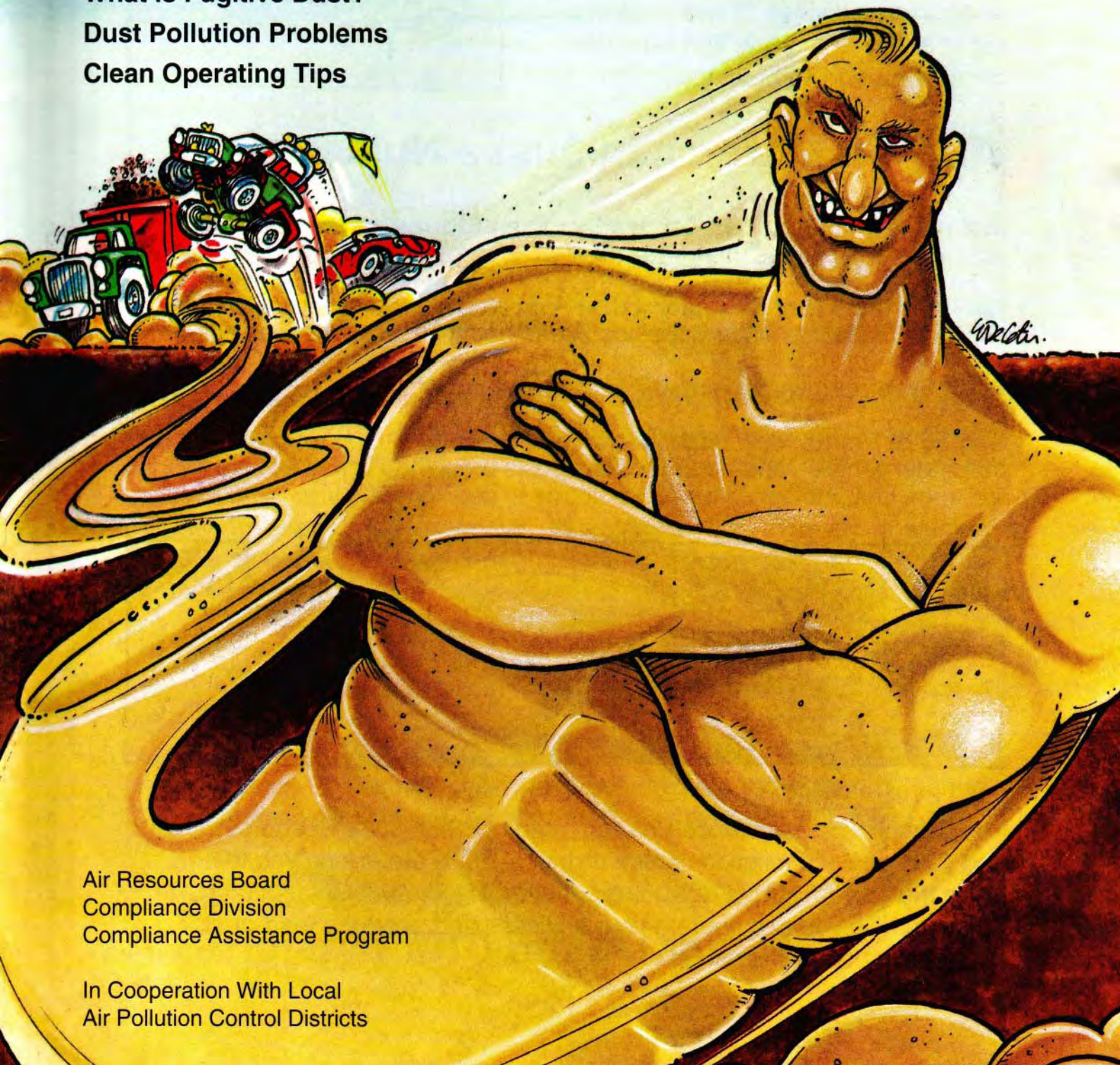
Fugitive Dust Control
Self-Inspection Handbook

How to Control Dust and Reduce Air Pollution

What is Fugitive Dust?
Dust Pollution Problems
Clean Operating Tips



Air Resources Board
Compliance Division
Compliance Assistance Program

In Cooperation With Local
Air Pollution Control Districts

What is Fugitive Dust?
It's Air Pollution!

"Dust" is Particulate Matter (PM), solid particles which come primarily from the soil. "Fugitive" dust is PM suspended in the air by wind action and human activities. It has not come out of a vent or a stack, and is usually not a by-product of burning. Fugitive dust particles are composed mainly of soil minerals (e.g. oxides of silicon, aluminum, calcium, and iron), but can also contain sea salt, pollen, spores, tire particles, etc.

