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A novel technique for child rescue system from borewell

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ABSTRACT

People are facing a critical situation such as child have fell in the bore well & struck in the borewell which is not covered and getting trapped. Due to scantiness off water level bore well are dig to more depth. The basis of this project is rescue the child who has fallen into the bore well. Rescue of a trapped child from the borewell is very complicated and difficult process in comparison to the other accidents. It takes several hours like 70 to 80 hours to rescue a child. The present systems are to save the child are less probability and not suitable for all kind of borewell. So we move on to new technique which is applicable for all kind of borewell. Here in this project the child who struck inside the borewell is saved within a short span of time and without an injury. This is done by the balloon technique and spring shaped robotic arm with the help of camera and gear motor.

INTRODUCTION

The main objective of this project is rescue the child who is struck inside the hole is saved within a short span of time and without an injury. This is done by the balloon technique and spring shaped arm with the help of gear motor connected with arduino and camera. In the balloon technique, the multilayer balloon is made to pass under the child. The space of the bore hole is finding through the camera that can be viewed in the monitor screen with the help of that the balloon is passed under the child and it can be bellowed with the help of helium gas. So the multilayer balloon is covered the surface of the bore well which prevents the child to move further inside. Now the spring shaped arm is passed inside the bore well, then the position of the child can be viewed by the same camera in the monitor. Then the spring shaped arm starts rotated over the child with the help of gear motor, then the child is hold by the arms spring and the child is pulled up safely. One additional technique is further added in the rescue operation

to ensure the safe recovery of the child. That is rim technique, in this the rim is passed over the child with the help of four sided rope. The rim is passed over the arm spring and it reaches the child middle body. Inside the rim it is fixed with a tyre tube, once it reaches the child center position the tyre tube is expanded with the help of gas. Then the child is tightly griped and safely rescued without any difficulties.

STATISTICS FOR BOREWELL ACCIDENTS

India is the biggest user of the groundwater in the world and has over 27 million bore wells. In its document "Standard operating procedure on bore well Incident response" says, 85% of rural water needs, 50% of the urban drinking and industrial needs and 55% of the irrigation needs were met through bore wells. The statistics of the borewell accidents is shown in the Figure 1. There are 29 states and 732 districts in India. We planned to sell

more number of products in the place where major bore well accidents occurs. According to the

statistics major accident occurs in Gujarat, Tamil Nadu and Haryana.

