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16. Abstract Project

This report presents the results of the second year's research activities. Included are the findings from speed studies before and after implementation of the double-fine law in Texas, as well as an assessment of other legislation that could be enacted to promote work zone safety in Texas. Results of the speed studies indicate that implementation of the double-fine law has had no measurable effect at the work zone study sites examined in this research. Discussions with law enforcement officers in Texas suggest that the provision that workers must be present in order for the fine to be doubled will be difficult to enforce statewide. Based on these and other discussions, the researchers recommend that efforts be taken to eliminate the worker presence requirement from the current law. The report includes other recommendations regarding legislation that should be considered for implementation as well.

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WORK ZONE-RELATED TRAFFIC LEGISLATION IN TEXAS

by

Gerald L. Ullman, Ph.D, P.E.
Associate Research Engineer
Texas Transportation Institute

Paul J. Carlson
Assistant Research Scientist
Texas Transportation Institute

and

Nada D. Trout
Assistant Research Scientist
Texas Transportation Institute

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Related to Construction and Maintenance Work Zones

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TEXAS TRANSPORTATION INSTITUTE
The Texas A&M University System
College Station, Texas 77843-3135

IMPLEMENTATION RECOMMENDATIONS

The second year's research effort on this project has yielded the following preliminary recommendations regarding work zone-related traffic legislation in Texas:

1. Eliminate the worker presence requirement from the double-fine law (Texas Transportation Code Sections 542.404 and 729.004),

2. Increase the minimum fines for a violation that is cited within a work zone,

3. Modify the double-fine law to require a fine or greater court costs to be assessed on motorists who receive a violation in a work zone and who take a defensive driving class to have the ticket dismissed, and

4. Develop legislation to allow a reduced regulatory speed limit to be posted in certain maintenance work zones without a commission minute order for the project.

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 project was Dr. Gerald L. Ullman, P.E. #66876.

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1. INTRODUCTION

The desire to improve the safety of motorists and workers in various types of work zones has led many states to pass legislation which increases the fines applicable for traffic violations that occur in these zones. TTI Research Report 1720-1 documented that 42 states had passed legislation of this type by 1997 (*1*). Since the publication of that report, two more states have enacted increased work zone fine legislation. Table 1 presents an updated list of increased fine laws nationally. In addition, two states which had failed attempts to increase fines in work zones during the 1997 legislative session are planning to resubmit the proposed bills in 1999.

Although this type of legislation has become very popular, it has been difficult to estimate how effective these laws have been in increasing motorist compliance with traffic control laws and in improving work zone safety. For instance, an analysis of fatal accident data did not find any significant differences between fatal accident frequencies occurring in states which had enacted increased fine laws and those which had not enacted such laws (*1*). Furthermore, discussions with law enforcement and other officials throughout the country indicate that these types of laws are not easily enforced in some cases, and may not always be well supported by the courts. Unfortunately, researchers have not been able to obtain actual field data from the various states to investigate these issues further. Most states did not collect data at the time the law was implemented and did not have a means of going back into their records to obtain this information after the fact.

Table 1. Enhanced Fine Legislation in Work Zones

State	Chapter/Section/ Bill No.	Date Enacted	Violations Affected	Workers Must be Present?	Type of Enhanced Fine	
					Fixed ($)	Multiple of Original Fine
Alabama	none	---				
Alaska	Amend Sec. 28.05.151	Passed 1998[a]	all traffic violation	no		2X
Arkansas	AC Section 27-50-408	1995	speeding	yes		2X
Arizona	none[b]	---				
California	MVC Section 42009	1994	numerous violations specified	yes		2X
Colorado	CRS 42-4-613.	1997	speeding	no		2X
Connecticut	CGS Vol 5. MVC 95-181 Sec. 1	1995	all moving vehicle violations	yes		2X
Delaware	MVC Title 21, Sec. 4105	1990	numerous violations specified	no		no less than 2X for 1st infraction
Florida	FAC Section 318.18	1996	speeding	no		2X
Georgia	CGA Section 40-6-188(a)(b)(c)	1996	speeding	no	$100-$2000, up to 12 mo. jail	
Hawaii	none	---	---			
Idaho	MVC Sec. 49-657	1996	speeding	no	$50	
Illinois	MVC Sec. 5. Sec. 11-605	1996	speeding	yes[c]	$150 min.	
Indiana	IC1993, 33-19 Chapter 6 Sec. 14	1993	speeding	no	.50 cents + $25 if ordered by judge	

Table 1. Enhanced Fine Legislation in Work Zones

State	Chapter/Section/ Bill No.	Date Enacted	Violations Affected	Workers Must be Present?	Type of Enhanced Fine	
					Fixed ($)	Multiple of Original Fine
Iowa	IC 1997, Sec. 805.8, Subsec 6, Sec. 321.1.	1993, 1997[d]	all moving vehicle violations	no		2X
Kansas	KSA 8-2004(c)	1994	all moving vehicle violations	no		lesser of 2X or $100
Kentucky	KRS, Chapter 37, Sec. 2. 189.2325	1996	speeding	yes		2X($120-$200)
Louisiana	LRS 32:57(G)	1997	speeding	yes		2X
Massachusetts	none	---	---			
Maryland	MVC Sec. 21-802.1	1991	speeding	no	$270	
Maine	MS Sec. 1. 29-a, MRSA 2075, sub-2.	1995	speeding	no		2X
Michigan	MVC Sec. 257.628, 257.629c, add Sec. 601b(1)	1996	all moving vehicle violations	no		2X
Minnesota	MS 1994, Sec.169.14, Subd. 5d(d)	1994	speeding	yes		larger of 2X or $25

