BOREWELL RESCUE ROBOT

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ABSTRACT : *The bore well accidents are now become common everywhere. Frequently we here news on child stuck in the bore well, some are being rescued and in some cases we lose to save the life of the child. The main objective of this project is to design and construct a portable robot which is cost effective, quick in action and accurate. The Bore well Rescue Robot is capable of moving inside the well and performs operations according to the user commands. The proposed model is designed to provide the child with two level of safety achieved by using robotic holding at the top and safety airbag at the bottom. This arrangement ensures that the child does not slip further deep during the rescue operation. The robot is operated by the human manually and monitor in computer .According to the observations made continuously using CCTV camera.*

KEYWORDS :*Robotic arm, circular disk, Airbag, IR device*

I. INTRODUCTION

Nowadays children falling in to the bore well seems common. Frequently we hear of news on children stuck in a bore well among various parts of India. In most of the cases of children falling into bore wells seem to occur in rural India. This says something about the bore well diameters. In the cities, bore wells are dug for domestic purposes. These are lesser in diameter. So looks like the bigger bore wells are the problem. Some manufacturing companies too dig large-diameter bore wells. These might be typically located in the villages.

However, this is not the primary reason - in the villages, people constantly seek groundwater. The moment a farm or company needs water , they try to dig a well. However, open wells are not always the solution (open wells are dug when you have groundwater available easily at shallow depths. Open wells are convenient. But then groundwater is not easily available - thus bore wells are due to a greater depth. Also companies need more water and wells won't suffice).

People need water and where does that come from? River or lake water supplies is not always available to all areas. Thus, groundwater is the source. And people dig to great depths to get groundwater. Groundwater for various reasons - summer, over exploitation, less recharge etc at times goes down deeper (water table).

However, many of the bore wells do not yield water and are "abandoned". The driller might have used casing and partially sealed the hole. Mostly, though the moment there is no water, the drillers pack up and leave. Vegetation takes over and these bore wells are forgotten.

Someday a child wanders over and falls. in. The diameter is enough for the child to fall in. However, it takes time to realize that the lost child could have fallen into the bore well.

The inside of the bore well now defunct or not used might have collapsed. Some bores are 300 feet deep (or more). The child might not always fall to the bottom but get stuck in the mud in between. This is not easy to find out as the hole is dark and deep. It is not a case of just pulling out the child through a vertical shaft.

So rescue operations begin and sometimes if the child is closer to the surface a rescuer gets in and pulls them out. However, if the child has fallen to greater depths, a camera is sent into the hole and then a parallel bore is dug. From there another

horizontal bore is dug. Quiet often the rescue succeeds but not always. A lot of Geology is involved and rescue plans must be fast and precise. But even with the best geophysical instruments, it is not easy to estimate the type and size of rock that blocks access to the point where the child is stuck. Moreover, drilling through rock can make the entire bore well collapse.

So we found a simplest solution to rescue the child without any failures or causing injury to child while rescuing. The instrument we designed in capable moving inside the same bore well were the child is being stuck. First of all oxygen is supplied to avoid the inability of breathing of child. Then the instrument is sent into the well using the pulley. The camera with a high powered LED is used to find the location of child ,The IR sensor is also added to detect the distance of the child to increase the accuracy. When the child is spotted, the instrument is fixed just above the child and the robotic arm holds the head for temporary safety and the gap between the child and well is spotted by the circular plate through the camera and the fiber cable is allowed to pass through the gap and the airbag is inflated under the child which sustains the child not to fall/slide anymore into the well. Then the whole system is pulled out by the pulley. Now the child could be rescued with high safety and without any injuries.

II. HARDWARE COMPONENTS

2.1 Pulley :

Fig 1: Pulley

Pulley systems are used to provide us with a mechanical advantage, where the amount of input effort is multiplied to exert greater forces on a load. We use this to push and pull or lift the entire system and child in rescue operation.

2.2 CCTV CAMERA :

CCTV (closed-circuit television) is a TV system in which signals are not publicly distributed but are monitored, primarily for surveillance and security purposes. **CCTV** relies on strategic placement of **cameras**, and observation of the **camera's** input on monitors somewhere. We use this to monitor the location of child and also to find the gap between the child and the well.\

Fig 2: Cctv camera

2.3 IR Sensor :

An **infrared sensor** is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion. We use this to find the distance and location of the child in high accuracy.

Fig 3: IR Sensor

2.4 PNEUMATIC VALVE :

The pneumatic valve are used to control the pressure of compressed gases as well as the rate and direction of flow. This in turn controls the action of the device

using the compressed air or gas. The pressure is applied through the pneumatic valve to stick the suction cup in the vertical pipe or hole and depressurize in the suction cup for holding the instrument steady for few minutes.

