

Road Safety Information

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*Supplying a
Vital Need*

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Improve the use of safety data in highway design, Pfefer and Neuman have advocated in a recent *TR News* article (1). My argument follows theirs, but it is broader and more focused.

My argument is broader because it deals with all the decisions that have an impact on safety—not just highway design decisions. My argument is more focused because it emphasizes the need for accessible, authoritative, fact-based information about the safety consequences of various decisions. This kind of information is a prerequisite for a significant decrease in highway casualties. However, compiling and maintaining this information requires long-term commitment and extensive resources.

Informed Decision Making

Decision making requires decisiveness. Informed decision making requires information. Making decisions is simple, but making informed decisions—for example, on matters affecting safety—is difficult. Useful knowledge on any matter of safety may be available, but it is not easy to find, it is time consuming to assemble, it is tedious to sift through, and it is notoriously difficult to interpret.

Suppose, for example, that you need to make an informed decision about the safety effect of more frequent vision tests for older drivers or of making the sideslope on a specific road segment less steep. There is knowledge on these topics. Someone surely has compared vision test requirements in different jurisdictions, and someone surely has examined the correlation between vision and crashes; others surely have asked the same question and reviewed the literature. Similarly, much must be known about how the steepness of sideslopes affects the severity of crashes.

Other designers and writers of guidelines surely have needed this information. But where is it? Have experts reviewed and synthesized the information?

Is there clear and straightforward guidance for its implementation?

Decision makers can be impatient. Who wants to wait months for an expert to produce a literature review? Who has the money to pay for it? Why should each jurisdiction pay for it all over again? After so many years of research and practice, why is the information not readily available?

Fact-Based Understanding

These are reasonable but unanswered questions, real but unresolved difficulties. Many important decisions—including vision tests for older drivers, sideslopes for roads, and myriad other issues affecting safety—are being made routinely without a fact-based understanding of the safety consequences.

In the aggregate, these decisions determine our future highway safety: how many will die, how many will be maimed, how much damage will be done. If decisions about safety have no fact-based understanding of the consequences, safety will be haphazard.

There are other reasons for making decisions without a fact-based anticipation of the safety consequences; some of these reasons reflect poorly on our institutions and on us. However, exploring that topic would divert attention from the purpose at hand.

Some maintain that even if authoritative information were easily available, it would not be used. On the contrary, if the relevant safety information were available, neglecting it in decision making would be less prevalent.

But spring is in the air for safety. There is a gradual shift toward treating road safety as a major public health concern, which would establish a knowledge-based style of road safety management. The Interactive Highway Safety Design Model under development by the Federal Highway Administration, the incorporation of explicit safety relationships in the new *Geometric Design Guide* for

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Canada, wide support for the emerging *Highway Safety Manual*, the AASHTO Strategic Highway Safety Plan, and similar initiatives are welcome signs of the times. Better information will nurture this renaissance.

What Is Information?

Webster's Dictionary defines information as "the communication or reception of knowledge." Knowledge communicated and received turns into information. Much valuable knowledge about safety has accumulated during many decades of experience, practice, and research; but this knowledge lies fallow. The accumulated knowledge is not readily communicated or received; therefore, it does not become information. It is not sufficient for knowledge to exist; to be used, knowledge must be available—this is the central point.

How does knowledge become available and how is it transformed into information that makes informed decisions possible? Consider the fields of medicine, law, and economics. Each of these fields, like the field of road safety, encompasses research and experience-based knowledge. But unlike the field of road safety, the fields of law, medicine, and economics have teachers who use the body of extant knowledge to write course notes and textbooks. Universities use these resources to train professionals. Trained professionals are the carriers and providers of the best available information.

Road safety has no trained professionals. There are engineers, statisticians, economists, ergonomists, and others who, after training in their profession, develop an interest and expertise in road safety. But no North American undergraduate or graduate program trains road safety professionals. The process by which accumulated knowledge becomes information to be imparted to trained professionals—the process that has worked well for medicine, law, and economics—is not available to road safety.

Taking Stock

What can be done? Establish programs to train road safety professionals. This creates a need for teaching, for writing course notes and textbooks, and for sifting through the extant knowledge to convert it into available information. But trained safety professionals need jobs and progressive career paths in road safety. These careers are not available. Therefore a different tack is necessary for the here-and-now.

Take stock of what is now available. These are marvelous tools for finding who published what on a certain subject, and the tools even provide an abstract of the research:

- ◆ The Transportation Research Information Services (TRIS);
- ◆ The International Road Research Documentation; and
- ◆ Similar bibliographic data bases.

In the future, the National Transportation Library, which now provides access to 5,300 full-text documents, mainly on transportation planning, also might become a useful repository of publications. If the library expands into road safety, some of the difficulty in tracking down material for study might be eased.

These useful tools make the absence of a coordinated discipline of road safety even more obvious.