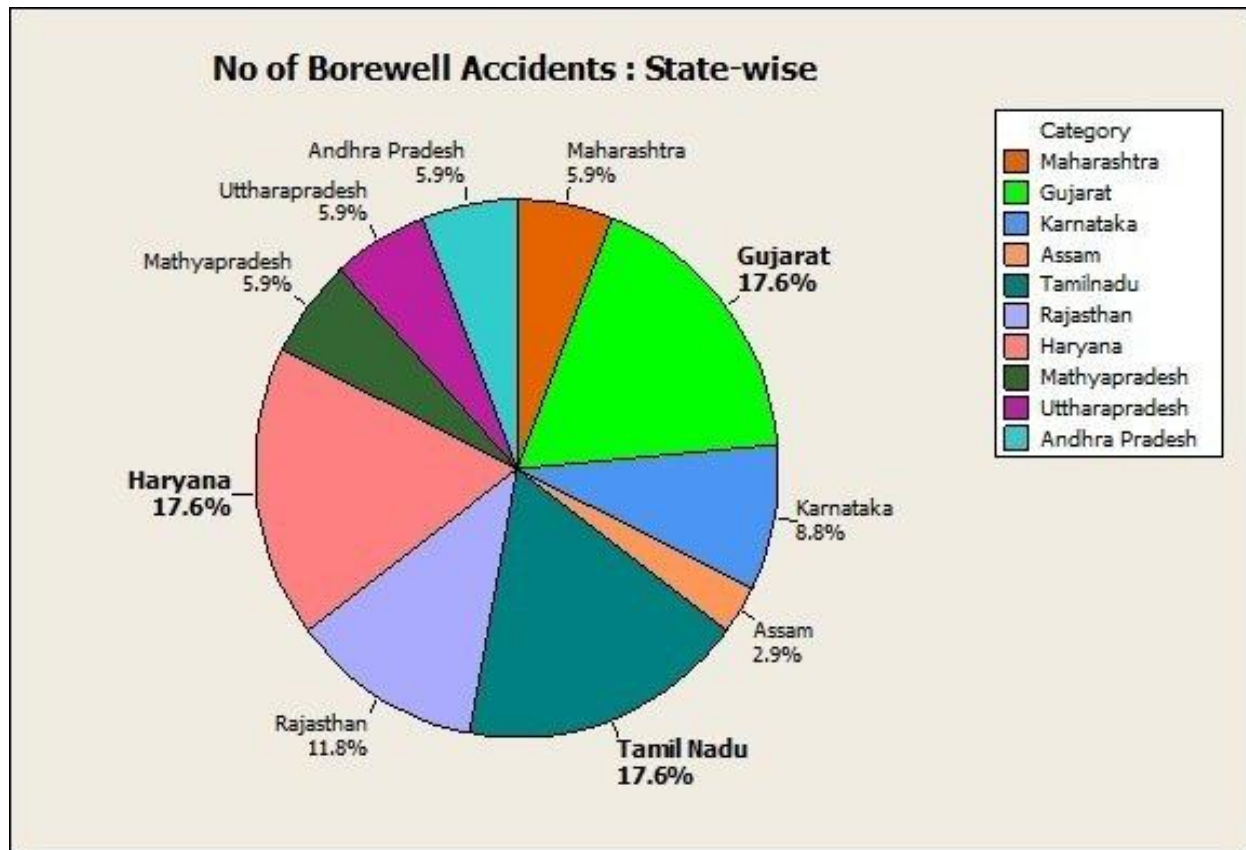
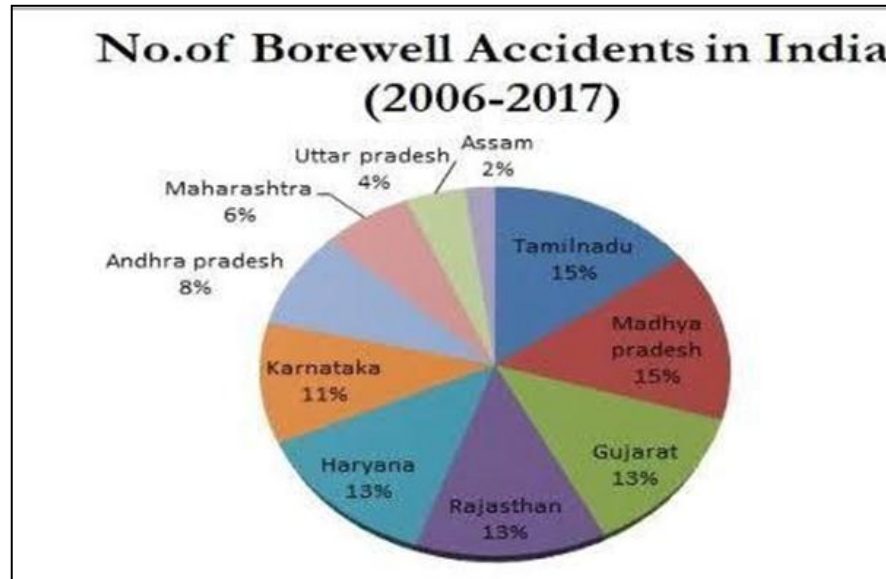


Figure 1 Statistics for Borewell Accidents

EXISTING METHOD AND ITS DISADVANTAGES



Figure 2 Existing Methods

There are many techniques available for rescuing the child. But those techniques are not properly executed in all rescue operations. So we need a better rescue system to save the child from the bore well. The rescue process of the trapped child is difficult, lengthy and also risky. In this project a new feature is made to rescue the child from the bore well. The existing methods are, digging a well parallel to the borewell. It is shown in Figure 2. It may take several hours and in some rare cases, it may take even days to rescue the child. Other methods are rope and arm method. In rope method a rope is passed into the borewell and made to tie in the infants hands and another rope which is connected to a hook is made to hold the infants collar. During this process it may have chance to get injury in the hands of the infant and it is very difficult to tie the rope in the infant's hands. In arm method the armed robot is passed and holds the hands of the child. But the defect in this method, there is very less probability to hold the hands of the child. Because we can't assure that the hands of the child will face upwards. At that time, the arm holds the child's head. It may chance to heavy injury for the child and even there is a possibility to death also. So we move to the new idea.

Techniques used

Our project ensures the safe rescue of the child by using of

1. Multilayer balloon technique,
2. Spring shaped arm technique and
3. Ring shaped rim technique.

Hardware requirement

1. Arduino UNO
2. Gear motor
3. L293d motor driver
4. Push buttons

Arduino UNO

The Arduino UNO is a prototype platform (open source) based on an easy to use hardware and software. It consists of a circuit board, which can be programmed and a software called arduino IDE (Integrated Development Environment), which is used to write & upload the source code to physical board. Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package. The board consists of 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins.