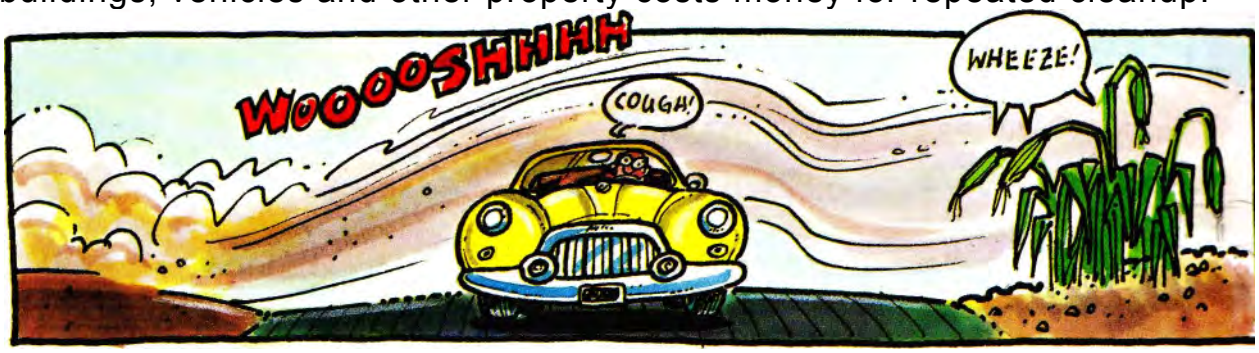
And It's More Than Just a Nuisance -

Visibility Reduction Can Be Deadly - Dust Storms can lead to traffic accidents and pileups on roads and highways, causing injury and death.

Health Effects May Be Major if dust is inhaled in large amounts, or if dust contains crystalline silica, asbestos fibers, heavy metals or disease spores.

Wind Erosion robs the farmers' fields of valuable topsoil.

Soiling of Plants: dust deposited on foliage reduces crop yields; soiling of buildings, vehicles and other property costs money for repeated cleanup.

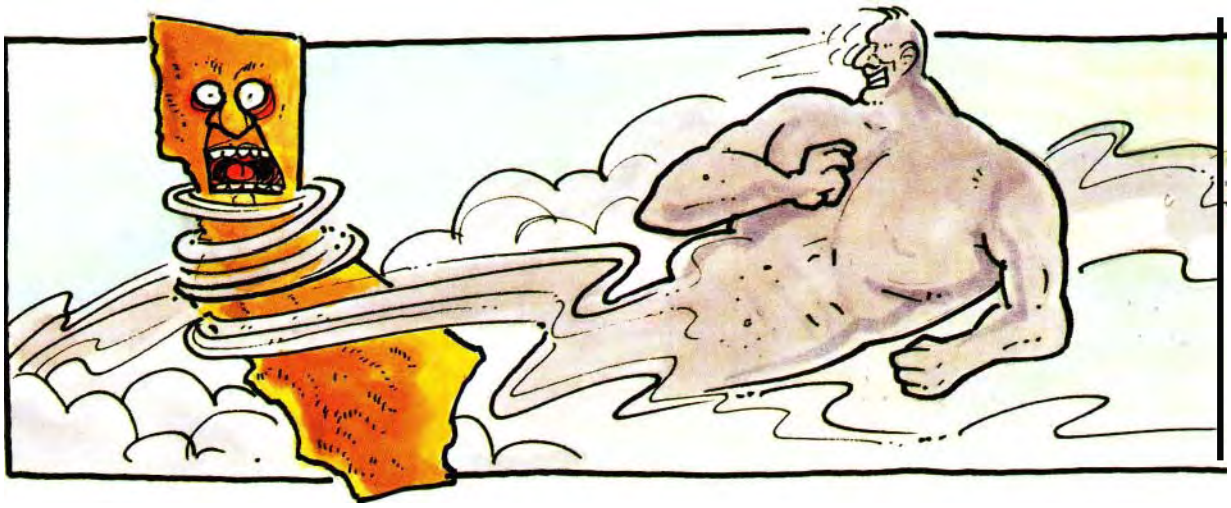


The Compliance Assistance Program at the California Air Resources Board and your local air pollution control district (APCD) are asking you to **help clear the air of fugitive dust.** Included here is information about fugitive dust and how you can operate your business and **produce less dust. You <u>can</u> make a difference!**

It Can Be Hazardous to Your Health...

About half of fugitive dust particles (by weight) are big particles, larger than 10 microns in diameter (the average human hair is 70 microns in diameter). These larger particles settle out more quickly, on the ground and in your upper airways.

However, the other half are particles **10 microns or smaller, or PM10**. Due to their very small size and weight, PM10 particles can remain airborne for weeks. When inhaled, PM10 particles can travel easily to the deep parts of the lungs and may remain there, causing respiratory illness, lung damage, and even premature death in sensitive individuals.



