

Characteristics of Elastic Tracked-Crawler Based on Worm-Rack Mechanism

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Abstract : There are many pipes such as a water pipe and a gas pipe in a chemical plant and house. It is possible to prevent accidents by these inspections. However, many pipes are very narrow and it is difficult for people to inspect directly. Therefore, development of a robot that can move in narrow pipe is necessary. A wheel movement type robot, a snake-like robot and a multi-leg robot are all described in the relevant literature as pipe inspection robots that are currently studied. Among them, the tracked crawler robot can travel by traversing uneven ground flexibly with a crawler belt attached firmly to the ground surface. Although conventional crawler robots have high efficiency and/or high ground-covering ability, they require a comparatively large space to move. In this study, a cylindrical crawler robot based on worm-rack mechanism, which does not need large space to move and which has high ground-covering ability, is proposed. Experiments have demonstrated smooth operation and a forward movement of the robot by application of voltage to the motor. In addition, performance tests show that it can propel itself in confined spaces. This paper reports the structure, drive mechanism, prototype, and experimental evaluation.

Keywords : tracked-crawler, pipe inspection robot, worm-rack mechanism, amoeba locomotion

Conference Title : ICMIT 2014 : International Conference on Mechatronics and Information Technology

Conference Location : Singapore, Singapore

Conference Dates : March 30-31, 2014