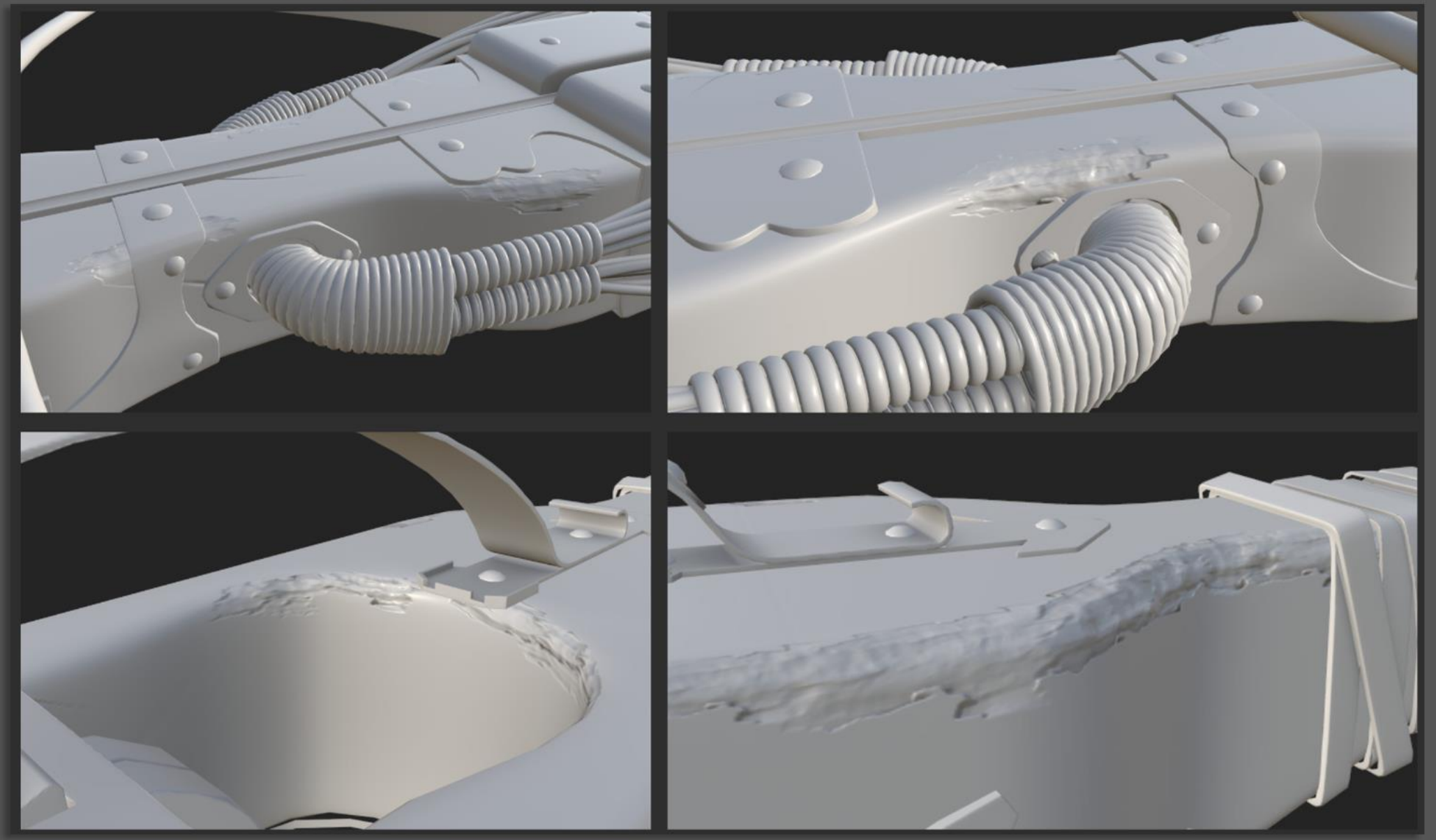


Baking

The majority of issues in this project was in the baking stage. The high and low poly models were overlapping perfectly, but I was still getting these artifacts (as shown in the images).

With a little back and forth from maya and subsatnce painter and with Human's advice to use the bake by mesh names method by using"_low" and "_high" suffix for the low and high poly mesh respectively, It gave me a good bake to start the texturing process.

