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16. Abstract  This report presents the results of research performed to identify and assess the work zone-related legislation that has been implemented in various states nationwide. As of 1997, 42 states had passed legislation pertaining to traffic laws in work zones. The report includes information on the types of legislation that has been passed, implementation characteristics and issues encountered by state transportation agencies, analysis of the effect of the legislation on work zone accidents, and enforcement characteristics and issues encountered pertaining to the legislation.			
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# **WORK ZONE-RELATED TRAFFIC LEGISLATION: A REVIEW OF NATIONAL PRACTICES AND EFFECTIVENESS**

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## **IMPLEMENTATION RECOMMENDATIONS**

The first year's research effort on this project has yielded the following recommendations:

1. The implementation of Texas House Bill 981, which increases the minimum and maximum fines that can be assessed for traffic violations in work zones, should be tracked through a detailed before-after study in order to quantify the actual impact of that legislation upon citation rates, fine levels, and dismissal rates.
2. TxDOT should maintain an awareness of the other types of work zone-related legislation that has been passed or is being pursued in other states and develop a recommended course of action for pursuing similar legislation in the 1999 Texas session if it is found to be effective in improving work zone safety in those other states.



## **DISCLAIMER**

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation (TxDOT) or the Federal Highway Administration (FHWA). This report is not intended to constitute a standard, specification, or regulation, nor is it intended for construction, bidding or permit purposes. The engineer in charge of the study was Dr. Gerald L. Ullman, P.E. #66876.

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## SUMMARY

This report presents the results of research performed to identify and assess the work zone-related legislation that has been implemented in various states nationwide. The most common type of work zone legislation enacted nationally has been that which increases the level of fines of violations which occur in work zones. In addition, some states have enacted legislation which allows lower speed limits to be posted in work zones without getting prior approval or conducting a traffic or engineering investigation. One state has enacted legislation which makes it a misdemeanor offense to endanger a highway worker or to disobey a flagger.

Slightly more than one-half of the states that have enacted increased work zone fine legislation have specified that the level of fine issued will be double what it would be outside of a work zone. Another sizable group of states have specified fixed dollar increases for fines in a work zone. Two states (including Texas) specify that the minimum and maximum fines that can be issued for violations in a work zone will be double what they are outside of a work zone.

Approximately one-half of the states with legislation require that special signing be posted at each work zone notifying drivers that fines for traffic violation in work zones are increased. Likewise, approximately one-third of the states require that workers be present at the work zone before traffic fines will be increased.

Analyses of fatal work zone accidents indicated that implementation of an increased fine law had no consistently measurable effect upon fatal work zone accident frequency. A few states showed a significant change in accident frequencies (some increased, others decreased). Fatal work zone accidents in most states with legislation, however, did not differ significantly from what would have been expected had no legislation been enacted.

With respect to enforcement of these laws, most agencies generally use one of three funding mechanisms to enforce any increased fine legislation that is enacted: regular duty budgets, overtime agreements paid by the DOT, or payback agreements to the enforcement agency which use revenues from the increased work zone fines. Anecdotal information obtained from discussions with both DOT and enforcement personnel revealed several common issues or concerns encountered when trying to enforce an increased work zone fine law. In each case, these concerns resulted in an abnormal amount of citation dismissals by the courts, and adversely affected enforcement personnel motivation. These concerns included the amount of authority and discretion the increased fine law gave to enforcement officers, the ability of lower income drivers to pay the higher fines, the signing required to ensure that motorists are notified that fines are increased in the work zone, and the difficulties encountered in ensuring that workers are present at the work site when the traffic violation occurs.



# 1. INTRODUCTION

## BACKGROUND AND STATEMENT OF THE PROBLEM

Worker and motorist safety in construction and maintenance work zones has been a major Texas Department of Transportation (TxDOT) priority for several years. The Department has sponsored numerous research studies to improve work zone traffic control methods and has also developed extensive training for TxDOT and contractor personnel to effectively implement the findings from that research. Unfortunately, Texas has led the nation in the number of fatalities that occur in work zones over the past few years (1). This result is not unexpected, given that Texas has the largest amount of roadway lineage in the nation to maintain (and so most likely the largest number of work zones per year). Nevertheless, the numbers are high enough for TxDOT to continue its commitment to finding new ways to improve worker and motorist safety in these zones.

Field experiences suggest that motorist noncompliance is an ongoing problem with certain work zone traffic control methods and techniques, particularly those relating to motorist speeds. Traditionally, this is most effectively combated through law enforcement. Research on speed control methods in work zones, for instance, has shown that the presence of enforcement can significantly reduce motorist speeds approaching a work zone (2-4). It can be hypothesized that motorist compliance with a reduced speed limit is related directly to both the relative magnitude of the speed limit (that is, it must not be overly restrictive) and the perceived severity of the enforcement threat. In fact, enforcement studies in non-work zone situations have suggested this to be the case (5).

The enforcement threat is a combination of both the likelihood of being apprehended and the penalty one receives if apprehended. Traditionally, the perceived likelihood of apprehension has been manipulated at work zones in order to decrease speeds and increase compliance with a speed limit (through the hiring of off-duty officers to accompany work crews, by increasing enforcement patrol frequency through a work zone, etc.). Unfortunately, this approach is labor-intensive, expensive to implement, and competes with other types of enforcement duties. That is why TxDOT has attempted to imitate the presence of enforcement with assorted devices (such as the use of radar drones which activate standard radar detectors, the type of vehicle warning lights used on equipment within the

work area, etc.). To be effective, though, these devices require real-time management so that the motoring public does not learn over time that they are indeed enforcement placebos.

The other part of the enforcement threat is the penalty one receives if apprehended. In recent years, several states have pursued initiatives that increase the fines that are invoked for traffic violations cited within work zones. Other states have passed legislation to combat specific types of negative driving behaviors in the vicinity of work zones. Unfortunately, the majority of states proposed legislation based on what other states already had in place or were pursuing at the same time through their own legislatures. Little, if any, investigation occurred as to the apparent effectiveness of the legislation or the impacts it had upon the DOTs, enforcement agencies, or the court system who had to implement it. There are numerous lessons to learn from the experiences of these various states which can be used to guide others who wish to pursue similar legislation or to further strengthen and enhance the legislation they already have in place. The Texas Transportation Institute, sponsored by the Texas Department of Transportation and the Federal Highway Administration, undertook a research effort to determine the extent and effectiveness of work zone-related legislation that has been enacted nationwide. This report presents the results of the first year's effort on that research.

## **CONTENTS OF THIS REPORT**

This report represents a compilation of work zone-related legislation enacted by each state in recent years, the reported or perceived effectiveness of that legislation to date, and lessons learned by those that implemented the legislation. Researchers obtained the information contained in this report from telephone interviews of Department of Transportation officials, law enforcement personnel, and other state officials. Information collected during these interviews included copies of the legislation enacted, work zone accident information, work zone citation histories, anecdotal information concerning court support of the legislation, and issues or concerns encountered during legislation implementation.

This report consists of four chapters. Following this introductory chapter, Chapter 2 is a summary of work zone legislation enacted in other states as of 1997 and an overview of the implementation impacts of the law upon transportation agencies. Chapter 3 presents an evaluation



of the effectiveness of this type of legislation. Included in this chapter is an assessment of the enforcement perspective of the legislation, including information on the following:

- patrol methods used and problems encountered,
- funding mechanisms, and
- perceived level of support (or lack thereof) in the courts.

Chapter 4 concludes the report with the summary of the findings from the national review of work zone legislation. In addition, Chapter 4 discusses the implication of these findings upon the newly-passed legislation (House Bill 981) passed during the 1997 session of the Texas Legislature and presents recommendations regarding next year's project activities.



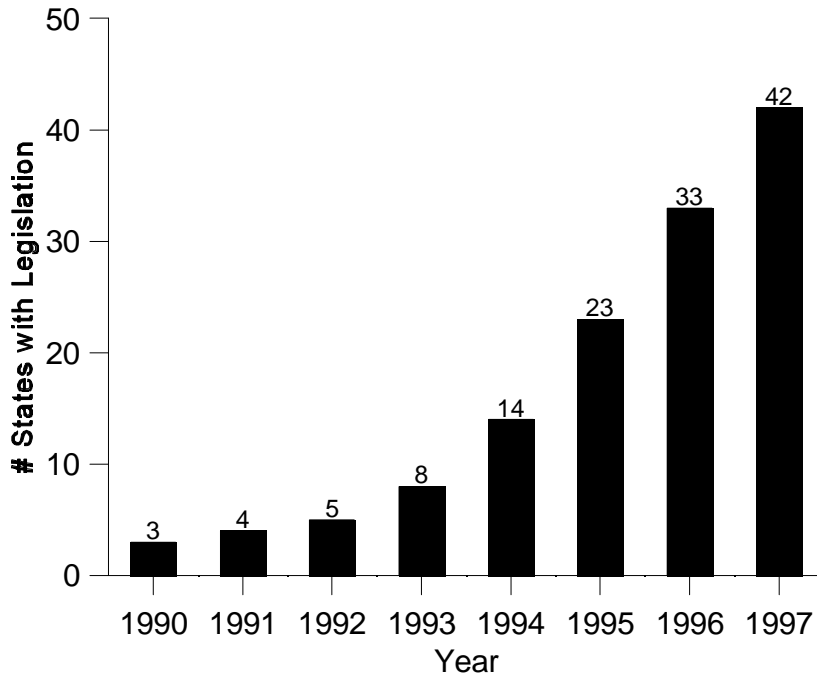
## **2. WORK ZONE LEGISLATION IN OTHER STATES**

Researchers contacted officials with each of the state DOTs to determine whether any work zone-related legislation existed in their jurisdiction. If such legislation did exist, appropriate department personnel were then contacted to determine their perception of the legislation's effectiveness and to identify any issues they had encountered during its implementation. This chapter begins with an analysis of legislation that enhances fines for traffic violations in work zones. This is by far the most prevalent type of work zone legislation enacted to date across the country. The chapter then concludes with a review of a few different pieces of legislation that some states have passed related to work zone operations and safety.

