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Report to the Congress; by Elmer B. Staats, Comptroller General.

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Highway safety legislation includes provisions for supplementing State spending for safety measures at rail-highway crossings. The Federal Highway Administration (FHWA) has designated several types of safety improvements that may be federally funded, including better warning devices or elimination of crossings. The Highway Safety Act of 1976 reduced the percentage of highway safety funds available for high-hazard locations and roadside obstacles and more than doubled the funding for improvements at railroad crossings although only 2% of highway deaths occur at grade crossings.
Findings/Conclusions: FHWA has not told States what level of safety they should provide at crossings. As a result, States have widely divergent policies for improving crossing safety. During 1975, about 38% of crossing accidents occurred at locations having active warning devices. Improvement in law enforcement and drivers' education may offer alternatives to warning devices. State and Federal officials favor nationwide safety standards but anticipate difficulties in agreeing on a goal and in funding. Highway legislation established specific funding levels for various programs, but such categorical funding does not give States the necessary flexibility to meet their most critical needs. States contended that high-hazard projects were the most cost beneficial, but some crossing projects were also considered sound investments. FHWA has proposed legislation that would combine six categorical safety programs into a unified fund. Recommendations: The Secretary of Transportation should require FHWA, the Federal Railroad Administration, and the National Highway Traffic Safety Administration to cooperate with the States and railroads in establishing a nationwide level of safety acceptable for rail-highway crossings and determining the best mixture of methods, including education and enforcement, to achieve that

level. The Congress should: authorize States who are selecting safety projects according to cost-effectiveness to treat the categories as a single safety fund; as an interim solution, reassess the current allocation of funds among the categorical safety programs; require the Department of Transportation to provide it with a cost estimate for reducing accident risk at grade crossings to a uniform level; and if categorical safety funding is retained, amend the Highway Safety Act of 1973 to distribute crossing safety funds among States in proportion to their needs. (HTW)

6101

BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Rail Crossing Safety--At What Price?

The Federal Highway Administration has not decided how much warning or protection motorists should have at railroad crossings. As a result, States have widely divergent policies for improving crossing safety.

Because Federal funds are earmarked for specific highway improvements, States have limited flexibility to select those projects that, in their judgment, provide the most safety in relation to cost. GAO recommends that

--the Highway Administration define the extent of safety needed at grade crossings and

--the Congress authorize States additional flexibility, provided Federal funds are used to the best advantage.

CED-78-83
APRIL 25, 1978

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-164497(3)

To the President of the Senate and the
Speaker of the House of Representatives

As discussed in this report, the Federal Highway Administration has not worked with other Federal agencies, State and local governments, or the rail industry to establish standards designed to provide motorists sufficient warning or protection at rail-highway grade crossings. In addition to recommending that the Highway Administration develop such standards, we are also making recommendations to the Congress for improving the use of highway safety funds.

We reviewed the rail-crossing safety program because it constitutes over half the Department of Transportation's highway safety funding, but crossing fatalities represent only 2 percent of the highway death toll. Additionally, State officials said improving locations having higher accident experience would result in more safety benefits.

We made this review under authority of the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director, Office of Management and Budget, and to the Secretary of Transportation.

Comptroller General
of the United States

D I G E S T

The Department of Transportation has not established sufficient guidance to warn or protect motorists where railroads cross highways. At the same time categorical Federal funding--specific funds for specific purposes--does not allow States the flexibility to select those highway safety projects that, in their judgment, are the most effective in terms of money spent. Improvements are needed.

States and the Federal Highway Administration favor consolidating highway safety funds. This would allow States to consider all projects in terms of a single safety fund. However, few States are able to rank all safety projects by comparing costs to safety benefits.

The Highway Safety Act of 1976 reduced the percentage of highway safety funds available for high-hazard locations and roadside obstacles and more than doubled the funding for improvements at railroad crossings. As a result, even though only 2 percent of highway deaths occur at grade crossings, more than half of the act's $769 million authorized for safety construction was designated for crossing safety.

UNIFORM SAFETY STANDARDS NEEDED

The Highway Administration has not told States what level of safety they should provide at public crossings. As a result, motorists are subjected to varying risks, and States cannot measure program progress or plan for its completion. (See pp. 6 to 13.)

States have used varying collision frequencies as a basis for determining what warning devices to install. For example, one State would not install flashing lights unless accidents were expected more often than once in 25 years,

whereas another State would act only if accidents were expected more frequently than once every 370 years. (See p. 8.)

During 1975 about 38 percent of crossing accidents were at locations having active warning devices. Strengthening law enforcement and educating drivers about crossing hazards may offer alternatives to warning devices for reducing crossing accidents. (See pp. 18 and 19.)

Most State and Federal officials favor nationwide standards for crossing safety, but there are some obstacles. They anticipated difficulties in (1) agreeing on a goal and (2) obtaining funds to meet it. Highway Administration officials believed States would have problems meeting a goal because the formula for distributing available crossing safety funds is not based on needs. GAO believes such problems can be resolved.

HOW CAN HIGHWAY SAFETY BE MAXIMIZED?

The Highway Safety Acts of 1973 and 1976 established specific funding levels for various highway safety programs, such as pavement marking, roadside obstacles, high-hazard locations, and rail-highway crossing safety. But categorical funding does not permit States to meet their most critical needs.

States contend that high-hazard projects are the most cost beneficial. Generally they deal with more dangerous locations and use safety funds more effectively. Even high-hazard projects that were not funded showed greater average potential for reducing casualties than the crossing projects that were funded. But some crossing projects were sound investments and would have been implemented under a project selection system based on cost-effectiveness.

The Highway Administration has proposed legislation that would combine six currently categorical safety programs into a unified safety fund. GAO believes a single safety fund would allow highway safety funds to be used more effectively. However, the

Highway Administration's proposal would not assure that States implement the most cost-effective projects, thereby achieving the maximum safety benefits from available funds.

RECOMMENDATIONS

The Secretary of Transportation should require the Federal Highway Administration, Federal Railroad Administration, and the National Highway Traffic Safety Administration to cooperate with the States and railroads in

--establishing a nationwide level of safety acceptable for rail-highway crossings and

--determining the best mixture of methods, including education and enforcement, to achieve that level.

The Congress should provide the States an incentive to develop and use procedures for selecting the most cost-effective safety projects. Therefore, GAO recommends that the Congress authorize those States wishing to maximize safety benefits--and found by the Highway Administration to be selecting all their safety projects according to cost-effectiveness--to treat the categories as a single safety fund. As an interim solution, GAO recommends that the Congress reassess the current allocation of funds among the categorical safety programs. This assessment should consider the relative cost-effectiveness of safety improvements and the magnitude of the safety problem that would be addressed by each category.

GAO recommends that the Congress require the Department of Transportation to provide it a cost estimate for reducing accident risk at grade crossings to a uniform level. GAO further recommends that if categorical safety funding is retained, section 203(d) of the Highway Safety Act of 1973 be amended to distribute crossing safety funds among the States in proportion to their needs for meeting the level of safety to be established by the Highway Administration.

AGENCY COMMENTS

Highway Administration officials said they would attempt to establish uniform guidance for determining what safety improvements should be made at individual crossings. They did not agree that the Congress should continue authorizing separate funds for specific types of safety improvements. They also opposed requiring States to select safety projects solely on the basis of comparative cost-effectiveness. Their ultimate objective was that States select all safety improvements on the basis of accident potential. This policy would not restrict improvements to only known accident locations. It would also allow improvements at locations that are currently accident-free but that have potential for accidents.

GAO still believes that States need to develop and use systems capable of selecting the most cost-effective projects. In addition, although accident potential should be recognized in making safety improvements, GAO believes that States will, and should, place primary emphasis on improving known high-accident locations. This approach would yield the most safety benefits and minimize the potential for legal liability.

Contents

ABBREVIATIONS

FHWA	Federal Highway Administration
GAO	General Accounting Office

CHAPTER 1

FEDERAL SUPPORT FOR CROSSING SAFETY

A single collision between a train and a motor vehicle can cause many deaths and injuries. Such accidents thus receive a lot of attention. However, they constituted only a small fraction of motor vehicle accidents and casualties. In 1976 only 7 of every 10,000 motor vehicle accidents involved trains, and only 3 of every 1,000 highway injuries or fatalities occurred at rail crossings. Of the total highway fatalities, about 2 percent occurred at grade crossings. Furthermore, while traffic deaths declined 9 percent from 1966 to 1976, deaths in collisions between trains and motor vehicles dropped 46 percent from 1,657 to about 900. One reason is the Federal and State effort to improve crossing safety.

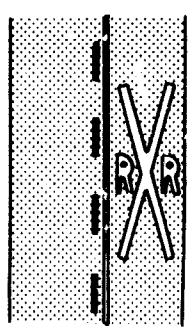
SAFETY MEASURES ELIGIBLE FOR FEDERAL FUNDS

The Federal Highway Administration (FHWA), Department of Transportation, has designated several types of safety improvements that may be federally funded. These projects would, among other things, either install better warning devices at a crossing or eliminate the crossing. What safety measure is most appropriate for a given crossing depends mainly on the amount of traffic.

Safety can be enhanced by passive or active warning devices. Passive warning devices, such as advance warning signs, crossbucks, and pavement marking (see illustrations below), inform a driver that he is coming to a crossing but do not tell him if a train is approaching.

ADVANCE WARNING SIGN

CROSSBUCK



PAVEMENT MARKING

Source: Manual on Uniform Traffic Control Devices.

Active warnings include flashing lights or flashing lights combined with gates, which are activated by an approaching train. In general, FHWA considers active warning devices the most cost-beneficial improvements. Other eligible improvements include improving crossing surfaces, installing lighting, and improving visibility.