Figure 3 Arduino UNO

Gear motor

A gear motor is a specific type of electrical motor that is designed to produce high torque while maintaining a low horsepower, or low speed,

motor output. Gear motors can be found in many different applications; here it is used to rotate the arm in desire position with the help of L293d motor driver.



Figure 4 Gear motor

L293D motor driver

L293d is a suitable device use to operate stepper motors & gear motors. This L298 Based Motor Driver Module is a high power motor driver used to drive DC gear Motors & Stepper Motors. It

uses the popular L298 motor driver IC & has onboard 5V regulator which it can supply to an external circuit. It can run up to 4 DC motors, or 2 DC motors with both directional & speed control.



Figure 5 L293D motor driver

Push buttons

A push-button is a simple switch mechanism to control some aspect of a machine or a process. Buttons are typically made out of hard material,

usually plastic or metal. Here it is used to control or operate the gear motor in both (forward and reverse) directions.



Figure 6 Push Buttons

Working

In this project the rescue process is executed in three stages. The first stage of rescue operation is holds the child in its same position by using the multilayer balloon technique and ensure the child can't move further inside the bore well. It is passed under the child who struck inside the bore well. The space can be identified by the camera. Once the tube reaches its position, it is made to fill with the helium gas. Then the balloon will expanded from the tube and covers the bore well surface as shown in Figure 7. Next stage is spring shaped arm technique. Once the arm reaches the child's body,

that is viewed by the camera and the gear motor starts rotate, which is connected to the arm. This is used to bring back the child from its tight position; child gets hold, the motor stops to rotate. Now the child gets to lift up. After lifting up the child the next stage process starts. The rim is made to pass inside the bore well. The structure of the rim is shown in Figure 8. It is passed over the child. After fixing the rim at the appropriate position the rubber tube which is present in the inner surface of the rim is made to blow with the help of the helium gas. The proposed model is shown in Figure 9.

