Hydrogenic Bike

Team 104

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Introduction

Project statement: The product intends to introduce Hydrogen fuel cell bikes as a sustainable alternative for urban transportation, reducing carbon emissions and promoting eco-friendly mobility.

Constraints:

Hydrogen Refueling Stations	Market Knowledge	Safety Regulations
Total Weight	Hydrogen Tank Size	Lifespan

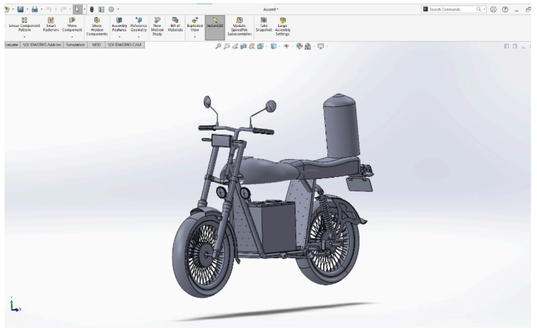
Target Specifications

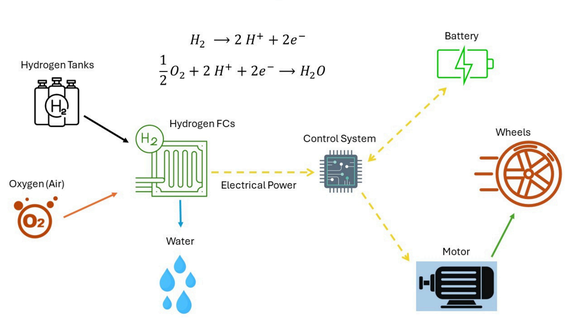
Weight	Motor Power	Weight Limit	Maximum Speed	Travel Range	Total Cost
50 Kg	1000 W	180 Kg	25 Km/h	2 Km	<10,000 SAR

Project Impact:

Environmental	Economic	Social
Significant reduction in urban transportation carbon footprint	Potential for cost savings over the lifecycle of the bike	Promotes awareness and adoption of clean energy technologies

Prototype & Functionality

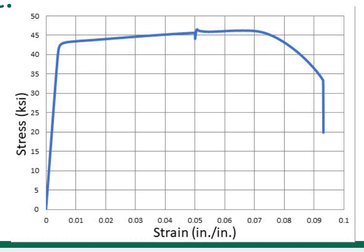




Test Validation

- The final prototype was tested using SolidWorks finite element analysis. Aluminum Alloys were selected as the frame material due to their high strength-to-cost ratio compared to titanium and their availability in the market. Following this selection, the bike frame was constructed according to the design concept.

Stress VS Strain Curve for Aluminum Alloy:



Proof

- Weight limit:
  - Tests have been made in solidworks using finite element testing.
- Motor power:
  - 1000 w is the minimum to drive the bike to the desired speed limit.
- Travel range:
  - With the amount of hydrogen it can be filled into the tank, this is the maximum range.

Conclusion

The hydrogen-powered bike represents a forward-thinking approach to urban mobility, offering a sustainable and eco-friendly alternative to traditional transportation methods. With successful prototype development and testing, this project paves the way for broader adoption of hydrogen fuel cell technology in personal transportation.