Harley Davidson: V-Rod Design Process

I. Recognize the Need
   - Market pull: other companies where creating bikes with speed that attracted more customers
   - Technology push: competing companies designed bikes with speed

II. Define the problem
   - Harley Davidson began to lose customers to bike companies that produced faster bikes instead of luxury bikes

III. Gather Information
   - Harley Davidson noticed that the only way to overcome this problem was to create a bike the public desired – a faster bike with the authentic Harley Davidson style

IV. Generate Conceptual Ideas
   - Brainstorming: The engine of Harley Davidson’s racing bike, VR1000, inspired the new Harley Davidson design.
   - Wanted to simulate the VR1000 to incorporate into the fast and luxurious bikes.

V. Compare, Combine, and Select Ideas
   - Collaborated with Porsche to create an engine with the speed they wanted.
   - Needed a stronger and bigger frame to fit the new engine. As a result, they designed a double curved rail to effectively support the bigger engine.
   - Needed a better cooling system due to a more complex engine. As a result, they designed a more efficient radiator with flaps on each side to prevent the air from escaping from either side, placing it towards the front of the bike to make it look like part of the bike.
   - Needed a bigger and better fuel tank that fit accordingly to the design, thus placing it under the seat.
   - Engineering team needed a bigger exhaust; however, the design team decided it will not suit the style, thus defeating the purpose of the design. As a result, they created a double-tubed
exhaust with an aesthetic curved design to satisfy the engineering design team's desire for a bigger exhaust.
- The design name was incorporated with the VR1000, thus naming it the V-Rod.

VI. Analyze and Design
- Created a clay model that would enable them to easily adjust the arising proportional and engineering issues.
- Clay model enabled them to ensure that the design was aesthetically pleasing to the eye.

VII. Fabricate and Test Prototypes
- Created a prototype and implemented many tests to check the durability of the design.
- Tests included:
  - Conducted a test to check whether the engine would over-heat in both moving and idling scenarios. They left it in a cubicle outdoors in the sun and rode it for a certain amount of time to test how the design would over-heat.
  - Tested how radiation would affect the design by placing it in rooms that emitted radiation that was directed towards the design.
  - Conducted several abrasive road tests to observe the durability of the design.

VIII. Communicate the Design
- Verbally: presented the design to sales representatives in a showcase
- Graphically: applied computer programs (Solid Works, AutoCad, etc.) to represent the bike's new design and individual parts.
- Written: provided written descriptions of the bike and its components