

U.S. Department of Transportation
Federal Highway Administration

COMMERCIAL VEHICLE PREVENTABLE ACCIDENT MANUAL

A Guide to Countermeasures

S. Carl Uzgiris
Crispin Hales
Michael A. Dilich

Third Edition
Edited by
Kenneth L. d'Entremont



Vehicle and Mobile Equipment Center



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Consulting Engineers & Scientists - Safety Philosophy & Technology

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U. S. Department of Transportation
Office of Motor Carriers

FOREWORD TO THE THIRD EDITION

This manual was originally published in 1991 as part of the ongoing effort within the U.S. Department of Transportation (DOT) to reduce the number of vehicle accidents on the nation's highways. It was the result of a Federal Highway Administration (FHWA) investigation into the primary causes of commercial vehicle accidents and the development of countermeasures which could be used to improve traffic safety. The focus of the manual is on improved safety management, preventive maintenance, and defensive driving. Vehicle design and highway design factors are not addressed. During the past five years this manual has proved valuable to DOT Safety Specialists and carrier companies alike in reducing accident rates. Additionally, many other organizations and companies have found it to be of direct practical use in their safety programs. This third edition incorporates suggestions, improvements, updated references, and also cross references to the complementary Hazardous Materials Incident Prevention Manual.

Safety specialists can use this manual to assist them in guiding carrier companies toward improved safety. Safety management within carrier companies can use this manual to promote dialogue among its staff relating to vehicle accident analysis and prevention. Maintenance personnel and drivers can benefit from reviewing and practicing the many safety tips provided specifically for their areas of responsibility.

The manual addresses accidents which can be prevented through reasonably expected performance by drivers and carriers. It presents means for improving such performance. However, it does not set out criteria for judging whether the performance of drivers and carriers in particular circumstances is reasonable. Nor is the manual intended to be an interpretation of Federal Motor Carrier Safety Regulations.

It is recognized that many accidents result from causes beyond the reasonable control of carriers and their drivers. Such accidents are not preventable with respect to the carrier and driver and are therefore not addressed in this manual.

In addition to assistance from the Office of Motor Carriers, the help and guidance provided by the following organizations are acknowledged:

- American Association of State Highway and Transportation Officials
- America's Road Team
- American Trucking Associations
- Commercial Vehicle Safety Alliance
- Consolidated Freightways
- Insurance Institute for Highway Safety
- Lancer Insurance Company
- Leaseway Transportation
- Motor Vehicle Manufacturers Association
- National Private Truck Council
- National Highway Traffic Safety Administration
- Overland Transportation System, Inc.
- Robert Foreman Associates
- Transport Service Company

Special thanks to Thomas Zabinski in the Triodyne Graphic Communications Department for updating and improving the format of the manual, to Dror Kopernik and Christopher Ferrone for assistance with particular countermeasures, and to Marna Forbes in the Triodyne Information Center for updating the references.

Suggestions and comments for future editions would be welcomed by Triodyne and the FHWA.

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Crispin Hales
Michael A. Dilich
Kenneth L. d'Entremont

Triodyne Inc.
Vehicle and Mobile Equipment Center

April 1997

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INTRODUCTION

Purpose:

This manual presents countermeasures which may be used to reduce the incidence of preventable Commercial Motor Vehicle accidents. It offers guides and tips to help drivers and safety supervisors formulate strategies which are reflective of the particular needs and circumstances of their company and will lead to improved driving safety.

Accident Preventability:

The manual uses the notion that a preventable accident is one wherein the driver and/or the carrier failed to act in a reasonably expected manner to prevent it. This concept is broader than the commonly used safety management tool for improving safety where accident preventability is judged only on the basis of the driver's performance. Thus, this manual presents countermeasures which seek to improve carrier performance as well as driver performance. It should be noted that this manual does not set out criteria for judging whether a given level of performance is reasonable.

How this manual should be used:

The manual contains a table of typical accident situations keyed to individually numbered countermeasure sheets. For each accident situation, some potential causes are listed, together with the principal and secondary countermeasures which may help to address those causes. Each countermeasure referenced in the table is fully described on its individual sheet which contains tips and questions intended to prompt the reader to focus on strategies that could be implemented to counter the particular accident situation. These strategies may be directed either towards the improvement of the driver's performance or the motor carrier's procedures. Since no two drivers or carriers are the same, countermeasures should be viewed as guidelines which could be developed into strategies that best address the needs and circumstances of the particular driver or carrier.

Where appropriate, the countermeasure sheets reference selected books and resources for further information from the list at the end of the manual. Also, where appropriate, the relevant Federal Motor Carrier Safety Regulations (FMCSR, October 1, 1995) are indicated.

