Summary

Full Method (264Kb)

SECTION 7.7
BUILDING CONSTRUCTION DUST

EMISSION INVENTORY SOURCE CATEGORY

Miscellaneous Processes / Construction and Demolition

EMISSION INVENTORY CODES (CES CODES) AND DESCRIPTION

630-622-5400-0000	(47357)	Building and Construction Dust - Residential
630-624-5400-0000	(47365)	Building and Construction Dust - Commercial
630-626-5400-0000	(47373)	Building and Construction Dust - Industrial
630-628-5400-0000	(54551)	Building and Construction Dust - Institutional
630-630-5400-0000	(60400)	Building and Construction Dust - Governmental

METHOD SUMMARY

The building construction dust source category provides estimates of the fugitive dust particulate matter caused by construction activities while building residential, commercial, industrial, institutional, or governmental structures. The emissions result predominantly from site preparation work, which may include scraping, grading, loading, digging, compacting, light-duty vehicle travel, and other operations. The emissions are calculated for 1999.

ACTIVITY DATA SOURCE: For the purpose of estimating emissions, it is assumed that the fugitive dust emissions are related to the acreage affected by construction. Because region-wide estimates of the acreage under construction are not directly available, other construction activity data are used to derive acreage estimates. Activity data are estimated separately for residential construction, and the other types of construction (commercial, industrial, institutional, and governmental). The activity data for construction are based on 1999 estimates.

For residential construction, the number of new housing units, estimated by the Department of Finance for 1999, is used to estimate acreage disturbed. Based on reference sources (Midwest Research Institute (MRI), South Coast Air Quality Management District, and KVB), it is estimated that single-family living units (houses) are built on 1/7 of an acre in heavily populated counties, and 1/5 of an acre in less populated counties. It is also estimated that multiple living units, such as apartments, occupy 1/20 of an acre per living unit. For all of these residential construction activities, a project duration of six months is assumed. Applying these factors to the reported number of new units in each county results in an estimate of acre-months of construction. This, combined with the construction emission factor, is used to estimate residential construction particulate emissions.

For commercial, industrial, and institutional building construction, construction acreage is based on project valuations obtained from the Department of Finance. The valuations are 3.7, 4.0 and 4.4 acres per million dollars of valuation for the respective construction types listed (KVB). Valuations are corrected from 1999 to 1977 values using the Annual Average Consumer Price Index (CPI-U-RS) provided by the U.S. Census Bureau. Each acre is assumed to be under construction for 11 months for each project type (MRI).

EMISSION FACTOR SOURCE: The emission factors are based on work performed by MRI under contract to the PM10 Best Available Control Measure (BACM) working group. For most parts of the state, the emission factor used is 0.11 tons PM10 /acre-month of activity (or 0.225 tons PM/acre-month). To develop the emission factor, the observed activity data were combined with operation-specific emission factors provided in U.S. EPA's AP-42 (5th Edition) document to produce site emissions estimates. These site estimates were then combined to produce the overall average emission factor of 0.11 tons PM10 /acre-month. This emission factor is approximately 71% lower than the previous emission factor that was used from the 4th Edition of AP-42.

The construction emission factor is assumed to include the effects of typical control measures such as routine watering. A dust control effectiveness of 50% is assumed from these measures, which is based on the estimated control effectiveness of watering. Therefore, if this emission factor is used for construction activities where watering is not used, it should be doubled to more accurately reflect the actual emissions.

The MRI report also includes an emission factor for worst-case emissions of 0.42 tons PM10 /acre-month. This emission factor is appropriate for large-scale construction operations, which involve substantial earthmoving operations. The South Coast Air Quality Management District (SCAQMD) estimated that 25 percent of their construction projects involve these types of operations, and applied the larger emission factor to the activities. For the remainder of the state, such detailed information is not readily available, so the average emission factor of 0.11 tons PM10 /acre-month was used.

TEMPORAL DATA: The temporal activity is assumed to occur five days a week between the hours of 8:00 a.m. and 4:00 p.m. The monthly activity increases during the spring and summer months. Some districts use a slightly different profile that has a larger peak during the summer months. Construction emissions for future years are based on construction activity projections.

CHANGES IN METHOD AND EMISSION ESTIMATES: The major change in this methodology from the previous methodology is the use of current activity data.

DATE OF THE LAST UPDATE: September 2002

GROWTH PARAMETER: For residential and commercial construction, the growth parameters were developed by Pechan (Categories 14 and 15 in their report, "Development of Emission Growth Surrogates and Activity Projections Used in Forecasting Point and Area Source Emissions, Final Report," February 26, 2001). The growth parameters are based on employment and output data in the construction sector (SIC codes 15 - 17). For the remaining categories, the growth parameters were developed by Pechan and are based on employment in the construction sector (SIC codes 15 - 17).

STATEWIDE EMISSIONS SUMMARY (1999 ANNUAL AVERAGE TONS/DAY)

CES No.	TOG	CO	NOX	SOX	PM
47357	0.00	0.00	0.00	0.00	40.74
47365	0.00	0.00	0.00	0.00	37.49
47373	0.00	0.00	0.00	0.00	15.47
54551	0.00	0.00	0.00	0.00	17.09
60400	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	110.79

To download the complete methodology (264Kb) in Acrobat format, please click this icon;

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eibweb@arb.ca.gov

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