The most effective way to prevent collisions at a given point is to close the crossing, assuming an alternate route is available. If a crossing cannot reasonably be closed, the ultimate protection is a grade separation, which allows traffic to pass over or under the tracks, thereby virtually eliminating the possibility of collision. Grade separations, according to FHWA, are seldom cost beneficial as safety measures because they are so expensive. Their primary purpose is to ease traffic in busy areas.

FHWA provided us the following average costs for safety measures, except crossing closures, completed in urban areas during fiscal years 1974-76. Closure costs were obtained from Illinois. Maintenance costs were based on Federal and railroad data.

	Installation cost	Annual maintenance cost
Passive warnings	$ 500	Nominal
Active warnings:		
Flashing lights	32,000	$1,175
Flashing lights and gates	52,000	2,175
Crossing elimination:		
Closure	2,000	Nominal
Grade separation	1,500,000	Not available

THE CROSSING SAFETY PROGRAM

Program administration

The program is managed and funded cooperatively by FHWA, individual States, local jurisdictions, and railroads. FHWA is responsible for developing program guidance, approving States' methods for selecting projects, and approving proposed projects.

In general, the work is done by the organizations that own the property on which the safety improvements are to be made. Therefore, government employees or contractors

install advance warning signs and pavement markings on the highway right-of-way, while railroad employees install crossbucks and any train-activated devices on railroad property.

Program evolution

Since 1916 Federal-aid highway construction funds have been available to supplement State spending to reduce hazards at rail-highway crossings. In 1970 the Congress recognized a need for a coordinated State and Federal approach. The Railroad Safety Act of 1970 (Public Law 91-458) and the Highway Safety Act of 1970 (Public Law 91-605) required the Secretary of Transportation to study the need to increase crossing safety. The Secretary was then to plan and take actions to reduce accidents.

In 1972 the Department of Transportation recommended that the Congress establish a 10-year, $750 million program to install train-activated warning devices at 30,000 crossings. The Department also recommended

--focusing any new Federal initiative on installing warning devices as opposed to grade separation,

--improving passive devices at less busy crossings, and

--establishing supplementary programs to educate motorists about crossing hazards.

These improvements were expected to prevent about 4,000 accidents and 500 deaths annually.

The Highway Safety Act of 1973 (Public Law 93-87) initiated several categorical grants for highway safety construction. One of these provided States 90-percent funding for crossing safety measures on Federal-aid highways except the Interstate Highway System. At least half the funds had to be used for installing protective devices. Two other programs created by this act funded safety measures to correct problems at high-hazard locations and remove roadside obstacles.

The Highway Safety Act of 1976 (Public Law 94-280) continued the crossing program through fiscal year 1978 and added funding for crossing safety improvements on non-Federal-aid highways. It also combined funding for the high-hazard and roadside obstacle programs. These acts authorized the following funding:

Target	1973 act FYs 1974-76 Amount (millions)	Percent	1976 act Transition quarter through FY 1978 Amount (millions)	Percent	Total Amount (millions)	Percent
Rail-highway crossings	$175	17.9	$419	54.5	$ 594	34.1
Roadside obstacles and high-hazard locations	375	38.5	250	32.5	625	35.8
Other hazards	425	43.6	100	13.0	525	30.1
Total safety programs (note a)	$975	100.0	$769	100.0	$1,744	100.0

a/ The Special Bridge Replacement Program, while labeled as a safety program, is not included in this table because projects are not justified on the basis of accident history. Therefore, we did not consider it a safety program for purposes of this report.

While the 1976 act reduced the funding of the high-hazard and other programs, crossing safety funding more than doubled to constitute over half the act's authorizations. Appendix I shows how States have used crossing safety funds.

During 1978 the Congress will once again develop new highway legislation. There has been much discussion on the problem of making rail-highway crossings safer. Opinions on this subject have been expressed by the railroad industry, State highway agencies, and Federal highway officials.

Several organizations are advocating continuation of the safety programs as currently legislated. Others are advocating consolidation of the categorical safety programs. This report should help the Congress determine the future of crossing and other safety programs.

SCOPE OF REVIEW

We reviewed FHWA's rail-crossing safety program to determine if it had established program goals and identified costs and methods of meeting an appropriate level of crossing

safety. We compared the benefits of crossing safety improvements with those of several high-hazard location projects.

We visited FHWA's Washington, D.C., headquarters; the State offices managing the program in Alabama, Florida, Idaho, Illinois, Iowa, and Washington; and the Highway Administration regional and division offices overseeing the program in these States. We reviewed pertinent Federal and State legislation, FHWA policies and procedures, and Federal and State records on the rail-crossing and other safety programs. We also interviewed officials at the Highway Administration, the National Highway Traffic Safety Administration, the Federal Railroad Administration, State highway agencies, and other public and private organizations.

CHAPTER 2

HOW SAFE IS SAFE ENOUGH?

FHWA has not told States what level of safety they should provide at the Nation's 219,000 public railroad crossings, so some have set their own standards. Thus, motorists in different States encounter widely varying risks at these crossings. Further, without national standards, FHWA and the States cannot adequately measure the program's progress or plan for its completion.

State and Federal officials agreed a standard is needed, but they anticipated difficulty in agreeing on one and in obtaining the funds to meet it. States also feared they could be held liable for accidents at substandard crossings. Another obstacle to meeting a national goal is that crossing safety funds are not distributed according to States' relative needs.

In addition, a question to consider when developing guidelines for warning devices is: What can be done in the face of some motorists' inclination to ignore them? Some States have initiated educational programs to alter driving habits as another method of making crossings safer.

THE LACK OF FEDERAL GUIDANCE

In funding highway construction in 1936, the Congress prohibited States from spending Federal funds for highway construction unless rail crossings on those highways had "* * * proper safety protective devices complying with safety standards determined by the Bureau of Public Roads * * * as being adequate * * *." Further, in the report accompanying the Highway Safety Act of 1973, 1/ the House Committee on Public Works recognized that more than 70,000 crossings--about a third of the 220,000 public crossings--have much less chance of being accident sites than the remaining 150,000. The Committee said few lightly traveled crossings have sufficient accident potential to justify train-actuated protection or larger expenditures for crossing separation or relocation. The Committee hoped "* * * that every railroad crossing in America would be provided with modern, up-to-date, protection adequate to the risks at each such crossing."

1/House Report No. 93-118, Apr. 10, 1973, p. 35.

(GAO emphasis added.) To meet these concerns, accident potential, as required by FHWA, must be a factor in determining what safety improvements to make.

Although States have been receiving Federal funds designated for crossing safety since late 1973, FHWA has yet to set a minimum safety level.

How safety levels can be measured

The level of safety at a crossing can be expressed as the frequency with which collisions can be expected; for example, once every 20 years, every 200 years, etc. On the basis of historical data, methods have been developed for determining this frequency by considering traffic accidents, traffic levels, and the types of safety devices present. Since eliminating collisions is financially infeasible, the question is how often society can accept them.

FHWA regulations

FHWA has not answered this question. Its guidance to States for setting priorities for crossing safety projects consists of three steps: ranking crossings by degree of hazard, considering accident history, and inspecting sites. It has also recommended that States include in their priority-setting procedures consideration for potential danger of catastrophes involving buses, passenger trains, or volatile substances being transported. FHWA has also enumerated six conditions (for example, multiple tracks with potential simultaneous trains) which may merit train-activated gates.

WIDE VARIATION IN STATE STANDARDS

Left on their own to choose an acceptable level of risk, States have set very different goals.

National surveys

A recent University of Illinois survey found States were using different criteria to determine what warning devices to install. 1/

1/John L. Sanford, "Criteria Used by State Highway Agencies To Determine Warrants and Priorities for Warning Devices at Rail-Highway Crossings," University of Illinois Highway Traffic Center, Apr. 1977, 115 pp.

Sixteen States used exposure factors (found by multiplying the average daily train traffic times the average daily motor vehicle traffic) to determine the minimum acceptable safety at grade crossings. One of these would install flashing lights if the exposure factor equaled 500 or more. At the other extreme was a State that established its minimum level for flashing light installation at 10,000. To give perspective to these variances, we translated these exposure factors into expected accident possibilities. The State with the 500-exposure cutoff would install flashing lights only if the probability of an accident was greater than one every 370 years, whereas the State with the 10,000-exposure cutoff would act if accidents were expected more often than once every 25 years.

The following tables show the minimum exposure factors and our calculations of the equivalent accident probability adopted for rural areas by the States which used motor vehicle and train traffic as their main criteria for installing active warnings.

Flashing Lights

Minimum exposure factor	Equivalent accident probability: Years between accidents	Number of States
500	370	1
1,500	159	4
2,500	96	1
3,000	80	6
4,000	63	1
5,000	50	2
10,000	25	1
		16

Flashing Lights and Gates

Minimum exposure factor	Equivalent accident probability: Years between accidents	Number of States
1,000	238	1
1,500	159	1
2,500	96	1
3,000	80	2
4,000	63	1
5,000	50	2
10,000	25	3
15,000	17	3
17,000	15	1
		15

Of the 23 other States that explained how they had selected the needed warning devices, 4 used other quantifiable criteria, 5 mentioned factors they consider, 2 would install train-activated flashing lights at all crossings, 1 said gates are required at high speed multiple track crossings, 10 relied on the judgment of engineers, and 1 had criteria only for crossing surface improvements.

Six-State review

Our review of six State highway agencies confirmed the disparity of safety standards. Two States had not set performance goals for crossing safety. Among the four that had, the minimum level of safety based on our computations ranged from one accident expected every 15 years to one every 160 years. Where States' criteria was not expressed in terms of one accident every "X" years, we converted it to that format.

Alabama and Idaho had not determined acceptable accident expectancies for their crossings. Alabama's general policy was to make improvements only when crossings had two or more accidents within a 3-year period. In contrast, Idaho ranked crossings by expected accident rates and continued to propose projects until funds were exhausted. It had no answer to the question of how much safety is enough.

