Breaking Down Harley’s V-Rod Engineering Design Process

In the early 1990’s Harley Davidson was faced with a rising problem as customers were more inclined to purchase a bike more built for speed and power rather than the stylistic Harley design. So with this problem, the team of engineers at Harley, led by Willie G. Harley, was challenged to make a bike that was very different but still known as a Harley. In order to make this a reality they chose to take the liquid cooling design from their racing bikes, and replace the old school air cooling system. This is the beginning of the long and tedious six year engineering design process that would put Harley back at the top of the motorcycle industry.

This process began from the bottom when Davidson looked at the custom bikes that street dragsters created. Rather than being offended by the ways they had altered the bikes, he was inspired to make his own custom bike that would encourage and support the customization of the bike. In addition, while generating conceptual ideas, the Harley team of engineers and stylists looked to European experts at Porsche to help solve the difficult matter of a more efficient and cost effective motor. Another difficult step was the collaboration between stylists and engineers. The stylist side of the relationship was all about marketing and what they found appealing to the Harley
customer. On the other side, engineers put practicality over style and as a result were sent back to the drawing board on multiple occasions. Due to the immense amount of communication and team work between the stylists and engineers, they both compromised to create the perfect bike.

Once the basic brainstorming and designing was complete the team put their ideas into CADD to see how it looked in 3-D. The initial reaction to what they saw was disgust and not what they had envisioned at all. Stylists wanted a piece of art that they could hang on the wall but still ride with the Harley style, sound, and speed. Another engineer decided to put the design into clay because it would be quicker and easier to make changes to the design of the bike. While assessing the clay model they realized that they would need extremely large exhaust pipes, which would be difficult to go with the style of the bike. To solve this issue, the stylists came up with an “S” shaped design that was nearly impossible for the engineers to create. After a series of meetings and trials the engineers found that if they cut the exhaust pipe into three separate pieces, the style would not be compromised and the functionality would be achieved. After testing the first prototype at one of the engineers house the team realized the true potential of this bike, but still realized they had to go back and keep designing the pieces of the bike and fabricate them individually. Another problem they encountered while in the wind tunnel was the airflow to the radiator (first Harley to have radiator). Once again the stylists and engineers clashed as the one side argued physics, while the other argued it looked like “Gumby’s Casket”.

Finally after the testing and prototypes, Harley decided that the bike had met their style and speed needs and with that the V-Rod was ready for the public to see.
They communicated their design at the Harley convention in Los Angeles and the public immediately fell in love with the new face of Harley Davidson. The team of engineers and stylists finally created the perfect bike that would put Harley Davidson back on top of the motorcycle industry. The now thriving company would forever be thankful for the incredible engineering team’s engineering design process that kept them out of bankruptcy.