Implementing the U.S. Department of Transportation’s Freight Data Dictionary


NCFRP Report 35
Implementing the Freight Transportation Data Architecture: Data Element Dictionary

Functions & Features
- Number of search hits and number of data sources containing the target term
- Dropdown for Data Source tables
- First five term hits from data source
- Add terms to table by clicking

Metadata
Structural information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource:
- Improves content discovery
- Classifies and categorizes
- Analyzes term frequency
- Links multiple key words to a pedagogical term
- Provides multilingual support

Technology
- Initial Development: Java, Javascript, jQuery, Ajax, PHP and Oracle Database
- Converted Oracle database to Microsoft SQL Server
- Created development, testing, staging, and production environments in Microsoft Azure Cloud
- Basic system security designed to meet DOT requirements
- Code conversion and debugging in Azure development environment underway
- Azure indexing will be added which will decrease the load on database, decrease search time and increase the system efficiency
- Web API will be created for integration to other applications

FDD Implementation Timeline
- Setup the Freight Data Dictionary in DOT network (accomplished)
- Convert Unix based Oracle to Windows based Oracle
- Convert Oracle to Microsoft SQL Server in Azure Cloud (accomplished)
- Implement Azure Index to the application (tested)
- Recode the application in Parallel in Azure (in progress)
- System testing (on Schedule – April 2018)
- Develop Web based Public Access API (on schedule – May 2018)
- Move to staging and Production environment (on schedule – May 2018)

Data Sources
The current FDD system is populated with freight data dictionary terms from 28 entities.
1. Air Carrier Statistics
2. Air Carrier Financial Reports
3. Annual Survey of Manufacturers
4. Border Crossing/Entry
5. CTA Intermodal Terminals Database
6. Carload Waybill Sample
7. Commodity Flow Survey
8. County Business Patterns
9. Fatality Analysis Reporting System
10. Federal Railroad Administration Safety Data Base
11. Foreign Trade
12. Freight Analysis Framework
13. Highway Performance Monitoring System
14. IHS Transsearch
15. Motor Carrier Management Information System
16. Motor Carrier Safety Measurement System
17. National Agricultural Statistics Service
18. National Ballast Information Clearinghouse Database
19. National Corridors Analysis and Speed Tool Database
20. North American Transborder Freight Database
21. Pipeline and Hazardous Materials Safety Administration
22. Service Annual Survey
23. Survey of Business Owners
24. Topologically Intersect Geographic Encoding and Referencing
25. U.S. Waterway Data
26. Vehicle Inventory and Use Survey
27. Vehicle Travel Information System
28. Woods and Poole Economics, Inc.

Key future tasks for the freight data community:
- Verify data sources and fill in missing definitions through outreach to freight data source entities
- FDD user testing, beginning in Spring 2018
- Build FDD Governance Body
- Expand data sources through outreach
- Expand FDD to include international freight data
- Set FDD versioning policy
- Recruitment to freight data users community and FDD community
- Create Data source catalog within FDD so that users can link directly to freight data sources
- Improve advanced search
- Build API for FDD harvesting
- Review metadata elements to include units of measure where appropriate
- Build function for data element (definition) comparison from different data sources
- Build a governance body
- Review NISO Standards on controlled vocabularies

FDD Improvement Ideas from Freight Data community:

- Join the Freight Data Dictionary Community.

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The FDD will record how different freight entities define similar terms differently, or, record how similar concepts may be signified with different terms. This should allow users to understand how terms are used in their specific contexts.

The FDD will not attempt to enforce preferred definitions.

Community Engagement
The greatest challenge of the Freight Data Dictionary is not technical. Once the FDD is launched, the greatest demand will be engaging the freight data community in enhancing, maintaining, and improving the dictionary.

To help build user interest, the authors gave presentations on the FDD at the Transportation Research Board 2018 Annual Meeting, including a lively conversation with the Freight Data Users’ Forum. https://tinyurl.com/trb-fdd

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Join the Freight Data Dictionary Community. Leave your card or email leighton.christiansen@dot.gov

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