

## Improve the Traffic Census and Highway Performance Monitoring Programs Questions and Answers

**What is the current data Polling Rate? We used to challenge for Per Second Data, what speed are we capable of nowadays?**

A: The PeMS polling rate (frequency) is 30 seconds, 24 hours per day, 7 days per week and 365 days per year.

**Are we responding to real time roadway problems in real time, or do we still rely on some traveler to call in to TMC first. What is the average response time to HWY incidence, as a result of data collection?**

A: The research did not cover this topic. We worked with historic volume data for this research. We are “generally” not using detector data to indicate roadway events, although certain ATMS can alert TMC staff to issues based on data. The overwhelming process is for a traveler to alert CHP who then alerts Caltrans TMS operators.

**What can newer methods contribute to the filling of gaps in (updating non-recent) vehicle classification count results (% trucks, axle count, % RVs, other long/heavy vehicles)?**

A: By newer methods, we’re assuming that you’re speaking to the commercially available “big-data”. More validation studies and/or research needs to be performed to ascertain how accurate the commercially available traffic volumes and classification volumes are prior to being used for HPMS, Census or other Caltrans programs needs.

**What is FC?**

A: FHWA roadway Functional Classification (FC) categories. For more info see: <https://dot.ca.gov/programs/research-innovation-system-information/highway-performance-monitoring-system/functional-classification>

**Can we download the presentations, equation for  $n = \frac{()}{1+0()}$ , etc?**

A: Please refer to the presentation slides at: [https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/research-connections/drиси\\_presentation\\_7-28-2021v2-a11y.pdf](https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/research-connections/drиси_presentation_7-28-2021v2-a11y.pdf)

**What does TOPS stand for?**

A: It’s a FHWA HPMS term/acronym that stands for “Total of Potential Samples”.

**Will your efforts to compile sample data also include access to the sample data by the Districts? For instance, HPMS contracted counts along local roads back in 2014-ish and 2017-ish. HPMS graciously shared the count data on the local roads. However, I have not heard of any effort to get more recent local road counts.**

A: The research study does not collect additional sample data. The researchers only used what data was available in HPMS and Traffic Census.

**How was the annual cost of these counts determined? This number seems incredibly low.**

A: The manual count costs were from Caltrans, an average of the count costs from recent contracts with count companies (at the time of publication). An average cost was used. For individual locations, costs vary greatly depending on the type of census station being constructed. For certain temporary hose counts, that do not require permanent infrastructure, the cost is limited to counting equipment and staff time. For permanent volume and classification count locations that require substantial permanent infrastructure and ongoing maintenance, costs are substantially higher.

**I thought the Census stations and the PeMS stations collected the same data?**

A: While both detector types collect basic volume data, Traffic Census data are subject to FHWA HPMS requirements for completeness and accuracy. The PeMS system has no requirements for ongoing data validation.

**Does CT still support PEMS?**

A: Yes, the PeMS website and system is maintained and supported by Caltrans.

**Did you match the AADT of 164 PeMS with Census locations?**

A: No we didn't. This could be done easily in Excel. Caltrans personnel are currently in the process of validating select PeMS AADT against Census AADT.

**Don't the sample locations change from cycle to cycle?**

A: The HPMS data collection locations do not change from cycle to cycle. New sampling locations are occasionally added, and a few might be moved/relocated to better meet the HPMS reporting criteria. Other than that the sampled locations are generally static across reporting cycles - for consistency reasons, ease of reporting, and to reduce the costs of reporting. While the "count" locations that are sampled change, each location is a "sample location" and does not change from year to year. Data from all required locations are submitted each year as part of the HPMS submission to FHWA. If continuous automated detection is used, then sampling (using physical counting) is unnecessary.

**How much effort has been put in to vetting the data from "Big Data" companies?**

A: There is a great deal of effort, but few tangible/ validated results. There have been several validation efforts performed showing the accuracy of the commercially available travel-time and traffic speed estimates. However, very few validation studies have been performed/published for the newer traffic volume and trip-based origin/ destination estimates.

**What is the cost associated with the commercial big-data? Why should we use it?**

A: The costs vary depending on the vendor and the terms of the agreement. Costs vary widely but are not insignificant. Depending on usage, big-data sources could potentially provide desired data, such as speed and travel time, at significantly more locations with no direct Caltrans infrastructure-related O&M costs. Big-data providers do not currently provide validated volume data of any kind.

