In July 1995 Harley-Davidson faced one of its toughest challenges by building what would later be called the V-Rod. It started when the company realized that they were losing a substantial amount of customers to the sport motorcycle market. This was a problem for them since they were such a staple in the motorcycle industry. With this problem they looked further into what they needed to do to still be competitive in the market. So they began to look into their sport bikes they had designed already. They knew that along with this idea they would need a liquid cooled engine, which was something they had never done before with their classic bikes. They also needed the bike to be street legal. The sound was something that needed to be regulated. The bike also had to be long lasting and fuel efficient.

The VR1000 was a very fast racing bike and they wanted to find a way to combine the best of their racing bikes along with their classic Harley-Davidson style. To support the engine they wanted to put in the bike they developed a double railed top tube frame. This added stability and strength for the amount of torque the engine would push out. They wanted to use a metal gas tank like they had in all their previous models. But with the size they wanted the gas tank to be they wouldn’t be able to fit everything on the frame of the bike in the correct fashion. Also, they needed the bike to be liquid cooled they needed a radiator. This was the first time they were using a radiator on a bike so with this they had many problems. They decided to put the radiator on the front of the frame behind the wheel. The design team and engineering team kept going back in forth with the overall look of the radiator and the function.

The engine design was difficult so they sent a team to Porsche to collaborate and design an engine to fit their constraints of fitting in the frame, being fuel efficient and being long lasting. Meanwhile another team was still building the frame. They came up with a way to cut the amount of welds down from 17 to 7 by hydroforming the frame tubes. Once they were all in agreement for the prototype for the bike they started testing the bike. Once they conducted these tests they realized the bike still had a long way to go.
The engineering team and the design team had to talk back and forth about the redesign of the bike. One recurring issue was the radiator. With the prototypes the design team was proposing, the engineering team thought to be impossible. And with the prototypes the engineering team was proposing, the design team thought them to be not suitable for the bike. So they had to compromise. The compromise was made after many redesigns. This was made much easier when an engineer on the team put flaps in the intakes for the radiator. This allowed for better airflow with a design the design team thought looked good on the bike. Many other parts had to be redone to fit the final prototype such as the exhaust. They wanted a double piped exhaust for the bike. But with the way the metal needed to be shaped coming off the frame of the bike, this was impossible. So they built, tested and redesigned many times until they came to the solution of bending the two pipes into one compartment to make it more physically possible for the pipes to fit. From there they split off into a two-pipe look for the exhaust. The gas tank issue was also solved too. They decided to sacrifice the metal gas tank look that they had used for all of their designs before and use a plastic molded tank.

Once the final prototype was created it had a sport bike inspired, fuel efficient engine which was liquid cooled. They had their radiator for their liquid cooled engine placed on the front of the bike. They also had their plastic molded gas tank that held the amount of fuel they desired for the bike. And they built this all on their originally designed double-tube frame. These were all firsts for Harley-Davidson and would have been impossible if it weren’t for the process of engineering design and hard work.