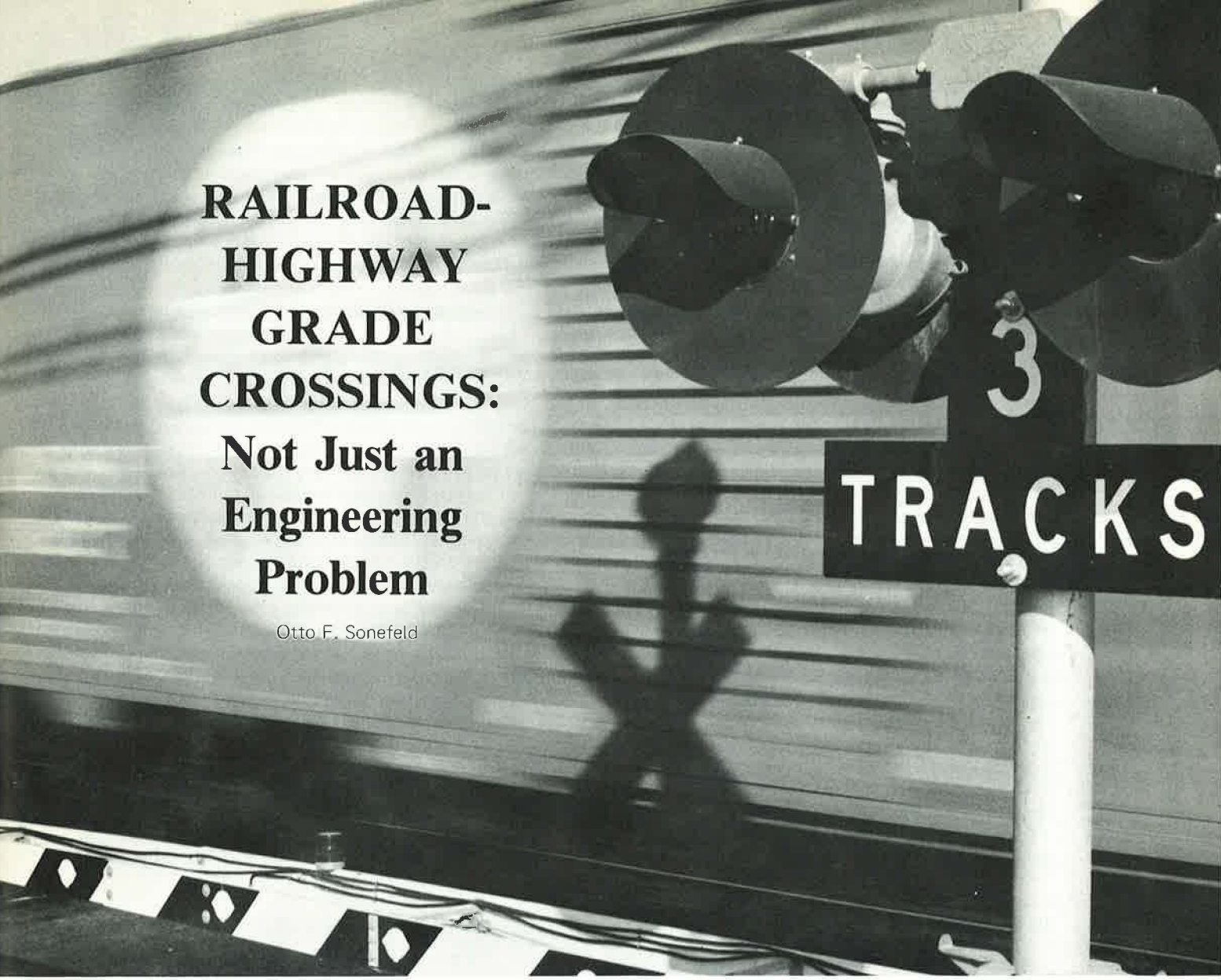

RAILROAD-HIGHWAY GRADE CROSSINGS: Not Just an Engineering Problem

Otto F. Sonefeld

It seems in vogue these days to be "born again." While it may or may not have anything to do with religion, I have had something of a change of heart in the past few years with respect to the role of driver education in railroad-highway grade crossing safety programs.

There are approximately 225 000 public railroad-highway grade crossings in the United States. There are an additional 140 000 private crossings that, although they are not within the purview of any public agency, are nonetheless the scene of many serious accidents each year.

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By using general averages, these 365 000 locations, primarily the public crossings, annually are producing about 13 000 accidents, 1000 deaths, and 5000 injuries. It is estimated there are another 20 000 to 25 000 accidents that are crossing related, that is, that are at or near the crossing although they do not involve a train. Except for airplane crashes, there is no other type of accident in the transportation world as severe as a collision at the rail-highway crossing.