**What are the prospects of including this type of data collection/reporting that would include non-motorized modes but report them as separate classes?**

A: At least one of the big-data vendors has started to produce estimates of non-motorized trips/traffic volumes. We have yet to see any validation statistics or validation studies on these. Caltrans D1 is currently undertaking an SP&R project to determine if Street Light (one big-data vendor that uses physical detection/cameras) can provide necessary active transportation data including estimated associated costs of collection and analysis.

**How does Caltrans data availability compare to that of other states?**

A: The research did not cover this topic. The use of loop data for meeting HPMS/Census requirements and/or usage of commercially available data by other DOTs would need to be researched. Caltrans PeMS is one of the most robust data collection/performance measurement systems in the nation.

**The problem with all these big data companies is, we don't own the data and it's a big black box how they process their data.**

A: We agree. That is a concern that Caltrans and other state DOTs will need to address as they consider before entering into any contracts/agreements with these big-data providers.

**Can traffic counts from project reports be considered HPMS compliant?**

A: If the counts and data gathered were performed in adherence with FHWA standards, then it may be possible. Please contact the HQ Traffic Census Branch for more specific information/guidance.

**Maintenance of detectors has been an issue and we have been extrapolating the data in some cases**

A: That is a known issue and is very challenging when extrapolations are widely inaccurate.

**What is the difference between urban and rural road data collection?**

A: Average traffic volumes generally indicate the type of count conducted – short-term vs. automated counters as does the availability of communication/electric infrastructure. For HPMS reporting purposes, rural and urban roadways have different sampling and accuracy requirements. For more details see: <https://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual/>

**I recall hearing over 50% of the detectors in District 7 were malfunctioning**

A: Yes, historically the funding for detector repair and maintenance has been inadequate to meet the needs. This has resulted in high rates of malfunctioning detector stations in some districts.

**How do you check for accuracy in your data collection?**

A: That depends on what the data are going to be used for.  
For HPMS reporting purposes, the accuracy requirements are specified by FHWA."

**Commercially available tools such as streetLight Data, do they only provide volumes? or they provide Classification as well?**

A: Some produce classification volume estimates. However, it should be noted that these are estimated volumes (from a proprietary modelling process) and they are not ground-truth counts.

**How accurate the commercial vendors' data would be?**

A: The reporting of traffic volumes is a relatively new feature for the transportation industry's commercial providers. At the time of publication of this research report, very few independent validation studies have been published showing the accuracy of the commercially available volume data. With this, the accuracy of the commercially available volume data are largely unknown, and he was pointing this out, recommending that Caltrans look into the accuracy prior to entering into any agreements with the commercial data providers.

**Did they match the AADT of 164 PeMS vs Census stations? Do you know if a PeMS station is capable of providing data that meets federal requirements for Census?**

A: The PeMS produced AADTs was not validated against the Census AADT values. The validation of PeMS AADTs was one of the project's recommendations prior to employing PeMS for Census and HPMS reporting.

**Did you evaluate the CITILABS, INRIX or STREETLIGHT for validation with federal requirements on Census?**

A: No. That was not part of this research project. For this project, we did have access to CITILABS, INRIX or STREETLIGHT data. This would have to be performed by Caltrans or it would need to be a new research project.

**Can Caltrans partner with local or regional agencies to potentially lower the cost of collecting this data?**

A: Partnering with regional/local partners is allowed.

**Detectors health is the most restricting factor in using PeMS data for census. Mostly half of the detectors are not working. Any effort to improve detectors health?**

A: While detector health is a priority for Caltrans Traffic Operations Program, actual work on detectors is conducted by the Division of Maintenance and resources necessary to markedly improve detector health have not historically been available.

**Is Sensys Network considered a major player in data collection?**

A: Sensys Network is not a data provider - for "big-data" or statewide data coverage.

**What is the cost to install census station?**

A: Traffic Operations' Traffic Census Program in the district or HQ can provide that information.

**For freeway travel times, is there a minimum spacing between detection zones/ installations?**

A: This research did not cover this topic. Recommended minimum (or maximum) spacing of detector stations would depend on the end use of the data or how the agency would be using the reported travel times.

**Shouldn't we be concerned about the veracity of largely unvetted PeMS data? Especially since Census personnel are not in control of them but will effectively be providing them as accurate.**

A: Yes, Caltrans should be vetting their data prior to using it for HPMS and/or Census reporting. The validation of PeMS AADTs was one of the project's recommendations prior to employing PeMS for Census and HPMS reporting. District Traffic Census personnel are required to verify the accuracy and completeness of the data they submit as part of their Traffic Census Program duties no matter the source of the data.