Washington State officials established a minimum level of safety of one accident every 15 years at rail crossings on State highways. (The State had no goal for rail crossings on highways under local jurisdiction.) This goal was based

on the funds State officials estimated would be available for rail-highway crossing improvements during the State's 14-year planning period. Officials did not consider higher safety levels cost beneficial.

In 1974 Florida set a goal of reducing annual crossing deaths by 50 percent (from 90 to 45) within 6 years. The State Department of Transportation determined it was not cost beneficial to install or upgrade active warning devices unless an accident could be expected more often than every 20 years. Florida applied this criterion to every crossing in the State.

Iowa's informal policy amounted to installing flashing lights if accident expectancy was worse than one every 160 years and automatic gates if worse than one every 80 years. In September 1977 Iowa transportation officials proposed formal criteria for identifying hazardous crossings and determining the appropriate level of safety improvement. These new criteria considered a crossing's physical characteristics, as well as its motor vehicle and train traffic. The State Transportation Commission rejected the new standards because some members thought:

--The standards were too expensive to meet.

--The State could be held liable for an accident at a crossing that met criteria for warning device installation but did not have the device in place.

Illinois had different levels of safety for three types of rail crossings: those on State-administered highways, those on locally administered highways, and those on high volume railroad lines, especially major passenger routes.

In the past Illinois had required active warning devices at all crossings where the exposure factor exceeded the equivalent of one accident every 80 years. State officials were concerned that constructing grade separations to satisfy that safety level on State-administered highways would be too expensive. Therefore, they decided to require upgrading warning devices only if accident expectancy exceeded one every 20 years. But State officials responsible for safety improvements on locally controlled highways rejected this new criterion. They continued using the 80-year accident rate because they believed that strict application of the new rate would mean installing very few active warning devices on locally controlled roads. Currently the 20-year accident rate is used only on State-administered highways.

Illinois also has a program for upgrading the warning devices in high volume rail corridors. Train-activated devices are to be installed on these lines if an accident is expected more frequently than every 50 years. This criterion is intended to allow greater protection for crossings where multiple-casualty collisions are likely.

The Illinois Division of FHWA could not accept three different levels of safety on different highway systems. It did not believe that lowering the standard for State-administered highways to one collision every 20 years was justifiable and said it would not approve projects based on an expected accident factor of one every 20 years. The State had not responded to FHWA as of January 1978.

To illustrate the diversity in hazard tolerances, we asked the six States what safety improvements they would make at 12 hypothetical crossings. (App. II is a copy of the questionnaire.) Their answers illustrate the result of FHWA's failure to set a nationwide performance goal for the program. At some of these crossings, States' responses ranged from no action to grade separation (at a cost of over $1 million). Responses are shown in the following table.

Average daily traffic		Type of location	Alabama (note a)	Florida	Illinois			Iowa	Idaho	Washington
Trains	Motor vehicles				State highways	Local highways	Well-traveled train corridors			
2	50	Urban	Do nothing	Close crossing	Do nothing	Close crossing	Close crossing	Do nothing	Close crossing	Do nothing
2	50	Rural	Do nothing	Do nothing	Do nothing	Do nothing	Close crossing	Do nothing	Do nothing	Do nothing
2	1,500	Rural	Do nothing	Flashing lights	Do nothing	Flashing lights	Flashing lights	Flashing lights	Flashing lights and gates	Do nothing
4	750	Urban	Do nothing	Flashing lights	Do nothing	Flashing lights	Flashing lights	Flashing lights	Flashing lights	Do nothing
4	500	Rural	Do nothing	Flashing lights and gates	Do nothing	Flashing lights	Do nothing	Flashing lights and gates	Flashing lights	Do nothing
8	200	Rural	Do nothing	Flashing lights and gates	Do nothing	Do nothing	Do nothing	Do nothing	Flashing lights and gates	Do nothing
8	1,500	Urban	Do nothing	Flashing lights	Flashing lights	Flashing lights and gates	Flashing lights	Flashing lights and gates	Flashing lights and gates	Flashing lights
18	50	Urban	Do nothing	Close crossing	Do nothing	Close crossing	Close crossing	Close crossing	Close crossing	Do nothing
18	100	Rural	Do nothing	Flashing lights and gates	Do nothing	Do nothing	Do nothing	Close crossing	Do nothing	Do nothing
18	2,500	Urban	Do nothing	Flashing lights	Flashing lights	Flashing lights and gates	Flashing lights	Grade separation	Flashing lights and gates	Flashing lights and gates
18	2,000	Rural	Do nothing	Flashing lights and gates	Flashing lights	Flashing lights and gates	Flashing lights	Grade separation	Flashing lights and gates	Flashing lights and gates
18	14,000	Urban	Do nothing	Flashing lights and gates	Flashing lights and gates	Flashing lights and gates	Flashing lights	Grade separation	Grade separation	Grade separation

a/Alabama's general policy was to make improvements only when crossings had two or more accidents within a 3-year period. See app. I, p.35, for information on how Alabama used its crossing safety funds.

Note: All crossings are assumed to be protected by crossbucks.

IS A NATIONWIDE GOAL DESIRABLE AND FEASIBLE?

State officials generally favored a national goal for crossing safety. They believed the program needed direction and expressed willingness to work toward meeting a national standard. Some, however, anticipated difficulties in establishing and achieving it.

In a paper presented to the 1977 National Conference on Railroad-Highway Crossing Safety, an Illinois official stated: "The lack of such a goal raises major questions regarding where we are going with this program and how far." A Florida transportation official suggested a level of one accident every 20 years.

However, some State officials expressed reservations:

--They had no assurance that funds would be available to achieve such a goal.

--The States and the Federal Government would have trouble agreeing on a goal.

--A standard could mandate improvements they would not consider cost effective.

--They believed the power to set such a goal should remain with the State.

--They feared being held liable if an accident occurred at a crossing before they could improve it to the minimum level.

These problems may not be insurmountable. FHWA has cooperated with the States before in setting criteria that must be met for Federal funding of bridge replacement and traffic signal installation. As for the question of liability, in its second annual report on highway safety improvement programs, FHWA said it believed (referring to the high-hazard program):

> "* * * a State is in a better position to defend itself against legal actions if it has an ongoing highway safety improvement program based on the required systematic procedures contained in the Federal-Aid Highway Program Manual."

In other words, if a State is acting systematically to meet Federal standards, it can better defend itself against lawsuits arising from locations where standards have not yet been met.

FHWA officials also favor a national goal. For example, an FHWA field official commenting on one State's criteria said:

> "There is a great deal of national concern on the need for a uniform hazard factor which would be applicable to all States when considering railroad crossing improvements."

One FHWA official noted it will otherwise be very difficult to determine when States have completed their crossing safety programs. Other FHWA officials acknowledged that States' varying criteria result in varying protection for drivers and passengers.

However, FHWA officials share States' concerns. Further, they believe States would experience difficulties in meeting a goal because the program's apportionment formula does not assign funds according to need.

Apportionment formula not based on safety needs

By law, rail-crossing safety funds are divided on the basis of each State's population, area, and mail route mileage, rather than on some measure of need for improvements. FHWA officials believed the States should not be held accountable for meeting goals unless they received funds in proportion to their needs.

They have therefore recommended changes to this formula. In its annual report to the Congress on highway safety improvement programs for fiscal year 1975, the Department of Transportation recommended that future apportionments for the Rail-Highway Crossing Program be made by giving 50-percent weight to the number of public rail-highway grade crossings on the Federal-aid system in each State and 50-percent weight in accordance with the current method. The report commented that a few States' apportionments exceeded their needs, while others with a high number of railroad crossings had insufficient funds to carry out needed improvements.

Since the formula does not consider the number of crossings in a State, the ratio of dollars to crossings (one measure of need) naturally varies. (See app. III.) Connecticut, with 110 crossings on the Federal-aid highway system, received $4.6 million, or $41,700 per crossing, from

1974 to 1978. In contrast, Iowa received $7.1 million to improve its 2,555 crossings on the Federal-aid system, or $2,800 per crossing.

On the basis of information provided by the Department of Transportation, we computed crossing safety needs for Connecticut, Nevada, Iowa, and South Carolina assuming every crossing in these States were upgraded to two hypothetical levels of safety--an accident every 20 years and one every 200 years. The following table compares, for crossings on Federal-aid highways, the funds actually apportioned to four States for fiscal year 1977 with the funds they would have received on the basis of their relative needs to achieve these levels. The table shows how varying goals affect the amount of funds States would receive annually.

	Funds apportioned	Funds based on needs to reduce accidents to 1 every	
		20 years	200 years
Connecticut	$1,394,845	$228,377	$ 277,253
Iowa	2,102,775	531,068	1,729,114
Nevada	923,050	412,274	166,565
South Carolina	1,464,826	862,057	2,286,426

Nevada would receive less money under the 200-year goal because its percentage of the national need was less than for the 20-year goal.

We made the same analysis for crossings on non-Federal-aid highways and found similar differences. The following table compares funds apportioned for such crossings for fiscal year 1977 with funds that would have been apportioned if distribution had been based on need. Again, the resources needed would vary widely depending on the desired level of safety.

	Funds apportioned	Funds based on needs to reduce accidents to 1 every	
		20 years	200 years
Connecticut	$ 836,907	$196,056	$ 331,060
Iowa	1,261,664	906,272	2,238,918
Nevada	553,831	13,579	188,119
South Carolina	878,895	253,182	549,410

Distributing highway funds according to need is not a new idea: interstate highway construction funds are based on States' relative needs to complete the Interstate Highway System. Special bridge replacement funds are allocated by States' relative needs to provide safer bridges.