I have been involved for almost two decades in what might generally be called the engineering aspect of grade-crossing programs. I have certainly given approval to driver education efforts in this field and have in fact been involved in these efforts myself from time to time, but I have always had misgivings about whether the product was being properly marketed or that it was, in fact, giving the right message to the right audience.

Also, as in highway safety programs in general, it is extremely difficult to determine whether these efforts

were successful, whereas it is not difficult to measure the positive effect of installing a set of flashing signals or gates at a crossing. So the feeling has been, and to a great extent still is, that the important thing is to get the signals installed and then worry about the education.

I am not suggesting that this is the wrong approach. As a matter of fact, it has accomplished a great deal. More than 50 000 crossings, or roughly one-fourth of the total, now have some form of automatic warning devices. In addition, the program of installing and upgrading these devices continues at an ever-growing pace. In 1979, a landmark total of 3000 were installed. The results have been impressive: 15 000 accidents/year in the late 1960s reduced to 12 000 accidents last year, and a reduction in fatalities from roughly 1500/year to 900/year.

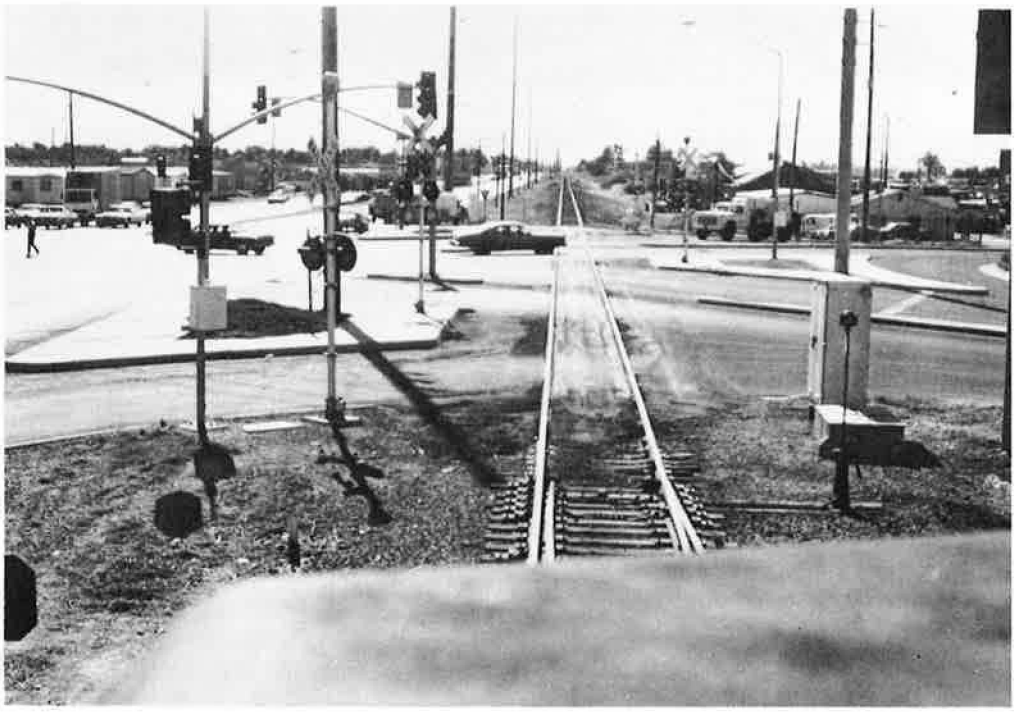
But what has happened in conjunction with this is both interesting and a bit disturbing. Whereas historically about 25 percent of the accidents occurred at crossings that had automatic warning devices, we are currently looking at a figure of close to 50 percent. Part of the explanation, of course, is exposure; that is, the crossings that have the most traffic are usually the ones equipped with automatic devices, and they are going to experience accidents simply because of the greater probability that trains and vehicles will meet. It is also true that as the number of protected crossings increases, the percentage of accidents at such locations can also be expected to increase (i.e., if all crossings have automatic warning devices, then 100 percent of the accidents would occur at such crossings). Even so, a close look at the numbers seems to suggest that the percentage of accidents at protected crossings is growing at a faster rate than the number of warning-device installations.

Does this suggest that we are at a point of diminishing returns? No, not at all. The dramatic growth in the number of highway vehicles continues to increase the potential for accidents, and there is also reason to believe that railroad traffic will grow significantly in the 1980s. Several other factors combine to show clearly that the hardware programs must continue for many years to come. But, while the engineering programs should be diligently pursued, we should also begin to question whether automatic devices alone are producing the results we are willing to live with.