2.5 SERVO MOTOR :

The Servo motors are used to control the movement of robotic arms and the rotation of circular disc to operate the instrument. They could operate at low speed and capable of operating on reasonable work load.

Fig 4: Servo motor

2.6 ROBOTIC ARM :

The Robotic arm is to hold the head of the child for comfort ability in rescue operation and to avoid collision child with the surface of well while rescuing which avoids injuries. It contains feature surface of easy holding. It is operated through the servo motor.

2.7 AIRBAG :

An **airbag** is a type of vehicle safety device and is an occupant restraint system. The **airbag**module is designed to inflate extremely rapidly then quickly deflate during a collision or impact with a surface or a rapid sudden deceleration. It consists of the **airbag** cushion, a flexible fabric bag, inflation module. It is inflated under the child to avoid further sliding into the hole. Also it provides a basement for the child to pull up.

Fig 5: Air bag

III. METHODOLOGY

The complete system is monitored and controlled by the operator based on provoking situation and difficulties. A small circular plate which contains a fiber cable is lowered down using the pulleys and chain. when the child is spotted using the IR device, The rotation of pulley stops and the circular disk is fixed stable using the pneumatic actuators. Now the disk is rotated to find the gap between the child and the hole. when the gap is spotted by the camera, The fiber cable is passed through the gap to the bottom of the child. Then the airbag is inflated using the compressor.

Now the child is secured by not sliding further in to the well. After that the pneumatic actuator is released and the entire system is pulled up and the child is rescued safely.

`In further implement if it is possible a closed mesh like structure will we formed around the child to rescue with much more safety.

