

CLIMBING ROBOT FOR GLASS-WALL CLEANING ON HIGH-RISE BUILDINGS

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ABSTRACT

There is numerous numbers of buildings with glass-wall installed which requires regular cleaning and maintenance in the urban area. With this phenomenon increasing the demand of developing climbing robot for glass-wall cleaning on high rise buildings

The main aim of this project is to build a climbing robot for glass-walls cleaning on high-rise building, which can free workers from traditional dangerous jobs used by gondola systems. The climbing robot is intelligent enough to handle simple environment, like obstacle from walls, these are fully controlled by a microcontroller PIC16F877.

This prototype climbing robot is fully actuated by pneumatic cylinders which consists of double-acting double rod and single rod cylinders. There are total 8 custom-made vacuum pads used for sucking the surface of the glass wall and also holding the body weight of the robot. With these equipment installed together mentioned above, the robot is capable of performing horizontal and vertical movements.

The custom-made vacuum pads are tested with good results and capable of holding up to 1.5kg of load (one pair of pads) on vertical surface. Therefore, the overall integration is unexpected good in terms of mechanism with the use of custom-made vacuum pad. However, the cleaning tools are not installed on the robot due to the limitation of holding capability of vacuum pads on the glass wall, it causes over loading if cleaning tools are installed on the robot.

Lastly, the overall objectives were 90 percent achieved, however only left out the cleaning tools.