

Design and Fabrication of a Movable Road Barrier Machine

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Abstract- *The increasing need for efficient traffic management during construction and peak hours has led to the development of advanced road safety systems. This paper presents the design and fabrication of a Movable Road Barrier Machine, intended for use in metro positions with significant traffic variations. The machine can transport concrete lane dividers to relieve traffic congestion effectively and safely. This innovation allows for the flexible deployment of barriers, enhancing productivity and minimising disruptions during road construction or maintenance.*

Indexed Terms- *Movable Barrier, Road Safety, Traffic Management, Barrier Transfer Machine, Traffic Congestion*

I. INTRODUCTION

Traffic congestion, especially during peak hours, presents a significant challenge in urban areas. To address this, movable barrier systems have been introduced, which can dynamically allocate lanes based on traffic flow. This paper discusses the design and construction of a Movable Road Barrier Machine, which can safely transport and reposition barriers as required, enhancing road safety and improving traffic management.

II. LITERATURE REVIEW

Movable barrier systems, also known as zipper machines, have been widely adopted in various countries for their ability to manage traffic during high-density periods. These systems are typically employed on highways and bridges, where lane allocation needs to be adjusted dynamically. Previous studies have shown the effectiveness of these systems in reducing traffic congestion and improving safety during construction activities.

III. DESIGN METHODOLOGY

The design of the Movable Road Barrier Machine focused on creating a robust system capable of handling the weight and size of standard road barriers. The machine's framework is constructed using structural steel, ensuring durability and the ability to withstand the stresses of daily operation. Key components include a chain drive system, trolley wheels, and a powerful motor to facilitate the movement of barriers across road lanes.

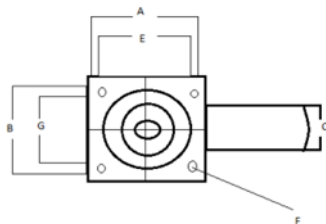
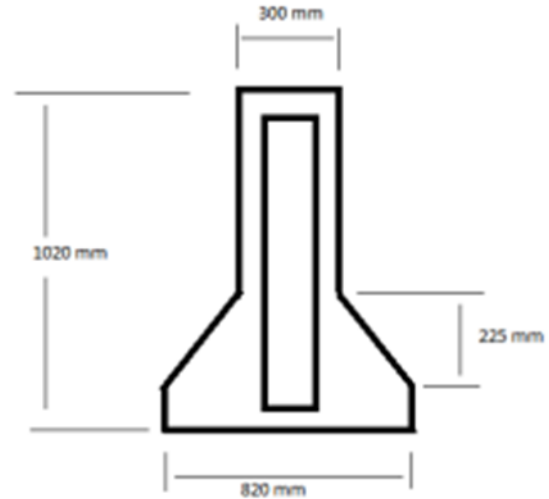
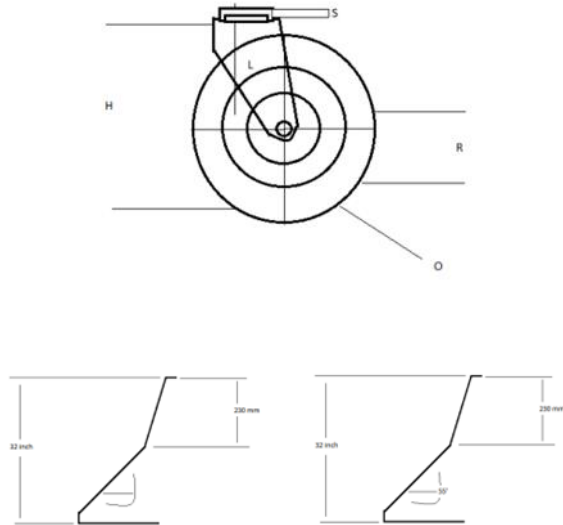
3.1. Frame Construction

The frame, made from high-strength structural steel, forms the backbone of the machine. Its design ensures stability and provides support for the other mechanical components.

3.2. Mobility Mechanism

The machine employs trolley wheels with roller bearings to ensure smooth movement across the road surface. The chain drive system, driven by a motor, allows for precise control of the barrier's movement.

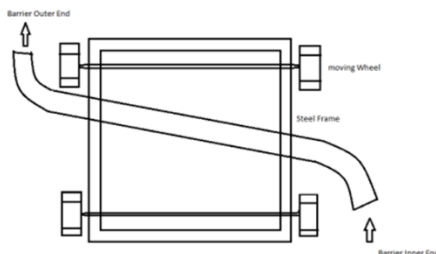




IV. SYSTEM COMPONENTS

The main components of the Movable Road Barrier Machine include:

- **Frame:** Built from structural steel, it provides the necessary support and durability.
- **Trolley Wheels:** Fitted with roller bearings to minimize friction and ensure smooth mobility.
- **Barrier:** The movable road barriers are made from concrete, connected via steel pins to form a continuous chain.
- **Motor and Chain Drive:** The motor powers the chain drive system, which moves the barriers laterally across the road.



V. APPLICATIONS

The Movable Road Barrier Machine can be utilized in both temporary and permanent applications. Temporary applications include road construction and maintenance, where the barrier can be quickly repositioned to protect workers and manage traffic. Permanent applications involve dynamic lane allocation on busy highways and bridges, providing flexibility in response to changing traffic conditions.

5.1. Temporary Applications

The machine is particularly useful for night-time operations near high-speed traffic, where quick deployment and removal of barriers can significantly reduce the risk of accidents.

5.2. Permanent Applications

In permanent installations, such as on bridges or expressways, the machine can be used to adjust lane configurations based on traffic flow, enhancing overall traffic management and safety.

CONCLUSION

The Movable Road Barrier Machine represents a significant advancement in road safety and traffic management technology. Its design allows for the safe and efficient repositioning of road barriers, reducing congestion and improving safety during construction activities. Future developments may focus on enhancing the automation of the system and

integrating it with traffic management software for real-time adjustments.

REFERENCES

- [1] Charles F. McDevitt, "Basics of Concrete Barriers," detailing the principles behind barrier design.
- [2] U.S. Patents No. 4,806,044 and 4828, which discuss hinge connections in movable barriers.