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FedFleet 2024: Fleet Data Quality - Understanding and Improving Your Agency's FAST Fleet Data Quality Metric?

January 2024

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Changing the World's Energy Future

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FedFleet 2024

Fleet Data Quality

Understanding and Improving Your Agency's FAST Fleet Data Quality Metric

www.gsa.gov/FedFleet

We are…

Ron Stewart / Sharath Kallaje

FAST Support Team

Idaho National Laboratory

We'll cover…

- Thinking about fleet data quality
  - … from a fleet manager's perspective
  - … from FAST program's perspective
- Understanding FAST's review process
- Understanding FAST's data quality metric
- Improving fleet data quality
  - … including FAST's data quality metric
- Q & A

Thinking about data quality

Fleet manager's perspective

- Complete?
- Correct?
- Current?
- Available?

FAST program's perspective

- Validation
- Review & feedback
- Quality metric

… all provide *some* insight into *some* those same aspects of quality

Understanding FAST's review process (1)

- **Data is validated as it is loaded in FAST**
  - Blocks data which *can't* be complete or correct
  - Flags data which *may* be suspect

- **Key points**
  - Understand the validation rules
  - Understand how to access validation results

Understanding FAST's review process (2)

- **FAST team reviews agency submission when complete**
  - High-level measures for year-to-year consistency
  - Vehicle-level measures for specific types of quality issues
  - Written feedback and detail provided to agencies
  - Opportunity for agency to respond and update submission

- **Key points**
  - Understand intent of review and feedback
  - Understand role of agency response to review

Understanding FAST's review process (3)

- **FAST team assembles "concerns per vehicle" metric**
  - Metric based on subset of validation flags and review measures
  - ... adjusted based on agency response to feedback
  - ... and divided by number of vehicles reported

- **Key points**
  - Understand what each included measure is looking at
  - Understand role of agency response to feedback

Understanding FAST's review process (4)

- **FAST team communicates metric to agency**
  - Provided to fleet POCs and agency leadership
  - Includes indication of improvement / regression
  - Includes comparison to overall federal fleet
  - Includes priority areas for agency improvement

- **Key points**
  - Is agency's submission getting better?
  - What are the key areas for improvement?

FAST's data quality metric (1)

- **Which validation warnings go into FAST's quality metric?**
  - OC-1.5: Vehicle acquisition cost inconsistencies
  - F-2-2: Fuel consumption inconsistent with vehicle fuel type/configuration
  - F-2.3: Vehicles consuming B100 w/o reporting diesel consumption
  - F-2.4: PHEVs reported w/o electricity consumption
  - F-4.6: Vehicles with questionable fuel efficiency (also review measure M6)
  - F-5.5: Vehicles with questionable high per-unit fuel cost

FAST's data quality metric (2)

- **Which review measures go into FAST's quality metric?**
  - M-6: Vehicles with questionable fuel efficiency (validation warning F-4.6)
  - M7: Year-to-year consistency of vehicle reporting
    - a) Vehicles with current-year acquisition dates also present in prior year submission (validation warning OW-1.3)
    - b) Vehicles with prior-year acquisition dates missing from prior year submission (validation warning OW-1.4)
    - c) Vehicles in current-year submission reported as disposals in prior-year submission (validation warning OW-4.4)
    - d) Vehicles in prior-year submission w/o disposal information missing in current-year submission
    - e) Vehicles in prior and current submissions with changes to static attributes (validation warning A-1.5)
  - M8: Vehicles with placeholder attributes

FAST's data quality metric (example)

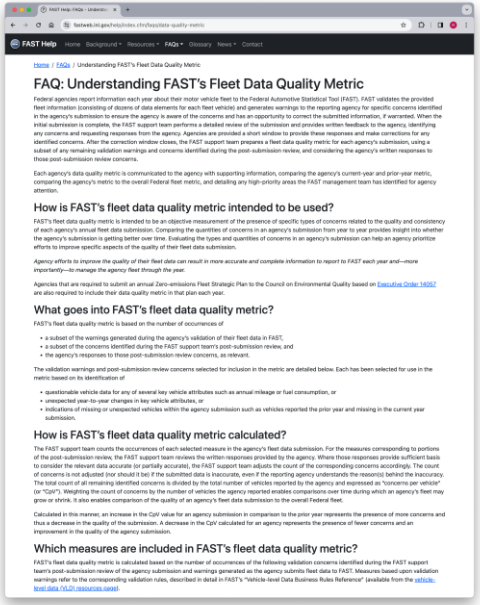
Measure	FY 2020	FY 2021	FY 2022
Review Measure 7(a)	6	2 ↓	2 →
Review Measure 7(b)	144	54 ↓	111 ↑
Review Measure 7(c)	118	189 ↑	222 ↑
Review Measure 7(d)	83	102 ↑	35 ↓
Review Measure 7(e)	646	346 ↓	459 ↑
Review Measure 8	1,321	1,812 ↑	2,131 ↑
Validation warning OC-1.5	259	5 ↓	36 ↑
Validation warning F-2.2	414	399 ↓	326 ↓
Validation warning F-2.3	0	0 →	0 →
Validation warning F-2.4	53	57 ↑	53 ↓
Validation warning F-4.6	636	424 ↓	266 ↓
Validation warning F-5.5	400	1 ↓	172 ↑
Total Concerns	**4,080**	**3,391**	**3,813**
Vehicles Reported	**8,139**	**8,370**	**8,549**
Concerns per Vehicle (CpV)	**0.50**	**0.41 ↓**	**0.45 ↑**
Year-to-year Change in CpV	n/a	**-0.09 ↓**	**+0.04 ↑**

FAST Fleet Data Quality Metric Detail - Example Agency

- Overall metric
  - Getting better or worse?
- Where are the concerns?
  - Getting better or worse?

