

## The Mech Touch Chapter 13: First Build

The Skill Tree featured a virtually endless amount of skills. With enough Design Points, Ves could become the ultimate mech designer, capable of drafting a complete design in minutes with his left hand while pointing out the faults of someone's else work with his right hand. Naturally, Ves lived in a world where time and resources were finite, so he didn't delude himself into thinking he'd ever reach that point in his lifetime.

For all its merits, the Mech Designer System represented an incomprehensible piece of technology. Sometimes Ves felt as if reality itself bent to its whims. He didn't know how sapient the program was or how it determined its own limits. If one day the System's sophisticated AI turned crazy, entire star systems might get embroiled into war.

The System in fact always addressed him as a user, not an owner. It acted as if Ves was just one client who conveniently picked it on the ground. If Ves' father hadn't given him the data chip, the System might have found a way to get its chip transported to some other person with the traits it preferred. This insecurity made Ves question if the System was using him rather than the other way around.

Certainly the System didn't work for free. Some powerful entity had gone through the trouble of designing a reality-bending software working on principles at least a thousand years beyond humanity's grasp, and somehow it ended up in an average person's hands. And it was a question whether the System will stay in that person's grasp for long.

For all Ves knew, the System only treated him as a train. Once it reached its destination, it would leave without a word.

So Ves felt the need to milk the System while he still could. So despite all his doubts and questions, he still skimmed over the Skill Tree and made a shopping list of skills he needed to tackle the redesign of the Caesar Augustus.

[Assembly - Upgrade to Apprentice]: 1000 DP

[Assembler Proficiency I]: 200 DP

[Assembler Proficiency II]: 400 DP

[3D Printer Proficiency II]: 400 DP

[Jury Rigging II]: 300 DP

[Electrical Engineering - Incompetent]: 200 DP

[Electrical Engineering - Novice]: 500 DP

[Electrical Engineering - Apprentice]: 1000 DP

[Mediumweight Armor Optimization I]: 300 DP

These were the absolute minimum required to produce or to redesign a Caesar Augustus. Ves needed to become much more familiar with the tools in his workshop in order to fabricate the C1's notoriously delicate components and put them together. And if he wanted to redesign the mech to make it easier to produce, then he needed to become proficient in electrical engineering pretty fast.

Since Ves was attempting to fabricate a stock C1 in Iron Spirit, he felt he should make a start on a purchase. He picked the cheapest option in the list and bought it immediately.

[You have spent 200 DP to acquire Assembler Proficiency I. Please view your Status in order to confirm your skills.]

[Status]

Name: Ves Larkinson

Profession: Novice Mech Designer

Specializations: None

Design Points: 98

Attributes

Strength: 0.7

Dexterity: 0.7

Endurance: 0.6

Intelligence: 1.2

Creativity: 1

Concentration: 1

Neural Aptitude: F

Skills

[Assembly]: Novice - [3D Printer Proficiency I] [Assembler Proficiency I]

[Business]: Apprentice

[Computer Science]: Incompetent

[Mathematics]: Incompetent

[Mechanics]: Apprentice - [Jury Rigging I] [Speed Tuning I]

[Metallurgy]: Apprentice

[Physics]: Novice - [Lightweight Armor Optimization I]

Evaluation: Halfway stepped out of the stupidity cave.

His status hadn't changed much except for the painful loss of so much DP.

Now that he had the means to produce a virtual version of the Caesar Augustus, Ves got ready. He logged in the game and entered his workshop. It was a good thing the machines in the workshop scaled to the mech you were working on. Iron Spirit remained a game even if it touted itself as a simulator, so it didn't want to scare people off by being too greedy.

However, some people spread rumors that the game would introduce a future update that 'enhanced' the gameplay experience of designers by forcing them to start paying for upgrades in their equipment. For now, the game simplified many things for Ves which he felt grateful for. He only had to pay 40,000 credits to get the raw materials for the C1 delivered to his virtual workshop.

In actually, the cost of raw materials didn't actually represent the value of the digital goods Ves received. The pallets of metals, plastics, ceramics and other materials he received were just a bunch of data that could be infinitely duplicated.