Table 1. Enhanced Fine Legislation in Work Zones

State	Chapter/Section/ Bill No.	Date Enacted	Violations Affected	Workers Must be Present?	Type of Enhanced Fine	
					Fixed ($)	Multiple of Original Fine
Missouri	RSM Sec. 304.580 [d]	1994	all moving vehicle violations	no	$35	
Mississippi	MC Sec. 63-3-516	1998	speeding	yes		2X or 250
Montana	MVC. 61-8-314 (5)(a)	1997	all traffic violations	yes		2X
North Carolina	Section 1. GS 20-141(j2)	1997	speeding	no	$100-$250	
North Dakota	MVL Sec. 39-09-02	1995	speeding	yes	$40+$1/mph when 10 mph+over limit	
Nebraska	RSN Sec. 11, Sec. 60-6, 190(1)(2)	1996	speeding	no		2X ($20-$400)
New Hampshire	VCS Sec. 265:6-a	1994	speeding	yes	$250-$500	
New Jersey	RS, Title 39-Chapter 4-203.5	1993	all moving vehicle violations	no		2X
New Mexico	none[e]	---	---			

Table 1. Enhanced Fine Legislation in Work Zones

State	Chapter/Section/ Bill No.	Date Enacted	Violations Affected	Workers Must be Present?	Type of Enhanced Fine	
					Fixed ($)	Multiple of Original Fine
Nevada	NRS Sec. 1, Chap. 484 new sec. 1(a)(b) 2, 3(a)(b)(c) (AB 456)	1997	speeding	yes		lesser of 2X or $1000, and/or 6 mos. jail or 120 hrs. community service
New York	Vehicle & Traffic Law 1180(f)(g)(3)	1997	speeding	yes		2X
Ohio	RC 4511.79(D)(3)	1991	speeding	no		2X
Oklahoma	47 OS, 1991, Sec. 11-806 (c)	1996	speeding	yes		2X
Oregon	MVC Sec. 11.230 (3)(a)	1995	all moving vehicle violations	no		2X
Pennsylvania	PaCS Sec. 33-3326 (c)	1989	numerous violations specified	yes		2X
Rhode Island	MVC Sec. 31-14-12.1(a)(b)	1996	speeding	no		2X
South Carolina	MVC Sec. 56-5-1535 (A)(B)(C)	1994	speeding	no	$75-200, 30 days jail or both	
South Dakota	MVC Sec. 32-25-19.1	1996	speeding	yes		2X

Table 1. Enhanced Fine Legislation in Work Zones

State	Chapter/Section/ Bill No.	Date Enacted	Violations Affected	Workers Must be Present?	Type of Enhanced Fine	
					Fixed ($)	Multiple of Original Fine
Tennessee	TCA Sec. 55-8-152(g)(2)	1996	speeding	yes[c]	$250-$500	
Texas	MVC Sec. 472.022(d)	1997	all moving vehicle violations	yes		2X of min. and max. applicable
Utah	UCA Chapter 138, Sec. 41-6-13	1998	speeding	yes		2X
Virginia	MVC Sec. 46-2-878.1	1992, 1995[f]	speeding	yes	$250 max.	
Vermont	VSA Sec. 16.23, Section 1010	1997	speeding	no		2X
Washington	RCW 46.61 Sec. 1	1994	speeding	no		2X
Wisconsin	WS Sec. 1. 346.60	1995	numerous violations specified	yes		2X of min. and max. applicable
West Virginia	MVC Subsec. 17C-3-4b, 17C-3-4a	1994	numerous violations specified	yes	$200 max., 20 days jail or both	
Wyoming	none[g]	---	---			

[a] Bill passed legislation April 1998, will go into effect April 1999.

[b] Bill was submitted but did not pass in the 1997 legislative session.

[c] Bill requires the use of flashing lights when workers are present, and when the increased fine structure is in effect.

[d] In Missouri HB 1028 for a $250 fine for speeding violations failed.

[e] In Iowa the original bill passed in 1993 with a fine structure of the lesser of the double fine or $100 for a violation occurring within any road construction zone. This was revised in 1997 (HF 704) to eliminate the $100 option, and to expand the work activity to include road construction, maintenance, survey, or utility work.

[f] In Virginia the original bill passed in 1992, and 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).

[g] 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.

Texas implemented its own version of a work zone double-fine law on January 1, 1998 (see appendix). This law doubles the minimum and maximum fines applicable for traffic violations which occur in a work zone where workers are present. Because only limited data were available from other states prior to its implementation, it is not known whether or not this law will have the intended effect on motorists and work zone safety. Depending on how effective the law is determined to be, opportunities may exist to improve the current wording of the law in the next legislative session. Another possibility is that other types of laws that have been implemented in a few other states may have potential benefit within Texas.