TABLE OF ACCIDENT SITUATIONS AND COUNTERMEASURES

TABLE OF ACCIDENT SITUATIONS AND COUNTERMEASURES

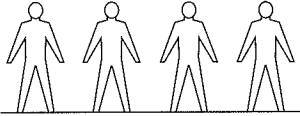
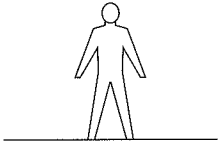
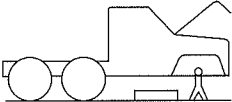
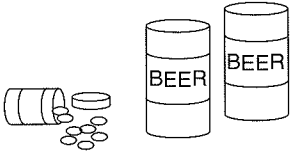

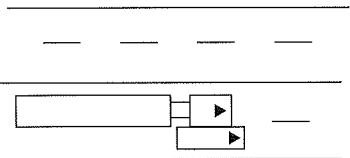
ACCIDENT SITUATIONS	POTENTIAL CAUSES	COUNTERMEASURES
<p>Excessive incidence of preventable accidents in fleet</p> 	<p>Lack of supervision</p> <p>Need for more safety control</p>	<p>A1 Accident preventability evaluations</p> <p>A4 Driver safety infractions</p> <p>A7 Fleet safety program and supervision</p> <p>A8 Company driver manuals</p> <p>A9 Driver training aids</p> <p>B1 Defensive driving</p>
<p>Excessive incidence of preventable accidents by individual driver</p> 	<p>Aggressive or reckless driving attitude</p> <p>Lack of skill</p> <p>Health problems</p> <p>Personal problems</p>	<p>A2 Driver qualifications and performance</p> <p>A3 Safe driver recognition</p> <p>A5 Drinking and substance abuse</p> <p>A6 Illness and fatigue</p> <p>A10 Truck driving schools</p> <p>B1 Defensive driving</p>
<p>Excessive incidence of accidents due to equipment failure</p> 	<p>Inadequate maintenance</p> <p>Lack of preventive maintenance</p> <p>Inadequate inspections</p>	<p>C1 Preventive maintenance and inspection procedures</p> <p>C2 Driver inspection reports and procedures</p> <p>A7 Fleet safety program and supervision</p> <p>A8 Company driver manuals</p>
<p>Impaired driver loss of control</p> 	<p>Alcohol impairment</p> <p>Drug impairment</p> <p>Illness or fatigue</p> <p>Adverse emotional state</p> <p>Inattention or drowsiness</p>	<p>A5 Drinking and substance abuse</p> <p>A6 Illness and fatigue</p>
<p>Rear-ending</p> 	<p>Following too closely</p> <p>Aggressive or reckless driving attitude</p> <p>Inattention or drowsiness</p> <p>Illness or fatigue</p>	<p>B1 Defensive driving</p> <p>A6 Illness and fatigue</p> <p>B8 Using and changing lanes</p> <p>C3 Brake performance</p>
<p>Lane change sideswipe</p> 	<p>Failure to scan space to sides</p> <p>Wandering over lane dividers</p> <p>Failure to anticipate lane mergers</p> <p>Failure to signal</p> <p>Poor mirror adjustment</p>	<p>B8 Using and changing lanes</p> <p>B5 Passing</p> <p>B1 Defensive driving</p>

TABLE OF ACCIDENT SITUATIONS AND COUNTERMEASURES

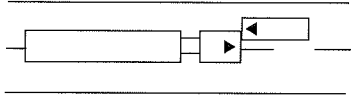
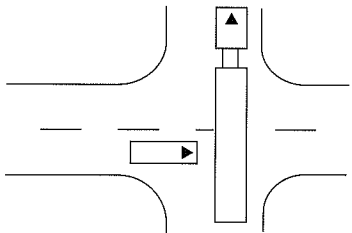
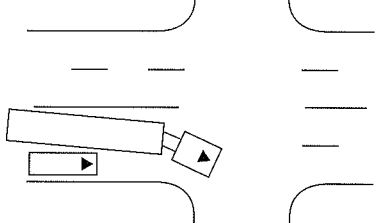
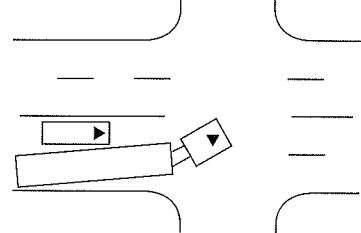
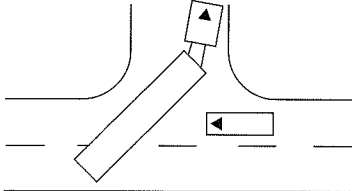
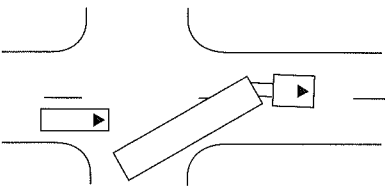
ACCIDENT SITUATIONS	POTENTIAL CAUSES	COUNTERMEASURES
<p>Over-the-centerline head-on</p> 	<p>Illness or fatigue</p> <p>Drug impairment</p> <p>Adverse conditions</p> <p>Inattention or drowsiness</p> <p>Mechanical defect</p>	<p>B8 Using and changing lanes</p> <p>B5 Passing</p> <p>B11 Driving in adverse conditions</p> <p>A5 Drinking and substance abuse</p> <p>A6 Illness and fatigue</p> <p>C1 Preventive maintenance and inspection procedures</p>
<p>Intersection collision</p> 	<p>Misjudging speed and closeness of vehicles</p> <p>Misjudging time for vehicle to clear intersection</p> <p>Failure to obey traffic control device</p> <p>Failure to use mirrors</p>	<p>B7 Crossing intersections</p> <p>B1 Defensive driving</p> <p>B2 Right-of-way</p> <p>C10 Vehicle lighting and conspicuity</p>
<p>Right turn squeeze</p> 	<p>Failure to scan space to the right</p> <p>Failure to use turn signals</p> <p>Failure to block area to right</p> <p>Failure to use mirrors</p>	<p>B6 Turning left and right</p> <p>B1 Defensive driving</p> <p>B2 Right-of-way</p> <p>B8 Using and changing lanes</p>
<p>Left turn squeeze</p> 	<p>Turning from wrong lane</p> <p>Failure to use turn signals</p> <p>Failure to use mirrors</p>	<p>B6 Turning left and right</p> <p>B1 Defensive driving</p> <p>B2 Right-of-way</p> <p>B8 Using and changing lanes</p> <p>C10 Vehicle lighting and conspicuity</p>
<p>Left turn across opposing traffic</p> 	<p>Misjudging speed of oncoming traffic</p> <p>Misjudging time for vehicle to clear intersection</p> <p>Failure to obey traffic control device</p>	<p>B6 Turning left and right</p> <p>B1 Defensive driving</p> <p>B2 Right-of-way</p> <p>C10 Vehicle lighting and conspicuity</p>
<p>Obstructing traffic flow when entering roadway</p> 	<p>Failure to give right-of-way to passing traffic</p> <p>Assuming other driver will see and avoid</p> <p>Aggressive or reckless driving attitude</p> <p>Misjudging speed of oncoming traffic</p>	<p>B2 Right-of-way</p> <p>B1 Defensive driving</p> <p>C10 Vehicle lighting and conspicuity</p>