The payment acted more like a tax in another name. Some of it ended in the hands of the taxmen, in Ves' case the Bright Republic. Another portion got sent to the intellectual property owners of the many mechs and components Ves used in his designs. Only a relatively small portion of credits remained as revenue for the BSBH Corporation that ran Iron Spirit.

"Well, now it's time to transform these ingots and pellets into working components." Ves rubbed his digital hands as he approached the virtual workshop's 3D printer.

The house-sized machine was a souped-up version of the one he had in his real universe workshop. Much of its features and quirks carried over. With a familiar hand, Ves started loading the blueprints of the frame, the most fundamental part of a mech, representing the skeleton that anchored the other components.

Since it mostly consisted of solid pieces, with the occasional hinges and joints, the production occurred smoothly. The young Jason Kozlowski hadn't messed with it evidently. Still, due to the higher quality alloys used in its composition, the construction of the frame took up half a day.

Next came the power reactor, the part that generated energy from energy cells or processed fuel. In general, the power reactor was a mature piece of technology. Developers only tinkered with it here and there to provide a few more percents of efficiency or maximum capacity. They could be easily scaled to tailor a mech's weight class, and the C1 featured a fairly well-designed medium reactor.

As a long-standing manufacturer of aircars and shuttles, National Aeromotives produced their own lines of power reactors. Jason borrowed a premium reactor available from the company's R&D division and stuffed it in his design.

The reactor required extra precision in the fabrication of its many miniature parts. Ves had printed engines from scratch before with the 3D printer, but this was the first time he took the trouble to print each millimeter-sized component one by one, and assembled them all together by hand. The tedious work took up an entire day. Ves felt he did an adequate job, in that the reactor worked. Whether it performed well, that was for later.

With that experience over with, his work on the engine proceeded a little smoother. Unlike the reactor, the engine took in energy to produce motive force. It allowed the mech to move its limbs and run like a marathon contestant. Much like the power reactor, Jason also borrowed it from his daddy's company, so it contained little innovations that made it troublesome to produce. Ves grew highly appreciative of NA's craftsmanship when he finished assembling the engine.

After that followed the musculature that made use of the motive force to move the mech's limbs. Cheaper mechs such as those used in agriculture used hydraulics, electrical engines or a bevy of other cheap alternatives. Combat mechs required something more sophisticated, to better emulate a living being's responsiveness when pilot connected to them neurally. Lucky enough, the technology behind artificial

musculature remained stagnant for over a century, so its production went like a breeze.

Next came some of the most difficult parts, the computer chips and cabling that provided instructions and processing power to a machine. It represented the brains and nervous system of the mech.

The chips demanded the most from the 3D printer, but they weren't difficult to produce since they were lastgen technology by now. The amount of miniaturization and other fancy stuff that went into the production of a chip could only be taken care of by an automated program. Ves only needed to inspect the 3D printer beforehand of dust and faults before producing the tiny chips.

Ironically, the cables required more finesse. As if aware his mech required too many cables, Jason chose a special mix of metals and insulators in different proportions depending on the size of the cabling. A single string of cabling could either be thicker or thinner at certain parts depending on its location. It made for a fine mess when you added in the sheer number of cabling, and Ves felt he was growing mad at the end.

After a long rest and a good night's sleep, Ves continued with manufacturing the specialist components of the Caesar Augustus. These components differed wildly from each other, as Jason had filled in a shopping list of all the best commercially available components.

The ECM, radar, boosters, gyroscope, cockpit, sensors and all the other components came from wildly different manufacturers. This meant that Ves had to watch out for certain issues on one set of parts, but needed to pay attention to a different area with another set of parts. Ves diligently read the documentation while he went over each component, so he hadn't been met with outright failures.

However, many parts came off the 3D printer in a marginally acceptable state. Ves lacked a reserve of raw materials to fabricate replacements for all but the worst parts. It just couldn't be helped. He could only blame Jason for blindly picking the shiniest toys and rely on his super-duper expensive industrial scale workshop to reproduce them perfectly.

With much of the interior of the mech done, Ves turned to the most expensive part of the mech, its proprietary armor. Thirty years ago, a manufacturer required a dedicated machine from National Aeromotives to mix a bunch of metals into a highly compressed piece of plating.

