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(57) Abstract :
Climbing robots are increasingly used in industrial and inspection applications, particularly for navigating vertical metal surfaces such as ship hulls, storage tanks, and bridges. However, challenges arise when dealing with surface discontinuities, stability, and precise maneuverability. This project focuses on designing and fabricating an omni-directional H-bot capable of climbing vertical metal walls while overcoming such obstacles. The H-bot mechanism, known for its precise motion control, is integrated with an advanced adhesion system using either electromagnetic or vacuum-based technology to ensure stable climbing. The robot features omni-directional movement, enabling seamless navigation in all directions while maintaining adhesion to the surface. A lightweight yet robust chassis, optimized power supply, and real-time control system with embedded sensors enhance its operational efficiency. The proposed design aims to improve automation in industrial maintenance, non-destructive testing (NDT), and surveillance applications. By addressing key challenges like surface discontinuities and power efficiency, this project contributes to the development of reliable and efficient climbing robots for real-world industrial environments. Accompanied Drawing [FIG. 1] [FIG. 2] [FIG. 3]

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