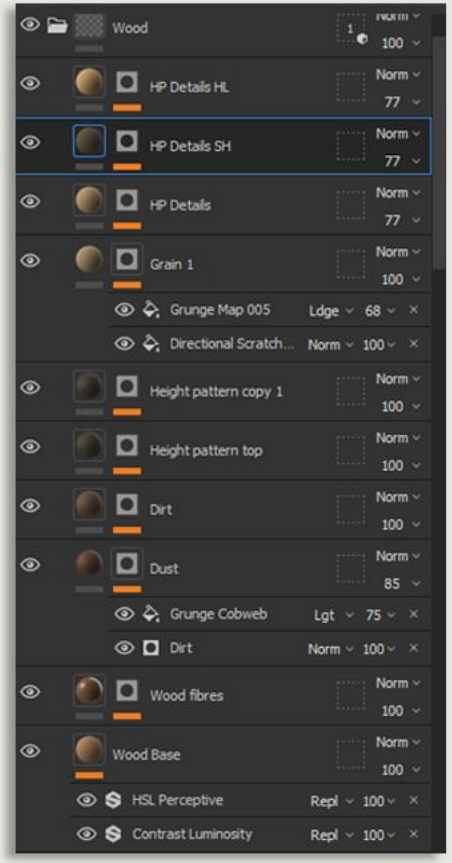
High Poly Baked Details



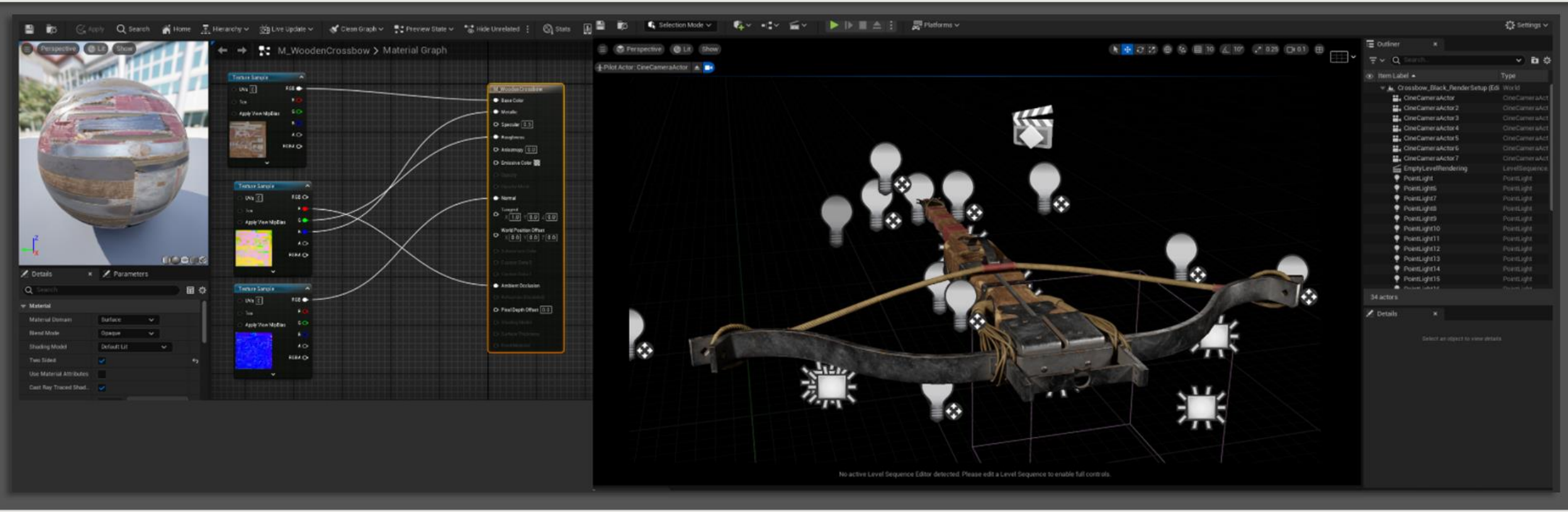
Texturing

Wood

The wood texture was fun to work on.
It has been layered with multiple wood grains with varying depths and colours. The highpoly details were essential in adding realism to the final result.



