

Development of Suction Wall Climber

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Abstract - The device is basically a vacuum motor that powers two suction paddles, and sticks onto any building surface, be it glass, stucco, or brick, depending on the altitude. The outer walls of high-rise buildings are made of various materials such as steel, red block, marble, glass, and so forth, and their surfaces can contain many grooves of irregular shapes and sizes materials used in the outer walls of buildings. The outer walls of high-rise buildings require regular maintenance including cleaning and painting. Gondola systems are used to carry on platforms the workers who conduct maintenance work on the outer walls of high-rise buildings.

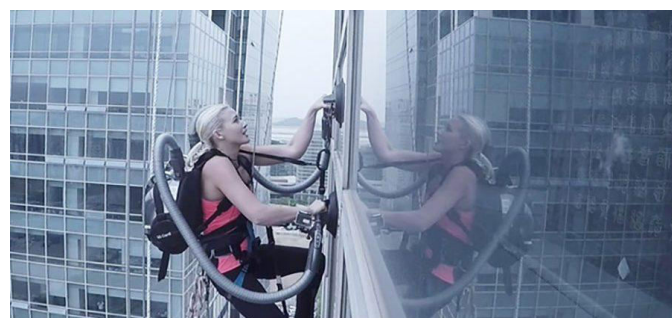
Key Words: motor, suction pads, hose pipes, casing

1. INTRODUCTION (Size 11, Times New roman)

New invention allows people to climb walls like Spider-Man Who hasn't dreamed about being the amazing Spider-Man and possessing his climbing abilities? "The device is basically a vacuum motor that powers two suction paddles, and sticks onto any building surface, be it glass, stucco, or brick, depending on the altitude. The outer walls of high-rise buildings are made of various materials such as steel, red block, marble, glass, and so forth, and their surfaces can contain many grooves of irregular shapes and sizes materials used in the outer walls of buildings, as repo. The outer walls of high-rise buildings require regular maintenance including cleaning and painting. Gondola systems are used to carry on platforms the workers who conduct maintenance work on the outer walls of high-rise buildings. However, for super-high-rise buildings, i.e., higher than 30 stories, it is very difficult to

perform such work on their outer walls using a gondola due to external disturbances including squalls. To perform this kind of work on outer walls using gondolas, considerable attachment force (to the wall) is required, taking into consideration the external loads and work load. However, robots traveling on vertical walls have limitations in terms of the shape of the walls and their adhesive force. Therefore, the vacuum suction ability with the various wall shapes should be evaluated and Previous experiences of the authors in the field of flexible subsection methods showed that many flexible clamping devices can lead to marks or remains in the surface of the parts that have to be machined; for example, leading to infiltration of wax in the parts to be machined. Therefore, the objective of this study is to explore the possibilities of vacuum clamping devices in the search for flexible clamping systems without side-effects in the parts..

2. Body of Paper



COMPONENT OF SYSTEM

Motor specifications : 2hp=1.4KW

Features:

Easy to use

Easy maintenance

Hassle free functionality

Working on any phase



- Suction Pads

This method works effectively for fine-textured wall surfaces with less asperities, such as in the case of glass. A series of Sky cleaners have been developed to clean and locomote on a glass wall by utilizing vacuum suction cups. The Sky cleaner is installed with the suction cups on both ends of actuators, like an X-Y stage, and these suction cups are connected to a vacuum pump. Additionally, the robot adheres to the glass wall using the suction force. One of the important characteristics in this case is that the robot is totally driven by pneumatic actuators. The use of pneumatic actuators offer the advantage of payload reduction. The segment variable bang-bang control has been proposed in order to control the position of the pneumatic actuator precisely. Another precedent involving a wall climbing robot with an ankle joint is presented. Thus, even if the façade design of the building has curvature and a small angle exists between neighboring glasses, such robots would still be capable of adapting to such situations.

- Motor

This method uses a negative pressure between the robot and the wall generally through the use of a pump. Numerous precedents exist for this principle demonstrating very high levels of mobility. Gao et al. have developed two kinds of wall climbing robots utilizing the wheel system with negative pressure generated by a vacuum pump which acts both as an impeller or a propeller. The robots basically consist of one sealed central body, two wheels for mobility and two vacuum pumps

- Suction Lines

A suction line is a pipe, hose, or tube that delivers a fluid to the suction or inlet side of a pump or compressor. These sorts of devices are used in a variety of different settings, and can look and function slightly differently depending on the core machine at issue. In general, these lines supply fluids for chemical processing, refrigeration systems, and vacuum pump applications, and can also provide fluids key to oil and water well drilling. They can be thin or thick, long or short; some are optimized for harsh or corrosive fluids, while others carry primarily water. The lines can deliver basically any product that a pump or compressor can handle, including gases and petroleum products.

- Casing

It is a welded case of a MS bar for insulation of motor and safety belts.

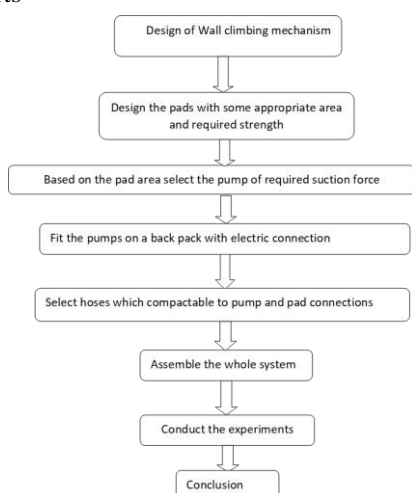


Fig -1: Figure

Welded foot rest :



Charts



CONCLUSIONS

Several components changed with the new design of the personal assisted vacuum climber system. These components were modified and it has been replaced by the new materials. The overall improvements compared to the original system were:

- Decreased personal assisted vacuum climber system weight by 10 lbs.
- Enhanced ergonomics and ease of climbing
- Improved manufacturing and assembly
- Cost to build one system reduced
- Increased time of operation

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