Coincident with the accident decline in the past year or two has been a rapidly increasing emphasis of driver education efforts on rail-highway crossings. Operation Lifesaver, a nationally coordinated program with state emphasis, is in various stages of development and operation in some 26 states. The numbers suggest, although solid proof is difficult to document, that positive results are being obtained by the combination of an active engineering program supported by an intensive, thoughtful, and continuous education program to improve driver awareness of hazards at grade crossings. I am particularly impressed with the synergies that can and do result from such engineering-education marriages.

Regarding these programs, I would like to make a few personal observations that I feel support my thesis that rail-highway intersections present somewhat unusual problems and thus require even greater attention, from both an engineering and an education standpoint, than many other traffic-conflict locations.

1. Traffic at rail-highway crossings consists of one mode on a public thoroughfare versus another mode on a private thoroughfare, as opposed to the usual highway situation in which both modes are on public thoroughfares. If nothing else, this raises great opportunities for



name calling, finger pointing, and general procrastination in achieving corrective results.

2. Although accidents are comparatively few in number at any given crossing, they are almost always treated in a sensational manner. It is interesting that a highway accident that takes a human life is often forgotten very soon after it occurs, while a crossing accident stays in the memories of people for years to come. We should be careful that this phenomenon does not detract from objectivity in analyzing crossing problems.

3. Rail-highway crossings are more apt to be thought of by the traveling public for such factors as roughness and delay by trains, rather than for the inherent hazard at the location. I think there is also a question in the minds of most motorists as to the significance of railroads in today's society, leading them to believe that these intersections belong exclusively to the automobile and that the railroad is indeed an unnecessary nuisance at this point in history. I have studied several hundred crossing-accident reports and have personally investigated at least a few hundred crossings where accidents have occurred, and all too often I am forced to conclude that there is no reasonable explanation for the accident except for driver attitude or other preconditioning that either prevents the driver from recognizing the crossing as a hazard or forces him or her to act against good judgment even if the hazard is recognized. Obviously, not all drivers fall into this category, but I am suggesting that it is a significant factor in a surprising number of accidents.

4. Rail-highway crossings include one stream of traffic that essentially can take no avoidable action, as opposed to the normal highway situation in which both streams of traffic potentially can take avoidable action. Again, I think that many motorists tend to overlook this fact in their driving routines.

5. There is a good deal of confusion among enforcement officers as to the legal obligation of motorists at rail-highway grade crossings. This is not only because there are differences from state to state in the laws concerning grade crossings but also because of varying interpretation of these laws by the officers who are expected to enforce them.

6. The automatic warning devices at rail-highway crossings are not physically or operationally the same as those normally experienced by motorists at highway traffic intersections. We really do not know whether crossing signals are any better or any worse than conventional traffic signals, but the fact is that they look different, they operate differently, and they give a different message to a motorist.

7. Unlike many other highway-safety topics, very little if any attention has been given to rail-highway crossings in driver education or driver licensing courses. About two years ago, a national study of driver license manuals showed that some states almost completely avoided the subject and, even worse, some states actually gave misinformation about procedures at grade crossings. Furthermore, I have never seen a safety film made by a public agency on the subject of rail-highway crossings; they have always been produced by railroad companies. The problem with that is that, no matter how sincere the intentions, they always come off as a bit self-serving.

At the risk of oversimplifying a very complex problem, I would like to suggest three factors that I think are critical to the reduction of grade-crossing problems nationally:

1. There is a need for much greater communication, cooperation, and understanding between the many parties that have responsibility for resolving crossing problems. Those grade-crossing programs that can be labeled successful are universally characterized by constant interaction between all government levels and all railroad levels; the unsuccessful ones are plagued by stubbornness, shortsightedness, and general misunderstanding.

2. There is a need for more and better research on driver behavior. We are still woefully unaware of why rail-highway accidents really occur. One of the keys to understanding this problem involves a much more penetrating analysis of accident data, including both railroad and police reports, and the information available in the national grade-crossing inventory system. This could conceivably lead to significant modifications in both the engineering and educational systems we know—or it may in fact tell us that what we are doing is pretty good.

3. My final point is simply to restate the need for driver education programs that are objective, credible, basic, and, most of all, continuous. The railroad industry will continue to do its share in this regard, but the long-range payoff clearly requires the cooperation, assistance, and expertise of those organizations, private and public, that for many years have involved themselves in highway safety education. I am optimistic that this will happen.