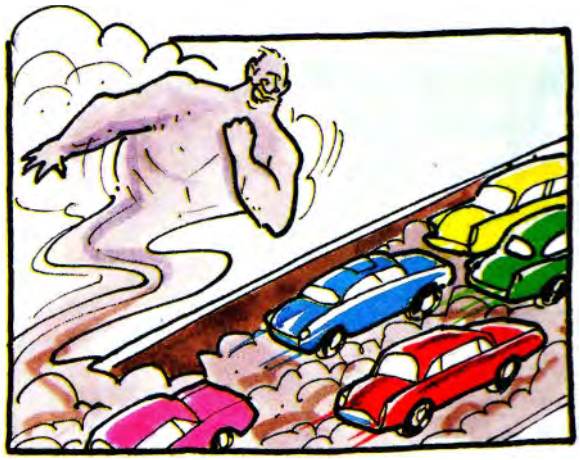
The PM10 pollution problem in California is widespread and severe. People in California are exposed to unhealthful levels of PM10 more frequently than to any other air pollutant measured. At over half of the sites monitored, the highest daily measurements are **more than twice the State standard,** which is based on minimizing adverse health effects.

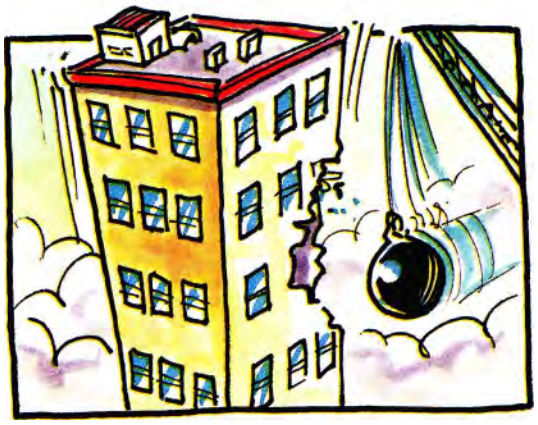
Because fugitive dust PM10 particles come directly from the source, they are classified as **primary** particles. Certain pollutant gasses can undergo physical changes or chemical reactions to form much smaller **secondary** particles, which are the most harmful types of PM10.

Fugitive dust, or dust not coming from a combustion source, accounts for about 90% of all primary PM10 emissions.

Fugitive Dust is a Problem: In the City,

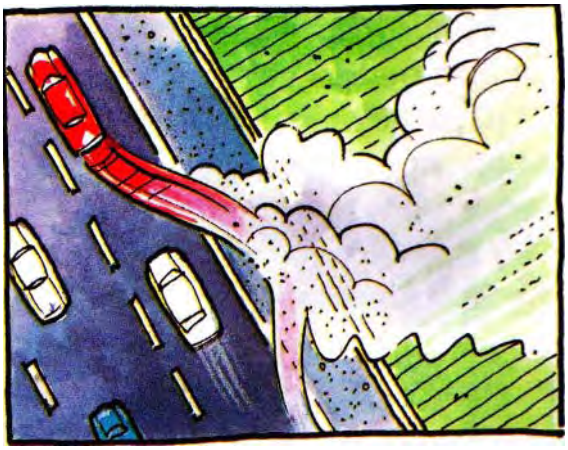
Vehicles on Streets and Highways are constantly pulverizing and tossing up dust from the roadway, particles worn from the road and countless tires, tracked-on dirt from unpaved areas, litter, spills, plant debris, pollen, etc. The ARB estimates total annual PM10 emissions statewide from paved roads at approximately **411 tons per day (tpd)** (2005 data).





Building Construction and Demolition Activities which produce fugitive dust include land clearing, grading, and excavation with heavy equipment, truck travel into and out of the work area, and loading and unloading demolition debris and building materials. Building and Construction activities produce **196 tpd of PM10.**

Unpaved Shoulders, Parking Lots, Vacant Lots and Alleys are areas where vehicle travel stirs up dust repeatedly. The dust is carried onto paved roads, where it is swept up into the air again and again. Back at the lot, the wind is blowing away new dust exposed by recent vehicle disturbance. (PM10 emissions for these areas are included in the unpaved roads category)



Leaf Blowers are used to move leaves and dust into the street, where the dust will be kicked up by vehicle traffic -again and again.

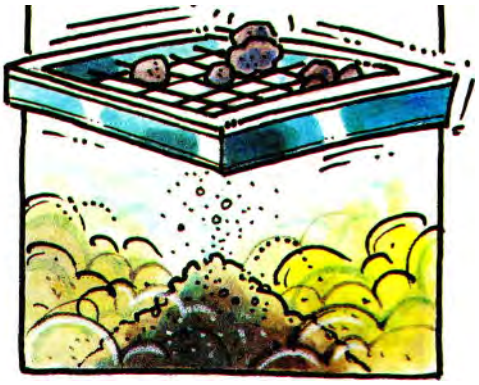
And in the Country ...

Areas of Exposed Ground and Unpaved Roads are common, both public and private, and can extend for miles. With little or no traffic, vehicles may travel at excessive speeds, throwing large amounts of dust up into the air. Numerous trips produce numerous dust plumes. Repeated disturbances caused by human activities expose more dust to wind action. **521 tpd PM10.**

Farming Operations can be very dusty. Activities such as plowing, land leveling, cultivating, harvesting and pasturing livestock disturb the soil surface and provide new material for wind erosion. **170 tpd PM10.**

Off-road Vehicles destroy the natural crust on the soil that normally resists wind action, and crush the plants helping to hold the soil in place, opening the disturbed areas up to wind erosion. (PM10 emissions for off-road vehicles are included in the unpaved roads category).

