INTRODUCTION

In January of 1978, the Federal Highway Administration (FHWA) initiated a nationwide safety review of federal-aid highway construction projects completed since 1970. The purpose of the review was two-fold, to determine:

1. The degree to which safety concepts contained in the 1974 AASHTO publication "Highway Design and Operational Practices Related to Safety" were being incorporated in new projects (this publication is commonly called the "Yellow Book").

2. The progress made in the timely safety upgrading of older federal-aid highways.

The reviews consisted of an office check of state safety-related policies, standards, and specifications, and a field performance review of newly completed projects. The field review was a detailed study of how the highway and its appurtenances perform in preventing accidents or in reducing accident severity. These reviews were performed under both day and night conditions. Actually the reviews were accomplished by the FHWA field offices. A representative from the regional office was the leader of each regional review group, the remaining members of the review team usually consisted of the FHWA Division safety program engineer from the state being reviewed and a safety program engineer from another division office in that region and state resource personnel. Division offices prepared a report on the findings in their state which were then forwarded along with a regional summary, to the headquarters office task force. The headquarters office task force was appointed by former administrator Cox to develop the review
guidelines, participate in the actual reviews and prepare the final report. The task force consisted of:

Chairman, R. Clarke Bennett, Office of Highway Safety, FHWA
Then Deputy Administrator Karl S. Bowers, Office of Administrator, FHWA
Roger Scott, Office of Engineering, FHWA
Roy Anderson, National Transportation Safety Board
Tom Alcorn, National Transportation Safety Board, Alternate

The FHWA safety review was a major undertaking, involving over 150 FHWA field office engineers and 130 state resource personnel. Representatives from the headquarters office task force participated in the safety reviews in 22 states. The effort by the headquarters office task force alone involved traveling 20,000 miles of highways and reviewing over 130 projects. This resulted in taking over 1,700 photographs of highway features.

The final report on this review was printed in December of 1978, and has been distributed. The report covers over 20 topics related to the safety of the highways and is far too extensive to cover in this presentation. Therefore, I will concentrate my discussion on the general findings and recommendations of the report.

**General Findings**

With respect to the original charge of the review, to determine if the Yellow Book safety concepts have been incorporated in new highway
projects, we are happy to report that generally the states are doing an excellent job in following the Yellow Book safety concepts on new highways. There were some notable exceptions. A few states were still using curbs in the construction of high speed roadways. The review teams believe this compromised safety. See Figures 1 and 2.

With respect to the second charge, timely safety upgrading, there was wide variation between states, FHWA Division, and Regions on safety upgrading policies and progress.

Some states—with numerous real hazards on their older interstate—are not contemplating any major safety upgrading until completion of the entire interstate. See Figure 3.
Other states have accomplished some minor safety upgrading which is only partially effective. A few states have already accomplished substantial safety upgrading. See Figure 4.

Figure 4. A 5-in. surfacing was accomplished as part of a safety upgrading project. But it resulted in a hazardous 5-in. dropoff at the edge of the pavement.
There was very little evidence that the highway agencies are even planning to safety upgrade non-interstate highways. It was clearly evident to the review teams that the real opportunities to improve safety on our nation's highways lie in improving the safety of the non-interstate highway system. These are the roads with the most hazardous conditions and the same 55 mph speed limit as the interstates. This is where 90% of all fatalities occur. This will be a difficult job! See Figure 5.

**Figure 5. Inadequate guardrail, a common safety upgrading need on non-interstate roads also.**

In addition to the general findings already stated, there were a number of other areas noted during the review which need to receive greater attention at both the state and FHWA field office level. As an example, accident data was not being used to evaluate the performance of highway features, or for operational reviews of sections of highways. In fact, at the time of the reviews, lack of readily available accident data, hampered performance evaluation in many of the 22 states visited by the headquarters office task force. Two states could only produce a general fatality rate for the sections of roadway under review. Five states provided accident data printouts at the time of the review, but because information on location or collision type was missing, the data was impossible to analyze. One state could only produce raw accident reports, none later than 1976. The remaining states had some type of data available, but only one state had used the data to analyze the safety of highway features in advance of the actual review.

Even on new construction, the review teams observed a number of breakaway sign, guardrail, and crash cushion installations that would not perform as intended in design. There is an obvious need to establish performance requirements for these devices as well as design specifications. A detailed discussion of this appears in the presentation on "Design and FHWA Safety Review."
Another problem noted by the review teams was a wide variation between both states and regions related to safety policies, such as accommodation of pedestrians—some states provide sidewalks in urban areas, others do not.

Maintenance of damaged roadside hardware also varied; some were replaced within 24 hours, others waited months. Policies on accommodation of utilities also varied widely; some states had no policy on utility placement, and it showed. See Figure 6.

