ROADWAY RELATED TORT LIABILITY AND RISK MANAGEMENT

4th Edition

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TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION 1

The Duty 1
The Problem 1
The National Picture 2
    Number of Claims and Suits 2
    Settlements and Judgements 3
Types of Claims 4
Traffic Accident Magnitude and Costs 4
    Cost of Accidents 4
    Ostrich Syndrome 5
    Positive Action is Called For 5
References 6

CHAPTER TWO: THE LEGAL SYSTEM 14

Terminology and Concepts 14
    Tort Liability 14
    Risk Management 14
    Negligence 15
    Sovereign Immunity 15
    Governmental-Proprietary Distinction 16
    Discretionary and Ministerial Acts 16
    Nuisance 16
    Standard of Care 17
    Other Terminology 17
The American Legal System 18
    Types of Law 18
    The Court System 19
Procedures Used in Lawsuits 20
    Introduction 20
    Initiating a Trial 20
    The Discovery Phase 21
    The Trial 22
    Post-Trial Activities 22
    Selecting Cases for Appeal 23
References 24

CHAPTER THREE: TORT LAW IN KENTUCKY 27

Introduction 27
    General Negligence Laws 27
        The Duty 27
        Proximate Cause 27

TABLE OF CONTENTS

Defenses 27
Negligence in Kentucky 28
Sovereign Immunity 29
The Concept 29
Local Government Immunity 31
Counties 31
Urban-County Governments 33
Municipalities 33
Board of Claims 37
Purpose of the Board of Claims 37
Powers of the Board of Claims 38
1986 Amendments to Board of Claims Statutes 39
Collateral or Dependent Claims Not Allowed 39
Reduction of Awards by Extraneous Proceeds 39
Suits Against Individual State Employees 40

CHAPTER FOUR: SUMMARY OF BOARD OF CLAIMS CASES IN KENTUCKY 44

Introduction 44
Procedure 44
Results 45
Summary 50

CHAPTER FIVE: HIGH-RISK AREAS 65

High Accident Locations 65
Maintenance and Construction Sites 66
Motorist Safety 66
Pedestrian Safety 66
Worker Safety 66
Edge Dropoffs 68
Slippery Roads 69
Narrow Bridges 70
Fixed Objects Along the Roadway 71
Pavement Defects 72
Traffic Control Devices 73
Signals 74
Signs 74
Markings 75
Summary 76
References 78

TABLE OF CONTENTS

CHAPTER SIX: RISK MANAGEMENT PRINCIPLES 79

Risk Management 79
Accident Reduction Program 80
Notice of a Defect 83
Action on Complaints 83
Maintenance Records 84
Inventories 85
Operational Reviews 85
Qualified Staff 86
Educational Program 86
Standards 87
Review of Agency Standards and Policies 87
Summary 88
References 90

CHAPTER SEVEN: ACCIDENT REDUCTION PROGRAMS 91

Federal-Aid Safety Programs 91
Section 209: Hazard Elimination Program 91
Section 203: Rail Highway Safety Program 92
Additional Uses of Accident Data 93
Other Safety Improvements 93
Accident Analysis at Individual Sites 94
Collision Diagrams 95
Condition Diagrams 97
Summaries of Accident Characteristics 97
Field Trips 97
Identifying Causes and Selecting Improvements 100
Summary 101
References 102

CHAPTER EIGHT: IF YOU ARE INVOLVED IN A SUIT 106

Release of Information to Attorneys 106
If You are Subpoenaed 107
Tips for Witnesses 107
The Role of the Expert Witness 108
If Your "Name is on the Bottom Line" 110
Selecting Witnesses 110
Being Prepared for Trial 111
When All is Said and Done 111
References 112

TABLE OF CONTENTS

CHAPTER NINE: DETAILED INFORMATION FOR BOARD OF CLAIMS CASES OF $50,000 OR MORE 113

CHAPTER TEN: INTRODUCTION TO ACCIDENT RECONSTRUCTION 166

Introduction 166
Traffic Accident Investigation 166
Typical Reconstruction Techniques 167
- Crush Distance as a Measure of Vehicle Speed 167
- Kinetic Energy 168
- Time-Distance-Speed Relationship 168
- Speed from Skid Marks 169
- Vaulting 170
- Linear Momentum 171
- Other Techniques 172

Summary 173
Example Reconstruction Problems 173

APPENDIX - GLOSSARY 185

CHAPTER ONE
INTRODUCTION

This training material has been prepared to address the tort liability problems faced by the Kentucky Transportation Cabinet and Kentucky local governments. The workbook defines the problem by reviewing the national picture of growing numbers of suits and escalating financial losses from suits against highway agencies.

The workbook also sets out solutions, and reviews actions which can decrease the exposure of highway agencies to these suits. This risk management concept is emphasized throughout the workbook.

THE DUTY

The function of government is to provide security and services for its citizens. Transportation is one of the services which governmental officials and employees are charged with providing. The goal of transportation should be the safe and efficient movement of people and goods, within reasonable fiscal constraints.

While providing transportation services, the government is not the absolute insurer of the safety of a highway user. The total resources of any government are limited, and it would not be realistic to expect that the bulk of all funding be devoted to keeping the roads in an absolutely sound and safe condition. However, the courts have consistently held that governments are required to maintain streets and roads in a reasonably safe manner. Failure to do so may result in liability if a user suffers injury.

The Kentucky Transportation Cabinet and local governmental units are charged with providing and maintaining reasonably safe travelways. As such, they must be aware of the possibility of suits. Employees of these agencies should also realize that their personal actions might lead to exposure for their agencies.

THE PROBLEM

Suits alleging that governmental negligence caused traffic accidents are increasing at an alarming rate. As a result, many highway agencies have found that their insurance costs are skyrocketing. Many jurisdictions have found their insurance policies cancelled, or have elected to become self insured in an effort to control costs.

In general, highway agencies have not known how to respond to this perplexing situation. The legal system is complex and difficult to understand. The threat of more suits exists on every side, and the potential for future losses is staggering.

Some states have been successful in addressing tort liability through education of their employees, through aggressive action by the state attorney general's office in fighting suits, through increased emphasis on safety programs and through other techniques.

This workbook will review techniques that some states have found successful in limiting tort exposure and court losses. Some of the techniques are simple to adopt but others may require changes in existing policies and concentrated efforts on the parts of employees. No techniques work for every single agency. The best course of action is for each highway agency to review its tort exposure and to select activities that provide the right level of risk management for their current situation.

The first order of business in designing a risk management program is to understand the nature of the problem. The next portion of this chapter explains the number of suits occurring across the United States, and the trend of increasing losses in the courtroom.

THE NATIONAL PICTURE

In the late 1970s, the Administrative Legal Subcommittee of the American Association of State Highway and Transportation Officials (AASHTO) conducted a nationwide survey to measure the growing tort liability problem. This survey was published (1) in 1978. AASHTO repeated the survey in 1979, 1981, 1983, 1987 and 1988. The surveys were very comprehensive, dealing with topics like loss of sovereign immunity, number of claims filed, type of insurance coverage, legal grounds for suits, and financial losses.

Because AASHTO is a collection of state highway agencies, the surveys dealt exclusively with the tort situation at the state level. The questionnaire in any year provided a snapshot of the state highway agency tort situation. The reports could be compared from year to year to identify trends and changes in tort liability. For example, the data showed that the number of tort claims grew from about 2,000 in 1972 to an estimated 27,000 in 1987 (2). The number of states reporting that they possessed full sovereign immunity dropped from 31% to 12% between 1978 and 1986 (3). The variation in types of claims from state to state was documented, and possible reasons for these changes were outlined (4).

The AASHTO surveys, as supplemented through telephone surveys by the authors, provide excellent data for understanding the national picture. Trends in the number of claims and in financial losses will be discussed in the next portion of this paper.

NUMBER OF CLAIMS AND SUITS

The number of claims and suits filed against state transportation agencies is reflected in Table 1-1. All data prior to 1988 were taken from surveys by AASHTO. The data for 1988, 1989, and 1990 were gathered by the authors during a 1991 survey conducted at the University of Alabama.

The table covers the most recent ten-year period. Five states received more than 1,000 claims claims each in 1990, and at least fourteen states received more than 500 claims each. The largest number of claims occurred in Pennsylvania with 6,013. This continued a trend. The Pennsylvania Department of Transportation averaged 6,128 claims per year for the past eight years.

The claims in Table 1-1 are those reported by the states. Not all of the states responded to the survey in any given year and only a few states responded to every AASHTO survey. The lowest level of reporting was bout one-quarter of the states in 1983. The highest level was about three-quarters of the states in 1982 and 1990. To overcome this irregular and incomplete reporting, the authors prepared maximum and minimum estimates of the total number of claims. These estimates are reflected in Table 2.

The initial AASHTO survey in 1978 asked the states to tabulate claims as early as 1972. These values are shown in Table 1-2. After 1981, the table reflects the authors' estimates of minimum and maximum claims, 29,000 and 32,900 respectively. The estimated range is reasonably narrow, indicating good correlation between the two procedures utilized for the estimates.

The data in Table 1-2 have been plotted on Figure 1 to illustrate the trend. The average of maximum and minimum estimates was plotted for 1981-90. The shape of the curve is a parabola, which means that the rate of growth is increasing with time. Since 1972, the increase in the number of claims and suits has averaged slightly more than 16% per year. In other words, the growth curve has been equivalent to a 16% compound interest rate.

The states which responded to the surveys had received a total of 234,200 claims since 1972. Since some states did not respond to the AASHTO questionnaires, the true number of claims for all states for all years is undoubtedly much higher. A more reasonable value is estimated by the authors to be more than 310,000 claims in nineteen years.

SETTLEMENTS AND JUDGEMENTS

Reported settlement and judgement amounts may be found in Table 1-3 . For 1990 about 70% of the states responded to the author's survey and indicated a total of approximately $120 million in tort settlements and judgements. California indicated that more than $36 million was devoted to closing tort claims and suits. The second highest amount was experienced in New York, with losses of almost $18 million, followed closely by Louisiana at about the same level. Michigan and Pennsylvania each had about 15 million dollars in losses.

Between 1972 and 1990, the states responding to the survey lost $880 million in judgements and settlements. When the effects of incomplete reporting are considered, a conservative estimate of total tort payouts is between $1.2 billion and $1.7 billion for state highway agencies over the eighteen year period.

Using procedures discussed previously, the authors estimated that a total of $134 million to $228 million was devoted to settling tort cases in 1990. This represents only state-level highway agencies. Local highway agencies are thought to have experienced about the same number of claims and losses as state agencies (4). If so, nationwide losses can be estimated at $268 million to $456 million for 1990.

In addition to settlements and judgements, the states also devote a considerable amount of money to the defense of tort issues. When court costs, attorneys salaries and fees, expert witness fees, employees time spent preparing defenses, giving depositions and appearing in court, and other costs are considered, the states devoted at least $60 million to defense costs. This means that total 1990 tort expenses range from a low estimate of $195 million to a high estimate of $290 million for state highway agencies. These numbers may be doubled to include the effects of suits against local highway agencies.

Even with the limitations to the accuracy of this data, it is reasonable to conclude that tort actions against highway agencies in 1990 may be conservatively estimated to have cost between $400 million and $600 million. The authors feel that it may be stated with reasonable certainty that these suits cost the U.S. taxpayer at least on-half billion dollars.

Reported losses have been plotted on Figure 2, along with the authors' estimates of full reporting for years following 1981. Although this curve is irregular in nature, the general shape should be familiar to the reader by now. The trend is for continuing growth in financial losses due to these suits.

TYPES OF CLAIMS

The types of claims vary from state to state. The preferences of tort attorneys, the magnitude of previous awards and the character of the highway system all come into play.

To illustrate the diversity in the types of claims, data was taken from Louisiana records. The number of claims filed, and the amount of reimbursement requested from Louisiana are displayed in Table 1-4. During a five-year period, over 1,000 claims were filed in this state. No more than 16% of the claims fell into any one general category.

An understanding of the types of claims helps in designing a risk management program. An overview of primary claims topics is included in Chapter Five of this workbook.

TRAFFIC ACCIDENT MAGNITUDE AND COSTS

Over the last five years, there have been an average of approximately 146,000 traffic accidents per year in Kentucky. Fortunately, there has been a decrease in the rate of fatalities per million miles driven in the past few years. Figure 3 indicates other trends during this period. The reader may obtain a feel for the overwhelming magnitude of the traffic collision problem by studying the figure.

Cost of Accidents

It is difficult to equate human life and suffering to money. After all, we could not eliminate all accidents, injuries and deaths by simply paying an amount of money, say a billion dollars per year, into a mystical fund. However, assigning such fiscal values allows

us to compare hazardous locations, select improvement projects, etc., and to make rational decisions involving difficult issues. It appears to be necessary to use such a scale, and organizations like the National Safety Council and the National Highway Traffic Safety Administration routinely issue typical accident costs.

National Safety Council estimates of the real cost to society for an accident in 1990 were approximately:

Fatal Accident	$410,000
Injury Accident	$ 17,100
Property Damage Only, no fatalities or injuries	$ 3,500

For example, if there are 100 property damage accidents in a downtown parking area in a given year, this represents $350,000.

Over the past five years, about 64.5% of Kentucky accidents were PDOs, about 0.6% included fatalities, and 34.9% included injuries. FHWA-approved accident cost values were applied to Kentucky accident data to yield average cost per accident. A good approximation is that in 1990, accidents ended up costing the public an average of about $14,000 per occurrence! When subjected to a similar analysis, Kentucky lost about $2 billion in 1990 (see Figure 3). Individuals should be aware of the total costs of traffic accidents in terms of pain, grief and financial loss.

By now, the reader should be aware that the number of suits against highway agencies is still growing rapidly. The number of nationwide claims reached 33,000 to 35,000, and has increased at 16% per year since 1972.

There are more than 146,000 traffic accidents per year in Kentucky. Many of these include fatalities or disabling injuries. The cost of these accidents, both financial and in terms of human suffering, is substantial.

Ostrich Syndrome

In spite of the obvious risk of liability and the associated major financial losses, governmental units at all levels have been slow to take action. The most apt comparison is that of an ostrich with its head buried in the sand. The problem will not go away on its own, and it is time to quit ignoring the issue! Accident victims and attorneys are not ganging up on the public agency and its employees. They are simply exercising the right to sue under the American legal system.

Positive Action is Called For

There is a need to take positive action to minimize risk, by making risk management an accepted component of day to day operation. Resources expended on such positive approaches can be far more effective than losses incurred in negative situations.

This workbook will guide the participant in establishing a positive attitude toward risk management and in establishing a risk management program which is right for the situation faced by his or her agency.

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(3) Turner, Daniel S., Davis, James K. and Wood, Bryan T., "Status Report: Tort Liability Among State Highway Agencies," Transportation Research Circular No. 361. Transportation Research Board, Washington, D.C., pages 77-112, July 1990.

(4) Turner, Daniel S., "Lawsuits Confound Highway Agencies," Traffic Safety, Vol. 91, No. 4, pages 24-18, July/August 1991, Chicago, Illinois.

(5) "Analysis of Traffic Accident Data in Kentucky, 1986-89," Kentucky Transportation Research Center, University of Kentucky, Lexington, Kentucky, 1991.

TABLE 1-1. TORT CLAIMS & SUITS FILES AGAINST STATE TRANSPORTATION AGENCIES

State	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AL	263	172		173	265	311	342		502	555
AK	37	63								
AZ	293	214		319	359	412	517	500	674	758
AR	170	165		148	137	182	125	473	507	514
CA	523	444	3390	4068	5099	4934	6012	3831	2639	3269
CO	89	126				950		829	890	718
CT	900	1200						785	743	963
DE							2			
FL	92	73	625	726	766	810	1822	2808	1192	1347
GA										
HI								62	50	41
ID	223	193	233	273	328	243		241	261	276
IL	45	114			1357	1299	1251	1148	1158	1184
IN	607	773	881	256	135	136	147	685	936	1163
IA	184	182	211	256	242	371	319	397	329	321
KS	11	12		18	16			11	15	8
KY								647	616	
LA	448	514		517	585	623	593	3298	431	416
ME	28	6				16	6	4	14	6
MD										
MA	150	166						212	212	212
MI								171	173	219
MN	133	181	507	244	285	277	262	220	243	326
MS			7	12	8	10	10			
MO	27	39	29	28	32	34	31	404	464	712
MT								387	431	396
NE	63	92								
NV								164	176	223
NH	26	24		12	21	16	16	13	34	27
NJ										
NM	20	30						524	596	532
NY	326			344	384	364	363	472	374	484
NC								2185	1830	
ND								0	0	0
OH	130	128	143	202	258	294	229	228	221	281
OK	8	7	11	15	15	307	427	658	595	
OR	466	588		504	730	594	557	599	872	876
PA			6502	6368	6100	6082	5941	5763	6256	6013
RI	100	100								
SC	319	372						412	418	443
SD	0	0				3	3	207	212	168
TN		400			45	111	552	89	118	128
TX	58	69	81	75	92	106	125	137	119	108
UT	16	4		805	791	969	1004	434	588	4934
VT	90	90						97	122	95
VA				24	28	41	57			
WA	64	88						900	888	841
WV	308	228	176	234	285	311	350	767	900	659
WI				125	136	129	80	212	199	165
WY	55	72		16	28	21	22	95	121	114

TABLE 1-2. SUMMARY OF REPORTED AND ESTIMATED DATA

Year	Claims/Suits (x 1000)			Settlements/Judgments ($ Millions)		
	Reported	Estimated		Reported	Estimated	
		Min.	Max.		Min.	Max.
1972	2.2					
1973	2.7					
1974	3.2			9.0		
1975	4.1			6.3		
1976	4.7			12.4		
1977	5.6			11.1		
1978	7.1			15.9		
1979	9.4			16.0		
1980	13.3			36.0		
1981	6.3	12.5	13.8	22.6	37.2	40.9
1982	6.9	12.5	15.1	24.6	39.2	47.4
1983	12.8	16.8	20.6	82.9	104.3	117.8
1984	15.8	18.4	23.5	47.2	122.7	157.1
1985	18.5	18.6	25.0	104.2	175.2	236.5
1986	20.0	21.1	28.8	65.4	137.1	187.8
1987	21.2	25.1	29.6	94.2	165.6	195.4
1988	31.2	31.8	33.5	101.2	107.2	153.9
1989	28.1	28.5	29.5	119.9	126.1	208.4
1990	29.5	32.9	35.0	127.3	133.8	227.5
1991						

Note: For 1972-1980, 100% of states participated in survey. After 1980, participation was less than 100 %, so estimates were prepared to represent full reporting.

TABLE 1-3. AMOUNTS ($ X 1000) OF SETLEMENTS AND JUDGMENTS BY YEAR

State	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
AL	85	50		95	56	108	81	156	191	92
AK	81	99								
AZ	2,518	484		1,930	1,030	1,770	2,820	1,903	4,307	7,348
AR	233	150		153	78	110	156	247		114
CA	5,265	5,184	4,565	4,565	7,391	14,596	21,788	21,172	33,872	36,199
CO								275	85	26
CT	30	45						1,292	1,173	783
DE										
FL			4,179	773	742	80	104	3,661	4,161	4,028
GA										
HI								2,811	212	1,295
ID	299	288	304	326	794	345	236	122	103	98
IL	519	662			500	487	188	206	663	712
IN	2,292	2,699	3,476	1,801,	1,851	2,865	1,684	2,221	3,035	3,771
IA	1,165	443	503	10,735	2,423	6,101	1,219	1,566	461	270
KS	26	4		220	306			450	250	50
KY				396	935	455	84	326	102	
LA	3,295	3,650			44,275	11,341	27,811	4,341	19,217	17,840
ME	1	25				14	1,103			25
MD										
MA	244	142								
MI								12,145	17,343	15,563
MN	114	658	218	774	488	419	541	44	72	27
MS										
MO	11	11	8	8	12	21	286	140	236	167
MT								452	391	370
NE	3	5								
NV								32	62	33
NH	11	7						65	4	
NJ							2,000			
NM								150	108	56
NY				7,500	15,600	9,700	11,400	12,289	7,728	17,933
NC	53	216		222	502			7,269	1,102	
ND								0	0	0
OH	343	89	98	206	2,544	1,417	1,876	3,967	354	229
OK	3					135	100	200	420	
OR	339	408		415	227	176	97	409	330	366
PA	3,630	7,000	12,000	15,000	21,600	12,500	17,370	15,588	18,210	14,773
RI										
SC	363	311					95	1,499	970	324
SD								45	50	114
TN					7	230	1,328			
TX	191	430	139	138	170	141	42	23	33	5
UT	126	145		1,400	2,300	1,800	1,700	531	1,073	1,066
VT	5	8						163	270	71
VA				56	341	335	17			
WA	1,323	1,356						5,174	3,162	3,353
WV			57,437					223	67	20
WI				29	45	36	86	78	44	202
WY	13	3		505	28	181	6	6	1	0

TABLE 1-4. LOUISIANA DEPARTMENT OF TRANSPORTATION SUMMARY OF CLAIMS RELATED TO HIGHWAY TORT LIABILITY FOR 1979-83

Condition	Claim Amount	No. of Claims
Shoulder	$203,935,706	175
Design, etc.	201,049,525	107
Surface	123,683,633	161
Work Site	121,102,215	107
Signs	94,664,421	96
Property	94,365,486	45
RR Crossing	59,835,430	39
Bridge	48,569,651	55
Drainage	48,569,651	16
Signal	36,309,772	126
Marking	29,136,161	26
Sight Distance	27,425,450	23
Traffic Control	26,125,700	7
Maintenance	24,816,773	28
Left Turn	10,893,211	18
Lighting	7,614,655	14
Equipment	6,400,870	4
Debris	6,386,497	13
Ferry	5,204,479	3
Mowing	4,062,350	4
Guardrail	3,511,109	6
Tunnel	2,350,000	1
Other	2,000,000	1
Steel Cable	1,110,000	2
DOTD Operator	227,000	1
Under - $100,000	286,867	9
TOTAL	$1,200,780,410	1,069

Figure 1: Number of Claims/Suits

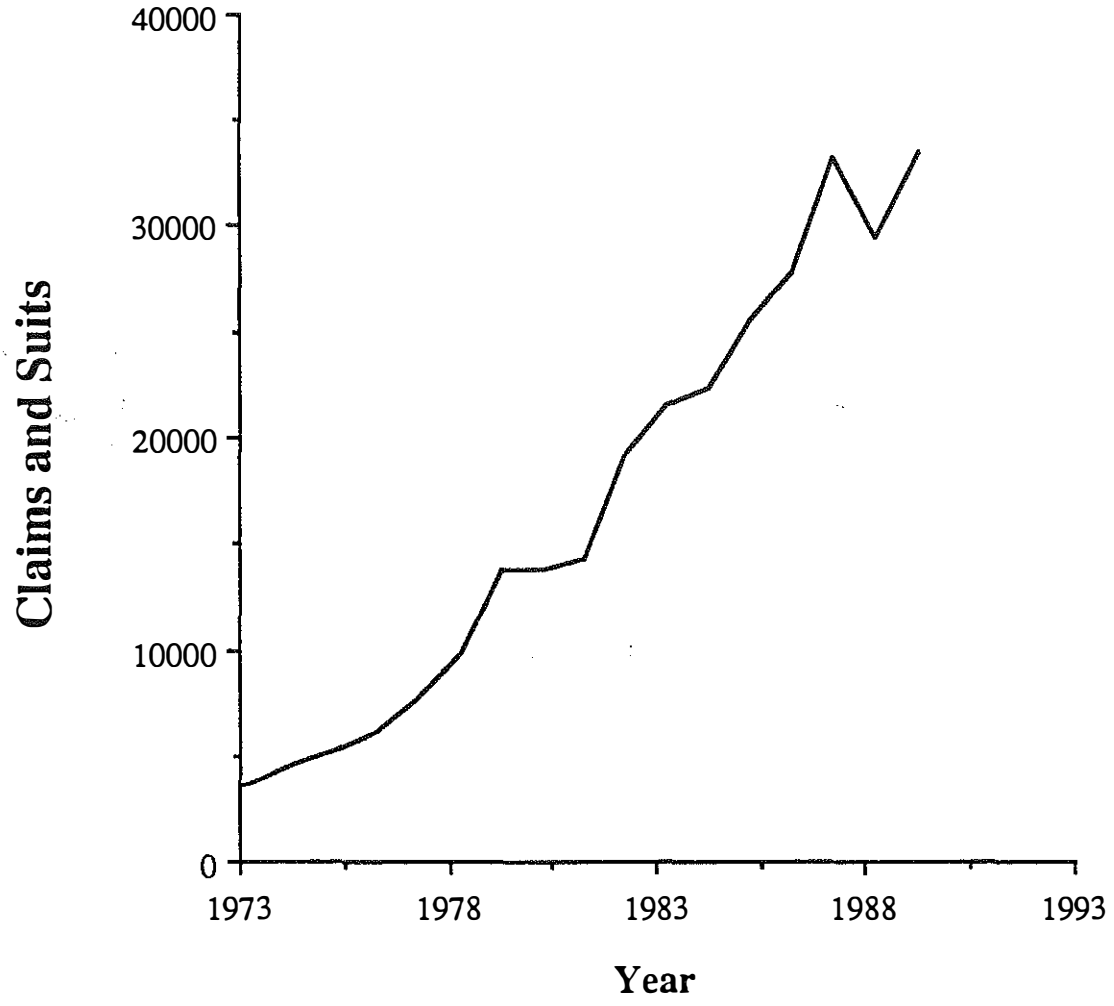


Figure 2: Amounts of Judgments and Settlements

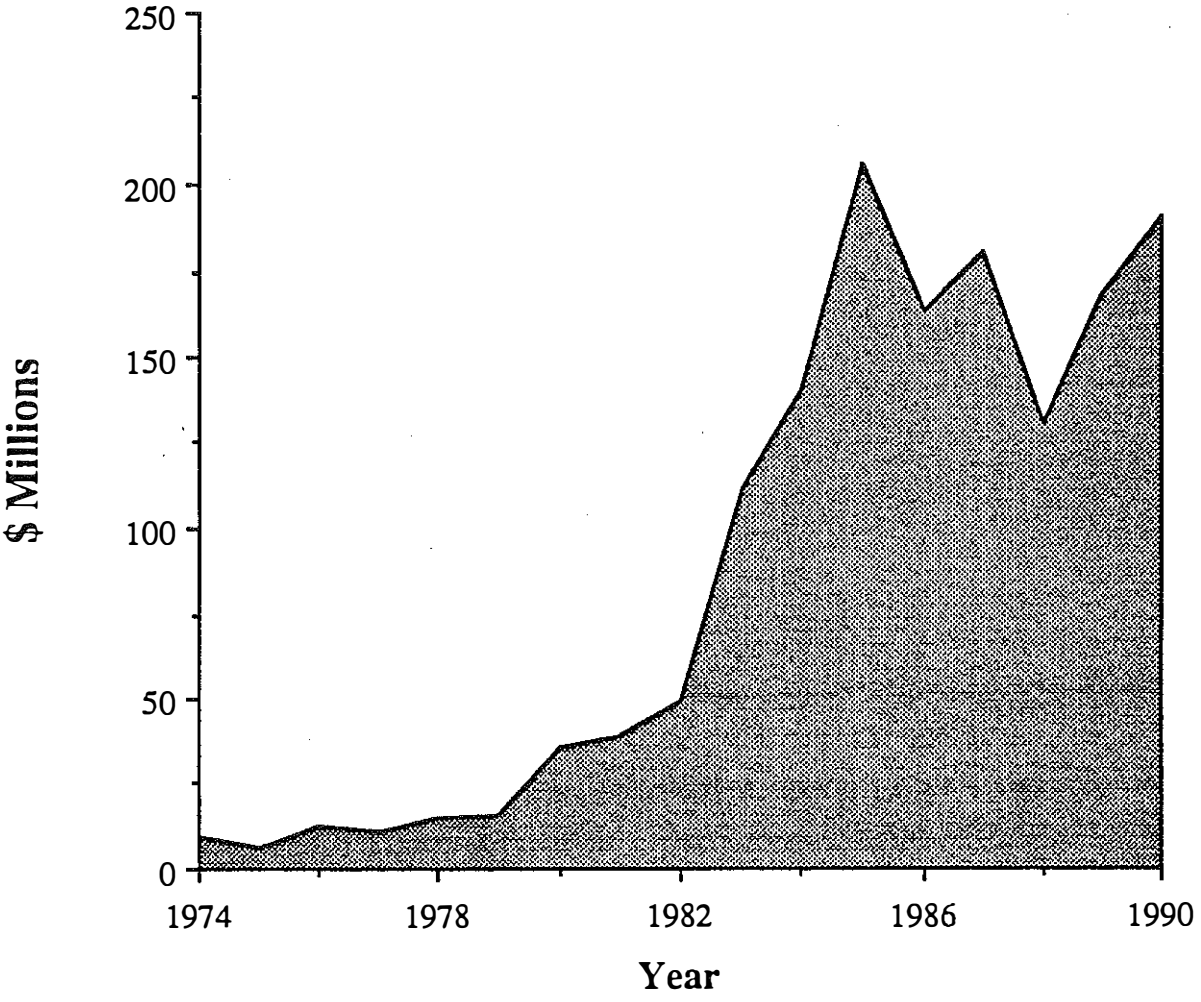
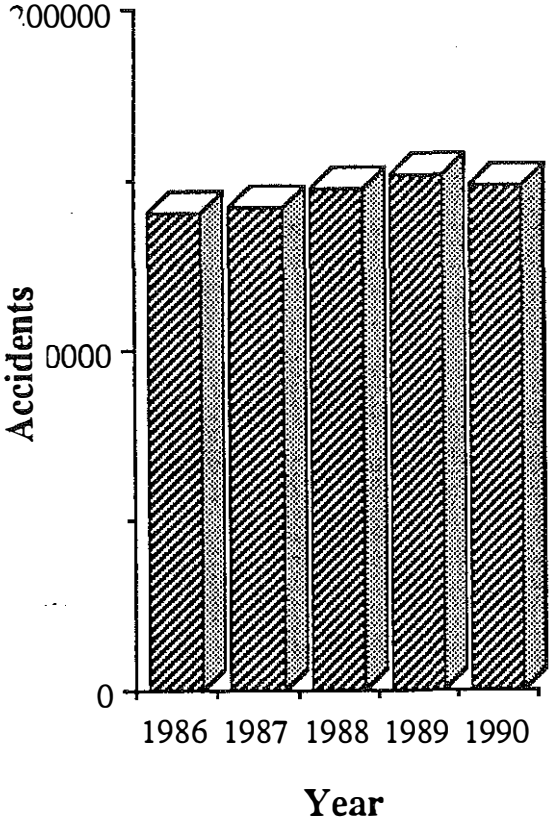
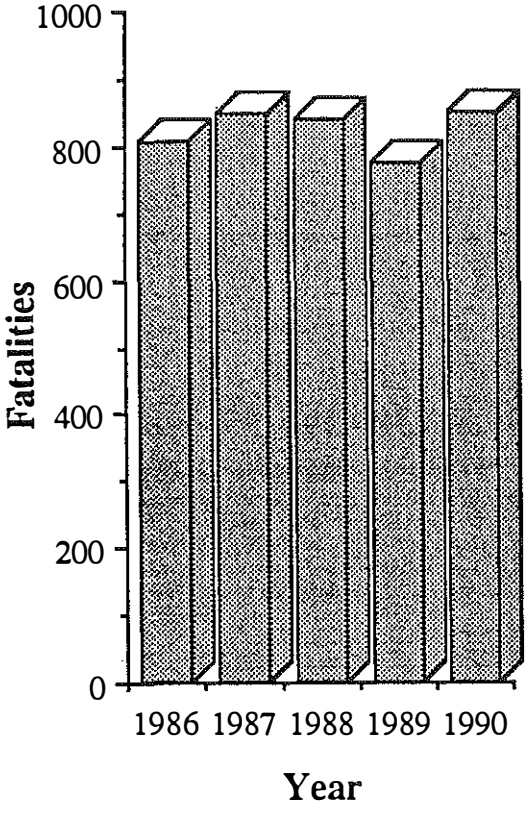


Figure 3

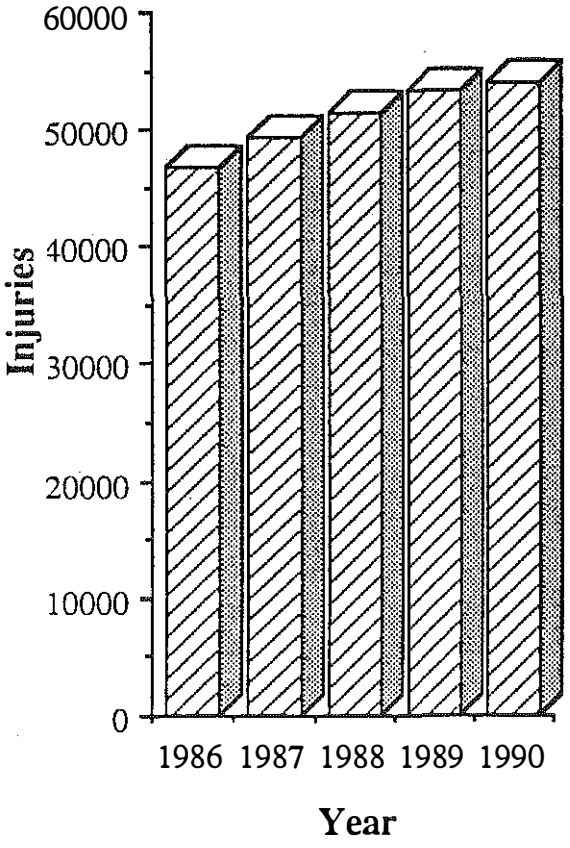
Number of Accidents in Kentucky



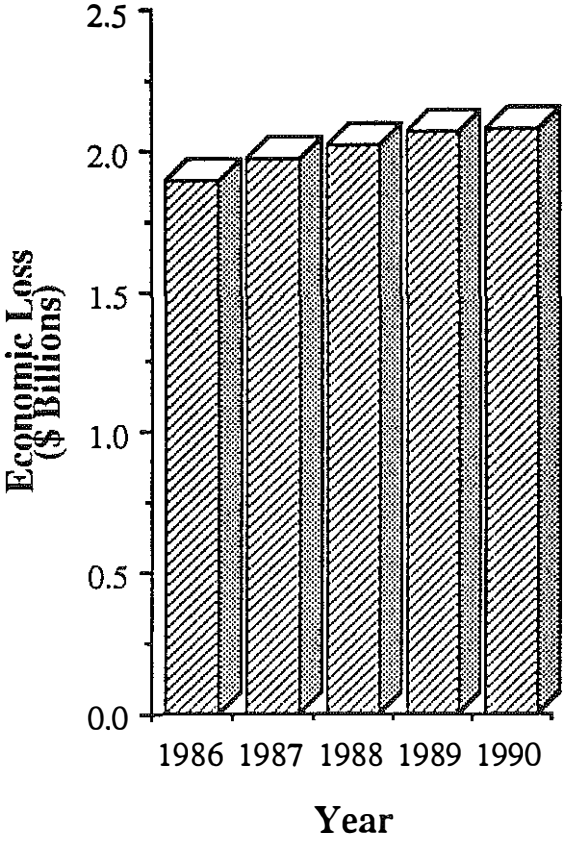
Number of Fatalities in Kentucky



Number of Injuries in Kentucky



Economic Loss in Kentucky



CHAPTER TWO

THE LEGAL SYSTEM

This chapter has been written to provide a brief introduction to our current legal system. Key concepts and terminologies are discussed, and the legal procedures utilized in civil proceedings are outlined.

TERMINOLOGY AND CONCEPTS

Familiarity with legal terminology is helpful in understanding the tort liability problem and potential solutions. The following discussion has been provided to assist managers and employees with transportation responsibility in gaining this familiarity.

Tort Liability

Simply stated, a tort is a civil wrong or injury. The person or persons to whom the wrongful action was directed may seek to regain their previous status through a suit. The person causing the wrong or injury may be liable for repayment for injuries or damages to property. Thus, the person performing the tort is liable for damages.

Risk Management

There are two recognized risk management techniques: risk control by minimizing exposure, and risk finance by purchasing insurance. The Insurance Company of North America has published an excellent summary of the topic, pointing out that regardless of which technique is used, the risk management process consists of four steps (1):

1. Identify the risks involved and evaluate them as required (e.g., frequency, probability, severity, predictability, etc.);

2. Determine the appropriate risk management methods (most suitable risk control technique, risk finance technique, or combination of the two, and the procedures, policies, and financial commitments necessary to administer the method);

3. Implement the appropriate methods; and

4. Monitor the methods and adjust as necessary.

If the customer elects to purchase insurance, he has decided to experience a minor loss (the insurance premium) rather than accept the risk of a catastrophic loss. In this case, the insurance company will measure the risk to establish a fair premium. The customer may reduce the premium by reducing the risk through good management practices. However, purchase of insurance does not guarantee that the purchaser will be completely free of traffic-accident liability. The presence of a large policy may make the holder an attractive target for a suit.

Also, the Kentucky Supreme Court recently ruled that purchasing insurance was equivalent to waiving sovereign immunity in some instances.

If the customer elects the other option, risk control, then the proper method of minimizing liability calls for the use of risk management procedures to limit exposure to the extent possible. The principles of insurance risk assessment can be applied to liability for automobile accidents. This report will address that process, the approach to risk management that utilizes risk control by minimizing exposure.

Negligence

Chapter Three will discuss specific Kentucky law applications of the negligence theory; however, a simple introduction is given here. Negligence is the failure to use reasonable care in dealing with others (2). Negligence in one form or another is usually the key to tort liability cases, and officials should understand its general principles and applications. In order to win a judgment on the ground of negligence, the plaintiff must prove the following (3): defendant had a duty to use reasonable care toward plaintiff, defendant breached that duty (negligence), defendant's negligence was the proximate cause of plaintiff's injury, plaintiff was not guilty of contributory negligence which caused the injury, and plaintiff incurred resulting damages.

Officials should be interested in breaking the chain of items to prohibit proof of their negligence. Not breeching their duty would be the ideal way to prevent losses in court. The best defense to a lawsuit is a preventative defense, by not ever allowing negligent situations to arise.

Sovereign Immunity

Sovereign immunity began in England, where the King would not allow a suit against himself. English courts afforded the same protection to those who governed with the King's authority. By 1812 the principle was in use in the United States, and eventually became well established as follows (2):

1) no one can sue the government without the government's permission, and

2) even if the government could be sued, it is not responsible for the acts of its employees.

Originally, almost all states possessed sovereign immunity. By 1978, it was a valid defense in only 16 states (4). The courts had nullified or substantially weakened it in the other locations. Since that time, virtually all but a few states have lost their immunity.

Governmental-Proprietary Distinction

British law distinguished between governmental actions. A municipal corporation could be held liable for operations which mainly benefited the "proprietors" or owners of a money making venture. Actions which benefited all inhabitants of a state were termed "governmental", and did not produce liability. The general principle was accepted in the U.S., but it has not been easy to distinguish between the two types of actions in practice. Use of the "governmental" distinction as a defense seems to be waning. It has become very difficult to distinguish the difference in governmental and proprietary functions, primarily because of overlapping and confusing court decisions.

Discretionary and Ministerial Acts

Decisions resulting from exercise of discretionary authority are immune to liability (5). Ministerial actions are not immune. The term discretionary function means the power and duty to make a choice among valid alternatives; it requires a consideration of alternatives and the exercise of independent judgment in arriving at a decision (6). There is no hard and fast rule for conduct that one must take, but there are actions which are certainly wrong (such as capricious action or abuse of discretion). The courts have generally held that planning level decisions are discretionary in nature.

Ministerial duties usually involve clearly defined tasks not permitting the exercise of discretion. Decisions made at the operational level are usually viewed as ministerial by the courts.

Organizing improvement programs, assessing property values, selecting a highway route, designing highways, and carrying out these functions (in good faith) are examples of discretionary acts (7). On the other hand, routine repair and maintenance work, traffic operations, driving city vehicles, and similar actions are usually ministerial acts.

Nuisance

Lewis indicates that nuisance is another legal avenue used by plaintiffs in highway accident related suits (8):

> Nuisance, unlike negligence, does not deal with tortuous behavior or performance. A nuisance is a physical condition that unreasonably interferes with the rights of the public. When nuisance is the issue, the focus is on the effect of the alleged condition, rather than its cause. The essence of nuisance is a condition that is continuous or reoccurring and invades a public right. The issue is simply whether or not the condition existed and whether it interfered with the public's right of reasonably safe travel.

Standard of Care

The critical issue in a trial may be whether or not the transportation agency had maintained roads and streets in a reasonably safe manner. The jury will be interested in establishing what standard of care would have been used by a reasonable man in providing this level of maintenance. If the agency's actions fell below this standard, then liability may be imputed.

Maintaining absolutely safe streets is not required, but it may be difficult to determine how close to this perfection the agency should have come. A subjective decision is usually necessary on the jury's part. Many items of information may be brought into court to help determine what should have been the prevailing standard of care (8). One of the strongest types of evidence will be the agency's own guidelines and policies. Regulations adopted by the agency may define in detail the minimum requirements. A reasonable person would follow such rules and orders. Other resources of information bearing on the standard of care include:

(1) agency directives and policies;

(2) directives of a superior agency;

(3) guidelines and policies of similar agencies;

(4) guides developed by national and professional organizations (such as, American Association of State Highway and Transportation Officials, Institute of Transportation Engineers, and National Association of County Engineers);

(5) textbooks and professional journals;

(6) research results; and

(7) expert witnesses.

Where the Kentucky Transportation Cabinet has established a standard of care for a given activity, or where there is an accepted industry standard, it is important that employees seek to achieve that level of performance.

Other Terminology

The layman tends to become confused by the myriad of "legaleese" encountered in dealing with the law. Many legal terms are Latin derivations, and others are used so infrequently in daily conversation that their meanings are not certain. A glossary of these terms has been included in the appendix to assist the reader in understanding legal issues.

THE AMERICAN LEGAL SYSTEM

American law is unique, generally having its roots in the "common law" system of England. The system we now use has evolved over many years. It includes a dependence upon case law, wherein judges are allowed to decide cases based upon the precedent of prior cases of a similar nature, rather than being forced to abide by a strict system of codes.

The American system is not a single unified political entity. Rather, it operates on several levels (9):

1. Federal statutory law is enacted by the Congress of the United States, enforced by the President through the Executive branch of governmental agencies, and interpreted by United States District Courts, U. S. Circuit Courts of Appeals, and the U. S. Supreme Court.

2. State statutory law is enacted by state legislative bodies, enforced by the Governor and his executive agencies, and interpreted by state trial courts, appellate courts and the State Supreme Court.

3. Another historical American ethic, the concept of local control, has given rise to yet another court system, the municipal court. The municipal court ("city court") is the judicial arm of municipal government. The legislative equivalent is the City Council. The executive equivalent is the Mayor.

Types of Law

There are a bewildering number of types of law. A few primary definitions are provided here for the benefit of the reader (9):

Statutory law is that body of law or collection of laws enacted by a legislative body.

Case law requires the court to interpret similar previous cases to determine if they have set a precedent that affects the current case.

Legislative law is that enacted by a legislative body. The United States Constitution is the highest form.

Regulatory law is that enacted by a regulatory agency, usually more detailed provisions of a legislative enactment where the legislative body has delegated those details to the regulatory body.

Substantive law is that law which applies to the substance of any given issue.

Procedural law is that which applies to the procedures to be followed in pursuing a legal remedy.

Criminal Law is the enforcement of standards of conduct by the State, and the state is always a party to the criminal case.

Civil Law is the non-criminal law dealing with regulation of citizens in many ways.

The Court System

The federal court system in the United States may be grouped into four distinct units (9):

1. U. S. District Court: This is the trial court of the U. S. court system. There is at least one and usually several districts in each state.

2. Circuit Courts of Appeals: There are 11 circuits, each with a court of appeals. This is intermediate between the trial court and the Supreme Court.

3. U. S. Supreme Court: The highest court in the country, this is an appellate court. As a practical matter, it is the ultimate decision forum for all legal questions, state and federal.

4. Specialty Courts: The maritime courts, patent courts, and U. S. Court of Claims handling contractual matters are representative of this category.

The state court system is entirely separate from the federal system. In Kentucky, there are several levels, as defined in the following paragraphs. In general, they are described below only as they apply to civil cases.

1. District Courts: (Kentucky Constitution 13). These are courts of limited jurisdiction (KRS 24A.110), which are used for Probate, such as filing of wills and other documents as public records, and Civil Courts where the controversy does not exceed $2,500. Criminal matters, such as a misdemeanor or violation are heard here (KRS 24A.120).

2. Circuit Court: (Kentucky Constitution 112). This is the Court of original jurisdiction (KRS 23A.010).

3. Kentucky Court of Appeals: (Kentucky Constitution 111). This is an intermediate appellate Court.

4. Kentucky Supreme Court: (Kentucky Constitution 110). This is the ultimate decision forum in the state, the highest appellate jurisdiction.

PROCEDURES USED IN LAWSUITS

Introduction

The United States system of government has selected courts as the primary means of resolving conflicts. The court is the judge and the judge is the court. The terms are used interchangeably. The basic function of the court is to apply law to the facts. The facts are determined by a jury, if one is used. If a jury is not used, the court also serves as the finder of the facts (10). In any lawsuit there are two parties involved, the plaintiff and the defendant. The plaintiff makes the original complaint against the other party. The other party thus becomes the defendant.

Engineers facing the threat of lawsuits should develop a legal mindset and should learn legal philosophy. Monitoring changes in legal theory, and understanding the rationale behind legal processes helps strengthen engineers' defenses against possible suits (11). A key to coping with litigation is understanding the role of engineers and attorneys. Both are highly educated, licensed to practice their professions and operate under fairly complete codes of ethics. Yet a basic difference is the degree of "truth" normally required in both of these professions. For an engineer, "truth" is related to design accuracy and standards, modified by conservative safety factors. For an attorney in a civil matter, truth rests on "a preponderance of evidence," theoretically only a small favorable margin (11). Trial attorneys are familiar with their adversarial roles, with public debate, and with the courtroom procedures. Engineers haven't been trained in these skills and are at a disadvantage when called to the courtroom and faced with lawyers trained to discredit them.

Engineers and attorneys also have different allegiances. Engineers are responsible to their clients and to society for their decisions. While attorneys are responsible to society according to a professional code, their primary duty is to their clients (11).

An attorney at law is a person qualified in character and training to serve as an officer of the court in representing people, and advising people in regard to the law. Every lawyer is an advisor to his client, an advocate for his client, and a negotiator of compromise for this client. Trial lawyers are subdivided into plaintiff's counsel and defense counsel because of the different aspects of these activities. Office practice is another area, and is concerned with such matters as preparing documents, advising businesses, settling estates, etc. (10).

Initiating A Trial

The purpose of pleadings in civil actions is to define the issues of the lawsuit. The plaintiff files with the clerk of the court a pleading usually called a complaint. The clerk then issues a summons (a warning or citation to appear in court) which, together with a copy of the complaint, is served on the defendant. The summons notifies him of the date by which he is required to either file a pleading in answer to the allegations of the complaint, or file some other pleading attacking the complaint (10). These steps are outlined in Table 2-1.