TABLE OF ACCIDENT SITUATIONS AND COUNTERMEASURES

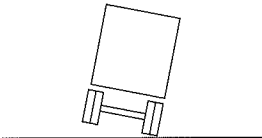
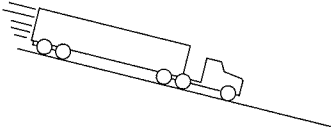
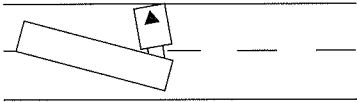

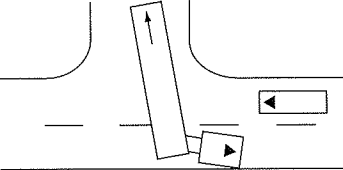
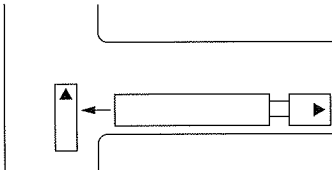
ACCIDENT SITUATIONS	POTENTIAL CAUSES	COUNTERMEASURES
Rollover 	Excessive speed for curve Unaware of influence of top-heavy cargo Driver uninformed of nature of sealed cargo	B4 Negotiating curves C11 Payload characteristics C12 Cargo securement A11 Planning schedules, loads, and routes
Downgrade runaway 	Not familiar with proper speed control Not familiar with proper gear selection Overuse of trailer only brakes Failure to check brake adjustment	B10 Negotiating downgrades C3 Brake performance C1 Preventive maintenance and inspection procedures C2 Driver inspection reports and procedures
Loss of control during adverse conditions 	Unable to judge safe speed for road/visibility conditions Aggressive braking on slippery road Failure to anticipate objects on road/bad road surface Unaware of conditions which cause jackknifing	B11 Driving in adverse conditions C11 Payload characteristics A11 Preparing schedules, loads, and routes B1 Defensive driving C4 Tire inflation C5 Tire wear and deterioration
Parking or stopping 	Sudden stopping in travel lane Parking in travel lane without use of emergency equipment	B9 Parking B2 Right-of-way B12 Emergency equipment and procedures C10 Vehicle lighting and conspicuity
Backing across road and obstructing traffic 	Failure to give right-of-way to passing traffic Failure to use headlights and running lights under reduced visibility conditions Assuming other driver will see and avoid Misjudging speed of oncoming traffic	B2 Right-of-way B1 Defensive driving
Start-up/Back-up collision 	Failure to check all around vehicle for clearance Failure to start up slowly Failure to begin backing up immediately after checking around vehicle	B3 Start-up/Back-up B1 Defensive driving

