

Technical Developments in the NONROAD Model: *Code Modifications*

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Code Modifications/Corrections

PM Calculation Equation

The equation was:

$$PM = PM_{base} - [BSFC \times 453.6 \times 0.157 \times 0.01 \times (0.0033 - S_{fuel})]$$

g/hr (pointing to PM)

g/lb (pointing to 453.6)

Converts S percent to weight fraction (pointing to 0.157)

In-use S level (%) (pointing to S_{fuel})

Fraction of fuel sulfur converted to PM for engines without traps

Add rated power and load factor

Correct base fuel sulfur (3300 ppm)

Now corrected to:

$$PM = PM_{base} - [BSFC \times 453.6 \times P \times L \times 0.157 \times 0.01 \times (0.33 - S_{fuel})]$$

Code Modifications/Corrections

- **PM** Calculation Equation -- Effect of Corrections:
 - Depends on equipment Hp
 - Net fleet inventory effect is substantial decrease in PM

Code Modifications/Corrections

- **PM** Calculation: New /Base PM Sulfur/
Input Packet
 - Model assumed 3300-ppm sulfur for input PM EF's when adjusting to in-use sulfur.
 - OPT file now provides more accurate base sulfur for Tier 2 & Tier 3 certification PM EF's.
 - Users should not modify these inputs.

Code Modifications/Corrections

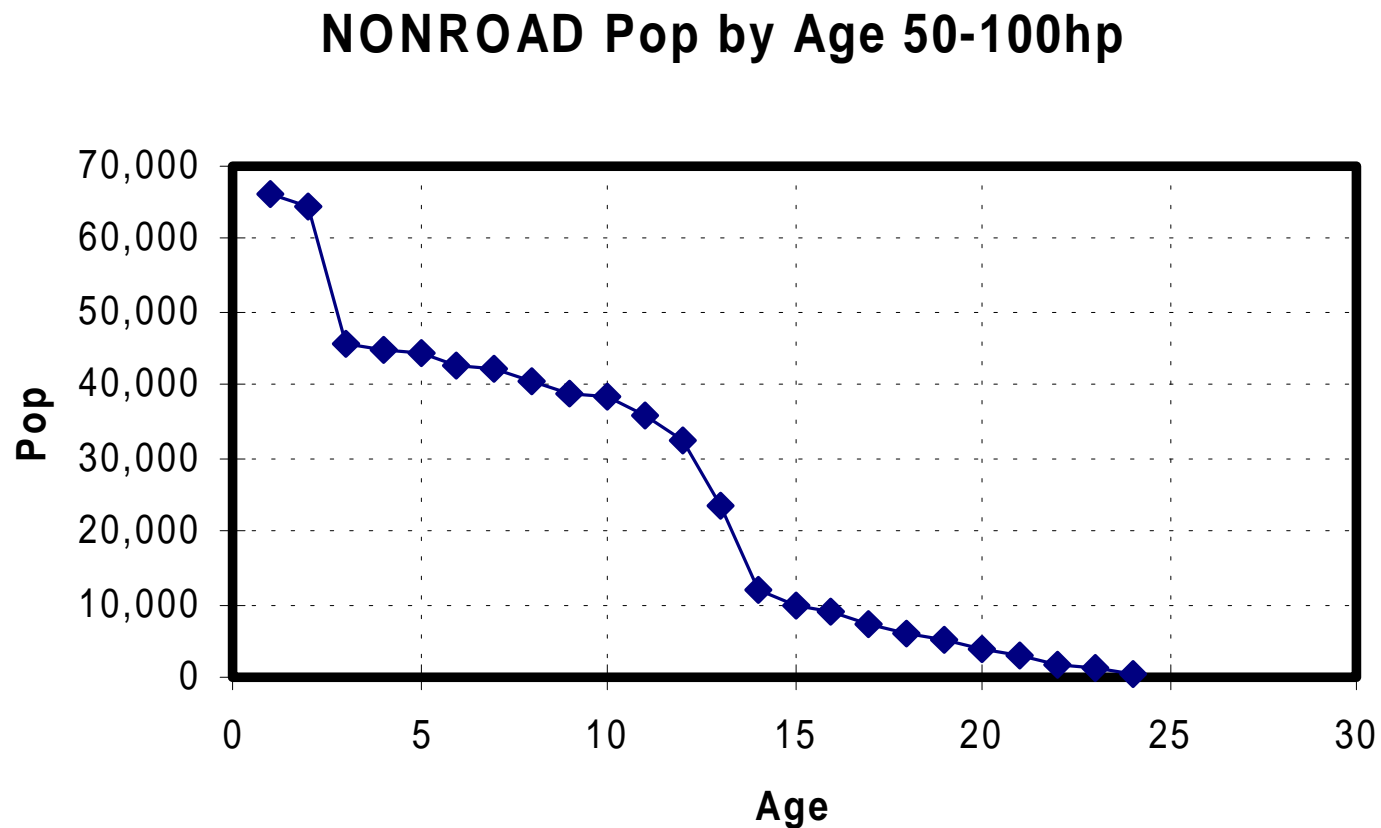
- **SO₂** Calculation Equation
 - Was missing Load Factor
 - Net effect of correction is to decrease SO₂ by roughly 40%

Code Modifications/Corrections

- Scrappage & Age Distribution
 - Prior method (year-by-year growth, scrappage, sales calculation) yielded “funny” age distributions
 - Age distribution of base population did not account for growth
 - A high growth rate yielded an unrealistic spike in sales (age distribution)

Scrappage / Age Distribution

HDD 2007 version (Ag tractors, 3% growth)



Code Modifications/Corrections

- Scrappage & Age Distribution, con'd
 - New simplified method:
 1. Use growth to determine target calendar year population
 2. Apply default age distribution based on scrappage curve shape and no growth
 3. Adjust for assumed growth rate

Scrappage / Age Distribution

NR2002 (Agricultural tractors, 3% growth)

NONROAD Pop by Age 50-100hp