This report documents the results of the second year's efforts to assess work zone traffic laws and their applicability to Texas. The research efforts included speed studies at selected work zones in Texas to evaluate the effect of the law upon traffic behavior, discussions with law enforcement officials about characteristics of the current double-fine law, and discussions with officials in other states concerning other work zone traffic laws that have been implemented. Based on the results of these activities, the researchers have provided preliminary recommendations have been provided regarding legislation that TxDOT should and should not consider pushing forward in the next session of the Texas Legislature.

2. EFFECT OF THE "DOUBLE-FINE" LAW ON WORK ZONE SPEEDS IN TEXAS

During Fiscal Year 1997-1998, TTI conducted speed studies at 10 different work zone construction projects in three different districts in order to assess whether the implementation of the work zone double-fine law in Texas had an impact upon a driver's choice of speed. These sites ranged from two-lane, two-way highways to multilane freeways. The sites were identified through contacts with construction personnel in each district. Studies were conducted at each site prior to the initiation of the law (in November and December 1997) and then at the same sites again several months after the law had been implemented (April and May 1998). Researchers measured speeds of at least 125 free-flowing vehicles at each site. At seven of the sites, traffic was measured in both directions of travel. In general, work zone activity at each site was limited to spaces adjacent to the roadway (that is, no temporary lane closures were present to otherwise affect speeds).

SITE DESCRIPTIONS

Table 2 summarizes the roadway characteristics of each of the study sites used in this evaluation. Four of the sites were located on freeway facilities, and the remaining six were on rural to suburban highways. Generally speaking, the traffic control plan at each of the highway sites involved two-lane, two-way operations. Furthermore, traffic volumes were low enough at all of the sites such that the work zone did not create significant congestion and thus influence speeds. Work zone project lengths ranged from 3 to 14 km (2 to 9 mi). Speed limits at three of the sites were not reduced from upstream speed limits. For the other sites, the speed limits were reduced between 8 and 24 km/h (5 and 15 mph).

Data collection personnel attempted to collect vehicle speed samples in each direction of travel, where possible. However, at US 69 and at I-10 in Houston, data were only collected in one direction of travel.

Table 2. Study Site Characteristics

District	Roadway	Work Zone Speed Limit	Upstream Speed Limit	Roadway Cross-Section	Work Zone Length (km)
Austin	FM 973	65/60 (R)	65/60 (R)	TLTW upstream and in work zone	5
	US 77	50 (R) 45 (A)	55 (R)	multilane undivided upstream, TLTW in work zone	14
	IH 35	65/60 (R)	65/60 (R)	suburban freeway (4-lane) upstream and in work zone	9
Houston	US 59	55 (R)	55 (R)	urban freeway (6-lane) upstream and in work zone	3
	SH 6	40 (R)	55 (R)	TLTW upstream and in work zone	6
	IH 10	55 (R)	60 (R)	urban freeway upstream and in work zone	8
Tyler	SH 154	55 (R)	70/65 (R)	TLTW upstream and in work zone	8
	SP 502	45 (R)	55 (R) NB 70/65 (R) SB	TLTW upstream and in work zone	3
	US 69	55 (R) 45 (A)	(60) R	TLTW upstream and in work zone	10
	IH 20	55 (R)	70/65 (R)	rural-suburban freeway (4-lane) upstream and in work zone	3

(R) regulatory speed limit

(A) advisory speed limit

65/60 65 mph regulatory speed limit for passenger vehicles, 60 mph regulatory speed limit for trucks

STUDY RESULTS

Tables 3 through 5 summarizes the results of the speed studies at each of the sites. Overall, it appears that the implementation of the law has not had an appreciable effect upon speeds at the sites examined. According to Table 3, average speeds at four of the nine sites (US 77, IH 35, SH 6, IH 10) were unchanged between the before and after condition. Changes at the remaining sites included both increases and decreases in average speed between the before and after conditions. At some sites, average speeds increased in one direction but decreased in the other. Only one site, SP 502, experienced a significant reduction in average speed in both directions of travel.

Table 4 presents the 85th-percentile speeds at each study site. This measure is typically taken to indicate the maximum speed the majority of drivers believe to be safe and prudent for conditions. As shown in the table, the trends before and after implementation of the law are similar to those seen in Table 3. Very few consistent changes in this speed value are evident. This speed measure remained unchanged at several of the sites, and yielded both small increases and decreases noted between studies at the other sites. It should also be noted that the 85th-percentile speed was much higher than the posted speed limit at seven of the nine sites, even after implementation of the double-fine law.

As a final indicator, Table 5 presents the percentage of drivers who were exceeding the posted speed limit at each of the study sites both before and after implementation of the law. This percentage did decrease significantly at two of the sites (US 59 and SP 502), but increased in one direction at another site. The remaining sites did not experience any significant changes in this percentage. Perhaps more disturbing is the fact that, at seven of the sites, more than one-half of the motorists were traveling faster than the posted limit. Such numbers emphasize the lack of credibility the motoring public currently gives to posted speed limits in work zones, regardless of whether they are regulatory or advisory limits.