TABLE OF ACCIDENT SITUATIONS AND COUNTERMEASURES

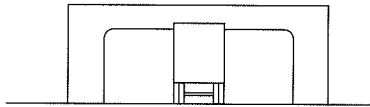
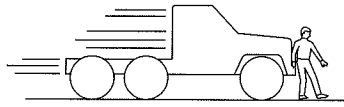
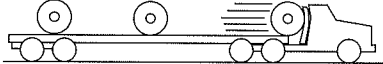
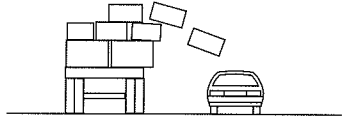
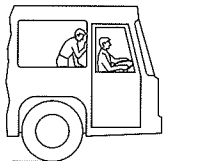
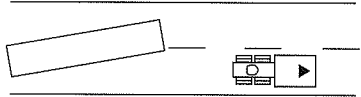
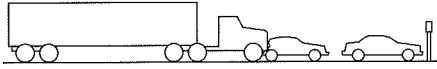
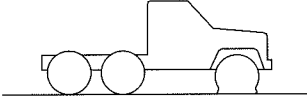
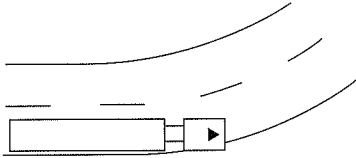
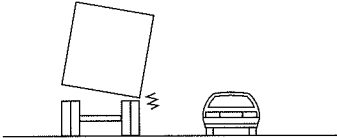
ACCIDENT SITUATIONS	POTENTIAL CAUSES	COUNTERMEASURES
<p>Impact with overhead object</p> 	<p>Failure to ensure clearance</p> <p>Unfamiliar with route to be traveled</p>	<p>C11 Payload characteristics</p> <p>A11 Planning schedules, loads, and routes</p>
<p>Pedestrian impact</p> 	<p>Inattentive to pedestrian traffic</p> <p>Running onto curb</p> <p>Failure to anticipate a pedestrian error</p>	<p>B13 Pedestrian interaction</p> <p>B1 Defensive driving</p>
<p>Loss of control due to cargo shifting</p> 	<p>Cargo not properly secured</p>	<p>C12 Cargo securement</p> <p>C11 Payload characteristics</p>
<p>Cargo falling into traffic</p> 	<p>Cargo not properly secured</p> <p>Liquid/gas cargo leaking</p>	<p>C12 Cargo securement</p> <p>C11 Payload characteristics</p>
<p>Passengers in vehicle disturbing driver</p> 	<p>Permitting passengers to stand forward of line</p> <p>Permitting passengers to move to or from seat while underway</p> <p>Permitting passengers to talk with driver while underway</p>	<p>B14 Passenger management</p>
<p>Trailer breakaway</p> 	<p>Improper coupling</p> <p>Damaged hitch</p> <p>Pintle hook not latched</p> <p>Safety chains not used</p>	<p>C9 5th wheel hitches and adjustable axles</p> <p>C8 Full trailer coupling</p> <p>C1 Preventive maintenance and inspection procedures</p> <p>C2 Driver inspection reports and procedures</p>

TABLE OF ACCIDENT SITUATIONS AND COUNTERMEASURES

ACCIDENT SITUATIONS	POTENTIAL CAUSES	COUNTERMEASURES
Brake failure 	<p>Failure to check brake adjustment</p> <p>Failure to replace badly worn parts</p> <p>Overuse of brakes on downgrade</p>	<p>C3 Brake performance</p> <p>C1 Preventive maintenance and inspection procedures</p>
Tire or wheel failure 	<p>Failure to inspect tire condition</p> <p>Failure to replace badly worn or damaged tires</p> <p>Failure to torque wheel nuts properly</p>	<p>C5 Tire wear and deterioration</p> <p>C4 Tire inflation</p> <p>C1 Preventive maintenance and inspection procedures</p> <p>C2 Driver inspection reports and procedures</p> <p>C6 Wheel retention and deterioration</p>
Steering failure 	<p>Failure to grease steering joints regularly</p> <p>Failure to replace worn out steering joints and bushings</p> <p>Failure to check power steering fluid level</p>	<p>C7 Steering system performance</p> <p>C1 Preventive maintenance and inspection procedures</p> <p>C2 Driver inspection reports and procedures</p>
Suspension failure 	<p>Failure to inspect spring condition periodically</p> <p>Failure to check U-bolts</p> <p>Failure to respond to symptoms during driving</p> <p>Overloading vehicle</p>	<p>C1 Preventive maintenance and inspection procedures</p> <p>C2 Driver inspection reports and procedures</p> <p>A11 Planning schedules, loads, and routes</p>

LIST OF COUNTERMEASURES

This list is intended to provide the safety specialist with an index to the accident countermeasures presented in the manual. Each countermeasure is given a descriptive title, which allows the reader to quickly identify the specific countermeasure of interest, and a reference number for locating the page containing the discussion of that countermeasure.

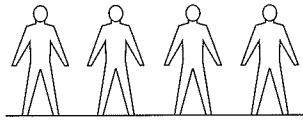
To further assist the reader in searching for specific countermeasures, the list is organized into three groups. The groups contain countermeasures which address the means for improving safety management, driving tasks, or vehicle condition.

LIST OF COUNTERMEASURES

NUMBER	SAFETY MANAGEMENT
A1	ACCIDENT PREVENTABILITY EVALUATIONS
A2	DRIVER QUALIFICATIONS AND PERFORMANCE
A3	SAFE DRIVING RECOGNITION
A4	DRIVER SAFETY INFRACTIONS
A5	DRINKING AND SUBSTANCE ABUSE
A6	ILLNESS AND FATIGUE
A7	FLEET SAFETY PROGRAM AND SUPERVISION
A8	COMPANY DRIVER MANUALS
A9	DRIVER TRAINING AIDS
A10	TRUCK DRIVING SCHOOLS
A11	PLANNING SCHEDULES, LOADS, AND ROUTES
NUMBER	DRIVING TASKS
B1	DEFENSIVE DRIVING
B2	RIGHT-OF-WAY
B3	START-UP/BACK-UP
B4	NEGOTIATING CURVES
B5	PASSING
B6	TURNING LEFT AND RIGHT
B7	CROSSING INTERSECTIONS
B8	USING AND CHANGING LANES
B9	PARKING
B10	NEGOTIATING DOWNGRADES
B11	DRIVING IN ADVERSE CONDITIONS
B12	EMERGENCY EQUIPMENT AND PROCEDURES
B13	PEDESTRIAN INTERACTION
B14	PASSENGER MANAGEMENT
NUMBER	VEHICLE CONDITION
C1	PREVENTIVE MAINTENANCE AND INSPECTION PROCEDURES
C2	DRIVER INSPECTION REPORTS AND PROCEDURES
C3	BRAKE PERFORMANCE
C4	TIRE INFLATION
C5	TIRE WEAR AND DETERIORATION
C6	WHEEL RETENTION AND DETERIORATION
C7	STEERING SYSTEM PERFORMANCE
C8	FULL TRAILER COUPLING
C9	5TH WHEEL HITCHES AND ADJUSTABLE AXLES
C10	VEHICLE LIGHTING AND CONSPICUITY
C11	PAYLOAD CHARACTERISTICS
C12	CARGO SECUREMENT