It's a Dusty Business ...



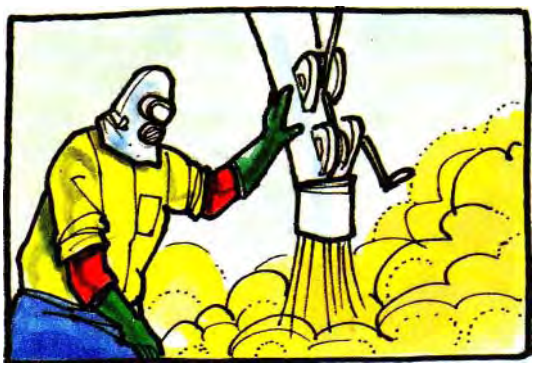
Sand and Gravel are needed in great quantities for road and building construction materials. Ancient or existing stream beds are good source of these materials. They are dug up, washed and screened to separate the soil from the sand and to separate the rocks and gravel by size. Most sand and gravel plants also use **Rock Crushing** equipment to reduce the larger rocks to gravel-sized pieces.

Concrete and Asphalt Batch Plants mix Portland or asphalt cement with sand and gravel to make paving materials. Dust problems can arise while receiving the raw materials, transferring them into storage bins, discharging them into mixing hoppers, loading the final product into trucks, and driving the trucks in and out of the plant area.

Mining and Mineral Processing usually involve large scale excavating, loading the ore or the overlying soil into huge, heavy trucks, transporting the ore for crushing, screening, processing and shipping, and discarding the remains in temporary or permanent storage piles. Dust emissions can occur in all areas.

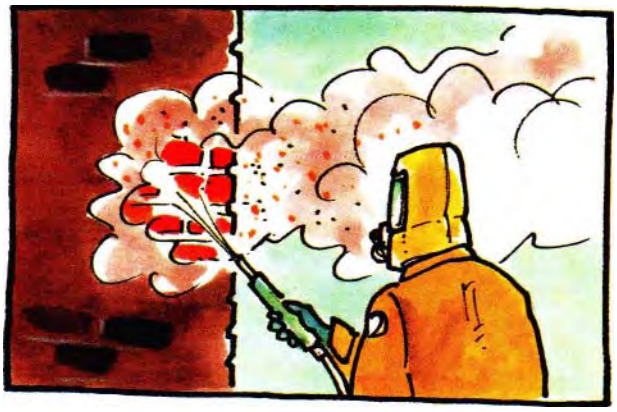
Approximately 51 tons of PM10 per day in California come from these types of industries.

Food, Agricultural Processing cover a wide range of businesses, some of which tend to be dusty, such as nut hullers, grain dryers and mills, powdered milk dryers, cereal manufacturers, animal feed mills, fertilizer plants, cotton gins, etc. **15 tpd PM10.**



Wood and Paper Products are made by sawing, trimming, chipping and sanding wood, which can result in large amounts of wood dust and chips. Collecting and disposing of the dust from collection devices and vehicle carry-out off the plant site cause concern in controlling dust emissions. **14 tpd of PM10.**

Abrasive Blasting, used to remove paint and other contaminants from a surface, is regulated by State law. Only State certified abrasives, low dust emitters, may be used out-doors, but the material removed is blasted to dust. This may be minimized by temporary enclosure and rapid cleanup. **12 tpd of PM10.**



Sunny California, the Dry (and Dusty) State

Our weather contributes to the fugitive dust problem. Unlike most other areas of the country, we have a wet season and a dry season. Long, hot summers allow the soil to dry out thoroughly and, if the surface is disturbed repeatedly, the soil may have months to blow away before normal rainfall can again saturate and hold it in place. Some areas are also prone to seasonal winds, which make matters worse. **"Natural" sources, or those not created by human activities, produce 253 tpd of PM10.**

Don't Be A Public Nuisance!

If you operate a business which emits enough dust, smoke or odor into the air to cause people in your neighborhood to complain, you will be subject to Section 41700 of the Health & Safety Code (H&SC), the “State Nuisance Law” of California, which prohibits the "discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public…”

Your Local Air District has Primary Authority to regulate your operation. Many districts have Fugitive Dust Rules, which prohibits the transport of dust off your property and requires you to "take every reasonable precaution to minimize emissions." Other districts may use the State Nuisance law (above) or the Visible Emissions/Opacity rule (see following page) to regulate fugitive dust emissions. Some districts may attach dust control measures to your Permit to Operate.

Check local District Rules at: http://www.arb.ca.gov/drdb/drdb.htm.

Be a Good Neighbor!

When Are Dusty Conditions a Violation*?

– **When You're Not Complying With the Local Fugitive Dust Rule.**

– **When Airborne PM Crosses the Property Line** and enough neighbors complain, the owner is subject to H&SC Section 41700 (the Nuisance Law).

– **When Visible Emissions [Airborne Dust] Obscure an Observer's View** by more than 40% for more than 3 minutes in any 1 hour, the responsible party is subject to H&SC Section 41701 (Opacity). However, most district opacity rules allow no more than **20% opacity** (visibility impairment).

