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Update on the U.S. Stored Vehicle Tare Study

By Rick Harshman

Preliminary results of a national study being conducted to examine the use of stored vehicle tares show a very high frequency of inaccuracies in the tare values. Results collected at 31 different locations by officials from 3 States participating in this effort revealed that **over 80 % of the stored vehicle tare values examined were in error by an amount greater than 0.2 %**, which is the approximate maintenance tolerance applicable to vehicle scales that have been in commercial service for 30 days or more. The NIST Weights and Measures Division (WMD) is coordinating the study as part of an effort to help develop recommendations to improve the accuracy of commercial transactions completed using vehicle scales. Officials from California, Indiana, Kansas, Maine, Maryland, Michigan, Nevada, New Mexico, Ohio, and West Virginia are currently participating in the study.

Over the past few years, officials have grown increasingly concerned that a number of vehicle scale users rely on stored vehicle tares that have been found to have errors of several thousand pounds. When using a stored vehicle tare, the net contents of bulk commodities loaded onto a vehicle are not determined by weighing the vehicle in both a loaded and unloaded state, and then subtracting the difference of the two values as is customary in a typical “weigh-in/weigh-out” operation. Instead, vehicles are generally only weighed in a loaded state and stored tare values (one being assigned to each vehicle and often established days, weeks, months, or years in advance of commercial transactions) are applied and used to determine the net contents. An example of a *stored vehicle tare* is one that is stored in computer memory and recalled for use in future commercial transactions to compute the net weight of the commodity contained in a vehicle. Other types of stored vehicle tares include those written or recorded on weigh tickets or tare charts or those marked on vehicles.

In collecting data for the study, officials randomly selected 10 vehicles at each location where it had been determined device operators were using stored vehicle tares to complete commercial transactions. Industries examined include waste disposal, recycling, and agricultural and aggregate commodities. The actual tare weight for each vehicle selected for the study was obtained by weighing the vehicle empty (unloaded) and as a single draft on a commercial vehicle scale. Officials then compared the actual tare weight to the stored vehicle tare device operators were applying in commercial transactions.

Officials also examined 32 of the vehicle scales used to establish many of the stored vehicle tares and to verify the actual tare values of the empty vehicles. Was there any correlation between the errors discovered in the stored vehicle tares and the accuracy of the vehicle scales used to establish those tares? Of the 32 scales examined, 23 (or 71 %) were found to be correct (i.e., they conformed to NIST Handbook 44 requirements), and the data collected proved that significant errors in stored vehicle tares existed regardless of whether or not a scale passed or failed. Although the study is ongoing and not

expected to conclude until June 30, 2006, a total of 316 stored vehicle tares have been examined in the WMD study thus far. A summary of these tares is as follows:

- Number of tares exceeding ± 0.2 % of the actual tare value of the vehicle: 254 (approximately 81 %);
- Number of tares within ± 0.2 % of the actual tare value of the vehicle: 62 (approximately 19 %);
- Number of tares having an error in the direction favorable to the device owner: 157 (approximately 49 %);
- Number of tares in error by an amount greater than 10 times the vehicle scale maintenance tolerance of ± 0.2 %: 71 (approximately 22 %);
- Number of tares in error by an amount greater than 20 times the vehicle scale maintenance tolerance of ± 0.2 %: 29 (approximately 9 %);
- Largest individual minus error (i.e., an error favoring the device owner) recorded: -580 lb;
- Largest individual positive error (i.e., an error favoring the customer) recorded: 5780 lb.

The following related information was also collected at each establishment surveyed:

- Average number of vehicles weighed daily: 137 (ranged from 70 to 550 vehicles);
- Average percentage of daily transactions completed using a stored vehicle tare: 95 %;
- Average cost-per-ton of the commodities weighed on vehicle scales: \$37.50 (ranged in cost from \$5.00 to \$62.00).

WMD continues to request participants in the study provide data on stored vehicle tares from at least 20 different businesses using the National Tare Study Survey Form previously provided. Completed forms and requests for further information on the national study on stored vehicle tare should be forwarded to Tom Coleman, Laws and Metric Group, NIST Weights and Measures, 100 Bureau Drive Stop 2600, Gaithersburg, MD 20899-2600. Email: t.coleman@nist.gov.