During this stage of a trial, attorneys attempt to provide the soundest possible position for their clients, jockeying for the upper hand in the coming trial. At the request of the attorneys, the court may be asked to decide numerous pre-trial matters. These are presented to the Court in the form of motions (eg., motion to dismiss based on the pleadings, motion to compel disclosure, motion to suppress evidence, etc.). (9).

Many lawsuits are decided without a trial even though the pleadings create issues of fact. These decisions result from the use of a procedure known as a summary judgement. This avoids trials when there is no genuine issue as to any material fact in dispute. If there are no facts in dispute, the only issue before the court is the legal effect of those facts. This can be decided without a trial.

The Discovery Phase

Discovery is a process sanctioned by the court in which the attorneys representing each party gather information about the case. It is designed to reveal strengths and weaknesses of the case and thereby permits appraisal of settlement potential. In addition, it enables orderly and effective organization and presentation of the case (9). The court has the power to require an attorney for one party to respond to a request from the other party's attorney, under the threat of contempt of court.

There are four techniques commonly utilized to gather information during discovery:

1. Interrogatories: These consist of written questions about the case submitted by one party to the other party. The person responding is usually required to sign a sworn statement asserting that the answers are true (8).

2. Requests for admissions: Written statements of fact are addressed to one party by the other party, with a demand for admission of such statement of fact (9).

3. Depositions: Procedures have been established for oral questions to be asked by an attorney to other parties, witnesses, or experts, with the answers given under oath. A word-for-word transcript is made by a court reporter (9). If a deposition is being taken by the opposing side, a lawyer should be present to protect his client's interest, and to object to any questions that could not properly be admitted into court as evidence (2). Although a deposition cannot be introduced as evidence if the witness is present in court, it can be used to impeach testimony if the answers in court do not agree with the answers in the deposition (2).

4. Production of documents: This is a procedure for requesting and obtaining from the other party written material, such as correspondence, memoranda, logs, diaries and inspection sheets, plans, drawings, maps, photographs, and data, including computer storage (9).

The "Perry Mason" syndrome has disappeared from American courts. The element of dramatic courtroom surprise has been removed, mainly due to clearly defined discovery and pre-trial procedures. Attorneys usually know the strengths and weaknesses of their cases long before the trial begins. It is now common for lawsuits to be settled sometime prior to trial, based upon the attorneys' knowledge of the facts (and their knowledge of who would probably win the case).

The Trial

As with the discovery phase, the actual court proceedings are now well defined in Kentucky. Table 2-2 outlines the required procedure.

The first step of the trial is to select the jury. Potential jurors are known as venire. They are selected by a method in which the court and the attorneys for each party examine the jurors' qualifications to ensure that they will be fair and impartial in reaching a verdict (10). Jury trials tend to be advantageous for plaintiffs. When the damages are great, a jury may be very sympathetic to the injured parties (8).

Next, the attorneys make opening statements, which are used to familiarize the jury with the essential facts in the case that each side expects to prove, so that the jury may understand the overall picture and the importance of each piece of evidence as presented (10).

After the opening statement, the plaintiff presents his evidence by means of examination of witnesses and production of documents and other exhibits. The party calling a witness questions him to establish facts about the case. After the party calling the witness has completed his direct examination, the other party is given the opportunity to cross-examine the witness. Cross-examination is limited to those matters that were raised on direct examination. After cross-examination, the party calling the witness again has the opportunity of examining the witness, and this examination is called redirect examination. It is limited to those matters covered on cross-examination and is used to clarify matters raised on cross-examination. After redirect examination, the opposing party is allowed to re-cross-examination, with the corresponding limitation as to the scope of the questions.

The defense presents evidence after the plaintiff's evidence has been completed, using the same procedure. Finally, each side summarizes its case through closing arguments, and the judge outlines the points of law which are applicable to the case. The jury retires to determine the facts of the case, then delivers its verdict.

Post-Trial Activities

One aspect of risk management that should not be overlooked occurs after the trial. The trial should be analyzed to see if a problem area has been identified, one that has the potential for additional future liability against the government.

It is important to collect data on the number of claims and losses, and the categories in which the losses occur. The objective is to classify functional areas and geographic locations that are most likely to generate law suits and large judgments. Once such problems are recognized, it makes sense to target resources into improving those facilities for which the agency is most vulnerable (8).

It is important for the expert witness to converse with the attorney after the case, and to have the attorney critique his performance. A good and conscientious lawyer will appreciate the call and be more than willing to give helpful hints toward better performance the next time around (12).

Selecting Cases to Appeal

The basis for appealing a court decision is an alleged error in trial procedure or application of the law. The jurors finding of the facts of the case can not be appealed. Where the award is small, it is impractical to be concerned about an appeal, even if it appears that it could be won. Cases that result in large awards should be reviewed and, where there appears to be a valid basis for appeals, such action should be undertaken.

There is a more important criterion for appeal, however. Adverse court decisions can build up a body of case law that may substantially affect governmental liability in the transportation area. A well-conceived loss-mitigation program will carefully select those cases for appeal that will set adverse precedents (10). This approach may be far more beneficial in the long term than merely focusing on those cases involving large monetary verdicts.

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Table 2-1: Starting a Legal Action In A Civil Trial

1. Filing of Complaint: A Complaint is a document which asserts a legal claim to something. The lawsuit is begun either by the filing of the Complaint or service of same on the Defendant as the first step.

2. Service of Complaint and Summons: A Summons is a command to a party to either appear for a trial or to file a document of denial, which is called an "Answer."

3. Filing of Answer: After an Answer has been filed, the case is said to be at issue. This means that a comparison of the Complaint and Answer shows that there are disputes, factual or legal, which are at issue between the parties.

4. Other Pleadings: A Plaintiff may wish to file a Response, which is a document responding to the Answer. A Defendant may file a Counterclaim.

Source: Reference (9), page 4.

Table 2-2: Trial Sequence.

1. Jury Selection (if a jury trial)
   (a) Challenges for cause
   (b) Preemptory challenges
2. Opening Statements of Counsel; (Not evidence)
3. Plaintiff's Case:
   (a) Witnesses: Direct Examination
   (b) Witnesses: Cross Examination
   (c) Documentary Evidence
4. Defendant's Case (same sequence as Plaintiff's)
5. Closing Statements of Counsel (not evidence)
6. Jury Instructions by Court
7. Jury deliberations and verdict
8. Judgement of Court

Source: Reference (9), page 6.

CHAPTER THREE

TORT LAW IN KENTUCKY

I. INTRODUCTION

A. General Negligence Laws

In order for there to be an actionable claim for negligence, three elements must be present; (1) duty and violation of the duty; (2) proximate cause; and (3) injury.

1. Duty

A duty is the standard of care that one person owes to another. It may include acts of omission as well as commission and varies according to the facts and circumstances of the situation.

The duty or standard of care owed to others is what determines the degree of the negligence. Ordinary negligence is the failure to exercise the care that a reasonable person would exercise in similar circumstances. Gross negligence however, is the failure to exercise even the slightest care and carries with it the possibility of punitive damages.

2. Proximate Cause

Proximate cause is the cause that leads to, and which might be expected to produce the result. It need not be the direct or immediate cause of injury, but must do more than merely furnish the condition or give rise to the occasion which made the injury possible. The test of whether a cause of an injury is the proximate cause is whether it is the natural and probable consequence of the negligent act (duty and violation of the duty) and involves some element of foreseeability. Obviously there can be more than one proximate cause of an accident as well as an intervening cause. An intervening cause, to relieve the original wrongdoer of liability to the victim, must be of highly extraordinary nature which is unforeseeable in character.

B. Defenses

a. Contributory Negligence

The defense of contributory negligence is no longer applicable in Kentucky because of the Kentucky Supreme Court's 1984 decision of Hilen v. Hays, Ky., 673 S.W.2d 713 (1984). Prior to Hilen v. Hays if a victim failed to use ordinary care for his own safety, he would be barred from any recovery from the original wrongdoer.

b. Comparative Negligence

Hilen v. Hays made comparative negligence the law in Kentucky. Comparative negligence calls for liability of the parties for any particular injury in direct proportion to fault. This doctrine reduces the total amount of an award against a defendant in proportion to the relationship the injured person's own negligence bears to the total negligence that caused the injury or damage. Thus, a plaintiff can be negligent himself and still recover some award against a defendant.

C. Negligence in Kentucky

Negligence law in Kentucky is rooted in the common law and in the Kentucky Constitution. Section 233 of the Kentucky Constitution adopted the common laws in force in Virginia as of June 1, 1792.

In addition to the negligence common law adopted through Section 233 of Kentucky's Constitution, there are other constitutional sections which insure a person's right to recover for another's negligence. Section 54 of the Kentucky Constitution provides that:

> The general assembly shall have no power to limit the amount to be recovered for injuries resulting in death, or for injuries to person or property.

Furthermore, Section 241 states that:

> Whenever the death of a person shall result from an injury inflicted by negligence or wrongful act, then in every such case, damages may be recovered for such death, from the corporations and persons so causing the same.

Finally, Section 14 says that:

> All courts shall be open and every person, for an injury done him in his lands, goods, person or reputations, shall have remedy by due course of law, and right and justice administered without sale, denial or delay.

These sections of Kentucky's Constitution, when combined, mean that the legislature may not abolish common-law rights of action of injuries to the person caused by negligence. Saylor v. Hall, Ky., 497 S.W.2d 218 (1973).

This right to sue for recovery of damages resulting from negligence is tempered by Ky. Const. Section 231 and Kentucky common law whenever the wrongdoer is a state governmental entity. Section 231 grants the defense of sovereign immunity to

negligence actions and is discussed more fully below.

II. SOVEREIGN IMMUNITY

A. The concept of sovereign immunity originated in the era of the divine right of kings when it was believed that a sovereign could do no wrong.

Kentucky has had a provision for sovereign immunity in each of its four constitutions of 1792, 1799, 1850 and 1891. With minor variations, each constitution stated that:

> The general assembly may, by law, direct in what manner and in what courts suits may be brought against the commonwealth.

Section 230 of Kentucky's Constitution, a companion section to Section 231, compliments Section 231 by providing that:

> No money shall be drawn from the state treasury but in pursuance of appropriations made by law.

The well know case of Foley Construction Company v. Ward, 375 S.W.2d 392 (1963) demonstrates that the Kentucky Supreme Court determines the applicability of state sovereign immunity by analyzing whether there is any fiscal impact on state funds if the plaintiff prevails and, if so, whether recovery from these funds is approved by the legislature. In Foley, the Supreme Court looked at whether the plaintiff could recover damages for breach of contract. The Court noted that "by this suit [The plaintiffs] seek to recover damages for an alleged breach of the contract." The Courts holding that sovereign immunity barred recovery is consistent with the basis behind sovereign immunity since the suit was not merely for enforcement of a contract, but for an expenditure from the state treasury for damages which had not been approved by the Legislature.

In Frederick v. University of Kentucky Medical Center, KY. App., 596 S.W.2d 30 (1979), the Kentucky Court of Appeals held that although the Legislature had established a fund out of which malpractice claims and judgements against the University of Kentucky Medical Center might be paid, the law establishing the fund did not specifically waive sovereign immunity as required by Section 231.

However, the Kentucky Supreme Court considered this same issue and reversed the Court of Appeal's ruling in Frederick. In Dunlap v. University of Kentucky Student Health Services, Ky., 716 S.W.2d 219 (1986), the Kentucky Supreme Court overruled Frederick and held that the Legislature had waived sovereign immunity by enacting the University of Kentucky Medical Center Malpractice Insurance Act. Unlike the Court of Appeals, Kentucky's Supreme Court found that the words of the Statute (KRS

164.939) indicated that a limited "legislative waiver is plain in its meaning and intent." Id., at 220. KRS 164.939 states that the legislative purpose of the act is to promote the health and general welfare of the people of the Commonwealth and that which public funds may be expended." By deciding Dunlap on the issue of whether there had been legislative approval for the expenditure of state funds for malpractice claims, the Kentucky Supreme Court continued to use the fiscal analysis in its determination that sovereign immunity did not apply in this situation. Since Dunlap sued the University of Kentucky Student Health Service Clinic for monetary damages, the only issue before the Court was whether the Legislature had approved such payments.

The dissenting justices in Dunlap criticized the Supreme Court for setting a precedent for finding implied waivers of sovereign immunity even though Section 231 requires that the General Assembly specifically "direct in what manner and in what courts suits may be brought against the Commonwealth." Although technically correct, the dissenting justices' resolution of the case (in which sovereign immunity would have barred recovery) would have forced the court to consider abolishing sovereign immunity.

The Kentucky Supreme Court, in holding that the Legislature had consented for the University of Kentucky Medical Center to be sued, avoided the issue of whether state sovereign immunity should or could be judicially abolished. (The complete abolishment of the state's immunity by the courts was argued by Dunlap and by the Kentucky Trial Lawyer's Association, who filed an amicus brief in Dunlap.)

In Kentucky Center for the Arts Corp. v. Berns, Ky 801 S.W.2d 327 (1990) the Supreme Court faced the sovereign immunity question head on. The Court described the problem as

> "the tension between our constitutional provisions, Kentucky Constitution Section 14, 54, and 241, protecting our citizens against legislative action to limit or deny access to the courts to pursue existing causes of action for personal injury and wrongful death, and our constitutional provision, Kentucky Constitution Section 231, interpreted through the years to constitutionalize the common law doctrine of sovereign immunity in suits brought against the Commonwealth".
> Id., at 328-29.

The court went on to confirm the relationship between Section 230 and 231 of the Kentucky Constitution and "ratified" sovereign immunity on the basis of protecting state funds.

However, the sovereign immunity accepted by the Supreme Court in Kentucky Center for the Arts is a very limited immunity applying

> "only to those agencies which are under the direction and control of the central State government and are supported by monies which are disbursed by authority of the Commissioner of Finance out of the State treasury".
> Id., at 331, citing Louisville & Jefferson Co. Metropolitan Sewer District v. Simpson, Ky., 730 S.W.2d 939 (1987).

After finding that the Kentucky Center for the Arts did not qualify under this test for sovereign immunity, the Supreme Court postponed the question of whether statutory authority to purchase insurance was a legislative waiver of immunity to a time when the governmental entity in question qualified for sovereign immunity protection. Although the court noted that KRS 44.073 (4) (enacted in 1986) states that "the purchase of liability insurance. . . shall not be construed as a waiver of sovereign immunity or privilege," the Justices gave an indication on where the Court will stand on statutory authority for purchases as waivers of sovereign immunity. The opinion states that

> Arguably, if the 1986 General Assembly meant to change the situation by enactment of KRS 44.073(14), it should have so stated with statutory language that immunity, where it exists, is not waived by the purchase of liability insurance even where, as here, the legislation expressly directs its purchase.
> Id., at 332.

It is probable that, unless the statute is amended as suggested by the Court, the purchase of insurance will be construed by the court as a waiver of sovereign immunity. (This has profound impact on state employees as will be discussed in subsequent sections.) The basis of this opinion rests on the Court's continued reliance on the relationship between Section 230 and 231 of the Kentucky Constitution. If an insurance company pays for the damages, the Court could justify a finding of waiver by saying that the money paid out is not coming from the state treasury and ignoring the fact that the State actually pays the premiums.

As a final note, the Supreme Court has recently reemphasized the Kentucky Center for the Arts test for what constitutes an agency protected by sovereign immunity and subject to Ky const. Section 231 in Calvert Investments Inc. v. Louisville and Jefferson County Metropolitan Sewer District, Ky., 805 S.W.2d 133 (1991). It is obvious from reading this opinion that although the Court acknowledges that sovereign immunity must be recognized in some instances, the Justices are not happy about doing so.

B. Local Government Immunity

a. Counties - Counties have long been considered an "arm of the state" and thus enjoyed sovereign immunity under Kentucky Constitution Section 231. As early

as 1884 the courts extended this doctrine to Kentucky counties.[1] Like state sovereign immunity, the immunity of counties could only be waived in negligence action by express provisions of the Legislature. The courts did, however, provide for the county to be sued on an express contract as early as 1909[2] and in nuisance cases on the theory that a nuisance may be such an invasion of the rights of an adjacent landowner as to amount to an injury and taking of property under section 242 of the Kentucky Constitution.[3]

In 1955 the Kentucky Court recognized a Legislative waiver of "county" immunity pursuant to KRS 67.180, a statute which authorized, but did not require, counties to purchase insurance covering vehicles operated by counties.[4] When a county purchased the insurance, the court said, it waived its immunity to the measure of the insurance policy. Similarly, in a case where a county failed to purchase Worker's Compensation insurance for its employees, the Courts declared that the county had not waived its immunity and was immune from a suit for damages.[5]

In Ginter v. Montgomery, Ky., 327 S.W.2d 98 (1959), the court considered the effect of the Board of Claims Act on Counties. In Ginter, the court decided that even though the Act operates as a partial waiver of state immunity, it does not completely abrogate the doctrine as to the state and does not purport to waive any immunity as to local governments.

One recent Kentucky Supreme Court case in which the doctrine of sovereign immunity as applied to counties is considered is George M. Eady Co. v. Jefferson County, KY., 551 S.W.2d 571 (1977). The Court applied the doctrine and stated that the county was immune from suit for damages resulting from the failure of the county to procure right of way titles in time for Eady to perform excavation work it had contracted to do for the sewer district. Although there was a contract involved, the contract had a "no damages" clause in it. The Court stated that since the Legislature had not provided for counties to be sued for breach of contract (not to be confused with performance of a contract) as it had for the state, the court had to apply the doctrine and allow counties to "continue to enjoy their singular protection from the inroads of justice." Id., at 572.

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[1]Moberly v. Carter County, 5 Ky. Law Rep. 694, 12 Ky. Opin. 485 (1884)

[2]Marion County v. Revis & McChord, 133 Ky. 477, 118 S.W. 309 (1909).

[3]Brown v. Marshall County, 394 F. 2d 498 (6th Cir. 1968).

[4]Monroe County v. Rouse, Ky., 274 S.W.2d 477 (1955).

[5]Ginter v. Montgomery County, KY., 327 S.W.2d 98 (1959)

Given the attitude of the court in the Eady case it would appear that, given the opportunity, the Kentucky courts would gladly find a waiver for the sovereign immunity doctrine as it applies to counties.

Counties currently have coverage through a self-insurance pool provided by the Kentucky Association of Counties. The latest information was that 114 of 118 eligible counties were participating in this pool. Fayette and Jefferson Counties are large enough to insure themselves. The premium for each county is based on exposure which considers many variables. This pool is reinsured to cover any large awards. Information is that there have been several lawsuits based on transportation issues.

2. Urban-County Governments - The Kentucky Court of Appeals ruled in Hempel v. Lexington-Fayette Urban County Government, Ky. App., 641 S.W.2d 51 (1982) that an urban county government is not a city and retains the immunities of a county government. "It is, like a county government, an arm of the state entitled to the protective cloak of sovereign immunity." Id., at 53.

3. Municipalities - Kentucky appears to have started without municipal immunity. In Prather v. City of Lexington, 52 Ky. (13 B.Mm.) 559 (1852), the court held that a city was liable in its corporate capacity, where the acts done would warrant a like action against an individual. By 1877, however, municipal immunity had found its way to Kentucky courts.

Twyman's Administrator v. Board of Councilman of Frankfort, 117 Ky. 518, 78 S.W. 446 (1904) is the first of an unbroken line of Kentucky cases which recognize municipal immunity. The Twyman court set out the state of municipal immunity at that time as follows:

> So far as municipal corporations of any class, and however incorporated, exercise powers conferred upon them for purposes essentially public - purposes pertaining to the administration of general laws, made to enforce the general policy of the state - they should be deemed agencies of the state, and not subject to sue or be sued for any act or omission occurring while in the exercise of such power, unless by statute the action be given. Id., at 466.

In Gnau v. Louisville and Jefferson County Metropolitan Sewer District, Ky., 346 S.W.2d 755 (1961), the court considered the effect of the Board of Claims Act on municipal immunity. After finding that the sewer district was an independent corporation exercising a public function and not a "state agency", the Court held that the Board of Claims statute did not waive immunity for any government entities other than those which are under the direction control of the central state government. Thus municipalities retained immunity despite the passage of the Board of Claims Act.

Even though the court continued to uphold the immunity rule, rumblings of

scontent began to be heard in 1958. Cases since 1964 were confusing and have often nflicted with one another.

The confusing nature of the cases since 1964 prompted the court in 1985 to decide Gas Service v. City of London, Ky., 687 S.W.2d 144 (1985). In Gas Service, the court held that municipal corporations are not immune from liability for ordinary torts, and carved out a narrow exception from this rule for a city's exercise of legislative, judicial, quasi-legislative or quasi-judicial functions. The Gas Service Court defined quasi-judicial and quasi-legislative functions as involving regulatory activity in which the government is not charged with having caused the injury, but only with having failed to prevent it by proper exercise of regulatory functions.

In applying the judicial/legislative exception to the cases decided since 1964, the Gas Service court said that in all but two, the functions carried out by municipal employees did not qualify for municipal immunity. The two that did qualify involved failure of employees of the government to inspect and regulate businesses and to enforce laws - activities which the court said fell under the quasi-judicial and "quasi-legislative" functions of government.

The legislative/judicial municipal protection exception stated in Gas Service assures "that lawyers for plaintiffs and defendants alike will have their work cut out for them in stitching together or unraveling the fabric of this latest judicial exception."[6] Unless and until the courts abolish municipal immunity without exception, application of the exceptions must be done on a case by case basis, with little guidance from the courts. If municipal immunity were completely abolished, perhaps the Legislature would finally be prodded into enacting a comprehensive governmental liability statute. Indeed, Justice Stephenson, in his dissent in the Gas Service case, stated:

> The majority opinion will undoubtedly lead to bankruptcy of many municipalities, large and small. My only suggestion to city fathers is to run for the hills and seek help from the legislature. Id., at 153.

In 1988, the Kentucky Supreme Court decided that the Transit Authority of Northern Kentucky (TANK) was not entitled to the protections of sovereign immunity. Kestler v. Transit Auth. of N. Ky., Ky., 758 S.W.2d 38 (1988). The Court determined that the mass transit authorities' enabling statute, KRS 96A.101, etseq., is a statute which provides for the mandatory purchase of liability insurance by the transit authority. Kestler, 758 S.W.2d at 39; KRS 96A.180. The Court held that the foregoing statute "clearly contemplates a limited waiver of governmental immunity to the extent of the insurance coverage." Kestler, 758 S.W.2d at 40.

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[6]Snell, "A plea for a Comprehensive Governmental Liability Statute", 74 Ky.L.J. 521.

The court declined to apply KRS 44.072, the statute upon which TANK relied for its position that the purchase of insurance should not be construed as a waiver of immunity, because KRS 44.072 was enacted July 15, 1986, a year and one-half after the accident which prompted the claim against TANK. Kestler, 758 S.W.2d at 40. Because the Court did not hold KRS 44.072 to be retroactive, it had no application to the claim against TANK. Kestler, 758 S.W.2d at 40.

A year later, the Supreme Court held that the purchase of liability insurance coverage as authorized by statute by the Green River District Health department constituted a limited waiver of Sovereign immunity. Green River Health Dep't v. Wigginton, Ky., 764 S.W.2d 475 (1989). In Wigginton, suit was filed against the Health Department after an infant had sustained brain damage at birth as a result of negligent treatment by an employee of the Health Department. Wigginton, 764 S.W.2d at 475. The Health Department was covered by a $1.5 million liability insurance policy, purchased as authorized by statute. Wigginton, 764 S.W.2d at 475; KRS 212.890(4). The Supreme Court agreed with the court of Appeals which stated:

> We agree with the circuit court that the appellee [the health department] is protected by sovereign immunity. However, KRS 212.890(4) allows the appellee to be sued and a final judgement obtained which shall measure the liability of its insurance carrier to the appellants.

Wigginton, 764 S.W.2d at 476.

With respect to KRS 44.072, the court in Wigginton, like in Kestler, held that that section expressly provides for no retroactive application. Wigginton, 764 S.W.2d at 478. Thus, KRS 44.072 again was not considered by the Supreme Court.

In 1991, the Kentucky Supreme Court held that the Louisville & Jefferson County Metropolitan Sewer District was subject to liability as a municipal corporation. Calvert Investments v. Louisville & Jefferson County Metro. Sewer Dist., 805 S.W.2d 133 (1991). Significantly, however, the Court in Calvert stated:

> The distinction we have made in Kentucky cases between municipal corporations and counties, and municipal corporations and school districts, is recognized and commented on in Restatement, Second, Torts, Section 895C, comment a , as follows:
>
> > Under the governmental structure of some States, however certain types of geographic subdivisions, such as counties and school districts, have been held to be entitled to any broader immunity (either from suit or from tort liability) that has been retained by the state itself, rather than being subjected to the type of liability that is applicable to cities and towns.... The classification is a

> matter of governmental structure and statutory language for the particular state,.....
>
> Thus, while we in Kentucky have treated tort liability for school districts and counties differently from other local entities, this difference may be explained by their particular status. School districts were created by the General Assembly and exist only as a means for the state to carry out the General Assembly's constitutional duty to 'provide for an efficient system of common schools throughout the state.' See Kentucky Constitution Section 186; Rose v. Council for Better Education, Ky., 790 S.W.2d 186 (1989). Counties are unincorporated political subdivisions of the state, preexisting its formation, whose existence is provided for constitutionally in Section 63, 64 and 65 of the Kentucky constitution. Both MSD and the Board of Health Classify as municipal corporations liable for their torts without disturbing precedent extending state sovereign immunity to counties and school districts as represented by Cullinan v. Jefferson County, [Ky., 418 S.W. 407 (1967)].

Calvert, 805 S.W.2d at 137-38.

In Cullinan, the plaintiff stepped into a hole and fractured his ankle while playing on county school premises. Cullinan, 418 S.W.2d at 408. The appellant filed suit against Jefferson County, Jefferson County Board of Education, and Jefferson County Playground and Recreation Board. Cullinan, 418 S.W.2d at 407-08. The court, in ruling that the county was protected from liability by sovereign immunity, stated that "Jefferson County is a political subdivision of the commonwealth..., and such is an arm of the state government. It, too, is clothed with the same sovereign immunity [as the state]." Cullinan, 418 S.W.2d at 408 (citing Monroe County v. Rouse, Ky., 274 S.W.2d 477 (1955); Ginter v. Montgomery County, Ky., 327 S.W.2d 98 (1959)).

Though the court was not faced with the specific issue of whether the purchase of liability insurance by a county constitutes a waiver of the county's sovereign immunity, the court's statement in Calvert that "MSD and the Board of Health classify as municipal corporations liable for their torts without disturbing precedent extending state sovereign immunity to counties and school districts as represented by Cullinan v. Jefferson Co., ..." tends to support the view that counties, unlike municipal corporations, continue to enjoy sovereign immunity.

In summary, municipalities do not maintain sovereign immumity as a defense. Many municipalities (almost 40 percent) are insured through the Kentucky Municipal Risk Management Association which is associated with the Kentucky League of Cities. Other municipalities have private insurance carriers while others are self insured. Claims related to transportion issues are common in municipalities.

III. BOARD OF CLAIMS

A. Purpose of Board of Claims

The Board of Claims, created in KRS 44.070, allows an injured party to receive up to $100,000 for injuries sustained at the hands of a negligent state agency or state employee. The Board is a limited waiver of the state's sovereign immunity from suit and the exclusive remedy available to one injured by the "Commonwealth, any of its departments or agencies, or any of its officers, agents or employees while acting within the scope of their employment". The Board of Claims Act created a board to investigate, take proof and compensate persons for the damages sustained as a result of negligence on the part of the commonwealth or its agents acting within the scope of their employment. The legislation originally provided only for claims arising from the negligent design and construction of highways but has been amended to compensate persons for damages sustained to either person or property as a proximate result of negligence on the part of the commonwealth or any of its agencies, departments, or cabinets.

Before creating the Board of Claims the General Assembly granted named persons the right to sue the state by passing a special resolution. One hundred eighty-five such special resolutions were introduced in the 1946 session of the General Assembly, the session which enacted the Board of Claims Act. The Board of Claims statute is now held to preclude special legislative authorizations to sue, thus the Board is the only avenue available for making a negligent claim against the state. Commonwealth v. McCoun, Ky., 313 S.W.2d 585 (1958).

The Board of Claims had its origin in an act of 1946 establishing a Highway Board of Claims with jurisdiction over claims for injuries to person or property due to "negligence in highways by the Department of Highways". (Chapter 189, 1946 Acts). The Act limited recovery to $1,000. The statutes, now KRS 44.070 to KRS 44.160, have been periodically amended to increase the maximum recovery. Last amended in 1986 (Chapter 499, Section 3, Acts 1986) the Board of Claims Act provides for the maximum recovery per occurrence ($250,000) to be equally divided among claimants provided that no individual claimant may recover more than $100,000.

In establishing the Board of Claims as an administrative agency the General Assembly intended to provide a method for processing claims against the Commonwealth with a minimum of formality and delay. However, its administrative proceedings must be fair and just. KRS 44.080. The powers of the Board to make an award are limited to those cases in which it finds that the damages were caused by the negligence of the Commonwealth. KRS 44.070. Timely filing is a condition precedent to any award. KRS 44.110 provides that a claim must be filed within one year from the date of the occurrence or the Board is without authority to make an award. Recently the one year statute of limitations has been held to apply over the two years

provision of the Motor Vehicle Reparations Act. Commonwealth, Transportation Cabinet, Department of Highways v. Micheal Abner, Ky., 810 S.W.2d 504 (1991).

An issue that is often questioned is whether a state agency can contract away its liability to a contractor. According to current state law an agency can not contract away its liability because it is a power bestowed upon them by this legislative act. However, it is noted in KRS 44.073 (subsection 15) that a state agency would not be liable for the acts of independent contractors.

B. Powers of the Board of Claims

The powers of the Board of Claims to make an award are limited to those cases in which it finds that the damages were proximately caused by the negligence of the Commonwealth or its agent. The Board is the statutorily designated finder of fact with exclusive authority to resolve any disputed issue of fact. Its decision or award may be overturned by a court when it is supported by substantial evidence and a circuit court may not substitute its own judgment for that of the Board. KRS 44.120 and KRS 44.140. In any case, a circuit court may not itself make an award but is limited to remanding the case to the Board only if the court finds that the Board's decision was in excess of its powers, the award was procured by fraud, the award did not conform to statute, or that the Board's findings did not support an award.

The Board of Claims applies only to agencies of the state. The Kentucky Supreme Court in 1961 ruled that the term "agencies" meant "those agencies which are under the direction and control of the central state government and are supported by monies which are disbursed by authority out of the state treasury." This includes many agencies of the state as well as the parties that represent the agencies. It should be noted that any action against a municipality cannot be filed under this act.

When making its decision the Board must apply the general law of negligence, which includes the doctrine of comparative negligence in appropriate cases. KRS 44.073(10). It has exclusive authority to determine the amount of an award subject only to a requirement that the amount be supported by substantial evidence and within the statutory maximum recovery. While maximum recovery is usually presented as a straight forward issue, the doctrine of comparative negligence can have a significant impact upon an award. For example, if one were to assume a claimant had shown injury in the amount of $1 million and that the Board determined 10% of the injury was a result of the Commonwealth's negligence, then the claimant would be entitled to 10% of $1 million as a compensated injury by the Commonwealth. Applying this amount to the statutory limitation the claimant would be entitled to a full maximum recovery of $100,000. This is supported by the case of Truman v. Kentucky Board of Claims (No.85-CA-2317-MR).

Finally, the Board's Orders, Awards and Judgements are enforced by the Franklin Circuit Court as authorized by KRS 44.130.

C. 1986 Amendments to the Board of Claims Statutes

1. Collateral or Dependent Claims Not Allowed

KRS 44.070(1) states in part that the Commonwealth "shall not be liable for collateral or dependent claims which are dependent on loss to another and not the claimant. The Board of Claims has interpreted this language to mean that the amount of insurance available to a claimant is deducted from any potential award amount. Also, the Board has a policy that insurance companies who pay for a claimant's damages cannot sue the state in a Board of Claims action to recover their payout. This latter interpretation was accepted by the Court of Appeals on May 31, 1991 when it decided Richerson, et al. v. Transportation Cabinet, et al., Kentucky Supreme Court No. 91-SC-000546, in the Transportation Cabinet's favor. However, the claimants have filed a Motion for Discretionary Review with the Supreme court which was denied. The Transportation Cabinet will move to publish the Court of Appeals opinion. The ruling means that insurance companies cannot sue in the Board of Claims to recover their payouts to claimants. This was supported in Poole Truck Line v. Transportation Cabinet, Court of Appeals No. 94-CA-0752-MR.

The outcome of the Richerson case will not only affect the agencies of state government but also the individual employees. Many lawsuits brought against employees in their individual capacity are brought by insurance companies whose claims for contribution have been dismissed by the Board of Claims as being collateral or dependent claims.

2. Reduction of Award by Extraneous Proceeds

The provisions of KRS 44.070(1) also contain language which requires that

> "any damage claim awarded shall be reduced by the amount of payments received or right to receive payment from worker's compensation insurance, social security programs unemployment insurance programs, medical, disability or life insurance programs or other federal or state or private program designed to supplement income or pay claimants expenses or damages incurred".

The issues that have arisen from this language are: what are "private programs designed to supplement income or pay claimant's expenses or damages incurred?" and, does the payment amount from such programs reduce the actual damages amount incurred by the claimant or does it reduce the amount that is awarded by the Board of Claims? Of course claimants take the position that insurance payments received by

them are not the "private programs" described in the statute and, even if they are, the insurance proceeds should be taken off the total damage incurred rather than the award amount.

For example, suppose there is a wrongful death claim resulting from a two car accident where the estate of the decedent brings a claim against the Transportation Cabinet for negligent road design. The estate can prove damages of $1,000,000 but has received "PIP" benefits of $10,000. The question is whether the $10,000 benefit should be taken off the $1,000,000 damage amount or off the award. If it is taken off the $1,000,000 and the Transportation Cabinet is held to be only 20% liable the cabinet is still faced with the maximum $100,000 award ($1,000,000-$10,000 = $990,000 x .20-$198,000). If the "PIP" benefits are taken off the award and the Cabinet is held to be 20% liable, the Cabinet will only pay $90,000 ($1,000,000 x .20 - $200,000. the maximum award is $100,000 - $10,000 = $90,000).

The case of Roof v. Transportation Cabinet contained these very issues. The Supreme Court held that the statutory maximum award can be reduced by basic reparation benefits received by the driver.

In Central Kentucky Drying Company, Inc. v. Commonwealth of Kentucky, 858 S.W. 2d 165 (Ky. 1993), the Supreme Court looked at whether amounts paid by a settling joint tortfeasor should be treated as a setoff against damages as specified in KRS 44.070(1). This section of the Board of Claims Act allows a damage award against the Commonwealth to be reduced by the amount paid to the claimant by enumerated sources. According to the Court, payments by a settling joint tortfeasor are not one of such enumerated sources. It is the Court's opinion that "other federal or state or private programs designed to supplement income or pay claimants' expenses or damages incurred" does not encompass settlement by a tortfeasor or its insurer. A general rule of statutory construction states that enumeration of particular items excludes other items which are not specifically mentioned. Louisville Water Co. v. Wells, Ky.App., 664 S.W. 2d 525 (1984). Therefore, the Court held that payments by a settling joint tortfeasor shall not be treated as an offset against a damage award in a Board of Claims action. As a result, it is possible for a claimant to recover damages from a settling joint tortfeasor in addition to the negligent state agency.

3. Suits Against Individual State Employees

a. History and Present Status

Prior to the 1986 amendments, it was well settled law that the Board of Claims Act did not apply to claims against state employees in their individual capacity. Spellman v. Beechum, Ky., 365 S.W.2d 33 (1962). A claimant had an option insofar as the matter of liability of a state employee was concerned, to proceed to judgment in the Board of Claims or file suit against a negligent state employee individually. Slucher v. Miracle, Ky., 382 S.W.2d 867 (1964). An action filed with the Board of Claims and

continued until there was an award precluded the right to sue a state employee in any other form. Dardeen v. Greyhound Corp., Ky., 412 S.W.2d 585 (1967); KRS 44.160. Therefore, after an award had been entered by the Board, a statutory immunity protected a state employee from further responsibility for his negligence.

The 1986 General Assembly attempted to vest the Board of Claims with exclusive jurisdiction over all negligent claims against state employees acting within the scope of their employment. Further, the amendments preclude a claimant's option of filing suit against a state employee unless and until the Board enters a judgment that it does not have jurisdiction over the claim because the employee was not acting within the scope of his authority. KRS 44.090 authorizes the Commonwealth to provide legal representation for state employees for "any claim filed with the board."

These efforts on behalf of the state employee have proven to be unsuccessful since their passage in 1986. Combined with the other 1986 amendments to the Board of Claims statutes and recent interpretations by the Kentucky Supreme Court, they have actually made state employees more vulnerable to being sued individually.

In 1989 the Kentucky Supreme Court decided three cases, all brought under the pre-1986 amended Board of Claims Act, which made it obvious that employee immunity from suit would not survive a constitutional test. In Guffey v. Cann Ky., 766 S.W.2d 55 (1989), University of Louisville v. O'Bannon, Ky., 770 S.W. 2d 215 (1989) and Gould v. O'Bannon, Ky., 770S.W.2d 220 (1989), the Court paid lip service to the fact that the cases were brought under the old law and went on to state that "a Statute which purports to extend sovereign immunity to the personal liability of its employees violates Sections 14, 54 and 241 of the Kentucky Constitution." Gould v. O'Bannon, supra at 222. Following this cue, the Court of Appeals declared the provisions of KRS 44. 073 to be unconstitutional in Blue v. Purcell, Ky. App., 793 S.W.2d 823 (1989) in a case where the claim clearly arose after th effective date of the 1986 Amendments.

Although the Supreme court has not itself decided a state employee negligence case where the claim arose after July 15, 1986, the Court has decided Kentucky Center for the Arts Corp. v. Berns, supra, and Calvert Investments, Inc. v. Louisville and Jefferson County Metropolitan Sewer District, supra, in which the Justices make clear their position that sovereign immunity may only be applied to state government agencies which receive their funding directly from the state treasury.

Where does this leave the state employee? Unfortunately, in a very precarious position. Because insurance companies cannot recover their subrogation claims in the Board of Claims, they often choose to sue the employee involved. Also, if awards in the Board are reduced by other payments received by national recovery. Indeed, in the last year there has been a great increase in the number of suits brought against individual state employees.

b. Defenses

The only defenses in suits filed against employees individually (besides the assertion that there is no negligence) are KRS 44.160 precludes suit against an employee where the Board of Claims has already entered a judgment. The Supreme Court (as the old Court of Appeals) ruled that an individual action against a state employee operating a dump truck was barred under this section where the Board of Claims had already entered an award. Dardeen v. Greyhound Corp, Ky., 412 S.W.2d 585 (1967). The Court stated of KRS 44.160 that "we find nothing unconstitutional in this statute". at 587.

As for the immunity defense, the Supreme Court has indicated that

> "there is a distinction between discretionary and ministerial functions of state employees. Discretionary acts will result in liability when negligently performed.
> ...
> State officers have frequently been held responsible for their ministerial conduct".
> Gould v. O'Bannon, supra at 221-22.

Roughly speaking, a discretionary act is one which is done in the performance of lawful duties requiring personal deliberation, decision, judgement or planning (such as policy decisions). 63A Am.Jur.2d Public officers and Employees Section 362. A ministerial act can be defined as a duty which is absolute, certain and imperative, in involving merely execution of a specific duty arising from fixed and designated facts, which is performed without regard to the exercise of the employee's own judgement. Id., Section 301. An example of a ministerial act would be entering information into a computer.

c. Legal Representation

There is no uniform statewide policy on providing legal counsel for employees sued in their individual capacity. KRS 44.090 only authorizes representation of the employee before the Board of Claims. However, KRS 12.211 authorizes the Attorney General to provide for the defense of a state employee in a civil lawsuit so long as the employee was acting within the Governor to promulgate regulations to provide such defense by various methods. (By letter dated March 21, 1991, the Attorney General has delegated the authority for the Transportation Cabinet provided that the decision to do so is done by the Cabinet's budget. So long as the employee sued was acting within the scope of his authority, the Transportation Cabinet routinely provides legal defense for its employees sued individually).

d. Judgment Against Individual Employees

Providing legal defense is a far cry from paying any judgment rendered against an individual employee. The state cannot pay such court judgments since the payments would be in violation of Sections 320 and 231 of the Kentucky Constitution. Even if there was a statute authorizing the payment of these judgments, it would likely be unconstitutional as violating Section 3 ("no grant of exclusive, separate public emoluments or privileges shall be made to any man or set of men") and Section 241 (damages for wrongful death may be recovered "from the corporations and persons so causing the same") of the Kentucky Constitution. This was apparently the fate of former KRS 12.214, repealed in 1978, which provided that judgments against individual employees were to be paid out of the general fund.

If the state employee were working for any other employer, he could bring his employer (the state) into the lawsuit under the doctrine of respondeat Superior. This legal maneuver says that where an employee acts negligently while within the scope of his employment, his employer can also be held liable. Unfortunately this theory does not work against the state because the state has sovereign immunity.

Whether an employee sued individually could bring a claim against the state for contribution in the Board of Claims once a civil judgment has been rendered against him remains to be seen. However, the one year statute of limitations for filing an action in the Board would have to be considered as well as whether such a claim would be a "collateral or dependent claim" prohibited under KRS 44.070 or the type of claim which would violate Sections 3 and 241 of the Kentucky constitution.

e. Recommendations

Obviously the General Assembly will be faced with the problem of state employee liability in the near future. It appears that there are several legislative steps which may be taken to lessen the burden on individual employees and allow them to perform their assigned tasks without the fear that a lawsuit against them could mean personal financial risk.

1. Make the provisions of KRS 44.055, Insuring State Vehicles, mandatory rather than discretionary.

2. Authorize the purchase of general liability insurance for state employees while performing ministerial duties (or possibly the reimbursement of individual employee purchases). Provide in the legislation that the purchase of such insurance shall not be construed as a waiver of sovereign immunity against the commonwealth using language recommended in Kentucky Center for the Arts Corp. v. Berns, supra.

3. Remove the prohibition in KRS 44.070 against recovery by insurance companies for "collateral or dependent" claims.

CHAPTER FOUR

SUMMARY OF BOARD OF CLAIMS CASES IN KENTUCKY

INTRODUCTION

One method of reducing the liability risk for government agencies and providing safer highways is to integrate information from highway case law into decision-making about the highway system. A method that can be used to obtain such information is to review tort claims in Kentucky to determine the basis of each claim. The cases that relate to specific areas, such as pavement condition or roadside barriers, can be studied to detect trends or characteristics in the accidents that led to the lawsuits. The claims can also be analyzed as a function of variables such as geographical location in the state, amount of claim, and amount of award. The results of such an analysis can be used in the development of an effective risk management program. Claims filed against the Kentucky Transportation Cabinet must be filed through a Board of Claims procedure. Therefore, by accessing this data, an analysis of these claims can be performed. The assumption is that the types of claims filed against the Transportation Cabinet would be similar to that filed against other government agencies. Following is a discussion of an analysis of claims made against the Kentucky Transportation Cabinet.

PROCEDURE

A summary of the claims made against the Kentucky Transportation Cabinet (KyTC) through the Board of Claims was prepared for 1981 through 1996. The claims were located by searching records maintained by the Board of Claims and the KyTC.

Information was obtained from files maintained by the Board of Claims and KyTC. One source of information was the claim form filed when making a claim. Information concerning the location and description of the accident and the basis for the claim is given on the claim form. The KyTC also maintains a computer file giving summary information for each claim. This file was used to obtain a portion of the information. The Board of Claims maintains a listing of all claims with an indication of the agency against which the claim was filed. This listing also includes the amount of the claim, the resolution of the claim, and a brief description of the basis of the claim. When more detailed information was desired for a claim, the case file for that claim was reviewed.

Various information was coded onto a computer file for each claim. This information included the date of the claim, the county where the action on which the claim was based occurred, the reason for the claim, the amount sought, the decision, and the date of the decision. The reasons for the claims were classified into several categories and are listed in the summary tables. The reasons for the claims were classified into specific categories for one summary and then combined into broader categories for another analysis.

The Board of Claims information was summarized. Examples of the types of analyses included summaries of the total number and dollar amount of claims and awards by year as well as the number and dollar amount of claims and awards as a function of such variables as type of claim, county, and highway district.

All claims under $1,000 are investigated by the administrative staff of the Board of Claims. If the claim is less than $500, a Findings of Fact is issued to the claimant (within 45 days of the date that receipt of claim is acknowledged) along with an Opinion and Order either awarding or denying the claim. If the claim is for between $500 and $1,000, the findings as to negligence are reported to all parties within the 45-day time period. Any party may then request a hearing before the Board. All claims over $1,000 are investigated by the agency concerned. The agency is given 30 days to answer the charges in writing to the Board and to the claimant. If the response filed by the affected agency admits liability, the case is submitted to the Board. If the response filed by the affected agency denies negligence, or questions the amount of damages, in a claim of $1,000 or greater, a hearing before a hearing officer is scheduled.

RESULTS

The total number and amount of Board of Claims actions against the Department of Highways (DOH) of KyTC are presented in Table 4-1. The dollar amount for any claim was limited to the maximum allowed by the Kentucky Revised Statutes (KRS). For example, claims for over one million dollars have been received; however, the maximum dollar amount possible under the KRS in effect at the time of the claim was used for the claim amount in the analysis since this amount represented the exposure of the KyTC. The total number of claims ranged from a minimum of 255 in 1981 to a maximum of 713 in 1990. The number of claims has remained fairly stable since 1984 with an average of 561 claims per year since that date. The maximum number of claims were filed in the three-year period of 1988 through 1990 with a general decreasing trend since 1990.

While there had been a trend of increasing dollar amounts for total claims since 1981, the total dollar amount of the claims increased substantially from 1986 to 1987

and has remained relatively stable since 1987. The average amount claimed for 1987 through 1996 is almost 6.0 million dollars per year. The increase beginning in 1987 would be related to the increase in the maximum allowable claim amount permitted by KRS which occurred in July 1986. There was a substantial increase in the average claim amount beginning in 1987. The average claim amount for the time period of 1987 through 1996 is about $10,500.

A general summary of the results of the Board of Claims cases is presented in Table 4-2. At the time of this summary, a decision had been made in 96 percent of the claims. While some payment was provided in approximately one half of the cases, only 17 percent of the claim amount was paid (for claims in which a decision has been made). The payment given each year represents the amount paid for claims filed that year. For example, if a claim was filed in 1990 but was not paid until 1993, the payment would be reflected for 1990. The smaller amounts of total payments in the most recent years are the result of the large number of unresolved cases filed during those years with large claim amounts. The high payment in 1985 resulted from two cases that accounted for $700,000 in payments. The lower percent of claim amount paid in the most recent years results from the dismissal of several claims with large claim amounts. The percentages will change when decisions are made on numerous additional claims with large claim amounts.

As of the date of this summary, 327 cases filed from 1981 through 1996 have not been resolved. This represents about four percent of all cases filed during this time period. However, the amount claimed in these 327 cases is approximately $17.1 million or about 24 percent of the total amount claimed in all cases during this time period. The average claim amount for the undecided cases is about $52,000. Approximately 23 percent of the claims of $50,000 or more remain unresolved with claims filed as early as 1985 still not having been decided. This shows that there is a potential for a substantial additional payment for claims filed during this period.