COUNTERMEASURES

TYPICAL ACCIDENT SITUATIONS



Excessive incidence of preventable accidents in fleet

COUNTERMEASURE

Objective:

To reduce motor carrier fleet accident rates by establishing a company standard for safe driving.

Description:

A preventable accident is one which occurs because the driver fails to act in a reasonably expected manner to prevent it. In judging whether the driver's actions were reasonable, one seeks to determine whether the driver drove defensively and demonstrated an acceptable level of skill and knowledge. The judgment of what is reasonable can be based on a company-adopted definition which establishes a goal for its safety management programs.

Note that the above definition of preventable accident is focused on the actions of the driver. It is the commonly used definition in evaluating driver performance. A broader definition, which can be used to evaluate the driver's and the motor carrier's actions, is given by the Federal Motor Carrier Safety Regulations as follows: "Preventable accident on the part of a motor carrier means an accident (1) that involved a commercial motor vehicle, and (2) that could have been averted but for an act, or failure to act, by the motor carrier, or the driver."

The concept of a preventable accident is a fleet safety management tool which achieves the following goals:

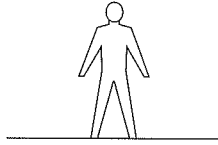
- It helps establish a safe driving standard for the driver.
- It provides a criterion for evaluating individual drivers.
- It provides an objective for accident investigations and evaluations.
- It provides a means for evaluating the safety performance of individual drivers and the fleet as a whole.
- It provides a means for monitoring the effectiveness of fleet safety programs.
- It assists in dealing with driver safety infractions.
- It assists in the implementation of safe driving recognition programs.

Questions for management:

- Does the company have a program for investigating accidents?
- Is there a company accident review committee?
- Has the company defined a standard for the safe driving performance of its drivers?
- Is the carrier's standard for safe driving performance sufficiently challenging such that it would serve to highlight areas for fleet safety improvement?
- Are the drivers instructed as to what the company standard for safe driving is?
- Are the drivers instructed about company procedure for evaluating the preventability of accidents?

REFERENCES: M1; M2; M4; M5.

TYPICAL ACCIDENT SITUATIONS



Excessive incidence of preventable accidents by individual driver

COUNTERMEASURE

Objective:

To improve motor carrier fleet safety by recruiting qualified drivers and monitoring the performance and qualifications of existing drivers.

Description:

The great majority of preventable accidents can be shown to be directly related to the performance of the driver. It is therefore extremely productive for any fleet safety program to have careful new driver selection and adequate monitoring procedures for existing drivers.

Questions for management:

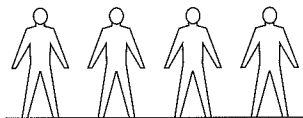
- When hiring new drivers:
 - Are recruiting efforts sufficient to attract an adequate number of qualified applicants for effective selection?
 - Is there an established formal procedure for interviewing, testing, and screening applicants?
 - Is there a defined standard of skill and knowledge to be met by successful applicants?
 - Are appropriate methods being utilized to check out previous employment history and references?
 - Is the prior driving record being checked?
 - Are the applicants' physical qualifications checked?
- Monitoring existing drivers' qualifications:
 - Is there a formal program for monitoring drivers' qualifications?
 - Is there a periodic review of the driving record?
 - Is there a periodic review of the drivers' health?
 - Are drivers monitored for drug and alcohol abuse?
 - Is there a means for identifying deficiencies in drivers' skills and knowledge and a procedure for remedial training?
 - Is there an established procedure for terminating unqualified drivers?

REGULATIONS: FMCSR Part 391.

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: P6.

REFERENCES: M1; M2; C1; C2.

TYPICAL ACCIDENT SITUATIONS



Excessive incidence of preventable accidents in fleet

COUNTERMEASURE

Objective:

To encourage safe driving and improve driver awareness of safety.

Description:

Safe driving recognition or incentive programs should be an integral part of a formal fleet safety program. Such programs identify and reward superior driving performance and set forth the selected drivers as examples to be emulated by the rest of the fleet. Such programs can be generated within the company or through participation in national safe driver award programs conducted by associations such as the National Safety Council or the American Trucking Associations.

Questions for management:

- Does the company have a means for evaluating driver performance?
- Does the company have a formal safe driver recognition and incentive program?
- Does the company participate in national award programs?

