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Topic: How a Structured Speed Data at The National Level Bridges Operational Gaps in Meeting Today's and Future Needs

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State of the Practice:

On November 3-4, 2009 FHWA held a Speed Data Summit in Tampa, Florida

- *27 participants from around the country were in attendance*

Finding:

- Virtually, all have some sort of speed data

The Purpose of the Speed Summit Meeting

- *To foster uniformity in the collection and reporting of speed data across states and jurisdictional boundaries.*

- *Key Points:*
  - *Accountability*
  - *Performance Measurement*
  - *Benefits and Cost Analysis*

What FHWA Seeks

- Data Sources – public and private domain data in the possession of state highway agencies
- Data Format – uniform format in reporting to facilitate data sharing and utilization
- Timely Reporting – establish meaningful reporting schedule

Why FHWA Seeks the Program

- Congress and public demand accountability
- Seeking performance measures that maybe useful for Performance Based funding decisions
- Renewed emphasis on benefit cost analysis

Desired FHWA Leadership to:

- Establish uniform speed data format – reporting
- Establish a minimum speed data quality standard
- Develop procedures to integrate different speed data (spot speed, space mean speed…)
- Develop methods to expand speed data to system level

Inconsistencies in Current Speed Data Collection Practices

- ***Speed Bins***
  - ✓ *Varying increments*
  - ✓ *Varying number of bins*
- ***Capture Time***
  - ✓ *Hourly*
  - ✓ *Daily*
- ***Lane Groupings***
  - ✓ *Individual lanes*
  - ✓ *Direction*
  - ✓ *Location (site)*

Outcome of Speed Data Summit:

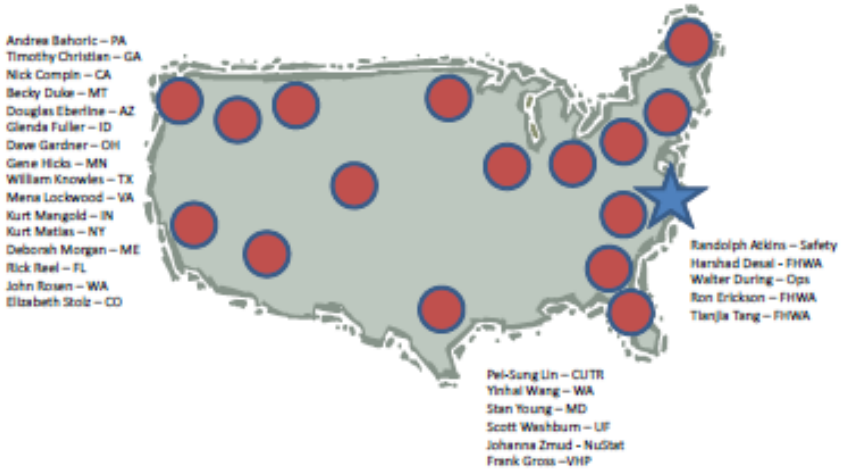
A common database structure to collect and store speed

SPEED
every 15 minutes (option) capable (every hour acceptable)
By Lane (by direction acceptable)
Lat/Long

BINS
< 20 MPH
20
25
30
35
40
45
50
55
60
65
70
75
80
≥ 85
+ optional

Speed will be stored:

- By lane
- Every 15 minutes (preferred option)
- Reporting every hour is acceptable
- In 5 MPH bins
- First bin ≤ 20 MPH
- States can report in 5 MPH increments as high as desired
- At least to 85 MPH
- Counter location identified by Lat/Long



NOW, WHAT'S NEXT?

State of the Practice

Recently pooled funded study to develop a standard test procedure entitled:

Travel Time Data Quality Assessments TPS 5-200

(cited document not yet available on the web)

- *The study reviewed a number of data quality assessments of probe-based travel time estimate technologies.*
- *The goal in each case was to measure the accuracy of speed and travel time estimates.*

State of the Practice - Continues

Employed methodologies have inconsistencies in the determinations of:

- Ground truth / Benchmark data
- Error estimation
- Accuracy determination

The selection of an employed process can affect the resulting findings of the data's quality assessment.

➔*Federal leadership is required to foster cooperation in the establishment of standards*

Measuring Error- Continue

The accuracy of the data is measured by performance metrics such as:

- *MAE (Mean Absolute Error),*
- *Error Bias or*
- *RMSE (Root Mean Squared Error).*

As such, the choice of the metric can affect the result of a quality evaluation.

➔Federal leadership would foster the development of national standards and performance measurements.

Error Methodology	Concerns	
The Mean Absolute Error (MAE)	does not indicate whether the estimates tend to be over-estimates or under-estimates.	Not as sensitive to large errors (i.e. outlier estimates) as other metrics. ▪This can be a problem when it is important to identify samples with few estimates that are particularly far off from the ground truth.
Error Bias	positive error bias indicate an under-estimation of travel times and (vise visa).	
Root Mean Square Error (RMSE)	weights outlier observations more heavily	gives a better indication of whether a data set contains outlier observations.

State of the Practice - Continue

The Office of Operation's findings from this pooled funded study are:

I. Methods utilizing space mean speed should be used to accurately reflect travel times.

II. In order to be consistent in our calculations of statistical estimations, it is necessary that acceptable Error Methodologies be used for error rate calculations.

➔ Federal guidance would better convey these facts.

State of the Art

In order to address such inconsistencies, a structured speed data at the national level bridges operational gaps in meeting today's and future needs.

This should at least address the following for which leadership by the Federal Government is necessary:

- *Uniformity*
- *Compatibility*
- *Accuracy*

In Conclusion, National Effort would (1/2):

- Foster the development and testing of national standards and performance measures.
- Foster consistency in standards for speed data capturing and management.
- Reduce cost of research.
- Proactively resolve technical and institutional barriers.

National Effort would (2/2):

- Facilitate the integration/ fusion of data.
- Facilitate the systematic capture of data.
- Be instrumental in the utilization of real-time speed data.
- Improve public confidence, acceptance, and understanding of traffic engineering principles and practices.

Thank You