Website Access

Now that we clearly see the wealth of knowledge on many safety issues, how do we make sense of the accumulated experience and knowledge, how do we transform it into available information so that it can guide informed decisions?

Availability today means a website with free access. Those who want to retrieve information, to contribute comments or information, to seek advice, or to engage in discussion, would be able to do so via the Internet.

The main component of the website would be fully downloadable documents that provide potential users with information—that is, interpreted knowledge—on an ever-growing list of safety subjects. For example, the user would be able to download files on driver vision and crashes, on vision testing, on older driver vision testing, and so on. The user would find files on sideslopes and crashes, ditch profiles and crashes, evolution of sideslope standards, and related topics.

For clarity, the downloadable documents would not be a compilation of voluminous research reports or a listing of abstracts. Sometimes users only need the bottom line (e.g., the number of crashes that can be prevented if the sideslope is 5:1 instead of 3:1). Others may want to read a summary page about how the bottom line estimate was produced or a table presenting results of the studies reviewed. Some users may require detail—for example, the empirical evidence from which the estimate was extracted and why some results were given more weight than others.

In other words, there should be an onion-like structure of files allowing the user to follow the process of how factual knowledge was transformed into usable information. The preparation of such documents on a large number of subjects is not easy and would be costly.

Dealing with Diverse Results

The difficulty is that road safety research often has produced inconsistent, even conflicting, results and conclusions. However, inconsistent results and controversy about what is true occur even in disciplines in which experiments are possible (e.g., physics or psychology) and also in disciplines with traditions of methodological rigor.

In road safety, several difficulties compound the diversity of results. First, the researcher seldom has the luxury of experiments; for example, it is not possible to conduct randomized trials with road curve radii or with seatbelt legislation. Second, much of what is published in road safety ranks low on the scale of methodological rigor.

Moreover, there is considerable publication bias—the inclination to investigate and to publish results that do not challenge the interests of stakeholders in a particular intervention or program. Therefore the central task of converting diverse knowledge into available information is more difficult in road safety than in fields that exercise better quality control over what is published.

How then should we go about the task of intelligently transforming available knowledge into information? It is obvious that a team of experts immersed in the study of road safety and knowledgeable in research methods should tackle each subject. But experts must rely on judgment. Therefore, the process should be transparent, well documented, collective, and open to input, comment, debate, and criticism. The Internet is ideally suited for this process of ever-evolving information.

A substantial initial effort should organize and synthesize the information. Then a sustained, ongoing activity should follow, in which comment, debate, criticism, and new results lead to cycles of review and updates.

Rich Experience

Only a fraction of useful safety knowledge now finds its way into TRIS and similar databases. At least one-third of my shelves holds useful material published by various offices: reports describing experience with a certain type of concrete barrier, or a snow clearing standard, or results of a drink-drive survey. Some is material that has never been submitted to a journal, presented at a conference, or identified with an international standard book number. It is material that cannot be found in any official database.

The authors of these reports, and the organizations for which they work, are not in the business of publishing papers. TRIS has no trace of these authors' rich experience. A clear distinction will

have to be made, however, between safety knowledge contributed with little quality control and documents prepared by teams of experts to give potential users information—that is, interpreted knowledge.

A useful website creates a community of users and contributors. If the site is useful, people will download documents, ask questions, chat, seek advice, and find contacts. If the website becomes the place to go for answers, questions, and discussion, participants will contribute what is now unreachable—the rich experience and wisdom of practitioners who do not publish papers.

Sizable Investment

Assembling comprehensive safety information and establishing a useful website will be costly. Even more costly will be the website's maintenance—the continual preparation and upgrading of documents to give potential users safety information on an ever-growing list of subjects.

There will be many users and beneficiaries, including local, state, and federal highway agencies and regulatory bodies, the insurance industry, consultants, motor vehicle manufacturers, municipalities, and most important, road users. But an unprecedented commitment and a sizable investment will be required.

Is the investment worthwhile? Some may question the value of a costly effort involving researchers and experts that is not integral to today's mode of decision making and design. However, the cost of not having information about the safety consequences of decisions is twofold. First, there is the cost of doing what is not effective—wasting resources on programs believed to be more effective than they are. Second, there is the cost of not doing what is effective—lives are cut short and pain goes unprevented when opportunities to improve safety at little cost are not recognized.

Comprehensive, authoritative, and easily accessible information is the foundation of modern road safety management. The only way to manage safety and save lives effectively is through the fact-based anticipation of consequences.

The technology is ripe and the atmosphere is favorable to start building the Safety Online Resource and Communication Exchange (SORCE). I call on TRB to provide the leadership to make SORCE happen.

Reference

1. Pfefer, R., and T. Neuman. Improved Safety Information To Support Highway Design. *TR News*, No. 204, September–October 1999, 23–27.

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