DESIGN AND FABRICATION OF MILD STEEL WALL CLIMBING ROBOT

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ABSTRACT

The maintenance and inspection of large vertical or horizontal tubes in an autonomous manner is still an unsolved issue. This Project presents the design of the permanent magnetic system for the wall climbing robot with permanent magnetic tracks. A proposed wall climbing robot with permanent magnetic adhesion mechanism for inspecting pies, Ducts is briefly put forward, including the mechanical system architecture. The permanent magnetic adhesion mechanism and the tracked locomotion mechanism are employed in the robot system. By static and dynamic force analysis of the robot, design parameters about adhesion mechanism.

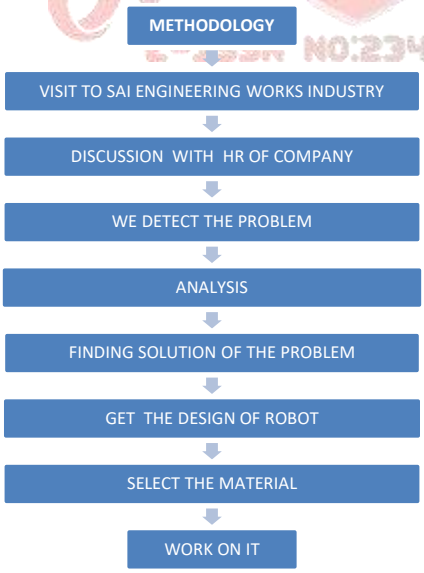
Keywords ; Climbing, Four Bar Mechanism, Magnetic Field, Detect Crack,

AIM & OBJECTIVES

The objectives of the project include:

1. Wireless controlling of Robot using Zigbee technology – it is a standards-based wireless technology developed to enable low-cost, low power wireless machine.
2 Climbing on wall by using magnetic field
3. Live video can be seen on display.
4. Electromagnetic based Climbing Operation of robot

METHODOLOGY



LITERATURE REVIEW

- S. Fish, UGV's et.al states that-

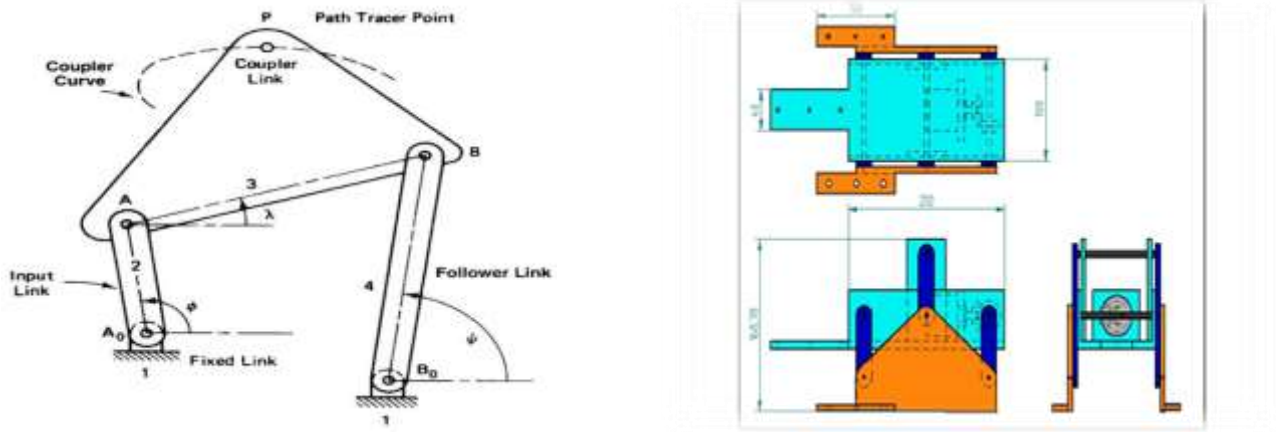
In this paper it present the mechanical and control design of a magnetic tracked mobile robot. The robot is designed to move on vertical steel ship hulls and to be able to carry 100 kg payload, including its own weight. The mechanical components are presented and the sizing of the magnetic tracks is detailed. All computation is embedded in order to reduce time delays between processes and to keep the robot functional even in case of signal loss with the ground station. The main sensor of the robot is a 2D laser scanner that gives information on the hull surface and is used for several tasks. We focus on the welding task and expose the control algorithm that allows the robot to follow a straight line for the welding process.[1]

- F.L. Menn, P. Bidaud, F.B. Amar et.al states that-

In this paper, a new concept of a wall-climbing robot able to climb a vertical plane is presented. A continuous locomotive motion with a high climbing speed of 15m/min is realized by adopting a series chain on two tracked wheels on which 24 suction pads are installed. While each tracked wheel rotates, the suction pads which attach to the vertical plane are activated in sequence by specially designed mechanical valves. The engineering analysis and detailed mechanism design of the tracked wheel, including mechanical valves and the overall features, are described in this paper. It is a self-contained robot in which a vacuum pump and a power supply are integrated and is controlled remotely. The climbing performance, using the proposed mechanism, is evaluated on a vertical steel plate. Finally, the procedures are presented for an optimization experiment using Taguchi methodology to maximize vacuum pressure which is a critical factor for suction force.[2]

MECHANISMS

1) FOUR BAR CHAIN MECHANISM:



(fig : h)

A four-bar linkage, also called a four-bar, is the simplest movable closed chain linkage. It consists of four bodies, called bars or links, connected in a loop by four joints. Generally, the joints are configured so the links move in parallel planes, and the assembly is called a planar four-bar linkage. Spherical and spatial four-bar linkages also exist and are used in practicePlanar four-bar linkages are constructed from four links connected in a loop by four one-degree-of-freedom joints. A joint may be either a revolute, that is a hinged joint, denoted by R, or a prismatic, as sliding joint, denoted by P.A link connected to ground by a hinged joint is usually called a crank.

A link connected to ground by a prismatic joint is called a slider. Sliders are sometimes considered to be cranks that have a hinged pivot at an extremely long distance away perpendicular to the travel of the slider.

RESULT & CONLUSION

This simpler, compact and lightweight robotic platform provides a safe and effective means to deal with hazardous duty operations. Within the mechanical area our robust platform, it is developed to climb on relatively smooth surfaces. Various work related instruments or tools such as painting tools, cleaning tools, drilling tools etc. can be mounted on it to carry up on wall.

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