

Equipment

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Project Title:

Evaluation of the AutoCone 130
Cone Trailer

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Evaluation of the AutoCone 130 Cone Trailer

The AutoCone trailer was evaluated as a potential lane closure solution to reduce worker exposure and improve safety.

WHAT WAS THE NEED?

Caltrans sets up highway lane closures daily throughout California, to create work zones for workers to conduct highway maintenance activities. In high traffic areas, lane closure is a high-risk operation. Presently, a cone truck requires a minimum crew of two, one to drive the truck and the other to drop off or pick up the cones. The crew operating the cones needs to manipulate the cones by hand, which can be physically demanding and may expose the crew to traffic.

The safety of Caltrans workers and the users of California's transportation system is Caltrans' number one priority. We are constantly working to improve the safety for all Caltrans workers and the public. The AutoCone 130 showed the potential to lower the risk of traffic exposure, by reducing the number of operators to one and by putting the operator into the safety of the cab. A research task was needed to evaluate the accuracy of manufacturer claims and determine the machine's overall value to Caltrans operations.

WHAT WAS OUR GOAL?

The goal was to obtain an AutoCone 130 cone trailer and evaluate its operation to determine if it works as advertised, document the decrease (if any) in worker exposure to traffic, compile other benefits and drawbacks, and obtain feedback from staff after using the machine. The overall goal was to improve worker and traveler safety.

WHAT DID WE DO?

In this research, the Advanced Highway Maintenance and Construction Technology Research Center worked with Caltrans Division of Equipment, Division of Maintenance, and Division of



Caltrans provides a safe, sustainable,
integrated and efficient transportation
system to enhance California's
economy and livability.

Research, Innovation and System Information to:

- Develop specifications for the AutoCone system, and procure two AutoCone 130 trailer systems
- Develop a test plan to support evaluation of the AutoCone 130
- Perform controlled field testing of the AutoCone 130
- Evaluate the performance and suitability of the AutoCone 130 based upon the test results

WHAT WAS THE OUTCOME?

- The AutoCone meets the manufacturer's specifications.
- Speeds are slower than expected since the machine is regularly stopped to index the drum. The speed is considered acceptable by Caltrans.
- The AutoCone trailer cannot be used in Caltrans operation since it cannot retrieve cones while backing up. A truck-mounted system is required.
- The AutoCone must be redesigned to use the Caltrans 28-inch cone.
- A truck-mounted AutoCone 130 is not likely to be a substitute for the typical Caltrans cone body truck due to the large size and cost. The typical maintenance lane closure requires 80 cones.
- A truck-mounted AutoCone 130 is useful in locations such as the Bay Bridge where Caltrans places 5-mile closure on a regular basis.
- The AutoCone trailer reliability must be improved before road testing proceeds.
- Reliability of any automated machine must be high to avoid exposure of personnel in the field.
- Doubling or tripling the capacity will be important to some Caltrans operations, such as the Bay Bridge closures. Unloading and reloading the AutoCone while on the road is not recommended.

Future research / changes

- Modify the mechanisms and controls so that the operator does not have to exit the cab during lane closures.
- Modify an AutoCone 130 trailer as necessary to increase reliability and test the machine with maintenance crews to obtain additional feedback. Technical support is required to support the machine during demonstrations.
- Review the design details with Division of Equipment engineers to assess the tasks required to mount the existing AutoCone onto a truck frame for continued Caltrans testing.
- Investigate the latest commercially available automated cone machines.
- The X-CONE can retrieve of the cones in reverse, which is important for Caltrans. It is worth investigating this commercially available cone management system to see if it is a viable alternative.

WHAT IS THE BENEFIT?

While the AutoCone 130 currently has a few drawbacks which prevent its use for Caltrans, the system and related commercial systems show great promise. The AutoCone could be modified as a truck-mount system, perhaps with higher capacity. In such a configuration, the system would provide Caltrans with the envisioned operational and safety benefits. Current commercial systems such as the X-CONE, show significant promise to achieve the desired benefits. The research to evaluate the AutoCone 130 clarified the potential to significantly improve Caltrans lane closure operations.

LEARN MORE

Final report: <http://ahmct.ucdavis.edu/pdf/UCD-ARR-21-03-31-02.pdf>

IMAGES



Image 1: Typical Caltrans cone body truck with 80 cones



Image 4: Arm and claw



Image 2: AutoCone 130 machine



Image 5: 36-inch cone with weighted base and a 28-inch cone



Image 3: Drum and drum lock

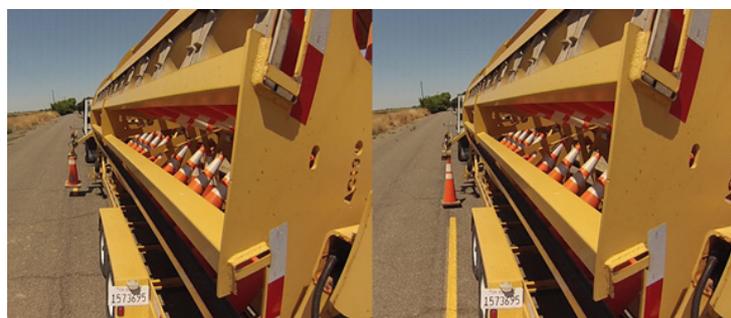


Image 6: Cone placing operation

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