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Principle Analyzing and Structure Designing for Driving and Timing of Fluid Medium Pressure Difference Pipeline Robot

Journal [Advanced Materials Research](#) (Volumes 211 - 212)

Volume [Mechatronics and Intelligent Materials](#)

Edited by Ran Chen

Pages 530-534

DOI 10.4028/www.scientific.net/AMR.211-212.530

Citation Yu Feng Zhang et al., 2011, Advanced Materials Research, 211-212, 530

Online since February, 2011

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Advanced Materials Research Vols. 211-212 (2011) pp 530-534
Online available since 2011/Feb/21 at www.scientific.net
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doi:10.4028/www.scientific.net/AMR.211-212.530

Principle Analyzing and Structure Designing for Driving and Timing of Fluid Medium Pressure Difference Pipeline Robot

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Introduction

Pipeline robot is designed to meet accurate and efficient pipeline detection and maintenance tasks [1-3]. Because of special working environment with limited space, energy supply problem is very important. Many methods were adopted [4-7], and self-driver method without cables through the use of fluid energy is relatively ideal. The robot is sinking in the pipeline full of flowing fluid medium and getting the driving force from the pressure and velocity energy of medium itself to push forward it. During the movement, robot needed to overcome the gravity and the friction resistance with the pipe wall. Then it would keep suitable pace state according to the job requirements. So the study of robot structure is needed and fluid mechanics conditions in the pipelines should be analyzed [8-9]. Drive with pressure difference in medium flow and the principle of throttling velocity were stated in this paper. And velocity unit device in pipeline robot based on the driving of fluid medium pressure difference was designed.

The robot's driving and velocity control principle analysis

Engineering fluid has a lot of energy. Therefore, when medium fluid in pipelines flows with a certain velocity, robot can use the driving force, generated by fluid pressure and fluid movement energy, through some kind of driving device. And as long as the pipeline robot can overcome the friction between itself and pipeline, it can move forward with a certain velocity. The principle is shown in Fig.1.

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