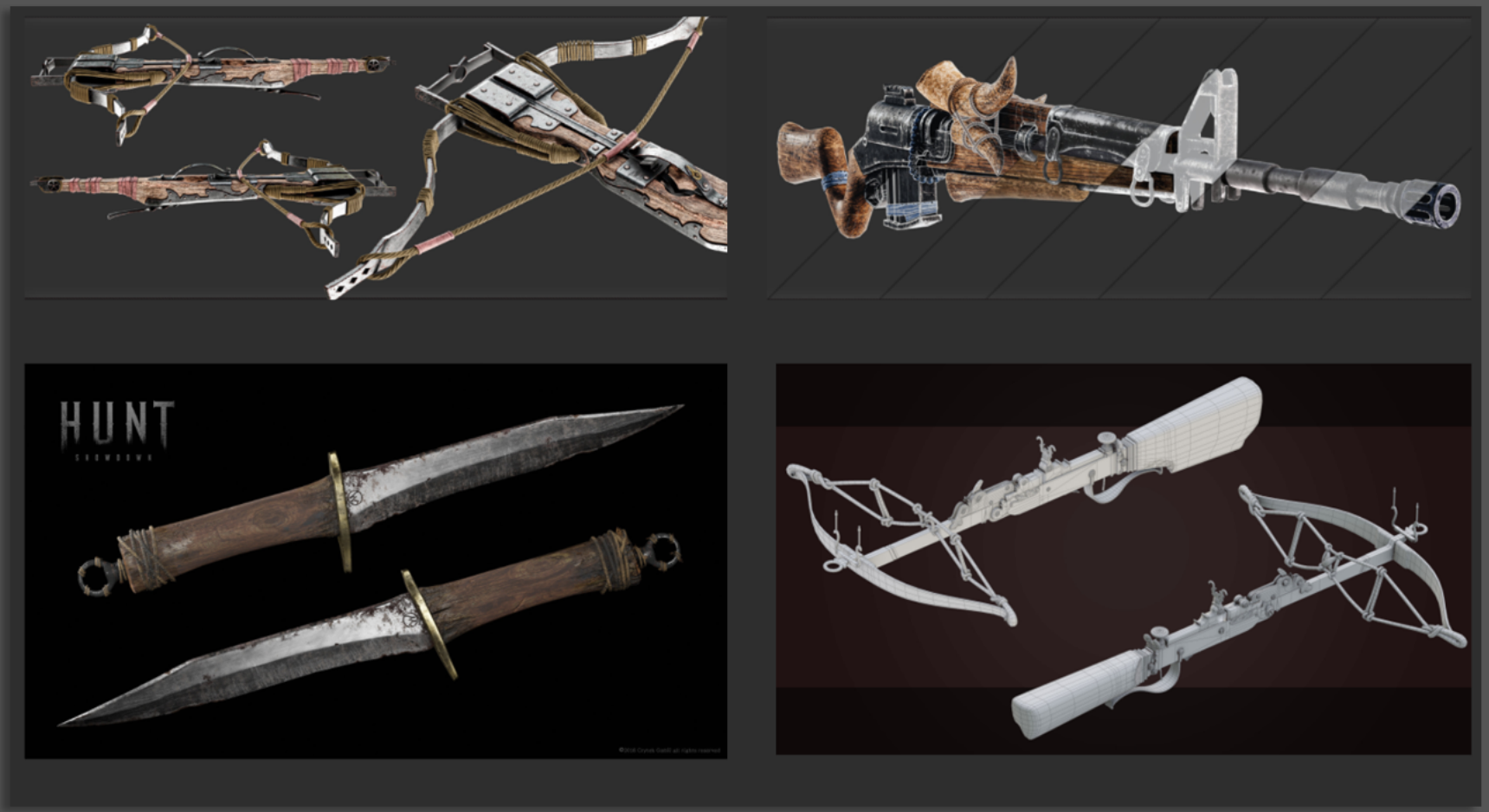
Presentation



In Unreal Engine 5, three texture maps are used an albedo, an ORM and a normal. My initial light setup consisted of 5 lights, which were 1 Key light, 2 fill Lights and a Rim light. further to that i added few more lights with low intensities to lighten up areas which were too dark.

For my renders, I first set up the hero shot and adjusted the lighting as needed.
When positioning a different camera, I had to reposition a few of the lights to ensure the new angle captured the scene effectively and produced a high-quality render.

Presentation : Comparison to Industry Examples



When comparing different Professional presentation sheets, one common factor would be a solid grey to dark background. Most follow a 2 object template like the knife and crossbow above. The gun however has been split into into multiple render passes. The Crossbow at the top has an interesting layout with 2 orthographic and a 3/4 top perspective.

Presentation : Comparison to Industry Examples

For my presentation sheet, I opted for a solid grey background with a darker tone. The borders initially appeared too plain, so I added a subtle vignette to provide some contrast and enhance the overall composition. I followed the example in the top left corner as a reference, but it felt too minimal, so I decided to add a perspective shot to give the presentation more depth.