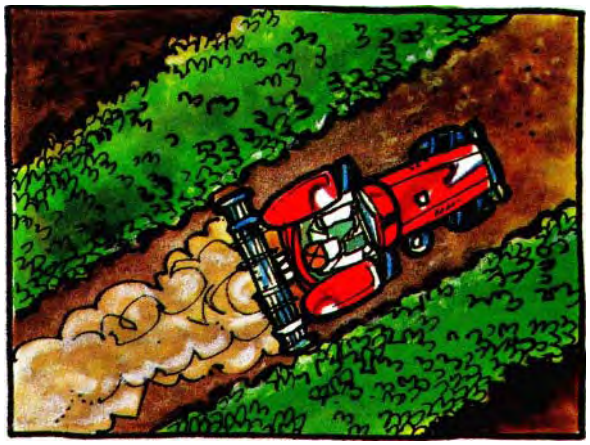
– **When Spills and Other Carryout Are Found Offsite,** the responsible party is subject to the Nuisance Law above and to Vehicle Code Section 23113 (Removing Material From Highway), and Section 23114 (Spilling Loads on Highways).

– **When You're Not Complying with the Permit Conditions** for your facility's operation, conditions such as watering dusty areas sufficiently to prevent blowing dust, limiting vehicle speeds, sweeping up spills, etc.

***Some Dusty Operations Are Exempt** from some local fugitive dust rules, such as agricultural operations and unpaved public roads, but none are exempt from the State Nuisance Law. In the near future **stricter Fugitive Dust rules may be adopted throughout California,** because of the need to meet the State and Federal ambient air PM10 limits now being exceeded.

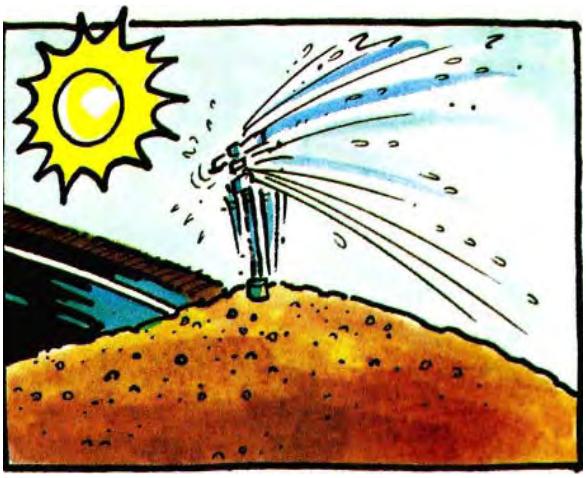
First - Think Pollution Prevention!

Minimize the Surface Area Disturbed - the less ground you disturb, the less dust you will raise as you work, and the less you have to clean up when your work is done!



Limit Dusty Work on Windy Days, and put your efforts into extra dust suppression measures as needed. See examples on the following pages.

Apply Dust Suppression Measures When Needed, even if your regular schedule is thrown off. It may be a one-time occurance, or the schedule may need adjusting to more frequent application intervals.

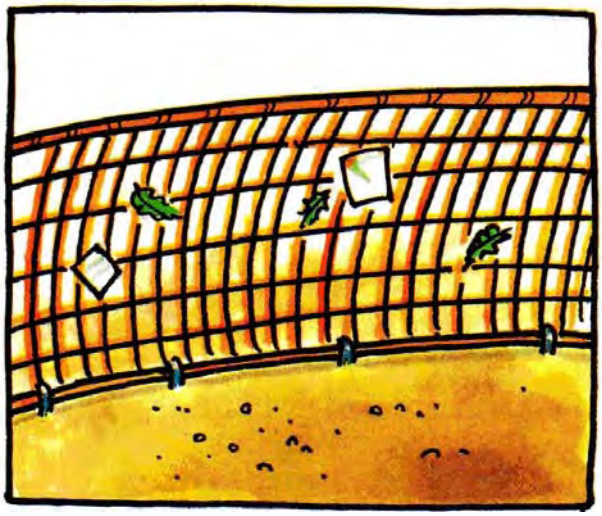


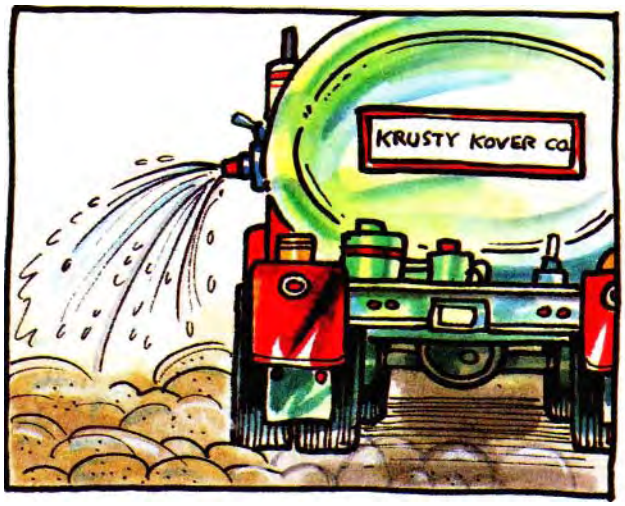
Clean Up Those Dusty Spills Immediately, don't wait for the next scheduled housekeeping - the mess will just get bigger and will take longer.