### **ENHANCED FINES FOR TRAFFIC VIOLATIONS**

#### **Extent of Implementation**

Nationwide, legislation which increases the fine and/or jail term for violation occurring with designated work zone areas has become extremely popular and has been implemented in most states. Appendix A provides a state-by-state summary of some of the basic characteristics of legislation in each state. As shown in figure 2-1, this legislation is relatively new in most jurisdictions. As of 1990, only three states (6 percent) had enacted legislation of this type. By 1997, 42 of the 50 states (84 percent) had adopted similar legislation. An additional two states had proposed bills regarding fines in work zones that did not pass during the 1997 legislative session. Officials from these states indicated they were going to try again to get a bill passed the next time their legislature convened.



**Figure 2-1. States with Increased Work Zone Fine Legislation**

**Types of Legislation**

This group of “enhanced fine” laws referred to above actually includes a number of different types of legislation. These differences include the types of traffic violations that are covered in the law as well as how the fine structure itself is actually modified when the violation occurs in a work zone. As table 2-1 indicates, the majority (28 of 42, or 67 percent) of enhanced fine laws passed by the states are limited to speeding violations within a work zone. Approximately 21 percent of the laws (9 of 42) increase fines for all traffic violations that occur within a work zone. The remaining 12 percent (5 of 42) of the laws increase the fines for a number of specific violations, generally drawn from the following list:

- speeding,
- engaging in speed contests,
- reckless driving,

- negligent or careless driving,
- driving under the influence,
- drinking while driving,
- improper passing/overtaking,
- improper backing,
- following too closely, and
- failure to yield or stop at a sign.

**Table 2-1. Violations Covered in State Legislation**

Types of Violations	States with Laws (% of States Having Laws)
Speeding only	28 (67)
All violations	9 (21)
Numerous violations specified	5 (12)

Table 2-2 summarizes how the various states chose to enhance their fine structures in the legislation that they passed. The most common approach (taken by 55 percent [23 of 42] of the states) was to specify that the fines enacted for a violation within a work zone would be double what it would be for that same violation occurring outside of a work zone. Two of the states (5 percent), including Texas, specified that the minimum and maximum fines applicable to a work zone violation would be twice what they are for non-work zone violations. In both of these cases, however, the language does not specify that fines for a given infraction should necessarily be doubled. Another 13 (31 percent) of the states with legislation specified actual fine amounts (generally higher than normal) to be levied for violations cited within the work zone. The actual amounts that the fines may be increased varied dramatically between states with this type of legislation, from a minimum increase of 50¢ to a maximum of \$2000. The final four states (10 percent) with increased fine legislation

specify that the fine will be either a fixed increase above normal or doubled, depending on the amount of the original fine.

**Table 2-2. Methods of Enhancing Fine Structures in Work Zones**

Types of Fine Structures	States With Laws (% of States Having Laws)
Fines imposed are doubled	23 (55)
Minimum and maximum fines allowable are doubled	2 (5)
Fines are set higher by some \$ amount	13 (31)
Fines are a fixed \$ higher or doubled depending on original fine	4 (10)

Another important categorization of the various pieces of legislation is the types of road work to which the increased fines apply. As shown in table 2-3, the majority of laws enacted of this type have been written to include construction and maintenance operations (specified by 26 of the 39 states [67 percent] with laws). The remaining states (13 of 39, or 33 percent) limit the application of these laws to construction zones.

**Table 2-3. Types of Work Zones Covered in the Legislation**

Types of Violations	States With Laws (% of States Having Laws)
All types of work zones	26 (67)
Construction zones only	13 (33)

### **Implementation Requirements**

The laws also vary somewhat across the states in terms of the implementation requirements specified in order for the increased fines to be enacted. Table 2-4 enumerates some of the more common requirements specified in these laws. Essentially all laws require that some traffic control device or piece of construction equipment that identifies an area as a construction or maintenance zone be present. However, laws in a number of states (20 of the 39 states with laws, or 51 percent) specifically indicate that a sign be erected that indicates that fines are increased within the work zone. Interestingly, the laws in two of these states (Delaware and New Jersey) indicate that such signs should be erected but that the absence of such signs does not excuse the motorist from the enhanced fines. Legislation in Michigan and Pennsylvania further hedges against required signing, saying that signs notifying the public of the increased fines should be installed “where practical.” In Oregon, the Oregon Department of Transportation “may give notice” of the increased fine within work zones but is not required to do so.

Another common stipulation found in many of the state’s laws requires that construction or maintenance workers must be present in the work zone at the time of the violation in order for the increased fine structure to be valid. As noted in table 2-4, this language was found in 14 of the 39 states with laws (36 percent). Most of the laws only require that the workers be present in the work area. The Wisconsin law was considerably more specific, however, in requiring that the workers be at risk: “If an operator violates [a motor vehicle law] where persons engaged in work in a highway maintenance or construction area are at risk from traffic, any applicable minimum and maximum

forfeiture . . . shall be doubled.” Unfortunately, the law did not expand upon what constitutes situations where workers are at risk. As a final requirement of note, the legislation passed by Arkansas limits the implementation of increased fines to work zones located on access-controlled facilities only.

**Table 2-4. Implementation Requirements Specified in Increased Fine Legislation**

Implementation Requirements	States With Laws (% of Those Having Laws)
Notification sign to warn motorists that fines are different	21 (50)
Workers must be present at work area	20 (48)
Law applies only to access-controlled roadways	1 (5)

**Public Information/Notification of Increased Fine Legislation**

*Signing*

As stated above, one of the implementation requirements of many of the increased fine laws is the posting of warning and/or regulatory signs notifying motorists that fines will be increased for work zone violations. Even if signing is not required in the legislation, most states contacted had developed specific signing design criteria to notify motorists of the potential for higher fines. Figures 2-2 through 2-4 provide some signing examples from a few of the states with increased fine legislation. As illustrated in figure 2-4, one rather unique design utilizes flashing lights to notify motorists when workers are present (and so when the increased fine structure is in effect). Currently, Illinois and Tennessee utilize this design (or a slight variant thereof).



