

Caltrans Structural Vegetation Management Solutions for Roadsides

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Caltrans VegCon Program implemented an Integrated Vegetation Management Program that consists of seven distinct methods for vegetation control. This document focuses on the “structural” method for vegetation control. Historically, structural applications have been the most expensive and least utilized method at Caltrans, but currently structural methods show promise for Caltrans’ future.

When choosing an appropriate vegetation management strategy, Caltrans considers safety for our highway maintenance workers, safety for the traveling public, and increased mobility. Structural methods can also decrease sight distance concerns. Generally, structural methods involve higher costs during initial installation, but they lead towards reduced maintenance needs and costs in the long run. Structural elements can also help Caltrans with its herbicide reduction goals. Hardscaping can unify and tie elements together while also being aesthetically pleasing – due to the wide variety of treatments, colors and patterns available.

Hardscape and Structural methods can be interchangeable terms. Basically, hardscape is the use of hard inert material surfaces such as asphalt, concrete and rock – in comparison to living soft material surfaces such as organic mulches and plants. Caltrans typically utilizes ten different highway hardscaping treatments. This document covers four products in detail – fiber weed control mats, polyureas, rubber weed control mats, and CRMCrete.

Fiber Weed Control Mats are synthetic polyester fibers spun together to create a mat that prevents weed growth while allowing for water and air percolation.

Fiber Weed Control Mat benefits include:

- Best for long straight runs of new guardrail or sign post installations
- Best on level compacted bases free of vegetation
- Less expensive than hard surface treatments
- Requires limited expertise to install (roll out mats, put on collars and seal)
- Simple removal replacement and repairs

Fiber Weed Control Mat limitations include:

- Not easily applied to curves (labor increases dramatically)
- Not recommended in high wind areas
- Labor intensive for existing guardrail and sign posts

Polyureas (or elastomers) are derived from the combination of isocyanate and resin- blend components. The result is a hard, but semi-flexible product that cures in less than one minute. Polyurea applications are typically applied through a spray with the two components

combined at the nozzle. They are applied in relative thin coats over a geotextile fabric stapled to the ground surface. The ground surface must be well-prepared, compacted, and have a smooth surface. The amount of pockets should be limited.

Polyurea benefits include:

- Can be colored
- Semi-flexible end product
- Bonds well to wood
- Fairly long lifecycle
- UV stable
- Spray-on application allows product to be applied around existing features.

Polyurea limitations include:

- Water gets under edges.
- Wind lifts the product, especially on non-solid bases (such as sand)
- Snow removal operations destroy the product
- Does not bond well to concrete and asphalt
- Sometimes has a smooth-sheen look until weathering occurs
- Requires specialized equipment to apply the material
- High level of expertise required for proper product installation
- Required safety gear due to sensitivity issues for VOC's released prior to curing.

Rubber Weed Control Mats were originally developed for the recreation industry (specifically to address playground safety surfacing and ADA accessibility issues). It is recycled tire rubber bonded together with a resin through a cold press process into a mat that lays directly on the ground. The rubber weed control mat tiles prevent sunlight from reaching the ground surface, retarding seed germination and plant growth. Rubber Weed Control Mat installation includes uses under new and existing guardrail, around sign posts and under fences. The tile's weight keeps the mat in place, so no staking is required. Tiles are joined together with an overlap that is sealed with asphalt crack filler or resin adhesive.

Rubber Weed Control Mat benefits include:

- Manufacturing process allows for specific requirements such as size or color.
- Integral color can be added during the manufacturing process.
- Product is flexible and not adhered to the ground surface. It is easier to repair compared to other products
- One person can make repairs without specialized equipment.

Rubber Weed Control Mat limitations include:

- Multiple joints in continuous runs may become unsightly over time
- Not applicable to curves
- Labor intensive on long runs
- Slow installation in comparison to other products

- Potential to ignite
- Joints have potential for separation and vegetation growth if not sealed properly
- Long-term degradation is unknown (for UV light and other factors)
- Potential storm water concerns
- High shipping costs (due to weight)

CRMCrete is short for Crum Rubber Modified Concrete. CRMCrete is a concrete-based product that includes recycled scrap tire crum rubber material and homopolymer polypropylene high performance reinforcing fibers blended into a slurry. Placement is similar to that of concrete and stamped concrete. Typical installation includes pouring CRMCrete into place, tamping and leveling as necessary, and in this application, Caltrans added a stamped texture to the top finish.

CRMCrete benefits include:

- Wide variety of colors to match soil colors by utilizing concrete stains
- Formwork is not always necessary
- Higher daily production rates – faster than other surface treatments
- Fairly easy installation
- Uses standard equipment and concrete mixes

CRMCrete limitations include:

- Consistency of mix may limit its use on slopes
- Limited history of maintainability and life cycle costs
- Repairs are difficult to match to the original color
- It is rigid and requires a 150 millimeter gap between the product and nearby guardrails/sign posts

So which is Caltrans preferred method? None. No single product is perfect!