A summary of the number of cases filed classified by the amount of the claim is shown in Table 4-3. As can be seen, the majority of cases (60 percent) were for less than $500. Only about 11 percent of the cases were for $10,000 or more. The number of cases in the highest claim amount of $50,000 or more reached about 50 in 1986 and has remained fairly constant through 1996. For the years of 1981 through 1984, the number of claims of $50,000 or more averaged about 25 or one half the number starting in 1986. This shows that the increase in the total dollar amount of claims in recent years has resulted from the increase in the maximum claim amount allowed by the KRS with a resulting increase in the number of claims of $50,000 or more.

More detailed information is given for the 687 cases involving a claim of $50,000 or more in Chapter 9. The county and route where the accident occurred are given along with the amount sought and amount awarded. More detailed information is

given concerning the reason for the claim. This information describes the alleged negligence which led to the claim. In some instances, comments giving more detailed information related to the claim are included.

The percent of claims in the various amount categories for which there was some payment is given in Table 4-4. The percentage of claims with a payment decreased as the claim amount increased; however, the percentages were not substantially different..

A summary of the total amount claimed for the various claim amount categories is presented in Table 4-5. It is shown that the large majority of the amount claimed was in the "$50,000 or more" claim amount category. While only 8.0 percent of all claims is in the "$50,000 or more" category, about 87 percent of the total amount of claims is in this category. In contrast, while about 60 percent of all claims are in the "under $500" category, only 1.3 percent of the total amount of claims is in this category.

The amount of payments for claims in the various claim amount categories is presented in Table 4-6. About 74 percent of all payments were for claims of $50,000 or more while about 4.8 percent were for claims of less than $500. Given the large dollar amount for unresolved claims of $50,000 or more, the percentage of all payments in this category will increase.

The percent of payments for claims in the various claim amount categories is presented in Table 4-7. The percentage of claims paid decreased substantially for the higher claim amounts. For claims of less than $500, about one half of the claim amount was paid. This percentage decreased for claim amounts of $10,000 or more to payment of slightly under one fifth of the claim amount. The percentage for the claims of $50,000 or more may change when the unresolved cases are decided.

A summary of various claim information by county is given in Table 4-8. As would be expected, the highest number of claims was for Jefferson County with 1,013 claims. The county having the second highest number of claims was Kenton County with 382 claims followed by Fayette County with 292 claims and Pike County with 281 claims. All counties had some claims with the lowest numbers of six claims for Robertson County and eight claims in Bracken, Clinton, Elliott, and Owsley Counties. The highest number of claims of $50,000 or more was Pike County with 34 of these claims. The total claim amount in Pike County was approximately $3.2 million which was the highest total in the state. Hardin County was second in the number of claims of $50,000 or more with 25 claims and had the third highest total amount of claims of about $2.9 million. Only two counties (Pike and Jefferson) had claim amounts of over $3 million while three other counties (Hardin, Floyd, and Kenton) had claim amounts between $2 million and $3 million. Robertson County had the lowest total amount of claims ($885) followed by Nicholas County ($3,778).

Fourteen counties did not have any claims of $50,000 or more. The average claim amount varied dramatically by county with the highest amount in Leslie County of $31,654 per claim and the lowest amount in Robertson County of $148 per claim. The county having the largest amount paid was Pike County followed closely by Jefferson County. There were also large amounts of payments in Taylor and Spencer Counties which were the result of one accident in each of those counties that resulted in more than one large award. The percent paid (of claims in which a decision had been made) varied substantially by county from a low of about one percent in Caldwell and Lyon Counties to 74 percent in Jessamine County.

The numbers of claims classified by reason for the claim and year of claim are summarized in Table 4-9. The number of claims is summarized in four-year intervals over the 16-year study period. The most common claim dealt with damage to a vehicle from hitting a pothole. Other common reasons listed included an accident involving a KyTC vehicle, an object thrown from a mower into a vehicle, an object thrown from an uncovered load, hitting an object in the road, and paint striping where a vehicle drives through wet paint. The categories used were based on the explanations given on the summaries maintained by the Board of Claims and review of case files. In some cases, more than one reason was coded for one claim. For example, a claim might state that there was inadequate warning for a curve which led to a vehicle running off the road, and there was no guardrail provided to protect the vehicle after it ran off the road. Up to two reasons could be coded for any single claim. There were 8,619 reasons coded for the 8,359 claims. The summary by year allows the determination of trends that may have occurred. Many of the reasons given, especially those with relatively small numbers of claims, fluctuated dramatically from year to year. There have also been changes in the numbers of the most common claims. For example, claims alleging damage to a vehicle from a pothole has increased in recent years while claims related to an object thrown from a mower and paint striping has decreased dramatically. These reductions may be related in the recent use of contractors for mowing and painting operations.

A more detailed analysis of the claims by the reason for the claim is given in Table 4-10. For each reason, the total number of claims, as well as the number of claims for $50,000 or more, are listed. In addition, the total amount claimed, the average claim amount, and the amount and percent paid for claims for which a decision has been made are given. The largest amounts claimed were related to inadequate or improper signs or markings, improper drainage, lack of guardrail, inadequate traffic control in a work zone, shoulder dropoff, an accident involving a KyTC vehicle, substandard guardrail, problem with a traffic signal, accident due to pavement defect, falling rock or rock slides, lack of a stop sign, inadequate signing on a stop approach, view obstructed, hit object on right-of-way, debris on road caused loss of control, and shoulder related defect. Lack of a stop sign and inadequate signing on

a stop approach were classified separately from the general category of inadequate signs because these reasons were specified in a number of claims.

Each of these 16 reasons accounted for more than two million dollars in claims. Combining the claim amounts related to these 16 reasons accounts for about 82 percent of the total claim amounts (considering two reasons can be associated with one claim). The highest average claim amount (for these 16 major reasons) was for claims related to inadequate signing at a stop approach followed by claims related to a shoulder dropoff, substandard guardrail, lack of guardrail, lack of a stop sign, a view obstruction, inadequate or improper signs or markings, and improper drainage. The amount paid was highest for improper drainage followed by claims related to an accident involving a KyTC vehicle, shoulder dropoff, inadequate or improper signs or markings, lack of guardrail, and substandard guardrail.

Considering all the reasons for claims, the highest percent paid was for claims related to spreading salt and/or cinders followed by claims related to an uncovered load, paint striping, snow removal/snowplow operation, and a signal head falling. The lowest percent paid (considering reasons for which there were several claims) was for claims related to hitting an animal followed by claims related to a pedestrian fall, hitting a manhole cover, and a break in the pavement.

Since there was such a large number of classifications for the reason for the claim, the reasons were grouped into several broader categories and analyzed as presented in Table 4-11. If two reasons were given for a claim, it would be added to both classifications. If both reasons were in the same broad category, it would only be counted once. This resulted in 8,610 reasons classified with 853 reasons classified for claims of $50,000 or more. The largest number of claims related to the road surface or a maintenance activity, but these claims were generally small in dollar amount. The major type of claims in the road surface category were pothole damage and hitting an object in the road. The largest claim amounts related to road surface were for claims in which a road defect was alleged to have caused an accident. The major types of claims in the maintenance activity category included an object thrown from a mower, paint striping, and spreading salt or cinders. The largest total claim amounts were related to claims involving traffic control devices. The major types of claims in this category would be related to inadequate signs or markings, lack of a stop sign, or inadequate warning on a stop approach. The total amount claimed in this category was substantially higher that any other with approximately 25 percent of the amount for all claims involving this reason. The category with the second highest amount claimed was drainage with approximately 13 percent of all claims involving this category. Following drainage, the categories with the highest amount claimed were barrier, road surface related, shoulder related, and work zone traffic control. The highest average claim amounts were for claims related to alleged deficiencies in barriers (guardrail) and shoulders.

The largest number of claims of $50,000 or more as well as largest amount paid were related to traffic control devices and drainage. The highest percentages of claim amount paid were for claims involving vehicle operation and hitting a fixed object (within the clear zone) with the lowest percentage paid for claims involving a geometric feature or work zone traffic control.

An analysis of the claims by highway district is presented in Table 4-12. The largest number of claims was in Districts 5 and 6 with the fewest number in Districts 10 and 8. The largest number of claims of $50,000 or more was in Districts 12 and 4 with the fewest number of these claims again in Districts 8 and 10. The largest total amounts claimed were in Districts 12 and 4 with the lowest in Districts 8 and 10. The highest average claim amount was in District 11 with the lowest average in District 5. The highest amount paid was in District 4 with the lowest amount paid in District 8. The highest percentage paid was in District 5 with the lowest percentage paid in District 6.

A summary of the reason for the claim versus highway district is shown in Table 4-13. Some differences were noted when comparing the distribution by district. The largest number of claims related to maintenance activity, vehicle operation, road surface, traffic control devices, and construction activity were in District 5. The largest numbers of claims related to barriers and shoulders were in District 4. District 1 had the highest number related to a geometric feature. The largest numbers of claims related to construction zone traffic control and fixed objects were in District 6. District 12 had the highest number related to drainage. A summary of the reason for the claim versus highway district for claims of $50,000 or more is given in Chapter 9.

SUMMARY

The analysis of Board of Claims cases revealed several specific sources of claims against the KyTC. Some of the major sources included inadequate traffic signs and markings (such as the lack of a stop sign or inadequate warning of a stop approach), inadequate drainage, lack of or substandard guardrail, and shoulder-related defects such as a shoulder dropoff. Identification of these areas should allow a government agency to take measures that would both reduce liability risk and provide safer highways. A previous research report (KTC-90-8, "Tort Liability Related to Highways in Kentucky") reviewed Board of Claims cases and made recommendations relating to the establishment of an effective risk management program. The summaries given in this report supports these recommendations.

TABLE 4-1. TOTAL NUMBER AND AMOUNT OF BOARD OF CLAIMS ACTIONS AGAINST TRANSPORTATION CABINET

YEAR	NUMBER	DOLLAR AMOUNT*	AVERAGE CLAIM
1981	255	$1,359,206	$5,330
1982	377	$2,027,072	5,377
1983	432	$1,479,683	3,425
1984	522	$1,729,049	3,312
1985	630	$2,740,002	4,349
1986	577	$3,938,688	6,826
1987	580	$6,341,047	10,933
1988	647	$5,626,428	8,696
1989	616	$6,304,642	10,235
1990	713	$7,109,101	9,971
1991	576	$6,367,845	11,055
1992	542	$5,081,444	9,375
1993	454	$4,834,615	10,649
1994	540	$6,390,474	11,834
1995	380	$5,144,188	13,537
1996	518	$5,826,889	11,249

* The dollar amount for any claim was limited to the maximum allowed by the Kentucky Revised Statutes.

TABLE 4-2. RESULTS OF BOARD CLAIMS CASES

Year	Number of Claims	Total Amount Claimed	Claims Decided		Percent of Claims with Payment*	Total Payment	Percent Claim Amount Paid
			Number	Percent			
1981	255	$1,359,206	255	100	53	$ 433,104	32
1982	377	2,027,072	377	100	64	618,491	31
1983	432	1,479,683	432	100	66	425,961	29
1984	522	1,795,958	522	100	68	471,166	26
1985	630	2,740,002	629	100	62	1,277,180	47
1986	577	3,957,450	577	100	57	1,072,281	27
1987	580	6,341,047	578	100	52	1,300,505	21
1988	647	5,650,428	645	100	43	995,567	18
1989	616	6,284,142	604	98	46	726,791	12
1990	713	7,109,354	699	98	46	542,042	8
1991	576	6,262,259	567	98	50	347,858	6
1992	542	5,083,939	522	96	45	281,190	6
1993	454	4,590,475	424	93	36	247,160	5
1994	540	6,437,180	489	91	37	263,970	4
1995	380	5,144,188	296	78	29	178,739	3
1996	518	5,826,889	416	80	26	45,325	1
All	8,359	72,089,272	8,032	96	49	9,227,330	13

* For claims in which a decision has been made. Applied to claims filed in given year.

TABLE 4-3. SUMMARY OF NUMBER OF CASES BY AMOUNT CLAIMED

	Number of Cases				
	Claim Amount				
Year	Under $500	$500-$999	$1,000-$9,999	$10,000 -$49,999	$50,000 or More
1981	152	39	37	5	22
1982	254	34	51	6	32
1983	291	41	70	10	20
1984	372	47	71	5	27
1985	411	83	90	9	37
1986	369	70	72	20	46
1987	353	63	99	12	53
1988	405	91	94	8	49
1989	362	71	118	15	50
1990	433	93	102	24	61
1991	319	86	107	14	50
1992	281	105	101	12	43
1993	239	65	87	15	48
1994	317	73	78	16	56
1995	156	60	101	20	43
1996	294	64	98	12	50
All	5,008	1,085	1,376	203	687

TABLE 4-4. DECISION VERSUS CLAIM AMOUNT

	Percent with Payment*				
	Claim Amount				
Year	Under $500	$500-$999	$1,000-$9,999	$10,000 -$49,999	$50,000 or More
1981	51	59	51	40	55
1982	69	62	55	33	47
1983	70	61	61	60	50
1984	71	55	65	20	56
1985	64	54	64	44	62
1986	58	57	54	40	57
1987	51	59	49	42	58
1988	40	51	45	63	57
1989	45	52	50	60	34
1990	49	46	40	46	33
1991	50	50	50	64	44
1992	47	46	46	58	21
1993	38	42	31	33	27
1994	38	38	46	31	20
1995	36	40	26	10	7
1996	34	28	18	0	0
All	51	49	46	40	37

* For claims in which a decision has been made and any payment was made.

TABLE 4-5. SUMMARY OF TOTAL AMOUNT CLAIMED BY CLAIM AMOUNT

	Total Amount Claimed				
	Claim Amount				
Year	Under $500	$500-$999	$1,000-$9,999	$10,000 -$49,999	$50,000 or More
1981	$28,890	$26,151	$ 91,322	$101,343	$1,111,500
1982	46,850	24,204	118,809	146,309	1,690,900
1983	52,294	28,692	178,571	220,126	1,000,000
1984	66,173	33,174	181,724	94,887	1,420,000
1985	79,229	59,009	243,528	208,236	2,150,000
1986	70,657	47,985	179,677	488,131	3,171,000
1987	64,289	43,253	271,243	201,275	5,760,987
1988	79,317	62,779	244,899	152,433	5,111,000
1989	75,408	49,256	299,714	273,337	5,586,427
1990	80,345	65,266	221,822	450,031	6,291,890
1991	63,812	59,826	260,896	264,725	5,613,000
1992	56,298	73,605	269,640	264,428	4,419,968
1993	51,469	45,398	207,957	264,279	4,021,372
1994	63,298	51,320	224,348	298,214	5,800,000
1995	33,051	42,620	293,444	375,073	4,400,000
1996	58,418	45,461	287,482	241,674	5,193,854
All	969,798	757,999	3,575,076	4,044,501	62,741,898

TABLE 4-6. PAYMENT VERSUS CLAIM AMOUNT*

	Total Payment				
	Claim Amount				
Year	Under $500	$500-$999	$1,000-$9,999	$10,000 -$49,999	$50,000 or More
1981	$13,550	$14,527	$ 47,631	$ 8,536	$ 348,860
1982	31,744	14,376	48,764	33,025	490,582
1983	34,014	16,776	89,133	60,036	226,002
1984	45,647	18,229	96,237	25,697	285,356
1985	54,902	35,912	158,716	20,600	1,007,050
1986	39,082	23,483	68,000	108,052	833,664
1987	26,107	19,194	73,470	17,850	1,163,884
1988	25,306	20,844	68,201	25,505	855,711
1989	27,333	16,960	93,317	68,535	520,646
1990	33,209	17,678	43,561	114,033	333,561
1991	25,994	20,071	68,218	16,991	216,584
1992	22,552	20,841	67,086	33,214	137,497
1993	16,795	12,016	41,549	50,600	126,200
1994	21,843	12,911	53,619	15,750	159,847
1995	10,571	11,332	25,356	3,980	127,500
1996	18,366	7,435	19,524	0	0
All	447,015	282,585	1,062,382	602,404	6,832,944

* For claims in which a decision has been made.

TABLE 4-7. PERCENT PAID VERSUS CLAIM AMOUNT*

	Percent of Claimed Amount Paid				
	Claim Amount				
Year	Under $500	$500-$999	$1,000-$9,999	$10,000 -$49,999	$50,000 or More
1981	47	56	52	8	31
1982	68	59	41	23	29
1983	65	58	50	27	23
1984	69	55	53	27	20
1985	69	61	65	10	48
1986	55	49	38	22	26
1987	41	44	27	9	22
1988	32	33	28	17	18
1989	36	34	32	28	12
1990	41	27	20	28	6
1991	41	34	27	6	4
1992	40	28	26	14	4
1993	33	27	22	25	5
1994	35	26	26	12	5
1995	32	27	15	3	10
1996	31	19	13	0	0
All	46	38	33	19	15

* For claims in which a decision has been made.

TABLE 4-8. SUMMARY BY COUNTY (1981-1996)

County	Total Number of Claims	Number of Claims $50,000 or More	Amount Claimed	Average Claim Amount	Amount Paid*	Percent Paid*
Adair	29	2	211,973	7,309	5,388	5
Allen	26	3	536,568	20,637	14,815	5
Anderson	36	6	630,475	17,513	146,257	44
Ballard	29	1	110,823	3,821	9,260	8
Barren	96	7	565,780	5,894	98,813	17
Bath	31	9	773,606	24,955	63,498	20
Bell	84	10	1,302,619	15,507	39,631	6
Boone	232	12	1,141,461	4,920	240,202	21
Bourbon	34	4	251,863	7,408	42,982	17
Boyd	97	8	802,825	8,277	102,457	19
Boyle	41	8	749,775	18,287	9,832	3
Bracken	8	0	5,648	706	1,447	26
Breathitt	34	3	349,128	10,268	9,989	3
Breckinridge	42	6	579,853	13,806	112,225	19
Bullitt	58	4	440,011	7,586	39,084	12
Butler	30	1	219,278	7,309	6,779	3
Caldwell	32	4	652,204	20,381	4,194	1
Calloway	42	3	351,974	8,380	31,397	9
Campbell	232	12	1,160,571	5,002	117,421	12
Carlisle	27	3	321,814	11,919	104,488	32
Carroll	55	4	368,936	6,708	8,034	42
Carter	51	12	1,407,695	27,602	42,193	3
Casey	17	0	16,328	960	8,456	52
Christian	57	6	718,897	12,612	52,451	11
Clark	64	2	219,116	3,424	43,125	20
Clay	46	2	274,083	5,958	14,535	6
Clinton	8	1	102,366	12,796	870	37
Crittenden	16	6	355,799	22,237	15,739	6
Cumberland	14	0	6,136	438	3,683	60
Daviess	147	7	744,234	5,063	111,905	15
Edmonson	24	2	220,171	9,174	6,998	3
Elliott	8	1	57,355	7,169	1,032	2
Estill	24	0	55,799	2,325	8,552	33
Fayette	292	16	1,772,672	6,071	158,641	11
Fleming	66	3	347,640	5,267	14,216	4
Floyd	192	23	2,584,373	13,460	323,442	16
Franklin	184	5	707,074	3,843	60,058	21
Fulton	37	3	245,462	6,634	64,746	26
Gallatin	36	6	465,534	12,932	35,321	54
Garrard	27	4	491,258	18,195	5,147	2
Grant	48	3	370,891	7,727	14,351	4
Graves	132	9	744,540	5,640	79,568	15
Grayson	77	14	1,260,797	16,374	207,929	18
Green	37	7	667,597	18,043	106,477	16
Greenup	99	15	1,329,644	13,431	340,618	26
Hancock	16	1	105,694	6,606	8,645	8
Hardin	208	25	2,884,870	13,870	227,584	13
Harlan	71	14	1,609,630	22,671	109,315	10
Harrison	20	3	313,599	15,680	11,646	5
Hart	32	2	188,595	5,894	5,703	28
Henderson	125	9	963,238	7,706	289,851	30
Henry	42	2	141,239	3,363	6,237	7
Hickman	24	0	7,184	299	1,691	24
Hopkins	169	17	1,618,207	9,575	160,968	14
Jackson	9	0	6,222	691	1,308	21
Jefferson	1,013	24	3,049,235	3,010	525,005	22
Jessamine	39	1	82,879	2,125	61,376	74
Johnson	45	6	787,625	17,503	50,605	12
Kenton	382	16	2,032,292	2,702	121,985	7
Knott	54	7	722,489	13,379	14,705	3
Knox	53	5	566,846	10,695	10,542	4

TABLE 4-8. SUMMARY BY COUNTY (1981-1996) (continued)

County	Total Number of Claims	Number of Claims $50,000 or More	Amount Claimed	Average Claim Amount	Amount Paid*	Percent Paid*
Larue	44	2	117,220	2,664	10,435	9
Laurel	64	9	932,641	14,573	453,624	55
Lawrence	36	9	868,397	24,122	109,075	14
Lee	17	0	38,373	2,257	2,188	6
Leslie	30	10	949,625	31,654	50,279	6
Letcher	59	7	793,206	13,444	27,971	5
Lewis	33	1	119,265	3,625	26,075	22
Lincoln	37	5	485,666	13,126	55,364	15
Livingston	25	1	267,657	10,706	6,699	3
Logan	60	2	238,835	3,981	21,198	9
Lyon	23	1	159,744	6,945	1,483	1
McCracken	161	11	1,128,630	7,010	123,514	14
McCreary	35	1	138,132	3,947	11,648	33
McLean	21	3	385,448	18,355	81,328	21
Madison	87	6	821,432	9,442	30,889	6
Magoffin	30	8	614,339	20,478	47,707	9
Marion	36	0	56,939	1,582	11,657	21
Marshall	71	4	616,393	8,682	46,550	18
Martin	36	6	609,808	16,939	46,077	8
Mason	73	1	198,907	2,725	15,912	23
Meade	43	12	1,169,568	27,199	159,220	16
Menifee	10	1	132,746	13,275	760	20
Mercer	27	5	609,360	22,569	64,874	16
Metcalfe	33	9	963,567	29,199	282,591	30
Monroe	34	2	167,795	4,935	55,726	33
Montgomery	47	9	951,638	20,248	62,767	8
Morgan	19	4	455,925	23,996	28,188	9
Muhlenberg	113	9	1,023,675	9,059	118,106	12
Nelson	70	2	344,523	4,922	16,822	13
Nicholas	12	0	3,778	315	2,673	71
Ohio	58	2	276,463	4,767	10,487	4
Oldham	53	2	371,448	7,008	80,635	22
Owen	32	1	117,703	3,678	13,678	12
Owsley	8	0	18,387	2,298	2,425	13
Pendleton	28	4	411,661	14,702	5,283	3
Perry	70	15	1,579,195	22,560	233,532	25
Pike	281	34	3,221,330	11,464	562,941	24
Powell	32	2	354,883	11,090	35,843	25
Pulaski	103	9	899,026	8,728	26,072	4
Robertson	6	0	885	148	357	40
Rockcastle	28	0	42,656	1,523	7,636	40
Rowan	71	10	934,436	13,161	181,167	23
Russell	27	4	574,723	21,286	92,966	26
Scott	72	4	596,073	8,279	119,610	32
Shelby	86	4	453,446	5,273	11,871	8
Simpson	38	2	237,252	6,243	14,686	6
Spencer	24	3	516,808	21,534	402,706	78
Taylor	50	14	976,135	19,523	415,986	54
Todd	17	0	26,643	1,567	1,784	7
Trigg	30	3	159,820	5,327	11,786	7
Trimble	22	0	65,857	2,994	16,537	25
Union	42	3	451,560	10,751	17,377	4
Warren	107	10	1,142,416	10,677	130,872	16
Washington	22	1	110,065	5,003	4,967	64
Wayne	30	3	221,009	7,367	17,091	14
Webster	70	2	261,761	3,739	80,769	31
Whitley	66	3	544,378	8,248	37,696	9
Wolfe	15	1	74,175	4,945	6,807	9
Woodford	39	3	353,722	9,070	176,951	50

* For claims in which a decision has been made.

Table 4-9 SUMMARY OF NUMBER OF CLAIMS BY REASON FOR CLAIM (1981-1996)

Reason for Claim	1981-1984	1985-1988	1989-1992	1993-1996	All
Pothole damaged vehicle	115	226	333	606	1,280
Accident involving Kytc vehicle	240	339	251	129	959
Object thrown from mower	141	264	362	26	793
Miscellaneous	103	204	236	89	632
Uncovered load	135	188	193	47	563
Object in road	100	112	133	179	524
Paint Striping	161	212	120	17	510
Falling road/rock slide	34	70	100	129	333
Utility	97	84	52	25	258
Hit tree limb/falling tree	19	68	54	77	218
Inadequate/improper signs/markings	25	49	70	71	215
Improper drainage	17	50	61	67	195
Snow removal-snowplow operation	26	72	31	20	149
Oil/tar on road	41	52	29	11	133
Spreading salt and/or cinders	59	48	18	6	131
Inadequate traffic control device -work zone	29	53	14	18	114
Construction zone-other	18	17	26	48	109
Hit manhole cover/drain	23	36	25	23	107
Pedestrian fall	16	19	29	37	101
Accident due to debris on road	18	30	37	15	100
Break in pavement	18	32	20	29	99
Lack of guardrail	6	33	21	31	91
Improper drainage damaged property	21	24	36	10	91
Accident due to pavement surface	21	14	15	40	90
Traffic signal malfunction--inadequate	7	37	14	19	77
Construction damaged property	11	14	26	17	68
Object thrown up from road	10	26	14	18	68
Work zone-flagger related	23	16	17	8	64
Hit object on right of way	9	20	11	23	63
Shoulder drop-off	11	19	27	2	59
Sign fell onto vehicle	13	10	14	16	53
Loose part of bridge deck	14	12	13	14	53
Substandard guardrail	7	12	10	21	50
Shoulder related defect	9	9	16	12	46
View obstructed	5	12	13	10	40
Lack of stop sign	6	13	13	8	40
Inadequate signing at stop approach	2	8	11	8	29
Signal fell	3	12	3	4	22
Improperly designed curve	1	4	1	15	21
Pedestrian-other	1	8	5	1	15
Hit animal	0	9	1	2	12
Construction-loss of business	5	2	1	2	10
Low clearance	6	3	0	0	9
Improper speed limit	4	1	1	1	7
Related to issued license	0	0	3	2	5
No roadway lighting	0	0	1	4	5
Road too narrow	2	0	0	2	4
Improper construction of median	0	0	1	1	2

TABLE 4-10 ANALYSIS OF CLAIMS BY REASON FOR CLAIM (1981-1996)

Reason for Claim	Number of Claims	Number of Claims $50,000 or More	Amount Claimed	Average Claim Amount	Amount Paid	Percent Paid*
Pothole damaged vehicle	1,280	2	$614,484	$480	$117,341	19
Accident involving Kytc vehicle	959	31	4,254,950	4,437	1,018,569	24
Object thrown from mower	793	2	458,317	578	94,039	21
Miscellaneous	632	13	1,730,585	2,738	143,262	8
Uncovered load	563	1	250,717	445	126,500	51
Object in road	524	0	269,535	514	51,839	19
Paint Striping	510	0	152,893	300	72,662	48
Falling road/rock slide	333	24	2,972,497	8,926	339,898	11
Utility	258	0	276,621	1,072	123,734	45
Hit tree limb/falling tree	218	5	928,691	4,260	95,651	10
Inadequate/improper signs/markings	215	126	12,542,544	58,337	780,667	6
Improper drainage	195	105	9,929,754	50,922	1,698,045	17
Snow removal-snowplow operation	149	0	43,584	293	20,425	47
Oil/tar on road	133	0	71,921	541	16,651	23
Spreading salt and/or cinders	131	0	34,591	264	19,576	57
Inadequate traffic control device -work zone	114	55	4,909,924	43,070	560,681	11
Construction zone-other	109	20	1,739,668	15,960	234,388	13
Hit manhole cover/drain	107	3	195,038	1,823	8,906	5
Pedestrian fall	101	13	1,291,980	12,792	16,969	1
Accident due to debris on road	100	21	2,406,342	24,063	266,691	11
Break in pavement	99	6	759,760	7,674	43,443	6
Lack of guardrail	91	68	6,503,437	71,466	779,626	12
Improper drainage damaged property	91	21	1,459,818	16,042	191,706	13
Accident due to pavement surface	90	37	3,291,441	36,572	256,646	8
Traffic signal malfunction- -inadequate	77	36	3,781,413	49,109	291,289	8
Construction damaged property	68	4	691,136	10,164	116,564	17
Object thrown up from road	68	0	26,502	390	4,280	16
Work zone-flagger related	64	8	781,374	12,209	51,641	7
Hit object on right of way	63	25	2,466,824	39,156	425,514	17
Shoulder drop-off	59	49	4,820,648	81,706	790,405	16
Sign fell onto vehicle	53	0	40,833	770	18,044	44
Loose part of bridge deck	53	0	107,458	2,027	24,601	23
Substandard guardrail	50	46	4,015,863	80,317	672,654	17
Shoulder related defect	46	26	2,140,819	46,540	233,926	11
View obstructed	40	30	2,533,537	63,338	307,663	12
Lack of stop sign	40	24	2,757,125	68,928	472,397	17
Inadequate signing at stop approach	29	25	2,519,976	86,896	387,050	15
Signal fell	22	47	14,904	677	7,071	47
Improperly designed curve	21	18	1,224,646	58,316	78,202	6
Pedestrian-other	15	4	363,711	24,247	431	0
Hit animal	12	1	139,571	11,631	1,605	1
Construction-loss of business	10	3	237,821	23,782	0	0
Low clearance	9	0	11,899	1,322	2,046	17
Improper speed limit	7	5	563,825	80,546	6,000	1
Related to issued license	5	2	210,240	42,046	190	0
No roadway lighting	5	4	402,000	80,400	200	0
Road too narrow	4	1	52,773	13,193	0	0
Improper construction of median	2	2	200,000	100,000	32,500	16

*For claims in which a decision has been made.

TABLE 4-11. SUMMARY OF REASON FOR CLAIM INTO VARIOUS CATEGORIES (1981-1996)

Reason for Claim	Number of Claims	Amount Claimed	Average Claim Amount	Number $50,000 or More	Amount Paid*	Percent Paid*
Maintenance activity	2,394	4,921,366	2,056	32	766,735	19
Vehicle Operation	1,522	4,505,667	2,960	32	1,147,069	30
Road Surface Related	2,555	9,034,185	3,536	82	807,367	14
Fixed Object	63	2,466,824	39,156	25	425,514	25
Barrier	140	10,319,300	73,709	113	1,452,282	20
Traffic Control Devices	446	21,677,942	48,605	213	1,956,518	12
Shoulder Related	105	6,961,465	66,300	75	1,024,331	17
Drainage	287	11,389,572	39,685	118	1,889,751	21
Geometric Feature	76	4,022,855	52,932	51	420,411	13
Work Zone Traffic Control	176	5,676,699	32,254	63	610,172	13
Construction Activity	185	2,666,953	14,416	27	350,202	18
Miscellaneous	661	2,686,495	4,064	22	145,898	7

* For claims in which a decision has been made.

TABLE 4-12. SUMMARY BY HIGHWAY DISTRICT (1981-1996)

District	Number of Claims	Number $50,000 or More	Amount Claimed	Average Claim Amount	Amount Paid*	Percent Paid*
1	622	46	4,469,840	7,186	496,921	14
2	864	63	7,201,381	8,335	936,081	14
3	476	43	4,318,305	9,072	634,262	17
4	666	85	8,356,162	12,547	1,279,005	20
5	1,518	45	5,745,118	3,785	1,142,133	27
6	1,113	66	6,389,181	5,741	569,725	12
7	821	73	7,530,263	9,172	922,451	17
8	328	25	2,698,015	8,226	229,174	13
9	549	60	5,975,151	10,884	789,841	16
10	262	34	3,672,950	14,019	375,991	16
11	429	53	6,186,044	14,420	716,930	16
12	714	94	9,587,228	13,427	1,134,816	16

* For claims in which a decision has been made.

TABLE 4-13. REASON VERSUS HIGHWAY DISTRICT

Number in Given Category

Reason Category	Highway District 1	2	3	4	5	6	7	8	9	10	11	12	All
Traffic Control Device	32	42	40	50	64	37	59	17	38	10	18	39	446
Drainage	14	20	10	37	29	26	19	19	28	15	30	40	287
Road Surface Related	93	281	81	132	672	476	258	46	135	58	109	214	2,555
Barrier	4	17	5	22	12	10	20	2	11	9	12	16	140
Construction Zone - Traffic Control	13	14	8	11	25	32	15	15	10	10	10	13	176
State Vehicle Operation	153	138	130	130	261	173	118	57	107	55	78	122	1,522
Shoulder Related	13	13	5	19	6	6	19	3	8	2	2	9	105
Fixed Object	7	5	1	6	8	13	7	2	1	1	7	5	63
Geometric Feature	13	5	6	12	6	8	5	5	1	6	7	2	76
Construction Activity	13	6	9	15	57	15	9	12	10	11	8	20	185
Maintenance Activity	228	257	157	213	301	282	234	127	161	79	133	222	2,394
Miscellaneous	62	84	41	50	99	65	77	34	58	24	32	35	661

CHAPTER FIVE
HIGH-RISK AREAS

It is impossible to eliminate all traffic accidents. As long as people are imperfect, they will make mistakes and accidents will happen. Some of these accidents are more likely to result in tort claims than others. These "high-risk" accidents (or potential conditions for high-risk accidents) deserve special attention in this notebook. Accidents resulting in fatalities or serious injuries are prime candidates for lawsuit activities. The probability for fatal or serious-injury accidents increases as vehicular speeds increase and where the potential for head-on, fixed-object collisions increases. Based on these factors, it would seem that accidents occurring on urban freeways and rural roadways would have a higher general risk of tort claims. It is difficult to determine if this statement is true.

Although many people will indicate that they "knew someone would eventually get killed at that intersection", it is impossible to predict when or where a fatal accident will occur. There are, however, some roadway locations or conditions that are considered to have a greater potential for accidents. Collisions are more likely to occur along highway curves than on straight sections of a roadway simply because the driver must apply some driving skill to negotiate a curve. Accidents are more likely to occur as traffic volumes increase and at locations where motorists are required to make several decisions in a short period of time.

Rather than attempt to discuss the full range of operational or geometric design conditions that may influence accident occurrences, this chapter will address eight "defects" often identified by plaintiffs as the basis for lawsuits and the causes of accidents. These eight "defects" are listed below and are addressed at length in this section.

A. High-Accident Locations (HAL's)
B. Maintenance and Construction Sites
C. Edge Dropoffs
D. "Slippery" Roads
E. Narrow Bridges
F. Fixed Objects Near The Roadway Edge
G. Pavement Defects (Potholes)
H. Traffic Control Devices

HIGH ACCIDENT LOCATIONS

A high-accident location (HAL) is defined as an intersection or section of roadway that has a relatively large number of reported traffic accidents within a specified period of time when compared with other intersections and roadway sections within the same jurisdiction. The term "relative" is important. An intersection having 10 or more accidents within a 12-month period may be considered a high-accident location if it was located in a small town, like Sandy Hook. However, if that intersection was located in a large city, like Lexington, then it would not be considered as a high-accident location. The reason for the difference is due to traffic volumes. In Sandy Hook, intersectional traffic volumes may be 3,000 per day. In Lexington, intersectional

traffic volumes may be 50,000 per day. Many more accidents would be expected to occur in Lexington than in Sandy Hook.

Selection of HAL's for a city, county, or state is based upon one of several accepted techniques. Engineers may simply count the number of collisions, may calculate the accident rate, may use a combination number-rate method, or may use a sophisticated, statistical procedure to choose HAL's. The Kentucky Transportation Cabinet (Ky TC) now has a very good procedure which uses a computer analysis of accident data and an optimization procedure to select HAL's. The accident statistics necessary to enable these locations to be identified are summarized in an annual report (1).

Recognizing high-accident locations is important because the occurrence of many previous accidents at a particular site may be viewed by the court as constructive notice. Failure to identify, analyze, and improve the HAL may be interpreted as negligence on the part of the governmental unit. It is difficult to defend the Department's position when a jury is given an abundance of information about a HAL that was essentially ignored by the government. Such inaction may be considered as a lack of reasonable care.

MAINTENANCE AND CONSTRUCTION SITES

Maintenance and construction sites (work zones) are high-risk areas of special concern for a number of reasons. One of the primary factors is that in addition to the vehicular exposure hazard, pedestrians and construction workers are also exposed. Work zones are at variance with the motorist's normal expectations (2). That is, they contradict the popular ideologies of driver consistency and expectancy. In light of this, it is usually held that state authorities should provide proper safeguards or adequate warnings of work zone areas and that these warnings must be commensurate with the degree of danger. The adequacy of these warnings is a question in tort law that is usually left for the courts to decide. Unfortunately, most of the past cases discuss only what is not adequate; decisions on what is adequate warning are rarely addressed. The Manual on Uniform Traffic Control Devices (MUTCD) (3) contains provisions for adequate warning in construction and maintenance zones which should alleviate this problem to a great extent.

The Federal Highway Administration (FHWA) conducted a nationwide review of construction sites. Though safety had been improved over previous years, several areas were selected for continued emphasis (4):

A. Management was not fully utilizing accident data at construction sites.

B. Guardrail and barrier rail transitions were a problem. There were still too many blunt-end and transition hazards.

C. There seemed to be a lack of concern by construction personnel for the motoring public. For example, construction equipment and vehicles were often located hazardously close to the traveled way.

D. There was a problem with pavement drop-offs.

E. Other problems which were a bit less prevalent included unneeded and confusing pavement markings, the use of damaged and dirty warning signs, and inadequate taper lengths.

In consideration of motorist safety, pedestrian safety, and worker safety in work zones, the following paragraphs have been provided.

Motorist Safety

Accident experience in work zones is almost always higher in comparison to non-work zone areas. This relatively high accident experience can usually be attributed to motorist expectations as applied to one or more of the following practices: signing, delineation, shoulders, geometrics, control device maintenance, surface maintenance, flagging, speed zoning, or debris removal. Inadequate implementation in any one of these areas may lead to increased driver confusion and subsequent accidents. The MUTCD contains guidance on these practices and the (KyTC) has established good training programs in these areas. A training course dealing with traffic control in work zones has also been presented by the Kentucky Transportation Center.

Different types of projects require different work zone layouts, and some types of work zones have greater potential for accidents than others. In addition, it is easier to provide adequate warning for some maintenance activities than for others. For example, the construction or rehabilitation of a bridge is a stationary activity in which there is typically ample opportunity to warn motorists of any possible hazards. This is in contrast to shorter term activities, such as pot hole repairing or striping, when the adequate warning doctrine can be more difficult to implement. The key elements for protecting any work zone activity are sufficient warning and visibility.

Pedestrian Safety

One of the major weaknesses in work zone safety has been the lack of attention given pedestrians who pass through these zones. In a report sponsored by the FHWA, work zones were referred to as "obstacle courses" with the following observation being made: "It seems as though there is no real concerted effort being made by an organization, group, or any agency to afford the pedestrian the same rights and privileges that a vehicle has as it passes through a construction zone. The pedestrian is simply allowed to fight through construction areas full of debris, mud, and other obstructions."(5) The report went on to say that, although the MUTCD provided comprehensive guidelines for vehicular traffic control, there was not a large amount of attention given to pedestrian safety.

Worker Safety

It is generally accepted that work zones experience higher accident rates than sites where there is no construction. However, workers are more vulnerable to serious injury since they have a high degree of exposure to vehicles operated by confused and irritated drivers (6). The

seriousness of this problem can be seen in the following injury rate statistics. The mean injury rate for all industries is 6.24 per 100 full-time employees. The rate for municipal workers is 24.34 per 100 full-time employees, while utility maintenance workers experience 18.10 injuries per 100 full-time employees. These rates are evidence of a problem in accommodating employee safety in work zone areas.

From the standpoint of motorist, pedestrian, and worker safety, a conscientious effort might be extended toward existing safety practices in the highway work zone. Adherence to the fundamental rules of thumb listed below will help mitigate the hazard:

1. Traffic safety in construction and maintenance zones should be an integral and high priority element of every project from planning through design and construction.

2. Traffic movement should be inhibited as little as practicable.

3. Motorists should be guided in a clear and positive manner while approaching and traversing construction and maintenance work areas.

4. The implemented traffic control elements should be inspected on a routine basis to ensure acceptable levels of operation.

5. Constant attention should be given to the implemented traffic control elements to minimize (or negate) potential increases in hazards.

EDGE DROPOFFS

Edge dropoffs (or low shoulders) are usually brought about by pavement overlay and resurfacing activities. These edge dropoffs may also result from erosion associated with highway drainage. When a given section of highway is overlayed, a differential is introduced between the elevation of the main lanes and elevation of the shoulder area. Over a period of several years, successive asphalt overlay applications may produce excessive elevation differentials creating potentially hazardous conditions for motorists leaving the main lanes and entering the shoulder area. This hazard exists regardless of whether the shoulder is grass, gravel or pavement. The hazards associated with edge dropoffs are obvious. The responsibility of the public agency is basically twofold: (1) warn of the defect, and (2) correct the defect.

Where a shoulder dropoff or low shoulder exists at a site, and after it has been identified as a potentially hazardous condition, it is the responsibility of the public agency to provide adequate warning of this condition. A warning device such as the W8-9A Low Shoulder sign should be used where the shoulder is sufficiently lower than the pavement, thus creating a hazard to vehicles that may get off the pavement. This sign may be warranted on a roadway where erosion of the shoulders has occurred, whether or not the shoulder is safe for vehicular traffic travel. The sign shall be removed when the hazard has been corrected (3).

It is important to note that merely warning of the defect (hazard) is not sufficient; it is the responsibility of the public agency to correct the defect as soon as practicable. The sign is not intended as a long term solution.

Evidence strongly suggests that a 1:1 slope (or flatter) on the edge of pavement allows an errant motorist a much better opportunity to execute a recovery maneuver to return his vehicle to the travelway. There could be a benefit from emphasizing this procedure in the future to provide an extra margin of safety for motorists.

SLIPPERY ROADS

Most "slippery" road cases involve a wet-weather accident in which an out-of-control vehicle slides along or off of the roadway and collides with another vehicle or a fixed object, or possibly flips over one or more times. Occasionally, the roadway surface was slippery due to mud or diesel (or gasoline) spillage, but usually water is the lubricant.

Accidents resulting from diesel (or gasoline) spillage are rare. Usually the spillage is the result of a previous accident on the roadway and investigating officers are normally quick to have such spillage removed by the local fire department, or they notify the responsible maintenance agency to spread sand on the roadway to soak up the fuel.

In tort cases involving slippery roadway surfaces, the plaintiff must prove that an unusually unsafe condition existed at the time of the accident, and that such a condition was known (or should have been known) to exist. Generally, proof of a slippery road condition requires an accident history that contains several wet weather accidents similar to the accident relating to the lawsuit. The question that must be addressed is whether the number of previous accidents is sufficient to prove that a hazardous condition really existed. Each claim must be viewed individually because there is no definite number of wet weather accidents that is considered to be the dividing point between a hazardous or non-hazardous condition.

A governmental agency which is investigating two roadways having similar design characteristics, equal volumes, and the same number of accidents in the most recent 12-month period may look at wet weather accidents as part of the analysis. If roadway A has 65% wet weather accidents, and roadway B has 25% wet weather accidents, then roadway A probably would have a more slippery surface and might be studied for possible improvements to minimize wet weather accidents.

Because motorists do not usually drive more cautiously in wet conditions, even though they certainly should, wet weather accident rates are usually higher than dry weather accident rates. Generally, roadways in the Southeast are only wet a maximum of about seven percent of the time. Consequently, if wet weather accidents are found to occur 25 percent of the time on a roadway, such a condition is fairly typical. However, when wet weather accidents approach 50 percent or more of the total, then consideration should be given to analyzing wet weather accidents. It must be noted that if 50 percent or more of the total number of accidents on a roadway are wet weather accidents, this does not necessarily mean that the roadway is

"hazardous" or "slippery". There may be other reasons for the high wet weather rate. Every location is unique and should be analyzed before determining if a hazardous condition does exist.

Another measurement of the "smoothness" of a roadway surface is obtained with the use of a skid-test trailer. The skid-test numbers reflect wet conditions on the pavement; in fact, the trailer sprays water on the roadway immediately prior to beginning the skid of the trailer tires to provide wet conditions. Skid test numbers usually are found to be between 20 and 60. These numbers provide a good basis for comparing pavement surface textures and they provide a conservative approximation of the actual pavement friction factor.

Highway engineers would like to know what skid test number constitutes the division between a "hazardous" and "non-hazardous" conditions. Once again, the answer is not specific. Nationally, skid test numbers around 30 are often viewed as suggesting the need for additional analysis, but do not necessarily signify an impending hazardous condition. Dry pavements usually have a friction factor of about 0.50 to 0.80. Wet pavements usually have a friction factor between 0.30 to 0.55. A skid test number of 30 indicates a pavement having a friction factor in the lower range of the normal readings. This is the basis for considering a skid test number of 30 as an indication that there may be a need for additional analysis. It indicates that the pavement is approaching the end of its life and that some improvement will be needed at some point in the future.

Similar to any roadway condition where the governmental agency determines that the public should be warned of a potentially hazardous condition, a "Slippery When Wet" sign may be installed in advance of a roadway segment that has had an unusually high number of wet weather accidents, a low skid test number, or a combination of the two. Installation of such a sign satisfies the government's requirement to warn the public of an unusual roadway condition.

A governmental agency can reduce its risk of tort liability by identifying roadway segments having a significant number of wet weather accidents, skid-testing its roadways on a scheduled basis, warning the traveling public of unusually smooth roadway surfaces, and improving the roadway surface texture (i.e., increase its friction factor) by overlaying the section with new pavement.

NARROW BRIDGES

Of the more than 500,000 bridges which serve vehicular traffic in the United States, the FHWA has determined that about 45 percent (or about 250,000) are deficient in some respect (7). As defined by the FHWA, the term deficient includes bridges which are functionally or structurally obsolete. Since it is quite rare for individuals to bring suit against agencies for structural deficiencies (i.e., death or injury brought about by a bridge collapse), attention will be focused on functional deficiencies which are more common in bridge tort litigation.

Functionally obsolete bridges are those that are structurally sound but are no longer adequate to serve current traffic demands (7). Most are too narrow, or are poorly aligned with

the roadway, or have insufficient underclearances. Narrow bridges seem to be the deficient area of greatest concern. Studies by the FHWA and others have shown that accidents and fatalities are more numerous on narrow bridges (7).

At this point, it is worth mentioning that the most common (and successful) claim by plaintiffs who are involved in highway bridge accidents is that the state was negligent in failing to provide adequate warning of a hazardous condition on the bridge (7). Courts which are unwilling to approve damage awards against the state for narrow or structurally weak bridges appear more willing to hold the state accountable for the far less costly duty of warning the public of the potential hazard. For example, in Barr vs. State [355 so. 2d 1324 (1978)], the court held that the State of Louisiana was liable for the death of a truck driver on a narrow bridge. It ruled that the decision not to widen the bridge was within the State's discretionary boundaries, but the State was judged negligent in failing to warn of the narrow bridge according to the adopted MUTCD.

