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**

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**

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**

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**

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**

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**

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**

EPA GSE Inventory Tools

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

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

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**

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)**

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

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

ATA GSE Studies

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

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**

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**