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APPENDIX A

MORE SOPHISTICATED DATA COLLECTIONS
FOR
AN IMPROVED ACCIDENT DATA SYSTEM

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January 27, 1975

MORE SOPHISTICATED DATA COLLECTION FOR AN
IMPROVED ACCIDENT DATA SYSTEM

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NEED

It is essential that NHTSA have a national data bank for surveillance and effectiveness studies related to the impact of standards on accident, injury and fatality frequencies. The relatively small output of the special federal teams and/or the higher quantity, but low content state data banks are inadequate for the purpose. In addition to information on the general accident environment, vehicle damage and occupant injuries, details of the impact environment -- velocity at impact, change in velocity during impact and possibly, vehicle deceleration -- are required for a sample of 100,000 to 500,000 automobiles annually.

CANDIDATE SYSTEMS

Candidate systems for achieving the required information are:

- Crash recorders, with accident, vehicle and occupant information supplied by "conventional" investigations by police and/or special teams.
- Off-scene computer reconstruction of accidents as reported by police and/or special teams.
- Computer aided investigation and reconstruction of accidents (e.g., SMAC) using appropriately equipped police and/or special teams.

Use of crash recorders alone to provide data on the impact environment for the required number of accident cases would be prohibitive in cost. For example, if accidents of tow-away severity or higher are of principal interest, then 30-40 times as many automobiles must be equipped with crash recorders as the number of accidents needed annually for analysis*. Also, and most important, the crash recorder only provides a portion of the data required; conventional investigative methods must still supply accident and vehicle descriptions, vehicle deformation, occupant injuries, restraint system use, etc.

*

Additional cost for each accident case would be 30-40 times the cost of each crash recorder installation.

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Off-scene computer reconstruction (SMAC) of the more extensively reported accidents now resulting from the special team studies has already been demonstrated. A modest amount of additional work on SMAC is required to increase the generality of the reconstruction of the various accident types. Also, application of this reconstruction aid to accidents as presently reported by police should be studied with the objective of determining the minimum information required for each accident.

The computer aided investigation and reconstruction of accidents by police offers the most promise for the attainment of the large data base required. If the use of appropriately equipped accident investigation vans is determined by individual police agencies to be beneficial for their present activities, in terms of overall efficiency, then the mechanism for providing all of the necessary accident data for NHTSA will be accomplished. Providing the police with equipment that will be cost/beneficial for their present needs will obviously provide the means for the attainment of the data required by NHTSA at the lowest cost. Also, the digital format of the accident descriptions and reconstructions that would be output from this equipment would result in minimal data processing for a fast response data bank.

RECOMMENDED APPROACH

The overall objective is the attainment of a consistent, coherent data bank that will be adequate both in size and specific content for the purpose and is practical in terms of development time and cost.

Whether police or special teams are used as the basic collection agency need not be decided immediately. What should be decided as soon as possible is the efficacy of the computer aids to reconstruction and

investigation that have already been developed. The crash recorder may play a role in further validating these aids; it cannot be seriously considered as the ultimate data collection method because of prohibitive cost. A decision to continue with special teams should include the provision of demonstrated aids for these teams. If police want these aids and their efforts can be integrated into a national data system, then it appears axiomatic that a police based system would provide the most for the least cost.

A program is outlined below for achieving the improved accident data system:

- 1.) Install crash recorders in special automobiles, e.g., air bag equipped vehicles, for additional validation of computer reconstruction aids.
- 2.) Accident Reconstruction
 - a.) Continue validation of SMAC via staged crashes (including crash recorders) for a broad accident spectrum.
 - b.) Determine accuracy achievable on police reported accidents and establish minimum data requirements as function of accuracy achievable.
- 3.) On-Scene Reconstructions
 - a.) Accident vans for special investigative teams to improve data consistency and achieve more accurate reconstructions.

- b.) Field trials with police agencies to determine accident reporting and/or accident reconstruction configurations.
- 4.) As the result of 1, 2, and 3 (above), establish national data collection system elements.

TIMING AND APPROXIMATE COST

Aggressive pursuit of this plan would provide detailed requirements and set up of the overall system within two years. Meanwhile, the present multilevel data collection centers would continue to provide data, but with a transition toward the final system in the second year.

An acceptable, complete data system could be achieved at a cost of five to ten million dollars annually. Actual costs to NHTSA are dependent upon the usefulness and acceptability of the investigation and reconstruction aids to selected police agencies and their subsequent integration into the system.