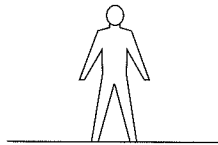
Management tips:

- Use safe driving recognition to:
 - encourage safe driving performance
 - heighten driver safety awareness
 - foster driver professionalism
 - focus the monitoring of individual driver performance and skills
 - help monitor fleet performance and effectiveness of the fleet safety program

REGULATIONS: FMCSR Part 383 Subpart C and G; Part 385.

REFERENCES: M1; M2; C3.

TYPICAL ACCIDENT SITUATIONS



Excessive incidence of preventable accidents by individual driver

COUNTERMEASURE

Objective:

To improve fleet safety by remedial training or termination of unqualified drivers.

Description:

Driving is a profession requiring skill, knowledge, physical and mental health, and character integrity. Public safety and company reputation require that drivers be fully qualified. Drivers who are not qualified should receive remedial training or be terminated if they cannot be brought up to the necessary level of competence.

Questions for management:

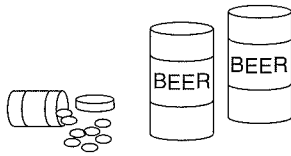
- Does the carrier have a formal review program for driver qualification?
- Do all the drivers meet the FMCSR qualification requirements?
- Does the company have a standard for safe driving?
- Is there a company policy for issuing reprimands and terminations?
- Is a progressive disciplinary action a feature of the policy?
- Are remedial training programs available?
- Is remedial training included in the progressive discipline?

REGULATIONS: FMCSR Part 391.

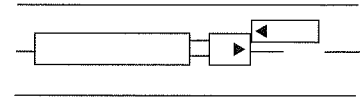
HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: P2.

REFERENCES: M1; M2.

TYPICAL ACCIDENT SITUATIONS



Excessive incidence of preventable accidents by individual driver



COUNTERMEASURE

Objective:

To prevent accidents caused by drivers under the influence of alcohol or drugs by identifying and controlling abusers.

Description:

It has been well documented that drivers under the influence of alcohol or drugs have been involved in about half of all fatal traffic accidents. Drinking or substance abuse by drivers cannot be tolerated. Company management must be acutely aware of the seriousness of this societal problem and establish procedures to effectively control it within their respective organizations.

Questions for management:

- Are the driving records and references of new-hire applicants checked thoroughly for evidence of drinking or substance abuse problems?
- Has a written policy been established which stipulates countermeasures that will be followed when dealing with abusers?
- Has a formal policy been made known to all drivers?
- Do drivers' immediate supervisors and dispatchers know how to identify personnel under the influence?
- Are immediate supervisors and dispatchers motivated to notify management about problem drivers?
- Has management educated drivers about the ways in which drinking and substance abuse affect driving performance?
- Does the company have a list of references and potential sources for help available to drivers?

Management tips:

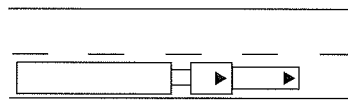
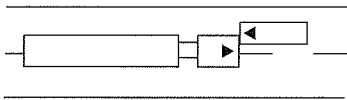
- Be aware of marked changes in work behavior, personal relations, mood, and appearance of your drivers.
- Immediate supervisors are in the best position to observe unusual driver behavior.
- Do a thorough job screening job applicants for drinking and substance abuse. Your company can't afford to deal with the problems abusers will give you.

Driving tips:

- Don't drink and drive.
- Don't abuse drugs, legal or illegal.
- Find out if prescription or over-the-counter medications may adversely affect safe driving.
- Get help fast if you have, or think you may have, an abuse problem.

REGULATIONS: FMCSR Part 383.51; 383.53; 391 Subpart H; 392.4; 392.5.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents caused by ill and fatigued drivers through the use of common sense and compliance with FMCSR's regarding physical qualifications and hours of service.

Description:

Everyone understands how ill or fatigued drivers can be a hazard to themselves and others. Nonetheless, drivers sometimes push their bodies beyond reasonable limits and become a hazard anyway. This is why comprehensive federal regulations have been established. In addition to being law, these regulations are useful to both the drivers and supervisors in sensibly defining when medical conditions or duty status call for rest and no driving.

Questions for management:

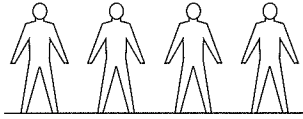
- Are supervisors fully aware of all the FMCSR's which relate to physical qualifications, medical examinations, and hours of service?
- Are maximum on-duty and driving times clearly spelled out to your drivers?
- Do you cross-check driver logs with odometer readings, fuel receipts, and weight scale tickets?
- Do you use tachographs or on-board trip computers if you suspect driver violations?
- Have drivers been explicitly informed how violations will be dealt with?

Driving tips:

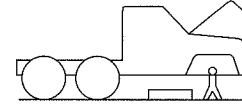
- Don't start a long trip unless you get a good sleep before you go.
- When possible, schedule your trips so that you drive when you are normally awake and you sleep when you are normally asleep. Don't throw off your body clock more than necessary.
- Be careful with any kind of medication. Many medicines can make you sleepy.
- If you get drowsy, don't drive. You're asking for problems. At least take a short nap until you can drive somewhere to get a good sleep.

REGULATIONS: FMCSR Part 391 Subpart E; 392.3; 392.4; 392.5; 395.
HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: P3.