Table 3. Effect of Double-Fine Law On Average Speeds

District	Site	Speed Limit	Average Speed, mph			
			Before		After	Change
Austin	FM 973	65/60 (R)	SB	59	61	+2*
			NB	61	57	-4*
	US 77	50 (R)	SB	58	57	-1
		45 (A)	NB	58	58	NC
	IH 35	65/60 (R)	SB	68	68	NC
			NB	69	68	-1
Houston	US 59	55 (R)	NB	65	62	-3*
	SH 6	40 (R)	EB	45	45	NC
			WB	46	46	NC
	IH 10	55 (R)	EB	60	61	+1
Tyler	SH 154	55 (R)	SB	59	57	-2*
			NB	58	57	-1
	SP 502	45 (R)	NB	48	44	-4*
			SB	46	43	-3*
	US 69	55 (R)	SB	60	59	-1
		45 (A)	NB	61	63	+2*
	IH 20	55 (R)	EB	53	59	+6*
			WB	54	56	+2*

* change is statistically significant (α=0.05)

(R) regulatory speed limit

(A) advisory speed limit

65/60 65 mph regulatory speed limit for passenger vehicles, 60 mph regulatory speed limit for trucks

Table 4. Effect of Double-Fine Law on 85th-Percentile Speeds

District	Site	Speed Limit	85th-Percentile Speed, mph		
			Before	After	Change
Austin	FM 973	65/60 (R)	SB 65	69	+4
			NB 68	65	-3
	US 77	50 (R)	SB 64	64	NC
		45 (A)	NB 65	65	NC
	IH 35	65/60 (R)	SB 72	73	+1
			NB 73	73	NC
Houston	US 59	55 (R)	NB 70	67	-3
	SH 6	40 (R)	EB 51	57	+6
			WB 49	51	+2
	IH 10	55 (R)	EB 66	66	NC
Tyler	SH 154	55 (R)	SB 65	62	-3
			NB 64	64	NC
	SP 502	45 (R)	NB 53	49	-4
			SB 53	46	-7
	US 69	55 (R)	SB 65	65	NC
		45 (A)	NB 66	70	+4
	IH 20	55 (R)	EB 58	63	+5
			WB 59	59	NC

(R) regulatory speed limit

(A) advisory speed limit

65/60 65 mph regulatory speed limit for passenger vehicles, 60 mph regulatory speed limit for trucks

Table 5. Effect of Double-Fine Law on Motorist Compliance to Speed Limit

District	Site	Speed Limit	Percent Exceeding Speed Limit, mph			
			Before		After	Change
Austin	FM 973	65/60 (R)	SB	12	13	+1
			NB	28	29	+1
	US 77	50 (R)	SB	92	85	-7
		45 (A)	NB	89	88	-1
	IH 35	65/60 (R)	SB	75	71	-4
			NB	78	70	-8
Houston	US 59	55 (R)	NB	100	87	-13*
	SH 6	40 (R)	EB	85	78	-7
			WB	86	87	+1
	IH 10	55 (R)	EB	78	87	+9
Tyler	SH 154	55 (R)	SB	66	60	-6
			NB	63	62	-3
	SP 502	45 (R)	NB	76	39	-37*
			SB	54	32	-22*
	US 69	55 (R)	SB	74	69	-5
		45 (A)	NB	87	90	+3
	IH 20	55 (R)	EB	29	75	+46*
			WB	48	56	+8

* change is statistically significant (α=0.05)

(R) regulatory speed limit

(A) advisory speed limit

65/60 65 mph regulatory speed limit for passenger vehicles, 60 mph regulatory speed limit for trucks

DISCUSSIONS WITH TEXAS DPS

Although citation data from the study sites are not yet available, TTI researchers have also discussed the enforcement of the double-fine law with Texas Department of Public Safety (DPS) officers. The officers did indicate that their old ticket books did not include a special check box to indicate that the citation was issued in the work zone. Although the new tickets will include such a box, an extensive inventory of the old tickets exists. The supply of old tickets will be exhausted before the new tickets are used. In the interim, it is up to the officer's discretion whether to make a note on the ticket to indicate that it was issued in a work zone.

Officers who were contacted did express some concern over the enforcement difficulties associated with the "workers present" component of the double-fine law. Although they were not aware of instances yet where tickets had been dismissed, they were concerned about an officer's ability to testify under oath that he or she knew that workers were present at a site when issuing a citation. Because of the dynamics associated with work activities, officers felt that they could not be sure when work crews were actually present at a work zone unless they had just passed through the zone and seen them. They expected that officers were probably going to be rather conservative in issuing these types of citations because of this clause in the law.

When asked their opinion about how local justices of the peace (JPs) who actually determine fines for citations issued in their jurisdictions have or will implement the double-fine law, officers felt that it would vary widely from location to location. The officers emphasized that the law only doubles the maximum and minimum fines, and does not require the JP to actually double any fine issued. They said that many JPs have a "courtesy letter" that the officers carry to give motorists that indicates the fines that the JP issues for typical offenses. DPS is currently obtaining copies of some of these letters from their various area offices for review by Texas Transportation Institute to include in the final analyses.

3. IMPLEMENTATION CONSIDERATIONS WITH WORK ZONE TRAFFIC LEGISLATION

During FY 1998, TTI researchers have had a dialogue with officials in several states regarding the implementation of their double-fine or other traffic laws specifically applicable to work zones. Of key interest to researchers were the following issues:

1. Which states, with a worker presence requirement in their double-fine law, have eliminated or attempted to eliminate that requirement through subsequent legislation? How successful were these attempts?