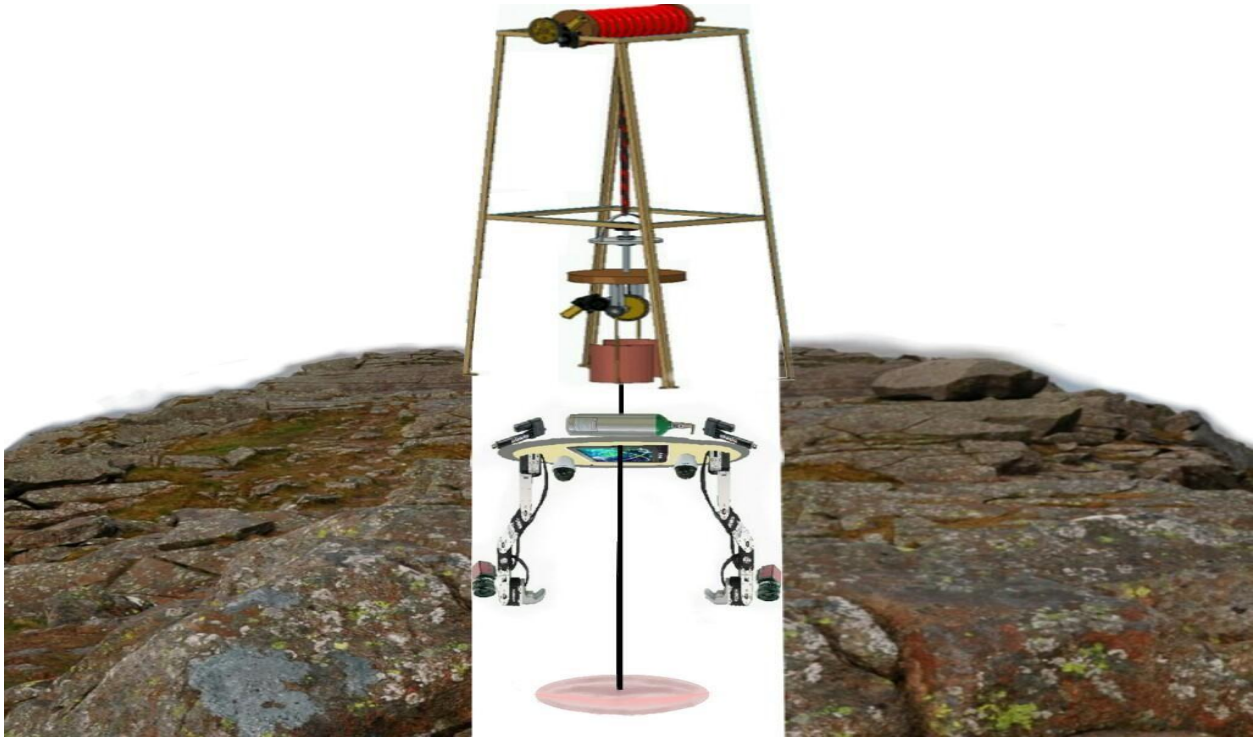
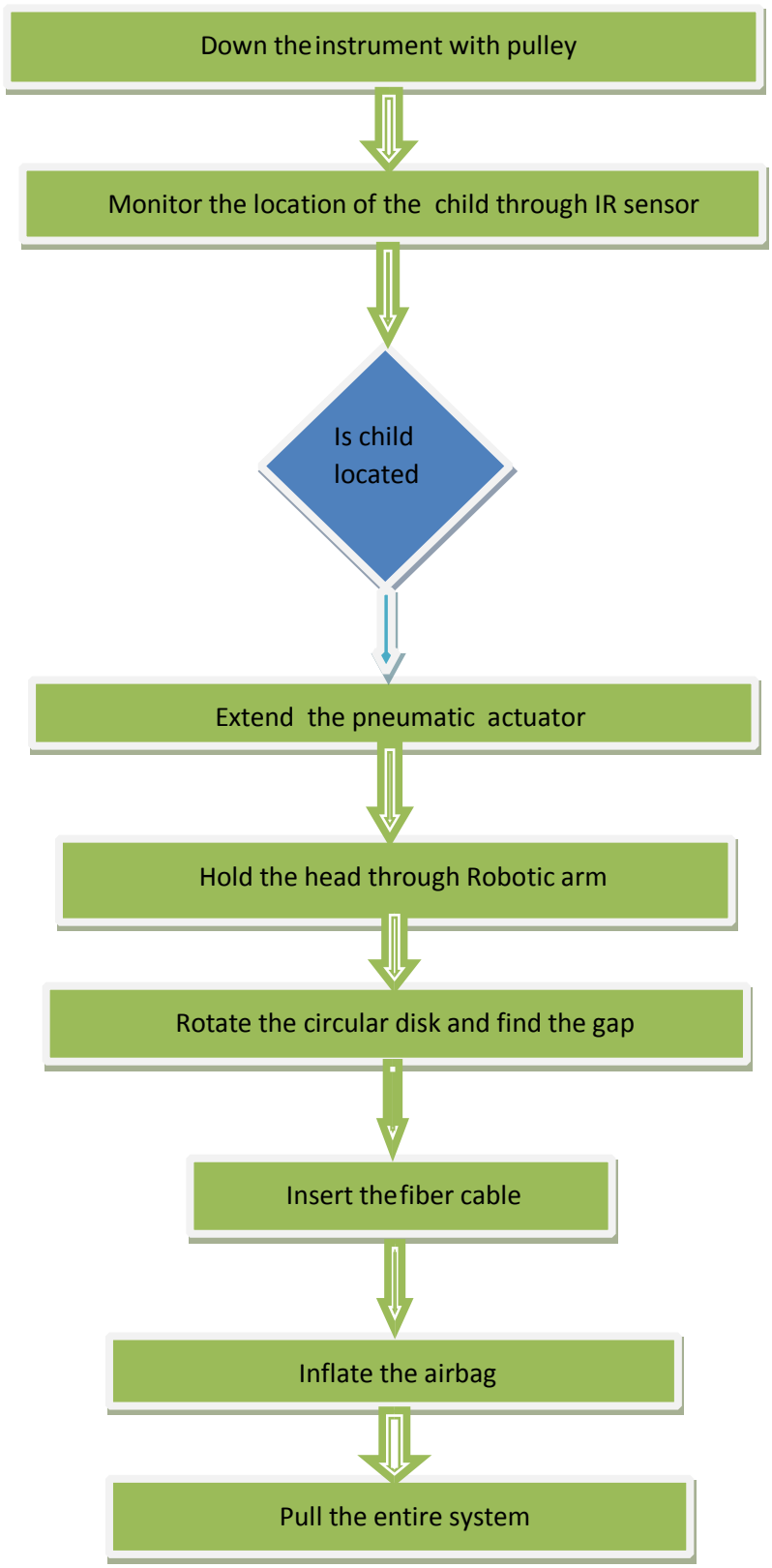


Fig 6: Conceptual Diagram

IV.FLOWCHART



V.CONCLUSION

At present, instruments or devices to rescue the child who stuck in the bore well is not moreover available in the fire stations because of lack of efficiency and possible of failures in existing instruments. So we designed a robot which is of high efficiency in rescuing the robot and there is no possibility of failures while rescuing. Also it is cost efficient so that the needed persons could afford it easily. The controlling is very easy and done by the operated by lively monitoring through the camera. Through this we can safeguard the child without any possibilities of failure and injury.

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