Dust Control In Occasional Use Areas:

Grow Vegetative Ground Cover - growing grasses or legumes is the most effective, easiest and most economical control because these plants provide a dense, complete cover. Even when the vegetation dries up, the roots will help hold the soil in place. Don't leave open areas uncovered!

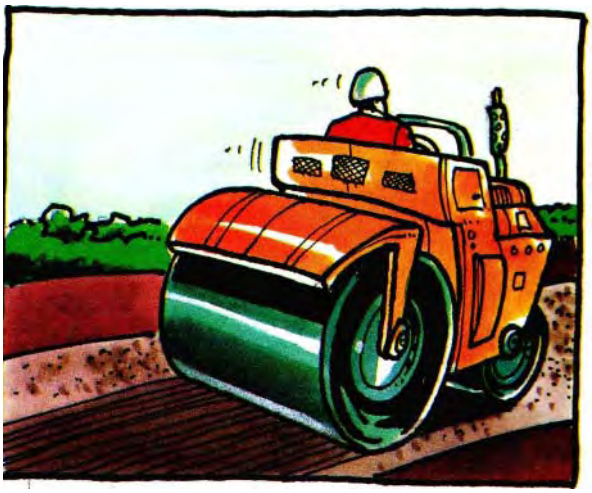
Use Wind Erosion Controls - plant bushes or trees, erect wood or rock walls or earthen banks as permanent wind-breaks, or install porous wind or snow fences as more temporary measures. Using controls with 50% porosity is ideal; the reduced wind velocity provided allows larger particles to settle to the ground.



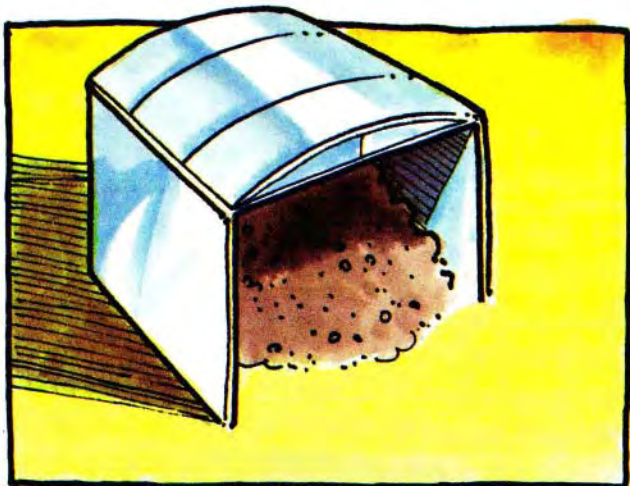


Apply Crust-forming Chemicals which may include mineral salts, petroleum resins, asphalt emulsions, acrylics, and adhesives. These treatments must be reapplied periodically to ensure continued effectiveness. First check with the appropriate agency in your area to be sure the material you want to apply is not harmful and may be used for this purpose.

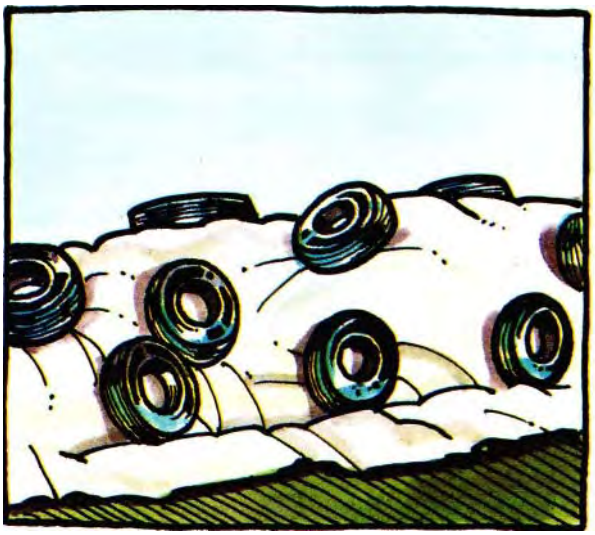
Dust Control in Frequently Used Areas:



Pave Haul Roads and Storage Areas and any other heavily used areas. Heavy vehicles pulverize the surface material and create a constant source of dust. If wholesale paving is too costly, pave just the entrance and exit to minimize carryout, and gravel the remainder to reduce the amount of surface silt.

