

## **PART 2 PRESENTATIONS: BACKGROUND ISSUES PERTINENT TO NCHRP REPORT 230**

### **A. The Purpose of the NCHRP Report 230 Update**

*By: Charles Bartell, California Department of Transportation*

The original intent of NCHRP Report 230 and its predecessors was to provide recommended uniform procedures for conducting full-scale crash testing of highway safety appurtenances and evaluating the data from these tests. This was to permit comparison of different candidate appurtenances based on full-scale tests, often by different testing organizations. The necessity of rerunning a series of tests to slightly different criteria for different highway agencies was eliminated.

Most of the original requirements for test conditions and matrices evolved from research performed in developing roadside barriers, that is guardrail, median barrier, and bridge railing. Uniform test and evaluation procedures of various designs and their modifications were to be compared, even when some of the tests were performed by others. Over the years it has become necessary to develop new test procedures and to adapt old ones when new appurtenances come on-line when there are no specific tests related to those devices. This is where we are now in considering appropriate tests for such items as temporary barriers, movable median barriers, and truck-mounted crash cushions. Test criteria must consider new products and be adaptable to as yet unidentified appurtenances.

Another value in uniform test criteria is in the performance certification of new highway safety appurtenances. Performance certification is applicable to all new highway safety systems, whether developed by a public agency or in the private sector. Before a product is exposed to public traffic, it is required to have satisfied the appropriate test performance criteria. The certification process often serves as a screening process. Frequently, Caltrans, like many agencies, is approached by inventors, developers, and salespeople proposing to sell us a better mousetrap. Often, the mousetrap is nothing more than an idea or a few lines on paper. The proposers are informed that we cannot use or even consider their product until it has been shown to safely perform its intended function. NCHRP Report 230 is referred to as the authority for tests to prove the viability of a product. Many of the proposed concepts are abandoned, while others are tested and eventually see use. Many times a product subject to certification testing fails in the minimum matrix. Sometimes the failure is marginal. What is perhaps needed are tolerances for borderline results. Possibly, even a test that barely passes may indicate a need for additional tests. When additional testing is required, what was certification testing frequently becomes research or developmental testing.

Many times the added testing results in a greatly improved product.

Considering the foregoing, I believe that the NCHRP Report 230 update should serve as both a foundation for the development of safety appurtenances and as a certification document for the performance of newly developed systems. Research testing should not be downplayed because someone may believe that everything has been invented or improved to its ultimate capability. We know from experience that this is not the case; something new is always coming along. On the other hand, research should not become an endless ritual just because we may learn something. Our primary goal is to be certain that hardware we put out along a road is the safest thing for the intended function.

In-service evaluation is the culmination of the process leading to the adoption of a new safety appurtenance. It also provides the yardstick for evaluating the performance of existing systems. NCHRP Report 230 describes six objectives of in-service evaluation which are still valid. Briefly, they are:

1. Determine whether or not the design goals have been met.
2. Acquire the broadest range of experience and information possible. Tests are usually performed under very narrow idealized conditions. Information on real-world performance is needed.
3. Identify any problems.
4. How has the trial installation fared in the environment?
5. Does the installation interact with or have an effect on adjacent highway operations?
6. Acquire maintenance data relative to costs, manpower, hours, and equipment.

These are basic information items that are needed to decide whether to adopt, reject, or modify the appurtenance being evaluated. Finally, it is necessary to have a uniform format or outline for in-service evaluations. This will assure that the desired information is gathered and that valid comparisons of alternate safety appurtenances can be made.