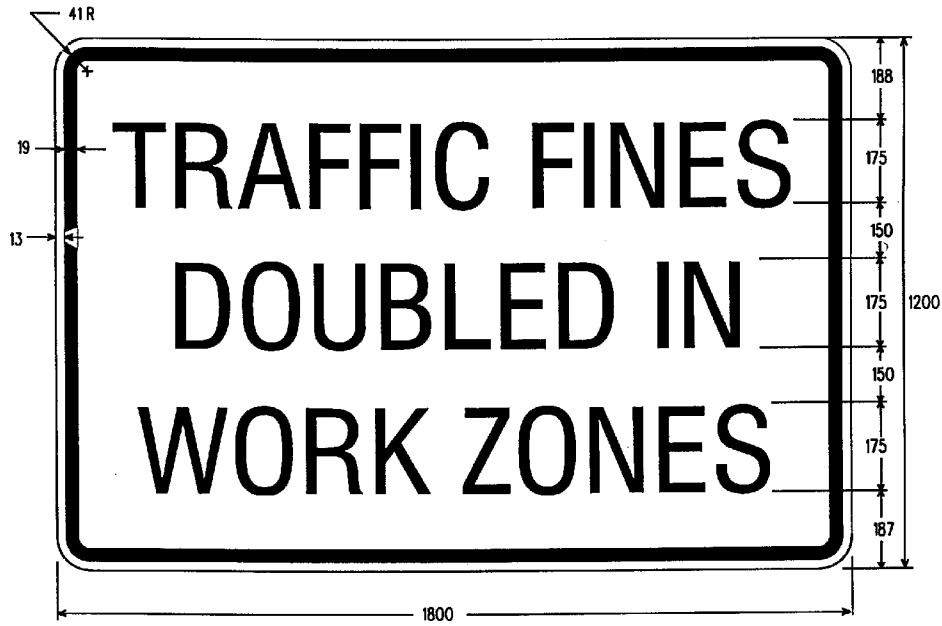


Figure 2-2. Special Double Fine Signing in Michigan

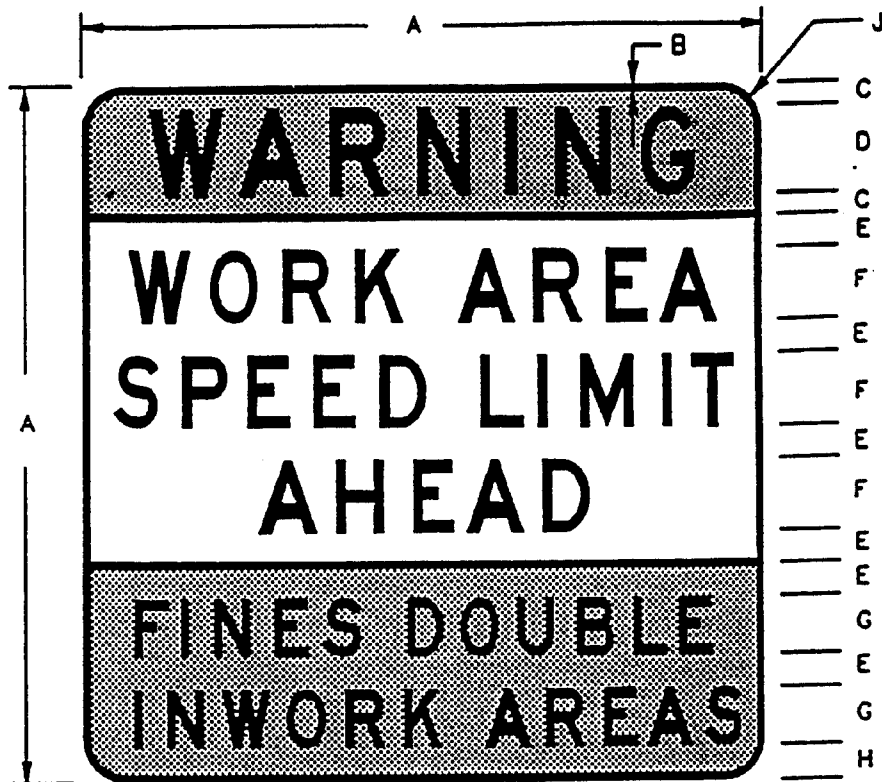


Figure 2-3. Special Double Fine Signing in Maryland

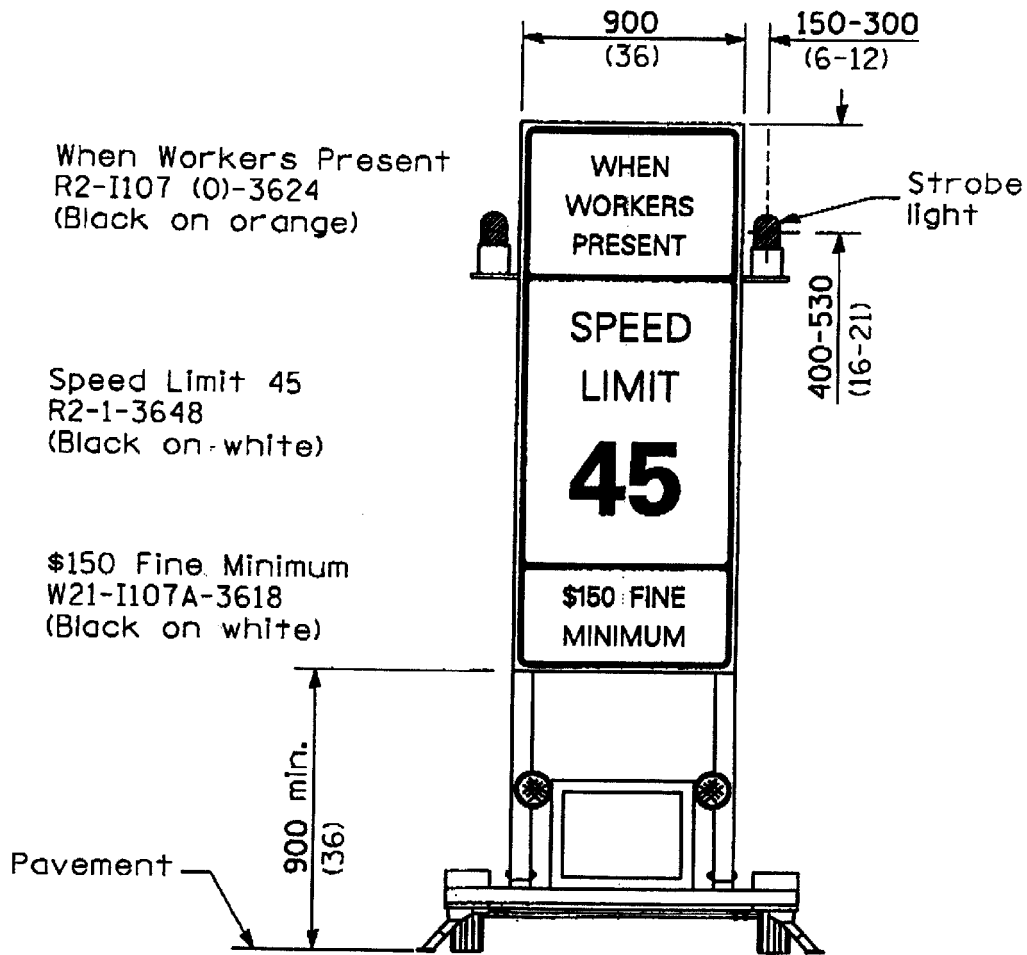


Figure 2-4. Special Increased Fine Signing in Illinois

### *Other Information Dissemination Efforts*

Other than the posting of special warning/regulatory signs at work zones, most states have not implemented a special media or public information campaign specifically to announce their new work zone legislation. If any efforts to publicize the new laws were made, they were incorporated into existing work zone safety promotions. For instance, a year before an increased fine law was passed in its state, the Kansas Department of Transportation implemented a rather extensive media blitz and informational campaign to increase overall public awareness of work zone safety (the “Give ‘Em a Brake” program). This campaign included an unveiling of the program by the governor of the state of Kansas, a series of television and radio public service announcements, billboards and other signing, and brochures/promotional items with the slogan imprinted upon them. Nationwide, other states have implemented similar slogans and work zone programs. When the Kansas Legislature then adopted an increased fine law in 1994, the DOT was able to incorporate this new law into their existing public information program. As an example, figure 2-5 illustrates the modified “Give ‘Em a Brake” brochure that included information on the new Kansas law. The second panel of the brochure provides specifics about the law (i.e., a minimum \$67 fine for speeding).

As a final note on this topic, a rather unique and informal public awareness effort was developed in Arkansas after that state adopted an increased work zone fine law. In locations where media stations have helicopters in the air to monitor traffic during peak periods, it has become popular for the traffic reporter to point out when he or she sees people pulled over in a work zone and make fun of them because they will be receiving a hefty (double) fine for the violation. According to Arkansas DOT personnel, this has become an extremely effective means of informing the public about this law and its consequences for traffic violators.



**GIVE EM A BRAKE**  
KANSAS HIGHWAY WORKERS

*We depend on you to keep Kansas work zones safe.*

Remember, most fines in Kansas work zones are doubled. If you are ticketed for driving just 10 miles an hour over the speed limit in a work zone, you will pay at least \$67 in fines and court costs.

*"Motorists must treat construction and maintenance zones with special care. Those who don't drive safely and within Kansas law will be subject to enforcement action."*



**WHEN YOU SEE ORANGE**  
The Kansas Department of Transportation and Kansas Highway Patrol urge you to:

- ◆ Slow Down
- ◆ Pay Attention
- ◆ Keep a Safe Distance
- ◆ Be Patient
- ◆ Watch for Workers and Equipment

Kansas Department of Transportation  
Office of Public and Employee Information  
Docking State Office Building  
915 Harrison, Room 754  
Topeka, KS 66612-1568

Kansas Highway Patrol  
122 S.W. 7th Street  
Topeka, KS 66603-3847



NOTE: This information is available in alternative accessible formats. To obtain an alternative format, contact the Kansas Department of Transportation, Office of Public and Employee Information, 7th Floor, Docking State Office Building, Topeka, Kansas, 66612-1568 or Phone (913) 296-3785 (Voice)/(TTY).

**Figure 2-5. Work Zone Safety Brochure (Kansas)**

## **OTHER TYPES OF WORK ZONE LEGISLATION**

### **Reduced Speed Limits Without an Engineering Study**

Traditionally, reduced speed limits within construction zones are established by submitting a request and rationale for reduced speeds (and location of speed limit signs) along with the construction traffic control plans to a commission or board for approval. Unfortunately, this approach does not lend itself well to adjusting speed limits to conditions once construction has started or to using them at maintenance-type work zones that have limited lead time. Therefore, another popular piece of legislation enacted in recent years in many states allows state or local DOTs to establish reduced speed limits within construction and maintenance work zones without first conducting a traffic or engineering study.

As of 1997, five states (Indiana, Kentucky, Maine, Minnesota, and Nebraska) had legislative mechanisms in place to reduce work zone speed limits in this manner. Each of these also has enacted increased fine laws for work zone violations (interestingly, the increased fine legislation in each of these states is limited to speeding violations). The specific characteristics of these laws vary state by state. Table 2-5 summarizes the different legislative approaches. For example, the Indiana law specifies that the reduced speed limit in a work zone will be 16 kmph (10 mph) lower than the normal speed limit for that type of roadway. Meanwhile, both Maine and Minnesota allow the speed limit in the work zone to be reduced up to 16 or 24 kmph (10 or 15 mph), respectively, but allow smaller increments to be used if they are determined to be more appropriate. The Nebraska law sets the statutory work zone speed limit fairly low (40 kmph [25 mph] in urban areas, 56 kmph [35 mph] in rural areas), and then allows the supervisor of the work zone project to raise it as he or she sees fit (up to the normal speed limit of that roadway). Only the Kentucky law leaves the reduction to the full discretion of the supervisor in charge of the work zone.

**Table 2-5. States Allowing Reduced Work Zone Speed Limits Without Traffic and Engineering Investigation**

State	Restrictions/Characteristics of the Law
Indiana	<p>Speed limit must be 10 mph below normal speed limit.</p> <p>Maximum work zone speed limit is 45 mph.</p>
Kentucky	No restrictions.
Maine	<p>Work zone speed limits can be set between 25 and 55 mph.</p> <p>Maximum speed limit reduction allowed is 10 mph</p>
Minnesota	<p>Work zone speed limits can be set between 20 and 40 mph.</p> <p>Maximum speed limit reduction allowed is 15 mph.</p>
Nebraska	<p>Statutory speed limits in work zones are 25 and 35 mph in urban and rural areas, respectively.</p> <p>DOT supervisors can raise limits above statutory levels (up to normal speed limits for that roadway) as they deem appropriate.</p>

**Other Flagger/Worker Safety Legislation**

*Reckless Endangerment of Highway Workers*

Washington (1994), Oregon (1995), and Montana (1997) have all passed legislation making it illegal for motorists to endanger highway workers. An example of this type of legislation is provided below, from Section 11.231 of the Oregon Vehicle Code:

A person commits the offense of reckless endangerment of highway workers if the person drives a motor vehicle in a highway work zone in such a manner as to

endanger persons or property if the person removes, evades, or intentionally strikes a traffic control device in a highway work zone.

Reckless endangerment of highway workers is a Class A misdemeanor in Oregon. A person convicted of this offense is subject to suspension of driving privileges. Unfortunately, data as to the effectiveness of this legislation upon work zone safety were not available.

#### *Refusing to Obey a Flagger*

Another law, listed in Section 11.232 of the Oregon Vehicle Code, defines a “Refusing to obey a flagger” offense: “A person commits the offense of refusing to obey a flagger if the person intentionally and unreasonably disobeys a lawful order by a flagger relating to driving a motor vehicle in a highway work zone.” Violation of this law is considered a Class A traffic infraction, which means that an officer does not need to witness the infraction in order to cite the violator.