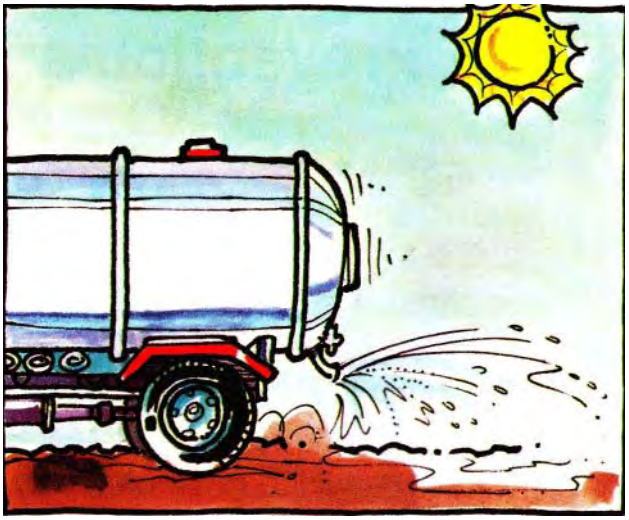


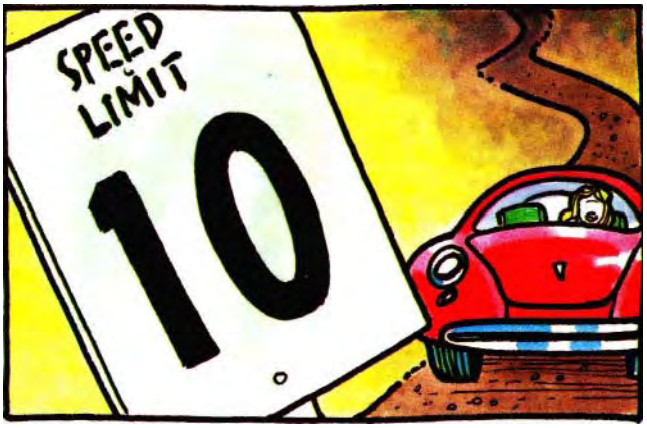
Enclose Storage, Handling Areas if dusty materials are frequently loaded and unloaded. Storage silos, 3-sided bunkers and open-ended buildings are some enclosures used. If handling is less frequent, wind fencing can be used. Conveyor loading may require enclosure or the use of water or foam spray bars both above and below the belt surface to reduce emissions.



Keep Storage Piles Covered when not in use, either with a physical cover or with a dust suppressant spray. Limit the working face of the pile to the downwind side. Most emissions come from loading the pile, loadout from the pile, and truck and loader traffic in the immediate area, if the pile is batch loaded. Keep the drop height low to reduce dust, and keep the ground at the base of the pile clear of spills.

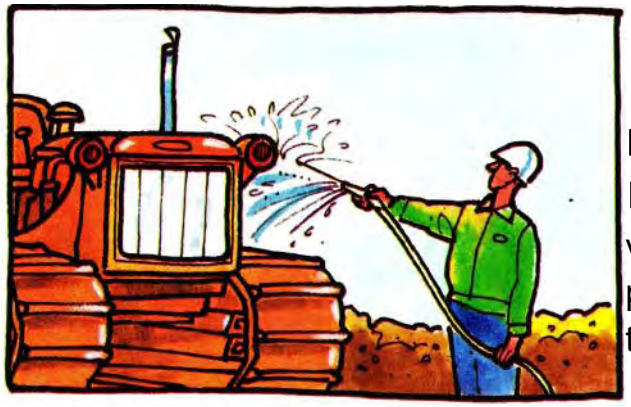
Water and/or Sweep Often enough to ensure that vehicle traffic is not picking up dust for wind action and carryout. Fewer treatments are necessary in cool, wet weather. "Reasonable dust control measures" are required by some local fugitive dust rules, as are an adequate water supply and keeping dust control equipment in good working order.





Reduce Speed Limits on unpaved surfaces to 10 or 15 miles per hour for well-traveled areas and heavy vehicles, never to exceed 25 mph for **any vehicle** on any unpaved surface.

Minimize Trips by carpooling and grouping jobs and errands. Keep exposed areas adjacent to roads undisturbed by posting, fencing, installing gates or otherwise **Limiting Access to Vehicle Traffic.**

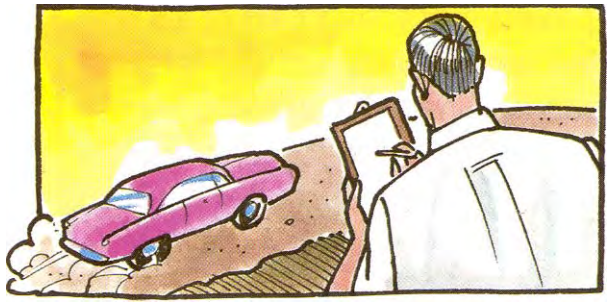


Prevent Transport of Dusty Material Offsite by rinsing vehicles before they leave the property and tightly covering loaded trucks.