**Alex made a comment that commercially collected data maybe good for Volumes (AADT) but he emphasized the need for accuracy of data collection, can he elaborate on this point.**

A: The reporting of traffic volumes is a relatively new feature for the transportation industry's commercial providers. At the time of publication of this research report, very few independent validation studies have been published showing the accuracy of the commercially available volume data. With this, the accuracy of the commercially available volume data are largely unknown, and he was pointing this out, recommending that Caltrans look into the accuracy prior to entering into any agreements with the commercial data providers.

**As for emerging technology; what about using large-scale radar remote sensing for census data collection?**

A: Roadside radar detection is currently used at specific locations statewide. Please check with the Traffic Operations' Traffic Census Program in the district or HQ for further information

**Data collection in the rural areas have been an issue in the past and now. Is there a plan for PeMS sensors to be extended to rural locations?**

A: The short answer to this question is that average traffic volumes in low-volume areas do not change significantly enough to justify the relatively high costs associated with required permanent infrastructure (primarily communication/power infrastructure).

**I thought the purpose of this presentation was about Improving Traffic Census and Highway Performance Monitoring Systems at Caltrans and not about promoting the sale of commercial count data by other companies. PeMS might have a few flaws in terms of detection functionality but why not make a recommendation to improve this system.**

A: This research had three main components, which were presented: 1) Improving HPMS reporting - by developing sampling procedures for rural "local" roadways. 2) Improving Census reporting - by identifying potential Caltrans PeMS locations that might be used to meet Census reporting needs. 3) Literature review of the commercially available traffic volume data."

**The density of roadway networks and clustering of settlements are very important factors for traffic volume and travel time. Why these factors are overlooked during estimation of HPMS sample sizes?**

A: These factors are not overlooked by the FHWA HPMS sampling process. The samples are drawn from the segmented roadway network, and called the "Total of Potential Samples" (TOPS) for FHWA HPMS sampling purposes. For more details see: <https://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual/>"

**Were the existing District Census locations evaluated for spacing compliance? The district does not count Off System routes. Only on a ten-year basis, some cross-street intersections are counted using hoses.**

A: HPMS is reported for both On System and Off System roadways. The sampling was done to meet HPMS reporting requirements, not for Census reporting. Census is reported for On Systems roadways only, and not subject to the FHWA HPMS sampling requirements.

***In the recent past, we came across a couple of locations where the truck traffic data was grossly overestimated in the traffic census page. We found this out when the consultant did counts in the same location. In one of the locations, the truck traffic was actually 3.7% compared to 17% reported by traffic census. When consultants do data collection, how can we incorporate that into the traffic census?***

A: District Traffic Census personnel are responsible for providing accurate data to the HQ Traffic Census Branch, which provides the data to the DRISI HPMS Branch. If traffic/vehicle classification counts are conducted in accordance with FHWA Traffic Census Program and HPMS reporting rules/guidelines, then data can be submitted to the HQ Traffic Census Branch and included in the submission to the DRISI HPMS Program.

***Truck counts are 1/3 or the Census reports, PeMS currently doesn't capture truck counts, how would this be handled?***

A: Currently, vehicle classification count data are obtained from traditional short-term count techniques (e.g., tube counts, Miovision, etc.). The Caltrans Traffic Census Program uses all available validated truck volume and classification counts.

***How do you know where to set count locations? Also, what type of counting device would be preferable on rural roadways? Permanent type counters as opposed to say the traditional tube counter? In my experience, tube counters just don't last, and having permanent counters all over is not cost effective.***

A: For HPMS purposes, the number of count stations and their locations are determined via FHWA HPMS guidelines (<https://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual>). Tube counters are the most popular (standard method) for short-term traffic volume data collection on lower volume roadways, but not used for permanent count stations. Video based technologies, like Miovision, might work better for multi-lane, high-volume freeways. Guidance on the location of Traffic Census count locations is available from the district or HQ Traffic Census Programs. FHWA sets standards for data submitted to the Traffic Census Program and HPMS. Detector type is a decision made by State DOTs.

***Does Caltrans HQ have a subscription for this data? If so with who?***

A: Traffic volume data are not currently available for purchase from private contractors.

***Loops are or were the Gold Standard for Census counts. Has this changed? MVDS (Radarr) are now acceptable?***

A: Tube counters are the most popular (standard method) for short-term traffic volume data collection on lower volume roadways, but not used for permanent count stations. Video based technologies, like Miovision, might work better for multi-lane, high-volume freeways. Guidelines for the collection of Traffic Census Program and HPMS data are provided by FHWA and available from either FHWA or the HQ Traffic Census Program.

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