#### *Illegal Lane Changing*

In 1997, an Ohio legislator proposed a bill to make it illegal to change lanes within 500 feet of a work zone lane closure cone taper. The Ohio DOT neither supported nor opposed the bill. The bill also included some wording authorizing the use of automated enforcement within work zones as well. The bill was not passed during the 1997 legislative session, and it is not known whether it will be introduced again at a later date.





### 3. EFFECTIVENESS OF WORK ZONE LEGISLATION

#### EFFECT OF INCREASED FINES UPON ACCIDENTS

##### Fatal Work Zone Accidents

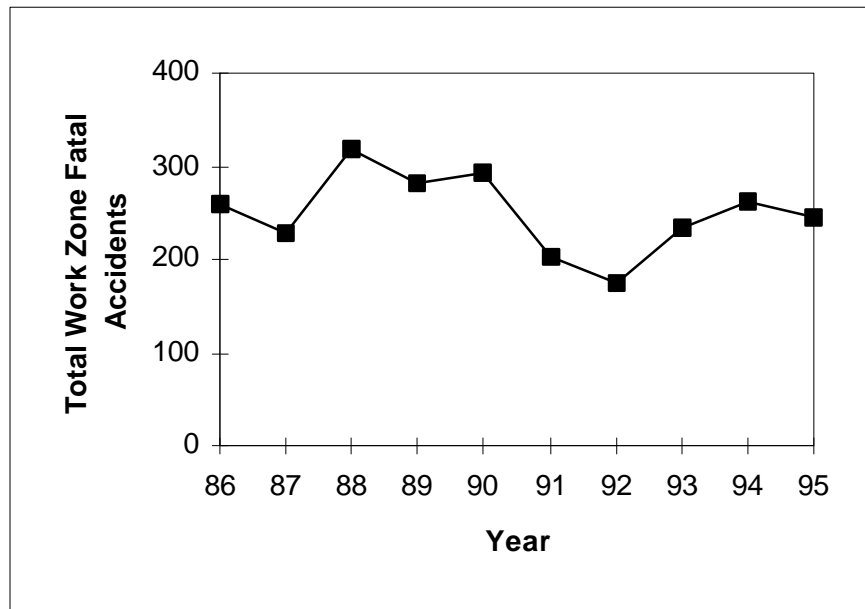
The ultimate goal of enacting work zone-related legislation is to improve safety in the work zone for both the workers and for the motoring public. Consequently, the most direct measure of the effectiveness of such legislation is whether or not accidents that occur within a work zone are reduced in frequency and/or severity. Unfortunately, evaluation of the effectiveness of work zone legislation (primarily the increased fine laws) proved to be a very difficult task. Obtaining similar data from all 50 states, whether that be citations, enforcement hours, accidents, or fatal crashes, proved nearly infeasible. Even if a state did record accidents or citations as occurring in work zones, they either did not have an efficient manner to obtain a history of the data or did not keep appropriate records to search for such data. Furthermore, those states that actually recorded work zone data were very skeptical about the accuracy of the data. From conversations with several law enforcement officials nationwide, it appears that the “check box” on the citation form or accident report is not consistently checked nor is it a priority of the officer’s to check.

Recognizing the limitations in available work zone accident information, an attempt was made nonetheless to assess the impact of increased fine legislation upon fatal accident frequency by utilizing the Fatal Accident Reporting System (FARS) maintained by the National Highway Traffic Safety Administration (NHTSA) of the U.S. Department of Transportation. Appendix B summarizes fatal accidents occurring in *construction zones* for each state over the last several years. Only fatal accidents in construction zones were extracted from the FARS database. This is because some states implemented the increased fine structure exclusively on their construction zone projects (rather than on all types of work zones). As noted in Chapter 2, increased fines in work zone legislation in most states has been passed only recently, which limited the amount of after data that is available (FARS data were only available through 1995).

To determine the effectiveness of the increased fine legislation, researchers conducted a before-and-after analysis using a control group and a check for comparability. This approach has

successfully been used in past analyses of construction zone accident evaluations (6). A before-after analysis with a control group provides a means of isolating the effects of a treatment from the many other time-related effects that may influence the performance measure being used to evaluate that treatment. Factors such as the number of work zones established each year, increases in traffic volumes over time on the various roadways, and other factors may impact work zone accidents. The control group represents a guess as to how these other factors influence accident frequencies at the location of interest.

For this analysis, 14 states had passed and implemented the law early enough to capture at least one year of after data from the FARS database. The control group used in the analysis was all of the other states that did not have work zone legislation passed between 1984 and 1995. Researchers assumed that the total yearly work zone fatal accident trend for this group of states was indicative of the trend that would have also occurred in those states which passed laws, if legislation had not been passed in those states. Figure 3-1 illustrates the total annual fatal work zone accidents for the group of control states.



**Figure 3-1. Total Fatal Work Zone Accident History for Control Group States**

It is recommended that multiple years of accident data be used in analyses such as these to maximize the strength of the study (7). Consequently, researchers used a total of four years of accident data prior to the implementation of the law in each test state. For each state, the frequency of fatal work zone accidents during these four years was compared to the frequency of such accidents occurring in the control group of states during those same years, using a maximum-likelihood goodness-of-fit test (7). Meanwhile, the number of years of data available after implementation of the law varied from state to state (generally between one and four years of data were available). Accidents occurring in the year the law was implemented were not used in the analysis, since the actual time of the year in which the laws were implemented varied from state to state as well.

Researchers summed the yearly work zone fatal accidents for the before and after time periods for both the test state with legislation and the control group of states without legislation. A cross-product ratio was used to estimate the number of fatal work zone accidents expected to occur in the test state in the after period as follows:

$$E[\textit{Test State}_{after}] = \frac{(\textit{Test State}_{before})(\textit{Control States}_{after})}{(\textit{Control States}_{before})}$$

The percentage change in fatal work zone accidents in the test state after implementation of the law was then simply the ratio of actual accidents to the expected number of accidents (minus one) during the after period of analysis. Researchers first computed analyses separately for each of the test states; table 3-1 presents these results. Researchers then combined the results of these individual state analyses into an overall estimate using a weighted average of the individual analyses, with a test of homogeneity performed (again using maximum-likelihood goodness-of-fit statistics) to estimate the degree to which the overall average reasonably represents all of the test states (8). Table 3-1 shows these results.

**Table 3-1. Effect of Increased Fine Legislation on Work Zone Fatal Accidents**

State	Available Yrs After Law Implemented	Change From Expected Fatal Accidents After Law Implementation	Significance of Change (Z-Statistic)	Comparability of Control Group of States
Delaware	4	+40%	0.68	3.45
Indiana	2	-4%	-0.19	7.03
Iowa	2	-2%	-0.03	3.80
Maryland	4	-13%	-0.46	18.22 <sup>a</sup>
Minnesota	2	-18%	-0.43	1.15
Missouri	1	+4%	0.12	6.62
New Hampshire	1	+147%	0.99	0.20
New Jersey	1	-87%	-3.48 <sup>b</sup>	22.10 <sup>a</sup>
Ohio	4	+1%	0.05	11.50 <sup>a</sup>
Pennsylvania	3	+43%	1.54	4.30
South Carolina	1	-100%	0.23	7.43
Virginia	3	+299%	4.22 <sup>b</sup>	1.91
Washington	2	+32%	0.74	6.87
Wisconsin	1	+10%	0.27	2.28
Total		+12%	1.28	33.47 <sup>c</sup>

<sup>a</sup> value exceeds  $X^2_{(0.05, 3)} = 7.82$ . Control group not comparable to this state's fatal work zone accident history.

<sup>b</sup> value exceeds  $Z_{(0.25)} = 1.96$ . Change is statistically significant.

<sup>c</sup> Homogeneity of effects between states:  $X^2 = 33.47 > X^2_{(0.05, 13)} = 22.36$ . Changes in fatal work zone accidents are not similar between all states.

The results of the analyses indicate that, overall, states that enacted legislation to increase fines in work zones did not experience significantly lower fatal accident rates than states without fines. Fatal accident experiences in those states after implementation of a law were not significantly different than those of the states that did not enact any work zone-related legislation. Results did differ significantly state by state, however, based on rejection of a hypothesis of homogeneity between states using a maximum likelihood chi-square statistic. As noted in table 3-1, changes in fatal

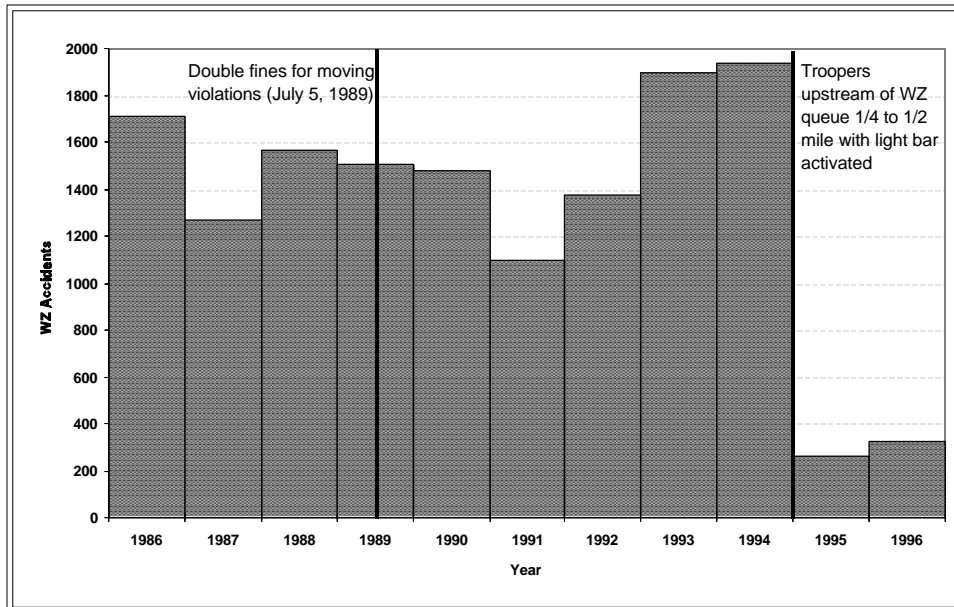
accident frequencies after implementation of an increased fine law (relative to changes that occurred in states without legislation) varied from an 87 percent decrease to a 299 percent increase. However, the frequencies in 12 of the 14 states after implementation of the law were not significantly different from the frequencies before implementation.