State officials in three of the six States reviewed felt crossing safety funds should be apportioned on some basis of need. Some of the bases suggested were

--number of crossings exceeding a specific level of traffic in a State,

--number of highway and railroad miles within a State, and

--States' relative needs to meet a predetermined level of safety.

While officials at three State agencies were satisfied with the current formulas, at only one did they view a change with apprehension. They were worried that smaller rural States would lose funds.

EDUCATION AND ENFORCEMENT AS ALTERNATIVE SAFETY MEASURES

The causes of collisions

According to a number of studies, most collisions between trains and motor vehicles result from driver error. For example, a 1973 Federal Railroad Administration study stated:

> "The primary cause of almost all grade crossing accidents is an error or series of errors in motorist perception or judgment. Often the situation is made far more hazardous by poor protection or difficult environment. However, even the most well conceived and effectively-implemented protection can be negated through distraction, willful violations of law, carelessness, or some form of irrational behavior."

In fact, at least 30 percent of the collisions between trains and motor vehicles in 1975 occurred at crossings with functioning train-activated flashing lights and an additional 8 percent at crossings with functioning gates.

Changing driver behavior

To the extent that drivers continue to act with contempt for law and life, safety devices will be ineffectual. Several States have begun strengthening law enforcement and educating drivers about the hazards of railroad crossings. Although a 1972 Department of Transportation report on crossing safety recommended developing educational programs, FHWA officials noted that a short-term program could have only short-lived benefits. Officials at the National Highway Traffic Safety Administration, which is responsible for driver-oriented safety programs, said they had no specific education or enforcement program for rail crossings because the size of the crossing safety problem did not warrant one.

However, States and railroads have cooperated in education and enforcement efforts. The principal program, "Operation Lifesaver," was initiated in Idaho in 1972 by the Union Pacific Railroad. Its objectives are (1) to create a continuing public awareness of the hazards inherent at every crossing and (2) to develop public support for grade crossing improvement programs employing education, enforcement, and engineering measures. As of November 1977, the National Transportation Safety Board reported that 13 States had sponsored Operation Lifesaver-type efforts. State and railroad officials consider these efforts effective. However, their effectiveness has not yet been conclusively demonstrated.

CHAPTER 3

HOW EXPENSIVE IS SAFETY?

Since the crossing safety program lacks a specific goal, realistic costs to complete it cannot be estimated. The Department of Transportation has attempted to estimate that cost; however, its assumptions have turned out to be faulty.

TRANSPORTATION DEPARTMENT ESTIMATES UNREALISTIC

In proposing the crossing safety program in 1972, the Department envisioned a 10-year $750 million effort. It recommended spending nearly all this money on crossing protection, which it defined as flashing lights or flashing lights and gates as the most cost-beneficial improvement. It advocated that grade separations should be funded by other highway programs, since their primary benefit is to facilitate traffic movement, not to remove hazards.

However, the 1973 legislation and FHWA guidance for implementing the program in 1974 made grade separations and various other improvements eligible for program funds. As a result, States did not concentrate on installing active warning devices to the degree recommended in 1972. The following table shows how States have obligated funds through June 30, 1977.

Type of improvement	Amount (millions)	Percent
Active devices:		
Flashing lights	$ 44.2	29.2
Flashing lights and gates	29.1	19.2
Adding gates to existing flashing lights	18.6	12.3
Total	91.9	60.7
Other:		
Grade separations	17.5	11.5
Crossing surface improvements	17.4	11.5
Closing crossings	.1	.1
Signing and marking	8.0	5.3
Illumination	.2	.1
Other	16.3	10.8
Total	59.5	39.3
Total	$151.4	100.0

Sixty percent of program funds have been obligated as anticipated--on active devices--the most cost-beneficial improvement. Grade separations, which eliminate accidents at a high price, accounted for 11 percent, while crossing surface improvements, for which safety benefits are undocumented, constituted another 11 percent. Thus, the original estimate of the program's cost is currently unrealistic.

Another program estimate was developed as part of a study issued in 1976 by the Department of Transportation. The Highway Safety Act of 1973 required the Secretary of Transportation to study highway safety needs, prepare recommendations, and estimate the cost of meeting these needs to give the Congress a basis for evaluating highway safety programs and setting future funding levels.

The study estimated that States needed $468 million over the next 4 years for rail-highway crossing safety. This estimate, however, is not a realistic picture of future program costs, because while it included installing flashing lights at crossings, it did not consider gates. As shown in the table on page 20, States are using 32 percent of their program funds for flashing lights coupled with gates and an additional 39 percent for other than active devices. Further, the study did not address the cost of achieving minimum safety at all crossings.

NEEDS CAN BE DETERMINED

Rail crossing safety needs can be systematically determined if a goal of reducing accidents to a specific level of probability is set. For example, Florida established a desired level of safety for all crossings of no more than one accident expected every 20 years. The State estimated it would need $106 million over the next 20 years to achieve this goal.

OUR ESTIMATE

The Federal Railroad Administration helped us determine the existing safety levels at crossings on Federal-aid and other highways. We based our analysis on a 1968 study "Factors Influencing Safety at Highway-Rail Grade Crossings" sponsored by FHWA and the American Association of State Highway and Transportation Officials.

The only improvements we considered were signing and marking, flashing lights, flashing lights with gates, and grade separations. We did not consider crossing closures,

special lighting, or crossing surface improvements because of the limitations of our methodology.

Existing levels of safety at crossings

About 1 motor vehicle-train accident occurs annually for every 20 public crossings. At our request the Federal Railroad Administration computed the expected accident rate for the Nation's 174,480 crossings having 1 or more train movements daily. Our data base was the National Rail Highway Crossing Inventory. The following table shows the probability of accidents for the 174,480 crossings expressed in terms of anticipated time intervals between accidents.

Probable time between accidents	Crossings meeting this level			
	On Federal-aid highways	On other highways	Total	Percent
(years)				
200	15,429	87,582	103,011	59.0
100	22,623	104,444	127,067	72.8
50	29,072	117,721	146,793	84.1
20	35,240	128,472	163,712	93.8
10	37,609	132,368	169,977	97.4
5	38,764	134,199	172,963	99.1
1	39,331	135,046	174,377	99.9
Less than 1	39,382	135,098	174,480	100.0

FHWA officials told us that under a study begun during July 1977, they have recently developed preliminary information about the effectiveness of warning devices at grade crossings. Using 1975 accident experience, FHWA tentatively concluded that available warning devices--such as flashing lights or flashing lights with gates--may provide only about one-fifth as much protection as previously believed. Therefore, we believe that upon completion--estimated to be summer 1978--FHWA should update this information to provide the Congress current information on how much protection is available at grade crossings.

CHAPTER 4

IS CATEGORICAL FUNDING APPROPRIATE?

Expressing the cost of the crossing safety program tells only part of the story. Because every Federal dollar spent on crossing safety is a dollar not spent on another safety program, part of this program's price is reduced safety on other parts of highways.

State officials would prefer that Federal funding for highway safety be provided in a unified grant, rather than in several categories. They would have more flexibility to use the money for the most cost-beneficial projects, thus providing greater overall safety on the Nation's highways.

CURRENT FUNDING SYSTEM FOR HIGHWAY SAFETY

The Highway Safety Act of 1973 established four separate programs for types of safety improvements on Federal-aid highways: rail-highway crossings, high-hazard locations, roadside obstacles, and pavement marking. A fifth program, safer roads demonstration, also provided funds for these types of improvements on non-Federal-aid highways but was repealed by the Highway Safety Act of 1976. The Congress provided specific funding levels for each type of safety improvement to heighten States' awareness of their various safety needs, maintain control over highway safety priorities, and insure that various types of safety improvements would be made. The Congress believed that unless funds were restricted, less publicized hazards would not be corrected. The Highway Act of 1976 continued these programs, combining the funding for the high-hazard and roadside obstacle programs. It also initiated specific funding for rail crossings on non-Federal-aid highways. A summary of funding follows.

Program	Act 1973	Act 1976	Total
	----(000,000 omitted)---		
Pavement marking	$175	$100	$275
Roadside obstacles and high-hazard locations	a/375	250	625
Rail-highway crossing safety:			
Federal-aid highways	175	250	425
Other highways	-	169	169
Safer roads demonstration	250	(b)	250
Total	$975	$769	$1,744

a/$175 million for roadside obstacles and $200 million for high-hazard locations.

b/This program was replaced by a program not dedicated solely to safety improvements.

The Congress gave the States some flexibility in applying the funds. The 1976 act allows up to 40 percent of a category's funds to be transferred to another category if the State can demonstrate to FHWA that the transfer is in the public's interest. All remaining funds in a category may be transferred if the State has met that program's objectives and if the transfer is approved by the Secretary of Transportation. However, since the crossing safety program has no quantified objectives, its completion would be hard to establish. (See ch. 2.)

OFFICIALS DISSATISFIED WITH CATEGORICAL FUNDING

Highway officials in the six States reviewed would like to see categorical funding discontinued in favor of a single funding source for highway safety improvements. They find that categorical funding does not permit them to meet their most critical needs. Specifically, they believe (and some Federal officials agree) that important high-hazard correction projects are getting pushed aside for less cost-beneficial rail-crossing improvements.

For example, Idaho officials said they had hundreds of unfunded high-hazard projects. One stated,

> "It is very disconcerting, for example, not to be able to fund a project location with seven accidents in one year * * * when you can fund a railroad highway grade crossing that has one accident in 10 years."

This sentiment was echoed in many other States. In a 48-State survey presented by an Illinois official at the 1976 meeting of the American Association of State Highway and Transportation Officials, 42 States said they wanted funding levels changed. On the average they wanted the high-hazard program's funds nearly tripled and the crossing program's share more than halved. Their perception of their needs is compared with actual program funding below.

