

Borewell Rescue Equipment

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Abstract - The borewell accidents are now common in every where. Frequently we here news on child stuck in the borewell, some are being rescued and in some cases we lose to save the life of the child. To overcome this issue we proposed a system, in which the equipment can move inside the borewell and rescue the child safely. The main objective of the project is to design and construct a portable borewell rescue equipment which is cost effective, quick in action and accurate. The equipment is capable of moving inside the borewell and perform operations according to the user commands. In this project we have automated the operation of borewell rescue equipment with help of a wiper motor, chain, self motor, metal rad and a metal plate. Thus our project is easily portable and less expensive which can be used in many situations to rescue the victim safely and also in less time.

Key Words: Wiper motor, self motor, Metal plate and metal rad.

INTRODUCTION

The expected number of wells and borewells in India is now reducing and there are only twenty-seven million borewells. Growing water scarcity is one of the most important problems in India. Since the water level is decreasing day by day so more peoples are affected. Borewells are constructed to overcome water scarcity. These borewells are left opened after finding that ground water is not abundant in that place. Borewells that yielded water and subsequently got depleted are left uncovered. The bore wells in turn have started to take many innocent lives. Small children without noticing the borewell fell inside and get trapped. There is no proper technique to rescue in case of such accidents. In most cases a parallel hole is dug up and then a horizontal path is made to reach to the baby. It takes nearly 20-60 hours to dig the parallel pit, by that time the child would have lost its life. It is a time taking process, and also risky in various ways. There is possibility of injuries to the child inside the borewell. Whatever may be the case the success ratio depends on lots of factors like availability of time taken for transportation of machinery to the situation, human resources and mainly the response time of various government organizations. In India according to the NCRB (National Crime Records Bureau) report of 2011 there are 5 average deaths per day in the license bore wells.

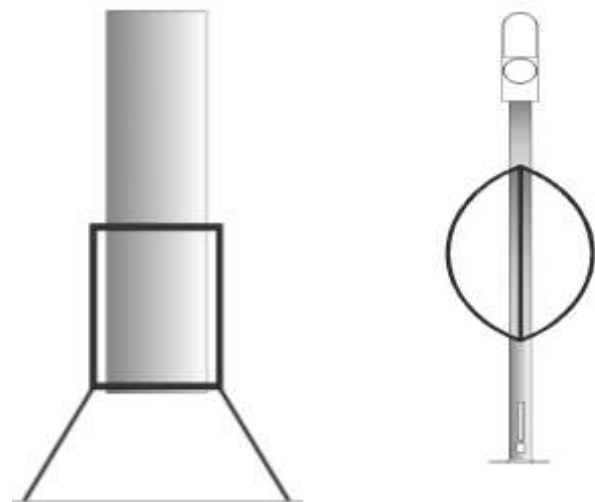
PRODUCT DEVELOPMENT PROCESS

This product " THE BOREWELL RESCUE EQUIPMENT" carried based on KARL .T. ULRICH'S product development process. [5]

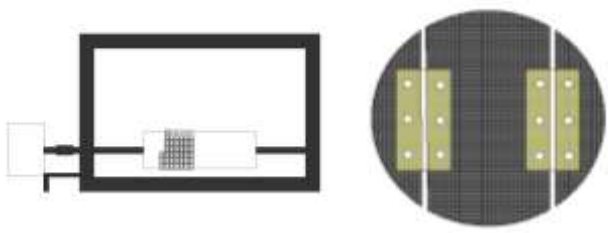


Product development process

SYSTEM LEVEL AND COMPONENTS DESIGN



Cad design of product

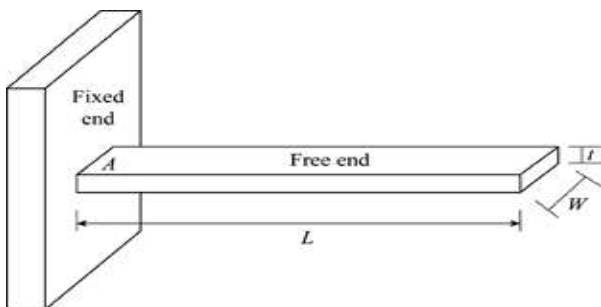


Cad design of product Top view of metal plate



Design of product

DESIGN CALCULATION



Cantilever

Consider the centre piece of the metal plate as a cantilever ie;one end is fixed and other end is free.

