

IJARSCT International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

Impact Factor: 6.252

Volume 2, Issue 8, June 2022

IJARSCT

Development of In-Pipe Robot for Cleaning and Inspection

Prof. G. V. Devke¹, Mr. Ameya Bidwe², Mr. Shubham Ankush³, Mr. Vilas Bodke⁴, Mr. Pranchal Bhingardeve⁵

> Assistant Professor, Mechanical Engineering, NBNSSOE, Pune, India¹ UG Student, Mechanical Engineering, NBNSSOE, Pune, India^{2,3,4,5}

Abstract: The aim of the project is to design a pipe cleaning and inspection robot for industrial applications. This is going to use a very simple mechanism for cleaning the internal area of the pipe with changing diameters. The design is focusing on developing a bevel gear mechanism which is able to clean and translate the robot body into the pipe effectively. Here we are going to use only a single DC motor for both cleaning and locomotion in the pipe. The inspection of the pipe is by using the ultrasonic sensor. The ultrasonic sensor is going to give the distance between the obstacle and the robot. According to the distance measured we are going to know about the bends and joints. The ultrasonic sensor is also going to give information regarding the waste materials accumulated in the pipe.

Keywords: Cleaning Device, Robot, Pipeline, Engineering Design Process, etc.

REFERENCES

- Mansi S. Chabukswar1, Ravikant K. Nanwatkar2 in International Journal of Research in Engineering, Science and Management, volume2, issue 12 published 2019/12.
- [2] C. Anthierens, C. Prelle, A., Jutard, M.Btemps, "Pnumatic Acuated Microrobot for In-pipe Locomotion", 4th Japan-France/ 2nd Asia-Europe Congress on Mechatronics, Kitakyushu, Japan, 6-8 october, 1998.
- [3] H. Nishikawa, T. Sasaya, T. Shibata, T. Kaneko, N. Mitumoto, S. Kawakita and N. Kawahara, DENSO CORPORATION, Japan, "In-pipe Wireless Micro Locometive System", in Proc. International Symposium on Mechatronics and Human Science (MHS '99), Nagoya, Japan, Nov.24-26, 1999.
- [4] S. Aoshima, T. Tsujimura, T., Yabuta, "A Miniature Mobile Robot Using Peizo Vibration for Mobility in a Thin Tube", Transaction of ASME, Journal of Dynamic Systems, Measurements and Control, Vol.115, pp. 270-278, June 1993.
- [5] K. Suzumori, T. Tsujimura, M. Kimura, Y. Hasegawa, "Micro Inspection Robot for1-in Pipes" in IEEE/ASME Transaction on Mechatronics, vol.4, NO. 3, PP 286- 292, September 1999.
- [6] S. Hirose, H. Ohno, T. Mitsui, K. Suyama, "Desigin of In-pipe Inspection Vehicles for 25,50,150 Pipes", Journal of Robotics and Mechatronics 12,3, pp.310-317,2000.
- [7] F. Rfeiffer, T. Rossman, "Control of a Tube Crawler", Proceeding of the Fourth International Conference on Motion and Vibration Control, Movic'98, Zurich, 1998, pp. 889-894, Vol.3, Switzerland, August25-28.
- [8] Design Of Machine Element, Auther -V.B.Bhandari, (Tata Mc-graw Hill)
- [9] Dynamics Of Machinary, Auther -R.B.Patil (Tech-max publication).
- [10] PSG Design Data Book
- [11] Theory of machine, Auther R.S.Khurmi (Tata Mc-Graw Hill)
- [12] Balaguer, C., Montero, R., Victores, J. G., Martínez, S., & Jardón, A. Past, Present and Future of Robotic Tunnel Inspection, Automation in Construction, InPress, doi: 10.1016/j.autcon.2015.02.003.
- [13] Saenz, J., Elkmann, N., Stuerze, T., Kutzner, S., & Althoff, H. (2010, October). Robotic systems for cleaning and inspection of large concrete pipes. In Applied Robotics for the Power Industry (CARPI), 2010 1st

```
Copyright to IJARSCT
www.ijarsct.co.in
```

IJARSCT



Impact Factor: 6.252

IJARSCT International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

Volume 2, Issue 8, June 2022

International Conference on (pp. 1-7).

- [14] Li, Z., Zhu, J., He, C., & Wang, W. (2009, August). A new pipe cleaning and inspection robot with active pipe-diameter adaptability based on ATmega64. In Electronic Measurement & Instruments, 2009. ICEMI'09. 9th International Conference on (pp. 2-616). IEEE.
- [15] Landsberger, S. E., Sundra, R., Short, D. B., & Martin, B. F. (1993). Cable crawling underwater inspection and cleaning robot. U.S. Patent No. 5,203,646. Washington, DC: U.S. Patent and Trademark Office.
- [16] Virgala, I., Gmiterko, A., & Kelemen, M. (2013). Motion Analysis of In-pipe Robot Based on SMA Spring Actuator. Journal of Automation and Control, 1(1), 21-25.
- [17] Canavese, G., Scaltrito, L., Ferrero, S., Pirri, C. F., Cocuzza, M., Pirola, M., & Di Lullo, A. (2015). A novel smart caliper foam PIG for low-cost pipeline inspection— Part A: Design and laboratory characterization. Journal of Petroleum Science and Engineering, 127, 311-317