Program	Act 1973	Act 1976	States' preferences
	(percentage)		
High-hazard locations and roadside obstacles	38.0	32.5	58.0
Rail-highway crossings	18.0	54.5	15.0
Pavement marking	18.0	13.0	7.0
Off-system improvements (note a)	26.0	-	20.0
Total	100.0	100.0	100.0

a/ The Safer Roads Demonstration Program was repealed by the 1976 legislation and replaced by a program not solely dedicated to safety improvements.

As shown above, States thought the high-hazard and roadside obstacle programs deserved over half the total funds. Thirty-nine States considered one of these programs their top priority.

Since its first report on these safety programs in February 1975, FHWA has supported States' calls for consolidating safety funds. In February 1976 it recommended that the Congress combine all highway safety improvement programs, except railroad overpass construction, into a single program to eliminate or reduce accidents.

INEFFICIENT USE OF SAFETY FUNDS

We found no studies had been made to address States' contention that high-hazard projects are the most cost beneficial. Therefore, we analyzed six States' projects selected at random from three groups: funded rail-crossing improvements, funded high-hazard improvements, and high-hazard projects for which no funds were available.

Three States had analyzed estimated costs and safety benefits of these projects. Benefits include reductions in fatalities, injuries, and property-damage-only accidents. Their results follow.

	Crossing projects			Funded high-hazard projects			Unfunded high-hazard projects		
	Ala.	Fla.	Iowa	Ala.	Fla.	Iowa	Ala.	Fla.	Iowa
Number of locations (note a)	20	20	20	38	13	10	20	19	20
Ratio of benefits to costs:									
Low	.2	.8	0	.4	1.1	1.6	0	.1	.2
High	8.6	7.0	.6	120.5	462.9	44.1	22.7	17.2	14.1
Average	1.6	2.6	.2	7.0	54.0	11.8	3.4	5.5	4.7
Number of locations where benefits exceeded costs	10	19	0	34	13	10	10	18	18

a/Some projects cover more than one location.

For the three States that had not made cost-benefit analyses, we compared accident histories for the three types of projects.

	Crossing projects			Funded high-hazard projects			Unfunded high-hazard projects (note a)	
	Ill.	Wash.	Idaho	Ill.	Wash.	Idaho	Ill.	Wash.
Number of locations	b/20	c/20	d/20	20	20	20	20	16
Annual accidents per project:								
High	8.0	2.0	1.2	145.0	21.0	79.7	67.0	264.3
Low	0	0	0	0	1.0	1.7	1.0	1.0
Average	1.9	.3	.2	23.1	10.1	14.5	24.8	30.1
Average annual casualty accidents per project:								
Injury	.5	.1	0	6.9	3.3	4.8	7.6	12.3
Fatal	0	0	0	.1	0	.1	0	.1

a/Idaho had not accumulated accident data for projects not scheduled for completion.

b/Accident data was available for only 14 of the 20 locations.

c/Accident data was available for only 18 of the 20 locations.

d/Accident data was available for only 16 of the 20 locations.

The above tables show that high-hazard projects generally deal with more hazardous locations and make more effective use of funds. Even the high-hazard projects that were not funded show greater average potential for cutting casualties than the crossing projects that were funded. On the other hand, some crossing projects were better investments than some high-hazard projects. Thus, if all highway safety projects were selected by cost-benefit ratios, some crossing improvements would still be made.

Transfer provisions inadequate

Some States attempted to use the transfer provisions of the Highway Safety Acts to correct funding imbalances. As of May 25, 1977, States had made 10 transfers--6 from crossing safety, 1 from bridge replacement, 1 from high-hazard locations, and 2 from roadside obstacles. These transfers reduced crossing safety funds by $6.2 million and increased high-hazard funds by $7.5 million.

However, the transfer provisions did not provide States sufficient flexibility. For example, Illinois identified 168 high-hazard projects for fiscal year 1977, but was able to fund only 65. An official said he would have transferred the State's crossing safety and pavement marking funds to these projects if he could.

SAFETY PROJECTS NOT SELECTED BY COSTS AND BENEFITS

To make the most effective use of their Federal safety funds, States should choose projects according to cost-benefit ratios. If the Congress authorized a single fund for safety--as the States desire--the States could then implement the most beneficial projects.

Our report "Management Actions Needed To Improve Federal Highway Safety Programs" (CED-76-156, Oct. 21, 1976) pointed out that the Department of Transportation's highway safety standards required cost and benefits to be considered in selecting safety improvement projects. However, not all States had project selection systems based on cost-effectiveness; therefore, we recommended that FHWA insure that States develop this capability.

FHWA generally agreed with our recommendations and said it would stress improving States' systems during fiscal year 1977. It acknowledged that better project selection systems were desirable, but indicated that it would be some time before this could be accomplished.

The Highway Administration required that cost-effectiveness be used to select high-hazard projects but not for the other safety act programs. Some States still are not doing cost-benefit studies. Of the six States reviewed, only one routinely prepared cost-benefit studies for almost all its proposed safety improvements. Three compared costs and benefits for high-hazard projects, as required, while two made no cost-benefit studies.

ALTERNATIVES FOR FUNDING HIGHWAY SAFETY

Since the current categorical funding and the lack of cost-effectiveness studies do not provide the most highway safety for the money, alternatives must be considered.

Adjusted categorical funding

State officials have said the Congress could continue to authorize safety funds in categories, adjusting levels among them to better reflect nationwide needs for the various types of improvements. This procedure would help States implement more effective projects. But since needs in each category vary from State to State, this allocation would still not be fully effective. Furthermore, without cost effectiveness analysis, there would be no guarantee that funds would be used most beneficially.

Categorical funding coupled with an unrestricted safety fund

Other State and Federal officials stated that if the Congress wished to insure that States continue to improve safety in each category, it could maintain categorical funding but add an undesignated fund that could be used for States' highest priority safety projects. This procedure would give States more flexibility to fund their priority improvements, but less cost-effective projects would still be funded for the same reason noted in the alternative for adjusting funding.

A single fund

As has been suggested by the States and by previously proposed legislation, the Congress could authorize a single fund for highway safety. States would establish their own priorities and use funds accordingly. The trouble with this approach is that few States can now perform cost-effective analyses for all safety projects. Therefore, although the flexibility to obtain the most safety benefits would exist, States would not be able to select the best projects.

CHAPTER 5

CONCLUSIONS, RECOMMENDATIONS, AND AGENCY COMMENTS

NEED TO ALTER PROGRAM FUNDING

Highway safety funds are not being used to achieve the greatest effect. Categorical funding does not give the States the flexibility to undertake the most cost-effective highway safety projects.

We analyzed the benefits of safety projects in six States. For the three States that prepared cost-benefit analyses, funded high-hazard location projects were more cost beneficial than funded crossing safety projects. In addition, high-hazard projects for which Federal funds were unavailable had cost-benefit ratios more than double the already funded crossing safety improvements. For the three States not doing cost-effectiveness studies, accident statistics revealed high-hazard locations had about 20 times the accident experience of crossing locations.

The States and FHWA favor consolidating highway safety funds. The difficulty in such a move is that few States have the capacity to rank all safety projects according to cost-effectiveness. Linked to this inability is the fact that FHWA has not required States to adopt cost-effectiveness as a project selection criterion for all federally funded safety programs.

Thus, while we believe a single safety fund would allow highway safety funds to be used more effectively, there would be no assurance that only the most cost-effective projects were implemented. On the other hand, if States were required to have cost-effectiveness analysis systems before they could receive or use future safety funds, many States' safety programs would come to a halt until they developed this ability.

To avoid these problems, the Congress should continue categorical funding but allow States to treat all categories as a single safety fund when FHWA certifies that States on an individual basis are ranking and selecting projects by costs and safety benefits. This alternative would assure the Congress that States not electing to develop procedures for selecting the most cost-effective projects overall will continue to perform each type of safety project. Although States could choose to continue spending funds by category, the prospect of having the flexibility to select the most cost-beneficial projects should give them an incentive to develop the capability to do so.

FHWA should make an aggressive and concerted effort to have the States take advantage of any such increased opportunity for maximizing the effectiveness of highway safety funds.

A disadvantage is that States not developing the capability for selecting the most cost-effective projects overall would not be able to maximize the effectiveness of their safety funds. To overcome some of this disadvantage, we believe the Congress should reassess the current distribution of funds among the categorical safety programs. One reason is that although one-half of the specifically designated safety funding is for accomplishing rail crossing safety projects, only 2 percent of the Nation's highway fatalities occur at crossings. Such an assessment should consider the relative cost-effectiveness of safety improvements and the magnitude of the safety problem that would be addressed by each category.

Another problem is that the formula for distributing rail crossing funds is not based on State needs. This fact contributes to varying levels of safety among the States.

NEED TO DEFINE PROGRAM OBJECTIVES AND COSTS

Another reason safety levels vary among States is FHWA's failure to establish performance goals for crossing safety. State-set goals vary widely. A nationwide goal is needed so decisionmakers will know when the crossing safety program has been completed. Further, a uniform goal would allow FHWA to project program costs and measure and evaluate State progress. This goal is particularly important if categorical funding continues; however, even under a cost-effectiveness-based project selection system, goals are needed to determine what safety improvement is needed. The effectiveness of programs to change driver behavior--education and stepped-up law enforcement as alternatives to crossing improvements--has not been assessed. State and railroad officials believe them effective.

FHWA should work with State and local governments and the rail industry to both establish a performance goal and determine how to reach it. FHWA should also cooperatively determine the proper role of engineering, enforcement, and education programs in achieving this goal.

