



Caltrans Division of Research,
Innovation and System Information

Research



Results



Maintenance

Identify and Implement Successful, Measurable, Maintenance Friendly, Safe Roadside Design Practices

A study to research and develop new machinery that improves safety and efficiency in roadway repairs, trash cleanup, and vegetation control.

DECEMBER 2010

Project Title:

Identify and Implement Successful, Measurable, Maintenance Friendly, Safe Roadside Design Practices

Task Number: 1104

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Task Manager:

Gloria Gwynne

WHAT WAS THE NEED?

The California Department of Transportation (Caltrans) is responsible for maintenance of California's highway system and its rights-of-way. This project sought to further the development of safer and more efficient roadside maintenance operations, with a focus on efforts to collect litter and debris and control vegetation on roadsides. Communication methods were evaluated for sharing with practitioner's solutions to existing roadside maintenance problem-areas. This project developed a roadside maintenance on-line toolbox of best practices. The toolbox was designed as an interactive database presenting the features and pros and cons of different methods of addressing various roadside maintenance concerns. A review and assessment of existing equipment and methods was performed followed by development of mechanical tools that fill identified holes in the existing best practices. Conceptual vegetation cutting tools that allow workers to perform remote operations from within a truck were designed and tested. Vegetation cutting tools intended to be used with a vacuum truck were further refined and tested. The vacuum truck, known as the "Automated Roadway Debris VACuum" or ARDVAC, allows an operator to use a joystick and position the "vacuum cleaner" nozzle while staying in the truck. By adding vegetation cutters, noxious and invasive weeds can safely be cut and removed from the roadside. The next step is input from experienced users of the ARDVAC prior to further tool refinement.



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WHAT WAS OUR GOAL?

The goal was to develop safer and more efficient roadside maintenance operations to achieve the mandates of “enhance transportation services, improve safety, and reduce energy and environmental impacts.” Research and development of new machinery will help to improve safety and efficiency in roadway repairs, trash cleanup and vegetation control.

WHAT DID WE DO?

The focus was on litter/debris collection and vegetation control on roadsides within the protected confines of a truck. Maintenance equipment and methods were reviewed and assessed followed by development and testing of conceptual vegetation cutting tools that allow workers to perform remote operations from within a truck. Vegetation cutting tools intended to be used with a vacuum truck known as the Automated Roadway Debris Vacuum (ARDVAC) were refined and tested. Two concept tools, a rotary cutter and a reciprocating cutter were tested on grasses and woody stemmed weeds. Assembly of a third tool known as the tumbleweed processor was completed and it was then tested for use on tumble weeds.

WHAT WAS THE OUTCOME?

A web-based Vegetation and Debris Control Toolbox was developed. The toolbox is a compilation of existing operations and concepts that may be implemented in the future. It shows all possible equipment for any job scenario. This simple and easy way to access resource will help facilitate selection of the correct equipment for the correct job.

Testing of the cutting tools has demonstrated the strengths and weaknesses of each concept. Caltrans has begun operations of pre-production versions of the ARDVAC. As the operators of the ARDVAC become familiar with its capabilities and the design is refined, it is expected that it will find new applications. It is recommended that this vegetation cutting tool concepts be considered for further development once operations with the ARDVAC have provided needed user experience.

The toolbox can evolve as technology and trends change. This flexibility and evolutionary ability are what makes the toolbox a work in progress. It changes as the technology changes. To ensure that the toolbox stays relevant to current users it must be updated regularly. Each time a new section is added to the toolbox, feedback from the users must be obtained. As the toolbox nears a more stable and more complete version, an expanded survey of it should be done at the maintenance yard level to get feedback on usability.

WHAT IS THE BENEFIT?

The benefit is providing landscape maintenance workers with database of tools to do their jobs, by developing roadside maintenance on-line toolbox of best practices and identifying possible holes for addressing with new designs.