Policies on frequency of repainting markings varied. Some repainted at short intervals—others waited as long as three years. Some states mark no passing zones, others do not, and some markings were confusing. There were various other policies related to signing construction and maintenance which could compromise safety. See Figures 7 and 8.

Figure 6. Utility poles compromise clear roadside, sign has breakaway supports.
These variations in safety activity and policies indicate that the FHWA Division offices need to strengthen their influence over state highway-related safety activities.

RECOMMENDATIONS

1. As a result of these findings, the review teams made scores of recommendations, many of which apply to a specific deficiency
in a specific FHWA division or region. The recommendations in the individual state reports have already been brought to the attention of state agency and some have been implemented. Safety performance reviews have proved an effective method for identifying and quickly initiating needed safety-related improvements. Therefore, the headquarters office task force recommends that safety performance reviews should be continued on a formal basis as a routine procedure by all FHWA offices. These follow-up reviews have been designated as an FHWA emphasis area for FY 1979.

2. It is obvious that FHWA must take the initiative in accelerating safety upgrading on all federal-aid highways. As an overall recommendation, the task force believes that FHWA should establish the minimum requirements necessary to constitute a safety upgrading program, initiate a study of safety upgrading needs based on these requirements and establish national goals for accomplishing the upgrading.

3. The next overall recommendation relates to the wide variation in FHWA influence in state safety policies. It is recommended that the division safety program engineer be assigned specific responsibilities with respect to accident analysis, both at high accident locations and for the safety performance of highway hardware. The safety program engineer should also provide overseeing of safety standards and design criteria, safety upgrading projects, and route and project performance reviews.

4. Many of the safety deficiencies noted during the on-site review indicate there is a lack of knowledge on the part of construction and maintenance personnel on the concept of safety performance of highway hardware. It is recommended that FHWA develop a series of training courses for both FHWA field and state personnel. This training should cover, as a minimum, new safety technology and performance concepts, the timeliness of repair of damaged hardware, and safety maintenance priorities. This training is already underway. There is also a need to train field personnel in the analysis and use of accident records for monitoring the safety performance of highway features.

5. The task force also recommends that FHWA undertake research to determine more realistic criteria for establishing speed limits which consider such safety-related criteria as roadside conditions, traffic conflicts, and driver acceptance. Research is also needed to establish a method to monitor the performance of various
safety hardware using accident data supplemented by crash testing.

6. There were also a vast number of safety-related policies that need to be clarified at the federal and state level with respect to such things as:
   (a) Pedestrian accommodation
   (b) Maintenance and replacement of damaged highway hardware
   (c) Pavement remarking policies
   (d) Delineation of roadside hazards
   (e) Location of ground mounted sign supports and many, many others.

The task force recommends that each office in FHWA headquarters review the final report and its recommendations, and no later than 90 days after its distribution provide the Federal Highway Administrator with their recommendations for improvements.

In retrospect, the review identified far more problems than it provided solutions. The final report discusses over 20 highway-related safety topics and contains over 40 recommendations. Deputy Administrator John Hassell, after reviewing the report, has decided the best method of implementing the recommendations is through an FHWA task force of key field and headquarters office personnel. On December 20, 1978, Mr. Hassell appointed such a task force and gave the task force four charges.

1. To review the findings and recommendations and establish priorities for improvements needed in FHWA policies and procedures.
2. Recommend specific corrective action and assign lead responsibility to accomplish this to the appropriate headquarters or field office.
3. Establish safety goals and time frames for implementing improvements.
4. Develop a process to monitor the progress of the designated offices in accomplishing these improvements.

The first meeting was held January 22, 1979. As a result of this meeting, the following general instructions have been issued to all FHWA offices.

1. FHWA headquarters offices will be assigned responsibility for various report recommendations by the implementation task
force. The offices should review the report and provide the task force with follow-up action for appropriate recommendations by February 28, 1979.

2. Follow-up safety performance reviews by FHWA field offices should be started in May of 1979.

3. Specific deficiencies in highway safety which are identified through these reviews are to be corrected in a timely manner.

4. Safety performance reviews made this year should be forwarded to the office of highway safety by September 1, 1979. The implementation task force will evaluate these reviews, and together with results of other activities will provide a report to the administrator by October 1, 1979, on accomplishments this year.

CONCLUSION

The implementation task force is now in the process of reviewing the various FHWA office response to the report recommendations and will meet the week of March 19 to develop the final course of action.

As it now stands, the easy part of our job, the actual safety review, is completed, but the hard part, determining how and when the problems noted in the reviews can be corrected and avoided in the future, has just begun.

It certainly won't be easy, but it can be done and FHWA is going to be committing a major portion of its resources to improving the safety of the nation's highways. I hope that if another extensive safety review is conducted, say five years from now, and the Purdue Road School wants a full report on the findings, the presenter will need no more than 15 minutes, and at least half of his slides can show desirable practices instead of problems.