The low sample sizes associated with fatal accident analyses does make it difficult to identify any subtle impacts that a treatment such as increased fine legislation may have upon safety. Consequently, the next step in this analysis was to investigate whether increased fine legislation affected the frequency of other types (non-fatal) of work zone accidents. Unfortunately, very few states have work zone accident data in a format which allowed evaluation to occur. The following section provides a review of work zone accidents in a selected number of states for which data were available.

## **Case Studies**

### *Pennsylvania*

Pennsylvania was the first state to pass an increased fine in work zone law, implementing it in 1989. Initially, it appears that the legislation itself had no effect upon work zone safety, as evidenced by the total number of work zone accidents which occurred per year (see figure 3-2). Because of its apparent lack of effectiveness, Pennsylvania then decided to increase the presence of police officers in advance of the work zones. Starting in 1994, the Pennsylvania Department of Transportation and the Pennsylvania State Police combined efforts and began placing a trooper with the trooper's vehicle's light bar activated 0.4 to 0.8 kilometers upstream of the start of queues entering work zones. After this practice was initiated, it does appear that accidents began decreasing.



**Figure 3-2. Work Zone Accident History in Pennsylvania**

### *Washington*

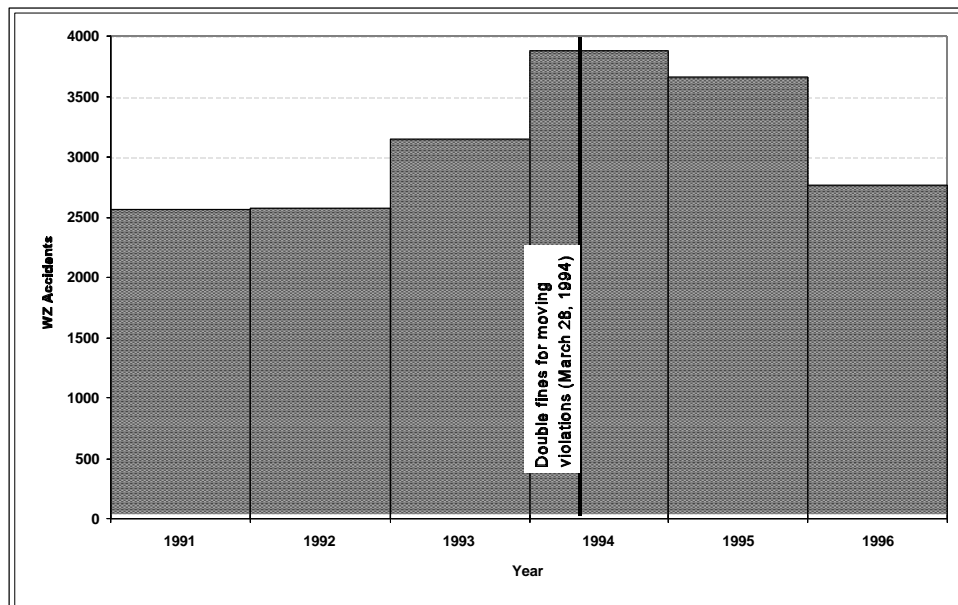
Another state with accident information available is Washington. On March 28, 1994, the state of Washington passed a double fine for speeding in work zones. The law also includes a provision for citing persons who drive negligently in work zones for endangerment of roadway workers. The law also extends to school and playground areas.

Washington's experience with the increased fine law is somewhat difficult to interpret since many work safety improvement techniques were implemented simultaneously. The Washington Department of Transportation's Work Zone Safety Task Force, which convened in September 1993 to study work zone safety generated these improvements. Through their final report, the Task Force recommended increased and improved worker protection, operating procedures, worker and contractor training, and incident reporting. Some of the improvements were implemented through the use of innovative work zone safety devices such as water-filled barriers, changeable message signs, intrusion alarms, truck mounted attenuators, and moveable barriers. Other changes included making workers' clothing more visible, using law enforcement vehicles at work sites, and closely

monitoring traffic control operations to make sure unneeded barrels and signs were removed. An added emphasis on work zone safety is also being provided for employees at district safety meetings.

Another major factor which may have influenced the data analysis is that WSDOT has a strong “Give ‘em a Brake” public education program. WSDOT uses litter bags, bus boards, media packets, and radio and television announcements to develop driver appreciation and to educate the drivers on safety from a work zone standpoint.

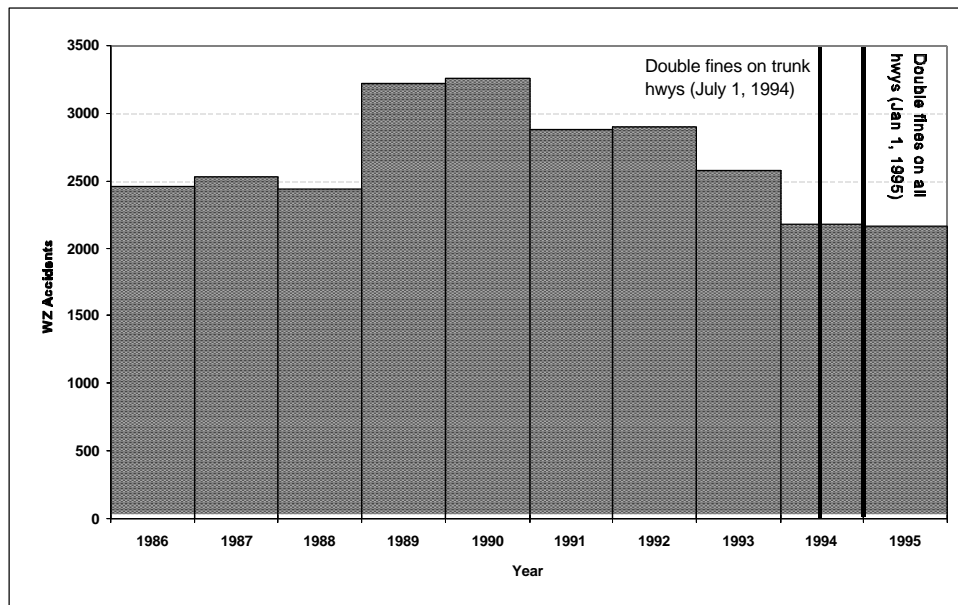
Figure 3-3 shows that total work zone accidents (as reported by WSDOT) steadily increased to a peak in 1994 and has been steadily decreasing since then. Coincidentally, this trend reversal coincided with the implementation of the increased fine law and other work zone safety initiatives. Unfortunately, it cannot be said for certain the extent to which the law itself was responsible for the reversal (if indeed it had any effect at all). Nevertheless, the law was one tool the WSDOT used to increase overall awareness of the work zone safety problem and to obtain support for techniques to reduce the problem.



**Figure 3-3. Work Zone Accident History in Washington**

*Minnesota*

In 1988, Minnesota implemented legislation that allowed them to establish regulatory speed limits in work zones without a traffic or engineering study. They then developed an increased fine law in 1994 and implemented it gradually over a six-month period (the first step began on July 1, 1994, when the law was implemented on trunk highways; the second and final stage was implemented January 1, 1995, on the remainder of the highways). Figure 3-4 show Minnesota’s recent history with construction zone accidents. The figure suggests that the increased fine structure for work zones has not significantly impacted work zone accidents in Minnesota. It should be noted that the Minnesota Department of Transportation formed a Work Zone Safety Unit to develop and implement work zone safety traffic control standards, specifications, and policies that promote uniformity and safety of work zone traffic controls on Minnesota’s highways. The results of this unit’s effort have been implemented over the years concurrently with the increased work zone fine law.



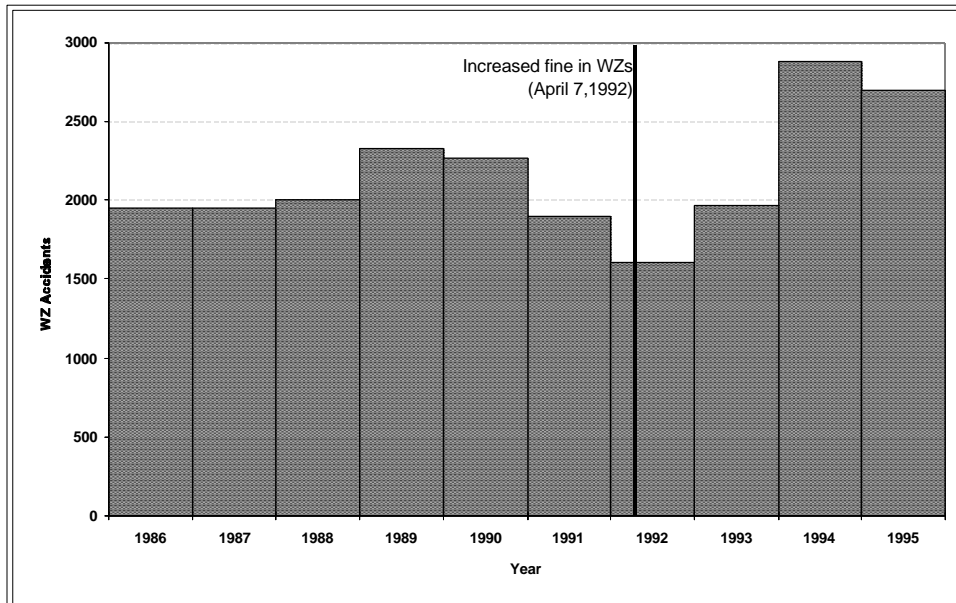
**Figure 3-4. Work Zone Accident History in Minnesota**



*Maryland*

Maryland enacted an increased fine law in work zones in 1991. However, judges were dismissing what the Maryland Department of State Police perceived as a high proportion of the challenged cases. The judges felt that a fixed fine (instead of a double fine with a \$1000 maximum as was initially implemented) was more appropriate and consistent with Maryland's typical fine structure. Therefore, on April 7, 1992, an amendment was passed which incorporated a fixed fine for speeding in work zones.