2. Why were other laws relating to work zones (such as failure to obey a flagger, endangerment of a highway worker, etc.) enacted? How successful have they been? What administrative and technical requirements exist for implementation?

Researchers investigated the following laws or components of laws:

- Worker presence requirement of the increased fine laws,
- Minimum fine levels specified in the increased fine laws,
- Worker/flagger safety laws (reckless endangerment of a highway worker, failure to obey a flagger),
- Setting regulatory speed limits without a commission minute order,
- Using increased fines to pay for additional enforcement, and
- Video radar enforcement.

WORKER PRESENCE REQUIREMENT

Upon additional review of state legislation and contacts with various officials, TTI researchers could not find a state with a worker presence requirement in the double-fine law that had (as yet) rescinded that requirement. However, officials in two states (New York and

Pennsylvania) have continued to voice concerns over enforcement problems of their laws which require workers to be present, and would like to see that requirement removed. At the same time, no states which do not require workers to be present in order to receive a double-fine penalty in a work zone have initiated new legislation to add that requirement to the law books.

Two states which require workers to be present have also established requirements to notify motorists that workers are present through the use of a flashing light assembly (Illinois and Tennessee). Tennessee law requires a light to be present in order for the double fine to be valid, whereas the Illinois DOT chose to implement this light as a policy decision by the department in order to assist both motorists and enforcement in knowing when the law is in effect. Presently, this approach does appear to be working in these states, although no citation or other corroborating data were available. However, other states which have considered a similar technology have noted that the lights represent a significant additional expense and required the development of specific operational policies for their use.

MINIMUM FINES REQUIRED

Texas is one of only two states (Wisconsin is the other) with increased fine legislation that specifies only that the minimum and maximum allowable fines be doubled, rather than a fixed increase or a doubling of the actual fine imposed for the violation. It is interesting to note that minimum fines specified by law in Wisconsin are much higher than those in Texas, as shown in Table 5. Whereas Texas law generally allows a higher maximum fine to be set against a motorist who commits one of the violations shown, the minimum fines allowed to be set are much lower than required by Wisconsin law. For example, the minimum fine specified for a speeding violation in a work zone in Wisconsin is $60, compared to the $2 minimum fine for Texas.

OTHER WORKER/FLAGGER SAFETY LAWS

Three states (Washington, Oregon, and Montana) have made reckless endangerment of highway workers a specific offense in their vehicle code. These laws basically indicate the following:

"a person who drives a vehicle in a roadway construction zone in such a manner as to endanger or be likely to endanger any persons or property, or who removes, evades, or intentionally strikes a traffic safety or control device is guilty of reckless endangerment of roadway workers" (excerpted from the Washington Vehicle Code).

Another provision of the law allows a citation to be issued on the basis of a report from a highway worker (that is, the law enforcement officer does not have to witness the offense in order to write a citation for it).

Table 5. Comparison of Wisconsin and Texas Minimum and Maximum Fines

Wisconsin Statutes Location	Wisconsin		Corresponding Texas Double-Fine Requirement
	Violation	Double Fine	
346.17(5)	346.04(1) or (2) failure to obey official traffic control devices or fleeing from an officer	$40-$200	$2-400
346.22(1)(b)	346.18 (6) failure to obey yield sign	$40-$200	$2-400
346.43(1)(b)3	346.37 or 346.39 failure to obey signal or flashing beacon	$40-$200	$2-400
346.49(1)(c)	346.46 (1) failure to obey stop sign or intersection stop	$40-$200	$2-400
346.60(3m)	346.57(2),(3),(4)(d) to (h) or (5) failure to obey speed limit	$60-$1200	$2-400
346.65(5m)	346.62(2) to (4) reckless driving negligently causing bodily harm	(2) $600-$4,000 30 days-1 year imprisonment	$2-400

Meanwhile, two states (Oregon and Utah) also have passed laws which make it a specific offense for failing to obey a flagger or peace officer in construction or maintenance zones. These laws also do not require a law enforcement officer to witness the infraction in order to issue the citation.

TTI researchers have had discussions with officials in each of these states to try and determine the rationale behind enactment of these types of laws. Interestingly, none of the states indicated that these laws were an attempt to counter or address a specific type of problem that was occurring in work zones. Instead, they were initiated primarily because they were perceived by officials as increasing the emphasis of worker and flagger safety in work zones. Interestingly, the first state to enact such legislation (Washington) did so in part because of efforts by a widow of a highway worker who had recently been killed in a construction zone. Her concerns over work zone safety led to the development of an overall work zone safety program in that state. Her outcries for harsher penalties for those who drive unsafely in work zones and cause crashes that injure workers was a major force in the submission and passage of the reckless endangerment of a highway worker law. That law was replicated the following year in Oregon, along with the failure to obey a flagger law. Again, sentiments for families of workers recently killed in work zones was a contributing factor to the enactment of those laws. Other states who enacted these laws simply felt that they were positive steps towards increased protection of workers.

Officials in all of the states contacted about these laws indicated that they were not being heavily enforced at this time. As one official put it, these events are not a major problem and happen only on rare occasions. Apparently, the laws are not intended to be utilized as part of day-to-day enforcement operations in work zones, but rather as a means of invoking additional punishment upon motorists who are involved in a crash that injures highway workers.