Weight of victim =8kg

Weight of plate =300gm =.3kg

Total weight=8+.3=8.3kg

=8.3x9.81=81.423N

L=22cm=220mm B=7.5cm=75mm D=4mm

Deflection at free end =WL³/8EI

Youngs modulous of mild steel=2x10⁵Mpa

Moment of inertia,I=BD³/12

I=75x4³/12=400mm⁴

Deflection at free end=81.423x220³/8x2x10⁵x400=1.354mm

Bending moment,m=WL/2

m=81.423x220/2=8956.53Nmm

Bending stress=mxy/I

y=D/2=4/2=2

=8956.53x2/400

=44.78 N/mm²

The bending stress of the plate is (44.78 N/mm²) less than the bending stress of the mild steel (150N/mm²) so the design is safe.

WORKING

Place the plastic pipe along with the stand on the floor. Then arrange the metal plate with a metal rad for rescue operation. Place chain mechanism four meter above the plastic pipe and connect the chain with the joint in the metal rad. Then connect all the electric wires to the lead acid battery of 12V.Switch ON the toggle switch, then the wiper motor will start to rotate and the metal plate with the metal rad will move in downward direction through the plastic pipe. When the metal rad reaches below the victim ,switch OFF the toggle switch and then switch ON the two way switch of self motor and it will start to rotate. Due to the rotation of self motor ,the cable in the metal rad will move upward and the mild steel plate will get unfold. Switch OFF the two way switch of the swlf motor when the plate gets unfold. The plate acts as a seating arrangement for the victim. Then switch ON the toggle switch in opposite direction and the metal plate with the metal rad will move in upward direction. Switch OFF the toggle switch and take the victim when the victim reaches the top of the plastic pipe. Remove all the electric connections and switch OFF the power. Replace all parts of the equipment in the normal positions

RESULT AND DISCUSSION

The product is produced, the product is easier to construct and less consumption of energy compared to other fabrication materials. The process, cutting, drilling, welding and assembling are simple. This equipment will rescue the victim within minutes.

ADVANTAGES AND DISADVANTAGES

The borewell rescue equipment is easy to work, less cost compared to other products, safety to human life, less no of

moving parts, high durability, simple in construction, safe operation can be achieved and may also used in various applications for picking different objects, where human involvement is not preferred. Main disadvantage is it uses electrical energy, there is no sensors it consume more man power and chance for corrosion.

FUTURE SCOPE

We designed and fabricated a model of borewell rescue equipment and expect the following future expansion suggestion will be useful. It is an automatic rescue operation system, the metallic plate can be used below the safety airbag in order to provide extra support to the child from the bottom and in future we can use this project in several application by adding additional component to this project such as ultrasonic sensor, air bag, mic is used to listen the voice of the child ...etc

CONCLUSIONS

While concluding this report, we feel fulfill lots of practical experience during then manufacturing schedules of the working project model. We are happy that our knowledge has been used for social welfare. Although the design criterions with problems definitions which, however were overcome by using references & teachers guidelines. The choice of raw materials helped us in machining of the various components to very close tolerance and thereby minimizing the level of balancing problem. We will do efforts during machining, fabrication and assembly work of the project model to fulfill the need of project. This project is fabricated on the basis of literature and research on different journal and paper relevantly available and fabricated in accordance so it can provides flexibility in operation. This innovation is easy and less costly and has lot of room to grow more economical. This project "BOREWELL RESCUE EQUIPMENT" is designed with the hope that it is very much economical and helpful to rescue the children from borewell. On the basis of it design and estimating cost and availability it is very cheap and very useful for the society. We like to conclude with the help of our project, we are able to rescue without damage.

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