In summary, courts generally appear to favor enforcement of the duty to warn motorists of potential bridge hazards as opposed to penalizing the State for failing to rehabilitate or replace a narrow or structurally weak bridge. This is usually attributed to the high cost and inconvenience to the public associated with major bridge alternations.

FIXED OBJECTS ALONG THE ROADWAY

Many fatal and serious-injury accidents are the result of vehicular impact with fixed objects. Development of breakaway signs and luminaire supports, flexible roadside barriers, and attenuation devices (crash cushions) was stirred by the desire to minimize the number of fixed object accidents. Typical fixed objects adjacent to the roadway include utility poles, signal poles, trees, bridge wing walls, overpass support columns, culvert headwalls, and improper barrier rails.

The recommended treatment of roadside objects involves a three-step process:

1) remove the object;
2) relocate the object; or
3) protect a vehicle from hitting the object.

Tort liability cases involving fixed object accidents usually include the claim that one of the three actions stated above should have been taken by the defendant. The decision concerning which action may be appropriate is site specific. Once again, it is difficult to say that certain objects should always be removed or relocated or that crash cushions should always be installed at certain locations. These decisions are site specific and discretionary in nature.

There are two areas of concern for fixed object accidents: (1) traffic barrier design and installation, and (2) the clear zone concept. Quite often, the plaintiff in a lawsuit will state that the installation of a guardrail would have prevented a fixed object accident. However, it must be understood that the installation of a guardrail (or barrier) is essentially the installation of a fixed object to protect a vehicle from hitting another fixed object. A guardrail should be installed

only if it can reduce the severity of an accident with the fixed object that it is designed to "protect". In many cases, the presence of a guardrail will actually increase the possibility of an accident (vehicle with guardrail) but decrease the severity of accidents because guardrails are designed to contain and redirect a vehicle which approaches at a small angle. Proper end treatment is a portion of guardrail design.

The clear zone concept is also presented in many tort liability cases involving fixed object accidents. The concept is based on many research studies whose results advocated clearance of roadside obstacles as a way to reduce accidents. Study results indicated that about 85 percent of all run-off-road accidents involved vehicles which never traveled beyond 30 feet from the edge of the travelway. Consequently, a clearance of 30 feet was established as the ideal condition for roadside safety.

Current roadway design standards generally support this concept and highway designers should attempt to locate roadside obstacles as far from the travelway as possible. Of course, it is not feasible to design extremely wide bridges and overpasses to accommodate such wide clearances; consequently, design standards provide some minimum clearances that should be maintained for new construction or major reconstruction projects.

It is also not feasible to provide such wide clearances in urban areas. A Policy on Geometric Design of Highways and Streets (8), recommends a range of minimum clearance for different conditions. Clearances vary depending on the type of roadway (its functional classification) and the speed of the roadway. A review should be made of this publication for more detailed information.

Another source of information concerning necessary clear zone widths and guidelines for installing roadside barriers is the Roadside Design Guide (9). Information in this report was used to develop a procedure used by the KyTC to identify and prioritize existing highway sections in need of guardrail (10).

PAVEMENT DEFECTS

Pavement defects are of several types including potholes, cracks, and fragmented sections. The government's duty to correct these defects (or warn of them) is related to the government's duty to exercise reasonable diligence to keep highways and streets reasonably safe for travel.

In cases involving pavement defects, the question often arises as to whether or not the plaintiff is guilty of contributory negligence in failing to avoid the defect. In Louisiana, in Hogg vs. Department of Highways of the State [80 So. 2d 182 (1955)] the plaintiff was injured when his motorcycle struck a large hole in a highway bridge and overturned. The passage of heavy traffic had caused chunks of concrete pavement to become dislodged, creating a hole 12 by 14 inches wide which extended entirely through the wood decking of the bridge. The judgment of the court was for the plaintiff since the evidence indicated that the State's road foreman had ample (constructive) notice of the broken condition of the pavement on the bridge. Further, the court held that the plaintiff was not guilty of contributing negligence in failing to avoid the hole,

and that the State of Louisiana was liable because it knew of and failed to correct the hazardous condition of the bridge floor.

In all of these cases, the duty of the state to warn of the defect and correct the defect is obvious. A comprehensive program to install adequate warning devices as well as a documented ranking program for the correction of defects are examples of methods to minimize liability of state agencies.

TRAFFIC CONTROL DEVICES

Traffic control devices are commonly used to expedite traffic safely and efficiently through potentially high-risk areas such as intersections, curves, or other sections of roadway which may present some type of risk to the motorist. The MUTCD defines traffic control devices as those "used to direct and assist vehicle operators in the guidance and navigation tasks required to traverse safely any facility open to the public" (3).

Traffic control devices may be classified into three basic categories:

1) Signals;
2) Signs; and
3) Pavement markings and delineation

According to the MUTCD, all traffic control devices in these three categories should fulfill the following five basic requirements:

1) Fulfill a need;
2) Command attention;
3) Convey a clear, simple meaning;
4) Command respect of road users; and
5) Give adequate time for proper response.

In most tort cases dealing with traffic control devices, the MUTCD (or some similar document adopted by the state) is introduced by either the defendant, the plaintiff, or both. The governmental agency (who is usually the defendant) may introduce the MUTCD to prove that recommended standards were followed to make the road reasonably safe for use by the motorist. On the other hand, the plaintiff may introduce the manual to show that the government did not follow its own adopted standards, or that the adopted standards were less than reasonable. These conflicting views are an example of the legal concept of "prima facie"; though the reasonability of the standard is presumed, evidence may be introduced to the contrary.

Following is an examination of some cases involving the principle categories of traffic control devices.

Signals

In the case of Bourgeois vs. State of Louisiana (255 So. 2d 861, 1971), the plaintiff brought suit for the State's negligence in failing to properly maintain a traffic signal at an intersection. The plaintiff encountered a green light at an intersection and attempted to proceed through the intersection when she was hit by a vehicle traveling on the intersecting street. Witnesses claimed the traffic signal was stuck with green showing on the one street and red on the other. The plaintiff's car was hit by another vehicle when the other vehicle attempted to maneuver across the intersection against a red indication. The court found the State guilty of negligence in failing to properly maintain the signal and this was determined to be the proximate cause of the accident. Negligence was determined since the State had received actual notice three days prior to the accident, yet failed to take corrective action. Moreover, an accident had occurred the day preceding the Bourgeois accident and corrective action had not been taken.

In a similar case involving a malfunctioning traffic signal, Williams vs. Michigan State Highway Department [205 N.W. 2d 200, (1972)], the state was found negligent in failing to reasonably maintain a traffic signal. The case involved a collision at a signalized intersection in which a young girl was severely injured. The girl was a passenger in a car driven by her sister. The plaintiff's vehicle was struck by another vehicle at an intersection controlled by a traffic signal which was displaying green on all approaches. A gas station owner whose business was located on the comer of the intersection testified that on three previous occasions the signal was green on all approaches, and that on two previous occasions the signal was red on all approaches. On the first occasion when the signal was green on all approaches, he notified the police of the problem, whereupon the police instructed him to strike the controller cabinet with a rubber mallet. After he followed these instructions, the signal returned to normal operation. The second time the signal malfunctioned, he struck the cabinet on his own with the same successful result. The third time the signal malfunctioned, showing green on all approaches, the signal began functioning normally before the gas station owner could attack it with his mallet! The courts held that the State had actual notice and a reasonable amount of time to correct the defect, yet failed to do so. The defective signal was determined to be the proximate cause of the accident, and the plaintiff was awarded $1,200,000 by the judge.

These cases illustrate the necessity of maintaining traffic control devices in proper functioning order. When an agency has actual or constructive notice of a traffic signal malfunction, maintenance and repair work should commence as soon as feasible. Failure to do so opens the door for possible tort litigation.

Signs

The proper signing of roadway facilities is necessary if tort liability is to be minimized. Of the various categories of signs, tort cases almost always involve only two categories, Regulatory or Warning signs. Additionally, the majority of these cases involve tort suits against governmental agencies for either:

1) Improper placement of a sign, or
2) Failure to place a sign where one is needed

Thus, in Boeing Co. vs. The State of Washington (572 P. 2d 8, 1978), the state was held negligent for its failure to post an adequate number of warning signs. The case involved a truck hauling two jet engines in which one of the engines struck the underside of an underpass and the other was knocked to the roadway. At the time of the accident, a warning sign was in place which correctly stated the height of the underpass and the driver observed the warning sign in sufficient time to stop. The driver attempted to proceed underneath the underpass since he incorrectly guessed the height of his load, and the accident ensued. The plaintiff contended that the clearance of the underpass was so low as to constitute an inherently dangerous condition. The plaintiff argued further that numerous previous accidents at the same site provided evidence that the existing warning signs were inadequate to prevent accidents, and that either truck traffic should have been re-routed or a device should have been installed to warn traffic if their load was too high to clear the underpass. The court agreed with the plaintiff, citing that the history of frequent accidents indicated the need for a more effective system and that the agency was negligent in failing to provide such a system.

In the case of Lynes vs. St. Joseph Road Department, [185 N.W. 2d 111 (1970)], the plaintiff sued the St. Joseph Road Commission in St. Joseph's County, Michigan, for the Department's failure to maintain a regulatory sign. The plaintiff's car was involved in an accident at an intersection with another vehicle. The plaintiff contended that the stop sign at the intersection had inadequate reflective quality, and since the accident happened at nighttime, he was unable to see the sign in sufficient time to avoid the accident. The court found the Department negligent in failing to properly maintain the sign, stating that "the County has a duty to maintain the highway in reasonable repair so that it is reasonably safe and convenient for the public". The court ruled that signs are part of the highway and are thus part of the safe street doctrine.

Markings

Roadway markings are a necessary form of traffic control which may be used in one of two ways:

1) To supplement the regulations or warnings of other devices such as traffic signs or signals, or

2) To be used alone to produce results which could not be achieved through use of any other device.

The MUTCD outlines the functions of markings: "... some instances, markings are the only practical means of conveying the desired regulations and warnings to vehicle operators." (3) Sometimes markings make it possible to convey regulations and warnings to the driver without diverting his attention from the roadway. This is an important concept to keep in mind when discussing sign and marking cases. If the driver is supplied with too much information, the drivers' attention may be diverted from the roadway. Likewise, if information is not supplied adequately along the roadway, the driver's attention will be diverted as he searches for the necessary information to accomplish the driving task. The majority of the tort cases involving markings result from either inadequate or incorrect roadway markings, or from markings that

have faded too much to be useful.

In Elliott vs. State of Indiana (342 N.E. 2d 674, 1976), the driver of one vehicle on a two-lane state highway attempted to pass on the left side of the vehicle immediately in front of him which suddenly turned to the left onto an unmarked county road. The vehicles collided and the driver of the first car was killed. Plaintiff claimed that pavement markings failed to indicate a no-passing zone, and in addition, there were no traffic signs indicating the existence of a road or left turn possibility. Portions of the state-adopted MUTCD were introduced into evidence. The court found that while there was no absolute duty imposed by statute to provide warning signs and striping at intersections, and while there was no breach of ministerial duty, the State of Indiana had a general duty to exercise care in the design, construction, and maintenance of its highways, and was negligent in not doing so at this intersection.

In the following case, Norris vs. State of Louisiana (337 So. 2d 257, 1976), the court held that failure to comply with the State MUTCD does not necessarily constitute negligence. In this case, a fatal accident occurred at a point known as "Cooper's Curve" on Louisiana Highway 498, a two-lane rural highway. At the accident site, the degree of curvature was 13.75 degrees. A curve warning sign with a 25 mph advisory plate attached was posted approximately 484 feet from the beginning of the curve. In addition, the width of the roadway was 20.17 feet and there was a large tree 9.25 feet from the edge of the roadway. The plaintiff filed suit against the state claiming there were numerous defects present along "Cooper's Curve"; the curvature was excessive and should have been reduced to 6 degrees; reflective curve delineators and center striping, both of which were not present at the site, would have made the curve less hazardous; a right turn sign should have been installed instead of the curve sign; and the tree was located too close to the edge of the roadway. The court held that there was adequate signing and maintenance for the average prudent person; the situation was not ideal, but was adequate. In addition, the court held that the failure to comply with the requirements of the state MUTCD manual does not necessarily constitute negligence. The State was held not liable and there was no recovery.

Summary

In the preceding three traffic control areas of signals, signs, and markings, the government was found to have a responsibility to the public to provide and maintain facilities which are adequate and safe for the reasonably prudent driver. Strict adherence to adopted MUTCD statutes does not ensure against tort claims, but will certainly minimize recovery in such cases.

A final and important note in the application of traffic control devices according to the MUTCD statutes is the use of the words "shall", "should", and "may" in the description of specific conditions concerning these devices. As addressed in the Manual, these words are defined as follows (3):

> shall - a mandatory condition. Where certain requirements in the design application of the device are described with the "shall" stipulation, it is mandatory that these requirements be met.

should - an advisory condition. Where the word "should" is used, it is considered to be advisable and desirable usage, recommended but not mandatory.

may - a permissive condition. No requirement for design or application is intended.

Obviously, the "shall" condition is most subject to tort claims since there is minimal discretion involved in such applications. The "should" and "may" conditions are of a more discretionary nature, and as such, are less subject to litigation. Special consideration should be given to these latter two conditions, however, because a governmental agency may be required to justify why a signing condition which the manual may have recommended with the term "should" was not initiated. Recent court cases have indicated the word "should" has strong implications of "shall".

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CHAPTER SIX

RISK MANAGEMENT PRINCIPLES

Since the mid 1970's, there have been numerous books, manuscripts and articles written on the subject of automobile accidents and tort liability. Governmental agencies have not completely utilized this material. Heavy use of legal jargon, the bewildering assortment of articles, and (perhaps) a fear of discovering a self-incriminating piece of information are a few reasons that the articles have not been heavily utilized.

This chapter contains summaries, by topic, of actions being taken to reduce liability across the nation. This information was gathered through a literature review. While reading the summaries, several points must be kept in mind:

1) These are solely the author's condensations of many pages of technical literature, and have not been issued or endorsed by any agency.

2) These are not to be considered as a euphoric solution to the liability problem. They are examples of things that seem to be working at various locations across the nation.

3) In deciding which, if any, of the ideas to adopt, public entities should carefully consider each item (or combination of items) in light of the local situation.

The literature review was performed to simplify a complex situation, and to help responsible officials select actions to reduce traffic accidents and related tort liability exposure.

Risk Management

Tort liability must be managed (1). A successful risk management program involves the implementation of both risk finance and risk control techniques. A risk management program is desirable and necessary to achieve the following three important goals:

1) Minimize the potential number of lawsuits being filed;
2) Minimize the number of lawsuits lost; and
3) Minimize the damages from lawsuits lost.

From the standpoint of achieving these goals, several desirable elements should be considered when developing a risk management program. Risk finance techniques, which have been discussed previously, are generally most useful in achieving the third goal: minimizing money damages to the agency from lawsuits lost. Risk control techniques, on the other hand, are useful in achieving all three of the goals. The remainder of this chapter will cover various risk control measures and their applications in a successful risk management program.

Accident Reduction Program

The heart of any good RMS action should be a program to reduce accidents, injuries and fatalities. Realistically, we must recognize that we can never eliminate all traffic accidents, but we may be able to decrease the number of collisions by altering the roadway environment. Specifically, emphasis should be placed upon improving situations and locations which have demonstrated a potential for high risk.

The accident reduction program might proceed in the following manner:

1) ensure that local police know why accident data is needed, that accident reports are correctly filled out, and that they are filed in a manner that facilitates cross classification and retrieval;

2) prepare a high-accident situation or location list;

3) look for patterns of accident types and causes;

4) develop alternative corrective measures for each site, and determine the most cost-effective treatment;

5) develop a priority list among competing sites, and program corrective actions based upon the list;

6) erect warning signs at sites which cannot immediately be repaired, or take routine maintenance actions to improve safety at the site;

7) review projects after completion;

8) periodically reassess the priority list and the need for warning or minor improvements at sites not yet completed; and

9) keep good records of all portions of the program.

Obviously, there are many details which might be added to the above list to specify the manner in which the individual tasks are performed. The details vary with type of highway, degree of hazard, and other factors.

High accident locations can be identified by reviewing accident data. In the simplest case, police accident reports may be examined and accident locations marked with pins on a street map. On the other hand, the Kentucky Transportation Cabinet and a few large cities have automated records of accidents, and use computers to monitor traffic accidents. Computer programs are used in accident reduction efforts, including calculating accident rates for state routes and finding high accident locations. This data is routinely provided to cabinet employees or public officials. Employees of the Transportation Cabinet may obtain the appropriate accident data by contacting:

Accident Surveillance Section
Division of Traffic Engineering
Kentucky Transportation Cabinet
State Office Building
Frankfort, Kentucky 40622
Telephone: (502) 564-3020

Officials of local public agencies in Kentucky (for example, county road officials) may gain access to this data by contacting the local Highway District Office. Local agencies (sheriff's office, police departments, etc.) should be consulted first, because they originate this data, and their information is more likely to be up to date.

Once the high-accident situations or locations are known, patterns of accidents should be identified and matched to causes if possible. This may be as simple as reviewing a few accident reports to see the types of accidents occurring at an intersection, or it may require using supporting data (collision diagram, condition diagram, traffic counts, warrant analysis, summary of key facts, field observations, etc.) for complex locations. Procedures for making these studies are well documented (1,2,3) and are outlined in more detail in another chapter. Likewise, processes for matching corrective measures to accident patterns, and for choosing the most cost-effective improvements, are well documented in the same references.

In addition to examining individual accident locations, it may be prudent to develop programs to remedy systemwide deficiencies. For example, the Transportation Cabinet has made special studies of items like railroad crossings, roadside obstacles, and other major topics.

In summary, good accident reduction programs may take many different forms. Discretion should be exercised in devising a program to fit the local situation. Good programs share several characteristics:

1) they require good accident reporting, and a good filing system,

2) they include periodic review of accident data,

3) they identify areas and situations of high risk,

4) corrective actions are directed where they will do the most good,

5) a program of improvement is developed to optimize use of resources (establishing a rational priority system for making safety improvements is important in spending safety funds wisely),

6) motorists are warned of known defects until they are repaired,

7) completed projects are evaluated, and

8) good documentation is maintained.

A concerned, aggressive attitude on the part of governmental officials and employees will help. Discretionary decisions must be made to establish a productive safety program, and dedicated employees are needed to carry it out.

Routine inspection of "high-exposure" accidents, those which have a high probability of a lawsuit, would be an obvious method of preparing for suits, and of gaining direct knowledge of accident situations. This is also a good way of minimizing the problems associated with attempting to recreate accident scenes many months after the date of the accident. Defendants may not learn that they are being sued until it is too late to gather first hand knowledge of the scene. The first significant question that must be addressed is, "what is a high-exposure accident?" Any accident that results in a death or major injuries has a much higher potential for lawsuit activity than one involving only minor injuries or property damage. If multiple deaths or major injuries are involved (e.g., a bus accident or several automobiles in a multiple collision), then the potential for lawsuit activity increases. Each public entity will have to decide which accidents warrant immediate investigation. As a general rule, all fatal accidents should be considered as "high-exposure" accidents. Injury accidents will need to be dealt with on an accident by accident basis.

Other "high-exposure" accidents are identified by the conditions of the accident. If much publicity is provided, the potential for lawsuit activity will be increased. If a specific claim of a roadway deficiency is made by a witness, the investigating officer, or by an individual involved in the accident, the potential of lawsuit activity will be increased. These claims may be similar to one of the following:

A. "There was a shoulder dropoff that caused me to lose control of the vehicle."

B. "There were not any signs warning me of this problem."

C. "The signs confused me."

D. "The road surface was so slick that I could not even stand up on it without falling down."

E. "I hit the pothole and lost control and hit the other car."

F. "I hit that puddle of water and lost control."

G. "The signal pole was located much too close to the road."

H. "This is the 10th accident like this one that I have investigated this year."

I. "The weeds were so tall that I could not see anything traveling down the road."

J. "The traffic signals were apparently showing GREEN in all directions."

Notice of a Defect

Once a public entity has notice of a defect, a duty arises to repair it or to warn the public until it can be repaired. Notice can be obtained in three ways:

1) Actual Notice: This is the simplest form, such as a complaint call. It is important that the notice be properly recorded and that an appropriate response be taken. A planned program of standby crews and spare parts may be necessary for calls after normal work hours.

2) Constructive Notice: If a defect exists for an unreasonable length of time, the agency should have discovered it. All employees are usually considered agents of the government, and if they observe defects (or should have observed them), constructive notice may have occurred. Educational programs become important in making employees aware of the need to notice and report defects.

3) Notice By Own Actions: If the entity's own actions cause the defect, notice is not required. For example, if a poor repair job leaves a defect, then notice of the defect exists already.

A separate section of this report has been devoted to notice of defects to emphasize that notice does not have to be actual or direct, and that the government may be liable for failure to act after receiving notice. All public employees should be trained to look for defects and to report them promptly. Provisions should be made for immediate response, and for warning the public.

Action On Complaints

A procedure should be established for receiving complaints, and if possible, a single person should be designated to receive and handle them. Upon receiving a notice of a defect, this person should:

1) Record key information as required by the complaint form.

2) Determine the severity of the defect and the appropriate response action. If the nature of the complaint is:

   a) Routine, file a normal work request.

   b) Critical, call for a maintenance crew to investigate and repair the problem.

   c) Questionable or unknown, call for (or perform) a field visit to confirm the nature of the problem.

3) If needed, call for law enforcement control of dangerous sites, and instruct maintenance crews on the use of temporary control devices.

The person handling complaints, and a sufficient number of backup personnel, should receive detailed training. Experience and good judgement are desirable characteristics for these persons to possess.

It is advisable to adopt a standard procedure for handling complaint calls, and to adopt a standard data form to record key information:

(1) The time the complaint was received;
(2) The name, address and phone number of the person who made the complaint;
(3) The time the maintenance crew received notice;
(4) The time the crew responded;
(5) The time the repair was completed;
(6) What trouble was found by maintenance personnel;
(7) What repairs were made; and
(8) What materials were used. (5)

The forms should be prepared in a timely manner, completed, dated, signed, and filed in a reasonable manner (1).

It is important to maintain records of complaints and response actions. Periodically review these files to ensure that corrective actions have been completed, and to analyze patterns, etc., in order to improve agency response.

Though the documentation of defect notices is important, caution should be exercised in the written description of such complaints. The description should be as objective as possible. Words such as "hazardous" or "unsafe" should be used sparingly or avoided. Only facts should be recorded, not opinions. (1) The documentation should be prepared in such a way that its authenticity and authorship may be easily demonstrated.

Maintenance Records

One of the most important aspects of risk management is good maintenance record keeping. Standard forms may be used for acquiring and storing pertinent information for routine maintenance, response to complaints, and gathering information on defects.

Highway agencies regularly perform routine preventative maintenance. Checklists may be used to include items to be checked at each site. These forms should include remarks by work crews and the date. They should be filed for future reference.

Recording and/or documenting agency actions is useful in the following situations:

1. Justification for discretionary decisions;

2. Complaints;
3. Maintenance/Repair activities; and
4. Roadway conditions (Inventories).

Inventories

A traffic control device inventory is a very useful way to minimize liability suits. It should locate and identify devices, note those which are not in conformance with the MUTCD, find unnecessary devices which should be removed, note those that need replacing due to age or wear, and serve as the basis for a continuing maintenance/ replacement program. Where defective devices are noted, the public should be warned until the defect can be repaired. The warning should not be considered as a permanent substitute for remedial action.

The control device inventory should be updated as a continuing review. The entity should attempt to find and replace defective devices before constructive notice occurs. As old devices are replaced or new devices installed, records should be changed. As defective devices are identified, the inventory should be coded to indicate the need for correction.

A roadway inventory system is another effective tool which usually contains information about roadway conditions and the general roadway environment. Such a file would include such basic roadway information as the number of lanes, roadway alignment, access control, and cross-section information (lane width, shoulder width, clear zone, etc.) (1).

Other types of inventories are also useful in court. Videologging and photologging are two methods of obtaining roadway inventories which are becoming increasingly popular. Such documentation methods are advantageous for two reasons:

(1) A large amount of information may be obtained quickly and economically; and

(2) Pictorial information is more easily understood by lay persons on a jury than are engineering plans and diaries.

This form of documentation requires timeliness to be useful. If the roadway has changed appreciably since the photologging activity, the photographic information should be updated to restore its usefulness.

Operational Reviews

Public entities are generally immune to liability caused by the design of a highway, where the design is prepared in conformity with established current standards and approved in advance by a public authority. The immunity does not last forever, however. Changed conditions can demonstrate the need for additional or remedial action. Using outmoded standards can also lead to liability.

Operational reviews are used in several situations. First, a review may be conducted after completion of construction (opening day) to determine if the design is functioning properly and to look for unexpected adverse effects. Another review should be performed after traffic has had an opportunity to stabilize and to become familiar with operating on the new facility.

The third type of operational review is a periodic examination of sample sites throughout the jurisdiction. Representative sites should be selected based upon accident history, complaints, geographic balance, and other criteria.

The purpose of the operational review is to check basic design and traffic control elements. If changed conditions have produced a dangerous condition, the hazard should be investigated. Where corrections could produce substantial improvements, they should be programmed. It may be necessary to modify or improve design standards if operational reviews indicate that another design technique would be more appropriate.

A camera, a tape recorder, and a checklist are all valuable tools for performing reviews. It is helpful to develop a standard series of items to check in the field, and to use the list at every site to ensure uniformity.

Qualified Staff

A critical consideration in any public agency's risk management program is to provide qualified and capable personnel to perform agency duties in a responsible manner. It is generally held that public agency employees owe a duty to the public to provide a reasonable "standard of care". If such care is not exercised, the agency or responsible employees may be held liable for such conduct. Obviously, if an agency is operating with unqualified, incompetent personnel, it will be more difficult to provide a reasonable standard of care.

As a minimum, employees are generally expected to follow guidelines and procedures which have been adopted by the agency. Such documents generally contain information ranging from design criteria to operational policies to procedures for periodic reviews. Strict adherence to such guidelines, standards, and policies will not absolutely guarantee against tort claims. In a court of law, however, testimony to the effect that rules and guidelines were being followed will help prove "reasonableness" since a reasonable person would follow such rules (1). It may be necessary to provide training to ensure employees are aware of their responsibilities.

Educational Programs

The first aspect of a good educational program involves the public. There is a need to gain public support for the governmental unit's accident reduction program, which should be perceived as a high priority item. The consequences of sign vandalism, techniques for reporting defective devices, and the "cost" of traffic law suits are examples of items which might be kept before the public.

The second part of the educational program might include government employees. Since the courts consider them agents of the transportation department, they need to be aware of their roles as observers and reporters of defects. They might be informed of how to submit a report of a defect, and of the importance of prompt reporting.

Employees of the transportation agency need to be aware of the total safety effort. An accident reduction program or a risk management program will not be fully successful until transportation employees understand it and adopt it as their own. They must feel responsible, involved and useful in the program. Specific technical training will be needed for employees involved directly with the RMS such as the person handling complaint calls, etc. Maintenance personnel must learn to examine all functions of the traffic control device, not just repair the specific portion reported as defective.

A good educational program must include both initial training and periodic updating. New employees should be indoctrinated, and existing employees should be updated through continuing education activities. Brief (10 to 20 minute) training sessions on a frequent basis have proven to be better than a longer program at less frequent intervals.

Standards

One way to minimize risk of liability is to operate within accepted standards and guidelines. In a liability suit, the standard may be introduced as defense to show that the entity took reasonable action. Merely going by the book does not guarantee freedom from liability however. The courts have held that on occasion action beyond the standard is required to create "a reasonably safe condition". For example, a city using MUTCD signal clearance intervals lost a suit because they failed to consider that the signal had a heavy volume of high speed trucks on a downhill route which might need a longer clearance. The same principle applies to construction, maintenance, and other standards.

A word of warning is in order. Adopting a standard is a good way to define the performance level for the local entity, but failure to adhere to adopted standards or guidelines constitutes negligence. Therefore, the standards should be kept current, realistic, and obtainable.

Adherence to agency guidelines and policies brings to mind a potential problem deserving serious consideration: the wording and terminology used in agency documents. This matter is discussed in the following subsection.

Review of Agency Standards and Policies

The adoption of relevant standards, policies, and manuals by an agency is necessary and useful to:

1) define the manner in which various activities are to be performed, and

2) insure a consistent degree of quality and safety for work performed by the agency (1).

As previously mentioned, such documents also may serve a useful purpose in court, if it can be shown that the agency was adhering to them. On the other hand, if written policies and procedures are not followed, it will be relatively easy for a plaintiff's attorney to establish that a reasonable standard of care was not exercised. In light of this, a periodic review of all relevant documents or manuals adopted by the agency should be undertaken.

One reason for such a review is to determine if the terminology and wording, which may have been appropriate at the time the document was written, are presently applicable. In the past, manuals were often written with strong language to stimulate procedures of higher quality. In terms of application, little or no leeway was given to achieve general compliance. Now that much of the desired improvement seems to have come about, tort liability is a major concern. The strong language which was chosen to benefit the agency in the past may now make an agency extremely vulnerable to lawsuits. (1)

Four important points to consider when reviewing agency policies are the following:

(1) Are the documents useful and needed?
(2) Are the documents current and consistent with present policy?
(3) Are the documents written from a defensive standpoint?
(4) Are the documents imposed as required "standards" or as general guidelines? (1)

From a liability standpoint, the fourth point may deserve special consideration. It has been suggested that terms such as "standards" or "warrants" may serve as potential traps. It will likely be difficult to convince a jury that any deviation from such a document was prudent or reasonable. As such, the use of terms like standard or warrant should be carefully scrutinized, and in most cases avoided (1). "Guidelines" would be considered as the preferred terminology.

Regardless of whether a document is a standard or a more general guideline, any deviation from such a document may pose problems in terms of convincing a jury that the deviation was a correct engineering decision instead of an omission or oversight. The most important consideration is to provide adequate documentation of such discretionary decisions to show that a conscious decision was made and that guidelines were not merely disregarded.

SUMMARY

Suits alleging that governmental negligence caused traffic accidents are becoming more common, and officials are becoming acutely aware of the subject. To address this problem, a project was conducted to determine ways to devise a Risk Management System to limit governmental liability. This project included a thorough review of technical literature and legal periodicals on liability. Educational material was prepared to explain how to devise an appropriate RMS.

This report makes it easy for officials to find and extract information pertinent to their local situation. The literature review was summarized by topic to allow rapid review. Information was provided to help the state, cities, and counties take positive steps to reduce traffic accidents and to reduce their exposure to liability suits.

A good RMS begins with knowledgeable, committed leaders. It is a planned program based upon exercise of discretionary authority. It centers on a strong accident reduction program and employees who are conscientious about carrying out the program. It utilizes a priority technique to systematically eliminate trouble spots while making maximum use of available funding, and it is periodically updated.

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CHAPTER SEVEN

ACCIDENT REDUCTION PROGRAMS

Accident reduction efforts come in many forms. They may be as casual and simple as reviewing a few copies of police accident reports to look for patterns of accidents. They may be formal and complex, utilizing computers to sift large data bases, and optimization procedures to select improvements for specific sites. This chapter will outline accident reduction programs in general, and will document procedures that may be used to investigate a site with a suspected accident problem.

FEDERAL AID SAFETY PROGRAM

The primary program of the Kentucky Transportation Cabinet dedicated entirely to accident reduction is the Federal Aid Safety Program. The Highway Safety Act of 1973 established five concentrated areas for categorical safety funding, in the following specific areas:

SECTION 203:Rail-Highway Crossings on the Federal Aid System

SECTION 205:Pavement Marking Demonstration Program

SECTION 209:High Hazard Location

SECTION 210:Roadside Obstacle Removal

SECTION 230:Safer Roads Program

Some sections of the act have been deleted since 1973; however, Section 203 and Section 209 money is still available.

Section 209: Hazard Elimination Program

The Hazard Elimination Program is a federal program which still appropriates money which the state may use on high hazard locations. Approximately $3,500,000 is appropriated to Kentucky each year. On projects which qualify for high hazard funds, the federal money pays 90 percent of the cost and 10 percent is left to be paid by the state or local governing agencies.

Typical projects include replacing and upgrading signs and pavement markings, upgrading traffic signals, installing traffic signals, constructing or lengthening turning lanes, resurfacing slick pavements, and implementing minor bridge treatments. Many other safety improvements are also made with these funds. Typical costs include:

1. Installing or upgrading traffic signals - $30,000 - $60,000

2. Constructing turning lanes on existing pavement - $30,000 - $100,000

3. Constructing turning lanes (purchase new ROW and widen pavement) - $50,000 - $300,000

4. Typical HES safety project includes both items 1 and 2 (or 3) - $100,000-$200,000

5. Resurfacing on a curve or within an intersection - $10,000 - $50,000

The procedures utilized by the Cabinet for allocation of Section 209 funds are as follows:

1. Potential High Accident Locations (HAL's) are selected through routine Accident Surveillance Section monitoring of accident data for the previous years, or from candidate sites suggested by District or Central Office personnel, or from sites suggested by local officials.

2. If not already done, District employees visit the site, assess the need, and prepare specific recommendations for improvements.

3. Accident data and construction cost data are identified, and benefit-cost analyses are performed.

4. Using a benefit-cost and optimization routine, the data are analyzed and the projects are prioritized by computer, using benefit-cost as the basis.

5. A program document (list of sites and recommended treatments) is prepared and submitted to FHWA for approval.

6. FHWA-approved projects are added to the Cabinet's six year plan as they are programmed for design.

7. Projects are then authorized for construction as funds become available.

Section 203: Rail Highway Safety Program

The Federal Aid Safety Act of 1973 and subsequent safety acts allocated funds for the upgrading of hazardous rail-highway crossings located on Federal Aid System roads or on off-system roads. The purpose of this program is to reduce fatalities, injuries and property damage through improved rail-highway grade crossing safety. For crossing improvements, the funding ratio is 90% federal funds and 10% state or local governing agency funds.

Typical types of rail-highway improvement projects are the installation of standard signs and markings at all crossings, installation of crossbucks, installation of active warning devices,

crossing illumination, crossing surface improvements and separation or relocation to eliminate at-grade crossings. Typical costs for some of these types of warning devices are as follows:

1. Signs and Markings - $1,500
2. Standard flashing lights and bell - $40,000
3. Standard lights, bell and gates - $70,000
4. Cantilever signals and bell - $50,000
5. Cantilever signals, bell and gates - $80,000
6. Grade separation - $1,000,000 - $3,000,000
7. Standard surface improvements - $5,000
8. Rubberized crossing surface - $15,000 - $30,000

The procedures used to fund a rail-highway project are much the same as those outlined for Section 209 funds, except that the criteria used to define high accident locations are different.

ADDITIONAL USES OF ACCIDENT DATA

In addition to the Federal Aid Safety Program, the Kentucky Transportation Cabinet utilizes accident data in many other ways to enhance safety, and provides accident data to other users upon request. Several of these uses are listed as examples:

1) Generate special reports for the accident surveillance program.
These are predominately "build up" reports, where the continued accumulation or build up of accidents at a site leads to its inclusion on a computer summary report.

2) Provide "overnight reports" for specific locations for specific time periods, upon request by Cabinet District personnel or public agency officials.

3) Special studies of accident characteristics and types are performed to provide input to administrators for use in discretionary decisions while formulating policies.

4) Provide detailed accident listing and summary information for use by Cabinet personnel in evaluating potential safety enhancements for all 3-R safety projects.

There are many other uses of accident data, but the foregoing list illustrates typical applications.

OTHER SAFETY IMPROVEMENTS

The major existing Cabinet safety effort is the Accident Surveillance Program, which identifies and analyzes sites for improvement. Funds to construct major safety projects usually come from Section 203 and 209 programs; however, state moneys are used for many safety projects.

Accident data may be used as a planning tool to help locate sites that need improvements, and to set priorities among sites competing for the limited available funds. As a general rule, those safety projects which are low cost in nature are usually handled with existing maintenance funds or other state funds. When the safety improvements are expensive or require extensive construction work, it is usually referred to categorical safety or construction funding programs.

A number of safety improvements are included as a part of most reconstruction or upgrading projects. Current design standards are applied, on a project by project basis, to produce safer roadways than existed prior to the project.

Cabinet and local government employees may identify potential sites for safety treatment. The investigation may indicate that the appropriate treatment is inexpensive (such as signs, pavement markings, or shoulder work). When this occurs, the normal procedure is to improve the site, using routine maintenance funds to abate the problem. The key factor is finding the cause of the accidents so that corrective measures and their costs can be identified. Once these costs are known, the appropriate state or local funding mechanism can be utilized. The rest of this chapter is devoted to procedures for investigating accident problems at individual sites. This information can be used while making accident studies.

ACCIDENT ANALYSIS AT INDIVIDUAL SITES

Once a hazardous location has been selected, an employee can proceed through a series of work steps to identify the cause of the problem, to find a solution, and to implement the best improvement to remedy the situation. The general sequence of work steps is fairly well defined:

- o accident data and summary reports are obtained,
- o accident patterns are isolated,
- o the cause(s) for the patterns are identified,
- o possible improvements are matched to the causes,
- o the best improvement is selected,
- o the improvement is implemented, and
- o the site is evaluated to determine if the improvement worked.

This workbook will concentrate on the first three topics, although all of them are necessary to conduct a full scale accident reduction program.

Accident Patterns. These may be identified by combining the information from collision diagrams, condition diagrams, summaries of accident characteristics, field observations, traffic parameters (speed, volume and turning movements) and other data specific to the individual site.

The majority of the investigator's time will probably be spent in preparation and analyzation of these work steps.

Accident Causes and Improvements. Once the accident pattern has been isolated and identified, the cause can be pursued. This may be as simple as replacing a stop sign, or it may be very difficult to cure because several factors have combined to cause the collisions. In the second case, a great deal of careful effort will be required to locate the most probable causes. Researchers have developed lists of the most likely causes for certain patterns of accidents to aid in the diagnosis, and a sample table is included later in this chapter. Tables of improvements were developed in a similar manner. A sample of this type of table has also been included.

Other Steps. Identifying, implementing and evaluating the improvement are the remaining work steps. However, detailed instruction in these areas is beyond the scope of this course.

Collision Diagrams

A collision diagram is a visual summary of the accidents which have occurred at a particular location. It is prepared to identify accident patterns (and thus causes). Rather than having to look through numerous accident reports, the information is condensed and placed on a single diagram. The investigator does not become distracted or bored while turning from page to page and can concentrate on finding accident patterns.

Data Required. A sample collision diagram is shown as Figure 1. Its main purpose is to display the location and direction of travel for vehicles and pedestrians prior to the collision, and to give clues to the intent of the parties involved. The diagram contains a wealth of data, including general qualifying information such as:

- o the location,
- o the street or highway names,
- o the investigator's name,
- o the study period, and
- o the traffic control devices.

In addition, detailed data is provided for each accident, including the following (1):

- o type of accident,
- o severity (property damage only, injury, or fatality),
- o time of day,

- o date,
- o day of the week,
- o pavement condition (wet, dry, icy),
- o weather (clear, fog, rain, sleet, snow, etc.), and
- o a special note if the accident happened at dawn, dusk, or in darkness.

Data Coding. In order to place information from multiple accidents on a single diagram, it is necessary to reduce the data to codes and symbols to conserve space. The bottom of Figure 1 shows many of the commonly used symbols. These symbols may vary slightly from location to location as alternate or additional symbols are adopted to suit local needs.

Data which cannot be easily represented by a symbol is presented in an abbreviated code form. The lower right hand corner of Figure 1 contains several examples of these codes. For instance, the letters D and C indicate dry pavement and clear weather respectively. Engineers often enlarge the codes to represent other items pertinent to their investigations.

Types of collisions are indicated by varying the manner in which the arrows are drawn. Rear-end, head-on, right-angle and other collisions are defined by such variations. They make it possible to recognize patterns by looking for groups of collision types.

Preparing a Collision Diagram. The diagrams are relatively simple to prepare. They may be drawn freehand, without emphasizing the exact location of accidents. The following list summarizes the principles involved in plotting diagrams (2, 3):

- o collision diagrams are not drawn to scale,
- o travel direction is important, but exact location is not,
- o diagrams are usually prepared for the most recent one, two, or three years of data, depending upon the number of accidents,
- o note any major changes that have occurred and do not include accidents that occurred before the change,
- o patterns are important, and
- o include non-involved vehicles and pedestrians.

The advantages of using a prepared form include having a handy list of symbols and codes, blanks to remind the user of key information, and standardization. The investigator must use care to ensure that symbols used in constructing a diagram correspond with those shown on the particular form being utilized.

Condition Diagrams

A condition diagram is a map that contains the physical characteristics of a site. Unlike the collision diagram, it is a scaled drawing which represents the accurate location of objects influencing the accident. The purpose in preparing it is to relate accident patterns, as found on the collision diagram, to the roadway and operational elements at the hazardous location.

Summaries of Accident Characteristics

In addition to preparation of collision and condition diagrams, a third source of data is usually developed. Accident characteristics are tabulated and examined in the search for patterns. A series of summaries can expose factors that may not be obvious on the diagrams. For example, rush hour accidents which occur only on wet pavement could be identified quickly through a summary table, while they may not be evident on a diagram.

Here are the most important characteristics to summarize (1):

- time of day,
- day of week,
- month,
- road surface condition,
- weather,
- light,
- accident type, and
- severity.

It may not be necessary to tabulate all of these items. The investigator should prepare as many summaries as necessary to develop a feel for the characteristics of accidents at the particular location before moving to the next step.

Field Trips

There are some types of information that can only be gathered by going to the site and observing conditions. For example, a stop sign might have become faded and hard to read. The investigator would not be able to isolate this problem from the diagrams and summaries. The

next few paragraphs will describe the types of procedures that should be used during field trips in order to maximize the amount of data gathered by the observer.

Preparation for the Visit. Too often an investigator has gone to a hazardous location, performed an investigation, and returned to the office to discover that valuable information had been overlooked. The investigator can minimize this type of error by thorough preparation prior to visiting the site. Collision and condition diagrams, accident characteristic summaries, speed profiles, and traffic volumes might be reviewed to acquaint the investigator with the situation being studied. He or she may find it appropriate to make notes about confusing items so that they may be checked in the field.

Care must be used in selecting an appropriate time for the visit. If the data indicates a unique situation (such as rush hour accidents), the observation period should be timed to include the unique occurrence. In the absence of a specific time associated with the collisions, two visits are recommended. One should be made during daylight and the other at night. The dual visits will disclose any visibility problems during either type of light condition.

Observation Techniques. The observer should drive through the site on each approach to develop a feel for the location. It is important that the observer see the site through the eyes of a typical driver, noting things which might be confusing or which might require exceptional maneuvers by the motorist. Any item which might have contributed to the accident should be noted. Special attention should be given to driver visibility problems during this portion of the investigation.

After having driven through the site several times, the observer should find a good vantage point and spend some time looking at traffic flow. There are a number of items to check. A checklist provides a helpful method to ensure that no important items are overlooked. In the absence of a checklist, the investigator might carefully prepare a list of items to review and questions to answer at the site.

The I.T.E. Manual of Traffic Studies lists eleven questions that the analyst should consider during a field investigation (3):

- o Are the accidents caused by physical conditions of the road or adjacent property, and can the conditions be eliminated or corrected?

- o Is a blind corner responsible? Can it be eliminated? If not, can adequate measures be taken to warn the motorists?

- o Are the existing signs, signals, and pavement markings doing the job for which they were intended? Is it possible that they are, in any way, contributing causes of accidents rather than preventing them?

- o Is traffic properly channelized to minimize the occurrence of accidents?

- o Would accidents be prevented by the prohibition of any single traffic movement, such

as a minor left-turn movement?

- o Can part of the traffic be diverted to other thoroughfares where the accident potential is not as great?

- o Are night accidents far out of proportion to daytime accidents, based on traffic volume, indicating need for special nighttime protection, such as street lighting, signal control or reflectorized signs or markings?

- o Do conditions show that additional traffic laws and selective enforcement are required?

- o Is there a need for supplemental studies of traffic movement, such as driver observance of existing control devices, speed studies of vehicles approaching the accident location, and others?

- o Is parking in the area contributing to accidents? If so, perhaps reduction of the width of approach lanes or parking-related obstructions in advance of the intersection are causing the accidents?

- o Are there adequate advance warning signs of route changes so that the proper lanes may be chosen by approaching motorists well in advance of the areas, thus minimizing the need for lane changing near the accident location?

Design and Geometrics. Traffic volumes and characteristics may change with time. Many intersections become outmoded or deficient in capacity due to these changes. As a result, these intersections become hazardous and accidents begin to accumulate.

The inspector must decide if the physical features of the accident location are adequately serving the existing level of traffic. Poor pavement conditions, erratic vehicle maneuvers, or a condition that violates driver expectancy may indicate that the geometrics need improvement.

Traffic Control Devices. Signs, pavement markings, and signals are examples of traffic control devices. Each control should be examined for three specific reasons. The observer should determine for each device:

- o if it is clearly visible and operating as designed,

- o if it is properly controlling traffic, and

- o if the accident problem can be remedied by altering the device.

It is important for the observer to examine the devices in the same manner that an unfamiliar driver would use. For example, faded advisory signs would not be important to a local driver, but could cause an out-of-town motorist to miss important information.

Identifying Causes And Selecting Improvements

After the data gathering and preparation has been completed, the investigator will have collision and condition diagrams, summaries of characteristics, field observations and other information with which to work. At this point, he or she should concentrate on the most pertinent data items from these multiple sources. Any patterns discovered on one source should be confirmed, where possible, using other sources.

Collision Diagrams. This document is usually the key to identifying accident patterns. The first step in the analysis is to group similar accidents to see if one type dominates. If this occurs, the pattern recognition process might be finished. If several groups of patterns are obvious, or if no pattern can be found, then the analyst must carefully review the summary of characteristics and field observations for further clues.

Once a pattern is found, the condition diagram should be consulted to see if there is an obvious cause. For example, a series of rear-end accidents on the collision diagram, combined with numerous wet-weather accidents in a summary table, might be tied to slippery pavement on the condition diagram.

A good example of supplying possible explanations for obvious accident patterns may be found on Figure 2. The five portions of the diagram cover four separate types of control devices. The first part (uncontrolled intersection) will be discussed as an example of how the table may be used. There are two patterns on this part of the figure. The dominant pattern is the right-angle type involving northbound vehicles. Evidently the drivers of such vehicles are not always able to see or to get out of the way of traffic on the other roadway. The figure lists the two most probable causes as: (1) northbound drivers are not able to see vehicles on the other road due to poor visibility, or (2) excessive speed causes problems in estimating whether vehicles will miss each other, or prohibits northbound vehicles from stopping once the drivers realize the intersection is blocked.

An excellent discussion on how to relate patterns and causes is found in Reference (2). Many types of accidents are covered, including right-angle, rear-end, side-swipe, and non-involved vehicle types.

Pattern-Cause-Treatment Tables. Several of these tables have been developed in recent years. In general, they try to define causes for specific accident patterns, and then try to suggest as many realistic improvements as possible for the causes.