TYPICAL ACCIDENT SITUATIONS



Excessive incidence of preventable accidents in fleet



COUNTERMEASURE

Objective:

To improve safe driving performance with an effective fleet safety program.

Description:

Fleet safe driving performance is dependent on management commitment to the implementation of a formal fleet safety program. An effective safety program will interact with most aspects of fleet operations and challenge the skills and knowledge of its supervisors and drivers.

Questions for management:

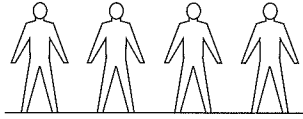
- Is there a formal fleet safety program?
- Does your fleet safety program provide the framework for safety management to:
 - recruit and screen new drivers?
 - monitor driver qualifications and safety infractions?
 - provide training to upgrade driver skills and knowledge?
 - provide a formal mechanism for investigating and reviewing accidents?
 - implement safe driving incentives?
 - monitor maintenance and equipment safety?
 - oversee and implement regulatory compliance?
 - establish carrier safety standards?
 - communicate program goals to drivers and supervisory personnel?
 - monitor program effectiveness?
 - offer recognition to drivers who meet the required standard of performance?
- Is there a designated person with responsibility for safety and compliance with regulations?
- Is the safety director given an opportunity for professional development by attending training seminars and industry association meetings?
- Does the company and its supervisory staff maintain membership and remain active in trade and professional associations?

REGULATIONS: FMCSR Part 385.

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: P3.

REFERENCES: M1; M2.

TYPICAL ACCIDENT SITUATIONS



Excessive incidence of preventable
accidents in fleet

COUNTERMEASURE

Objective:

To improve fleet safety through improved communication.

Description:

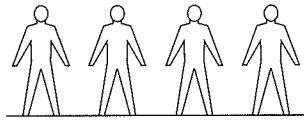
The company driver manual is a key communication link between the company and its drivers. It conveniently brings together information about the company, its policies and procedures. It is indispensable for training new drivers and is a handy reference for existing drivers. The manual should be progressively developed and continually updated.

Questions for management:

- Does the company have an updated manual for its drivers?
- Does the manual describe the fleet safety program?
- Does it set forth the carrier's standards for safe driving?
- Is the company procedure for review and classification of accidents included?
- Are the company's disciplinary procedures explained?
- Is the manual regularly reviewed and updated?

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: P2.
REFERENCES: M1; M2; C1.

TYPICAL ACCIDENT SITUATIONS



Excessive incidence of preventable accidents in fleet

COUNTERMEASURE

Objective:

To improve fleet safety through use of training aids.

Description:

The number of driver training aids is so great that the problem is how to locate, select, and evaluate the most appropriate ones for the company. It is important to determine what mix of audio-visual aids, posters, manuals, pamphlets, and other literature is most effective in improving the company's training program. Advice is available from a number of organizations.

Questions for management:

- Does the company have a safety training program?
- Are audio-visual aids being utilized?
- Has a recent survey of available driver training aids been carried out by the company?
- What about retraining for meeting new regulations and license requirements?

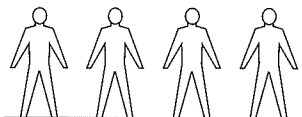
Management tips:

- Remember the following sources of driver training aids:
 - national and state truck and bus associations
 - safety organizations
 - insurance companies
 - company in-house productions
 - private sector providers and consultants

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: T1.

REFERENCES: C1 to C6; D1 to D4.

TYPICAL ACCIDENT SITUATIONS



Excessive incidence of preventable
accidents in fleet

COUNTERMEASURE

Objective:

To improve fleet safety by improving driver skills and knowledge.

Description:

Truck driving schools are good sources of motivated young drivers and remedial training. There are many schools. Some are operated commercially, others are operated privately by large carriers. Each school is different; with differing objectives, facilities, and staff orientation. It is important to check that the curriculum of the school matches the needs of the company, before the school is selected.

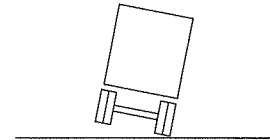
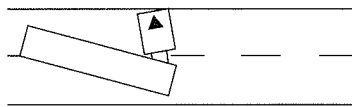
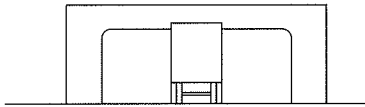
Questions for management:

- Are truck driving schools being used as a recruiting source?
- Has the carrier considered truck driving schools for remedial training?
- Has the company identified schools which meet its objectives?

Management tips:

- Sources of information about truck/bus driving schools:
 - national and state truck and bus associations
 - insurance companies
 - accreditation organizations
- Some factors to be considered when selecting a particular school:
 - curriculum content
 - adequacy of facilities
 - compatibility of training vehicles with company fleet
 - staff qualifications and experience
 - certification
 - referrals
 - hours of driving instruction and practice.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To maximize safe driving efficiency through planning at the dispatching level.

Description:

Assisting the driver with pre-trip planning avoids overburdening the driver with unusual driving conditions caused by tight schedules, unusual cargoes, and unfamiliar or hazardous routes.

