

## ROADSIDE SAFETY - A FUNCTION OF AGENCY PERSPECTIVE

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### INTRODUCTION

It is my observation that the importance and stature of the safety activity is changing for the better in many highway agencies. Public pressure, tort liability, environmental concerns, whatever the reason, safety is gaining in agency stature and prestige. Safety Management Systems and Risk Management are new buzz words in highway transportation. It is possible that Highway & Roadside safety will emerge from what I perceive as the doldrums of the back room and mundane grind, to that of a creative challenge similar to that which attracted many of us to engineering. Roadside safety can be much more than paraprofessional unquestioning adherence to guidelines and manuals on guardrail, sign supports, or clear zones.

The Intermodal Surface Transportation Efficiency Act of 1991 requires that in the near future States develop, establish, and implement a Highway Safety Management System. This can well be the critical turning point in the quality and level of safety activity for the decade ahead.

Will Safety Management Systems provide the creative challenge that will lead to improved highway safety? Or will Safety Management Systems become the ceiling and shield behind which agencies play it safe through prescribed processes for adherence to standards and manuals?

The timing of this Symposium is most opportune. The approaching ISTEA mandated Safety Management Systems provide the opportunity for assessment of past practice, by the professional and agency. We can address many issues such as whether we have made full utilization of information systems. In the processing of roadside accidents and the evaluation of remedial measures are we effectively analyzing accident causes? Do we at times apply remedial measures to the incorrect causes? What is the effectiveness of our accident location systems? To what extent are locations meriting remedial action addressed?

The purpose of this paper is to present a case for the greater utilization of existing resources toward a better understanding of the causes of roadside accidents and the potential for improved remedial measures. Can a 10 to 20 percent reduction in accidents become a reality?

### IDENTIFICATION OF LOCATIONS MERITING REMEDIAL ACTION

Many state, county, and urban transportation departments limit their accident analysis to "unsafe" sections of highway (i.e. more than average number of reported accidents). Specific unsafe roadside accident locations are also identified as those with an above average number of reported accidents.

This practice of limiting accident analysis to selected sections of highway severely restricts the number of locations subject to low cost, effective remedial action. The situation must wait until either the required number of accidents have occurred, a tort claim for negligence has been filed, or a substantial judgement awarded against the agency.

Until the advent of the computer and advanced information systems, agencies were limited to responsive measures directed at high accident locations. Present technology allows the professional to evaluate the "safety rating" of an entire section of roadway. Roadway geometrics, roadside features, and environment can now be integrated so that today the trained professional engineer has the capability to introduce roadside safety measures, to forestall future accidents, at any location in the highway system.

From highway sections with a low level of accident frequency, we can derive locations justifying cost effective preventative measures and indications of types of roadside features warranting remedial action.

I suggest that the agency perspective of limiting sites for remedial action to locations with a predetermined number of prior accidents is obsolete.

### THE ROADWAY AS AN ELEMENT IN ROADSIDE ACCIDENT CAUSATION

Observation of the practices of a few highway agencies disclosed a lack of correlation between roadside accidents and pavement coefficient of friction, centerline and edgeline striping, roadside signing and roadside features.

There is a linkage between the roadway, roadside design, operation and maintenance, and roadside

accidents. A frequent problem is the lack of information regarding actual roadside conditions relative to specific roadside accidents. The problem of information regarding actual roadside conditions extends to analysis of roadway sections and the need for assistance to the driver in negotiating the section of highway.

Critical to problem identification and implementation of remedial measures is the information available to the engineer regarding roadway conditions at the time of the accident. To what extent, if any, did the highway contribute to the driver causing the vehicle to leave the roadway?

In many cases the primary roadway information available to the engineer is that from police reports and computer processing of accident records. This information is generally inadequate for a professional determination of the role of the roadside in accident causation. Lacking adequate information or confidence in available data, the engineer often elects to take no action or less than the optimum action, due to the uncertainty of accident causation and the potential of any correctable measures.

The conclusion by the engineer that the roadside accident was due to "driver error" is too often based on inadequate data regarding existing highway conditions rather than sound engineering judgement.

Improvement in the reporting and processing of roadway conditions at the accident location would materially assist the engineer. This would include information such as shoulder width, surface condition, driveability and extent of shoulder drop off. The office engineer should have available that information needed to make a professional determination as to possible linkage between roadway conditions and accident causation.

