

## TESTING LABORATORY PERSPECTIVE

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This presentation represents my personal opinion not necessarily that of the Texas Transportation Institute (TTI). I am generally in favor of a certification process. Most existing testing laboratories should not have any problem with meeting certification requirements. There are, however, issues that are important to a testing laboratory and need to be considered.

### ITEMS TO BE CONSIDERED IN CERTIFICATION REQUIREMENTS

Certification requirements need to be specific, explicit, and clearly defined. Requirements should be performance based to the extent possible, i.e., specify the desired end result, but not necessarily the exact means or equipment to accomplish the result. A lot of the equipment, instrumentation and software are custom made and not easily standardized among the testing laboratories. Updates to the certification requirements should be kept to a minimum since it takes a long time to establish the proper procedures and to train the crew. Efficiency will suffer with frequent changes in the requirements and the potential for mistakes will increase. The requirements should cover both Initial certification and periodic update or re-certification. There needs to be some mechanism for inputs from users and testing laboratories in developing the initial requirements and future updates or modifications to the requirements.

### COST CONSIDERATIONS

Cost is a major consideration for testing laboratories unless the laboratory does not engage in competitive bidding for projects. Cost considerations can be broken down into two areas:

1. Capital outlay, i.e., purchase of specific equipment items that are required for a testing laboratory to be certified initially. The required capital outlay will probably be small for existing testing laboratories, but can be prohibitive for a new testing laboratory.

It should be kept in mind that some of the testing laboratories, especially those affiliated with universities and governmental agencies, typically have problems acquiring new equipment. For example, at TTI, capital equipment is generally purchased with capital funds

which are appropriated by the State Legislature. Needless to say, the capital funds are hard to come by and usually require very long lead times.

2. Periodic maintenance, i.e., costs associated with maintaining the certification. The key items are:

- a. Periodic calibration of accelerometers rate transducers by a certified laboratory, e.g., manufacturer, National Bureau of Standards, etc. Besides the cost of the actual calibration, the process takes 4 to 6 weeks, and the laboratory will need spare equipment during calibration.

For example, TTI calibrates its accelerometers under steady state conditions (using a centrifuge), but sends them back to the manufacturers for dynamic calibrations.

- b. Periodic calibration of electronics, including telemetry, filters, etc. A device similar to the NHTSA Data Acquisition System Evaluation Test System, but at the appropriate frequency, i.e., 180 Hz instead of 1,000 Hz, would serve well for this purpose.

- c. Validation of software, e.g., digitization, calculation of occupant risk factors, etc. A standardized analog (or digital) test data set can be used to check the validity of the software.

- d. Reporting requirements: documentation of activities regarding certification or re-certification requirements, e.g., date, nature and results of calibration of existing equipment, new equipment, etc.

The cost for testing will probably go up some because of added expenses associated with these maintenance requirements. However, since all testing laboratories are subjected to the same requirements, there should not be any cost advantage or disadvantage to a testing laboratory except in initial capital outlays.

### OTHER CONSIDERATIONS

Four more questions pertaining to certification and product testing are discussed in this section.

1. Who should decide on the certification requirements and who should administer and monitor the certification program?

These questions are very important questions and will have great impact on the testing laboratories. However, from the perspective of a testing laboratory, there are no unique concerns regarding these questions.

2. Should there be different levels of laboratory certification, e.g., level I for tests without electronic instrumentation, level II for pendulum and bogie vehicle testing, and level III for all testing, including full-scale crash testing?

This issue is actually of little concern to existing testing laboratories since we already can handle all testing, but would have a great impact on new testing laboratories, particularly those that do not want to develop full-scale crash testing capability (an extremely expensive endeavor).

3. Currently, testing laboratories are expressing an opinion on the pass/fail of a device based on the evaluation criteria, but the opinions are only recommendations. It is up to the FHWA to actually decide on the pass/fail of a device, either at the headquarters or at the division level. Should the current practice be continued or should other options be considered, such as having the testing laboratory actually decide on the pass/fail of a roadside safety appurtenance, or simply report the data and have another agency, such as FHWA, to determine the pass/fail of the device?

From the standpoint of a testing laboratory, I would oppose leaving the final decision of pass/fail of a safety device to the individual testing laboratories. The reason is that the approval authority and responsibility should rest with FHWA or the state or local highway agency, and not with testing laboratories. I would not have any problem with reporting only the data and not even express an opinion or recommendation, but I suspect that this is not a viable approach since too much work would be required of the agency making the decision. I think maintaining the current practice is probably the best approach.

4. Should a manufacturer qualify its own products? Similarly, should a testing laboratory qualify its own designs?

The concern is that there may be some built-in biases because of self interest, either financial or professional, that may affect the interpretation of test results. It is just human nature to be favorably biased toward one's own design and project and *total* objectivity is very

difficult. On the other hand, I also believe that the professionalism in us will keep us reasonably objective in most, if not all, cases.

Another consideration is that it is very difficult, if not impossible, to separate developmental tests from compliance tests during the design and development process for a new safety device. We typically start out with an initial design and then modify the design based on the results of the crash tests. If the test is a failure, we will term the test a "developmental test" and then modify the design and test again. If the test is a success, it becomes a compliance test.

A related issue is the uniformity and consistency in the interpretation of data and results among the testing laboratories. In other words, for a given crash test, will all testing laboratories interpret the evaluation criteria in the same manner and arrive at the same conclusion? I believe that is the case in most of the tests, but there are some exceptions. Some of the evaluation criteria are subjective in nature and open to interpretation. Examples of such criteria are occupant compartment deformation and intrusion and vehicle stability and trajectory.

One potential solution to this concern is to set up an independent review or oversight panel, consisting of personnel with expertise and experience in the area of testing and evaluation of roadside safety appurtenances from FHWA, state highway agencies, testing laboratories, and any other related agencies. The panel will review selected tests from the various testing laboratories and determine if the tests are properly conducted, the data and results appropriately evaluated, and the findings and conclusions valid.

This can be set up as part of the certification process. The independent review panel will serve as a safeguard against major biases and also as a check and balance to ensure uniform and consistent results and interpretations from the various testing laboratories.

Of course, this review panel will require some funding, but the expenses will be minuscule compared to the costs of installing and maintaining roadside safety hardware.