Design Process Behind Harley-Davidson’s V-Rod

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1. Recognizing Need
   a. The marketing push was the Harley Davison needed to compete with the newer faster sport bikes that Yamaha and other competitors were producing. They needed a completely new bike that could go faster. The technology push was that they needed a faster bike that incorporated their fast vr1000 dragster engine.

2. Define the Problem
   a. Harley Davidson was losing customers to other competitors. This was because people wanted speed over looks. The problem was that Harley Davidson did not know how to incorporate their vr1000 dragster liquid cooled engine into their classic bikes. They wanted to bike to appeal to their common customer, but also pull in new younger customers.

3. Gather Information
   a. They tested their own vr1000 engine and looked at how it could be infused with their normal street bikes. They examined the frame of their own bike and compared it to the Yamaha frames.

4. Generate Conceptual Ideas
   a. A plethora of Harley Davidson’s top workers collaborated in order to engineer all of the necessary parts for the new, revolutionary bike. They gathered different ideas regarding different parks, such as the radiator, the revolutionary frame, the exhaust pipes and the liquid-cooled engine. They brainstormed to develop an acceptable look — one with the proper, curved frame. They still needed to maintain the “Harley” look in order to keep old, devoted customers.

5. Compare, Combine, and Select Ideas
   a. The selected team joined forces with Porsche to develop a proper engine. Willie and the mechanical engineers debated over having a practical frame while still maintaining the classic Harley look. The styling team and engineers argued over ways to practically incorporate a radiator, a gas tank, and an exhaust system. Normally, when they reached an agreement, the VPs would not be amused. For over a year, they rifled through hundreds of names for the bike.

6. Analyze and Design
   a. The team brought the bike into a wind tunnel to test air flow. They needed to add fins to the radiator to maintain the air flow. They analyzed the sound of the muffler and developed a way to give it the Harley sound, but still maintain under noise regulation. They needed to make the gas tank larger than one gallon in volume. They developed a plastic gas tank that could be molded to the shape of the housing and contain 3 gallons. They needed to make the engine look like a traditional Harley V-Twin. A water-cooling
pipe moving off to the right interfered with the appearance of the engine. They positioned horizontally to keep it out of the way.

7. Fabricate and Test Prototypes
   a. They built a crude prototype to get a good idea for the frame. They brought the prototype to an employee’s house to test the handling. They tested, discarded, and built several new engines for 2 years. They then brought it to an anechoic room to test the sound. They fine-tuned the final prototype’s sound. They tested its ability to cool while idle by driving in the desert and keeping it in the heat for hours. They tested its ability to maintain structural integrity while driving on hard, bumpy terrain. They used a reverb chamber to bombard it with radio waves. They tested the bike in stormy conditions by leaving it in a rain-simulated room. They tested the engine’s ability to run uninterrupted for 500 hours. For a good opinion, Willie G Harley tested the bike himself.

8. Communicate the Design
   a. The stylists and engineers would come up with a design and show it to the VPs, namely Willie, who would decide whether or not it would be acceptable. The designs would be drawn, crafted on AutoCAD, and molded and carved in clay.