RECOMMENDATIONS TO THE CONGRESS

The Congress should provide the States an incentive to develop and use procedures for selecting the most cost-effective safety projects. Therefore, we recommend that the

Congress authorize those States wishing to maximize safety benefits--and found by FHWA to be selecting all their safety projects according to cost-effectiveness--to treat the categories as a single safety fund. As an interim solution, we recommend that the Congress reassess the current allocation of funds among the categorical safety programs. This assessment should consider the relative cost-effectiveness of safety improvements and the magnitude of the safety problem that would be addressed by each category.

We recommend that the Congress require the Department of Transportation to provide it a cost estimate for reducing accident risk at grade crossings to a uniform level.

We further recommend that if categorical safety funding is retained, section 203(d) of the Highway Safety Act of 1973 be amended to distribute crossing safety funds among the States in proportion to their needs for meeting the level of safety to be established by FHWA.

RECOMMENDATIONS TO THE SECRETARY OF TRANSPORTATION

We recommend that the Secretary require the Federal Highway Administration, Federal Railroad Administration, and National Highway Traffic Safety Administration to cooperate with the States and railroads in:

--Establishing a nationwide level of safety acceptable for rail-highway crossings.

--Determining the best mixture of methods, including education and enforcement, to achieve this level.

AGENCY COMMENTS AND OUR EVALUATION

Department officials acknowledged that they did not have uniform criteria for determining the optimum degree of protection motorists should have at grade crossings. They said they would attempt to establish uniform guidance for determining what safety improvements should be made. The Department said it would solicit public comments on determining a uniform level of risk at grade crossings through the formal rulemaking process by the end of the fiscal year 1978. It pointed out that research now underway may provide the first reliable method for predicting accidents for all grade crossings. It believed that this capability would enable it to develop uniform national criteria for grade-crossing safety improvements but advised us that establishing such standards would require about 2 years.

Department officials agreed that if the new legislation authorizes specific funds for grade-crossing improvements, the funds should be distributed among the States, at least in part, on a basis of need. They referred to their prior recommendation that needs could be related to the total grade crossings per State.

The Department said that Federal Highway Administration, Federal Railroad Administration, and National Highway Traffic Safety Administration officials plan to cooperate with the National Safety Council to promote engineering, enforcement, and education activities through Operation Lifesaver. However, we believe the Department should actively promote coordination among these three agencies for developing uniform national criteria for grade-crossing improvements so that the appropriate roles of engineering, education, and enforcement efforts will be determined.

Responding to our proposal that it provide the Congress an estimate of the costs to achieve national standards, the Department said it would provide this information if the Congress requested it. We believe that the Congress needs this information to be fully aware of the scope of rail crossing safety needs.

Department officials did not agree that the Congress should continue providing highway safety funds through categorical grants. They referred to the Administration's legislative proposals--S. 2440 and H.R. 10578 now pending before the Congress--which, if passed, would authorize a single safety fund to replace six currently categorical programs. They pointed out that a single fund is the most effective way to administer the safety programs. One reason is that it would minimize administrative requirements.

The proposed bills would, in part, require States to

> "* * * have a process for systematically identifying and locating hazardous highway locations, sections, and elements, including roadside obstacles, on a continuing basis, methods for assigning priorities to the various types of hazards identified, a process for the correction of identified safety needs in accordance with the priorities developed, and a continuing evaluation of the safety benefits obtained."

This provision, if enacted, would not insure that States implement safety projects on the basis of cost-effectiveness and thereby achieve the maximum safety benefits.

Department officials did not believe cost-effectiveness should be a required criterion for selecting safety projects. They said that States must consider numerous other social and economic factors in the selection process, including accident potential, State and local political constraints, economic and manpower resources, and other necessary factors. The Department said its ultimate objective was that FHWA's safety programs be based on potential for accident prevention.

The Department pointed out that cost-effectiveness analyses as project selection criteria are not always sensitive to accident potential and social and economic factors. It said that cost-effectiveness was a useful tool for deciding what type of safety improvement should be made to solve a specific safety problem but cautioned that its use could unduly restrict States' ability to perform a needed variety of safety improvements.

We believe the goal of the safety programs should be to maximize the safety benefits of available funds. States have expressed desires to secure a single fund for safety to be able to obtain the most benefits. While a single fund for safety would provide that opportunity, there can be no asssurance that safety benefits are being maximized unless States develop systems capable of selecting the best projects regardless of type of safety improvement.

While we agree that State and local officials should determine their own priorities, every effort should be made to insure that the limited funds available for safety are used in those areas that result in the greatest safety benefit. Political constraints, economic and manpower resources, and other social and economic factors can affect decisions to implement safety improvements. But the fact that about 47,000 highway deaths and 1,800,000 disabling injuries occurred during 1976 necessitates developing a systematic approach for selecting the best projects. Further, we believe that introduction of a single fund for safety--as proposed by the Highway Administration and also under our recommendation--makes the need for an effective selection process using cost-effectiveness as the major selection criterion even more important.

Finally, we believe accident potential should be recognized in making safety improvements. However, potential accident locations include both known accident locations and locations where accidents have not occurred previously but are likely to occur in the future. We found that States have identified hazardous locations which they have not improved because they lack sufficient funds. In 1976 State officials

stated their preferences for more funding for known accident locations. We believe that State officials will and should place primary emphasis on identified accident locations because of the potential for continuing high accident rates and the legal liabilities that may arise if these locations are not corrected as soon as possible. We agree that accident potential could be a proper basis for selecting locations for safety improvements but only after existing actual high-hazard locations are improved.

APPENDIX I

STATES' OBLIGATIONS OF CATEGORICAL RAIL CROSSING SAFETY FUNDS AS OF JUNE 30, 1977

	Funds used for					
	Train-activated warning devices	Passive signing and pavement marking	Grade separation	Crossing surface improvements	Other improvements	Total
Alabama	$ 1,526,758	$ 773,394	$ -	$ -	$ 285,147	$ 2,585,299
Alaska	34,511	-	1,442,746	-	7,200	1,484,457
Arizona	779,681	-	-	-	155,497	935,178
Arkansas	1,217,493	-	-	-	116,100	1,333,593
California	9,159,714	41,877	6,684,606	-	499,745	16,385,942
Colorado	388,518	-	1,145,474	-	710,547	2,244,539
Connecticut	309,640	9,000	18,938	524,049	225,184	1,086,811
Delaware	102,519	25,920	-	69,561	133,560	331,560
Florida	5,335,495	-	-	-	868,315	6,203,800
Georgia	4,709,104	-	-	-	456,136	5,165,240
Hawaii	-	-	-	-	-	-
Idaho	920,491	-	-	321,604	240,328	1,482,423
Illinois	4,568,096	148,478	-	4,954,055	94,068	9,764,697
Indiana	1,617,957	577,953	-	545,228	55,800	2,796,938
Iowa	2,036,829	900	436,895	29,040	598,643	3,102,307
Kansas	1,595,226	12,411	-	40,158	-	1,647,795
Kentucky	1,274,131	-	-	-	4,500	1,278,631
Louisiana	2,002,753	27,702	-	1,354,500	175,459	3,560,414
Maine	359,723	25,241	-	339,588	177,453	902,005
Maryland	187,292	82,672	905,030	-	139,528	1,314,522
Massachusetts	202,999	583,247	-	1,766,202	3,154,910	5,707,358
Michigan	4,069,370	266,380	45,846	2,111,796	1,097,274	7,590,666
Minnesota	2,392,393	13,545	2,034	-	-	2,407,972
Mississippi	1,850,145	-	-	10,350	-	1,860,495
Missouri	6,962,837	-	-	-	-	6,962,837
Montana	770,533	450,230	749,825	-	-	1,970,588
Nebraska	1,196,215	1,800	716,162	84,663	157,025	2,155,865
Nevada	1,091,485	5,820	-	66,624	99,683	1,263,612
New Hampshire	112,590	-	216,374	215,273	58,970	603,207
New Jersey	571,964	-	1,800	647,616	656,988	1,878,368
New Mexico	602,265	40,197	-	21,704	7,560	671,726
New York	4,309,886	1,438,679	1,509,263	759,091	1,652,586	9,669,505
North Carolina	3,098,498	32,400	-	-	1,206,101	4,336,999
North Dakota	1,423,883	-	-	-	-	1,423,883
Ohio	94,320	793,239	180	2,139,741	6,161	3,033,641
Oklahoma	1,812,831	359,036	-	-	4,320	2,176,187
Oregon	2,111,557	66,730	-	-	13,698	2,191,985
Pennsylvania	2,367,143	1,334,158	-	497,256	142,711	4,341,268
Rhode Island	56,697	178,229	-	-	6,824	241,750
South Carolina	1,495,122	-	-	-	190,931	1,686,053
South Dakota	974,017	17,872	-	364,665	16,139	1,372,693
Tennessee	869,000	20,295	405	165,986	1,251,096	2,306,782
Texas	4,463,185	1,200	2,280,300	-	62,116	6,806,801
Utah	886,869	354,310	-	78,809	130,771	1,450,759
Vermont	154,686	35,351	-	161,938	76,074	428,049
Virginia	3,532,948	-	1,371,349	-	251,720	5,156,017
Washington	1,626,989	66,475	-	25,101	99,263	1,817,828
West Virginia	1,269,402	172,377	-	140,486	-	1,582,265
Wisconsin	2,411,124	-	-	810	1,139,239	3,551,173
Wyoming	986,343	-	-	-	83,031	1,069,374
District of Columbia	-	73,203	-	-	-	73,203
Puerto Rico	-	6,842	-	-	-	6,842
Total	$91,893,217	$8,037,163	$17,527,227	$17,435,894	$16,508,401	$151,401,902

SPECIFIC CROSSING CHARACTERISTICS

Crossing number	Annual average daily traffic	Actual vehicle speed	Urban or rural road	Number and type of daily trains	Number of tracks
1	50 vehicles	30 mph	Urban	2 freight	1 track
2	50 "	30 "	Rural	2 freight	"
3	1,500 "	45 "	Rural	2 freight	"
4	750 "	25 "	Urban	2 passenger 2 freight	"
5	500 "	45 "	Rural	2 passenger 2 freight	"
6	200 "	50 "	Rural	2 passenger 6 freight	2 tracks
7	1,500 "	35 "	Urban	2 passenger 6 freight	"
8	50 "	20 "	Urban	6 passenger 12 freight	1 track
9	100 "	30 "	Rural	6 passenger 12 freight	"
10	2,500 "	40 "	Urban	6 passenger 12 freight	2 tracks
11	2,000 "	40 "	Rural	6 passenger 12 freight	"
12	14,000 "	40 "	Urban	6 passenger 12 freight	"

If the administrative classification of a highway (i.e., whether it is a Federal-aid or non-Federal-aid highway or whether it is maintained by State or local authorities) would influence the type of protection warranted, please note this and determine the type of protection for each administrative class.