The agency can compensate for the limited physical information derived from the accident report. The agency can make available and encourage the engineer to utilize tools such as photologging, digitized photographic information and the increasing potential of geographic information systems. GIS systems are available to combine roadway, roadside and environmental features with traffic data, (volumes, speeds, accidents, accident claims, etc.). The information can economically be made available that will enable the engineer to minimize the role of the roadway in the causation of roadside accidents.

The ISTEA mandated Highway Safety Management System provides an opportunity for agency review and improvement of the information available to the engineer regarding roadside accidents and roadway features. The tools are available for the agency to take

those actions that will substantially reduce the role of the roadway in the causation of roadside accidents.

### **NEED FOR ATTENTION TO ROADSIDE ACCIDENTS**

Roadside accidents characteristics; 45% of all deaths occur on curves; 34% involve crashes on hills; and that 65% of the roadside deaths occur on rural roads(1) indicate the potential for development of effective safety programs.

Some states require that roadway speed limits be reviewed at least every 5 years in order to justify the use of radar for enforcement. A similar form of "professional" roadside safety analysis might prove cost effective, particularly if actual and potential liability costs are included in the cost analysis.

Some form of periodic roadside safety analysis should result in the driver being provided a high level of Positive Guidance along sections of highway susceptible to roadside accidents. The British concept of an existing "Road Safety Audit"(2) may be an appropriate consideration. A demonstration program that would evaluate the merits of system wide approaches toward roadside safety might be a potential outcome of this symposium.

As a minimum we must make the institutional changes that will result in an incentive for the application of professional skills to roadside accident prevention.

### **URBAN ROADSIDE SAFETY**

The topics of utility poles and street furniture such as newspaper racks related to driveways and intersections was probably not considered in the planning for this symposium. Some local governments have addressed the issue of driveway and intersection sight distance through requirements which prohibit utility poles above 12 inches in diameter, signs, and large trees within an intersection sight distance triangle.

In rural areas practice is often consistent with the recommendations in The 1981 AASHTO publication A Guide For Accommodating Utilities Within Highway Right-of-Way that utility poles be located "beyond the clear zone" or "as near practical to the right-of-way line".

In urban areas with curbed sections, the recommendation that utilities "be located as far as practical behind the face of outer curbs and, where feasible, behind the sidewalks" is seldom fulfilled.

Common practice is to locate utility poles, even large diameter poles carrying high voltage, 12 to 18 inches from the face of curb.

Accidents resulting from urban driveway or intersection sight distance impairment seldom, if ever, qualify as high accident locations. In an urban, area with thousands of intersections such accidents happen with regular frequency at different locations.

Present computer capability provides the government agency with an opportunity to identify and analyze urban roadside accidents due to sight distance obstructions or design features. Policies and practices relating to roadside interference with intersection sight distance should be reviewed. Parking restraints at intersections should be included as part of any review of urban roadside safety.

The design and location of roadside storm water catch basins and gutter inlets can also result in an urban area wide problem to pedestrians and bicyclists. As in the case of intersection sight distance problems, the frequency at any one location is generally low, but the number throughout an urban area can be significant. The resulting personal injury can be serious and the liability claim and award against the agency substantial. Today's information systems have the capability to expand the engineer's capability to identify and analyze the factors relating to urban roadside accidents. We have reached the point in the development of information systems and professional competence that it is practical to effectively address the issue of urban roadside safety.

#### **TORT LIABILITY CLAIMS AGAINST THE GOVERNMENT AGENCY**

Despite wide variation among states as to the ability of an individual to litigate against a government agency, most if not all states are vulnerable to the potential of monetary loss from claims for negligence and the allowance of a section of hazardous roadway.

The relationship between claims against government agencies and the highway safety effort has not been effectively addressed. Establishment of a framework for the utilization of information obtained from tort claims and settlements regarding possible roadside deficiencies could be one of the important accomplishments of this symposium.

I suggest that tort claims can be a source of information regarding preventable types of accidents and can be of assistance in the identification of locations subject to safety improvement.

Another area that has not been explored is the potential for a reduction in the cost of tort liability through improved safety management. What is the

linkage between liability claims and accident prevention?

