Caltrans Standard Specifications
Section 18
Dust Palliative
Design Guidance
May 30, 2014

Dust palliatives are used to temporarily control dust during highway construction projects. Dust palliatives include water, dust suppressants, and dust control binders. Palliatives are used for public safety to control dust caused by vehicles and for environmental reasons to reduce wind-caused fugitive dust. The most common dust palliative used by contractors is water, but Caltrans must specify that dust control binders or dust suppressants must be used as dust palliatives in some situations.

There are two situations where the use of dust palliatives must be specified in the special provisions and contract bid items must be included in contracts. The first situation is for projects where water usage restrictions are in place where mandatory use of dust palliatives, other than water, is required. Refer to Water Conservation Guidelines for when to require the use dust control binders or dust suppressants as dust palliative. The second situation is for projects when there are no water usage restrictions in place and where staging requires public traffic to be placed on soil or base material. For this situation when the estimated traffic is 75 or more trips per day the special provisions must include the use of dust suppressants to reduce dust caused by public traffic.

Dust suppressants should be used for:

1. Temporary haul roads
2. Construction staging, material storage, and layout areas
3. Compacted soil or aggregate base roads or driveways
4. Paved surfaces

Dust control binders should be used on all other areas, including:

1. Rough graded soils
2. Completed slopes
3. Soil stockpiles

Estimating Guidance

Because of the number of available products, wide range of available product concentrations, various application rates, long term effectiveness, and requirements for reapplication, the bid item for dust palliative is based on a lump sum. For projects where project staging requires public traffic to drive on subgrade, aggregate subbase, or aggregate base and estimated traffic is 75 or more trips per day, use of dust suppressants is required and is estimated based on SQYD.

<u>Estimating Costs for Dust Control Binders</u>

Estimate the areas in acres where dust control binders must be used. If areas will be disturbed multiple times, include multiple applications for rough graded soils. Estimate the cost of dust control binder based on $2,500.00 per acre. The control binder unit cost is based on $2,470 per acre as shown in Appendix A, Tackifier Comparison Matrix in Erosion Control Toolbox, dated July 2009.

Estimated costs of dust control binder = Estimated area (acres) X $2,500.00 per acre

Estimating Costs for Dust Suppressants

Estimated cost for Dust Suppressant is based on using SS1H emulsion as the base unit cost and the following:

Where:

- Application rate of 1.0 gal/SQYD
- Emulsion dilution 5 parts water to 1 part emulsion 1/(1+5) = 0.17 = 17%
- Estimated area in square yards where dust suppressants must be used = Estimated SQYDs
- Cost of SS1H emulsion is based on the following unit cost:

Estimated Quantity (Tons)	Estimated* Unit Cost
<2	$2,200
3–5	$1,200
6–10	$1,000
>11	$650

*Based on tack coat bid item cost data for 2012–2014 using top three bidders.

Calculation:

Estimated SQYDs X 1.0 GAL/SQYD X 0.17 (percent emulsion) = gallons of emulsion

Gallons of emulsion X 8.33 pounds/GAL ÷ 2000 pounds/ton = tons of emulsion

Estimated cost of dust suppressant = estimated tons of emulsion X Unit Cost $/ton

Estimated Cost for Dust Palliative

Bid item for dust palliative is used when water use is restricted and includes using both dust control binders and dust suppressants for controlling dust.

Estimated cost Dust Palliative = estimated costs of dust control binder + estimated cost of dust suppressant.

Bid Items

Bid Item: 180106 DUST PALLIATIVE

Include a bid item for dust palliative when restrictions are in place on using water. Bid item is required for water conservation categories Voluntary Water Conservation, Mandatory Water Rationing and Severe Public Drinking Water Shortage. Refer to Water Conservation Guidelines for more information about when the bid item for dust palliative must be included in projects.

Bid Item: 180105 DUST SUPPRESSANT

Include a bid item for dust suppressants when public traffic is required to drive on subgrade, aggregate subbase, or aggregate base.

Dust Palliative Estimating Examples:

Example 1

- Rough grading estimated at 8 acres
- Cut and fill slopes estimated at 11.4 acres
- Median area estimated at 1.7 acres
- Contractor's haul road of 1600 feet and width of 10 feet
- Contractor yard of 100 feet by 100 feet
- County road where public traffic is to be staged on subgrade and aggregate base (length 2400 feet and width of 24 feet)

Estimate for dust control binder:
(8 acres + 11.4 acres + 1.7 acres) X $2,500 / acre = $52,750

Estimate for dust suppressant:
Haul road area: (1600 feet X 10 feet) ÷9 SQFT/SQYD = 1,778 SQYD
Contractor yard area: (100 feet X 100 feet) ÷9 SQFT/SQYD = 1, 111 SQYD
For county road dust suppressant must be applied to both subgrade and aggregate base, so:
2 (2400 feet X 24 feet) ÷9 SQFT/SQYD= 12,800 SQYD
Total area for dust suppressants:
1,778 SQYD +1,111 SQYD +12,800 SQYD=15,689

Calculation:
15,689 SY X 1.0 GAL/SY X 0.17 (percent emulsion) = 2,667 gallons of emulsion
2,667 gallons of emulsion X 8.33 pounds/gallon ÷ 2000 pounds/ton= 11.11 tons of emulsion
11.11 tons X $650/ton = $7,221.50

Engineers estimate: $52,750 +$7,221.50 = $59,971.50
Use for Engineer's estimate of lump sum: $60,000
Bid Item: 180106 DUST PALLIATIVE $60,000

Example 2

For a project where there is no water usage restriction and public traffic will be staged on soil or base material. Public traffic staging detour on aggregate base where the length of detour is 600 feet and width of detour is 22 feet.
Detour area: (600 feet X 22 feet) ÷9 SQFT/SQYD = 1,467 SQYD
1467 SQYD X 1.0 GAL/SQYD X 0.17 (percent emulsion) = 250 gallons of emulsion
250 gallons of emulsion X 8.33 pounds/gallon ÷ 2000 pounds/ton= 1.05 tons of emulsion
1.05 tons X $2,200/ton = $2,310
Engineers estimate based on: $2,310 ÷1,467= $1.57 / SQYD
Use for Engineer's estimate: $1.60 / SQYD
Bid Item: 180105 DUST SUPPRESSANT= 1,467 SQYD @ $1.60 / SQYD

Note: If public traffic is staged on multiple layers such as subgrade, aggregate subbase and aggregate base than multiple applications of dust suppressants must be included in the engineers estimate.