APPENDIX II

GAO GRADE CROSSING PROTECTION CASE STUDY

GENERAL CHARACTERISTICS FOR EACH CROSSING

1. Sight distance is unobstructed in all quadrants.

2. The angle of all the crossings is 90 degrees.

3. All tracks are tangent (straight line).

4. If there are two tracks at the crossing, there are no simultaneous train movements.

5. There are no adverse highway approach grades.

6. Each crossing is currently protected by crossbucks; by advance warning signs; and, where warranted, by pavement markings.

7. There have been no accidents at any of the crossings.

8. The actual train speeds are as follows:

	Rural	Urban
Passenger trains	79 mph	25 mph
Freight trains	50 mph	25 mph

9. All roads are two-lane traffic with one lane in each direction.

10. The following alternatives are available:

    1. Do nothing.

    2. Close the crossing.

    3. Install flashing lights.

    4. Install flashing lights and automatic gates.

    5. Construct a grade separation structure.

If the crossing is to be closed, the maximum total additional travel distance for each crossing is less than 1 mile in rural areas and two blocks in urban areas. The crossings are not used as primary routes for emergency or mass transit vehicles. In addition, assume that the program will continue at the same funding level indefinitely.

APPENDIX III

RAIL CROSSING SAFETY FUNDS

APPORTIONED PER CROSSING

	Section 203(b) on the Federal-aid system			Section 203(c) off the Federal-aid system		
	Total apportionment FYs 1974-78	Number of crossings (note a)	Apportionment per crossing	Total apportionment FYs 1977 and 1978 (note a)	Number of crossings (note a)	Apportionment per crossing
Alabama	$ 7,041,333	991	$ 7,105	$ 2,549,582	3,812	$ 669
Alaska	11,691,125	77	151,833	4,224,334	144	29,336
Arizona	4,732,087	193	24,519	1,710,854	867	1,973
Arkansas	4,716,763	859	5,491	1,680,646	3,230	520
California	31,502,848	2,849	11,058	11,341,177	6,633	1,710
Colorado	5,754,259	341	16,875	2,077,985	2,013	1,032
Connecticut	4,586,455	110	41,695	1,633,961	460	3,552
Delaware	1,794,497	172	10,433	647,974	91	7,121
Florida	11,347,164	1,157	9,807	4,113,406	4,807	856
Georgia	9,264,772	1,307	7,089	3,317,887	5,623	590
Hawaii	1,944,665	0	N/A	702,198	6	117,033
Idaho	3,159,771	353	8,951	1,141,073	1,718	664
Illinois	18,530,916	2,426	7,638	6,697,578	11,471	584
Indiana	9,246,754	2,792	3,311	3,338,749	7,353	454
Iowa	7,086,121	2,555	2,773	2,560,832	6,511	393
Kansas	6,461,265	1,889	3,420	2,329,711	7,962	293
Kentucky	6,226,808	812	7,668	2,246,500	2,880	780
Louisiana	6,602,044	699	9,445	2,386,377	4,229	564
Maine	2,598,105	238	10,916	931,708	881	1,058
Maryland	6,190,250	524	11,813	2,250,142	599	3,756
Massachusetts	8,228,973	542	15,183	2,973,456	688	4,322
Michigan	15,047,729	2,610	5,765	5,416,941	5,847	926
Minnesota	8,898,118	1,756	5,067	3,206,753	6,348	505
Mississippi	5,067,250	933	5,431	1,839,750	2,648	695
Missouri	9,934,190	1,280	7,761	3,587,838	5,370	668
Montana	4,550,807	359	12,676	1,636,507	1,937	845
Nebraska	4,880,274	1,112	4,389	1,750,493	4,468	392
Nevada	3,070,335	65	47,236	1,109,145	293	3,785
New Hampshire	1,797,685	245	7,337	649,126	472	1,375
New Jersey	10,224,741	478	21,391	3,686,989	1,724	2,139
New Mexico	3,997,473	163	24,524	1,441,166	706	2,041
New York	27,836,342	1,090	25,538	10,066,858	3,360	2,996
North Carolina	9,277,245	1,506	6,160	3,356,368	3,938	852
North Dakota	3,441,405	1,035	3,325	1,248,691	4,709	265
Ohio	17,088,744	2,565	6,662	6,166,699	7,398	834
Oklahoma	6,342,244	947	6,697	2,289,584	4,828	474
Oregon	5,148,079	836	6,158	1,856,010	2,133	870
Pennsylvania	18,942,601	1,358	13,949	6,891,806	5,406	1,275
Rhode Island	2,142,355	58	36,937	773,580	84	9,209
South Carolina	4,861,345	2,194	2,216	1,755,924	2,258	778
South Dakota	3,660,561	711	5,148	1,317,005	2,682	491
Tennessee	7,813,483	559	13,978	2,832,155	3,607	785
Texas	23,538,300	1,888	12,467	8,539,078	12,728	671
Utah	3,199,332	192	16,663	1,146,237	1,180	971
Vermont	1,547,701	143	10,823	582,034	451	1,291
Virginia	8,423,634	979	8,604	3,029,288	1,827	1,650
Washington	6,717,588	956	7,027	2,436,385	3,334	731
West Virginia	3,459,166	780	4,435	1,247,318	1,680	742
Wisconsin	8,858,090	2,123	4,172	3,193,823	5,216	612
Wyoming	2,907,859	106	27,433	1,046,555	514	2,036
District of Columbia	1,045,442	21	49,783	377,496	49	7,704
Puerto Rico	3,571,725	17	210,101	1,291,268	38	33,981
Total	$405,998,818	49,951	$ 8,128	$146,625,000	169,211	$ 867

a/This does not recognize the effect of the 1976 Federal-aid highway realinement, which resulted in movement of about 5,000 crossings from on to off the Federal-aid highway system.

APPENDIX IV

OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

ASSISTANT SECRETARY
FOR ADMINISTRATION

March 6, 1978

Mr. Henry Eschwege
Director, Community and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

This letter is in response to your request for Department of Transportation comments on the General Accounting Office draft report "Rail Crossing Safety--At What Price?" We have enclosed two copies of our response to the report. Please let us know if we can assist you further.

Sincerely,

for Edward W. Scott, Jr.

Enclosure

DEPARTMENT OF TRANSPORTATION REPLY

TO

GAO DRAFT OF REPORT TO

THE CONGRESS OF THE UNITED STATES

ON

RAIL CROSSING SAFETY - AT WHAT PRICE?

SUMMARY OF GAO FINDINGS AND RECOMMENDATIONS

The GAO reviewed the Federal Highway Administration's (FHWA) railroad-highway grade crossing safety program to determine if FHWA had established program goals and identified costs and methods for meeting an appropriate level of crossing safety. The review was conducted in FHWA Headquarters in Washington, D.C.; the State highway agency offices managing the program in Alabama, Florida, Idaho, Illinois, Iowa, and Washington; and in FHWA regional and division offices overseeing these States. In addition, appropriate officials were interviewed in the National Highway Traffic Safety Administration (NHTSA), the Federal Railroad Administration (FRA), and in other public and private organizations.

In its report on the grade crossing program, GAO charged FHWA with failure to establish an acceptable level of safety at railroad-highway crossings nationwide and to determine the proper role of engineering, enforcement, and education in achieving this goal. Further, GAO concluded that categorical funding does not give the States the flexibility to undertake the most cost-beneficial highway safety projects; thus, GAO contends, safety funds are not being used to achieve the greatest benefit.

Nevertheless, GAO recommended to the Congress that categorical safety funding be continued, except that, for those States wishing to maximize safety benefits--and found by FHWA to have developed a system to select all safety projects according to cost effectiveness--the Congress should authorize those States to treat the categories as a single program for safety funding. In addition, GAO recommended that the Congress revise Section 203(d) of the Highway Safety Act of 1973, as amended, to apportion available grade crossing safety funds among the States in proportion to their needs for meeting a program goal to be established by FHWA.

Recommendations were made by GAO to the Secretary of Transportation to require FHWA to establish, in cooperation with the States and railroads, a nationwide level of safety acceptable for railroad-highway crossings and to determine the best mixture of measures to achieve this level. The GAO further recommended that FHWA establish procedures to insure that the States effectively manage their programs to achieve this level of safety. Finally, GAO recommended that FHWA should report to the Congress an estimate of the total cost to achieve this level of safety at grade crossings.

SUMMARY OF DEPARTMENT OF TRANSPORTATION POSITION

The GAO report highlights some of the problems FHWA and the States have encountered in administering the railroad-highway grade crossing safety program established by Section 203 of the Highway Safety Act of 1973, as amended. The program requires a considerable amount of coordination and the cooperation of several agencies and disciplines to select and advance grade crossing safety improvements. The FHWA has recently given added emphasis to improving the management of this phase of the highway safety improvement program.