FAST's data quality metric (more)

- **FAQ in FAST's Help**
  - How is the metric intended to be used?
  - What goes into the metric?
  - How is the metric calculated?
  - Which measures are included in the metric?
  - An example
  - How was the federal fleet scored in recent years?



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FAQ: Understanding FAST's Fleet Data Quality Metric

Federal agencies report information each year about their motor vehicle fleet to the Federal Automotive Statistical Tool (FAST). FAST validates the provided fleet information (consisting of dozens of data elements for each fleet vehicle) and generates warnings to the reporting agency for specific concerns identified in the agency's submission to ensure the agency is aware of the concerns and has an opportunity to correct the submitted information, if warranted. When the initial submission is complete, the FAST support team performs a detailed review of the submission and provides written feedback to the agency, identifying any concerns and requesting responses from the agency. Agencies are provided a short window to provide these responses and make corrections for any identified concerns. After the correction window closes, the FAST support team prepares a fleet data quality metric for each agency's submission, using a subset of any remaining validation warnings and concerns identified during the post-submission review, and considering the agency's written responses to those post-submission review concerns.

Each agency's data quality metric is communicated to the agency with supporting information, comparing the agency's current-year and prior-year metric, comparing the agency's metric to the overall Federal fleet metric, and detailing any high-priority areas the FAST management team has identified for agency attention.

How is FAST's fleet data quality metric intended to be used?

FAST's fleet data quality metric is intended to be an objective measurement of the presence of specific types of concerns related to the quality and consistency of each agency's annual fleet data submission. Comparing the quantities of concerns in an agency's submission from year to year provides insight into whether the agency's submission is getting better over time. Evaluating the types and quantities of concerns in an agency's submission can help an agency prioritize efforts to improve specific aspects of the quality of their fleet data submission.

Agency efforts to improve the quality of their fleet data can result in more accurate and complete information to report to FAST each year and—more importantly—to manage the agency fleet through the year.

Agencies that are required to submit an annual Zero-emissions Fleet Strategic Plan to the Council on Environmental Quality based on Executive Order 14057 are also required to include their data quality metric in that plan each year.

What goes into FAST's fleet data quality metric?

FAST's fleet data quality metric is based on the number of occurrences of

- a subset of the warnings generated during the agency's validation of their fleet data in FAST,
- a subset of the concerns identified during the FAST support team's post-submission review, and
- the agency's responses to those post-submission review concerns, as relevant.

The validation warnings and post-submission review concerns selected for inclusion in the metric are detailed below. Each has been selected for use in the metric based on its identification of

- questionable vehicle data for any of several key vehicle attributes such as annual mileage or fuel consumption, or
- unexpected year-to-year changes in key vehicle attributes, or
- indications of missing or unexpected vehicles within the agency submission such as vehicles reported the prior year and missing in the current year submission.

How is FAST's fleet data quality metric calculated?

The FAST support team counts the occurrences of each selected measure in the agency's fleet data submission. For the measures corresponding to portions of the post-submission review, the FAST support team reviews the written responses provided by the agency. Where those responses provide sufficient basis to consider the relevant data accurate (or partially accurate), the FAST support team adjusts the count of the corresponding concerns accordingly. The count of concerns is not adjusted (nor should it be) if the submitted data is inaccurate, even if the reporting agency understands the reason(s) behind the inaccuracy. The total count of all remaining identified concerns is divided by the total number of vehicles reported by the agency and expressed as "concerns per vehicle" (or "CpV"). Weighting the count of concerns by the number of vehicles the agency reported enables comparisons over time during which an agency's fleet may grow or shrink. It also enables comparison of the quality of an agency's fleet data submission to the overall Federal fleet.

Calculated in this manner, an increase in the CpV value for an agency submission in comparison to the prior year represents the presence of more concerns and thus a decrease in the quality of the submission. A decrease in the CpV calculated for an agency represents the presence of fewer concerns and an improvement in the quality of the agency submission.

Which measures are included in FAST's fleet data quality metric?

FAST's fleet data quality metric is calculated based on the number of occurrences of the following validation concerns identified during the FAST support team's post-submission review of the agency submission and warnings generated as the agency submits fleet data to FAST. Measures based upon validation warnings refer to the corresponding validation rules, described in detail in FAST's "Vehicle-level Data Business Rules Reference" (available from the vehicle-level data (VLD) resources page).

- https://fastweb.inl.gov/help/index.cfm/faqs/data-quality-metric

Improving fleet data quality (1)

- **Prioritize improving data quality**
  - What's feasible?
  - What's most important?
  - Where are the biggest gains?

- **Measure it**
  - How can you tell if it is getting better?
  - Start measuring / monitoring early

Improving fleet data quality (2)

- **Find and fix problems at / close to the source**
  - Fix the *cause* of the problem
  - Start finding / fixing early

- **Participate in the post-submission review**
  - Ensure metric is representative
  - Use review to inform improvement priorities

Improving fleet data quality (3)

- **Prioritize / Measure / Find & Fix**
  - On-going / continuous activity
  - These (should) form a feedback loop

- **Primary intent: Better data to manage your fleet**
  - By-products: simpler EOY reporting, improved quality metric

Q & A

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FAST Help
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