SETTING REGULATORY SPEED LIMITS WITHOUT A COMMISSION MINUTE ORDER

TxDOT speed zoning procedures currently allow engineers responsible for construction projects to adjust posted regulatory speed limits between the normal speed limit for that roadway

and a lesser speed limit when work activity is present and slower speeds are believed to be warranted. However, it is the researcher's understanding that a commission minute is still required prior to the beginning of the project to authorize that the lower regulatory limits can be posted when determined to be appropriate by the engineer. While the current process does provide speed limit flexibility during construction projects, it does not allow lower regulatory speed limits to be posted at maintenance work zones that are often short in duration and offer minimal advance notice. Unfortunately, these are the types of work zones that often require workers to be out next to high-speed traffic without the protection of longitudinal barriers or large buffer spaces. Because this type of work zone is so temporary, most motorists passing through it do not have prior knowledge of what is going on or what they are expected to do to negotiate the zone.

Although work crews are allowed to post lower advisory speeds for these types of conditions, enforcement officials acknowledge that they do not usually enforce advisory speed limits. Furthermore, the lack of ability to post lower regulatory speed limits for maintenance activities creates a perceptual inconsistency in work zone speed limits in general. For example, two work zones (one a short-term construction activity and one a maintenance activity) on the same roadway may involve the same general traffic control strategy (such as a single-lane closure). From the motorist's perception, very little difference will be evident in the two work zones. However, the construction zone could have a lower speed limit posted while it is in place whereas the maintenance zone will have only an advisory speed posted, if anything.

Researchers have had discussions with officials in other states who have enacted legislation which allow them to post lower regulatory speed limits for maintenance work zones. Minnesota was one of the first to implement such a law. The law specifies the magnitude by which the posted speed limit can be reduced (the legislation adopted by Maine follows a similar approach). Their experiences with the law have been positive, based on limited before-after speed data. Other states have written their laws to allow a default work zone limit to be valid on a given type of roadway, regardless of whether it is a construction or maintenance activity. The engineer is then allowed to use that limit or not in the work zone depending on conditions.

USING FINES TO PAY FOR ADDITIONAL ENFORCEMENT

Both Kentucky and Indiana have adopted legislation which directs the additional funds collected by the double-fine law to be specifically used for work zone enforcement. The project in Kentucky started with borrowed money totaling $10,000. About 40 projects have been funded since the programs inception (about two years ago). The project has always been in the black and is currently making money (about $30,000 are available right now). It is estimated that this activity requires about 20 percent of a FTE's time to administrate in that state.

Work zones on interstates (800 centerline miles) and four-lane controlled access parkways (500 centerline miles) are the focus of the program, although work zones on some two-lane roads have been approved. To determine which projects are funded, the process is as follows:

1. The district engineer sends an e-mail to headquarters requesting implementation of the program for construction or maintenance zone in the following fiscal year.
2. The e-mail is forwarded to three people who decide whether the request should be honored.
3. If approved, the state police and the highway patrol (two separate agencies) are informed of the work zone limits, times, and bi-weekly schedules.
4. The enforcement agencies are responsible for developing an enforcement. The officers are paid overtime rates ($33/hour) and bill the DOT in 200 hour blocks.
5. Before enforcement begins, the DOT places courtesy calls to the district judge and county attorney, and usually sends a representative to make a public appearance and provide a story about work zone safety results to the local papers.

One related problem that has been noted with the law in Kentucky is that the local elected county judge (Kentucky has 120 counties) has the authority to send the violator to traffic school to dismiss the points and the fine (Kentucky operates on a point system for retaining driving privileges). The DOT is considering an attempt to modify the legislation to continue to let

attendance at traffic school eliminate the loss of points, but have the fine still remain if the violation occurs in a work zone.

The Indiana law also allocates a set portion of the fines from work zones to go back to the DOT for enforcement. These are only applied to state patrol issued citations. Fine distribution from other enforcement jurisdiction issued citations is decided upon at the local levels. During the winter season, the district engineers from the six districts of the DOT submit reports requesting the additional enforcement on projects they have scheduled for the upcoming construction season. The reports are reviewed and priority is given to interstate facilities. Typically, six to eight contracts are awarded annually. These contracts generate about $300,000 in fines for the following years contracts. During some years, the money has been supplemented with FHWA highway safety money bringing the total to over $500,000.

VIDEO RADAR ENFORCEMENT

South Dakota DOT submitted legislation in 1998 to authorize the use of photo radar equipment to identify vehicles violating reduced speed zones in highway work zones. However, legislators felt that photo radar would violate individual privacy rights, and the bill failed. Nonetheless, the DOT has purchased two video laser speed detection units, and are using the laser devices for regular work zone enforcement activities. An officer controls the unit and captures the speed and video image. An officer still must stop the vehicle in order to issue a citation. They have experimented with the use of the device to send out warning letters. It is hoped that this video component of the device will eventually eliminate the need for an officer to appear in court when a citation is contested (by providing photographic evidence of the vehicle and its speed). However, officials have not yet actually attempted this in court at this time.

