

agencies, from the research staff, and appropriate disciplines wherever we can find this advice.

The institute research team usually works as an interdisciplinary group. This interdisciplinary research has during the years provided successful solutions to many transportation problems.

Our philosophy with regard to safety is that safety is a byproduct of efficiency; that anything we can do to increase the efficiency of any element of the road-driver-vehicle system will result in safer highway transportation.

Now, this philosophy is based in part upon the philosophy of Chief McDonald, and if I might paraphrase his quotation back in 1948, he felt that we had reached the point in our knowledge of the way people use the highways to be able to coordinate highway design and traffic operation. He said that the degree to which this philosophy is accepted and applied would determine the safety and efficiency of our future highways.

For many years in freeway design and operation and parallel studies in freeway accidents we have substantiated this philosophy that design and operational improvements that create more efficient traffic operation result in a reduction of freeway traffic operation, or traffic accidents.

Now, for several years, as Dean Benson mentioned, we have been conducting or had conducted traffic accident studies in the conventional manner. These post mortem studies were disappointing and discouraging.

Our present philosophy, present approach, is to use accident frequency as a symptom of inefficiency and then to apply the diagnostic approach to improve the efficiency and thus improve the safety.

As Dean Benson mentioned, we learned quite early that roadside hazards were a problem. And as more and more miles of freeways were completed, and more signs installed, it was recognized that the large signs that required these massive supports would constitute a hazard to vehicles leaving the roadway. The personnel of the Texas Highway Department and the Texas Transportation Institute became concerned with this problem and began developing a research study aimed at minimizing these hazards. But accident experience was more serious than anticipated and we found a need for more immediate solutions and that this was a matter of urgency.

So we changed our normal research approach and developed the approach of finding through experimentation an acceptable answer, then applying these solutions experimentally along the roadways, and finally going back and doing a more extensive study to find the best answer to the problem.

I might just add, before turning it over here to Dr. Hirsch, the importance of bringing together the research staff and the operating engineers. This has the advantage of stimulating a broad view of the problem which exposes the impractical divisions of responsibility and brings back about a closer understanding, a mutual understanding and respect for each other. And this I think more than any other thing has caused the implementation of this research as rapidly as it has.

I would like to turn this over to Dr. Hirsch now to describe to you our work in the breakaway sign research project.