An example table has been included as Table 7-1. The information in it came from various sources, and illustrates that many approaches have been used in the past to solve the problem of matching patterns to improvements. The important point is that such tables provide instant access to techniques used for accident reduction.

Using the Tables. An example has been provided to illustrate how improvements may be selected. The initial diagram on Figure 2 will be analyzed to compare the recommendations in Table 7-1. This is the example used previously, a right-angle accident pattern at an

uncontrolled intersection. Possible causes for the pattern and suggested improvements are compared in Table 7-1. Even though the solutions come from several sources, the same terms show up throughout the table.:

- o visibility...of devices,
- o visibility...of vehicles,
- o sun blindness,
- o sight distance,
- o interference of...signing,
- o remove sight obstructions,
- o inadequate signals,
- o inadequate signal timing,
- o amber time,
- o install control devices, etc.,

Usually these tables present as many practical solutions to the problem as possible, and the investigator must choose the most appropriate.

There are many occasions when no one pattern dominates the collision diagram. In such cases, it may be difficult to identify the best solution. An intensive screening of all data should be conducted to give clues as to the best solution. It may be that several improvements must be implemented simultaneously to solve the problem. There may be no exact answer to a complex accident problem, and the investigator must strive to match patterns and improvements to the highest degree possible. Experience in accident studies greatly aids this action.

SUMMARY

The techniques in this chapter generally provide the best methods available to reduce accidents, whether by the Federal Aid Safety Program or by other means when resources are limited. They are not fail-proof, mandatory, "cook-book" techniques that automatically ensure that the optimum improvement will be implemented. Rather, they offer opportunities to exercise good judgement in attacking a complex, costly and tragic problem.

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(1) Identifying Alternative Highway Safety Improvements, A Self- Instructional Text, Institute of Transportation Engineers, 1977.

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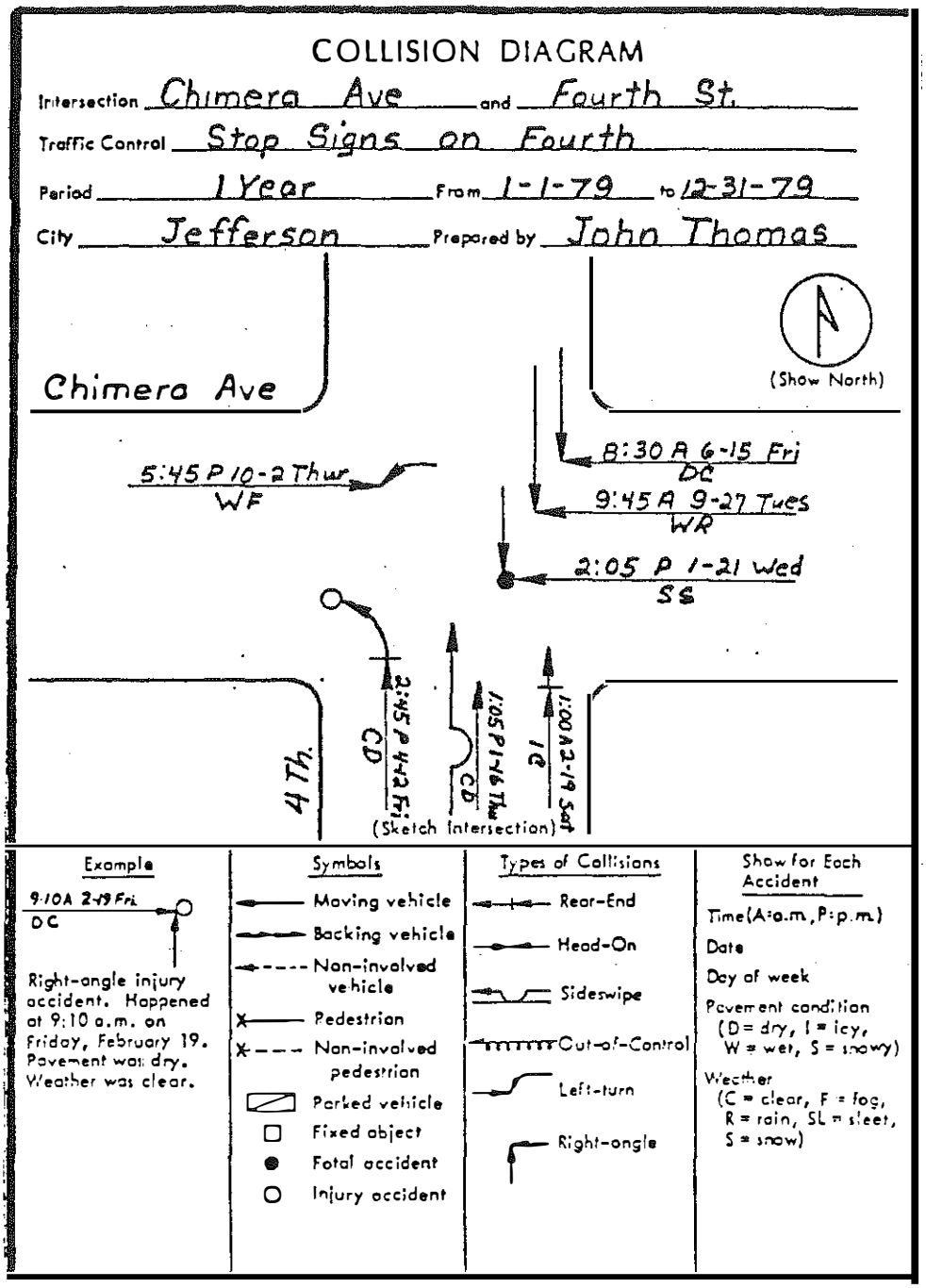
(4) Woods, et. al., Traffic Engineering Course Notes, Department of Civil Engineering and Texas Transportation Institute, Texas A&M University, College Station, Texas, January, 1976.

(5) Manual On Uniform Traffic Control Devices, Federal Highway Administration, U. S. Department of Transportation, Washington, D. C., 1978.

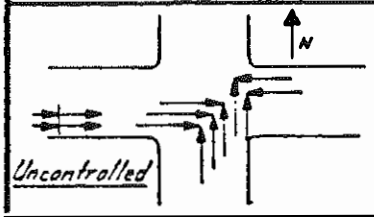
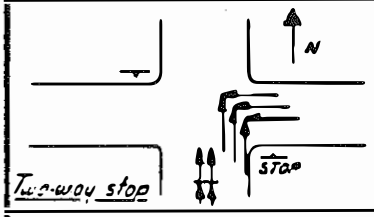
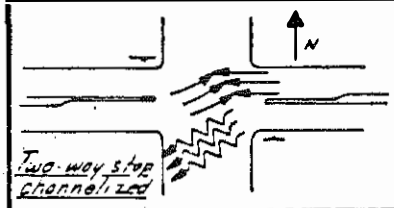
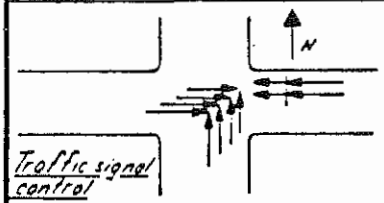
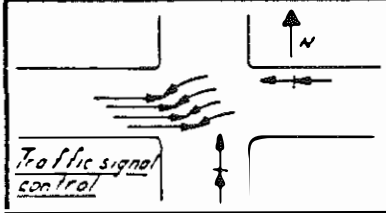
(6) Alabama CORRECT Investigation Manual, State of Alabama Highway Department, 1974.

Figure 1: Typical Collision Diagrams.



Source: Identifying Alternative Highway Safety Improvements, A Self-Instructional Text, Institute of Transportation Engineers, 1977.

Figure 2: Causes For Accident Patterns.

ACCIDENT PATTERN	POSSIBLE EXPLANATION
	• Poor corner visibility at SE and/or SW • Excessive approach speeds, especially for northbound
	• Poor visibility of stop sign at SE corner • Corner visibility and location of stop line at SW corner not compatable • Excessive westbound approach speed
	• High approach speed and stopping sight distance inadequate for westbound • Edge of pavement delineation and width inadequate at SW corner • Visibility for left-turning drivers, west to north, is poor
	• Visibility of signal heads, for eastbound, northbound, and for westbound is, poor • Pavement surface for westbound is poor • Stopping sight distance and queue lengths for westbound are not coordinated
	• Visibility for left turning drivers, east to south, is poor • Approach speeds from the west are too high

Source: Design Of Urban Streets, Technology Sharing Report Number 80-204, Federal Highway Administration, Washington, D C, January, 1980.

TABLE 7-1. TYPICAL PATIERN-CAUSE-IMPROVEMENT TABLES

Accident Pattern	Cause or Problem	Items to Check, or Common Improvemen
Right-Angle Reference (4)	Right of Way Assignment	Relationship of control to design Visibility of traffic control devices Sight distance to intersection Visibility of approaching vehicles Types of control present Amber time on signals Sun blindness Interference of commercial signing Placement of traffic control devices
Right-Angle Reference (1)	Restricted Sight Distance	Remove sight obstructions Restrict parking near corners Install yield signs, see ref. (5) Install stop signs, see ref. (5) Install warning signs, see ref. (5) Install signals, see ref. (5) Channelize intersection Move near-side bus stop to far side
Right-Angle Reference (1)	Large Total Intersection Volume	Install signals, see ref. (6)
Right-Angle Collision Reference (6)	Restricted Sight Distance Inadequate Signals Inadequate Signs Timing Under Designed	

CHAPTER EIGHT

IF YOU ARE INVOLVED IN A SUIT

If recent trends hold true, Kentucky government managers and employees will be involved in an increasing number of tort liability suits over the next few years. They can expect to spend substantial time preparing for and defending these suits. In addition, employees will be called upon as third parties to testify as expert witnesses to items such as which standards governed an accident location. This chapter provides practical advice on how to prepare for and handle these situations.

RELEASE OF INFORMATION TO ATTORNEYS

During the initial stages of a trial or potential trial, the plaintiff's attorney is trying to decide if he has a case, how strong his case is, and who to sue. He (or one of his investigators) may visit the transportation agency's office for his general education or to begin to gather evidence.

Public records in Kentucky are subject to the Open Records Statute (KRS 61.850 to 61.884). Virtually all of the documents handled by members of the Kentucky Transportation Cabinet come under this act, with a few exceptions (such as some types of negotiations while in progress, some types of personnel investigations, etc.). The public is allowed to inspect and copy documents as part of the statutes.

Administrative regulations have been prepared to carry out the intent of this legislation. Under them, each department of State government is required to appoint a "records custodian" and to post this Cabinet, the Commissioner of the Administrative Services Department has been designated as the custodian. The administrative regulations require persons seeking information to make their request to the custodian in writing. The custodian then either releases the information, or serves notice that the information cannot be made available. There are many other details to the regulation, and affected public employees are encouraged to consult their agency's attorney.

If you are approached for information, refer the request to the records custodian. If the custodian requests that you supply information to a person or group, courteously comply. It is a good idea to keep a record of information dispensed in this manner in case a suit develops. You may also sometimes decide to notify agency attorneys if it is apparent that information is being gathered for a suit.

The attorney's request must be reasonable. Where the request is specific and the attorney knows what he wants, it should be a simple matter for you to provide the information. Often times this is not the case, and you may have to help the attorney deduce what he needs. It may be a matter of not knowing the correct nomenclature to ask for what he knows he needs. You may have to provide a limited amount of assistance as a matter of courtesy.

At some point, it may become obvious that the attorney does not know what he needs and is "fishing," trying to "catch" information upon which to begin a case. Normally, you are not required to respond to these types of questions. When you suspect that this is the

situation, excuse yourself, go to a telephone and call your agency's attorney for advice.

Attorneys are generally not allowed to ask broad, sweeping questions that require universal answers, i.e., "List for me all of the times you have ever reviewed a roadway for maintenance needs." A question must be realistic and within your realm of knowledge before you may be required to answer it. It also helps to remember that "I do not know the answer to that question" is always an appropriate response when it is how you truthfully feel.

In responding to questions, it is helpful to consider yourself as a courteous, public minded employee, and to respond in line with the "Tips For Witnesses" listed later in this chapter.

IF YOU ARE SUBPOENAED

Subpoenas are a routine and normal portion of a court case. If you receive one, the first thing to do is to contact the appropriate attorney in your agency's central office. Jointly, determine the nature of the subpoena, what the plaintiff's attorney wants you to provide, and whether you are the correct person to respond.

The counsellor can help you prepare a response for your testimony by defining the limits of your testimony and the appropriate nature for your remarks. Read the "Tips for Witnesses" later in this chapter. When the time comes for you to give your testimony, relax, then give your remarks with confidence, knowing you have prepared as well as you can.

Tips for the Witnesses

If you find yourself testifying in court or giving a deposition under oath, remain calm and take your time. Appropriate time should be taken before answering, in case your attorney wants to object to a question. This also allows you to gather your thoughts and give an accurate but brief answer. If questions are answered more quickly on direct examination than on cross-examination, the jury will notice this and may feel that you are in trouble (1). Some general suggestions that can be offered as an aid to being a good witness are:

1. Walk to the witness stand with even steps.

2. When the officer finishes the oath, say "I do" in a loud voice so that all in the courtroom can hear. Do not act timid.

3. Be thorough and frank. Do not be too anxious to please, or too eager to please, or too eager to fight.

4. If you make a mistake or a slight contradiction, admit it and correct it. Do not tie yourself in knots trying to cover up some slip of speech or memory.

5. Keep your temper. Do not let anyone draw you into arguments over trivial points or even important ones. Be firm but flexible.

6. If you cannot answer "yes" or "no", say so, but modify your reply by "under certain circumstances..."

7. If you do not know or cannot remember, say so. These are legitimate answers to the most illegitimate questions.

8. Avoid mannerisms in speech. The habit of prefacing replies with something like "I can truthfully say" may cast unwarranted doubts on your whole testimony.

9. If a lawyer asks: "Are you as positive about this as you are about the rest of your testimony?"--stop. Are you?

10. "Do you want this jury to understand . . .?" Listen closely to that one; if you do not want the jury to understand it that way, make clear what you do want them to understand.

11. If the opposing attorney interrupts you before you had a chance to complete your answer, you should indicate this to the presiding judge.

12. Do not volunteer information.

13. Be brief; just answer the question and stop.

14. Do not memorize any of your testimony.

15. Wait until the entire question is asked before answering.

16. On cross-examination, do not look at your attorney.

17. Keep your hands away from your face and mouth.

18. When addressing the court, use "your honor"; when addressing the attorneys, use their names.

19. During the recess you should not carry on any conversation with other witnesses or parties to the controversy. You should be aloof from everyone except the attorney who retained you to testify.

20. Remember that the witness stand is not a comfortable place for one who is not telling the truth, the whole truth, and nothing but the truth (2).

The Role of the Expert Witness

The expert witness has much to consider in the giving of testimony while on the witness stand. An expert witness should be able to communicate clearly, and be able to explain technical or scientific subjects and matters in plain, understandable language. Above all, he should not try to impress the jury with his learning and ability, but try to communicate to them in a way that they can understand. He should have good speaking ability and be definite in his opinions. He should never tender an opinion unless he has one and unless it is sound, based upon good scientific knowledge and experience, and should stick to that opinion once it has been rendered.

Expert witnesses should follow certain guidelines in their preparation of, and giving of, testimony. The most obvious guideline for an expert witness is ALWAYS tell the truth. Of course, lying under oath is a crime and for that reason alone should never be considered. Honesty is the best policy not only from a moral and legal standpoint but also because it is the best way to get across the true facts to the trier of the case (1).

Litigation should be a reach for truth. The court is looking for guidance in its decision and the best way to get it in technical matters is from expert testimony. It should be the expert's intention to provide the court with as much unbiased background and detailed information as he can. This will better enable the court to adjudicate the matter correctly and, hopefully, determine as much of the truth as possible.

The expert witness should never be an advocate. The lawyer is supposed to be the advocate -- to take sides in the matter before the court. The expert witness is decidedly not there to take sides, hard as it may be to avoid being prejudiced on occasion. It is certainly only human for the expert witness to try to help the attorney who engaged him, especially if he is directly involved in the case. Or, if the expert is a consultant engaged for a specific litigation, it would be reasonable to expect at least some bias for the side paying the bills. The expert has certainly heard more favorable testimony from one side than from the other. The tendency toward bias must be resisted if the expert's credibility is to be maintained (1). The better course is to steer clear, as much as possible, of personal involvement in the case and answer all questions without the intent to help either side.

Temperament is important. If an expert finds it difficult to accept the fact that anyone would dare question his knowledge, then he belongs in an office. One should not be an expert witness if he finds it difficult to keep complete control over his emotions. If the attorney expects to get the best result for his client by attacking the expert witness, that's what he will do (1). He has to be careful though, because sometimes if the expert stays cool and answers responsively without trying to hide anything, the tables can be turned. the judge and jury can be very sympathetic to the expert under the right circumstances.

Equally important to keeping emotions under control on the witness stand is answering questions responsively. That means listening carefully to the specific question which is asked (not anticipating another question), and answering it as briefly as is reasonable possible. The attorneys for both sides have reasons for each specific question. They are not usually interested in any further explanation. Sometimes the judge will direct a specific question at the witness, and that is one time when the expert can expand on his answer (1).

Another very important guideline while on the witness stand is that one should always stay within his own area of expertise when testifying. In a court of law an opposing attorney can make mincemeat of the expert who tries to extend his testimony into uncharted water outside the scope of his education, experience and background.

The attorney in direct examination should always know the answer that you will give to any question he asks. In cross examination, one should be aware that the effective lawyer can sometimes lead the witness and extract testimony which the witness did not intend. The expert should not permit himself to be led by the nose by either attorney. He should try to ignore adjectives and adverbs which tend to channel him toward a specific answer and reply honestly based only on his own knowledge and opinion of the case. (1).

After testimony has been given on the witness stand, good trial lawyers will sometimes request that the expert sit at counsel's table during the remainder of the trial. The purpose of this is to provide the attorney with background information of a technical nature as the trial develops, which may be useful to the court (1). He can help frame questions and interpret answers, especially if the other side's expert is giving testimony. The expert witness should never leave the courtroom after testifying, on the assumption that the attorney is through with him, without first checking that his services are no longer needed in the chamber. He should also not drop out of sight after the case is over. He should be interested in the outcome - which may not be settled for some time after the last witness has spoken and lawyers for both sides have completed their summations.

IF YOUR "NAME IS ON THE BOTTOM LINE"

You may have the unfortunate experience of being named as a defendant in a traffic accident related suit. Upon notification of a lawsuit immediately contact your agency's chief counsel. A preliminary investigation should be made of the complaint, and preparation for trial should begin. For cases involving the State, the Cabinet's chief counsel will organize an investigation and prepare a file to determine if there is liability. If there is liability, the Cabinet may try to settle out of court. If no settlement is possible, both parties will obtain information from one another to prepare for court action. Facts are of prime importance to both the plaintiff and the defendant.

A local attorney will often be appointed to help you prepare your case. A good working relationship should be established with your attorney as soon as possible. Attorneys need to be assured of a reasonable chance of winning a case before investing substantial time, energy and money (3). Once the decision to go ahead has been made, a diligent and complete investigation must follow. In the investigation, a thorough and accurate accident data collection and evaluation program should be followed. The next step in preparing for a trial is selecting the necessary witnesses. You may be called upon as a witness, or to assist in finding appropriate witnesses, and to evaluate their potential contributions to the case.

Selecting Witnesses

Sometimes a law enforcement officer makes a statement at the scene of an accident which misrepresents conditions or increases the liability of the governmental entity. The officer may, or should, be made a party to the suit (4). Officers are not experts in traffic engineering, roadway design, vehicle ballistics, etc., to the extent of knowing what constitutes a dangerous condition. Yet, statements have been made by officers at the scene of an accident which were successfully used by plaintiff's attorneys to win cases. This problem should be resolved by working with the law enforcement agencies.

Cabinet or other governmental employees may be used as expert witnesses in a suit, or they may be needed to advise the government's lawyers. Often, providing technical or organizational assistance during the preparation for the trial may be their most important function.

Generally, an expert is needed if the jury will be helped appreciably, and if general experience of an ordinary person is not sufficient. An expert is not needed if the jury can just as easily determine the answer to the question at issue. An expert witness is one who has acquired by study or experience a special skill or superior knowledge in a particular field

about which persons who do not have special training are incapable of forming an accurate opinion or of deducing correct conclusions (1). Expert witnesses differ from ordinary witnesses in that the expert witnesses can state their opinions and conclusions based on fact, whereas ordinary witnesses can only testify to something they said, smelled, tasted, felt, and in some cases heard. The weight that a jury will give to expert testimony will depend upon the extent of the experts' learning, skills, experience, and primarily the foundation and the reasons that they give for their opinion in drawing their conclusions.

The witness should do his research well. Once it has been determined that he is the person for the job, most of the time spent doing the work will not be in actual court time, but in preparation for that day. Usually, a written report will be prepared which will form much of the basis for the attorney's case. Because of the permanence of written information, words must be selected very carefully (words like "reasonable", "never", "absolutely", "definitely".) Every avenue of information should be researched so that full preparation is achieved.

Being Prepared for Trial

Being prepared means visiting and inspecting the site as many times as necessary to fill in the gaps of your knowledge. Being prepared means reviewing files, plans and available data to find all pertinent information. Being prepared means locating all pertinent standards and specifications, and learning how they apply to this case. Being prepared means interviewing your colleagues who may be able to shed additional light on the subject. Being prepared means making the necessary calculations and preserving them for future reference in case certain lines of questioning come up while you are in the witness chair. In order to be an effective witness, you must be totally prepared.

Promptness and availability by all witnesses, including the expert witness, are two characteristics which are absolutely essential to the proper management of a case. The witness must schedule his time carefully so that he will be there when he is needed. Conferences relating to litigation should be held in the attorney's office a day or so before trial, especially when experts are involved. Experts are expected to be professional, and their appearance reveals something about their knowledge and ability. The noble intent of an expert does not excuse implied disrespect for the court.

WHEN ALL IS SAID AND DONE

Using information collected during the investigation and evaluation program, information received in the depositions and interrogatories, and information obtained in the form of documents, your attorney can prepare for trial in order to successfully defend a lawsuit or win a lawsuit and recover damages.

Your portion of defending a law suit can be taken care of by careful preparation of your testimony, and by close coordination with your attorney. Make up your mind to be prepared, to be scrupulous in your testimony, and to represent your agency as well as you can.

After the trial, commit yourself to risk management principles to minimize your chances of having to go to court again. Your time is best spent in providing the citizens of your state with the best roads possible, not in preparing for court!

REFERENCES

(1) Pagan, Alfred R., "Ten (More or Less) Commandments...for the Expert Witness," Better Roads, August-June issues, 1980.

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(3) Reed, George L., "Coping With Litigation, " Civil Engineering, June, 1985.

(4) Lewis, Russel M., "Practical Guidelines for Minimizing Tort Liability," NCHRP Synthesis of Highway Practice 106, Transportation Research Board, 1985.

CHAPTER NINE

DETAILED INFORMATION FOR KENTUCKY BOARD OF CLAIMS CASES OF $50,000 OR MORE

As noted in Chapter 4, for the time period of 1981 through 1996, there were 687 cases in which the amount sought was $50,000 or more. Prior to June 1986, the maximum claim was $50,000. At that time, the maximum single award was increased to $100,000 with a total award of $250,000 allowed for all claims in a single accident (with no individual claimant receiving more than $100,000).

An analysis of these claims by the reason for the claim is given in Table 9-1. Up to two reasons could be listed for any claim. For each reason, the total number of claims is given along with the amount claimed, average claim amount, amount paid, and percent paid.

While these claims account for only 8.2 percent of the total claims filed, they account for about 87 percent of the amount sought and 74 percent of the amount paid as of the date of this summary. Also, 23 percent of these cases remain open as of this date. These open cases represent approximately $16 million in claims. This shows that the basis and results of these claims should be examined in more detail than the summaries given in Chapter 4.

An analysis of the claims of $50,000 or more by the reason for the claim is given in Table 9-1. For each reason, the total number of claims for $50,000 or more are listed. In addition, the total amount claimed, the average claim amount, and the amount and percent paid for claims for which a decision has been made are given. There were 858 reasons coded for the 687 claims of $50,000 or more. The largest number of claims, as well as the largest amount claimed, related to inadequate signs or markings, followed by improper drainage. The improper drainage cases typically involved a vehicle hydroplaning and losing control. If the claims related to lack of a stop sign or inadequate signing on a stop approach are combined with the general category of inadequate signs or marking, this category would be second to only improper drainage in the amount paid. Claims related to shoulder dropoff, lack of a guardrail or substantard guardrail, inadequate traffic control in a work zone and hitting an object on the right of way also resulted in large amounts paid

There were 16 reasons which had an amount claimed of over $2 million. Of those 16 reasons, improper drainage, hitting an object on the right-of-way,

substandard guardrail, and lack of a stop sign had the highest percentage paid.

Accidents involving inadequate or improper signs or markings had the lowest percentage paid.

A summary of the reason for claims of $50,000 or more versus highway district is shown in Table 9-2. The reasons listed in Table 9-1 were combined into a smaller number of reason categories. The highest number of claims related to drainage, road surface condition, and maintenance activity occurred in District 12. There were also several claims involving drainage in District 4. The largest number of claims related to a traffic control device was in District 7. The highest number of claims related to barriers, shoulder condition, and geometric feature (typically obstructed view or improper curve design or superelevation) were in District 4. The highest number of claims related to traffic control in a work zone or a fixed object, which typically involved hitting an object within the clear zone, were in District 6. District 2 had the highest number of claims related to state vehicle operation. District 5 had the highest number of claims related to construction activity.

Following in Table 9-3 is a more detailed description of each of these claims. The county and route on which the accident occurred was obtained along with the amount sought and amount awarded. A more detailed explanation for the basis of the claim is given. This information describes the alleged negligence which led to the claim. In some instances, comments giving more detailed information related to the claim are included.

TABLE 9-1. ANALYSIS OF CLAIMS FOR CLAIM AMOUNT OF $50,000 OR MORE

Reason for Claim	Number of Claims	Amount Claimed	Average Claim Amount	Amount Paid	Percent Paid*
Inadequate/improper signs/markings	126	$12,070,875	$95,801	$720,875	6
Improper drainage	105	9,333,500	88,890	1,654,113	18
Lack of guardrail	68	6,302,500	92,684	762,628	12
Inadequate traffic control device -work zone	55	4,629,854	84,179	467,102	10
Shoulder drop-off	49	4,729,968	96,530	790,405	17
Substandard guardrail	46	4,012,400	87,226	671,723	17
Accident due to pavement surface	37	2,900,000	78,378	217,000	7
Traffic signal malfunction--inadequate	36	3,640,000	101,111	268,896	7
Accident involving Kytc vehicle	31	2,500,600	80,665	237,199	9
View obstructed	30	2,459,427	81,981	302,663	12
Shoulder related defect	26	2,076,500	79,865	230,356	11
Hit object on right of way	25	2,410,000	96,400	420,697	17
Inadequate signing at stop approach	25	2,500,000	100,000	386,300	15
Falling road/rock slide	24	2,398,887	99,954	273,892	11
Lack of stop sign	24	2,700,000	112,500	464,547	17
Accident due to debris on road	21	2,100,000	100,000	210,200	10
Construction zone-other	20	1,575,000	78,750	179,395	11
Improperly designed curve	18	1,211,500	67,306	76,702	6
Miscellaneous	13	1,122,500	86,346	0	0
Pedestrian fall	13	1,000,000	76,923	2,000	0
Improper drainage damaged property	13	896,997	69,000	21,500	2
Work zone-flagger related	8	700,000	87,500	12,500	2
Break in pavement	6	57,100	9,517	3,000	5
Improper speed limit	5	550,000	110,000	3,000	1
Hit tree limb/falling tree	5	650,000	130,000	51,000	8
No roadway lighting	4	400,000	100,000	200	0
Pedestrian-other	4	350,000	87,500	0	0
Construction damaged property	4	275,000	68,750	0	0
Hit manhole cover/drain	3	151,890	50,630	0	0
Construction-loss of business	3	150,000	50,000	0	0
Related to issued license	2	200,000	100,000	0	0
Pothole damaged vehicle	2	200000	100000	4750	2
Improper construction of median	2	200,000	100,000	32,500	16
Object thrown from mower	2	200,000	100,000	0	0
Hit animal	1	100,000	100,000	0	0 **
Road too narrow	1	50,000	50,000	0	0
Uncovered load	1	50,000	50,000	50,000	100

* For claims in which a decision has been made.
**No cases decided

TABLE 9-2. REASON VERSUS HIGHWAY DISTRICT FOR CLAIMS OF $50,000 OR MORE (1981-1996)

Number in Given Category

Reason Category	Highway District 1	2	3	4	5	6	7	8	9	10	11	12	All
Traffic Control Device	15	22	27	23	12	15	31	8	23	4	8	25	213
Drainage	3	6	5	24	4	10	6	6	12	7	10	25	118
Road Surface Related	5	2	4	6	3	11	2	1	8	12	10	18	82
Barrier	3	16	4	20	7	10	18	1	11	8	8	7	113
Construction Zone - Traffic Control	6	5	1	3	8	19	7	4	0	1	2	7	63
State Vehicle Operation	3	6	5	2	3	2	3	3	1	1	1	2	32
Shoulder Related	10	10	5	15	1	4	13	1	5	2	1	8	75
Fixed Object	4	1	0	2	1	7	2	1	1	0	4	2	25
Geometric Feature	10	5	5	12	1	5	2	2	1	5	2	1	51
Construction Activity	1	1	0	2	12	1	1	1	2	0	5	1	27
Maintenance Activity	0	1	0	1	0	0	0	1	9	3	5	12	32
Miscellaneous	1	1	0	0	2	5	1	1	2	1	5	3	22