4. WORK ZONE LEGISLATIVE RECOMMENDATIONS FOR TXDOT

Based on the results of the field studies at selected work zone sites, discussions with officials in Texas and in other states, and an assessment of current work zone practices within TxDOT, researchers have four interim recommendations regarding work zone legislation:

1. Eliminate the worker presence requirement from the double-fine law,
2. Increase the minimum fines for a violation that is cited within a work zone,
3. Modify the double-fine law to require a fine or greater court costs to be assessed on motorists who receive a violation in a work zone and who take a defensive driving class to have the ticket dismissed, and
4. Develop legislation to allow a reduced regulatory speed limit to be posted in certain maintenance work zones.

The following sections describe the rationale behind these recommendations, and summarize the advantages and disadvantages associated with each one.

RECOMMENDATIONS

Recommendation #1: Eliminate the Worker Presence Requirement from the Double-Fine Law

TTI researchers recommend that TxDOT give priority to eliminating the requirement that workers be present in a construction or maintenance work zone in order to double the applicable fine. As written, the law places an extra burden upon law enforcement officers to verify worker presence in order to issue citations. Experiences in other states suggest that this burden, coupled with the already difficult task of issuing citations in these areas due to restricted lateral widths and presence of work equipment, can lead to less active enforcement activity in work zones. Obviously, this is counterproductive to the goal of improving work zone safety. Furthermore, the field study data suggests that the double-fine law will not have a significant effect upon motorist behavior unless it is effectively enforced.

Advantages of Eliminating the Requirement

- Removal of the worker presence requirement will simplify enforcement of work zones.
- Removal of the requirement implies that concern exists for motorist behavior in all types of work zones, not just those where workers are present.

Disadvantages of Eliminating the Requirement

- Removal of the worker presence requirement requires a change to the law just passed in the last legislative session. Researchers do not know whether this has any political ramifications in the legislative process.
- Removal of the requirement could give the perception to some that TxDOT has decided that worker safety is not as great a concern as it was last year. It will be necessary to articulate to legislators and industry officials that the removal of the requirement is not to decrease emphasis on worker safety, but to increase it by making it easier to enforce work zones.

Other Considerations

- If the double-fine law is not changed to eliminate the worker presence requirement, TxDOT should consider implementation of dynamic flashing lights and signs (similar to those used in Tennessee and Illinois) upstream of each work zone where workers are present. These flashing lights would be attached to signs notifying both the public and law enforcement that fines are double and that workers are ahead. While not eliminating the need for enforcement to verify the presence of workers at a site, this assembly can provide some assistance as long as it is implemented properly and consistently. In addition, the presence of a flashing light and sign would also emphasize to motorists that workers are present downstream and that it is important for them to comply with the posted speed limit and other traffic laws. Of course, such a system does represent a significant additional expense to TxDOT and contractors as well as an increase in time and attention that must be devoted to traffic control at each site.

Recommendation #2: Increase the minimum fines for a violation that is cited within a work zone

As discussed in Chapter 3, the current double-fine law only specifies that the fine for a violation in a work zone must be $2 or greater (violations occurring outside of work zones must be $1 or greater). Texas is the only state where the double-fine law implies such a small minimum fine. There is currently little legal incentive in the new law for the local JPs to significantly raise fines for offenses occurring in work zones.

Advantages of Increasing the Minimum Fine

- An increase would guarantee that a significantly higher fine will be assessed against a motorist who violates a traffic law in a work zone.
- An increase or rewording of the current law would also allow TxDOT and contractors to post on signs in the work zone of the minimum fines that will be imposed for violations that occur in the work zone. This technique is used by several other states as an additional deterrent against violations.

Disadvantages of Increasing the Minimum Fine

- This recommendation will require a change to the law just passed in the last legislative session. The political ramifications of this on the legislative process are unknown at this time.
- Increasing the minimum fine reduces some decision-making authority of local justices of the peace. This change may be seen as bureaucratic and heavy-handed by local governments.

Other Considerations

- The minimum fines in work zones in Wisconsin (the other state that doubled the minimum and maximum fines in work zones) are $60 for speeding and $40 for other minor traffic offenses.

Recommendation #3: Modify the double-fine law to require a fine or greater court costs to be assessed on motorists who receive a violation in a work zone and who take a defensive driving class to have the ticket dismissed.

Drivers in Texas who have not taken a defensive driving class in the last two years can do so to dismiss most types of traffic violations, even those issued in a work zone. For these motorists, the work zone double-fine law has no increased threat of penalty. TxDOT should consider pursuing a change to the double-fine law that still requires a higher fine or court costs (in terms of a surcharge or similar technique) to be paid if the violation occurs in a work zone, even if the motorist elects to take a defensive driving course and has the ticket subsequently dismissed. As an alternative, the law could be changed to prohibit citation dismissal via a defensive driving course if the violation occurred in a work zone. TTI recommends the first option because less public opposition is expected.

Advantages to Altering the Defensive Driving Allowance for Work Zone Violations

- Changing the law in this manner would extend the spirit of the double-fine law to all motorists, not just those who cannot or do not take defensive driving to dismiss a citation.

Disadvantages to Altering the Defensive Driving Allowance for Work Zone Violations

- Changing the law regarding the defensive driving dismissal option could increase the number of traffic citations challenged in the court system.
- Elimination of the defensive driving dismissal option could increase some motorists' insurance premiums.