Figure 3-5 appears to contradict the theorized effect of an increased fine structure for work zones. The state passed and implemented their version of the law in 1992. As shown in the figure, accident frequencies have not decreased since the passage of the increased fine law but seem to have actually risen slightly in subsequent years. Of course, as indicated in a previous section, such an increase could be due to greater work zone exposure, increased traffic volumes, etc. Even so, one cannot say that the increased fine law has reduced work zone accidents. It should be noted that increased enforcement of Maryland's work zones is only provided when a contract has been issued with the Department of State Police.



**Figure 3-5. Work Zone Accident History in Maryland**

## **Summary**

Available accident data does not provide conclusive evidence that work zone legislation alone (particularly the implementation of increased fines in work zones) significantly reduces the frequency of work zone accidents. Results of the multiple before-after analyses of fatal work zone accidents indicated no difference in fatal accident trends between states that had implemented increased work zone fine legislation and those which had not. Generally speaking, case study analyses of total work zone accident trends were likewise inconclusive with respect to the effect of work zone-related legislation.

Evidence from Pennsylvania indicates that it was not the implementation of an increased fine law, but rather an increase in enforcement levels at work zones, that significantly impacted work zone accidents in that state. Obviously, enforcement and work zone legislation are highly interdependent. In previous studies, enforcement has already been shown to have a substantial effect on work zone speeds (2-4), presumably leading to increased safety in these zones. One could further argue that driver attention is higher and behavior more cautious as well when enforcement is present. Meanwhile, the intent of work zone legislation has increased the enforcement threat by making an individual violation more expensive to motorists. Unfortunately, the accident evidence that is available does not illustrate the extent to which increased fine legislation may enhance the effectiveness of enforcement (if at all). Consequently, researchers investigated enforcement experiences through direct interviews with enforcement officials. The following sections discuss further state experiences regarding the relationship between enforcement and work zone-related legislation.

## **ENFORCEMENT ISSUES PERTAINING TO WORK ZONE LEGISLATION**

### **Patrol Methods**

Although reference is usually made to work zone “enforcement” in a generic sense, it is important to note that different enforcement techniques have been successfully used at work zones in the various states, each of which may have influenced the enforcement-legislation relationship differently. Generally speaking, enforcement procedures can be categorized in one of two ways:

- Circulating patrols through the work zone, and
- Stationary patrols.

Past research has indicated that both approaches can be effective in reducing speeds, although stationary patrols appear to reduce speeds by a slightly greater amount on average (4). Perhaps more relevant to this research, however, is the fact that enforcement agencies in different states have very different perspectives on where they should set their patrol officers at work zones for maximum effectiveness. In Pennsylvania, for instance, these agencies generally station patrol vehicles in advance of the work zone. Enforcement officials believe that their primary purpose at the work zone is to be present and visible (rather than to cite violators) so that motorists reduce their speeds and drive more cautiously. Of course, stationing enforcement at this location does not allow officers to easily chase and apprehend traffic violators, and so they do not issue a large number of citations in work zones. Nevertheless, the work zone accident reductions that coincide with the initiation of the enforcement activities in Pennsylvania provide strong evidence that their approach is effective.

The state enforcement agency in Connecticut takes a slightly different perspective regarding work zone enforcement. Because of the difficulties in apprehending violators within the work zone, this agency positions their patrol vehicles just downstream of the zone, capturing violators (primarily speeders) as they exit the work zone. In a slightly different approach, the enforcement agency in Kansas utilizes a two-patrol unit team for its work zone enforcement activities. One unit measures speeds within the work zone and radios downstream to the second unit to identify violators who need to be ticketed once they get past the work zone. This approach increases the ability of the enforcement officer to apprehend and cite violators. However, motorists are not aware that the officer is present until after they have passed through the work zone. Theoretically, this approach could affect motorist behavior similar to the selective traffic enforcement programs (STEPS) in place in Texas and elsewhere, if overall enforcement levels are high enough to generate motorist expectations that an officer will be present at each work zone. Unfortunately, the enforcement level needed to achieve this expectation cannot be ascertained from the available data.

Regardless of the patrol method utilized, a few problems were commonly heard from the enforcement agencies contacted regarding work zone-related laws. These included the following:

- ▶ difficulties in apprehending violators within the work zone (due to a lack of shoulders, restricted lane widths, etc.),
- ▶ difficulties in keeping track of whether work zone personnel are present at a work zone (relevant in states with legislation requiring workers to be present in order to impose higher fines for traffic violations),
- ▶ difficulties in remembering to mark that a traffic infraction was incurred in a work zone., and
- ▶ difficulties in enforcing laws that were viewed as particularly “complex” (i.e., requiring workers be present, special traffic controls, certain speed limit restrictions).

Researchers attempted to gather and evaluate enforcement data (citations) from the states. Unfortunately, historical records of citations were not generally kept by those states who had enacted legislation more than one year ago. Conversely, enforcement agencies who did have some background citation information were in those states which had yet to enact legislation, or had enacted it so recently that after data were not yet available. Therefore, it was not possible to positively correlate enforcement levels and safety effects for any of the states examined.

### **Funding Mechanisms**

Another important difference found pertaining to enforcement and increased work zone fine legislation is the mechanism by which this enforcement is funded. In general terms, three funding approaches have been found nationwide:

- As part of normal duty,
- Through contractor (DOT) or STEP contracts,
- Through payback arrangements from the increased fine revenues generated.

The first alternative, where work zone enforcement is part of regular patrol duty and funding, is the most prevalent arrangement in existence nationally. Arrangements may be made with enforcement agencies to emphasize work zones, but this must generally come at the expense of reduced enforcement activities elsewhere.

The second approach sometimes utilized is for the cost of additional enforcement at specific work zone locations to be incorporated into a specific construction contract (with an interagency agreement for increased enforcement established between the DOT and the enforcement agency). In essence, the contract provides overtime funding for officers. This approach allows a specified level of enforcement to be guaranteed at a work zone location. However, it tends to be site specific and limited to construction-type projects that are more extensive in nature and duration.

The final approach utilized by a few states (presently Kentucky and Indiana) is to designate that the additional revenues from the increased work zone fine legislation be used to fund work zone enforcement activities. A special fund or account is established in which work zone fine revenues are deposited. Then, the transportation agency manages that fund, hiring off-duty police officers to patrol and to enforce traffic laws in work zones. Table 3-2 presents the specific wording used in the laws for these states to allocate revenues to work zone enforcement.

### **Court Support of Enforcement**

Attempts to objectively assess court support of the work zone laws enacted in other states were not successful for the same reasons that were given above for tracking citation levels. As a result, efforts turned to identifying and collating anecdotal experiences enforcement personnel had with the implementation of these types of laws. During the telephone contacts of transportation and enforcement agencies in each state with work zone legislation, several issues were discovered pertaining to the court support of the additional fines that are imposed for speeding in construction and maintenance work zones. The major issues are as follows:

**Table 3-2. Examples of Work Zone Enforcement Hire Back Legislation**

State	Section of Code	Wording
Kentucky	189.394 (7)	“All fines collected for speeding in a highway work zone in violation of Section 4 of this Act shall be deposited into a separate trust and agency account within the Transportation Cabinet known as the ‘Highway Work Zone Safety Fund.’ The highway work zone safety fund shall be used exclusively by the transportation cabinet to hire or pay for enhanced law enforcement of traffic laws within highway work zones.”
Indiana	8-23-2-15(c & d)	“The department [of transportation] shall use the money transferred to the department under IC [Indiana Code] 33-19-7-1 and IC 33-19-7-4 to pay the costs of hiring off duty police officers to perform the duties described in subsection (b)....All money transferred to the department under IC 33-19-7-4 is annually appropriated to pay off-duty police officers to perform the duties described in subsection (b).”

- Citations dismissed due to the belief that an officer does not have the authority to influence the fine that is being imposed,
- Fines reduced when the driver does not have a means to pay the additional fines,
- Citations dismissed because the drivers were not adequately warned of the additional fine for work zone violations,
- Citations dismissed because the enforcement officer could not verify that workers were present in the work zone when the citation was issued, and
- Lower fines issued by the courts when the citation is issued in a work zone.

In addition to these specific issues, a few states simply dismissed many work zone citations because the court system was already overloaded. Regardless of the reason for dismissal or fine reduction, almost all state officials who mentioned this type of problem noted its adverse consequence upon officer morale and efforts to enforce traffic violations in work zones. In a few instances, there was a perception that officers tended to avoid work zone areas because of these problems and concentrated their efforts elsewhere to be more effective overall. The sections below provide further details concerning the above issues.

### *Authority Issue*

The citation procedures in most states require that the law enforcement officer indicate on the ticket whether or not the violation is within a designated construction and maintenance zone (and whether workers were present at the time the citation was issued). Many states have reported that judges feel that this gives the officers control over the amount of the fine that is issued against an individual (i.e., a person does not receive an increased fine if the officer does not check the construction/maintenance zone box on the citation). It is the belief of many judges that officers do not have the right to impose an additional fine on drivers and therefore have been inclined to dismiss or dramatically reduce the fines. This has made it difficult for some of the states, such as Kentucky, to keep the additional officers patrolling the work zone areas. Kentucky had developed a budget for the additional officers required for work zone patrol to be covered by the additional fines that resulted from the increased fines. When the court system reduces or dismisses the fines, the state does not receive additional funding and therefore has to reduce or to reassign officers away from the concentrated effort in the work zone areas.

Florida's court system has viewed the need for drivers to slow down in work zones as not always being necessary. In fact, anecdotal information indicates that the courts have been accepting and siding with testimony from drivers who stated that they did not believe that a reduced speed limit in the work zone was warranted to slow down and the fine was unfair. As a result, the courts have dismissed many of the citations.