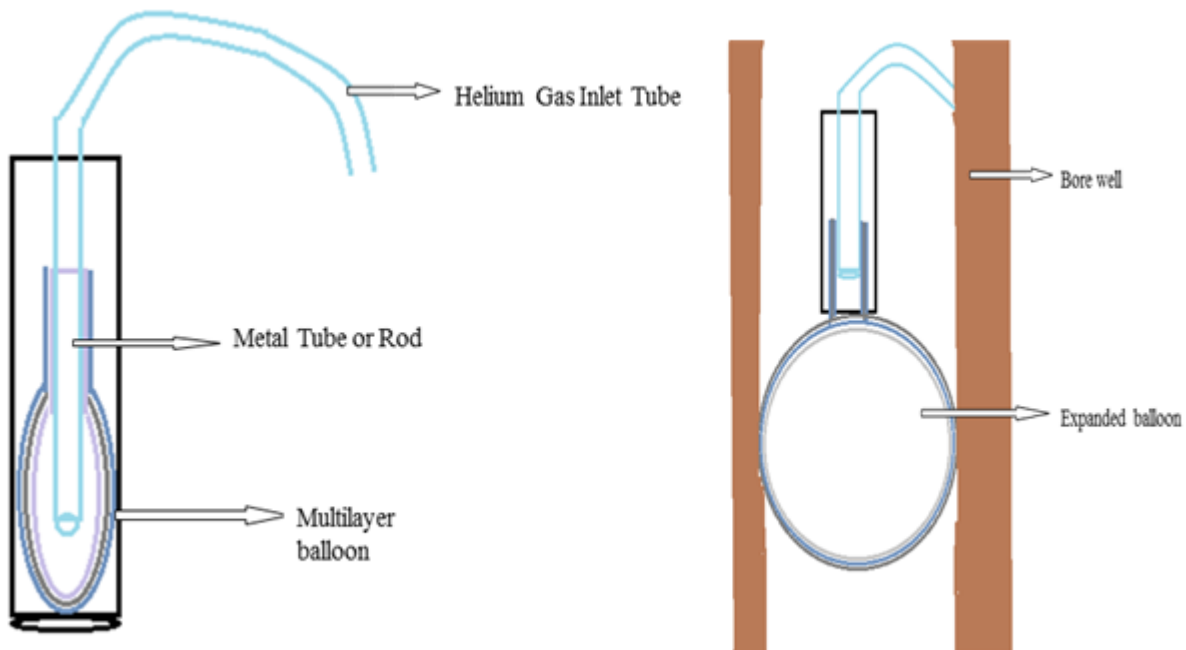


Figure 7 Implementation of balloon technique

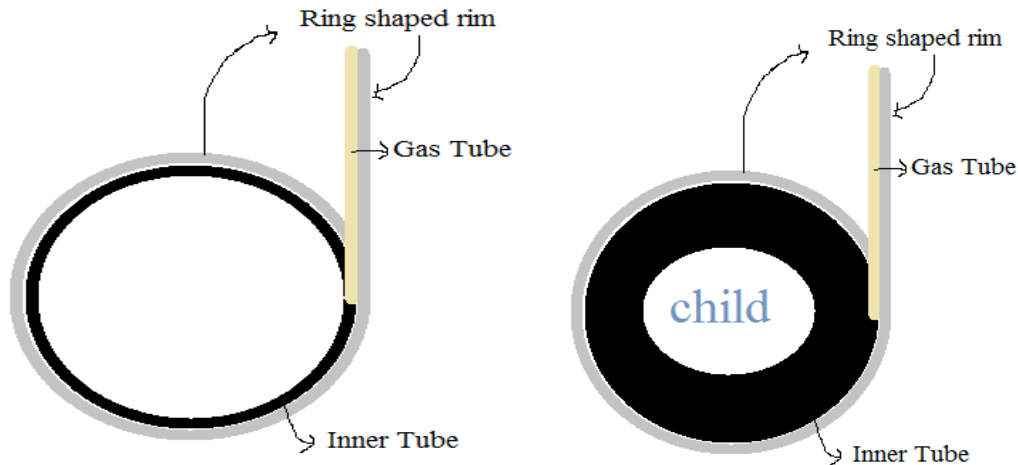


Figure 8 Implementation of rim technique

Proposed system

The main motive of our project is to rescue the child within the adequate time limit when the child fallen into the abandon bore well. In the proposed method we introduced a special grapping

mechanism which has the ability to rotate at 360 deg angle in forward and reverse direction. The whole mechanism is operated through a pulley system that provides upward or downward motion for the spring shaped arm.

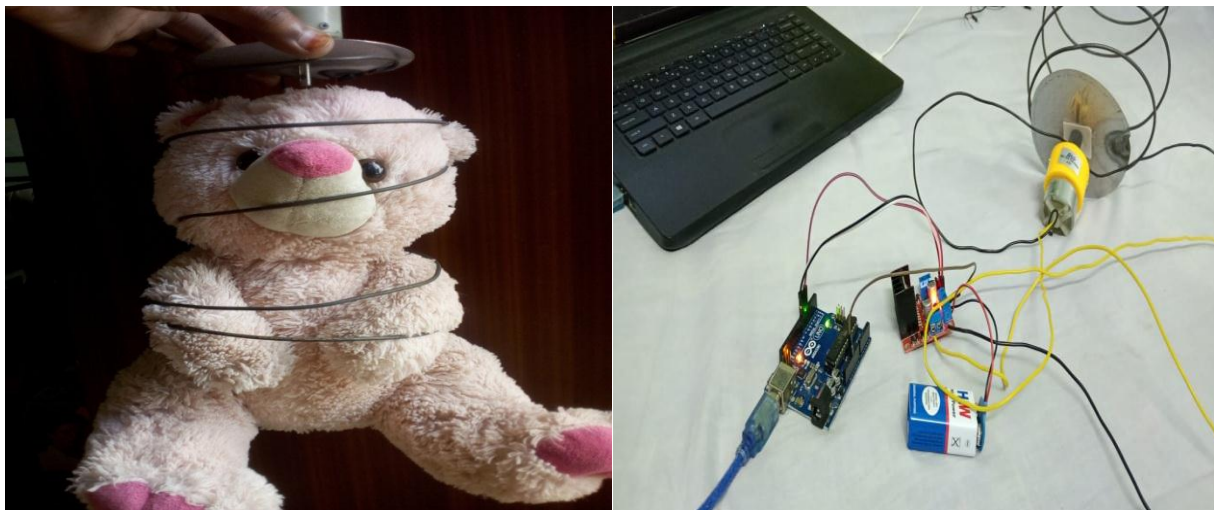


Figure 9 Proposed system

CONCLUSION

‘A novel design of child rescue system from the bore well’ is mainly designed to rescue the child within the adequate time limit and without any injury. Our concepts are fully focused on rescue

the child in alive manner. The spring shaped arm technique is mainly used to grab the child in its original position without any difficulties. Some of the challenges faced by the previous works were overcome by the proposed model.

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