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
81-3	Leslie	US 421	$50,000	Vehicle struck steel beams left on right-of-way and overturned.	$1,000	DOT left beams on right-of-way.
81-5	Christian	US41A	$50,000	A fatal accident in which the traffic signal was not working properly.	0	
81-37	Oldham	US42	$61,500	Car went out of control on improperly banked icy curve.	$61,702	
81-65	Hardin	US 31W	$50,000	Fatal accident when vehicle lost control due to shoulder drop off and was hit by vehicle in opposing lane.	$50,000	Gravel shoulder lower than PCC pavement.
81-66	Hardin	US 31W Bypass	$50,000	Refer to 81-65.	$50,000	
81-67	Hardin	US 31W Bypass	$50,000	Refer to 81-65.	$25,000	
81-68	Hardin	US31W Bypass	$50,000	Refer to 81-65.	$25,000	
81-73	Hardin	US 31W Bypass	$50,000	Refer to 81-65.	$5,542	
81-80	Grayson	US 62	$50,000	Injury accident resulted when car broke through inadequate guardrail.	0	
81-123	Whitley	I 75	$50,000	Rear-end collision into slow moving DOH vehicle traveling in right lane. Alleged that DOH vehicle did not have proper lighting or identification.	0	
81-166	Trigg	Mill Rd.	$50,000	Bridge removed with no warning signs.	0	Not state maintained road.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
81-201	Campbell	KY 8	$50,000	Pedestrian injured when fell because of hole in pavement.	0	Hole in pavement in parking lot.
81-234	Pulaski	KY 461	$50,000	Injury accident occurred when car hit pothole and lost control.	0	Car hit embankment and utility pole.
81-290	Bourbon	Peacock Road	$50,000	Injury accident when pickup ran through wooden rail on bridge.	0	Peacock Road not state maintained. Bridge in sharp curve.
81-291	Graves	KY 893	$50,000	Fatal accident occurred when vehicle backed from driveway and did not observe approaching vehicle due to weeds on side of road limiting visibility.	$17,500	
81-292	Graves	KY 893	$50,000	Refer to 81-291.	$17,500	
81-336	Webster	KY 132	$50,000	Fatal accident when vehicle lost control due to a shoulder drop off and hit bridge.	$40,000	Drop off of 3 to 6 inches.
81-359	Campbell	I 471	$50,000	Accident in construction zone involving collision with a highway divider which was not properly marked.	$3,500	
81-380	Campbell	Parking Lot	$50,000	Pedestrian injured when fell in parking lot due to defective pavement.	0	Plaintiff moved to dismiss.
81-406	Fayette	KY 922	$50,000	Inadequate markings (traffic control) in a construction zone. Fatal accident.	0	At I 64 interchange.
81-423	Hopkins	KY 109	$50,000	Flagman allowed truck to come through dangerous area (injury accident).	0	Flagging for previous accident at request of state police.
81-443	Jessamine	US27	$50,000	Vehicle dropped off the shoulder in a construction zone and then overcorrected and hit an oncoming vehicle.	$52,166	A drop off of 1 to 18 inches was measured. The driver had a BAC of 0.22. The KyTC was found to be 20 percent at fault.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
82-12	Breckinridge	KY86	$50,000	Injury accident when truck ran off road, lost control, and hit opposing vehicle. Alleged insufficient roadway width.	0	
82-16	Daviess	Fairview	$50,000	Accident involving DOH driver having heart attack.	$32,287	Driver allowed to drive although previously complained of chest pains.
82-110	Barren	US 68	$50,000	Fatal accident due to missing stop sign.	$42,500	Intersection of US 68 and Old Mayfield Mill Road.
82-125	Jefferson	Unk.	$138,400	Hit guardrail on icy bridge.	$138,400	
82-148	Carter	KY 1	$50,000	Fatal accident when vehicle hit rock on shoulder. Alleged failure to straighten curve and failure to reduce speed limit.	0	Excessive speed was determined to be the cause of the accident.
82-183	Pike	KY 194	$50,000	Driver lost control due to shoulder drop off.	0	Collision with opposing vehicle.
82-188	Green	KY 793	$52,500	Fatal accident when vehicle hit steel bridge which collapsed. No guardrail on approach to bridge.	0	Bridge was scheduled for replacement. State did not maintain bridge.
82-192	Campbell	Gerger Ave.	$50,000	Damage to home and unacceptable traffic noise due to construction of I 471.	0	In Bellevue.
82-264	Kenton	KY 177	$50,000	Pedestrian injured when fell into drain opening left uncovered.	$500	Decamsey Street in Covington. Hole four feet in depth.
82-291	Pulaski	KY39	$50,000	Fatal accident due to water pooling.	0	Highway did not drain properly.
82-292	Pulaski	KY39	$50,000	Refer to 82-291.	0	
82-293	Pulaski	KY 39	$50,000	Refer to 82-291.	0	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
82-294	Larue	US 31E	$50,000	Fatal accident due to spillage of oil which was not cleaned from the road.	0	Alcohol and speed involved.
82-298	Pike	US 23	$50,000	Fatal accident occurred when vehicle hit pothole and lost control resulting in a head-on collison with vehicle in opposing lane.	$25,000	Partial negligence for claimant. Noted previous complaints about road conditions.
82-299	Pike	US 23	$50,000	Refer to 82-298.	$25,000	
82-300	Pike	US 23	$50,000	Refer to 82-298.	$25,000	
82-301	Pike	US 23	$50,000	Refer to 82-298.	$25,000	
82-302	Pike	US 23	$50,000	Refer to 82-298.	$25,000	
82-330	Warren	KY 101	$50,000	Fatal accident due to inadequate signing. Driver failed to stop at intersection and was struck by a bus.	0	At intersection of KY 101 and KY 1297.
82-370	Pike	KY 194	$50,000	Injury accident resulting when lost control of vehicle due to water and oil on road.	0	
82-411	Grayson	W.K. Pkwy.	$50,000	Fatal accident when guardrail end penetrated into the vehicle.	$50,000	Blunt guardrail end treatment.
82-432	Jefferson	I 65	$50,000	Vehicle overturned due to detour not in conformity with acceptable engineering standards; inadequate warning signs.	$13,333	Cargo shifted on truck.
82-481	Knox	Masters Street	$50,000	Pedestrian injured when stepped in a hole in pavement during repaving operation.	0	Four-inch drop off about eight inches from curb.
82-531	Morgan	KY 205	$50,000	House and property damaged due to construction (inadequate drainage).	0	Flooded because culverts too small.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
82-533	Jefferson	KY 864	$50,000	Construction caused loss of business due to lack of access.	0	On Poplar Level Road in Louisville.
82-536	Scott	I 75	$50,000	Tractor-trailer hit raised area in traveled portion of road throwing driver from his seat and around the cab.	$50,000	
82-551	Jefferson	I 65	$50,000	Refer to 82-432.	$16,062	
82-552	Jefferson	I 65	$50,000	Tractor-trailer overturned on curve on detour.	$12,000	Contractor had majority of liability.
82-553	Jefferson	I 65	$50,000	Truck overturned on curve on detour.	$10,500	Contractor had majority of liability.
82-554	Jefferson	Unk.	$50,000	Turning left from an intersection and hit in side.	0	
82-573	Jefferson	I 65	$50,000	Refer to 82-432.	0	
82-600	Perry	US 28	$50,000	Vehicle lost control on patch of ice. Alleged lack of warning sign and guardrail.	0	No record of accident found.
83-26	Pike	KY 195	$50,000	Injury accident when vehicle lost control due to pothole and hit oncoming truck.	$3,200	Pothole was 15 inches wide by 41 long and 5 inches deep.
83-45	Pike	US 23	$50,000	Injury accident occurred when vehicle left road and hit ditch on shoulder causing loss of control.	$14,454	KyTC caused deep ditch by periodic cleaning.
83-98	Carter	US 60	$50,000	Injury accident due to accumulation of mud on the road.	0	Mud accumulated where coal company constructed a service road.
83-188	Martin	KY 292	$50,000	Soft shoulder broke away with loaded truck allowing it to go over embankment.	$37,900	Both KyTC and claimant judged 50 percent at fault. Truck overweight.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
83-251	Kenton	KY 1829	$50,000	Fatal accident resulted when vehicle went over retaining wall of culvert into creek.	$28,000	DOH found 25 percent negligent due due to inadequate wooden guardrails.
83-355	Warren	US 68	$50,000	Accident in construction zone when vehicle lost control due to shoulder drop off and struck pile of dirt.	0	Noted failure to warn of drop off. Joint motion to dismiss.
83-377	Pike	US 23	$50,000	Refer to 83-45.	$21,250	
83-378	Pike	US 23	$50,000	Refer to 83-45.	$21,250	
83-383	Boone	KY 338	$50,000	Injury accident after vehicle went off road and overturned. Alleged failure to mark hazardous curve and excessive speed limit posted.	$3,000	
83-384	Barren	I 65	$50,000	Injured when car struck an open drain over a storm culvert. Failed to replace grate after complaints or provide warning signs.	0	Plaintiff moved to dismiss.
83-409	Perry	KY 80	$50,000	Injured when vehicle struck rocks from landslide. No warning signs or protective fences.	0	
83-592	Clark	US 60	$50,000	Fatal accident when vehicle struck bridge abutment. Inadequate guardrail and improper traffic control.	$25,000	Possible shoulder drop off and improper superelevation.
83-601	Rowan	KY 519	$50,000	Injury accident when vehicle hit rocks and debris in a blind curve.	$50,000	
83-602	Rowan	KY 519	$50,000	Refer to 83-601.	$25,000	
83-639	Campbell	US 27	$50,000	Injury accident involving a vehicle pulling from a side road into the path of a state single-unit truck.	$148	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
83-648	Bourbon	KY 353	$50,000	Fatal accident in construction zone. Warning devices not proper or adequate.	0	
83-650	Pike	US 119	$50,000	Had to close business due to traffic flow, dust and mud during construction.	0	
83-691	Wayne	KY90	$55,000	Dust in the air from road cleaning and flagman signaled claimant to proceed.	0	
83-719	Boone	KY 16	$50,000	Injury accident when vehicle ran off road in curve and hit a tree. Failure to warn and provide guardrail.	0	
83-733	McCracken	US 60	$50,000	Driver confused by traffic controls which had been changed from 4-way to 2-way stop.	0	At intersection of Park Avenue and 8th street in Paducah.
84-95	Warren	US 31W	$50,000	Lost control on ice and slid into guardrail. Fatality occurred when end of guardrail went through driver's door.	$37,500	KyTC admitted 10 percent negligence. Blunt guardrail end treatment.
84-98	Graves	KY 3141	$50,000	Vehicle struck utility pole in narrow median. Pole location was hazardous and markings were insufficient. Injury accident.	$5,000	Crittenden Lane in Mayfield. KyTC judged 10 percent at fault.
84-173	Elliott	KY32	$50,000	Four-year old fell into 5-foot deep hole and broke leg.	0	
84-175	Pike	US 23	$50,000	Rock and debris fell on car from a rock cut resulting in injuries.	$200	KyTC aware of condition of rock cut (no offsets in wall).
84-176	Pike	US 23	$50,000	Refer to 84-175	$31,300	
84-226	Jefferson	KY 1932	$50,000	Pedestrian injured at intersection controlled by traffic signal because signal timing did not allow sufficient time for pedestrian to cross intersection.	$22,500	Intersection of Breckinridge Lane and Hikes Lane in Louisville.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
84-341	Union	US60	$50,000	Accident involving DOH truck. No flagman at maintenance site. Visibility reduced by dust.	$7,500	
84-342	McCracken	US 45	$50,000	Vehicle hit manhole cover raised in an incorrect manner.	0	Plaintiff moved to dismiss.
84-425	Jefferson	KY 864	$50,000	Pedestrian injured when struck at traffic signal. Pedestrian control not working.	0	Pedestrian started across road when signal red but changed while crossing.
84-442	Campbell	KY 8	$100,000	Pedestrian fatality in construction zone. No provisions for pedestrians. Material obstructed pedestrian's safe path. Inadequate warning.	0	Barrier needed to keep children from entering construction zone.
84-484	Knox	Unk.	$50,000	Highway construction resulted in drainage problem flooding property.	0	In Barbourville.
84-485	Jefferson	I 71	$50,000	DOH truck stopped in right lane to clean spill of salt when hit in rear. No flares, flashing lights on truck, or flagman.	$9,725	
84-716	Floyd	US 23	$50,000	Improper drainage caused severe erosion to property.	0	
84-794	Floyd	KY 7	$50,000	Hit pothole in road and lost control. Hole was 15 inches deep, 10 feet wide, and 4 feet long and had been in road for three months or longer.	0	KyTC judged 50 percent at fault. Loss less than the initial $10,000 abolished by the Motor Vehicle Reparation Act.
84-799	Graves	KY 121	$50,000	Injury accident in construction zone where vehicle lost control on oil on resurfaced road. Flagman ahead sign present but no flagman.	$2,500	One lane was 3 inches higher than the other.
84-800	Graves	KY 121	$50,000	Refer to 84-799.	$2,500	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
84-802	Greenup	KY 750	$50,000	Pedestrian injured when stepped on water meter cover.	0	Cover turned which allowed pedestrian to fall into hole.
84-804	McCracken	US 60	$50,000	Confused at intersection where traffic control had been changed from a 4-way to a 2-way stop.	0	Intersection of Eighth Street and Park Avenue in Paducah.
84-805	Fulton	US 51	$50,000	Construction limited visibility at intersection. Traffic control devices not adequate. Fatal accident.	$30,000	Embankment on inside of curve limited visibility.
84-931	Madison	KY 876	$50,000	Injury accident related to failure to properly install and maintain traffic signal (specifically, a pedestrian signal).	0	Intersection of KY 876 (Bypass) and Lancaster Avenue.
84-932	Warren	KY 1297	$50,000	Injury single-vehicle at intersection due to no stop sign.	$3,222	Intersection of KY 1297 and Hydro Cole Bend Road.
84-970	Pike	US 23	$50,000	Injured when car hit rock slide.	$25,346	Previous rock slides in area.
84-1033	Pike	Unk.	$50,000	Property flooded as a result of blockage of culvert.	0	
84-1053	Fulton	US 51	$50,000	Refer to 84-805.	$33,063	
84-1094	Warren	I 65	$50,000	Fatal accident when driver lost control of vehicle due to hydroplaning.	$40,000	Partial negligence for plaintiff.
84-1157	Harlan	KY 160	$50,000	Fatal accident when vehicle dropped off shoulder drop off (inadequate warning).	0	Driver BAC of 0.26. Shoulder dropped off one to two feet.
84-1174	Campbell	US 27	$50,000	Water pooling in construction area resulted in fatal two-vehicle collision.	$35,000	Water pooling in median area in crossover.
85-72	Grant	I 75	$50,000	Fatal accident when truck hit guardrail and then hit bridge abutment.	0	Truck hit turned down end treatment and then rode on top of guardrail to impact.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
85-102	Bourbon	KY 1876	$50,000	Stop sign hidden by route marking signs.	0	Intersection with US 460. Hit utility pole.
85-116	Campbell	DNA	$50,000	Fell while carrying license plate and cut hand.	0	Occurred in county courthouse.
85-181	Greenup	KY 10	$50,000	Retaining wall fell and damaged home.	0	
85-182	Monroe	Jackson Street	$50,000	State employee pulled from maintenance facility into path of motorcycle.	$5000	Employee driving private vehicle.
85-345	Jefferson	I 65	$50,000	Vehicle lost control at exit ramp in construction area. Alleged lack of proper traffic control and no guardrail.	0	Exit ramp to KY 841.
85-434	Caldwell	US 62	$50,000	Ran into the rear of vehicle that was slowing down because of water on road. Failed to warn of flooded roadway.	$750	
85-435	Spencer	KY 1251	$200,000	Fatal accident at intersection with no stop sign or warning sign in place.	$200,000	Intersection with KY 44. Vandalism caused problem keeping stop sign.
85-489	Lyon	KY 293	$50,000	Road was blocked by construction denying access to business.	0	Bridge was being replaced. Resulted in lost business.
85-491	Meade	US 60	$50,000	Lost control of vehicle at curve due to inadequate warning.	$35,000	Noted previous accidents and complaints.
85-492	Muhlenberg	KY 181	$50,000	Pedestrian injured when hit by vehicle because driver could not see claimant due to overgrowth of trees, shrubs.	$36,000	
85-502	McLean	US 431	$50,000	Fatal accident occurred when DOH ditcher pulled onto highway into path of vehicle.	$50,000	
85-521	Spencer	KY 1251	$200,000	Refer to 85-435.	$200,000	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
85-543	Boone	Union Hathaway Road	$50,000	Injury accident when vehicle hit unmarked culvert headwall on right-of-way.	0	
85-598	Lincoln	Unk.	$50,000	Rocks and boulders fell from truck and crashed through windshield of car.	$50,000	
85-599	Jefferson	I 75	$50,000	Lost control due to debris on road and ran off ramp. State had removed guardrail on ramp.	$500	KyTC truck was parked on shoulder partially blocking view.
85-600	Jefferson	KY 1631	$50,000	Injured in collision caused by malfunctioning traffic light.	$21,120	Intersection of Fern Valley Road and Old Shepherdsville Road in Louisville.
85-650	Madison	I 75	$50,000	Fatality when worker fell from the bridge he was painting. No safety equipment required to to be worn.	0	Kentucky River bridge.
85-654	Montgomery	US 460	$50,000	Highway employee was mowing right-of-way and obstructed the highway causing injury accident.	$4,500	
85-755	Muhlenberg	KY 277	$50,000	No warning signs at point where road ended at a boat ramp resulting in fatal injuries to passenger.	$15,000	Driver intoxicated and arrested.
85-786	Taylor	KY 210	$50,000	Car hit water in road causing driver to lose control and travel into creek resulting in fatalities. Improper design of culvert to handle flow of water, lack of guardrail, and no warning devices.	$50,000	Water 2 feet deep across road due to heavy rain.
85-787	Taylor	KY 210	$50,000	Refer to 85-786	$50,000	
85-788	Taylor	KY 210	$50,000	Refer to 85-786	$50,000	
85-789	Taylor	KY 210	$50,000	Refer to 85-786	$50,000	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
85-790	Taylor	KY 210	$50,000	Refer to 85-786	$50,000	
85-791	Taylor	KY 210	$50,000	Refer to 85-786	$50,000	
85-792	Taylor	KY 210	$50,000	Refer to 85-786	0	
85-793	Taylor	KY 210	$50,000	Refer to 85-786	0	
85-851	Harlan	KY22	$50,000	Cutting weeds and fell across a rock that came from slide area causing injury.	0	Claimant had signed release form barring claim.
85-854	Hardin	I 65	$50,000	Vehicle hit deep hole in road causing loss of control (in construction area).	pending	Hole measured 3 feet by 3 feet feet and was 15 inches deep (broke tie rod).
85-1005	Boone	US 25	$50,000	Accident occurred after resurfacing. Alleging shoulder drop off and no pavement markings.	$15,000	Drop off of 4 to 6 inches.
85-1007	Daviess	KY279	$50,000	Ditches were clogged causing dirt and mud to go onto road causing loss of control.	$35,000	Dirt and mud 2-4 inches in depth.
85-1008	Henderson	US 41	$50,000	Vehicle was hit in rear by a vehicle that could not stop on the bridge due to frost.	0	
85-1040	Barren	US 31E	$50,000	Fatal accident. Left-turn accident resulted when view was obstructed by another vehicle. Failure to designate turn lanes or provide left-turn signal.	$15,000	Intersection of US 31E and Cleveland Avenue.
85-1041	Barren	US31E	$50,000	Refer to 86-1040	$20,000	
85-1070	Pike	KY 195	$50,000	Injury accident resulting when jeep lost control on icy spot on pavement. Failed to maintain guardrail.	$4,180	
85-1071	Harlan	I 65	$50,000	Injury accident when vehicle hit ice on bridge. Failure to maintain roadside barrier.	0	No barrier provided for out-of-control vehicle exiting bridge.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
86-9	Breckinridge	KY 261	$50,000	Injury accident when driver lost control on slick asphalt.	0	
86-36	Fayette	KY 1685	$50,000	Lost control of vehicle on icy road and slid off highway into culvert due to no guardrail.	0	Vehicle slid into 25-foot deep ditch. Time limit for filing had expired.
86-38	Wayne	KY 90B	$50,000	Fatal accident resulting when driver failed to stop at stop sign due to inadequate warning of stop condition.	$3,000	Intersection of KY 1275 and KY 90 Bypass. Driver BAC of 0.19.
86-60	Floyd	US 23	$50,000	Fatal accident. In process of repairing traffic signal which was not operating properly. Inadequate work zone traffic control.	$5,426	Intersection of US 23 and KY 114.
86-61	Grayson	KY 79	$50,000	Drainage water permitted to drain across highway. Car lost control on ice and hit guardrail end which penetrated car.	$50,000	Blunt guardrail end treatment.
86-127	Henry	KY 127	$50,000	Fatal accident involving tractor trailer that ran off road in curve. Inadequate warning signs and inadequate guardrail.	0	Plaintiff dismissed suit.
86-144	Taylor	KY 210	$50,000	Refer to 85-786	0	
86-145	Taylor	KY 210	$50,000	Refer to 85-786	$50,000	
86-146	Taylor	KY 210	$50,000	Refer to 85-786	$50,000	
86-231	Floyd	US 23	$50,000	Refer to 86-60	$100	
86-322	Fayette	Waller Ave.	$50,000	Failure to place signs and markings in advance of railroad.	0	
86-323	Pulaski	KY 80B	$200,000	Fatal accident at intersection where driver states he did not observe traffic signal.	$5,000	Intersection of KY 80 Bypass and KY 39 in Somerset.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
86-327	Allen	KY 98	$50,000	DOH vehicle knocked a utility pole down causing a mobile home to catch fire.	0	DOH vehicle had been hit by another vehicle.
86-484	Floyd	US 23	$50,000	Refer to 86-60	$45,000	
86-485	Floyd	US 23	$50,000	Refer to 86-60	$45,000	
86-489	Trigg	KY 124	$50,000	Intersection accident where stop sign obscured by weeds and no other warning devices present (injury accident).	0	Intersection of KY 124 and KY 276.
86-562	Trigg	I 24	$50,000	Fatal accident in construction zone. Hit equipment on shoulder during fog. Inadequate warning devices.	$7,500	Driver BAC of 0.10.
86-565	Larue	KY 210	$50,000	Fatal accident. Weeds at intersection reduced visibility of approaching traffic.	0	Intersection with KY 470. Weeds 3 to 4 feet high.
86-566	Henderson	US 41	$50,000	Fatal accident at intersection where traffic signal on flash.	$6,000	Intersection of US 41 and Watson Lane. Separate lawsuit against Henderson.
86-567	Henderson	US 41	$50,000	Refer to 86-566.	$6,000	
86-568	Henderson	US 41	$50,000	Refer to 86-566.	$6,000	
86-626	Floyd	KY 80	$50,000	Inadequate drainage of roadway resulted in vehicle hydroplaning and crossing the median. A fatal accident resulted when the vehicle hit an opposing vehicle.	$42,000	Pool of water 4 to 5 inches deep.
86-627	Bell	KY 66	$50,000	Improper drainage of water resulted in vehicle losing control on ice.	$300	
86-655	Pulaski	KY 39	$50,000	Lost control of motorcycle and hit a guy wire on the right-of-way. No guardrail. Fatal accident.	$2,250	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
86-699	Warren	US 68	$50,000	Injury accident related to inadequate clearance interval at traffic signal.	0	Intersection of Riverview and Kentucky Streets in Bowling Green.
86-733	Kenton	I 75	$50,000	Vehicle overturned on exit ramp due to improper superelevation. No guardrail.	0	I 75 southbound at exit 188B.
86-771	Marshall	KY80	$50,000	Impact with unmarked culvert on shoulder of road. No guardrail.	0	Culvert 2 feet off roadway.
86-772	Warren	KY 880	$100,000	Injury accident in which operation of DOH vehicle was issue. Involved vehicle making U-turn.	0	
86-799	Perry	KY 15	$100,000	Collision with train at railroad crossing. Inadequate warning lights.	$10,000	Heavy fog.
86-833	Anderson	KY 1291	$100,000	Collision with guardrail end which entered vehicle resulting in fatality.	$36,141	Blunt guardrail end treatment.
86-885	Kenton	I 275	$100,000	Collision with guardrail end which entered vehicle resulting in fatality.	$1,000	BCT end treatment.
86-944	Boone	KY 14	$100,000	Head-on fatal accident. Complaint dealt with inadequate signs and markings and improper superelevation.	0	DOH previously notified of road defect.
86-1046	Campbell	US 27	$50,000	Child injured after running onto road. No guardrail between road and sidewalk.	0	Plaintiff moved to dismiss.
86-1053	Campbell	US 27	$100,000	Fatal accident in construction zone related to shoulder drop off and inadequate warning.	0	Head-on collision resulted.
86-1055	Floyd	KY404	$100,000	Injury accident when lost control on ice. No warning signs or markings.	$30,000	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
86-1116	Rowan	KY 519	$50,000	Large portion of rock cliff fell into path causing driver to swerve and hit guardrail. Injury accident.	0	
86-1118	Greenup	US 23	$50,000	Fatal accident related to water pooling.	$62,500	
86-1119	Greenup	US 23	$50,000	Refer to 86-1118.	$62,500	
86-1120	Kenton	I 75	$100,000	Fatal accident when truck overturned onto another vehicle due to improper design of curve.	0	I 75 southbound near Ft. Mitchell interchange.
86-1180	Laurel	I 75	$100,000	Fatal accident on ramp to weigh station when vehicle ran over delineator pole rupturing gas tank causing fire.	$101,649	
86-1181	Laurel	I 75	$100,000	Refer to 86-1180.	$101,649	
86-1182	Laurel	I 75	$100,000	Refer to 86-1180.	$101,649	
86-1183	Perry	KY 1149	$50,000	Injury accident resulting when pavement broke away and vehicle went over embankment.	0	
86-1185	Floyd	KY 80	$100,000	Injury accident when vehicle fell into collapsed culvert. Inadequate warning in construction zone.	$3,000	
86-1186	Fayette	KY 1681	$50,000	Driver lost control due to shoulder drop off in construction area.	0	Head-on collision in opposing lane.
86-1249	Floyd	KY 80	$121,000	Refer to 86-1185.	0	
87-22	Metcalfe	KY 3234	$100,000	Fatal accident due to limited sight distance and failure to advise of a side road beyond a hillcrest.	$33,333	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
87-23	Metcalfe	KY 3234	$100,000	Refer to 87-23.	$33,333	
87-24	Metcalfe	KY 3234	$100,000	Refer to 87-23.	$33,334	
87-25	Fulton	KY 94	$50,000	Fatal accident when slid onto metal pipe on right-of-way.	$20,000	
87-26	Edmonson	KY 259	$100,000	Injury accident when vehicle left roadway due to unsafe shoulder and insufficient warning signs.	0	
87-27	Warren	US 31W	$100,000	Improper and inadequate signs directing traffic resulted in injury accident.	0	Vehicle southbound in northbound lanes.
87-31	McCracken	US45	$100,000	Injury accident when DOH vehicle changed lanes.	$85,090	Intersection of Lone Oak Road and Highland Blvd. in Paducah.
87-113	Rowan	KY 32	$50,000	Rocks fell into roadway causing injury accident.	$50,000	
87-116	Calloway	KY 94	$100,000	Fatal accident when motorcycle hit pothole on shoulder causing loss of control.	$5,000	Crossed centerline and hit opposing vehicle.
87-210	Edmonson	KY 259	$100,000	Injury accident (hit culvert). Unsafe shoulder and inadequate warning signs.	0	Plaintiff moved to dismiss.
87-212	Perry	Briar Fork	$67,587	Earth and mud slide on state right-of-way caused residence to be pushed off foundation.	$22,000	Related to construction of Daniel Boone Parkway.
87-217	Harlan	KY 221	$177,000	Head-on injury accident related to water pooling.	$28,921	Water 3 inches deep on roadway.
87-221	Graves	KY 384	$100,000	Failure to provide stop signs or warning signs or guardrail resulted in injury accident.	0	Intersection with Macedonia Church Road.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
87-229	Henderson	KY 359	$50,000	No stop sign at intersection resulting in fatal accident.	$8,500	Stop sign knocked down day previous to accident.
87-344	Hopkins	KY 1034	$250,000	Stop sign obstructed by a bush at intersection and no stop ahead sign resulted in fatal accident.	$85,000	Intersection of KY 1034 and Wicks Wells Road.
87-349	Greenup	US 23	$100,000	Refer to 86-1118.	$83,332	
87-431	Warren	US 31W	$100,000	Improper signs directing traffic caused injury accident.	0	Vehicle wrong direction on 4-lane highway.
87-432	McCracken	KY 131	$110,000	Injury accident related to shoulder drop off and trees too close to the road.	0	
87-475	Greenup	US 23	$100,000	Refer to 86-1118.	$41,668	
87-516	Union	US 60	$100,000	Injury accident involving a DOH vehicle.	0	
87-521	Harlan	US 421	$100,000	Large rock fell from a cliff and hit truck causing fatality.	0	
87-524	Mercer	KY 1160	100,000	Fatal accident related to shoulder drop off as a result of paving.	$44,250	
87-525	Mercer	KY 1160	$100,000	Refer to 87-524.	$750	
87-526	Lincoln	US 27	$221,000	Injury accident resulting from collision with road grader.	0	
87-580	Greenup	KY 750	$250,000	Injury accident related to defective traffic signal and excessive speed limit.	0	
87-581	Bullitt	Cabin Hill Rd.	$70,000	Lake was drained. Dam was damaged and fish killed.	0	Police agency drained lake.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
87-584	Metcalfe	Cumb. Pkwy.	$108,600	Vehicle hit by state vehicle (injury accident).	$3,882	Slow speed with no warning emblem.
87-621	Kenton	I 75	$100,000	Fatal accident in construction zone. Related to flagging.	0	
87-623	Christian	US 41	$75,000	Injury accident due to traffic signal operating improperly.	$5,000	
87-624	Bell	KY 221	$100,000	Injury motor vehicle-bicycle accident related to view obstruction.	0	Bicycle pulled from driveway. View obstructed by trees and bushes.
87-677	Bullitt	I 65	$100,000	In construction zone, motorcyclist hit barrel blown into road by truck (injury).	$25,000	
87-705	Marshall	US 641	$150,000	Traffic signal not operating (being repaired) (injury accident).	pending	
87-732	Perry	Daniel Boone Pkwy.	$100,000	Fatal accident related to water pooling.	$100,000	Water pooling in rutting caused by overweight trucks.
87-733	Perry	Daniel Boone Pkwy.	$100,000	Refer to 87-732.	$40,000	
87-734	Harrison	US 27	$100,000	Pedestrian injured when fell at grate.	$1,500	
87-736	Bullitt	US 641	$100,000	Injury accident related to lack of marking in construction zone.	$4,635	
87-756	Marshall	US 641	$100,000	Refer to 87-705.	pending	
87-788	Jefferson	I 65	$125,000	Fatal accident related to improper drainage in construction zone.	$25,000	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
87-790	Boone	I 75	$100,000	Injury accident related to inadequate warning at construction zone.	0	
87-794	Russell	US 127	$250,000	Fatal accident at intersection in which signing on stop approach was inadequate.	$90,000	Intersection of US 127 and KY 619.
87-818	Campbell	US 27	$50,000	Shoulder drop off resulted in injury accident.	$5,000	
87-918	Anderson	US 62	$100,000	Water pooling caused injury accident.	$100,000	
87-975	Shelby	US 60	$100,000	Water drained onto property causing erosion.	0	
87-980	Madison	Simpson Road	$100,000	Inadequate signing at stop approach resulted in injury accident.	$3,125	
87-1053	Clay	KY 11	$77,800	Injury accident related to rock slide.	0	
87-1055	Floyd	US 23	$50,000	Vegetation cut causing erosion.	0	
87-1059	Boone	KY 338	$100,000	Hit pool of water in the roadway causing injury accident.	$22,500	
87-1060	Fleming	KY 11	$100,000	Injured in accident due to failure to install necessary traffic control devices.	0	
87-1061	Calloway	US 641	$100,000	Inadequate warning at work site.	0	
87-1063	Boone	KY 338	$100,000	Fatal accident related to lack of warning sign at curve, shoulder drop off, and lack of guardrail.	$143,731	
87-1112	Whitley	KY 11	$200,000	Driver drove through intersection over embankment due to lack of stop sign.	0	Intersection of KY 11 and KY 92. Stop sign torn down the night of the accident.
87-1156	Hardin	US31W	$100,000	Injury accident due to ice on road.	$10,000	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
87-1158	Fayette	US 25	$100,000	Fatal accident in which vehicle lost control due to shoulder drop off.	$10,000	Head-on collision.
88-6	Ohio	Western Ky Pkwy	$100,000	Pedestrian injured when hit by truck at service center on the Western Kentucky Parkway.	0	
88-58	Fayette	KY 57	$100,000	Fatal accident when truck ran off road and struck tree and culvert. Inadequate shoulder and culvert.	$82,000	DOH aware of previous accidents.
88-61	Christian	US 41	$200,000	Fatal accident when vehicle broke through wooden guardrail posts.	$17,500	Guardrail not modern design.
88-62	Grayson	KY 411	$100,000	Injury accident when vehicle broke through guardrail.	$124,000	Deteriorating wooden posts. Substandard guardrail design.
88-63	Greenup	KY 693	$50,000	Property flooded due to culvert not being large enough for heavy rain.	0	
88-85	Leslie	KY 2057	$100,000	Truck overturned when section of road failed. No guardrail.	0	
88-87	Leslie	KY 2057	$50,000	Refer to 88-85.	0	
88-139	Boone	KY 18	$50,000	Refer to 85-1005.	$5,000	
88-241	Hardin	KY 224	$100,000	Fatal accident at railroad crossing. Adequate warning signals not present.	0	
88-243	Mercer	KY 1989	$100,000	"No passing" markings not replaced after road was resurfaced.	$14,000	Accident in March 1987 after road was resurfaced in November 1986.
88-285	Fayette	I 75	$100,000	Injury accident involving DOH vehicle.	0	Dismissed because not filed within one year.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
88-331	Knott	KY 7	$100,000	Fatal accident at intersection. Stop sign placed too far back resulting in reduced visibility.	0	Intersection of KY 7 and KY 1498.
88-412	Boyle	US 150B	$75,000	Accident due to malfunctioning traffic signal.	pending	Signal failed to display yellow interval. Intersection with US 127.
88-415	Henderson	US 60	$100,000	Fatal accident at intersection. Visibility limited because of vegetation.	$64,500	Intersection with KY 1078.
88-416	Green	Unk.	$100,000	Flagged through area but then had to run off road to avoid paint striping operation.	$5,117	
88-463	Kenton	KY 177	$100,000	Inadequate warning and limited sight distance on intersection approach.	0	Intersection of KY 177 and KY 1303.
88-464	Harrison	US 62	$100,000	Accident due to gravel and oil left on road by DOH. No warning devices.	$7,150	DOH used oil and gravel to repair road the previous day.
88-467	Green	Unk.	$100,000	Refer to 88-416.	0	
88-527	Russell	US 127	$100,000	Driver was issued a drivers license although mentally incompetent.	0	Driver pulled from side road into path of claimant's vehicle.
88-528	Grant	KY 36	$250,000	Vehicle ran off road in curve recently resurfaced. Lack of warning or guardrail and shoulder drop off.	$7,500	No delineator or advisory speed sign or pavement markings. Slope exceeded 6 feet.
88-570	Pike	CR 5384	$100,000	Pedestrian fell off bridge because guardrail had been knocked down.	0	Marrowbone Creek Road
88-623	Boyd	US 23	$100,000	Fatal accident when guardrail penetrated vehicle.	0	
88-788	Pike	KY 468	$75,000	Injury accident when pickup overturned after hitting piles of asphalt on shoulder of road.	$20,000	Asphalt dumped on shoulder to empty load from truck.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
88-790	Lawrence	KY 3	$100,000	Vehicle lost control when hit oil on road from spill from prior accident.	$84,800	Prior accident occurred day before.
88-791	Whitley	KY 727	$100,000	Fatal accident. Ran off road into creek. No guardrail or warning devices.	$12,500	Shoulder caused driver to lose control.
88-843	Hopkins	Pennyrile Pkwy	$52,000	Vehicle struck in rear by DOH truck.	$2,000	Truck hauling guardrail and pulling an air compressor.
88-844	Carter	KY 174	$100,000	Accident due to lack of stop sign or warning on stop approach.	$500	Vehicle pulled from side road.
88-848	Laurel	KY 30	$100,000	Fatal accident at intersection. Proper warnings not provided.	0	Intersection of KY 30 and KY 490. Pavement markings, signing, and intersection beacon inadequate.
88-872	Ballard	US 60	$100,000	Struck grader blades which were holding a retaining structure upright.	$5,000	Caused tire to blow out.
88-916	Meade	KY 79	$200,000	Shoulder drop off caused driver to lose control.	$74,000	Ran off right side of road in curve. Four-inch drop off. Slid into another vehicle.
88-917	Perry	KY 28	$250,000	Lost control on oil and went over embankment not protected by guardrail.	pending	Oil on road as result of recent road work.
88-973	Grayson	Market Street	$50,000	No stop sign at intersection causing accident.	$500	Intersection of Market Street and S. Main Street in Leitchfield.
88-974	Boyd	Boy Scout Road	$50,000	Property damage due to flooding.	$12,500	DOH cleaning and replacing drain and tiles under roadway.
88-1017	Muhlenberg	KY 189B	$50,000	Intersection accident. During construction there was inadequate traffic control.	0	Intersection of KY 189 Bypass and KY 70. Driver did not see stop sign or signal.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
88-1052	Anderson	KY 513	$100,000	Fatal injury due to lack of guardrail or adequate warning signs.	0	Claim not filed within one year of accident.
88-1118	Metcalfe	KY 70	$100,000	Accident due to branches covering stop sign.	$100,000	Intersection with KY 1243. Stop sign became visible at 33 feet. Stop ahead sign installed at time of accident.
88-1119	Metcalfe	KY 70	$100,000	Refer to 88-1118.	$60,000	
88-1120	Laurel	KY 30	$85,000	Fatal accident at intersection. Proper traffic control not provided.	$73,394	Intersection of KY 30 and KY 490. Traffic control problems related to signing, pavement marking, and beacon.
88-1121	Pike	US 23	$100,000	Injury accident when hit tree which had fallen into road.	$50,000	Tree had been fire damaged and had been leaning toward the road.
88-1125	Barren	US 68	$100,000	Pavement became dangerous when wet. No warning provided.	0	
88-1226	Montgomery	US 460	$200,000	Intersection accident where the claim involves a problem with the traffic signal. Both drivers claimed to have a green signal.	$21,000	Intersection of US 460 and KY 1686.
88-1227	Meade	KY 79	$100,000	Refer to 88-916.	$15,000	
88-1228	Meade	KY 79	$50,000	Refer to 88-916.	$15,000	
88-1229	Meade	KY 79	$100,000	Refer to 88-916.	$15,000	
88-1231	Barren	US 68	$100,000	Refer to 88-1125.	0	
88-1257	Carter	KY 207	$100,000	Vehicle slid on mud on road and hit another vehicle.	$750	
88-1259	Jefferson	I71	$100,000	Fatal accident involving lack of warning devices at a work zone.	0	Three DOH employees were struck. Sustained fatal injuries.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
88-1297	Kenton	Fowler Creek Road	$100,000	Accident resulted when vehicle hit an irregular spot in the pavement causing loss of control.	0	Did not warn of condition.
88-1299	Bell	KY 92	$250,000	Fatal accident when tree fell from embankment onto vehicle.	$1,000	Accident diagram indicates tree not on right-of-way.
89-20	Franklin	DNA	$100,000	Injured using a guardrail straightening machine.	0	Inmate at Frankfort Career Development Center working for DOH. Case appealed.
89-35	Martin	KY 292	$100,000	Vehicle ran off road after hitting pothole.	$500	
89-46	Leslie	D.B. Pkwy.	$100,000	Vehicle lost control after hitting carcass of dead dog.	0	
89-47	Hardin	US 421	$250,000	Injury accident when lost control due to ice on road.	$1,750	DOH called earlier in day to remove debris from ditch.
89-73	Kenton	I 75	$100,000	Accident in construction area related to DOH supervision of traffic control.	0	
89-75	Breckinridge	KY 2202	$100,000	Lost control after hitting hole in road.	$4,750	
89-160	Pike	KY 610	$250,000	Injury accident when landslide hit vehicle.	$33,225	Stated that landslides had occurred before, so DOH aware of problem.
89-190	Pendleton	US 27	$100,000	Fatal accident due to ice on bridge. No warning given.	0	Head-on collison.
89-191	Pendleton	US 27	$100,000	Refer to 89-190.	0	
89-192	Letcher	KY 1103	$100,000	Vehicle ran into an unmarked and unprotected ditch.	0	DOT noted that private company was responsible for alterations of ditch.
89-309	Hardin	I 65	$250,000	Injury accident when vehicle overturned as a result of shoulder drop off.	pending	Road had been repaved.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
89-310	Woodford	US 60	$100,000	Fatal accident involving water pooling.	$100,000	Head-on collision.
89-339	Breckinridge	KY 261	$100,000	Fatal accident where vehicle lost control and overturned due to defective shoulder.	$50,000	
89-340	Breckinridge	KY 261	$100,000	Refer to 89-339.	$50,000	
89-362	Bell	US 119	$100,000	Injury accident related to landslide.	$3,825	Rocks fell on vehicle causing loss of control.
89-372	Johnson	KY 40	$102,000	Rock fell on vehicle from rock cut. DOH stopped vehicles with no detour marked.	pending	Vehicles stopped to cut brush.
89-408	Hardin	Pleasant Hill Rd.	$200,000	Vehicle lost control in curve due to lack of warning signs and pavement markings.	0	DOH noted that road was not state maintained.
89-409	Harlan	US 421	$100,000	Truck lost control on steep grade due to no warning signs.	0	DOH noted required signs in place.
89-440	Boyd	US 60	$50,000	Opposing left turn accident related to defective design of traffic signal.	pending	
89-441	Boyd	US 60	$100,000	Refer to 89-440.	pending	
89-442	Boyd	US 60	$100,000	Refer to 89-440.	pending	
89-462	Madison	KY 1617	$100,000	Injury motorcycle accident involving failure to provide adequate warning signs.	pending	
89-475	Jefferson	US31W	$100,000	Fatal accident when guardrail punctured vehicle.	$45,000	Guardrail in unrepaired condition from previous accident.
89-499	Martin	KY 908	$100,000	Portion of road caved in causing vehicle to run off the road.	0	
89-501	Metcalfe	KY 1243	$59,427	Accident at intersection due to grass and trees obscuring view.	$3,100	Intersection with KY 70.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
89-541	Pike	KY 122	$250,000	Fatal accident where vehicle lost control on wet road and slid into junk vehicle next to road (8.5 feet from road).	0	DOT had notified owner of junkyard to move vehicles beside road.
89-657	Laurel	KY 1223	$100,000	No traffic control device was installed at the intersection.	0	Intersection of KY 1223 and Clark Road.
89-689	Carlisle	US62	$115,000	Fatal accident involving shoulder drop off with no warning provided.	$60,000	Shoulder drop off related to resurfacing.
89-771	Spencer	KY 55	$100,000	Accident involving state truck making U-turn.	0	Truck gave no signal.
89-836	Taylor	KY 658	$100,000	Lost control after tires dropped off excessive shoulder drop off.	0	Resulted in head-on collision.
89-837	Magoffin	KY 402	$100,000	Guardrail too low allowing vehicle to vault over guardrail.	$35,000	
89-889	Caldwell	KY 2066	$100,000	Problem with warning at boat dock.	0	Alcohol involved (BAC of 0.27).
89-912	Green	US68	$100,000	Accident at curve where vehicle ran into rock embankment. Issues are lack of guardrail, shoulder, and warning sign.	$65,000	Unsafe speed listed as contributing factor.
89-913	Green	US 68	$100,000	Refer to 89-912.	0	
89-914	Green	US68	$100,000	Refer to 89-912.	0	
89-924	Carter	US 60	$100,000	Car hit bump on bridge and lost control.	0	Driver drag racing and charged with DUI.
89-936	Bullitt	KY 61	$100,000	Lack of warning and advisory speed at curve.	pending	Vehicle being chased by police. DOH noted 15 mph speed advisory present.
89-948	Meade	KY 1638	$100,000	Vehicle hit utility pole. Lack of guardrail and narrow shoulder.	0	Ran off road over steep embankment to avoid rear end collision.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
89-949	Boyd	US 23	$100,000	Opposing left-turn accident. Lack of proper traffic control and sight distance.	$45,000	Intersection of US 60 and 29th Street in Ashland.
89-953	Floyd	Unk.	$60,000	House flooded after highway altered drainage.	$1,500	
89-958	McCracken	US 60	$100,000	Vehicle lost control due to water pooling.	0	At Island Creek Bridge.
89-964	Logan	US 68	$100,000	Fatal accident involving DOH vehicle which had defective brakes.	0	Head-on collision.
89-972	McCracken	US 60	$100,000	Refer to 89-958.	0	
89-1005	Muhlenburg	Holt Rd.	$100,000	Accident at intersection due to missing stop sign.	0	Intersection of Holt Road and Railroad Avenue in Cleaton. DOH states intersection under control of county.
89-1006	Muhlenburg	Holt Rd.	$100,000	Refer to 89-1005.	0	
89-1010	Grayson	KY 79	$100,000	No flagman to warn of state truck stopped in road for road maintenance.	$50,000	Truck stopped in a curve on a hillcrest.
89-1058	Webster	KY 109	$100,000	Fatal accident involving shoulder drop off.	0	Opposite direction collision.
89-1091	Boyle	US 68	$100,000	Improper guardrail and inadequate shoulder and signing. Injury accident.	0	Vehicle hit guardrail and overturned.
89-1163	Johnson	US23	$100,000	Driver lost control when struck pothole filled with water. Fatal accident.	$10,000	
89-1209	Carlisle	US 62	$100,000	Refer to 89-689.	$7,000	
90-8	Lawrence	KY 2565	$100,000	Poorly placed stop sign and lack of warning sign resulted in vehicle running stop sign.	$5,000	Intersection with US 23.
90-38	Carlisle	US 62	$50,000	Refer to 89-689.	$36,000	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
90-39	Harlan	Brittains Creek Rd.	$100,000	Rode bicycle off bridge due to lack of guardrail.	0	
90-41	Letcher	KY 15	$100,000	Lost control when hydroplaned.	$7,000	
90-43	Daviess	US 231	$200,000	Hit bridge abutment. Inadequate guardrail.	0	
90-49	Jefferson	US60	$100,000	Pedestrian fell (no sidewalk).	pending	
90-83	Muhlenberg	W.K. Pkwy.	$100,000	Ran into rear of state vehicle stopped in roadway with no advance warning.	0	
90-110	Morgan	KY 437	$100,000	Lost control on mud in road. No warning.	$12,000	Mud from where state working on hill.
90-111	Campbell	KY 1121	$100,000	Lost control when ran onto ice on road.	0	
90-180	McCracken	Unknown	$51,890	Lost control when hit manhole cover and hit tree.	pending	
90-183	Boone	KY 338	$100,000	Hit utility pole located too close to roadway.	0	Pole not on state right-of-way.
90-184	Kenton	KY 16	$100,000	Inadequate warning at sharp curve.	0	No reduced speed or flashing lights.
90-185	Kenton	KY 16	$100,000	Refer to 90-184.	0	
90-201	Hancock	KY 144	$100,000	Stop sign missing (had been stolen).	$5,000	Intersection with KY 69.
90-220	Christian	KY 107	$100,000	Lost control when hydroplaned.	0	
90-222	Livingston	KY 453	$250,000	Accident due to missing stop sign.	0	
90-240	Breathitt	KY 1933	$100,000	Drove into section of road which broke away as vehicle drove across.	$3,500	Dirt under road had been washed away.
90-245	Letcher	US 119	$100,000	Head-on accident on three lane section of road. Lack of sufficient passing lane and visibility.	0	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
90-296	Marshall	US 68	$100,000	Crossed median into opposing lane because median inadequate (too low).	0	Intersection with US 641.
90-424	Harlan	KY413	$100,000	Driver which caused accident should not have been issued a permit because of mental disability.	0	
90-494	Carter	KY 1947	$100,000	Stop sign had been knocked down.	0	Intersection with KY 1959.
90-532	Harlan	KY413	$100,000	Refer to 90-424.	0	
90-553	Fulton	KY 116	$100,000	Pedestrian hit by vehicle. Did not maintain right-of-way and no roadway lighting.	0	
90-558	Laurel	KY 192	$100,000	Inadequate signing on stop approach.	0	Stop sign in place.
90-577	Perry	KY 15	$100,000	Vehicle ran into rock slide.	$25,000	
90-578	Pike	US 460	$100,000	Swerved to avoid tree in road and ran off road.	pending	Tree had been leaning toward road.
90-581	Bath	KY 1602	$100,000	Inadequate signing on stop approach. Lack of guardrail across from intersection.	$15,000	No stop bar or stop ahead sign. Intersection with KY 1325.
90-582	Powell	KY402	$100,000	Loss of control due to water pooling.	$20,000	
90-629	Martin	KY 1714	$100,000	Lost control due to ice on road.	0	Water from broken water line.
90-630	Pulaski	US 27	$90,000	State vehicle ran into rear of vehicle.	$750	
90-640	Johnson	US 23	$50,000	Refer to 89-1163.	$17,500	
90-641	Hardin	KY 1600	$100,000	Accident at intersection. View obstructed and change interval too short.	0	Intersection with King Road.
90-654	Kenton	KY 1486	$100,000	Accident in work area where state in process of placing warning signs.	$5,500	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
90-665	Taylor	KY 76	$100,000	No warning in advance of stop sign.	pending	Intersection with KY 70.
90-666	Taylor	KY 76	$100,000	Refer to 90-665.	pending	
90-669	Carter	US 60	$100,000	Lost control due to shoulder drop off.	0	
90-703	Bourbon	US 27	$100,000	Lost control due to shoulder drop off.	$37,500	
90-704	Pike	US 460	$70,000	Hydroplaned and crossed into opposing lane.	$45,735	Poor drainage.
90-705	Pike	US 460	$60,000	Refer to 90-704.	$18,576	
90-706	Pike	US 460	$60,000	Refer to 90-704.	0	
90-707	Pike	US 460	$60,000	Refer to 90-704.	0	
90-708	Metcalfe	US68	$100,000	Lost control in curve due to lack of warning. Ran into creek due to lack of guardrail.	0	
90-750	Leslie	US 421	$100,000	Business flooded due to road construction.	0	
90-794	Rowan	Bluebank Rd.	$100,000	Tractor overturned when ran onto defective shoulder. No warning and no guardrail.	0	
90-816	Mercer	US 68	$100,000	Lost control due to shoulder drop off.	$3,000	
90-841	Lawrence	KY 1690	$50,000	State vehicle made illegal turn.	0	
90-892	Jefferson	I 65	$200,000	Truck lost control in curve and hit median barrier throwing load onto opposing lane.	0	
90-915	Woodford	KY 33	$100,000	Ran off road in curve due to inadequate warning and lost control due to shoulder drop off.	$60,000	Inadequate superelevation in curve.
90-936	Harlan	US421	$100,000	Lost control on ice.	0	Ice formed near ditch.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
90-948	Kenton	I 75	$100,000	Pedestrian hit while walking on bridge. No pedestrian walkway provided.	0	
90-949	Kenton	I 75	$100,000	Refer to 90-948.	0	
90-988	Hopkins	KY 1034	$100,000	No warning signs or lighting at intersection.	0	Intersection with Bean Cem. Road.
90-1100	Lawrence	US 23	$100,000	Refer to 89-1163.	$7,500	
90-1121	Hardin	I 65	$150,000	Defective shoulders caused vehicle to lose control.	pending	
90-1298	Knott	KY 80	$100,000	Lost control on icy road.	$500	Hit boulder partially on shoulder.
90-1311	Oldham	KY 329	$240,000	Truck lost control due to shoulder drop off.	0	Accident involved school bus.
90-1313	Madison	I 75	$100,000	Improper paving of roadway caused accident.	pending	
90-1376	Hardin	US 31W	$100,000	Inadequate traffic signs and markings resulted in vehicle crossing into opposing lane.	pending	During heavy rain.
90-1406	Hardin	US 31W	$250,000	Lost control due to snow and ice on road.	0	
90-1438	Pike	KY 194	$100,000	Lost control due to ice on road.	$8,500	Ditch had overflowed.
90-1451	Hardin	US 31W	$150,000	Refer to 90-1376.	pending	
91-83	Letcher	US 23	$100,000	Improper design and marking of intersection resulted in turning left from straight lane.	0	Intersection with KY 114.
91-104	Green	KY 61	$100,000	Newly paved road had no pavement marking.	$33,333	Vehicle crossed into opposing lane.
91-145	Hardin	US 31W	$100,000	Lost control in curve due to lack of warning sign.	$20,000	
91-229	Hardin	KY 1882	$250,000	Accident resulted because of flooded roadway.	0	No warning signs or barricades.
91-263	Henderson	KY 136	$100,000	Improper design of intersection resulted in vehicle crossing into opposing lane.	0	Speeding and alcohol involved.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
91-288	Caldwell	W.K. Pkwy.	$250,000	Lost control when ran over trash bag left in road. Overturned because of defective design of median.	0	
91-395	Muhlenberg	KY 70	$150,000	Lost control due to shoulder drop off and ran down embankment because of lack of guardrail.	$5,000	
91-445	Bath	US 60	$200,000	Lost control due to shoulder drop off.	pending	
91-451	McLean	US 431	$200,000	Water pooling caused loss of control.	0	Claim for collateral damages.
91-459	Laurel	KY 3430	$100,000	Lost control on gravel in curve.	$50,000	
91-481	Woodford	Clifton Rd.	$100,000	Lost control due to shoulder drop off on newly resurfaced road. No guardrail on bridge.	0	Road resurfaced day of accident. No warning signs.
91-500	Muhlenberg	KY 70	$100,000	Refer to 91-395.	$1,000	
91-542	Hopkins	KY 1069	$100,000	Accident with state vehicle.	pending	Intersection with KY 1751.
91-547	Kenton	I 75	$150,000	Refer to 87-621.	0	
91-579	Meade	KY 259	$50,000	Accident caused by no stop sign.	0	Stop sign had been removed.
91-591	Lawrence	US23	$100,000	Lost control on wet road.	$12,000	Rutting caused water accumulation
91-617	Laurel	KY 3430	$100,000	Refer to 91-459.	0	
91-641	Boyd	KY 5	$100,000	Mower made illegal U-turn.	$25,000	
91-644	Union	KY 56	$250,000	Lost control due to shoulder drop off.	$500	
91-675	Lincoln	US27	$100,000	Stop sign missing and weeds obstructed view.	$1,000	No junction sign.
91-684	Knox	US 25E	$100,000	Allowed vehicles to park near intersection which limited visibility.	0	No warning signs.
91-700	Martin	KY 292	$100,000	Lost control of vehicle due to debris in roadway.	0	Coal on roadway.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
91-706	Hardin	US 31W	$100,000	Hydroplaned and lost control and hit concrete barrier.	0	Improper drainage.
91-707	Nelson	US 31E	$210,000	Hydroplaned and lost control.	pending	
91-730	Leslie	KY80	$100,000	Vehicle went over embankment due to lack of guardrail.	0	Guardrail had been removed.
91-760	Clark	Colby Rd.	$100,000	Lost control due to improper shoulders.	$1,500	
91-763	Floyd	KY 1428	$100,000	Hit unmarked culvert when pulled onto shoulder.	0	Weeds concealed culvert.
91-764	Floyd	KY 1428	$100,000	Refer to 91-763.	0	
91-771	Montgomery	KY 686	$100,000	Inadequate signing on stop approach.	0	Intersection with KY 713.
91-833	Hardin	KY 144	$100,000	Construction caused water damage to property.	0	
91-849	Knott	KY 582	$100,000	Inadequate warning of stop condition.	0	Intersection with KY 160.
91-850	Pike	KY 194	$100,000	Water pooling caused vehicle to lose control.	$3,949	Poor drainage.
91-858	Calloway	Fourth St.	$100,000	Pedestrian stepped in hole where pole had been removed.	0	
91-859	Montgomery	US 60	$100,000	Inadequate warning of stop approach. Caution light not working.	$6,100	Intersection with KY 686. Vehicle disregarded stop sign.
91-988	McCreary	US27	$101,500	Defective shoulder caused loss of control of vehicle.	pending	
91-994	Montgomery	US 60	$100,000	Refer to 91-859.	$6,100	
91-1027	Montgomery	US 60	$100,000	Improper traffic control at stop approach.	$10,000	Intersection with KY 686.
91-1030	Jefferson	US 31W	$100,000	Hydroplaned and lost control of vehicle.	$2,000	Design of road allows water pooling.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
91-1056	Kenton	KY 16	$100,000	Lost control due to water pooling and hit utility pole because of inadequate guardrail.	$20,000	Break in pavement not signed.
91-1083	Floyd	US 23	$101,500	Rocks fell from hill and hit vehicle.	$1,000	No warning sign.
91-1110	Montgomery	US 60	$50,000	Refer to 91-859.	$6,100	
91-1151	Hopkins	KY 85	$50,000	Inadequate guardrail allowed vehicle to run off embankment into river.	$2,668	
91-1152	Hopkins	KY 85	$50,000	Refer to 91-1151.	$1,333	
91-1163	Hopkins	KY 85	$100,000	Refer to 91-1151.	$5,333	
91-1164	Hopkins	KY 85	$50,000	Refer to 91-1151.	$2,668	
91-1186	Nelson	KY 46	$100,000	No stop sign or warning at stop approach.	0	Intersection with Clarktown Road.
91-1305	Bell	KY 987	$100,000	Lost control on ice on roadway.	0	
91-1369	Lawrence	KY 644	$100,000	Vehicle ran off road in curve and over embankment. Noted lack of curve warning signs and no guardrail.	0	
91-1370	Lawrence	KY 644	$100,000	Refer to 91-1369.	0	
91-1407	Letcher	KY 1103	$100,000	Vehicle ran off road due to drainage problem.	0	Related to construction of ditch.
92-0037	Butler	US 231	$200,000	Driver lost control on ice-covered bridge and vehicle traveled down steep embankment.	0	Lack of guardrail is issue.
92-0145	Greenup	US 23	$100,000	Boulder from rockslide fell on car causing injury.	$500	
92-0184	Henry	KY 55	$50,000	Rear-ended by state vehicle.	pending	Driver of state vehicle was intoxicated.
92-0290	Floyd	US 23	$240,000	Claimant was hit while crossing street from parking lot to state owned facility.	0	No crosswalk or traffic light for pedestrians.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
92-0292	Martin	KY 292	$100,000	Claimant walking along road that broke apart.	0	
92-0311	Leslie	DB Pkwy	$100,000	Defendant was killed by intoxicated driver. on Daniel Boone Parkway.	0	Toll booth operator allowed drunk driver access to toll road.
92-0315	Harlan	KY 38	$100,000	Debris from previous accident caused another.	pending	
92-0333	Fayette	KY 1974	$100,000	Poorly designed intersection and traffic control devices caused accident.	0	Intersection with KY 4.
92-0338	Bath	US 60	$100,000	Head on collision in curve. Issue related to signing.	$20,000	
92-0339	Bath	US60	$100,000	Refer to 92-0338	$20,000	
92-0385	Rowan	KY 519	$100,000	Rockslide occurred causing accident and injury.	$1,250	Road construction caused slide.
92-0386	Rowan	KY 519	$100,000	Refer to 92-0385	$1,250	
92-0419	Whitley	KY 204	$100,000	Vehicle left roadway and struck wood piling.	pending	Wood piling was state erected and maintained.
92-0437	Lewis	KY 10	$64,968	Rear tires of vehicle dropped off side of road causing accident.	$21,247	
92-0466	Jefferson	US 31	$100,000	Claimant made left turn and was hit by another vehicle.	pending	Opinion that left turns should be protected.
92-0486	Garrard	Old Sugar Creek Rd.	$100,000	Roadway collapsed forcing vehicle down steep embankment.	pending	
92-0504	Leslie	KY 118	$100,000	Road collapsed under vehicle causing accident.	0	Driver was charged with DUI.
92-0520	Fayette	KY 922	$100,000	Improper warning and signing in sharp curve where accident occurred.	pending	
92-0531	Fayette	KY 922	$100,000	Inadequate warning sings at curve	pending	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
92-0575	Scott	KY 32	$100,000	Resurfacing caused loss of control.	pending	Ran off road and hit tree.
92-0587	Fayette	KY 1927	$100,000	Claimant ran through stop sign hidden by foliage and hit a tree.	0	
92-0596	Christian	US 41	$100,000	Claimant's arm was hit by debris thrown from mower.	0	
92-0613	Grayson	US 62	$100,000	Accident due to poor visibility and poor design of roadway.	0	
92-0639	Madison	KY 1974	$65,000	Water flooded claimant's home due to inadequate culvert size.	0	
92-0673	Logan	US 68	$100,000	Narrow lanes, improper embankment, and speed limits caused accident.	0	
92-0745	Lawrence	US 23	$100,000	Traffic light malfunctioned causing collision.	0	Intersection with KY 3.
92-0786	Barren	KY 90	$100,000	No warning signs at curve caused loss of control and no guardrail protection.	0	
92-0787	Graves	KY 408	$100,000	Claimant hit by state dump truck.	pending	
92-0798	Hopkins	KY 502	$100,000	Defendant drove into flooded road and drowned.	$22,500	No warning signs of flooded road.
92-0840	Boone	Turkey Foot Road	$100,000	Traffic signal malfunctioned causing collision.	$750	Intersection with Dudley Road.
92-0854	Leslie	KY 1807	$50,000	Hill side below KY 1807 keeps falling into claimant's driveway.	pending	
92-0867	Hardin	KY 3005	$75,000	Vehicle was hit by railroad maintenance vehicle due to high weeds and poor visibility.	pending	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
92-0868	Hardin	KY 3005	$75,000	Refer to claim 92-0867.	pending	
92-0869	Hardin	KY 3005	$50,000	Refer to claim 92-0867.	pending	
92-0950	Hardin	KY 3005	$50,000	Refer to claim 92-0867.	pending	
92-1042	Fayette	KY 922	$100,000	A 7-8 inch drop off to shoulder caused accident.	0	No warning signs of drop off.
92-1051	Garves	KY 94	$100,000	State truck hit claimant's vehicle..	0	
92-1065	Harlan	US 421	$100,000	Milling from road was placed on shoulder causing fatal accident.	$50,000	Lost control due to debris on road.
92-1087	Hardin	KY 86	$100,000	Hit by train at railroad crossing.	pending	Sign blocked view of warning signal.
92-1125	Grayson	US 62	$100,000	Refer to 92-0613.	0	
92-1163	Fayette	Unknown	$100,000	Hit in eye by debris while installing guardrail.	0	Inmate work detail from LFUCG.
92-1212	Carter	KY 1122	$150,000	Ran off road and hit tree. No guardrail.	0	
92-1213	Hopkins	KY 112	$200,000	Water pooling in ruts left by coal trucks caused hydroplaning.	0	
93-63	Hart	US 31 W	$100,000	Defendant's tractor overturned at a culvert partially hidden by weeds.	pending	No object marker.
93-92	Allen	DNA	$100,000	Fell through drainage grate in state parking lot.	pending	Poor lighting contributed.
93-93	Allen	DNA	$100,000	Refer to 93-0092.	pending	
93-193	Morgan	KY 519	$100,000	Accident caused by break in pavement.	pending	
93-262	McCracken	Eich Road	$100,000	State driver rear-ended claimant's vehicle.	$700	
93-295	Greenup	US 23	$100,000	Water pooled in roadway causing hydroplaning and accident.	0	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
93-316	Clinton	KY 696	$100,000	Bridge repair caused accident and injury.	pending	No warning signs.
93-317	Metcalfe	Unknown	$100,000	Hit dip in curve and lost control of vehicle.	0	
93-322	Knott	KY 696	$50,000	Pooling water froze on roadway causing accident.	0	
93-323	Knott	KY 696	$50,000	Refer to 93-0322.	0	
93-378	Magoffin	KY 1081	$50,000	Hit head on by vehicle while crossing bridge.	0	Poor design of bridge and approaches. Bump at end of bridge caused loss of control.
93-379	Magoffin	KY 1081	$50,000	Refer to 93-0378.	0	
93-380	Magoffin	KY 1081	$50,000	Refer to 93-0378.	0	
93-382	Magoffin	KY 1081	$50,000	Refer to 93-0378.	0	
93-383	Magoffin	KY 1081	$50,000	Refer to 93-0378.	0	
93-432	Boone	KY 1017	$100,000	Hit head on by state truck.	$5,500	State employee was charged with DUI.
93-479	Franklin	I-64	$100,000	Claimant (on motorcycle) hit deer.	pending	No "Deer Crossing" signs.
93-520	Rowan	I-64	$100,000	Hillside slid onto claimants vehicle causing accident and injury.	0	
93-530	Lincoln	DNA	$100,000	Construction of temporary road and inadequately sized culverts flooded claimants property.	0	
93-531	McLean	KY 798	$100,000	Claimant standing on a concrete culvert which fell.	0	
93-547	Harlan	KY 221	$100,000	Claimant was working on contract with state and the truck he was working in hit high voltage power lines causing injury.	pending	
93-592	Meade	KY 144	$100,000	Claimants vehicle hydroplaned causing accident.	pending	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
93-661	Breckinridge	KY 333	$100,000	Claimants vehicle was hit head on by another.	0	Poor superelevation of curve.
93-677	Letcher	KY 7	$100,000	Decedent killed at unsignalized R/R crossing.	0	
93-679	Meade	KY 144	$100,000	Refer to 93-0592.	pending	
93-683	Graves	KY 564	$100,000	Pooling of water caused accident.	pending	
93-699	Carter	US 60	$100,000	Tractor overturned in culvert hidden by weeds.	pending	
93-710	Adair	Unknown	$100,000	Motorcycle lost control due to debris on road.	0	
93-822	Bell	Ky 190	$75,000	Removal of embankment caused landslide onto claimant's home.	pending	
93-827	Pulaski	Clifty Road	$100,000	Claimant wrecked due to vehicle turning into a blind entrance in a curve.	pending	
93-849	Floyd	US23	$100,000	Claimant hit guardrail under construction and in roadway.	pending	No lighting or construction signs.
93-850	Floyd	US 23	$100,000	Refer to 93-0849	pending	
93-876	Perry	KY 1165	$102,000	Improper drainage of roadway flooded claimant's property and home.	$7,500	
93-891	Crittenden	KY 1020	$50,000	Accident due to improper shoulder maintenance and curve superelevation.	$3,000	
93-892	Crittenden	KY 1020	$50,000	Refer to 93-0891.	$3,000	
93-893	Crittenden	KY 1020	$50,000	Refer to 93-0891.	$3,000	
93-894	Crittenden	KY 1020	$50,000	Refer to 93-0891.	$3,000	
93-895	Crittenden	KY 1020	$50,000	Refer to 93-0891.	$3,000	
93-911	Garrard	KY34	$94,375	Improperly signalized intersection.	pending	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
93-918	Knott	KY 80	$100,000	Improperly designed intersection caused. collision.	pending	Intersection with KY 160.
93-919	Knott	KY 80	$100,000	Refer to 93-0918.	pending	
93-954	Magoffin	US 460	$100,000	Decedent left road in a curve and there was no guardrail protection.	0	
93-974	Greenup	KY 1	$100,000	Vehicle hydroplaned and lost control in curve and lost control.	$17,500	
93-975	Greenup	KY 1	$50,000	Refer to 93-0974.	$17,500	
93-976	Greenup	KY 1	$50,000	Refer to 93-0974.	$17,500	
93-977	Greenup	KY 1	$50,000	Refer to 93-0974.	$17,500	
93-978	Rowan	KY 810	$100,000	Claimant was welder on bridge and fell.	$27,500	Injured when fell 30 feet.
93-1080	Boyd	US 23	$100,000	Rear ended coal truck on shoulder (no signs).	0	Driver taking tarp off. No lighting.
94-70	Carter	KY 1704	$100,000	Rockslide caused fatal accident.	0	
94-71	Floyd	US 23	$100,000	Poor lighting at intersection caused accident.	pending	Intersection with KY 1428.
94-72	Floyd	US 23	$100,000	Refer to 94-0071.	pending	
94-110	Muhlenberg	WK Pkwy	$100,000	Vehicle left roadway and hit abutment.	$41,397	No guardrail or rumble strips.
94-125	Franklin	US 60	$100,000	Decedent was hit by oncoming vehicle. Should not have been passing zone.	pending	Improper speed limit of 55 mph.
94-161	Monroe	KY 1366	$100,000	Decedent hit ice and slid into bridge abutment.	$40,000	No guardrails.
94-182	Greenup	KY 2	$100,000	Claimant hit slush on road and rolled down hill.	$1,750	No guardrails.
94-195	Pike	KY 122	$100,000	Rockslide fell on claimant's truck.	$4,000	
94-256	Morgan	KY 172	$100,000	Break in pavement caused accident.	$3,000	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
94-280	Scott	LeMars Mill	$100,000	Pooling water caused accident.	pending	
94-281	Daviess	KY 56	$100,000	Cement truck overturned in curve.	0	No signing or guardrails.
94-327	Boyle	US 127	$100,000	Road construction at intersection caused accident.	0	No signing.
94-333	Gallatin	US42	$80,000	No signing at construction site caused accident.	pending	Paving project.
94-334	Gallatin	US42	$80,000	Refer to 94-0333.	pending	
94-335	Gallatin	US42	$80,000	Refer to 94-0333.	pending	
94-336	Gallatin	US 42	$80,000	Refer to 94-0333.	pending	
94-338	Gallatin	US 42	$80,000	Refer to 94-0333.	pending	
94-348	Russell	US 127	$100,000	Lost control on wet road in sharp curve.	pending	Vehicle went through guardrail.
94-359	Meade	US 60	$100,000	Stop sign missing at intersection. Darkness and fog limited visibility.	0	Intersection with Stringtown Road.
94-439	Gallatin	US42	$100,000	Refer to 94-0338.	pending	
94-441	Perry	KY 550	$100,000	Pooling water caused accident.	$10,000	
94-468	Fayette	US 27	$100,000	Pedestrian hit at signalized intersection. Walk signal would not activate.	0	Intersection with Lowery Lane.
94-480	Scott	KY 1962	$100,000	Pooling water caused loss of control.	$32,500	
94-494	Letcher	KY 805	$100,000	Debris on roadway caused loss of control.	pending	
94-497	Owen	KY 227	$100,000	Poor traffic control devices caused accident.	$200	No stop signs or lighting.
94-524	Johnson	US 23	$100,000	Lack of guardrail.	0	Vehicle went over embankment
94-550	Fayette	Man-o-War	$100,000	Accident due to design and operation of traffic signal.	pending	Intersection with Clays Mill Road.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
94-594	Bath	KY 36	$50,000	Poorly designed culvert, no guardrail or warning signs.	pending	Headwall 14 inches off pavement
94-595	Bath	KY 36	$50,000	Refer to 94-0594.	pending	
94-596	Bath	KY 36	$50,000	Refer to 94-0594.	pending	
94-675	Bath	KY 36	$50,000	Refer to 94-0594.	pending	
94-676	Bath	KY 36	$50,000	Refer to 94-0594.	pending	
94-713	Letcher	Unknown	$100,000	Claimant was sprayed with weed killer after told to pull behind spray truck.	pending	Spray entered car causing lung damage to claimant.
94-764	Carroll	KY 36	$75,000	Driver of vehicle lost control and hit utility pole.	pending	Resurfacing caused loss of control.
94-765	Carroll	KY 36	$75,000	Refer to 94-0764.	pending	
94-786	Carroll	KY 36	$100,000	Refer to 94-0764.	pending	
94-787	Washington	BG Pkwy.	$100,000	Lost control on ice.	pending	Hit abandoned car on shoulder.
94-792	Pulaski	US27	$100,000	Decedent on work detail from Corrections suffered heat stroke.	pending	
94-910	Franklin	US 127	$100,000	Accident in curve due to gravel in roadway.	pending	
94-911	Franklin	US 127	$100,000	Refer to 94-0910.	pending	
94-946	Harrison	KY 353	$100,000	Accident in construction zone.	pending	No signs.
94-987	Harlan	KY 221	$250,000	Shoulder drop off after resurfacing.	pending	No signs (1.5 inch offset).
94-1009	Breathitt	KY 1111	$100,000	Lost control due to improper shoulder.	0	No guardrail protection.
94-1010	Jefferson	KY 22	$100,000	Decedent hit tree too close to roadway.	0	
94-1012	Caldwell	Simms Road	$200,000	Vehicle hit tree too close to roadway.	0	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
94-1020	Franklin	US 127	$100,000	Improper signs and markings at intersection.	0	Intersection with KY 898.
94-1021	Clay	US 421	$100,000	Ice on roadway caused loss of control.	$5,000	Improper drainage.
94-1028	McCracken	Broad Street	$100,000	Accident at intersection due to no traffic signal.	0	At Wal Mart.
94-1052	Fayette	KY 956	$250,000	Claimant slid through curve and hit telephone pole. No warning sign.	0	
94-1060	Rowan	KY 32	$100,000	Road collapsed causing accident.	pending	Poor markings.
94-1062	Lawrence	KY 3	$100,000	Tree lying across road caused accident.	0	
94-1104	Pike	KY 1056	$100,000	Water pooling caused accident.	$4,500	
94-1132	Carter	KY 1	$100,000	Break in pavement caused accident.	$17,500	
94-1142	Lincoln	US 127	$100,000	Improperly marked intersection caused accident in construction zone.	pending	
94-1215	Anderson	B.G. Pkwy	$100,000	Prisoner transported in state vehicle that wrecked.	pending	
94-1237	Washington	B.G. Pkwy	$100,000	Refer to 94-787.	pending	
95-7	Montgomery	I-64	$100,000	Vehicle ran over end of guardrail, ruptured fuel tank.	pending	Vehicle burned.
95-70	Henderson	Pennyrile	$55,000	Vehicle hit end of guardrail which penetrated car.	pending	Blunt guardrail end.
95-71	Henderson	Pennyrile	$55,000	Refer to 95-70.	pending	
95-73	Floyd	KY 194	$100,000	Condition of road.	pending	Defect or object upon hwy.
95-111	Knott	Unknown	$100,000	Improper drainage.	pending	
95-287	Menifee	Unknown	$100,000	Inmate cut by chainsaw while on work detail.	pending	Clearing brush.
95-293	Bell	US 25 E	$100,000	Hit patch of ice.	pending	Culvert filled.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
95-335	Boyle	KY 34	$100,000	Hit guardrail; base and bolts of guardrail deteriorated.	pending	Guardrail inadequate.
95-336	Pike	US 23	$100,000	Tire came off of DOH vehicle and struck another vehicle causing it to hit another.	pending	
95-381	Carter	KY 1	$150,000	Refer to 94-1132.	$17,500	
95-402	Perry	KY 451	$100,000	Failed to install guardrail to protect house.	pending	Pedestrian in yard hit by vehicle.
95-403	Perry	KY 451	$100,000	Refer to 95-402	pending	
95-416	Grayson	KY 1214	$100,000	Lost control of vehicle on wet pavement.	0	No warning signs.
95-451	Grayson	Sunbeam Road	$100,000	Lost control of vehicle after hitting pothole.	0	Not state-maintained road.
95-452	Grayson	Sunbeam Road	$100,000	Refer to 95-451	0	
95-453	Grayson	Sunbeam Road	$50,000	Refer to 95-451	0	
95-493	Perry	KY 7	$100,000	Lost control of vehicle after hitting a pothole.	pending	
95-536	Simpson	KY 1008	$100,000	Stop sign obscured by tree branch.	pending	
95-537	Simpson	KY 1008	$100,000	Refer to 95-536	0	
95-607	Bell	KY 188	$200,000	Vehicle lost control on curve.	pending	No guardrail.
95-641	Hopkins	WK Pkwy	$50,000	Blunt guardrail end treatment penetrated car.	pending	
95-642	Hopkins	WK Pkwy	$50,000	Refer to 95-641	pending	
95-643	Hopkins	WK Pkwy	$50,000	Refer to 95-641	pending	
95-644	Hopkins	WK Pkwy	$50,000	Refer to 95-641	pending	
95-645	Hopkins	WK Pkwy	$50,000	Refer to 95-641	pending	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
95-703	McCracken	US 45	$100,000	Lack of motorcycle warning signs for bridge with steel deck.	pending	
95-717	Pendleton	KY 177	$100,000	Vehicle hit CSX railroad bridge.	pending	No height signs.
95-783	Grayson	US 62	$100,000	Lost control of vehicle in curve.	pending	Ruts in road allowed water pooling.
95-810	Powell	Shipsbranch Rd.	$200,000	Lack of stop sign.	pending	No stop signs, no guardrail.
95-817	Meade	KY 1600	$100,000	View of stop sign obscured. responsible for sign.	0	Intersection with Coleman Road. County
95-818	Meade	KY 1600	$100,000	Refer to 95-817		pending
95-924	Pendleton	KY 17	$100,000	No signing or reduced speed before a curve.	pending	
95-939	Jefferson	I-64	$100,000	Vehicle stopped at construction site.	pending	I 264 interchange
95-949	Jefferson	I 64	$100,000	Refer to 95-939		
95-941	Jefferson	I-64	$50,000	Refer to 95-939	pending	
95-979	Anderson	KY 513	$100,000	Vehicle ran off road and overturned	pending	No guardrail
95-980	Anderson	KY 513	$100.000	Refer to 95-979		
95-999	Leslie	DB Pkwy	$100,000	Assaulted by fellow employee at toll booth.	pending	Failed to supervise workplace.
95-1005	Laurel	KY 1193	$100,000	Pedestrian fell on bridge.	pending	Drain Grate.
95-1020	Campbell	KY 8	$100,000	Improper drainage.	pending	Drainage ditch inadequate.
95-1042	Bell	KY 221	$100,000	Tree fell and hit car.	pending	
96-13	Boyle	KY 52	$100,000	Lost control on ice covered road.	pending	
96-14	Boyle	KY 52	$50,000	Refer to 96-13	pending	
96-15	Boyle	KY 52	$50,000	Refer to 96-13	pending	