### *Inadequate Violator Income to Pay Citations*

Officials in California have reported a problem with its court system and the willingness of the courts to enforce increased fines in work zones. Officials noted that drivers in a lower income bracket and having several citations are able to get the courts to reduce/dismiss the fines or to establish a payment schedule rather than face a jail term. This approach appears to be fairly well known throughout the general population. As one official noted, this reaction by the court system has lessened the impact of the legislation and has had a negative impact on the motivation of enforcement personnel for issuing such citations.

### *No Warning of an Additional Fine*

The increased work zone fine legislation in many states requires that signs notifying the public of the increased fines be present. This particular component in the law has been somewhat troublesome for a few states where some drivers have used this statement to get their citation dismissed. It appears that these motorists have claimed that they entered the work zone from a side road or driveway rather than approaching the work zone on the main roadway, and so were not notified that fines would be increased. Since notification was a required component of the law, they have been successful in getting some tickets dismissed. As a result, some states have limited the increased fine legislation to controlled-access facilities where it can be assured that drivers will see an increased fine warning sign prior to entering the work zone.

Officials in North Carolina have reported that the \$100 fine itself has not been much of a deterrent to keep drivers from speeding. However, they note that drivers seem to be more concerned about how a work zone citation affects their insurance costs. Apparently, a stiffer monetary fine results in a higher insurance rate for a prolonged time period.

### *Verifying Worker Presence at a Work Zone*

The final issue raised concerning enforcement of increased work zone fine laws is the stipulation in many of the laws that requires workers to be present in order for the increased fine to be applicable. Enforcement officials in several states noted instances where their officers had relied on the presence of temporary work zone signing (i.e., flagger ahead signs, etc.) to indicate to them



that workers were present in the work zone, and so enforced the work zone as such. However, when challenged in court, the officers could not testify that they had actually seen workers present in the zone, and so the court dismissed the citations. It is undesirable to leave work zone-related signing in place when it is not applicable to the work activity because it reduces the credibility of, and breeds disrespect for, work zone traffic control devices amongst the driving public. It is now apparent that this practice can have direct negative consequences to enforcement activities as well.

#### *Lower Work Zone Fines*

The final issue noted during the telephone contacts was the perception that some courts were setting the fines for work zone traffic violations lower than they would in non-work zone situations, such that the overall fine (once it was doubled as per the law) was about or only slightly higher than it would have been for that violation occurring outside of a work zone. Unfortunately, this practice could not be verified through court records or other objective means. Nevertheless, it does indicate a perception among some enforcement agencies that the court system does not always support enforcement activities, which can lead to a reduced emphasis placed on work zone enforcement by the officers.



## 4. SUMMARY AND RECOMMENDATIONS

### SUMMARY OF FINDINGS

This report has presented the results of research performed to identify and to assess the work zone-related legislation implemented in various states nationwide. The following bullets summarize the major findings of this activity:

- The most common type of work zone legislation enacted nationally has been that which increases the level of fines of violations that occur in work zones. Forty-two states have implemented this type of legislation. Five states have enacted legislation that allows lower speed limits to be posted in work zones without getting prior approval or conducting a traffic or engineering investigation. Three states have enacted legislation which makes it a misdemeanor offense to endanger a highway worker or to disobey a flagger.
- Slightly more than one-half of the states that have enacted increased work zone fine legislation have specified that the level of fine issued will be double what it would be outside of a work zone. Another sizable group of states have specified fixed dollar increases for fines in a work zone. Two states (including Texas) specify that the minimum and maximum fines that can be issued for violations in a work zone will be double what they are outside of a work zone.
- Approximately two-thirds of the states with increased fine legislation have made the law applicable to all types of work zones (construction, maintenance, or utility). Conversely, one-third of the states have limited the law to construction activities only. Similarly, two states have limited the law to work zones on controlled-access facilities.
- Approximately one-half of the states with legislation require that special signing be posted at each work zone notifying drivers that fines for traffic violation in work zones are increased. Likewise, approximately one-half of the states require that workers be present at the work zone before traffic fines are increased.
- Most states limit efforts to inform the public of the implementation of an increased work zone fine law to the special signing that they posted at the work zones. A few states have added

a statement or two about the legislation to their existing work zone safety promotional brochures.

- Analyses of the fatal accidents occurring in work zones between 1984 and 1995 indicated that implementation of an increased fine law had no consistently measurable effect upon fatal work zone accident frequency. A few states showed a significant change in accident frequencies (some increased, others decreased). Fatal work zone accidents in most states with legislation, however, did not differ significantly from what would have been expected had no legislation been enacted.
- Limited data were also available on total work zone accidents in states where legislation has been enacted. Again, it appears that the implementation of the law itself has not had a measurable effect on total work zone accident frequencies. Researchers observed a measurable decrease in accidents in one state which began stationing law enforcement personnel in the approach area to each work zone. However, it was not possible to determine whether there was an incremental benefit in having an increased work zone fine law in place when this practice was initiated.
- Enforcement agencies generally use one of three funding mechanisms to enforce any increased fine legislation that is enacted: regular duty budgets, overtime agreements paid by the DOT, or payback agreements to the enforcement agency that use revenues from the increased work zone fines.
- Anecdotal information obtained from discussions with both DOT and enforcement personnel revealed several common issues or concerns encountered when trying to enforce an increased work zone fine law. In each case, these concerns resulted in an abnormal amount of citation dismissals by the courts and adversely affected enforcement personnel motivation. These concerns included the amount of authority and discretion the increased fine law gave to enforcement officers, the ability of lower income drivers to pay the higher fines, the signing required to ensure that motorists are notified that fines are increased in the work zone, and the difficulties encountered in ensuring that workers are present at the work site when the traffic violation occurs.

## **IMPLICATIONS OF FINDINGS TO TEXAS WORK ZONE LEGISLATION**

The Texas Legislature introduced and passed House Bill 981 during the 1997 session. The newly passed law doubles the maximum and minimum fines that can be issued for a traffic violation, if that violation occurs within a work zone. The law requires that workers be present at the work zone and that the zone not be a mobile maintenance operation. Special signing notifying motorists that fines are increased is not required by the law, but at least one warning sign must be displayed to indicate that a work zone is present.

The information summarized in this report does provide some insight into the potential problems and expected effectiveness of this work zone-related law. One of the major concerns is the fact that the law only specifies that the minimum and maximum fines are doubled in a work zone. Although it is being implemented as a double fine law, there is nothing in place which requires the courts to increase fines for work zone traffic violations. Unfortunately, officials in other states with this type of wording in their legislation did not have a sense of whether the courts were or were not increasing fines for work zone violations as a result of increasing the minimum and maximum fines possible.

The stipulation that workers be present at the work zone in order for the higher minimum and maximum fines to be applicable is another issue that has caused enforcement and court support problems for some states. The Texas Department of Public Safety (DPS) is in the process of modifying their citation forms to include a check box for the presence of workers. However, whether or not the courts will challenge an officer's notation that workers were present is unknown at this time. It is also not known whether the field officers will remember to check the "workers present" box each time they write an applicable citation (another problem encountered in other states).

Another potential limitation of the current law with respect to its support by the court system is that it does not fully define what constitutes the limits of the work zone. While these are generally established via the first and last temporary warning signs on long-term construction projects, the distinction of work zone limits (particularly the end of the work zone) for maintenance activities is more difficult. Again, the extent to which the courts challenge citations in these types of areas remains to be seen.

## **RECOMMENDATIONS**

Despite the information obtained from other states regarding the implementation of work zone-related legislation, a number of questions still remain concerning the effectiveness of this practice. It is apparent that the likelihood of success in improving work zone safety lies in the ability of the legislation to effectively increase either the potential threat of apprehension for traffic violations within the work zone and/or the severity of the penalty once apprehended. Unfortunately, the limited amount of data available in other states precludes a thorough post-implementation analyses as to just how effectively these laws accomplish this goal.

The passage of Texas House Bill 981 during 1997 provides a unique opportunity for evaluating the effectiveness of this version of work zone legislation to increase the apprehension threat. Specifically, research during the next year should focus on the assessment of how the court system deals with the new law. A thorough before-after analysis should be performed on citation rates and fine dispensation procedures at selected case study locations in Texas to determine whether penalties are significantly increased by the laws. Data regarding how (and if) the new law affects citation rates and frequencies with which violators challenge the citations is also of interest and is data that is currently unavailable from other states.

## 5. REFERENCES

1. Traffic Safety Facts: A Compilation of Motor Vehicle Crash Data from the Fatal Accident Reporting System and the General Estimates System. NHTSA, U.S. Department of Transportation, Washington, D.C., August 1995
2. Richards, S. H., R. C. Wunderlich, and C. L. Dudek. *Controlling Speeds in Highway Work Zones*. Report FHWA/TX-84/58+292-2. Texas Transportation Institute, College Station, Texas, February 1984.
3. Graham, J. L., R. J. Paulsen, and J. C. Glennon. *Accident and Speed Studies in Construction Zones*. Report FHWA-RD-77-80. FHWA, U.S. Department of Transportation, Washington, D.C., June 1977.
4. Ullman, G. L. and D. R. Riesland. *Catalog of Work Zone Speed Control Methods*. Report FHWA/TX-90/1161-2. Texas Transportation Institute, College Station, Texas, May 1990.
5. Warren, D. L. Chapter 17 - Speed Zoning and Control. In *Synthesis of Safety Research Related to Traffic Control and Roadway Elements, Volume 2*. Report FHWA-TS-82-233. FHWA, U.S. Department of Transportation, Washington, D.C., December 1982.
6. Ullman, G.L. and R.A. Krammes. *Analysis of Accidents at Long-Term Construction Projects in Texas*. Report FHWA/TX-90/1108-2. Texas Transportation Institute, College Station, Texas, June 1991.
7. Griffin, L.I. "Three Procedures for Evaluating Highway Safety Improvement Programs." Presented at the Annual Convention of the American Society of Civil Engineers, New Orleans, Louisiana, October 1982.
8. Griffin, L.I. "A Systematic Framework for Analyzing Categorical, Before-and-After Data." Texas Transportation Institute, College Station, Texas, April 1989.





