The first stage of the engineering design process includes the recognition of the need. In this case Harley Davidson recognized that they needed to manufacture a motorcycle that could match the power and speed of a sports bike, while maintaining the Harley Davidson look and appeal. To do so, they planned on including a new liquid cool engine with 108 horsepower output. They hoped this would win back customers they lost to sports bikes.

The problem for Harley Davidson was that they were losing customers to sports bikes, because these bikes performed better than theirs did. This bike needed to include this high performance while maintaining the Harley style that their customers had grown accustomed to.

The next stage involved gathering information about the logistics of this idea. They looked at the VR-1000, which was their racing bike and used the engine they wanted to put into their new bike design. Harley also tried to find a name for the bike by researching different products. Also, they looked into the performance of the sports bikes they were trying to match with their new bike.

Brainstorming was the next process undertaken by the Harley design team. They used a multitude of models, included ones made out of clay and 3D sketches in computer programs. They discussed structural ideas, such as having a long front end, and how they were going to include a radiator that looked stylish. The style team and engineering team had to work together to make a plausible, good-looking design. Discussions also involved how they could put customizations, a big deal to Harley customers, on this sleek bike.

The next step involved comparison and selection of ideas. Choices ranged from air cooled engines versus liquid cooled ones, rounded frames versus straight ones, how they would put a gas tank on this bike, etc. The bike was made to look like a dragster, and a vortex generator was used to make the radiator work properly. Many designs made by the engineering team were turned down by the style team, and vice versa.

After the comparison and selection of ideas, analysis and design commenced. They had to work in all the designs they agreed upon into a real bike, such as the rounded frame, or the liquid cooled engine in the V design. They also looked at multiple radiator designs in a wind tunnel in order to come up with one that could get enough air flow behind the front wheel. Different metals were used in the frame, but they eventually settled on using aluminum.

Prototypes were then designed and tested. The engine was put through the Dusseldorf test, which simulated a 400 hour trip on the Audubon. A crude version of the bike with the VR-1000 engine was built and tested at one of the guy’s house, which allowed them to find out the bike was very fast. The radiator prototypes were tested in a wind tunnel, allowing them to test air
flow through the radiator. The bike’s ability to stay cool during a parade was tested in the extreme heat of Arizona. The bike was put in the sound room to hone the Harley sound in it. Radiation tests were also done on the bike.

After the completion of the bike design, advertisement was used to get the word out about the new bike. Harley advertised the top speed of the bike (140 mph) and unveiled the bike at an owner’s convention. They named the bike the V-Rod after a year of trying to pick out the right name, in order to make it sound appealing to customers. They put out commercials about the bike, which came out in March of 1999.