Fabrication technology advanced since that time, and now that the armor's formula became semi-public knowledge with the release of the C1's licensing options, all modern 3D printers could reproduce it as long as they weren't too cheap.

The Caesar Augustus required a large amount of plating for a medium mech. The large, bulky sword and shield also added to its total weight, almost pushing the mech into the heavy weight class.

The production of the plates came with its own challenges. Due to Ves' inexperience, some of its armor plates came out of the 3D printer with higher than normal stress or other issues. If the virtual 3D printer wasn't so good, Ves might get stuck with a number of half-failed plates.

"Damn." Ves sighed as he finally finished producing all of the C1's components. "This is more tiring than I thought. There's a world of difference between 1-star and 5-star mechs. Hundreds of years of technological progress only made things harder to build. I really miss the simple Fantasia."



The challenges he faced with this step alone broadened his vision of what mechs were capable of. Working on a near-modern mech meant for elites taught Ves what this target segment looked for in a war machine.

"An elite mech has to meet different requirements than regular frontline mechs. They pack as much armor and punch as possible in a reasonably mobile package. Energy efficiency isn't necessarily a problem when you can swap fuel or energy cells from a support group on the field."

Jason wasn't wrong to design the C1 along those lines. He just went a little bit too far with it. Competing mechs could do almost everything the Caesar Augustus could do, but lasted a little longer in the field. Sometimes that extra time counted, so procurers wanted to be safe than sorry by picking the less exaggerated choice. The Caesar Augustus was also a bitch to maintain in a chaotic battlefield, so generally only wealthy ace pilots who cared a lot about peak performance bought the models.

"Next up, assembly."

To assemble the mech from scratch, Ves first put together the frame. The parts that composed the mech's skeleton were built to be big and robust, so Ves easily got to practice his enhanced assembler sub-skill without much risk. The skill improved his ability to manipulate the lifters and arms that composed the assembler module. The parts that he wanted frozen stayed still, while the parts he wanted moved got shifted around just enough but no further.

As Ves already assembled the power reactor and engine by hand, he only needed to place them delicately in the slotted areas of the frame.

After that, Ves added the other components and systems that made up the functionality of the mech. The biggest piece was the cockpit, followed by the energy storage unit that stored the replaceable energy cells. All the smaller systems followed, such as the sensors and boosters.

Finally Ves reached the most troublesome stage. All of the components had been installed on the mech, but they remained isolated to each other. Ves had to connect each of them together in a mish-mash of cables and pipes. In between these relatively delicate components, Ves also had to squeeze in a lot of artificial muscles. Sometimes that led to very tight fits.

The work tested Ves the utmost. He screwed up many times, having to remove the cabling and do the placement all over again. Sometimes he had to cram a bundle of cables through a narrow opening between pipes by force. The stress and frustration caused Ves to slip his fingers sometimes, causing unforgivable mistakes in the assembly.

After a nerve-wracking day of playing plumber, Ves finally reached the end stage of the assembly. He spent a much more leisurely time putting the armor plates together. Sometimes the improper cabling caused the plates to fail to adhere in its position. Ves sometimes had to hammer the problem areas lightly in order to cram the pieces of armor in their place. It proved the parts he fabricated were of substandard quality.

"It's finally done." Ves said as he sprawled on the ground in exhaustion. The diagnostics and debugging still ran in the background, but Iron Spirit took care of most of the issues that popped up at this stage.

"What do you think, System? Did I do a decent job? Why aren't you giving me an evaluation yet?"

[The Mech Designer System only evaluates designs, not copies. Since you are not the designer of the Caesar Augustus C1, you will not earn any Design Points even if you manufacture it a thousand times. Please work hard and make your own designs.]

That made sense. The System didn't want to bring up a technician or a factory supervisor. The main job of a mech designer was to make designs. The act of fabricating a mech in person was only done in order to understand the mech better or to ensure its quality.

Ves could only rely on the numbers given by Iron Spirit in judging how well he built his first Caesar Augustus. And from what he read so far, the news wasn't looking good.