The GAO report expresses concern that grade crossing improvements are generally not cost effective when compared to projects for correcting high hazard locations. The FHWA maintains that cost effectiveness should not be a criterion required in selecting safety improvement projects. There are numerous factors which States do consider in the project selection process including accident potential and State and local political constraints. FHWA's ultimate objective is that the project selection process be based on the potential for forestalling accidents.

[See GAO note, p. 49.]

[See GAO note, p. 49.]

The GAO recommended to the Congress that categorical safety funding be continued except that, for those States found by FHWA to be capable of selecting all safety projects according to cost effectiveness, the various categories may be treated as a single program for safety funding. The Department believes the concept of a single safety fund will minimize administrative requirements and has recommended this concept in its legislative proposal recently submitted to the Congress. If categorical funding is retained in the new legislation, FHWA opposes the concept of allowing some States to treat the categories as a single safety fund because of the administrative problems created.

The FHWA concurs with GAO's recommendation to the Congress that the existing legislation relating to apportionment of funds for the grade crossing safety program should be amended to apportion available funds to the States in proportion to the States' grade crossing needs. The FHWA differs with GAO on how the "needs" would be determined.

The GAO recommended that the Secretary require FHWA to "cooperate with the States and railroads in establishing a nationwide level of safety acceptable for rail-highway crossings, and determining the best mixture of measures, including education and enforcement, to achieve this level." The FHWA believes the grade crossing improvement program should be based on a continuing effort to minimize the potential for grade crossing accidents. At the present time there are no uniform criteria for determining the optimum degree of protection to provide motorists with a uniform level of risk at all grade crossings. Research presently being completed will provide a reliable accident prediction equation which could be applied to all grade crossings. With such a method to predict grade crossing accidents,

warrants can be developed for protecting crossings on a uniform basis nationwide. A continuing program to upgrade crossing protection based on uniform warrants will reduce the potential for grade crossing accidents and forestall substantial numbers of accidents and casualties. The FHWA, FRA, and NHTSA, through their normal program management activities, presently possess the joint capability to develop and implement an effective mixture of methods to achieve increased safety at grade crossings.

[See GAO note, p. 49.]

The GAO finally recommended that FHWA report to the Congress an estimate of the total cost to achieve an acceptable level of safety at all grade crossings. If so requested by the Congress, FHWA, in cooperation with FRA, will prepare and submit an estimate of the total cost to make the grade crossing improvements required as a result of establishing uniform warrants for active warning devices and grade separations.

POSITION STATEMENT

The GAO report highlights some of the problems FHWA has encountered in administering the grade crossing safety program established by Section 203 of the Highway Safety Act of 1973, as amended. The identified problem areas have been recognized previously by FHWA through normal program management activities and, although all the problems are by no means solved, considerable progress has been made in advancing this multi-disciplinary program. Various aspects of the grade crossing safety program have been included in FHWA's Program Emphasis Areas each of the last 2 years. The FHWA will continue its effort, and will encourage the States to make a similar effort, to improve the management of this phase of the safety improvement program.

The GAO report makes the point that grade crossing projects are generally not cost effective when compared to projects for correcting high-hazard locations. The GAO found that some high-hazard projects which have not yet been implemented because of insufficient funds are potentially more cost

effective than most grade crossing projects which are being funded. On the other hand, GAO does recognize that some grade crossing improvements would be made even if all highway safety projects were selected on a cost-effectiveness basis from a single safety program fund.

The matter of selecting all safety improvements solely on the basis of cost effectiveness was recommended by GAO in its October 1976 report entitled "Management Actions Needed to Improve Federal Highway Safety Programs." The FHWA responded at that time and still maintains that cost effectiveness should not be the sole criterion considered to select safety improvement projects.

The FHWA believes there are numerous social and economic factors which must be considered in the project selection process. Cost-effective analysis alone is not always sensitive to accident potential, State and local political constraints, economic and manpower resources, and other considerations necessary to the decisionmaking process. Such analysis can be a useful tool when comparing alternative courses of action to a specific safety problem. It should not be used, however, to unduly restrict the States' ability to program and implement a needed variety of safety improvements.

The concept of selecting all projects by cost effectiveness is not really consistent with the categorization of safety funds mandated by the Congress in the Highway Safety Act of 1973. Separation of funds into various categories does permit safety improvements to be undertaken in a variety of improvement classes and allows a potential accident site to be corrected before accident experience renders the site a hazardous location. It is FHWA's objective, however, that the States' project selection process be based ultimately on the potential for forestalling accidents under a single program for safety funding.

[See GAO note, p. 49.]

APPENDIX IV

[See GAO note, p. 49.]

APPENDIX IV

[See GAO note, p. 49.]

Following are the specific recommendations contained in the GAO report with the Department's response immediately following:

RECOMMENDATIONS TO THE CONGRESS

1. "We recommend that the Congress continue categorical safety funding. In addition, for those States wishing to maximize safety benefits--and found by the Highway Administration to have the ability to select all their safety projects according to cost effectiveness--the Congress should authorize those States to treat the categories as a single fund for safety."

   The position of FHWA has been to support consolidating categorical safety funds into a single program for safety funding. This has been recognized and the Department included the single safety fund concept in the legislative proposal recently introduced in the Congress. We believe this single safety fund concept to be the most effective way to administer the safety program. It will allow even greater flexibility to address critical needs and priorities than the current provision which allows transferring funds from a category where needs are being satisfactorily addressed to a category where needs are insufficiently funded. The FHWA would not, however, for the reasons noted earlier, require that cost effectiveness be the sole criterion used to select projects under the present provisions or under the proposed single program for safety funding. If categorical funding is retained in the new legislation, FHWA opposes the concept of allowing some States to treat the categories as a single safety fund because of the administrative problems created.

2. "We further recommend that Section 203(d) of the Highway Safety Act of 1973 be amended to apportion available crossing safety funds among the States in proportion to their needs for meeting a program goal to be established by the Highway Administration."

The FHWA concurs that if the new legislation should authorize special funding for grade crossing safety, the funds should be apportioned, at least in part, on the basis of the States' needs. Consistent with our response to GAO's recommendations to the Secretary, however, "needs" should not necessarily be related to a level of safety expressed in acceptable numbers of fatalities over a period of years. The FHWA has previously recommended that "needs" in a new apportionment formula might be related to the number of grade crossings in a State.

RECOMMENDATIONS TO THE SECRETARY OF TRANSPORTATION

We recommend that the Secretary of Transportation require the Federal Highway Administration to:

1. "Cooperate with the States and railroads in:

   a. establishing a nationwide level of safety acceptable for rail-highway crossings, and

   b. determining the best mixture of measures, including education and enforcement, to achieve this level."

      a. The GAO recommendation suggests that FHWA should establish for grade crossings an achievable "level of safety" which might be based on an acceptable number of fatalities over a specified period of time. It is FHWA's position that no predetermined level of fatalities can ever be considered "acceptable" at grade crossings or, for that matter, at any other highway location.

         The FHWA believes it is more appropriate to have a continuing grade crossing improvement program to minimize the potential for grade crossing accidents by establishing a uniform level of risk for the motoring public. The ultimate improvement to reduce the accident potential at grade crossings is the construction of a grade separation at each of the 220,000 public crossings, which, of course, is neither feasible nor practical. The present program administered by FHWA allows the States to reduce the accident potential at grade crossings by upgrading the crossing protection to a level considered optimum by each State.

         At the present time there are no uniform criteria for determining the optimum degree of protection, including grade separations, to provide motorists

with a uniform level of risk at all grade crossings. One factor contributing to this situation is the absence of a credible method of predicting grade crossing accidents nationwide. Current research, however, indicates that a reliable accident prediction equation which could be applied to all grade crossings is at hand. With the development and refinement of a method to predict accidents, FHWA believes it will be possible to develop warrants for the application of warning devices or the construction of grade separations on a uniform basis nationwide. The FHWA will solicit public comment on such a proposal through the formal rulemaking process by the end of the current fiscal year. A continuing program to upgrade crossing protection based on uniform warrants will reduce the potential for grade crossing accidents and forestall substantial numbers of accidents and casualties.

b. The Operation Lifesaver program discussed on page 24 of the GAO report is the principal education and enforcement effort in use today by the States and railroads to promote grade crossing safety. The Department, through FHWA, FRA, and NHTSA has responded positively to a recent National Transportation Safety Board recommendation that those agencies actively support and participate in a nationwide Operation Lifesaver program to be administered by the National Safety Council.

The Department possesses the capability to develop an effective mixture of measures to achieve increased safety at grade crossings. The FHWA has the funding to implement the needed engineering improvements while the education and enforcement measures relate well to the functions and goals of NHTSA.

[See GAO note, p. 49.]

APPENDIX IV

[See GAO note.]

GAO note: Deleted material pertained to information contained in the draft which has been changed or is not included in this report.

PRINCIPAL OFFICIALS

RESPONSIBLE FOR ADMINISTERING

ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
DEPARTMENT OF TRANSPORTATION		
SECRETARY OF TRANSPORTATION:		
Brock Adams	Jan. 1977	Present
William Coleman	Mar. 1975	Jan. 1977
John W. Barnum (acting)	Feb. 1975	Mar. 1975
Claude S. Brinegar	Feb. 1973	Feb. 1975
John A. Volpe	Jan. 1969	Feb. 1973
Alan S. Boyd	Jan. 1967	Jan. 1969
ADMINISTRATOR, FEDERAL HIGHWAY ADMINISTRATION:		
William M. Cox	Apr. 1977	Present
Lester P. Lamm (acting)	Jan. 1977	Apr. 1977
Norbert T. Tiellmann	May 1973	Jan. 1977
Ralph R. Bartelsmeyer (acting)	July 1972	May 1973
Francis C. Turner	Feb. 1969	June 1972
Lowell K. Bridwell	Apr. 1967	Jan. 1969

(34264)