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Conceptual model for improving maneuverability in **borewell rescue devices**

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Introduction 1.

Children become victims as the outer surface of bore well not properly sealed.

Existing solutions have limited degrees of freedom that mostly doesn't consider rope sway and maneuverability issues. Pose great risk of wall collapse.

The project conceptualized compact mechanisms without compromising their maneuverability.



2. Product overview

a) Anchor deployment for sway mitigation and *maneuvering:* A parallelogram mechanism is used linking the anchor pads and the nut. The individually controlled anchor pads are operated by a slider crank mechanism. (Figure 1)

b) Module translation and rotation: Uses leadscrew and motor respectively

c) Gripper actuation and control: A bidirectional leadscrew controlled by motor through spur gears (Figure 2)

Analysis and results 3.

A minimum safety factor of 2 is achieved which is acceptable for rescuing a child. (Figure 3)

The maximum torque experienced by the translation motor is 25 N-m. NEMA 34 has been chosen.

Conclusion 4.

The borewell devices with these mechanisms aid the responders to rescue the child in even a shorter period.

By varying the pitch of the leadscrew and the dimensions of the links, we can attain various least counts according to the need.



Fig 1: Schematic diagram of the anchoring mechanism.









Fig 3: Static structural analysis

References 5.



Fig 2: Schematic diagram of the gripper control mechanism

Sridhar, K.P., Hema, C.R. and Deepa, S. (2018) 'Comparative study of design and analysis of gripper systems for bore well rescue operation', Int. J. Computer Aided Engineering and Technology, Vol. 10, No. 3, pp.266–273.

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