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
96-18	Lawrence	US 23	$100,000	Inappropriate warning signs; Improper grade; failure to design overpass.	pending	Intersection with KY 3.
96-20	Bell	US 231	$100,000	Head on collision with state vehicle.	pending	Negligence of defendant.
96-60	Grayson	KY 1214	$100,000	Vehicle ran off road.	0	About MP 12.
96-68	Pike	US 23	$100,000	Rock slide; no warning signs or cones.	pending	About MP 22.
96-83	Pike	Upper Pompey Creek Road	$100,000	Swerved into opposing lane of traffic to avoid break in pavement; went over embankment.	pending	Road should have been repaired.
96-181	Shelby	I-64	$100,000	Driver fell asleep; hit inadequate guardrail.	pending	Vehicle fire.
96-190	Shelby	I-64	$100,000	Refer to 96-181		
96-218	Johnson	KY 40	$100,000	Rock fell from embankment.	pending	Failed to inspect.
96-297	Ohio	KY 54	$250,000	No narrow bridge warning signs.	0	Bridge width 19 feet.
96-314	Fleming	DNA	$100,000	Bleach and battery acid poured down drain; inhaled fumes and later died.	0	
96-315	Fleming	DNA	$100,000	Problems occurred after inhaling fumes.	0	
96-354	Crittenden	US 641	$100,000	Inadequate markings and road signs.	pending	Back of guardrail and shoulder defective.
96-356	Mercer	KY 2168	$100,000	Vehicle crossed intersection and went over embankment and hit a utility pole.	pending	No stop sing at intersection.
96-430	Garrard	KY 34	$100,000	Pulled out in front of vehicle on US 27.	0	Should have been a signal.
96-431	Garrard	KY 34	$100,000	Refer to 96-430	pending	
96-463	Warren	US 68	$100,000	Vehicle hydroplaned on roadway.	pending	Failure to correct known defects in drainage.
96-490	Perry	KY 276	$100,000	Car came around curve and state crew was in road working on ditches.	pending	Should have had flagman.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
96-536	Christian	KY 1682	$250,000	Lack of traffic signal.	pending	Intersection of KY 1682 and KY 91.
96-546	Hopkins	Pennyrile Parkway	$100,000	Lost control due to pothole in road.	pending	
96-626	Mason	KY 8	$100,000	End of guardrail penetrated vehicle.	pending	Improper blunt guardrail end treatment.
96-640	Daviess	Old Lyddane Rd.	$100,000	Ran stop sign; poor signage; trees obscured view..	0	Intersection with KY 81.
96-641	Daviess	Old Lyddance Rd	$100,000	Refer to 96-641	0	
96-642	Daviess	Old Lyddane Rd	$50,000	Refer to 96-641	0	
96-687	Adair	KY 704	$100,000	No curve warning sign.	pending	
96-0716	Hart	I-65	$68,068	Accident at construction zone.	pending	Lane closure, merging into one lane.
96-742	Knox	US 25E	$200,000	Construction zone accident; head on collision where traffic was changed from 4-lane to 2-lane.	pending	Necessary warning signs not in place
96-785	Carroll	KY 467	$100,000	Motorcyclist swerved to avoid opposing vehicle; ran off road and hit culvert.	pending	No warning signs of culvert.
96-816	Allen	US 31E	$200,000	Vehicle ran red light due to improper or non-working traffic signal.	pending	Intersection with KY 101.
96-818	Scott	KY 32	$100,000	Failed to warn of curve.	pending	
96-819	Lyon	KY 293	$100,000	Vehicle failed to stop at stop sign.	0	Improperly maintained intersection warning signs.
96-824	Allen	US 31E	$50,000	Refer to 96-816.	pending	
96-832	Madison	KY 876	$100,000	Vehicle ran off road and hit trees and embankment.	pending	Improper design, guardrail, lack of warning signs, shoulder defect.

TABLE 9-3. DETAILED INFORMATION FOR CLAIMS OF $50,000 OR MORE

CLAIM NUMBER	COUNTY	ROUTE	AMOUNT SOUGHT	REASON FOR CLAIM	AMOUNT PAID	COMMENTS
96-855	Johnson	KY 3388	$100,000	Vehicle ran off road, struck railroad rails driven into embankment either as guardrail or to stop erosion.	pending	Improper placement of hazard.
96-856	Boyle	KY 33	$100,000	Stop sign missing.	pending	Intersection with KY 2168.
96-882	Boyle	US 150	$100,000	Pedestrian hit by vehicle at crosswalk.	0	Pedestrian signal not working.
96-884	Kenton	KY 1092	$100,000	Lost control on wet pavement; struck guardrail.	pending	No warning of hazardous conditions.
96-885	Kenton	KY 1092	$100,000	Refer to 96-884	pending	
96-886	Kenton	KY 1092	$50,000	Refer to 96-884	pending	
96-892	Warren	I-65	$100,000	Ran off road; hit abandoned vehicle on shoulder.	0	Abandoned vehicle stuck in hole; no warning of hole.
96-893	Warren	KY 526	$100,000	Lost control due to shoulder drop off.	pending	
96-974	Jefferson	I-64	$100,000	Lost control due to difference in elevation	pending	Difference in elevation 3-4 inches.
96-981	Floyd	KY 321	$100,000	Lost control due to mud on road.	0	Mud from coal trucks.
96-1064	Warren	US 68	$100,000	Vehicle hit pedestrian.	pending	Inadequate warning signs.
96-1069	Madison	KY 388	$125,786	Road construction.	0	Inadequate traffic controls.

CHAPTER TEN

INTRODUCTION TO ACCIDENT RECONSTRUCTION

INTRODUCTION

Traffic accident reconstruction is the process of using observed data, the laws of physics, an understanding of the mechanical behavior of vehicles and a scientific approach to draw conclusions about how a traffic accident occurred. This chapter has been written to provide a general overview of accident reconstruction. It introduces several of the major topics and provides a few example problems. A complete review of accident reconstruction is not possible in such a limited text, nor can it be taught in such a limited time period. It is possible, however, to provide an overview so that seminar participants can understand how reconstruction might be used to provide crucial evidence in a tort liability trial involving a traffic accident.

Some types of accident reconstruction are very simple. For example, where a vehicle came to rest after leaving clear skid marks on the pavement, the initial speed may be estimated from a knowledge of the pavement friction level and the length of the skid marks. Other types of accident reconstruction are complex. Examples include involvement of tractor-trailer trucks, vehicles undergoing a series of different reactions during a collision, or where the data is incomplete. Where the reconstruction activities are to be complex, a high degree of training may be necessary on the part of the reconstructionist.

Reconstruction usually consists of gathering and interpreting data, applying scientific principles, and drawing conclusions based upon the analysis of the evidence. There are no rules or techniques which must always be followed during the reconstruction. Instead, the investigator chooses from many reconstruction techniques to find those analytical tools that best fit the available evidence and the type of collision.

Performing a reconstruction has often been described as similar to working a crossword puzzle. It is rare that a puzzle can be worked by staring at clue one and answering the clues in succession until the puzzle is completed. Usually, the person working the puzzle solves one clue here, one clue there and another clue in some other place. Every clue that is solved helps in solving the remaining clues. So it is with reconstruction. The more evidence (clues) available, the more the reconstructionist (puzzle solver) knows about the accident (puzzle) and the more likely it becomes that the reconstruction (puzzle) will be successfully completed.

The remainder of this chapter points out the necessity of good data, introduces some reconstruction techniques, and provides several example problems.

TRAFFIC ACCIDENT INVESTIGATION

The majority of the information available to the reconstructionist is taken from the accident site. This may include photographs of the vehicles, or photographs of other physical evidence like skid marks and damage to secondary objects. Measurements of the

final locations of the vehicles; identification of the point of impact; identification, measurement and characterization of skid marks; examination of the vehicles; interviews with drivers and witnesses; and other techniques are used to gather this data.

Rarely does the investigator have complete data. Often the reconstructionist is asked to analyze an accident that is many months old, and the physical data will be gone by then. Skid marks will have disappeared and the vehicles may have been removed from the salvage yard prior to the investigator's examination. Even when the investigator visits the site soon after the accident, the evidence may be incomplete. For example, in some collisions the vehicles leave only partial skid marks. The absence of sufficient data and inaccurate data are normally the biggest difficulties in the reconstruction of an accident.

Frequently, the reconstructionist may have to use several techniques to overcome the lack of data or to verify the accuracy of the data. Once the investigator has gathered all available data and has assessed its accuracy, the reconstruction may begin.

TYPICAL RECONSTRUCTION TECHNIQUES

Many activities qualify as reconstruction techniques. This chapter will briefly introduce some of the prominent reconstruction activities and will describe some of their more common uses. The reader should keep in mind that this is not a complete discussion of reconstruction. It is only an introduction and the reader is advised to consult more complete texts to learn of the strengths and limitations of the techniques and to acquire sufficient knowledge to utilize the techniques.

Crush Distance as a Measure of Vehicle Speed

One of the simplest methods for estimating the speed of a vehicle involved in a collision is to measure the total deformation (crush) experienced by the vehicle. The wider and deeper the crush, the greater the velocity of the collision. More specific conclusions can be drawn about the crush in a specific accident by comparing it to the amount of crush experienced by a similar vehicle of an accident at a known speed. If enough of the accident crushes have been measured, it is possible to prepare a chart of crush distance versus speed. Typical crush-speed charts for front, side and rear impacts are shown in Figure 1.

There are serious limitations to using crush-speed figures. For example, a large, old car has a more substantial frame than a small, new car. The older, stronger car will have less crush deformation than the small car in similar collisions at identical speeds.

A second problem deals with the type and shape of object which has been struck. In a high-speed side collision, a utility pole may make a very deep penetration. A wider object like a brick wall will have a much shallower but wider crush area which may be uniform across the entire side of the car.

There are so many differences in automobile materials, designs and construction methods that it is not realistic to expect that one crush-speed curve can accurately

identify the performance of all vehicles. Perhaps the best use of curves like those shown in Figure 1 is to make quick, preliminary estimates of vehicle speeds from measured crush deformations.

In Alabama, it is virtually impossible to use crush distance as an estimate of vehicle speed in a court of law. Previous court rulings have severely limited the acceptability of crush-speed analyses as evidence.

The general crush-speed relationship has been improved for individual vehicle models. The National Highway Traffic Safety Administration (NHTSA) has conducted controlled crush tests to produce data like that reproduced in Figure 2. The table shows that for a 1988 Honda Civic weighing 2,542 pounds and driven at 35 mph, the average crush was 18.7 inches when the vehicle hit a rigid object in a frontal crash. The same table shows that a stationary Honda Civic weighing 3,710 pounds was struck from the rear by a rigid barrier moving 29.1 mph to produce an average of 20.4 inches of crush.

These types of tests are conducted under controlled conditions and the crush distance is the average of that measured at several uniformly spaced locations. This accurate crush information is then used to determine an "energy dissipation equation." Because this technique uses data gathered under controlled conditions for individual models, it is much more accurate than a general crush-speed chart.

An example of the estimation of vehicle speed from crush data may be found in example problem 2 at the end of this chapter.

Kinetic Energy

A moving vehicle possesses a certain amount of kinetic energy. An equation used to describe this energy is as follows:

$$E = \frac{1}{2} m(v^2 - v_o^2) \qquad [10\text{-}1]$$

where m equals the mass of the vehicle, v equals the final velocity of the vehicle and v_o equals the initial velocity of the vehicle.

This formula may be used to calculate the total kinetic energy associated with stopping a vehicle by setting the final velocity to zero. A good use for this equation is for designing a crash cushion type of traffic barrier. The cushion is designed with enough structural strength to absorb the total kinetic energy while slowing the vehicle at an acceptable rate to prevent serious injuries.

Time-Distance-Speed Relationship

The accident reconstructionist is often asked to establish the speed of vehicles at certain points during the sequence of collision events. There are a number of simple equations which may be used to make these types of calculations. All of these equations deal with five quantities:

(1) Time (t)
(2) Distance (d)
(3) Acceleration (a)
(4) Velocity (v), and
(5) Initial Velocity (v_o)

For a constant velocity situation, the distance traveled may be found by multiplying velocity by time. Once the velocity begins to vary, then acceleration (or deceleration) is involved. There are three general equations which form the basis for most calculations involving velocity, distance, acceleration or time. These equations are as follows:

$$at = v - v_o \qquad [10\text{-}2]$$

$$d = V_o t + \frac{1}{2} at^2 \qquad [10\text{-}3]$$

$$V^2 = V_o^2 + 2ad \qquad [10\text{-}4]$$

where the variables have been defined previously. These basic equations are often manipulated or combined to allow the determination of an unknown variable for different combinations of known variables.

During an accident reconstruction, it is often helpful to know the location of each involved vehicle at various times during the collision sequence. If the initial paths of the vehicles are known, the investigator may choose a starting point and starting time, then plot the location of each vehicle at fixed times during the sequence. Since the point of impact is frequently known, a common technique is to start there and work backwards to find the locations of the vehicles at fixed times as they approached the impact point.

A knowledge of typical vehicle acceleration and deceleration rates is very helpful in forming scenarios of what might have happened in a collision where no other data is available. Establishing the location of a vehicle undergoing "typical" acceleration or deceleration forms a good starting point for the analysis.

An example of a time-distance-speed calculation is shown in example 1 at the end of this chapter.

Speed from Skid Marks

Skid marks are frequently found at accident scenes. If all four of the vehicle's wheels are locked and the vehicle slides on a level surface there will be four skid marks, although sometimes the rear wheel marks lie on top of the front wheel marks and are difficult to see. Where the skid marks can be measured and the friction value of the pavement is known, the initial speed of the vehicle may be found using the following equation:

$$D = \frac{S^2}{30f} \qquad [10\text{-}5]$$

where D equals distance in feet, S equals speed in miles/hour and f is the coefficient of friction (drag factor). Nomographs are available to solve this equation. A good example is shown in Figure 3. Using the figure, it is possible to show that for a drag factor of 0.50 and a speed of 30 mph, a vehicle would skid 58 feet while stopping.

Formula 10-5 is simple and the nomograph is easy to use. Unfortunately, the simplicity of the concept misleads many investigators who fail to recognize that special circumstances often exist which require additional analysis. For example, one or more wheels may fail to leave a skid mark. A second example is when the vehicle slides part way on one pavement surface then the remainder of the skid distance on a second type of pavement surface. A third example involves when the left side of the vehicle slides on pavement but the right side slides on an earth shoulder.

There are additional complicating factors. In a sudden stop the center of gravity of a vehicle shifts as the front end goes downward and the back end rises. The front end of the vehicle then carries more of the weight and must provide more of the stopping power. Additionally, the pavement friction factor has a different value at high speed than at low speed, and as a tire slides and becomes hotter the friction factor becomes lower. Many times, the skid lengths vary for different wheels on the vehicle. All of these factors complicate the analysis.

The key to estimating speed from skid marks often lies in the accurate assessment of the friction factor, which is sometimes called the skid number or the drag factor. Researchers have determined that 40 mph is the standard speed at which the friction number should be measured. If the friction value is established at another speed, it must be adjusted to compensate. If the friction factor at the accident location is unknown, it may be estimated: (1) from values found in standard tables, (2) by performance of a skid test with an automobile, or (3) by performing a pseudo test using a small drag test device.

An example of using the drag equation to estimate velocity may be found in example 4 at the end of this chapter.

Vaulting

When a vehicle becomes airborne, it is acted upon by gravity and becomes subject to the laws of physics. This is a typical "projectile" analysis, like that used to determine how far a bullet will go if fired at a certain velocity from a horizontal rifle.

If the investigator knows the vertical distance that the vehicle traveled while airborne, the time of fall may be calculated. If the investigator knows the horizontal distance that the vehicle traveled in this time, then the speed of the vehicle may be determined. This is one of the simplest and most accurate of reconstruction techniques.

The exact vault formula is complicated in appearance and requires knowledge of: (1) the angle at which the vehicle was launched when it became airborne, and (2) the

horizontal and vertical distances which the vehicle traveled before impact. The exact formula is as follows:

$$v_o^2 = \frac{g}{2} \frac{D^2}{D \text{ Sign } \Theta \cos \Theta \text{ I } (h - \cos^2 \Theta)} \qquad [10\text{-}6]$$

Where v_o equals initial velocity, g equals acceleration of gravity, D equals the horizontal distance traveled, h equals the vertical distance traveled, and Θ equals the takeoff angle.

When using equation 10-6, the investigator must be careful to note that the takeoff angle is positive if the car was angled upward when it took off, and the angle is negative if the car was angled downward. The value of h can be positive or negative depending on whether the landing spot was below or above the takeoff point.

There are many complicating factors in the use of this equation. The takeoff angle may be difficult to measure. If the vehicle hits a curb or a bump, the car may spring upward without leaving evidence of the takeoff angle. If the vehicle traveled a great distance after takeoff, it may be very difficult to establish the horizontal and vertical portions of its travel. If the car rotates in the air, the front wheels may dip downward and hit before they would have if the car remained level. The measured horizontal distance between takeoff and landing will be smaller than it should be. This is important because the formula is actually intended to apply to the center of gravity of the vehicle.

The formula intimidates many investigators. To overcome this, some authors have prepared simple tables to indicate takeoff speed based upon the horizontal and vertical distances that the car traveled. Example 3 at the back of this chapter indicates how such a table should be used. The example also shows how to handle an inclined takeoff of the vehicle.

Linear Momentum

The momentum involved in a collision provides a useful tool for examining the actions of the vehicles. The momentum equation is a simple concept. It states that the vector sum of momentum before the collision must equal the vector sum of momentum after the collision.

Momentum is the product of mass times velocity. The momentum equation applicable to traffic accidents may be simplified and written as follows:

$$W_1V_1 + W_2V_2 = W_1V_3 + W_2V_4 \qquad [10\text{-}7]$$

where w_1 equals the weight of vehicle one and w_2 equals the weight of vehicle 2, v_1 and v_3 are the velocities of vehicle 1 before and after the collision, and v_2 and v_4 are the velocities of vehicle 2 before and after the collision.

In general, the investigator needs to know the paths of the approaching vehicles, the paths of their departures after the collision, the speeds after impact and the approximate mass or weight of each vehicle.

The most common use of the momentum equation is when the investigator can establish the post-collision speeds and directions of the vehicles through analysis of skid marks. Given the post-collision conditions and limited knowledge about pre-collision conditions, the equation may generate paths and speeds of the vehicles prior to the accident.

This is a vector process and a knowledge of vector math is necessary. An example is illustrated by Figure 4. The figure shows that the post-collision speeds and weights of two vehicles were known, yielding a vector sum of their momentum. The vector sum after the collision had to be the same as the vector sum prior to the collision. If the path and speed of one vehicle is known, the same data may be determined for the second vehicle. If the paths of the two vehicles are known prior to collision, the speeds may be determined by vector math.

An excellent example of using the skid formula and conservation of momentum formula to analyze an accident may be found in example 4 at the end of this chapter.

Other Techniques

There are many additional types of analyses that are applied to accident reconstruction. For example, knowledge of the various types of skid marks left by the vehicle can determine whether it was sliding straight ahead, spinning, or yawing. If the skidmarks are curved, it may be possible to calculate the critical speed, or the fastest the vehicle could have traveled on a given radius without losing control of the vehicle. This is very helpful in estimating the maximum speed the vehicle could have been traveling at some point in the collision sequence. This is not a precise technique but provides answers close to the exact speed of the vehicle.

A knowledge of the laws of physics will allow an investigator to determine the speed at which a truck had been traveling when it tipped over while rounding a corner. The investigator needs to know the radius of travel, the weight of the vehicle and the center of gravity of the load. A similar type of analysis can be used to calculate the shift in the center of gravity of a vehicle as it begins to brake or to corner.

Tires may be analyzed to determine the type of braking actions or whether the tire failed during braking. Vehicle head lamps can be examined to determine whether they were on or off at the time of collision. Bits of glass melted into the filament indicate that the light was on when the accident occurred. If the filament has sagged greatly and burst, it was probably hot when a sudden impact exerted more force than it could withstand. Other techniques involving the presence of oxidation or corrosion on the lamp filament may also be interpreted to determine whether it was on when the collision occurred.

Many other techniques could be mentioned to supplement those already discussed. This is beyond the scope of this chapter, which was intended for introductory purposes only.

SUMMARY

This chapter has introduced some of the concepts used in accident reconstruction. The purpose was to inform the reader of how accident reconstruction might help defend tort liability cases involving traffic accidents. This has been a very limited discussion and was not intended for use in accident reconstruction.

The reader must keep in mind that there are many limitations on when certain formulas may be used and that certain data must be made available for the proper application of formulas. Should the reader desire to learn more, it is recommended that the texts used as references in this chapter be consulted, or that the reader attend a continuing education course on this topic.

EXAMPLE RECONSTRUCTION PROBLEMS

Several typical traffic accident reconstruction problems are illustrated on the following pages. They were taken from texts and journals commonly used by accident reconstruction experts. The purpose of these examples is to illustrate that many types of calculations are simple in nature and easy to perform, once the reconstructionist understands the theory and principles. The examples do not include development of theory, and occasionally refer to tables and figures not reproduced in this workbook.

1. **Time-Distance-Speed Relationship.** This was excerpted from *Fundamentals of Traffic Accident Reconstruction*, by John Daily, Institute of Police Technology and Management, University of North Florida, Jacksonville, Florida, 1988.

2. **Principles of Conservation of Momentum and Energy to Crush.** This example was taken from *Accident Reconstruction Journal*, Volume 2, Number 6, November/December 1990, Waldorf, Maryland.

3. **Vaulting of Vehicle.** This example was excerpted from Chapter 9, *Traffic Accident Reconstruction*, Document No. PN806, Traffic Institute, Northwestern University, Evanston, Illinois, 1981.

4. **Conservation of Momentum (Angle Collision).** The final example came from Chapter 41, *Motor Vehicle Accident Reconstruction and Cause Analyses*, 2nd Edition, by Rudolf Limpert, Mitchie Company, Charlottesville, Virginia, 1984.

It is important for the reader to remember that even though the examples seem simple, the hardest part of any reconstruction is to recognize which reconstruction techniques are applicable to which circumstances, the limitations of the various techniques, and which data items must be available to use the various methodologies.

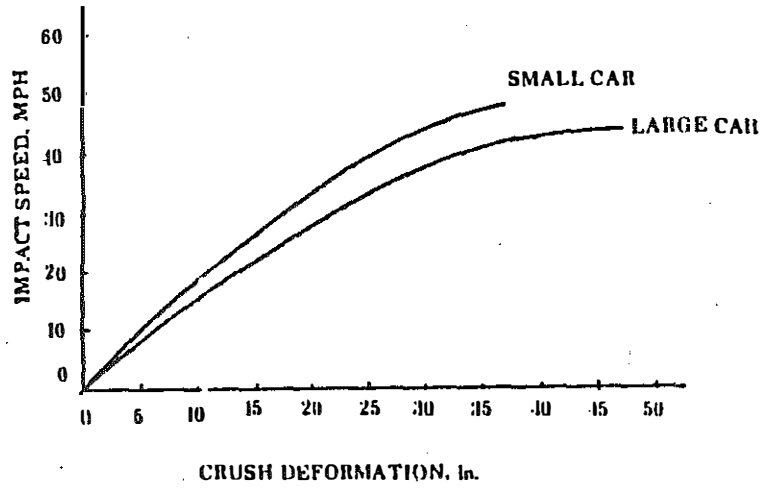


Figure 28-4. Frontal Impact Speed vs. Crush Deformation

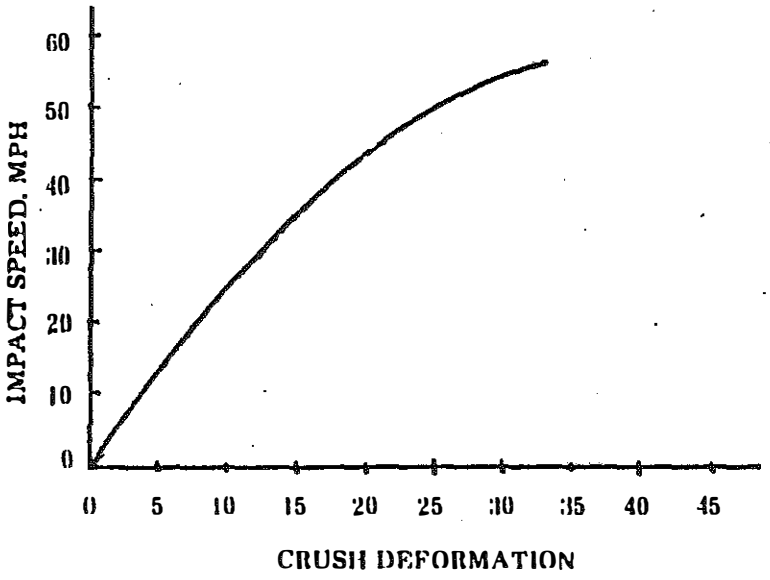


Figure 28-5. Side Impact Speed vs. Crush Deformation

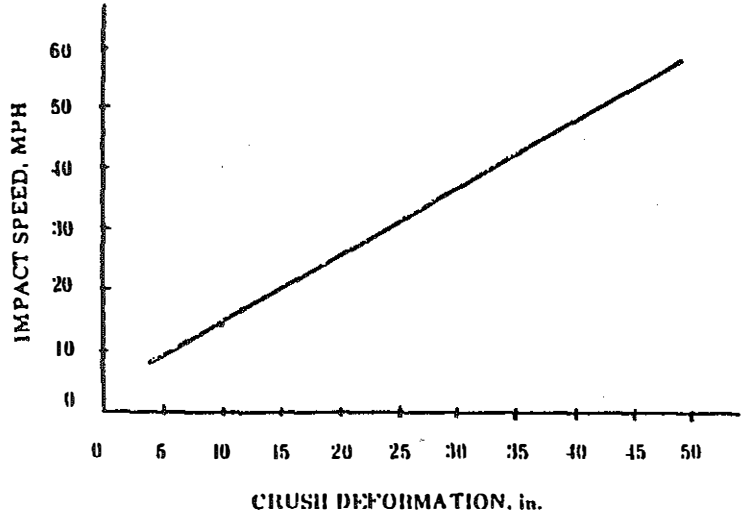


Figure 28-6. Rear Impact Speed vs. Crush Deformation

Figure 1:
Example Vehicle Crush Estimation Curves, excerpted from Chapter 28, *Motor Vehicle Accident Reconstruction and Cause Analyses*, 2nd Edition, by Rudolf Limpert, Mitchie Company, Charlottesville, Virginia, 1984, pp 417-419.

Figure 2: Example Vehicle Crush Characteristics, excerpted from *Accident Reconstruction Journal*, Volume 2, Number 3, May/June 1990, Waldorf, Maryland, pages 28-29.

NHTSA 1988 VEHICLE CRUSH DATA

For almost two decades, the National Highway Traffic Safety Administration has been conducting extensive crash test research, the primary goal of which was to evaluate a vehicle's occupant protection. During much of this testing, crush profile data was also recorded.

Accident Reconstruction Journal has obtained a list of the NHTSA crush data for model years 1970 through 1984. The *Journal* has also obtained crush data for 1969 through 1986 model year vehicles developed by Transport Canada and the University of British Columbia and has recently obtained NHTSA data for 1986 through 1989 model year vehicles. 1979 data is tentatively scheduled for publication in the July/August 1990 issue of the *Journal*. Crush data from other model years will be published in future issues.

Metric conversions of test speed and average crush were inserted by the editor.

FRONTAL IMPACT - RIGID BARRIER

MAKE	MODEL	TEST WEIGHT (lbs.)	TEST SPEED (mph)	TEST SPEED (kph)	C_1 (in.)	C_2 (in.)	C_3 (in.)	C_4 (in.)	C_5 (in.)	C_6 (in.)	AVE. CRUSH (in.)	AVE. CRUSH (cm.)
American	Eagle Premier	3509	29.3	47.1	17.2	16.9	18.8	19.0	17.4	17.8	17.8	45.3
Buick	Electra	3855	34.9	56.2	27.5	29.7	31.3	31.5	30.8	29.2	30.0	76.2
Buick	Regal	3710	35.1	56.5	19.0	23.7	26.3	26.3	25.0	21.3	23.6	59.9
Chevrolet	Beretta	3091	29.3	47.1	18.0	20.1	22.2	22.9	22.1	20.8	21.0	53.4
Chevrolet	Beretta	3350	34.6	55.7	20.5	23.8	25.4	25.8	25.5	23.9	24.2	61.3
Chevrolet	Corsica	3230	35.2	56.6	20.8	25.0	26.4	26.0	25.3	23.2	24.5	62.3
Chrysler	New Yorker	3650	34.8	56.0	26.6	28.0	29.0	28.9	28.1	28.0	28.1	71.4
Daihatsu	Charade	2218	35.2	56.6	22.1	22.2	22.8	23.1	22.9	21.7	22.5	57.1
Ford	Festiva	2190	34.8	56.0	15.2	16.5	17.1	17.2	17.5	17.2	16.8	42.6
Ford	Taurus	3660	35.1	56.5	17.5	19.0	19.8	20.6	19.8	18.6	19.2	48.8
Ford	Taurus	3676	35.0	56.3	18.7	20.6	21.2	21.1	20.5	19.0	20.2	51.3
Ford	Tempo	3080	34.8	56.0	19.7	21.0	20.1	20.3	20.3	20.3	20.3	51.5
Ford	Tempo	3145	29.2	47.0	14.6	14.5	14.9	14.8	14.8	14.9	14.8	37.5
Ford	Tempo	3138	29.3	47.1	14.0	14.7	14.8	14.8	15.2	15.1	14.8	37.5
Honda	Civic	2542	35.0	56.3	17.9	19.0	19.3	19.5	18.7	17.8	18.7	47.5
Honda	Acura Legend	3710	35.0	56.3	18.0	19.6	20.2	20.6	20.4	19.4	19.7	50.0
Isuzu	Spacecab Pickup	3747	35.2	56.6	21.1	21.0	21.7	21.5	21.0	21.0	21.2	53.9
Mazda	RX	3320	34.8	34.8	22.0	24.3	24.7	23.8	23.7	22.3	23.5	59.6
Mazda	929	3920	35.5	57.1	22.1	23.7	24.3	24.0	23.7	22.4	23.4	59.4
Mercury	Sable	3720	35.1	56.5	17.6	19.3	19.4	19.0	18.3	18.4	18.7	47.4
Nissan	Maxima	3688	34.5	55.5	18.9	20.2	21.0	21.0	19.8	19.0	20.0	50.8
Nissan	Maxima	3634	29.3	47.1	14.3	16.2	18.1	17.9	17.6	14.7	16.5	41.8
Nissan	Pulsar	2840	34.7	55.8	25.3	23.8	23.9	23.9	24.2	25.6	24.4	62.1
Nissan	Sentra Wagon	2675	35.2	56.6	21.6	22.2	22.6	22.1	21.8	21.8	22.0	55.9
Nissan	Van	4190	34.9	56.2	20.4	17.2	17.2	17.5	18.3	20.1	18.5	26.9
Oldsmobile	Cutlass	3620	29.3	47.1	10.8	12.7	13.2	13.7	14.1	13.1	12.9	32.9
Oldsmobile	Delta 88	3950	35.0	56.3	25.7	27.1	28.5	29.0	26.9	24.7	27.0	68.5
Peugeot	505	3525	29.3	47.1	17.8	20.6	21.5	21.7	21.8	18.6	20.3	51.6
Peugeot	505	3500	34.8	56.0	18.4	20.3	21.9	22.4	22.7	21.4	21.2	53.8
Pontiac	LeMans	2658	35.0	56.3	17.0	18.2	18.4	18.0	17.5	15.8	17.5	44.4
Renault	Medallion	3100	35.2	56.6	21.3	23.8	22.2	20.8	19.4	17.3	20.8	52.8
Saab	900	3340	35.3	56.8	18.7	20.9	21.9	22.3	21.6	21.7	21.2	53.8
Toyota	Tercel	2470	35.0	56.3	18.0	19.4	19.4	19.9	20.2	20.0	19.5	49.5
Toyota	Corolla	2750	34.6	55.7	20.4	21.9	22.9	22.9	22.5	21.1	21.9	55.8
Toyota	Cressida	3880	29.3	47.1	17.0	18.0	17.9	14.3	17.7	15.4	16.7	42.5
VW	Fox	2700	35.1	56.5	18.0	18.6	19.1	19.8	19.7	19.6	19.1	48.6
VW	Vanagon	4120	34.9	56.2	13.6	15.2	15.7	16.0	15.8	12.2	14.8	37.5
Volvo	GLE	3550	34.8	56.0	22.3	22.5	22.9	22.9	22.6	22.6	22.6	57.5
Yugo	GV	2282	29.3	47.1	11.9	12.6	12.8	13.2	13.0	12.6	12.7	32.2

Figure 2 (Continued)

MOVING BARRIER INTO REAR OF VEHICLE - BARRIER WEIGHT = 3987 lbs.

