DESIGN AND FABRICATION OF BOREWELL STONE DRLLING ROBOT

Mr. A.N. Mane[1], Mr. A.B. Dike[2], Mr. A.B. Kakade[3], Mr. L.P. Lidhure[4], Mr. S.K .Madane[5]

[1,2,3,4]*B.E Mechanical Student Shree Ramchandra College of Engineering, Pune.*
[5]*Assistant Professor Shree Ramchandra College of Engineering, Pune.*

---***---

Abstract - Use for the drilling a stone inside the borewell which can help us to free the borewell and use it again for water supply. Designing a robot which can be goes to inside the borewell. Which having drilling fitted in it. This can drill stone comes in the borewell and provide the safety for borewell start it again. Our robot design constitutes a best Ergonomic design and performs safest rescue operation and also use for the drilling a stone inside the borewell which can help to free the borewell and use it again for water supply.

Key Words: Borewell, drilling machine, camera, lead and screw mechanism, DC motor.

1. INTRODUCTION

1.1 Borewell

Borewell is a narrow shaft bored in the ground, either vertically or horizontally. A borewell may be constructed for many different purposes, including the extraction of water, other liquids (such as petroleum) or gases (such as natural gas), as part of geotechnical investigation, environmental site assessment, minerals exploration, temperature measurement, as pilot hole for installation or underground utilities, for geothermal installations, or for underground storage of unwanted substances, e.g. in carbo capture and storage.

1.2 Drilling machine

In this system we are used coreded hand drill. In the coreded hand drill having piston-grip. A specialty form is a right-angle drill, used to drill in tight spaces. Power used for corded drills is typically supplied by a universal motor, used for its high power to weight ratio. Cordeded hand drill is electrically power by internal electrical motor. Drills fitted with a bit, for drill, depending on application, secured by chuck.

1.3 Camera

A camera that feeds or streams its image in real time to or through a computer. It is also be used for video recording. With the help of camera we can see how much drilling operation done in borewell. Camera captures images up to **30** frames per second.

1.4 Lead and screw mechanism

A lead screw also known as a power screw or translation screw is a screw use as a linkage in a machine, to translate turning motion into linear motion. Screw thread have large friction energy loss compare to other linkage. They are not typically used to carry high power, but more for intermittent use in low power.

1.5 DC motor

Gear motor adds mechanical gears to alter the speed/torque of the motor for application usually such and reduce and increase torque .A gear motor is an all-in-one combination of a motor and gear box. The most important parameter in gear motor is torque, speed and efficiency.

2. OBJECTIVE:

The main objective of this project is as follows:
1. Design and fabricate a machine which helps us to break the stone stuck inside the borewell.
2. using this technique eliminate the cost to over this problem.
3. With help of robot reduce the human effort it is very less time consuming.

3. WORKING METHODOLOGY

The entire system is manually controlled by the user. The functional block diagram (fig.1) of borewell drilling robot. The CCTV camera is used for continuous monitoring and records each and every action of the drilling and display can be observed on monitoring. The fully computerized control unit controls the camera and acquires the image have been captured with help of CCTV camera. With help of this, the stone position can be inferred. With help of metallic arms will be hold to side surface of the borewell and the point contact occur between pipe and arm.
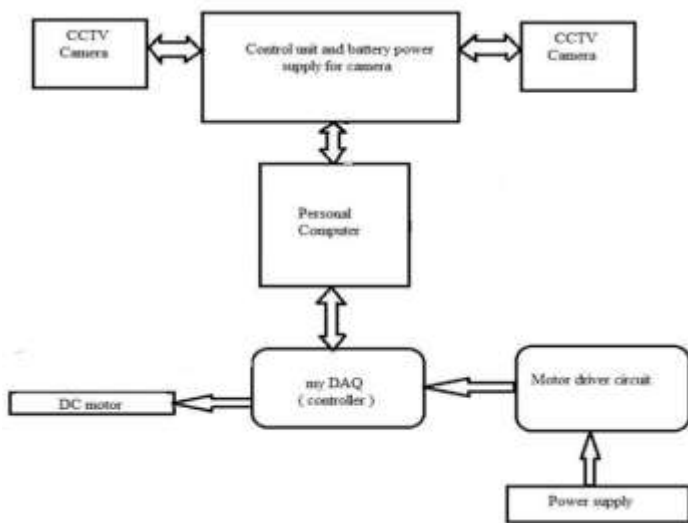

Fig. (1) Set-up

4 .HING LINK CALCULATION:

Material= Mild steel

Link is one side fix and other side load so it is cantilever type link

Bending stress for link –

$$\sigma = \frac{6wl}{bt^2}$$ .... Cantilever beam formula.

Where,

w=0.000128 KN

l=0.2 m

b=0.03 m

t=0.005m

$$\sigma = \frac{6*0.000128*0.2}{0.03*(0.005)^2}$$

σ = 204.8 MPA

Mechanical Arrangement:

Fig. (2) Actual setup

5. CONCLUSION

This system is used for the drilling stone stuck inside the borewell. We remove the stone inside the borewell by using the system so that we can use it again for water supply. We are designing a machine which can go inside the borewell, drill the stone inside by using drill bit attached to it. This can help [us to free the borewell and use it again for water supply. Robot can minimize the human effort, labour cost and rebore cost.

6. REFERENCES

[1] 'Pipeline Inspection and Borewell Rescue Robot' Biradar Preeti, Borchate Trupti, Chavan Prajkta, Prof. V. A. Kulkarni, Department of E and TC, PCCOE, Pune, India

[2] 'An Approach to Design of Child Saver Machine for Child Trapped in Borehole' Dr. C.N, Sakhale, D.M. Mate Associate professor, Assistant professor, Students of Final Year, Mechanical Engg Department, Priyadarshini College of Engg. Nagpur, India

[3]'Borewell Rescue Robot' V. Venmathi Assistant Professor ECE, SNS College of Engg. Coinbatore, Tamil Nadu.

[4] http://casi.sas.upenn.edu/iit/shankar.