Harley Davidson and the Engineering Design Process

The engineering design process is a series of steps that engineers use to create new products. The process begins with an idea to solve a specific problem that in the end becomes a finished prototype. There are eight steps in the engineering design process. Harley Davidson is a motorcycle company known for its classic style and loud bikes, but not for speed. In the 1990s, the company was faced with a dilemma. Sacrifice their loyal customers and style for speed, or risk being run out of business. They used the engineering design process to help solve their problem.

The first step of the engineering design process is to identify a problem or need. In the case of Harley Davidson, the company was losing customers to high speed performance motorcycles. To regain control of the market, Harley had to research what the consumers were looking for in a new motorcycle, and how their bikes compared. Their signature style did not allow for the speed of these new motorcycles, and to keep their customer base, they had to research how to combine the Harley style with the speed of the new high performance bikes. This research highlighted the second step of the engineering design process, which is research the need or problem identified in the first step.

Now that Harley had identified and researched their problem of having a high performance bike coupled with signature Harley style, they were faced with the task of actually trying to put it together. The design team for Harley started to visualize the concept behind combining the two styles. Their first issue was to find an engine that could provide the necessary speed. They decided to use the engine from the Harley racing bike. However, this needed to be redesigned to be street legal. With this new engine, the bike needed a radiator with a cooling system to maintain the temperature of the engine. This provided many challenges, because the designers and engineers disagreed about its location and size. The other big problem they ran into was the construction of the exhaust system. Incorporating it into the design created many conflicting style issues.

To stick with the Harley style, instead of coming up with multiple solutions for each problem, the design team came up with one idea for each, and kept tweaking it until it was a feasible design. To solve the engine problems, they teamed up with car maker Porsche to share ideas and try to design an engine that was both durable and fast. It also had to be street legal, meet all possible noise requirements, and handle like a Harley. Another problem was actually putting a radiator on the bike. Before this bike, Harley did not have a bike that featured a radiator. Incorporating a radiator posed a huge style challenge to both the design team and the engineers. They kept the radiator behind the front wheel and continued to modify it, until the radiator was functional and stylish. This Harley also required a large exhaust system. They used
many forms of modeling, such as clay modeling, to help solve this problem. In the end they developed a three chambered exhaust system that met all the requirements they were faced with.

Once they addressed all of these problems, they developed a prototype. They unofficially tested this prototype to iron out any final issues. Once these were fixed, they developed an official prototype that could go through vigorous testing models. These tests included various noise testing, idling testing, heat testing, and heavy road testing. Once they finished this testing, they figured out what was wrong, and fixed it on the new prototype. Once this prototype met all the testing requirements, they were ready to communicate the finalized high performance motorcycle to the general public. To do this, they revealed it at the annual dealers showcase in Las Vegas. After this, the bike was mass produced, and sent to dealers across the country.

This project took Harley six years to finish. Often times, the engineering design process is lengthy, time consuming, and even repetitive but it does pay off in the long run. Ultimately, the bike was a huge success for Harley and it helped to solve their problem of losing customers to other motorcycle companies. The eight steps of the engineering design process helped Harley to create a stylish bike with their signature sound, while still having the speed of a high performance bike.