Dust Prevention and Control Plan

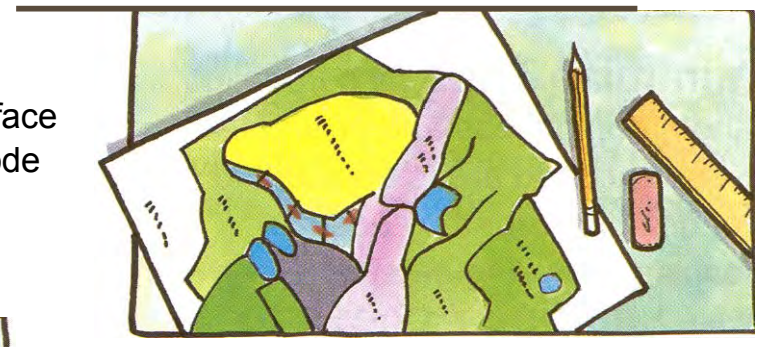
Keeping your potential fugitive dust problems under control is an everyday job that's easier to organize when you have a plan.

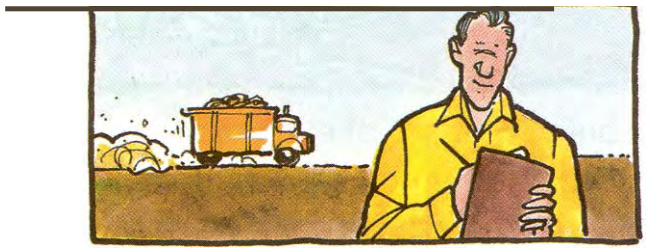
Start With a Facility Site Plan Map
Record all roads, staging areas, parking lots, and other open areas subject to wind erosion. Calculate the total area which must be treated with dust suppression measures. Indicate prevailing wind direction.



Study the Daily Traffic Volumes on the roads and open areas and determine whether they are used frequently or occasionally. Consider daily routine modifications which will reduce traffic in some areas or eliminate it altogether.

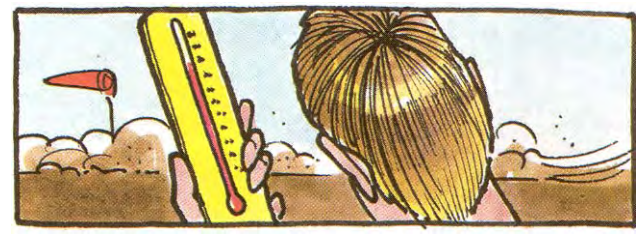
Assign Dust Control Methods according to how frequently the surface in an area is disturbed, and color code your map to show which method to apply where.





Calculate How Often any periodic dust control treatment must be applied, and draw up a Self-Inspection Checklist to record the scheduled applications.

Record All Dust Control Activities on your checklist daily. You may also want to log daily weather information such as average wind speed and direction, temperature, rainfall, etc.



Self-Inspection Checklist

Using a Self-Inspection Checklist helps you incorporate the routine tasks of fugitive dust control into your daily schedule. It serves as a job reminder on a daily basis, and as a record of your efforts to keep dust problems to a minimum. You can identify problem areas before they get out of hand, and anticipate making adjustments for seasonal changes or for any unforseen circumstances. **Your personal involvement in reducing fugitive dust will help us all breathe a little easier!**

Prevention

- ✓ Limit Surface Area Disturbed
- ✓ Limit Work in Wind
- ✓ Apply Suppressives as Needed
- ✓ Clean up Spills Immediately

Occasional Use Areas

- ✓ Grow Groundcover
- ✓ Erec t Windbreaks
- ✓ Apply Crust Chemicals

Frequent Use Areas

- ✓ Pave Roads
- ✓ Enclose Storage Areas
- ✓ Cover Storage Piles
- ✓ Wat er/Sweep Often
- ✓ Reduce Speed Limits
- ✓ Minimize Trips
- ✓ Limit Area Access
- ✓ Prevent Carryout Offsite

✓✓ **Use Your Checklist Daily!**

Date	Time	Prevention	Occasional	Frequent	Weather	Comments

Need More Information?

Air Resources Board (800) 952-5588 **District: _____**

Multi-County Districts

Bay Area (415) 749-4999

Feather River (530) 634-7659

Great Basin (760) 872-8211

Monterey Bay (831) 647-9411

North Coast (707) 443-3093

Northern Sierra (530) 274-9360

San Joaquin Valley (559) 230-6000

South Coast (909) 396-2000

Yolo-Solano (530) 757-3650

County Districts

Amador (209) 257-0112

Antelope Valley (661) 723-8070

Butte (530) 891-2882

Calaveras (209) 754-6504

Colusa (530) 458-0590

Eastern Kern (661) 862-5250

El Dorado (530) 621-6662

Glenn (530) 934-6500

Imperial (760) 482-4606

Lake (707) 263-7000

Lassen (530) 251-8110

Mariposa (209) 966-2220

Mendocino (707) 463-4354

Modoc (530) 233-5522

Mojave Desert (760) 245-1661

No. Sonoma (707) 433-5911

Placer (530) 745-2330

Sacramento (916) 874-4800

San Diego (858) 586-2600

San Luis Obispo (805) 781-5912

Santa Barbara (805) 961-8800

Shasta (530) 225-5674

Siskiyou (530) 841-4029

Tehama (530) 527-3717

Tuolumne (209) 533-5693

Ventura (805) 645-1400

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