

Estimating Emissions From Ground Support Equipment

Faster Freight-Cleaner Air California

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Introduction

- **Overview of GSE emission estimating tools**
 - FAA EDMS
 - EPA Models
 - ARB OFFROAD Model
 - Air Transport Association Studies
- **Observations on GSE inventories**
- **Recommendations**

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Ground Support Equipment

- **Category of equipment used to support aircraft and aircraft operations on the ground**
 - Aircraft tractors
 - Baggage & cargo tractors
 - Cargo loaders & belt loaders
 - Ground power units, portable air conditioners & air starts
 - Service, fuel & maintenance trucks

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FAA EDMS

- **Emissions and Dispersion Modeling System (EDMS) Version 4.2 (10/04)**
 - **Combines emissions and dispersion modeling to assess impact of airport emissions, including:**
 - Aircraft
 - GSE
 - Ground Access Vehicles (GAV)
 - Stationary sources

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FAA EDMS Overview

- **EDMS is the *required* model to:**
 - Perform air quality analysis for FAA (63 FR 18062; 4/13/98)
 - Support VALE Programs (9/04 EPA policy)
- **EDMS is an approved EPA model for SIP planning purposes regarding airports**
 - EPA allows use other tools
 - Many SIPs rely on NEVES for inventory data

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FAA EDMS Overview

- **GSE Emissions Module**
 - Expresses emissions per aircraft landing and take off (LTO) cycle
 - EDMS assigns default minutes of GSE operation/LTO based on aircraft type, including
 - Aircraft tractor (wide or narrow body)
 - Baggage tractor
 - Belt loader and cargo loader
 - Service, fuel, lavatory and food trucks
 - Ground power unit, air conditioning, airstart

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FAA EDMS Overview

- **GSE Emissions Module (cont.)**
 - Emission factors based on EPA NONROAD Model
 - Accounts for significant increases in GSE emissions
 - User can modify minutes of activity per LTO and aircraft assignments,
 - User should not modify emission factors

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FAA EDMS - Observations

- Defaults are based on LTO/aircraft and therefore may not properly address local airport design/operating modes
- User should confirm site-specific data
 - GSE population
 - Activity
 - Use of electric/on-road equivalents
- Only model that may be used in connection with FAA EIS and VALE programs

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EPA GSE Inventory Tools

- **1991 Study: NONROAD Engine and Vehicle Emissions Study (NEVES)**
- **EPA NONROAD Model**
- **GSE Model, updated as of 12/2000**

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EPA 1991 NEVES

- **Provides nonroad engine emission inventories for 13 metropolitan areas**
- **Other nonattainment areas have scaled data to approximate local nonroad engine inventories**
- **Should not be used for GSE, as NEVES incorrectly applies “terminal tractors,” which are used at ports/truck terminals, to airports**
- **Many SIPs still rely on this study, however, EPA no longer recommends for SIP planning purposes**

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EPA NONROAD Model

- **NONROAD Model defaults may not appropriate for use in estimating GSE emissions**
 - Population (*cf:* electric/onroad)
 - Categories of equipment
 - Emission factors (zero hour, in-use correction, deterioration)
 - Activity

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EPA NONROAD Model

- **Key benefit: NONROAD Model will predict changes in emissions over time**
 - Scrappage and replacement
 - Growth
 - New non-road emission standards
- **EPA currently supports its GSE Model, which allows category-by-category emission estimates (point-in-time only)**

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ARB OFFROAD Model

- **Limited to use in California, as it applies California OFFROAD emission regulations**
- **Allows user to predict changes of fleet/emissions with time**
- **Allows user to adjust:**
 - Population by category
 - Activity

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ATA GSE Studies

- **Successive efforts in Southern California to document by category:**
 - Population
 - Horsepower
 - Age
 - Fuel type
 - Activity
- **GSE population and activity studies in Texas and a number of other states**

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ATA GSE Studies

- **Studies suggest:**
 - **Regulatory models typically under estimate:**
 - Population
 - Activity
 - Age
 - **GSE fleet typically contains ~20% on-road equipment**

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Implications of ATA Studies

- **Higher baseline emissions from GSE**
- **Slower fleet turnover than predicted by NONROAD/OFFROAD Models, thus reducing the impact of new engine standards**
- **Need for refined GSE data at local level**
 - SIP
 - VALE Programs

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Recommendations

- **Clearly define**
 - Baseline year
 - Population & equipment to be included
 - Future and growth estimate
- **Understand the basis of your SIP GSE inventory**
- **Obtain early agreement on emission factors and inventory protocol**
- **Properly anticipate new emission standards**
 - ARB Portable Engine ATCM, LSI and ORD rules
- **Properly document analysis/assumptions**