MAKE	MODEL	TEST WEIGHT (lbs.)	TEST SPEED (mph)	TEST SPEED (kph)	C_1 (in.)	C_2 (in.)	C_3 (in.)	C_4 (in.)	C_5 (in.)	C_6 (in.)	AVE. CRUSH (in.)	AVE. CRUSH (cm.)
Buick	Regal	4893	29.5	47.5	11.5	11.8	12.5	13.0	12.8	12.8	12.4	31.5
Chevrolet	Cavalier	3989	29.4	47.3	15.5	13.8	13.0	13.3	14.3	15.5	14.2	36.2
Ford	Tempo	3682	29.8	47.9	11.8	13.5	13.0	12.0	12.0	11.7	12.3	31.3
Ford	Festiva	2505	29.9	48.1	10.8	10.8	10.8	10.6	11.0	12.0	11.0	27.9
Honda	Acura Legend	4580	29.5	47.5	11.3	11.0	11.3	11.5	11.8	12.8	11.6	29.5
Honda	Civic	3710	29.1	46.8	20.5	20.0	21.0	20.5	20.0	20.3	20.4	51.8
Mazda	MX6	3750	29.9	48.1	21.8	18.5	25.4	22.0	24.3	21.5	22.2	56.5
Plymouth	Voyager Van	3436	29.8	47.9	9.0	9.8	9.5	9.5	9.8	9.8	9.6	24.3
Nissan	King Cab Pickup	5020	29.3	47.1	11.5	11.0	11.0	11.3	11.1	12.4	11.4	28.9
Toyota	Supra	4460	29.7	47.8	12.5	9.8	9.5	9.2	9.0	12.0	10.3	26.2

MOVING BARRIER INTO SIDE OF VEHICLE - BARRIER WEIGHT = 3987 lbs.

MAKE	MODEL	TEST WEIGHT (lbs.)	TEST SPEED (mph)	TEST SPEED (kph)	C_1 (in.)	C_2 (in.)	C_3 (in.)	C_4 (in.)	C_5 (in.)	C_6 (in.)	AVE. CRUSH (in.)	AVE. CRUSH (cm.)
Moving barrier into Driver's Side - Force from 9:00												
Chevrolet	Caprice	4030	33.5	53.9	5.7	12.2	13.5	14.7	14.4	8.1	11.4	29.0
Chevrolet	Sprint	2100	33.7	54.2	13.3	14.3	13.8	13.0	12.0	11.7	13.0	33.1
Ford	Taurus	3690	33.4	53.6	3.0	13.0	13.7	14.2	14.1	10.7	11.4	29.1
Hyundai	Excel GLS	2700	33.9	54.5	15.9	16.6	17.2	16.9	17.4	3.5	14.6	37.0
Pontiac	Bonneville	3820	33.9	54.5	2.7	17.0	17.4	18.0	18.3	15.1	14.7	37.5
Toyota	Tercel	2550	33.7	54.2	5.3	10.2	10.9	12.0	11.0	6.5	9.3	23.7
VW	Golf	2660	33.8	54.0	6.8	13.9	13.8	13.8	13.9	8.7	11.8	30.0
Moving barrier into Passenger's Side - Force from 3:00												
Chevrolet	S-10 Pickup	3169	33.4	53.6	0.0	13.5	13.7	14.0	15.5	0.0	9.5	24.0
Dodge	Caravan	5024	33.6	54.0	0.0	18.9	19.2	20.2	9.8	0.0	11.5	28.8
Ford	Pickup	4103	33.4	53.6	0.0	25.1	22.4	21.1	18.3	0.0	14.5	36.8
Nissan	Pickup	3283	33.2	53.3	0.0	7.0	13.8	13.6	14.5	0.0	8.2	20.7

Figure 3: Vehicle Skid-Speed Nomograph, from *Traffic Accident Reconstruction*, Document No. PN806, Traffic Institute, Northwestern University, Evanston Illinois, 1981.

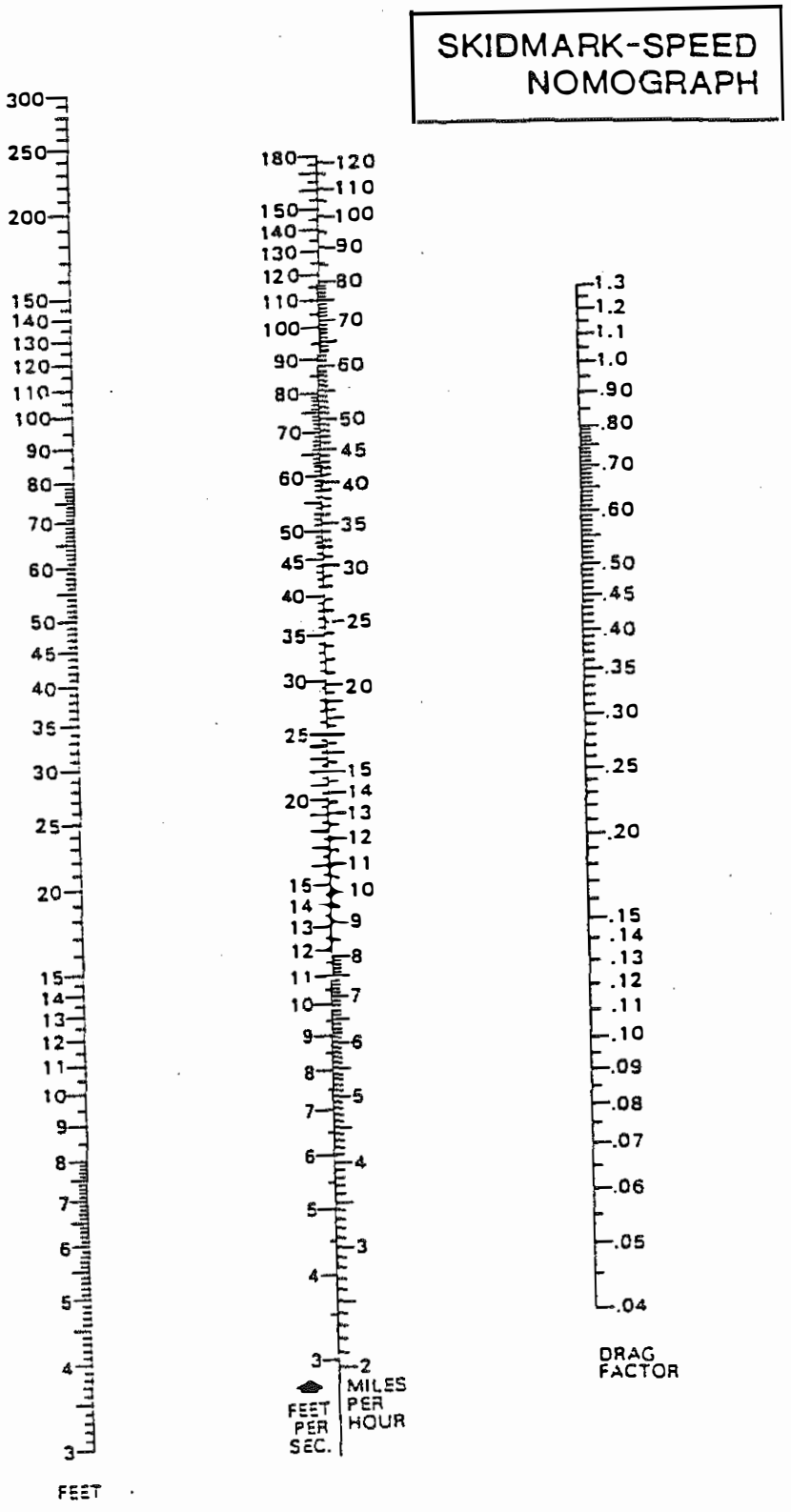
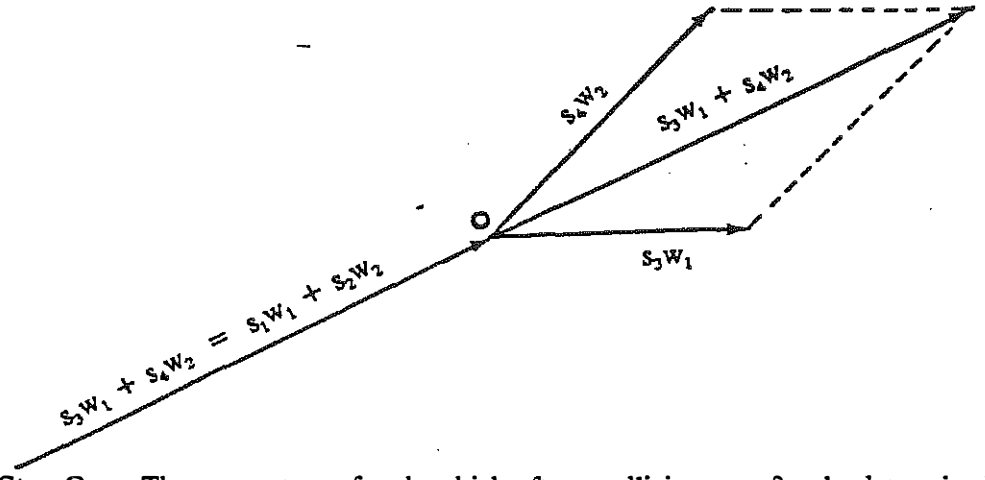
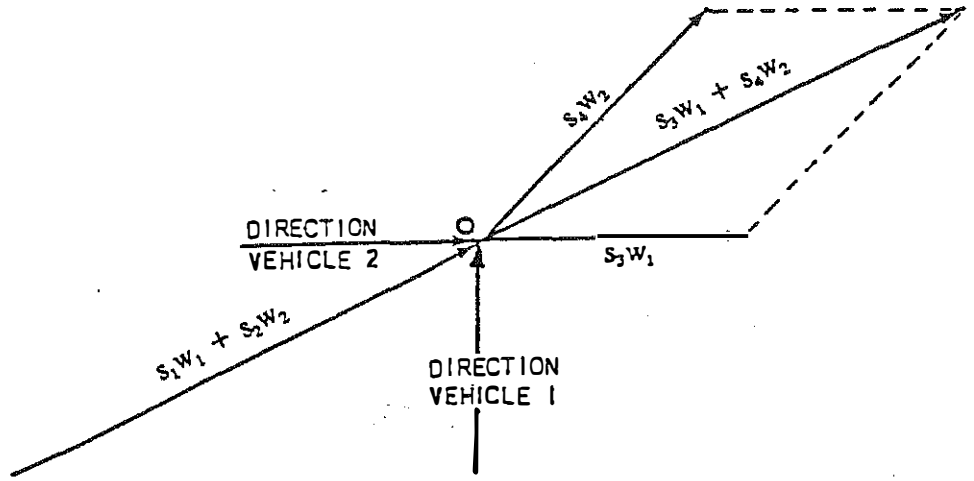


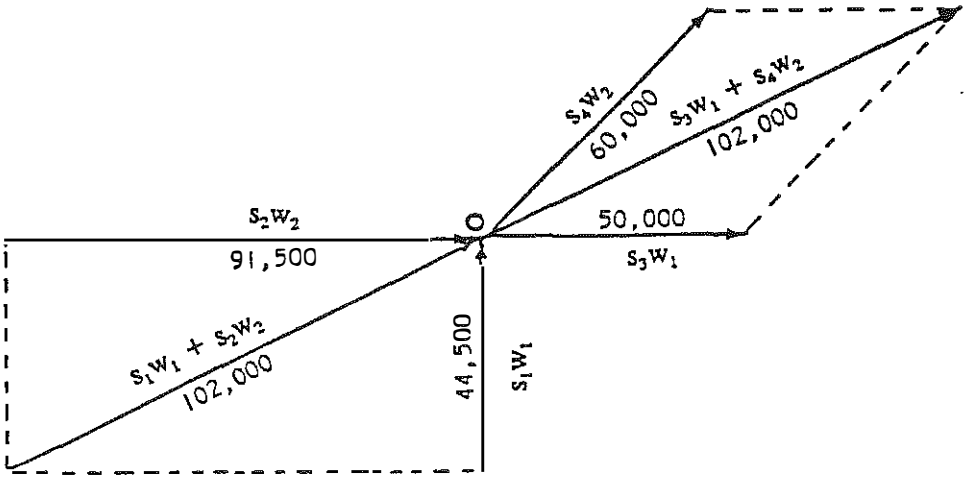
Figure 4: Example of vector addition of momentum, from *Traffic Accident Reconstruction*, Traffic Institute, Northwestern University, Evanston, Illinois, 1981.



Step One: The momentum of each vehicle <u>after</u> a collision can often be determined from skid marks. The total (vector) momentum of the two vehicles <u>after</u> the collision is the same as the total (vector) momentum <u>before</u> the collision.



Step Two: When the directions of movement of both vehicles <u>before</u> the collision are known, they can be used with the total momentum <u>before</u> the collision.



Step Three: The combination of <u>before</u> collision vectors yields the momentum of each vehicle <u>before</u> the collision.

Example 1: Time-Distance-Speed Relationship, excerpted from *Fundamentals of Traffic Accident Reconstruction*, by John Daily, Institute of Police Technology and Management, University of North Florida, Jacksonville, Florida, 1988.

A vehicle skids 130 feet on a surface that has a drag factor of .61. The initial speed is 84 miles per hour. How much time does the skid take?

Solution:

Begin with the Time - Distance Equation:

$$d = v_0 t - \frac{1}{2} a t^2$$

Put it in the form of a classic quadratic equation:

$$0 = v_0 t - \frac{1}{2} a t^2 - d \qquad a = fg \qquad v = 1.466 S$$

$$-\frac{1}{2} a t^2 + v_0 t - d = 0$$

$$\frac{1}{2} a t^2 - v_0 t + d = 0 \quad \text{or} \quad 16.1 ft^2 - 1.466 S_0 t + d = 0$$

Classic quadratic coefficients and values to be substituted for them:

$$a = \frac{1}{2} a = \frac{1}{2}(32.2)(.61) = 9.82 \quad \text{or} \quad a = 16.1 f = 16.1(.61) = 9.82$$

$$b = -v_0 = -1.466(84) = -123.14 \quad \text{or} \quad b = -1.466 S_0 = -1.466(84) = -123.14$$

$$c = d = 130$$

Substitute values and solve for time:

$$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$t = \frac{123.14 \pm \sqrt{(-123.14)^2 - 4(9.82)(130)}}{2(9.82)}$$

$$t = \frac{123.14 \pm \sqrt{15163.46 - 5106.4}}{2(9.82)}$$

$$t = \frac{123.14 \pm \sqrt{10057.06}}{19.64}$$

$$t = \frac{123.14 - 100.28}{19.64} \qquad \text{(solution with - option)}$$

$$t = \frac{22.85}{19.64} = 1.16 \text{ seconds}$$

If + option were used, the answer would be 11.3 seconds. This is an unreasonable solution, so we discard it.

Example 2: Principles of Conservation of Momentum and Energy to Crush, excerpted from *Accident Reconstruction Journal*, Vol 2, No 6, Nov/Dec 1990, Waldorf, Maryland.

6. 2950 pound V-2 is stopped for a red traffic signalwben it is struck in the rear by 3600 pound V-1. After impact V-1 skids 8 feet with a drag factor of 0.82, while V-2 travels 19 feet with a drag factor of 0.40. Determine the impact speed of V-1.

7. Recalculate Problem 6 using dissipation of energy, given the follow crush data (in inches):

	V-1 Front	V-2 Rear
C_1	5	9.5
C_2	5.5	9.5
C_3	5.5	9
C_4	6	8

Use the following crush energy relationships (Crush equivalent energy speed in miles per hour, Average Crush in inches):

V-1 Front: $cs_1 = 1.3 * C_{AVE} + 5$
V-2 Rear: $cs_2 = 1.0 * C_{AVE} + 5$

Solution: Problem Six

We will ultimately solve for the impact speed using the conservation of momentum equation. The variables:

S_1 = Impact speed of vehicle one
S_2 = Impact speed of vehicle two
s_1 = Post impact speed of vehicle one
s_2 = Post impact speed of vehicle two
W_1 = Weight of vehicle one = 3600 lb.
W_2 = Weight of vehicle two = 2950 lb.
d_1 = Post impact travel distance of V-1 = 8 feet
d_2 = Post impact travel distance of V-2 = 19 feet
f_1 = Post impact drag factor of V-1 = 0.82
f_2 = Post impact drag factor of V-2 = 0.40

Post impact speed of V-1:

$$s_1 = \sqrt{30*d_1*f_1} = \sqrt{30*8*.82} = 14.0 \text{ mph}$$

Post impact speed of V-2:

$$s_2 = \sqrt{30*d_2*f_2} = \sqrt{30*19*.40} = 15.1 \text{ mph}$$

Substituting into the conservation of momentum equation:

$$S_1*W_1 + S_2*W_2 = s_1*W_1 + s_2*W_2$$

$$S_1*3600 + 0*2950 = 14.0*3600 + 15.1*2950$$

$$S_1*3600 + 0 = 50,400 + 44,545 = 94,945$$

$$S_1 = 26.4 \text{ mph}$$

Solution: Problem Seven

We must estimate the energies dissipated by crush via determination of their equivalent barrier impact speeds. Average crush to the front of Vehicle One:

$$C_{1ave} = (5 + 5.5 + 5.5 + 6)/4 = 5.5 \text{ inches}$$

Crush energy equivalent speed:

$$cs_1 = 1.3 * C_{1ave} + 5 = 1.3*5.5 + 5 = 12.15 \text{ mph}$$

Average crush to the rear of Vehicle Two:

$$C_{2ave} = (9.5 + 9.5 + 9 + 8)/4 = 9.0 \text{ inches}$$

Crush energy equivalent speed:

$$cs_{c2} = 1.0 * C_{c2ave} + 5 = 1.0*9 + 5 = 14.0 \text{ mph}$$

Substituting into the dissipation of energy equation:

$$S_1^2*W_1 + S_2^2*W_2 = s_1^2*W_1 + s_2^2*W_2 + cs_1^2*W_1 + cs_{c2}^2*W_2 + cs_{t2}^2*W_2$$

$$S_1^2*3600 + S_2^2*2950 = 14.0^2*3600 + 15.1^2*2950 + 12.15^2*3600 + 14.0^2*2950$$

$$S_1^2*3600 + 0 = 705,600 + 672,629 + 531,441 + 578,200$$

$$S_1^2*3600 = 2,487,870$$

$$S_1^2 = 691.1$$

$$S_1 = 26.3 \text{ mph at impact}$$

Example 3: Vaulting of Vehicle, excerpted from Chapter 9, *Traffic Accident Reconstruction,* Document No. PN806, Traffic Institute, Northwestern University, Evanston, Illinois, 1981.

When the take-off is level, neither sloping up nor down, the speed corresponding to various horizontal and vertical distances can be obtained from the table in Exhibit 9-17. The speed is given where the column for vertical distance intersects the line for horizontal distance. For example, suppose a car travelled horizontally in the air 60 ft while dropping 10 ft. In the column headed 10 ft, find the line for 60 ft. There the speed of the vehicle is shown as 52 mph.

When the take-off is not level, adjust the measured vertical falling distance from the take-off point to the landing point. The calculation then involves the following three steps:

1. Multiply the grade of the take-off by the horizontal distance that the vehicle travelled forward. Remember that the grade is +, positive, if the vehicle is moving upgrade and —, negative, if it is moving downhill. For example, with a grade of + 0.10 (up 10 percent) and a horizontal distance of 60 ft, then + 0.10 x 60 = + 6 ft is the adjusting amount.
2. Add the adjusting amount to the vertical falling distance. Suppose that the vertical fall in the example was 10 ft. Then the adjusted falling distance is 10 + 6 = 16 ft.
3. Use the table, Exhibit 9-17, to find the corresponding speed. In this example, a horizontal distance of 60 ft and an adjusted vertical fall of 16 ft has a speed of 41 mph, considerably (11 mph) less than if the take-off had been level.

But suppose the slope had been down instead of up, — 0.10 instead of + 0.10. The procedure would give the following:

1. Slope multiplied by horizontal distance is — 0.10 x 60 = — 6 ft.
2. Adding the adjusting amount, which is negative and must, therefore, be subtracted, gives 10 — 6 = 4 ft for the adjusted falling distance.
3. The table, Exhibit 9-17, gives a speed of 82 mph which is much (30 mph) more than it would have been with a level take-off.

These examples indicate how important correction for grade is in estimating speed with data from a falling vehicle.

Correction for grade amounts to considering that the vertical fall started from the point at which the vehicle would have been had it continued straight ahead on the same grade until it was directly above the landing spot before it started to fall, as illustrated in Exhibit 9-18.

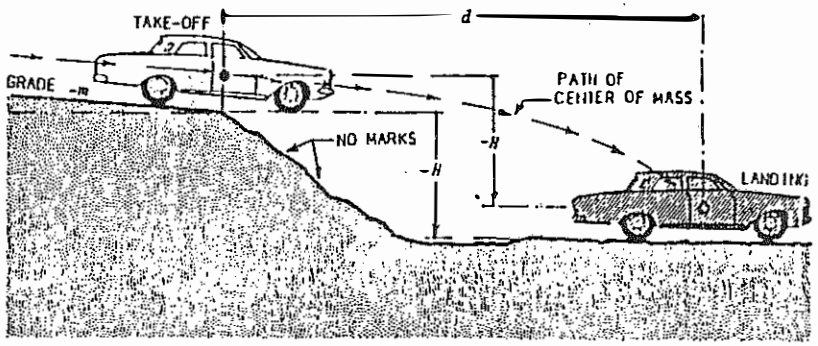


Exhibit 9-13. When a vehicle leaves the ground, the measurements required for speed estimates are the horizontal distance that the center of mass moved from take-off to landing, d, the vertical distance the center of mass fell, H, and the slope, up or down, of the take-off, m. The take-off slope must be very carefully measured.

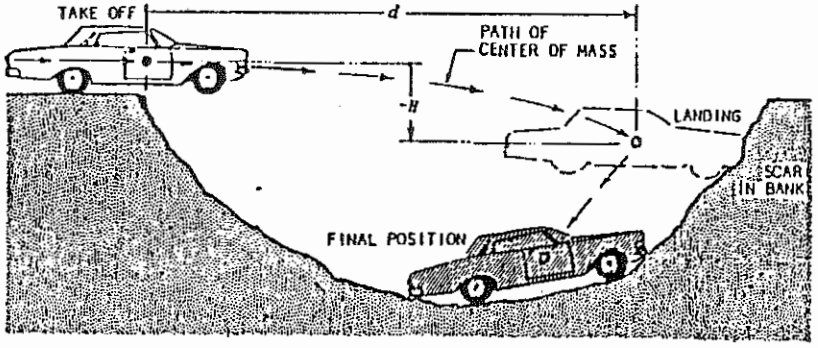


Exhibit 9-14. The landing position after a fall may not be the point where the vehicle finally comes to rest. Then the landing position has to be located from marks on the ground and dimensions of the vehicle. Surveying instruments may be required to measure the distances in a fall and the slope of take-off.

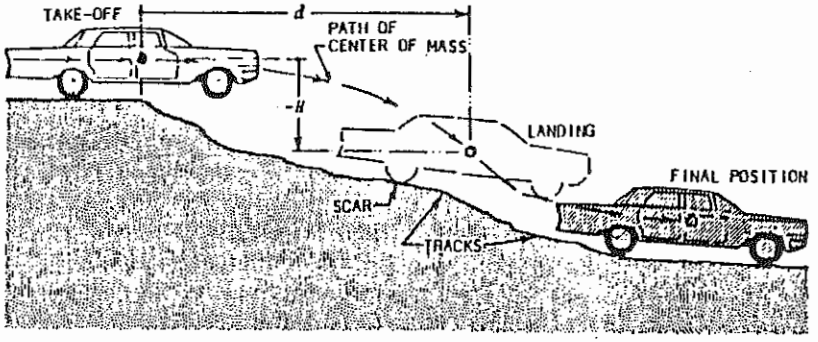


Exhibit 9-15. Usually the vertical distance of a fall is well enough represented by the vertical distance between take-off and landing surfaces, but if the vehicle lands on a slope, a correction must be made on the basis of marks made where the vehicle first struck the ground after a fall.

Example 3 (Continued)

If the adjusting figure for grade (horizontal distance multiplied by slope) for a down grade is greater than the vertical fall, there is some mistake in measurements or calculations. With an upgrade, it is possible for the landing to be at the same level as the take-off or even higher (Exhibit 9-19).

The equation or formula for the fall calculation is

$$S = \frac{2.74\ d}{\sqrt{md - H}} \text{ mph}$$

The vertical distance, H, is positive, +, if the landing is higher than the take-off and negative, —, if the landing is lower. Usually landing is lower than take-off so the square root becomes $\sqrt{md - (-H)}$ which is the same as $\sqrt{md + H}$. In the last example given, the fall was down — 10 ft in a horizontal distance of 60 ft with a — 0.10 take-off. Then, substituting these figures in the equation

$$S = \frac{2.74 \times 60}{\sqrt{-0.10 \times 60 - (-10)}}$$

$$= \frac{2.74 \times 60}{\sqrt{-6 + 10}}$$

$$= \frac{164.4}{2}$$

$$= 82.2 \text{ mph.}$$

This corresponds to the speed obtained for the same example from Exhibit 9-17. If the quantity, $md - H$, is negative, some mistake has n made in measurements or calations.

Exhibit 9-17

SPEED (MILES PER HOUR) REQUIRED TO FALL

Level distance in feet	Vertical distance of fall in feet																			
	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20	25	30	35	40	50
10	27	19	16	14	12	11	10	10	9	9	8	7	7	6	6	5	5	5	4	4
12	33	23	19	16	15	13	12	12	11	10	9	9	8	8	7	7	6	6	5	5
14	38	27	22	19	17	16	14	14	13	12	11	10	10	9	9	8	7	6	6	5
16	44	31	25	22	20	18	17	15	15	14	13	12	11	10	10	9	8	7	7	6
18	49	35	28	25	22	20	19	17	16	16	14	13	12	12	11	10	9	8	8	7
20	55	39	32	27	24	22	21	19	18	17	16	15	14	13	12	11	10	9	9	8
22	60	43	35	30	27	25	23	21	20	19	17	16	15	14	13	12	11	10	10	9
24	66	46	38	33	29	27	25	23	22	21	19	18	16	15	15	13	12	11	10	9
26	71	50	41	36	32	29	27	25	24	22	21	19	18	17	16	14	13	12	11	10
28	77	54	44	38	34	31	29	27	26	24	22	20	19	18	17	15	14	13	12	11
30	82	58	47	41	37	34	31	29	27	26	24	22	21	19	18	16	15	14	13	12
32	88	62	51	44	39	36	33	31	29	28	25	23	22	21	20	18	16	15	14	12
34	93	66	54	47	42	38	35	33	31	29	27	25	23	22	21	19	17	16	15	15
36	98	70	57	49	44	40	37	35	33	31	28	26	25	23	22	20	18	17	16	14
38	104	74	60	52	46	42	39	37	35	35	30	28	26	25	23	21	19	18	16	15
40	109	77	63	55	49	45	41	39	36	35	32	29	27	26	24	22	20	18	17	15
42	115	81	66	57	51	47	43	41	38	36	33	31	29	27	26	23	21	19	18	16
44	120	85	69	60	54	49	45	43	40	38	35	32	30	28	27	24	22	20	19	17
46	126	89	73	63	56	51	48	44	42	40	36	34	31	30	28	25	23	21	20	18
48	131	93	76	66	59	54	50	46	44	42	38	35	33	31	29	26	24	22	21	19
50	137	97	79	68	61	56	52	48	46	43	39	37	34	32	31	27	25	23	22	19
52	142	101	82	71	64	58	54	50	47	45	41	38	36	34	32	28	26	24	22	20
54	148	104	85	74	66	60	56	52	49	47	43	39	37	35	33	30	27	25	23	21
56	153	108	88	77	69	63	58	54	51	48	44	41	38	36	34	31	28	26	24	22
58	159	112	92	79	71	65	60	56	53	50	46	42	40	37	35	32	29	27	25	22
60	164	116	95	82	73	67	62	58	55	52	47	44	41	39	37	33	30	28	26	23
62	170	120	98	85	76	69	64	60	57	54	49	45	42	40	38	34	31	29	27	24
64	175	124	101	88	78	71	66	62	56	55	51	47	44	41	39	35	32	30	28	25
66	181	128	104	90	81	74	68	64	60	57	52	48	45	43	40	36	33	31	29	26
68	186	132	107	93	83	76	70	66	62	39	54	50	47	44	42	37	34	31	29	26
70	192	135	111	96	86	78	72	68	64	61	55	51	48	45	43	38	35	32	30	27
72	197	139	114	98	88	80	74	70	66	62	57	53	49	46	44	39	36	33	31	28
74	202	143	117	101	91	83	77	72	67	64	58	54	51	48	45	40	37	34	32	29
76	208	147	120	104	93	85	79	74	69	66	60	56	52	49	46	42	38	35	33	29
78	213	151	123	107	95	87	81	75	71	67	62	57	53	50	48	43	39	36	34	30
80	219	155	126	109	98	89	83	77	73	69	63	58	55	52	49	44	40	37	35	31
82	224	159	130	112	100	92	85	79	75	71	65	60	56	53	50	45	41	38	35	32
84	230	162	133	115	103	94	87	81	77	73	66	61	57	54	51	46	42	39	36	32
86	235	166	136	118	105	96	89	83	78	74	68	63	59	55	53	47	43	40	37	33
88	241	170	139	120	108	98	91	85	80	76	69	64	60	57	54	48	44	41	38	34
90	246	174	142	123	110	101	93	87	82	78	71	66	62	58	55	49	45	42	39	35
92	252	178	145	126	113	103	95	89	84	80	73	67	63	59	56	50	46	43	40	36
94	257	182	148	129	115	105	97	91	86	81	74	69	64	61	58	51	47	43	41	36
96	263	186	152	131	117	107	99	93	88	83	76	70	66	62	59	53	48	44	42	37
98	268	190	155	134	120	109	101	95	89	85	77	72	67	63	60	54	49	45	42	38
100	274	193	158	137	122	112	103	97	91	87	79	73	68	64	61	55	50	46	43	39
105	287	203	166	144	128	117	109	102	96	91	83	77	72	68	64	57	52	49	45	41
110	301	213	174	150	135	123	114	106	100	95	87	80	75	71	67	60	55	51	48	43
115	315	222	182	157	141	128	119	111	105	99	91	84	79	74	70	63	57	53	50	44
120	328	232	190	164	147	134	124	116	109	104	95	88	82	77	73	66	60	55	52	46
130	356	251	205	178	159	145	134	126	119	112	103	95	89	84	80	71	65	60	56	50
140	383	271	221	192	171	156	145	135	128	121	111	102	96	90	86	77	70	65	61	54
150	410	290	237	205		168	155	145	137	130	118	110	103	97	92	82	75	69	65	58
160	438	310	253	219		179	163	155	146	138	126	117	109	103	98	88	80	74	69	
170	465	329	269	233		190	176	164	155	147	134	124	116	110	104	93	85	79	74	

Example 4: Conservation of Momentum (Angle Collision), excerpted from Chapter 41, *Motor Vehicle Accident Reconstruction and Cause Analyses*, 2nd Edition, by Rudolf Limpert, Mitchie Company, Charlottesville, Virginia, 1984.

The collision involved the right angle side impact of a Ford Mach 1 with an Oldsmobile Delta 88. Although important factors in the total accident reconstruction, no injury production, occupant dynamics, and view obstruction analysis is presented. The investigating officer determined a speed of 65 mph for the Ford vehicle at the instant of wheel lock.

A witness of the accident stated that the speed of the Ford vehicle was "very high."

The maximum speed of the Ford must be computed.

Vehicle Data

Vehicle weights: No. 1 (Olds): 5040 lbs. No. 2 (Ford): 3450 lbs.

Accident Data

The collision diagram is shown in Fig. 41-5. The approach angles are $\alpha_{11} = 30$ deg (Olds) and 0 deg (Ford). The angles after impact are $\alpha_{12} = 41$ deg (Olds) and $\alpha_{22} = 12.9$ deg (Ford). The Oldsmobile slid 59.2 ft, the Ford 64.2 ft after impact on their tires. The Ford produced a braking skid of 105.3 ft before impact.

Collision Calculations

The impact is oblique non-central. Due to the small values of rotation involved in the actual collision, rotation is neglected in the collision analysis. Since the directions of vehicle travel before and after impact are located under different angles, the different linear momenta must be analyzed separately in the x and y direction. Conservation of momentum in each direction yields the following equations (Eq. 28-4):

y-direction (Vehicle weights are used instead of mass since $g = 32.2$ cancels)

Only the velocity components in the y-direction may be used. Hence,

$$W_2V_{21} - W_1V_{11}\sin\alpha_{11} = W_1V_{12}\sin\alpha_{12} + W_2V_{22}\cos\alpha_{22} \quad (41\text{-}7)$$

x-direction

$$W_1V_{11}\cos\alpha_{11} = W_1V_{12}\cos\alpha_{12} + W_2V_{22}\sin\alpha_{22} \quad (41\text{-}8)$$

The velocity of the Ford before impact V_{12} must be computed from Eqs. 41-7 and 41-8.

Velocities after impact:

The velocities after impact may be determined by Eq. 29-2:

Vehicle No. 1 (Olds):

$$V_{12} = \sqrt{(30)(0.3)(59.2)} = 23 \text{ mph}$$

A friction coefficient of 0.3 was used since vehicle no. 1 was sliding on dirt surface (Table 18-5).

Vehicle No. 2 (Ford):

$$V_{22} = \sqrt{(30)(0.6)(64.2)} = 34 \text{ mph}$$

A friction coefficient of 0.6 was assumed since the right wheels were partially off right-lane surface.

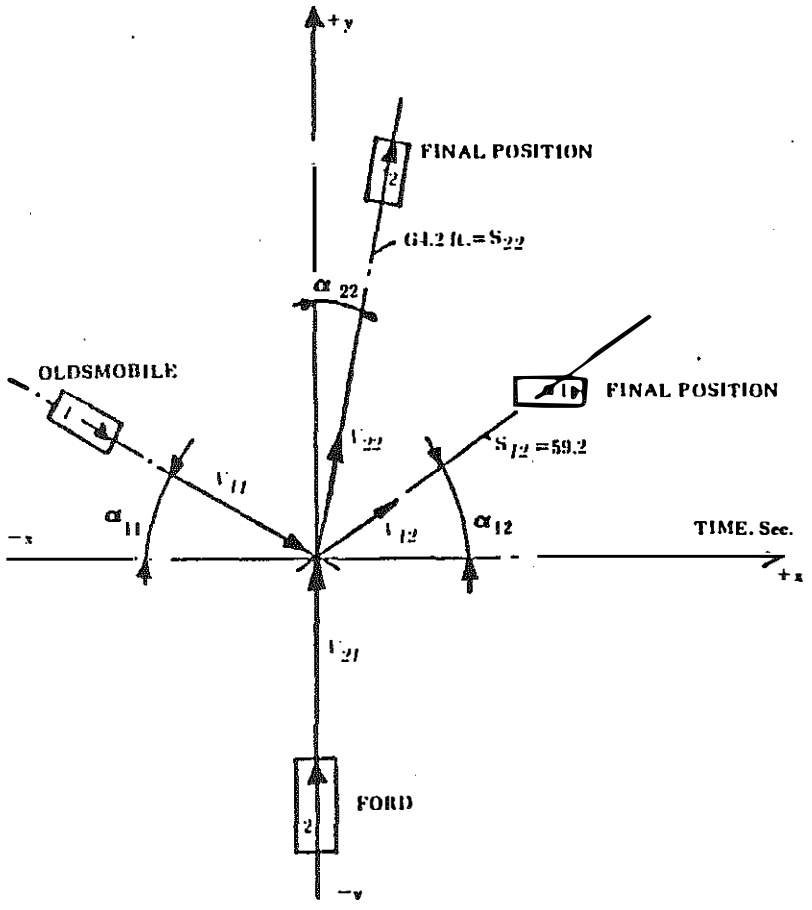


Figure 41-5. Collision Diagram, Two-Vehicle Collision

Eq. 41-8 may now be solved for velocity V_{11} (Oldsmobile before impact) and substituted into Eq. 41-7. Eq. 41-7 may then be solved for the unknown velocity V_{21}.
From Eq. 41-8:

$$V_{11} = \left(\frac{W_2}{W_1}\right) V_{22} \left(\frac{\sin \alpha_{22}}{\cos \alpha_{11}}\right) + V_{12} \left(\frac{\cos \alpha_{12}}{\cos \alpha_{11}}\right)$$

$$= \left(\frac{3450}{5040}\right)(34)\left(\frac{\sin 11.3°}{\cos 30°}\right) + 23\left(\frac{\cos 41°}{\cos 30°}\right) = 25 \text{ mph}$$

The speed of the Oldsmobile before impact is $V_{11} = 25$ mph.
From Eq. 41-7

$$V_{21} = V_{22} \cos \alpha_{33} + \left(\frac{W_1}{W_2}\right)(V_{12} \sin \alpha_{12} + V_{11} \sin \alpha_{11})$$

$$= (34)[\cos (11.3°)] + \left(\frac{5040}{3450}\right)(23 \sin 41° + 25 \sin 30°)$$

$$= 74 \text{ mph}$$

The result shows that the Ford was traveling 74 mph at impact. The velocity at the instant of wheel lockup may be determined by Eq. 16-19 as

$$V_{2\text{skid}} = \sqrt{(V_{21})^2 + 2aS} = \sqrt{(108.4)^2 + (2)(25.7)(105.3 + 12)}$$

$$= 133.4 \text{ ft/sec or } 91 \text{ mph}$$

A friction coefficient of 0.8 or a deceleration of $0.8 \times 32.2 = 25.7$ ft/sec^2 was measured at the accident site.

The actual stopping distance was numerically increased by 12 ft to account for aerodynamic drag. The aerodynamic drag may be determined by Eq. 19-4, yielding an effective stopping distance increase of 12 ft.

The velocity at the instant of deceleration initiation (approximately pedal force application begin) may be determined by Eq. 16-11 when both sides of the equation are divided by t, yielding ($V = S/t$):

$$V_{2\text{pedal}} = 133.4 + \frac{25.7}{2}(0.2)$$

$$= 135.9 \text{ ft/sec or } 92.7 \text{ mph}$$

A deceleration buildup time of $\Delta t = 0.2$ sec was assumed from the free rolling to the locked wheel condition.

APPENDIX

GLOSSARY

GLOSSARY

abate: to decrease, reduce, remove, or destroy; to abate a nuisance is to remove or destroy the thing that causes it.

abrogate: to repeal, annul, or abolish. A law, for example, is abrogated by legislative action, constitutional authority, or usage.

accord and satisfaction: an agreement between parties to accept something less than the amount actually due, and the delivery of that new amount.

accused: a person charged with a crime or misdemeanor, the defendant in a criminal case.

act: an enactment, as of a legislative body; a law or statute.

action: a judicial proceeding to enforce or protect a right.

actionable: giving legal grounds for an action, as trespass, slander, or breach of contract.

actual cause: the reason the accident or damage occurred.

actual notice: the receiving of a complaint or acknowledgment of said condition.

adjournment: the act of putting off, postponing, or suspending business or session, either temporarily or indefinitely.

adjournment: the act of putting off, postponing, or suspending business or session, either temporarily or indefinitely.

adjudication: the pronouncement of a judgement or decree by the court.

admissible: of such nature that the court or judge must allow it to be introduced, as certain evidence or testimony.

advocate: one that pleads the cause of another.

affiant: a person who makes and swears to an affidavit.

affidavit: a voluntary statement or declaration of facts, written or printed and sworn to by the person making it before an officer authorized to administer oaths.

affirm: to confirm, ratify, or approve. An appellate court (one in which appeals are taken) amy affirm the judgment or decree of a lower court.

answer: (n.) a pleading by a defendant in a lawsuit in response to the summons or complaint.

appellant: a person who appeals a decision, against him or her, from a lower court to a higher court.

appellee: the party in a litigation against whom the appeal is taken; also called respondent.

arbitrary: selected at random and without reason.

averment: a positive statement of facts in a pleading, without argument or inference.

brief: a written statement prepared by the counsel arguing a case in appellate court; also used on occasion in trial court.

burden of proof: the obligation to prove affirmatively a disputed fact or facts related to an issue raised in a case being tried before the court.

capricious: apt to change suddenly or unpredictably.

cause of action: the grounds upon which an action is based.

certiorari: a writ from a superior to an inferior court, directing that a certified record of its proceeding on a particular case be sent up for review.

change of venue: the change of the place of a trial, for good cause.

circumstantial evidence: evidence consisting of facts and circumstances that furnish a reasonable ground for inferring the existence of some other connected fact or facts.

civil procedure: prescribes the rules by which parties to civil lawsuits use the courts to settle their disputes.

class action: an action brought by one or more plaintiffs on behalf of other persons who are similarly situated or have suffered a similar wrong.

comparative negligence: a legal doctrine applicable in negligence suits, according to which the negligence of the plaintiff as well as that of the defendant is taken into account. Damages are based upon the outcome of a comparison of the two and are thus proportioned.

complainant: a person who files a bill of complaint; the party who starts a legal action; also called the plaintiff.

concurrent jurisdiction: a situation in which each of a number of different judicial bodies has the authority to deal with the same subject matter at the discretion of the person starting the legal action.

conflict of laws: the disagreement between the laws of different states as it affects the rights of persons acting under the laws of more than one jurisdiction.

constructive: assumed or inferred by legal interpretation.

constructive notice: does not require specific notice of the defect. If a defect has existed for an unreasonable period of time, the agency should have discovered the defect, and therefore has constructive notice of its existence.

continuance: the adjournment of the proceedings in a case from one day or term to another.

contributory negligence: negligence doctrine in which persons only minutely responsible for their own injuries cannot legally recover any damages.

counterclaim: a claim alleged by a defendant, which seeks to reduce the plaintiff's claim.

court action: not founded on criminal law or breach of contract. Tort action falls under this, and can be a combination of tort action and criminal action in certain cases. It is some character of abuse where one party injures another.

criminal law: founded on statute and violation.

Criminal procedure: prescribes the rules of law for the apprehension, prosecution, and fixing of punishment of persons who have committed crimes.

cross-claim: a claim brought by a defendant in an action against the plaintiff or codefendant or both.

declaratory judgment: a judgment that declares the status, rights, or duties of the parties involved, or that does not order any action to be taken.

de facto: a Latin expression meaning "in fact", accepted by the fact that it exists, rather than that it is according to law.

de jure: a Latin expression meaning "by right" or "by law" as opposed to de facto.

demeanor: the act of using degrading behavior or an outward manner towards others.

deponent: a person who, under oath, gives testimony that is set down in writing.

deposition: testimony of a witness taken outside a court and set down in writing for use as evidence in court.

discretion: the capacity to act intelligently and prudently.

discovery: the disclosure of facts, documents, and the like by one party to a suit at the request of the other party to a suit, for use as evidence in a case being prepared for trial.

discretionary duty: one involving the power to make choices among valid alternatives and to exercise independent judgment in choosing a course of action.

dismissal without prejudice: the dismissal of an action or proceeding in a way that does not prevent the plaintiff from bringing another suit based on the same cause of action.

enjoin: to direct, command, or forbid some act by court order (called an injunction).

estoppel: a condition in which a person is prevented by law wither from contradicting what he has previously stated or from stating or claiming what he has previously denied.

ex parte order: an order granted by the court at the request of one party to a proceeding without prior notification to the other party involved.

extraneous: not forming an essential or vital part; having no relevance.

extrahazardous crossing: a railroad grade crossing where unusual circumstances exist which make it unusually dangerous that the prudent persons cannot safely use the crossing unless extraordinary measures or precautions are taken.

governmental function: functions which government is legally required to perform (vs. proprietary functions).

hearsay: secondhand evidence; evidence derived from something a witness has heard others say. Can be admissible under certain circumstances.

hostile witness: a witness who, under direct examination, displays such prejudice or hostility toward the party that called that such a party is permitted to cross-examine him or her.

immunities: the freedom from all tort liability as a favored defendant.

independent contractor: a person who contracts to do certain work according to his or her own methods without control by the employer except as to the result or product of the work.

inter alia: a Latin phrase meaning "among other things".

interrogatories: a series of questions in writing used in the judicial examination of a party of witness.

joinder: the joining of two or more legal proceedings; the uniting of two or more persons as plaintiffs or defendants in one suit.

Joint and several: binding two or more persons both collectively and individually. Thus, a successful plaintiff under this doctrine could recover damages from any one defendant or from all of them.

jurisdiction: the power to hear a case; courts that have the power to hear a case have jurisdiction over the case.

last clear chance: a doctrine in the law of negligence according to which a person who has the last obvious opportunity to avoid injury to another person, or himself or herself, is liable if he or she does not do so.

leading question: a question intended to suggest or elicit the reply desired by the questioner.

litigation: the pursuit of a legal contest by judicial law.

malfeasance: the commission of an unlawful act or an act one has not right to commit; used most often to describe official misconduct.

mandamus: a writ issued by courts directed to public officials or inferior courts commanding them to do or not to do something specified in the order that is within the scope of their office or duties.

ministerial duty: duties that are more likely to involve tasks that re to be executed with minimum leeway and individual judgment. Ministerial tasks are said not to require any evaluation or weighing of alternatives before performance of the assigned duty.

misfeasance: the doing of a lawful act in an unlawful or improper way.

mitigate: to make less severe; lessen.

motion: an application to a court or judge to obtain an order or rule directing some act to be done.

negligence: the failure to exercise the standard of care that would be expected of a normally reasonable and prudent person in a particular set of circumstances.

nonfeasance: the failure to perform some act that one ought or is required to perform.

nonsuit: termination of a lawsuit without any judgment on the issues.

nuisance: any thing or practice which by its existence or use causes annoyance, harm, inconvenience, or damage. a nuisance is often a valid basis for a civil suit.

plaintiff: the person who begins an action at law; the complaining party in an action.

plea: a pleading; also, more specifically, a defendant's first pleading.

Pleading: the system of preparing formal written statements of a party to a legal action; a legal document, prepared by a lawyer and filed with the court, which sets forth the positions and contentions of a party. The purpose of pleadings in civil actions is to define the issues of a lawsuit.

precedent: an adjudged case or judicial decision that furnishes a rule or model for deciding a subsequent case that presents the same or similar legal problems.

preponderance of evidence: in a case of contested facts, superiority in weight (determined by value and not amount) of the evidence presented by one side over the other (all that is required to prevail in a civil suit).

presumption of fact: an inference that affirms or denies the existence of some unknown fact, based on the existence of some fact that is already known or that has already been proven.

prima facie case: is a case strong enough that it can be overthrown only by contradicting or rebutting evidence.

proprietary function: functions which can be provided by private persons

proximate cause: the legal cause of the injuries or damages that are sustained.

punitive damages: damages awarded to a plaintiff over and above those to which he or she is entitled, because the defendant has violated one of his or her legal rights. Such damages are awarded to punish and thereby make an example of the defendant to deter others from acting in the same way.

quash: to make void or set aside; abate, annul, as an indictment or a summons.

scope of employment: employee was acting on behalf of governmental unit, was performing assigned tasks.

sovereign immunity: the immunity of a government from being sued in its own courts except with its consent, or other exception.

stare decisis: the judicial policy of following legal principles established by previous court decisions.

statute of limitations: a statute that imposes time limits upon the right to sue in certain cases.

stay: a stopping or suspension of judicial proceedings or the execution of a judgment.

subpoena: a writ commanding a person to appear in court.

subpoena duces tecum: a writ commanding a person to appear in court with a particular document or paper.

tort: any private or civil wrong by act or omission, but not including breach of contract. Some torts may also be crimes.

tortfeaser: one who commits a tort.

venure: relates to and defines the particular territorial area within the state, county, or district in which the civil case or criminal prosection should be filed and tried.

voir dire: a preliminary examination of a person, especially of a proposed witness or juror, as to his or her qualifications for the function or duty in question.

writ: a written order issued by a court, commanding the person to whom it is addressed to do or not to do some act specified therein.