Recommendation #4: Develop legislation to allow a reduced regulatory speed limit to be posted in certain maintenance work zones

Speed limits in construction zones can be adjusted in real time according to conditions once commission minute approval is obtained to do so for a given project. Unfortunately, this approach does not allow lower limits to be posted at maintenance or utility work zones where little lead time is available to submit a commission minute order request. Advisory speed limits

may be posted, but are not generally enforced. Several states have adopted legislation that allows a lower regulatory speed limit to be posted in a work zone (including maintenance activities) without a commission minute order, and have generally been pleased with the results. TxDOT should consider pursuing similar legislation for Texas.

Advantages of Maintenance or Utility Work Zone Regulatory Speed Limits

- Adoption of this type of law would promote more consistency between construction zone and maintenance zone speed limits for certain types of traffic control strategies (such as temporary lane closures).
- Adoption of this type of law could also help place emphasis on the need for reduced speeds at locations where workers are typically out next to traffic without traffic barriers or other protection (i.e., maintenance operations).

Disadvantages of Maintenance or Utility Work Zone Regulatory Speed Limits

- Adoption of this type of law has the potential for misapplication of reduced speed limits by contractors or other personnel.
- Adoption of this type of law would require work crews to install additional advance signing which would slightly increase setup and take down time at each work zone.

LAWS NOT RECOMMENDED

TTI researchers recommend that three other laws that have been implemented in other states not be pursued in Texas at this time. The first of these is the payback legislation adopted in Kentucky and Indiana which uses all or part of the fines collected via the double-fine law to pay for additional enforcement (*1*). Because most local municipalities and counties in Texas rely on traffic fines (including those issued in work zones) for a significant portion of their operating revenue, it is believed that significant opposition to splitting fine revenues will result. More definitive legislation designating how fines will be increased in work zones would first be required before any type of payback legislation could be considered. In addition, there will be start up administration costs (extrapolation from Kentucky data suggests these would need to be

at least $25,000 in Texas) to TxDOT to implement such a law to manage the funds and determine appropriate disbursements.

The second and third laws not recommended for implementation in Texas are the endangerment of a highway worker and failure to obey a flagger violations (*1*). Discussions with other states indicate that these laws have been implemented primarily to allow stiffer penalties to be imposed on motorists who have crashes in work zones that injure workers, rather than to reduce crash potential, reduce vehicle speeds, or otherwise improve overall work zone safety. It appears both laws would be very difficult to implement effectively, and would not necessarily be expected to have a significant deterrent effect or safety impact unless heavily publicized and pushed very hard in court cases.

5. REFERENCES

Ullman, G.L., P.J. Carlson, N.D. Trout, and J.A. Parham. *Work Zone-Related Traffic Legislation: A Review of National Practices and Effectiveness.* Research Report FHWA/TX-98/1720-1. Texas Transportation Institute, College Station, Texas. September 1997.

TRC 472.022 OBEYING WARNING SIGNS

(d) An offense under this section is a misdemeanor punishable by a fine of not less than $1 or more than $200, except that if the offense is committed in a construction or maintenance work zone when workers are present, the offense is a misdemeanor punishable by a fine of not less than $2 or more than $400.

(e) In this section:

(1) "Barricade" means an obstruction:

(A) placed on or across a road, street, or highway of this state by the department, a political subdivision of this state, or a contractor or subcontractor constructing or repairing the road, street, or highway under authorization of the department or a political subdivision of this state; and

(B) placed to prevent the passage of motor vehicles over the road, street, or highway during construction or repair.

(2) "Construction or maintenance work zone" means a portion of a highway or street:

(A) where highway construction or maintenance is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices; and

(B) that is marked by one or more signs indicating that it is a construction or maintenance work zone.

(3) "Warning sign" means a signal, marking, or device placed on a barricade or on a road, street, or highway under construction or repair by the department, a political subdivision of this state, or a contractor or subcontractor to warn or regulate motor vehicular traffic. The term includes a flagger deployed on a road, street, or highway by the department, a political subdivision of this state, or a contractor or subcontractor to direct traffic around or on the road, street, or highway under construction or repair.

TRC 542.404 FINE FOR OFFENSE IN CONSTRUCTION OR MAINTENANCE WORK ZONE

(a) If an offense under this subtitle, other than an offense under Chapter 548 or 552 or Section 545.412 or 545.413, is committed in a construction or maintenance work zone when workers are present:

(1) the minimum fine applicable to the offense is twice the minimum fine that would be applicable to the offense if it were committed outside a construction or maintenance work zone; and

(2) the maximum fine applicable to the offense is twice the maximum fine that would be applicable to the offense if it were committed outside a construction or maintenance work zone.

(b) In this section, "construction or maintenance work zone" has the meaning assigned by Section 472.022.

TRC. 729.004. FINE FOR OFFENSE IN CONSTRUCTION OR MAINTENANCE WORK ZONE

(a) This section applies to an offense under Section 729.001 for a violation of Subtitle C, other than Chapter 548 or 552 or Section 545.412 or 545.413.

(b) If an offense to which this section applies is committed in a construction or maintenance work zone when workers are present:

(1) the minimum fine applicable to the offense is twice the minimum fine that would be applicable to the offense if it were committed outside a construction or maintenance work zone; and

(2) the maximum fine applicable to the offense is twice the maximum fine that would be applicable to the offense if it were committed outside a construction or maintenance work zone.

(c) In this section, "construction or maintenance work zone" has the meaning assigned by Section 472.022.