**APPENDIX A:**

**STATE-BY-STATE SUMMARIES OF  
INCREASED WORK ZONE FINE LEGISLATION**



**Table A-1. Enhanced Fine Legislation in  
Work Zones by State**

State	Chapter/Section/ Bill No.	Date Enacted	Violations Affected	Type of Enhanced Fine	
				Fixed (\$)	Multiple of Original Fine
AL	none	---			
AK	none <sup>a</sup>	---			
AR	AC Section 27-50-408	1995	speeding		2X
AZ	none <sup>a</sup>	---			
CA	MVC Section 42009	1994	numerous violations specified		2X
CO	CRS 42-4-613. (HB 97-1003)	1997	speeding		2X
CT	CGS Vol 5. MVC 95- 181 Sec. 1 (HB 6050)	1995	all moving vehicle violations		2X
DE	MVC Title 21, Sec. 4105	1990	numerous violations specified		no less than 2X for 1st infraction
FL	FAC Section 318.18 (SB 892)	1996	speeding		2X
GA	CGA Section 40-6- 188(a)(b)(c) (SB 580)	1996	speeding	\$100-\$2000, up to 12 mo. jail	
HA	none	---	---		
ID	MVC Sec. 49-657	----	speeding	\$50	
IL	MVC Sec. 5. Sec. 11-605 (HB 0008)	1996	speeding	\$150 min.	
IN	IC1993, 33-19 Chapter 6 Sec. 14 (HB 1154)	1993	speeding	.50 cents + \$25 if ordered by judge	
IA	IC 1993 - Sec. 3. Sec. 805.8 New Subsec2A (HF193)	1993	all moving vehicle violations		2X
KS	KSA 8-2004(c) (HB 2781)	1994	all moving vehicle violations		lesser of 2X or \$100
KY	KRS, Chapter 37, Sec. 2. 189.2325, (SB 137)	1996	speeding		2X(\$120-\$200)

**Table A-1. Enhanced Fine Legislation in  
Work Zones by State**

State	Chapter/Section/ Bill No.	Date Enacted	Violations Affected	Type of Enhanced Fine	
				Fixed (\$)	Multiple of Original Fine
LA	LRS 32:57(G) (SB 1363)	1997	speeding		2X
MA	none	---	---		
MD	MVC Sec. 21-802.1	1991	speeding	\$270	
ME	MS Sec. 1. 29-a, MRSA 2075, sub-2. (HP 134, LD 182)	1995	speeding		2X
MI	MVC Sec. 257.628, 257.629c, add Sec. 601b(1) (HB5123)	1996	all moving vehicle violations		2X
MN	MS 1994, Sec.169.14, Subd. 5d(d)	1994	speeding		larger of 2X or \$25
MO	RSM Sec. 304.580 (HB 1430)	1994	all moving vehicle violations	\$35	
MS	none	---	---		
MT	MVC. 61-8-314 (5)(a)	1997	all traffic violations		2X
MT	MVC 61-8-7 New section (HB 99)	1997	speeding		2X (\$20-200)
NC	Section 1. GS 20-141(j2) (SB 30)	1997	speeding	\$100-\$250	
ND	MVL Sec. 39-09-02	1995	speeding	\$40+\$1/mph when 10 mph+over limit	
NE	RSN Sec. 11, Sec. 60-6, 190(1)(2) (HB 901)	1996	speeding		2X (\$20-\$400)
NH	VCS Sec. 265:6-a	1994	speeding	\$250-\$500	
NJ	RS, Title 39- Chapter 4-203.5 (HB 2262)	1993	all moving vehicle violations		2X
NM	none <sup>a</sup>	---	---		

**Table A-1. Enhanced Fine Legislation in  
Work Zones by State**

State	Chapter/Section/ Bill No.	Date Enacted	Violations Affected	Type of Enhanced Fine	
				Fixed (\$)	Multiple of Original Fine
NV	NRS Sec. 1, Chap. 484 new sec. 1(a)(b) 2, 3(a)(b)(c) (AB 456)	1997	speeding		lesser of 2X or \$1000, and/or 6 mos. jail or 120 hrs. community service
NY	Vehicle & Traffic Law 1180(f)(g)(3)	1997	speeding		2X
OH	RC 4511.79(D)(3) (HB 247)	1991	speeding		2X
OK	47 OS, 1991, Sec. 11-806 (c) (HB 1860)	1996	speeding		2X
OR	MVC Sec. 11.230 (3)(a)	1996	all moving vehicle violations		2X
PA	PaCS Sec. 33-3326 (c)	1989	numerous violations specified		2X
RI	MVC Sec. 31-14- 12.1(a)(b)	1996	speeding		2X
SC	MVC Sec. 56-5-1535 (A)(B)(C)	1994	speeding	\$75-200, 30 days jail or both	
SD	MVC Sec. 32-25-19.1 (HB 1214)	1996	speeding		2X
TN	TCA Sec. 55-8- 152(g)(2) (SB 2075)	1996	speeding	\$250-\$500	
TX	MVC Sec. 472.022(d) (HB981)	1997	all moving vehicle violations		2X of min. and max. applicable
UT	none	---	---		
VA	MVC Sec. 46-2-878.1	1992, 1995 <sup>b</sup>	speeding	\$250 max.	
VT	VSA Sec. 16.23, Section 1010	1997	speeding		2X
WA	RCW 46.61 Sec. 1 (SB 5995)	1994	speeding		2X
WI	WS Sec. 1. 346.60 (SB 48 and SB 44)	1995	numerous violations specified		2X of min. and max. applicable

**Table A-1. Enhanced Fine Legislation in  
Work Zones by State**

State	Chapter/Section/ Bill No.	Date Enacted	Violations Affected	Type of Enhanced Fine	
				Fixed (\$)	Multiple of Original Fine
WV	MVC Subsec. 17C-3- 4b, 17C-3-4a	1994	numerous violations specified	\$200 max., 20 days jail or both	
WY	none <sup>c</sup>	---	---		

<sup>a</sup> Bill was submitted but did not pass in the 1997 legislative session

<sup>b</sup> Original bill passed in 1992 applied to only “reduced” maximum speed limits in work zones. This requirement was eliminated in 1995 to allow it to be applied to all maximum speed limits in work zones (even those not reduced from the normal speed limit).

<sup>c</sup> Wyoming has a separate (higher) fine structure for speeding at locations where a speed limit has been established based on an engineering study rather than the blanket speed limits defined in the motor vehicle code. This includes construction zones, school zones, transition zones, etc.

HB = House Bill

SB = Senate Bill

**APPENDIX B:**  
**FATAL CONSTRUCTION ZONE ACCIDENT DATA 1986-1995**





**Table B-1. Fatal Accidents in Construction Zones**

State	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Alabama	14	5	17	18	12	16	14	10	9	6
Alaska	1	2	2	0	3	3	2	0	1	1
Arizona	10	12	24	20	15	7	9	18	16	14
Arkansas	8	10	5	6	7	6	12	8	8	<b>14</b>
California	35	32	48	57	60	73	54	57	50	<b>52</b>
Colorado	6	3	3	1	5	6	1	8	2	5
Connecticut	7	2	4	7	8	7	6	5	11	<b>4</b>
Delaware	4	2	1	1	<b>0</b>	3	3	2	1	3
Florida	14	5	36	19	31	17	19	26	27	18
Georgia	22	24	7	11	12	7	8	49	48	<b>53</b>
Hawaii	0	1	0	1	3	3	1	3	1	2
Idaho	1	0	1	1	3	2	2	2	1	3
Illinois	25	18	18	23	38	31	21	17	31	<b>34</b>
Indiana	20	6	12	10	18	16	17	<b>14</b>	13	15
Iowa	1	8	7	4	4	4	7	<b>3</b>	7	3
Kansas	1	3	6	4	8	3	10	6	5	20
Kentucky	6	5	6	5	3	4	3	6	2	2
Louisiana	11	9	15	14	25	10	5	10	8	5
Maine	2	6	6	2	1	2	3	2	4	0
Maryland	12	15	2	7	4	<b>10</b>	5	7	4	4
Massachusetts	1	2	3	4	5	4	3	2	4	9
Michigan	10	4	19	8	6	9	8	3	12	9
Minnesota	10	8	13	12	9	6	7	5	<b>8</b>	6
Mississippi	3	3	3	1	4	3	0	2	7	4
Missouri	17	10	11	7	10	5	14	10	<b>13</b>	11
Montana	7	1	2	2	6	5	1	5	4	4
Nebraska	4	7	13	6	5	6	5	7	9	8
Nevada	3	7	5	8	10	5	7	7	6	4
New Hampshire	2	3	1	0	1	1	0	1	<b>0</b>	2
New Jersey	7	8	17	19	29	37	12	9	<b>10</b>	3
New Mexico	7	7	6	10	5	2	6	1	6	5
New York	4	11	9	9	12	14	10	12	26	<b>18</b>
North Carolina	2	2	5	1	6	14	5	9	11	5
North Dakota	1	0	2	4	2	1	0	1	0	<b>0</b>
Ohio	18	21	21	14	7	<b>9</b>	19	10	13	10
Oklahoma	9	10	9	7	5	7	6	10	5	12
Oregon	6	5	19	11	3	8	3	9	11	<b>5</b>
Pennsylvania	9	14	8	<b>9</b>	8	11	11	20	15	12

<b>Table B-1. Fatal Accidents in Construction Zones</b>										
State	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Rhode Island	1	0	3	1	0	1	0	2	0	1
South Carolina	2	4	3	3	4	12	5	7	7	0
South Dakota	0	3	1	1	0	1	3	2	4	4
Tennessee	11	10	11	11	7	13	9	15	8	12
Texas	128	127	126	142	126	73	93	90	97	99
Utah	3	1	1	0	2	0	0	1	0	0
Vermont	1	1	1	0	0	0	0	0	1	3
Virginia	2	8	2	5	3	3	6	11	14	10
Washington	4	2	0	9	4	11	7	6	12	10
West Virginia	2	7	0	2	4	3	3	3	0	3
Wisconsin	4	8	9	12	10	7	11	9	8	11
Wyoming	6	2	6	5	4	3	3	2	2	2

note: shaded cells denote when increased work zone fine legislation was passed in that state