It has been suggested that analysis of tort claims would result in public disclosure of engineering inadequacies and therefore jeopardize the potential agency defense. This possible obstacle to evaluation of liability claims has not been objectively evaluated. There are indications that a combination of inertia and "turf" between legal, engineering and finance are the likely factors inhibiting the use of liability claims as an instrument of highway safety. Who should fund the cost of claim analysis and which department should reap the rewards from any reduction in settlement costs?

In many states and local government the cost of tort liability is not borne by the highway agency and it is not possible to transfer savings in tort costs to the highway agency for accident prevention. The present shielding of the highway agency from the direct costs of tort liability and other accident costs reduces the incentive to invest in accident prevention.

It seems most appropriate for this Symposium to address the basis for the constructive use of data relating tort liability to an expanded effort toward roadside safety.

#### **ENGINEERING COMPETENCE/PERFORMANCE IN ROADSIDE SAFETY**

The subject of professional competence in all aspects of highway safety has been an issue for many years but never effectively addressed. Are Civil Engineers, without any education and training in all aspects of traffic safety, as competent and interested in safety as Traffic Engineers? Unlike most professions, no standards or criteria exist by which to measure or evaluate the competence of the traffic engineer or traffic engineering activity.

Most states and counties have a policy of rotating engineers in all aspects of highway activity. The attitude of management is that any good Civil Engineer can properly accomplish needed traffic engineering functions including that of roadside safety. The result of such practice is often "handbook engineering" not professional practice. An engineer with minimal on-the-job training will not be aggressive or innovative.

Material improvements in roadside safety can be accomplished by the establishment of minimum qualifications in terms of education and training for engineering personnel performing safety related activity. Some form of continuing education may be an appropriate starting point toward the increased professional capability of engineers responsible for roadside safety.

There is a need for some form of annual review of agency effectiveness in addressing the issue of roadside safety. The fact that a specific number of corrective measures were implemented and that a given amount of funds were expended on roadside safety is not assurance that the total problem of roadside safety is being effectively addressed.

Improvement in the capability of engineering personnel accompanied by an annual evaluation of roadside safety activity would be a major step toward a substantial reduction in roadside accidents.

## SUMMARY

This symposium occurred at a most opportune time. ISTEA requires the states to adopt Safety Management Systems. The issue to be addressed is will Management Systems codify and reinforce present practices or provide the incentive and requirement that the highway agency and individual engineer use all available resources to minimize roadside accidents?

## POST-SYMPOSIUM

Since the symposium in July 1992, the Institute of Transportation Engineers on June 1, 1993 formalized its response to FHWA/FTA Docket 92-14 regarding proposed rulemaking related to Safety Management Systems. The recommendations of ITE related to the issues raised in this paper include the following:

"It is especially important that personnel with expertise in traffic engineering and highway safety be responsible for all elements of the safety management system. Experience has shown that this knowledge and experience is critical to the success of planning, designing, implementing, operating and maintaining individual safety improvements and the overall safety of the highway system.

The rulemaking should therefore direct each state to establish specific requirements for

personnel responsible for traffic engineering and highway safety. These requirements should include minimum levels of education and training in traffic engineering and safety for different positions and levels of responsibility. For those in positions of responsibility for traffic engineering and safety, registration should be required along with a specification that the area of expertise is traffic engineering and safety."

"Although not specifically addressed in this proposed rulemaking the Institute also recommends that consideration be given to establishing a strategic research program on highway safety, similar to the Strategic Highway Research Program (SHRP). Much more work needs to be done to quantitatively determine how various measures contribute to the attainment of highway safety objectives."

"A system for surveillance of accidents along the entire highway system should be among the basic elements that a state's safety management system should include. This database system should also include information on total accident costs, the characteristics of claims and settlements against the government resulting from highway crashes, and direct or actual savings attributable to accident reduction. Agencies should introduce the concept of the safety audit into their safety management systems."

This Symposium was an agent for positive change. All concerned with highway safety have come to realize that in addition to funding and personnel, the prestige of the agency is critical to the achievement of safer highways.

## REFERENCES

1. *ROADSIDE HAZARDS*, Fatality Facts 1991  
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2. *Guidelines for: The Safety Audit of Highways*.  
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