Questions for management:

- Are Hours-of-Service statutory regulations enforced?
- Are records of driver duty status maintained?
- Does the carrier have a means of forecasting available driver hours?
- Is dispatching planned to minimize the need for excessive on-duty schedules?
- Are tight schedules minimized and allowances made for adverse weather conditions?
- Are dispatchers knowledgeable in matching cargoes with vehicles during dispatching?
- Are drivers instructed how to deal with sealed cargoes?
- How does the company handle the problem of overloading?
- How does the company instruct drivers with regard to improperly loaded or secured cargoes?
- Are routes planned and drivers coached to avoid high hazard locations?
- Are schedules reviewed to ensure against Hours-of-Service violations?

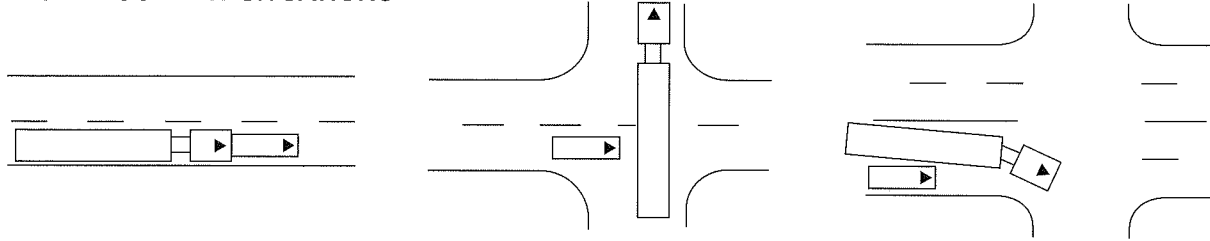
REGULATIONS: FMCSR 392.14; Part 395.

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: P1.

B1

DEFENSIVE DRIVING

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents by trying to anticipate hazardous situations and adjusting driver behavior to compensate.

Description:

The defensive driver tries to recognize potentially hazardous situations sufficiently in advance to allow time to safely maneuver past them. The defensive driver assumes that other drivers may make mistakes and is on guard in the event an error is made. The defensive driver searches ahead of what is immediately in front, to have advance warning of approaching hazards.

Questions for management:

- Do you periodically have a qualified person ride along with the drivers to evaluate their defensive driving habits?
- Do the drivers understand how they should be driving to be defensive drivers?
- Do drivers recognize that common situations such as crossing intersections, entering expressways, and stopping can be hazardous?
- What does the company do to encourage defensive driving?
- Have the drivers been trained in regard to defensive driving?
- Are the drivers aware of the concept of “preventable accident”?
- Does the company have an accident review program for classifying preventable and non-preventable accidents?
- Has the company defined a standard for judging safe driving performance for its drivers?

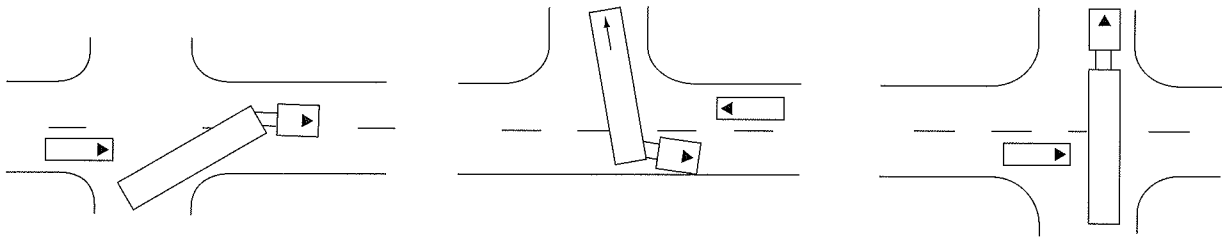
Driving tips:

- Learn to recognize driving situations that can be hazardous.
- Assume other drivers will make errors.
- Adjust speed, position, direction, and attention to be able to maneuver safely if a hazard develops.
- Scan far enough ahead to be able to react safely to approaching situations.
- Scan frequently to the side and rear for passing or approaching vehicles.
- Scan thoroughly before changing speed or direction.

REGULATIONS: FMCSR 383 Subpart G.

REFERENCES: M1; M2; D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents by giving the “right-of-way” until it is apparent that the right-of-way is being given by the other driver.

Description:

Generally the driver who arrives last gives the right-of-way to those who were already there. You give the right-of-way when entering traffic. You give the right-of-way when turning left in front of approaching traffic. You give the right-of-way when changing lanes. You move into your intended path or direction only after you are assured you will not conflict with other traffic.

Questions for management:

- Do your drivers understand the meaning of right-of-way?
- Do you periodically have a qualified person ride with your drivers to evaluate their behavior in right-of-way situations?
- Do you have a realistic scheduling policy which does not encourage drivers to take the right-of-way rather than give it?
- Are the drivers aware of the concept of “preventable accident”?

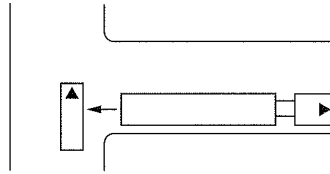
Driving tips:

- Do not force other drivers to brake or steer because of your obstructive maneuver into their path.
- Assume other drivers will not see you and avoid you when you maneuver into their path.
- Move into your intended path or direction only after you are assured you will not conflict with other traffic.

REGULATIONS: FMCSR 383.110; 383.111; 383.113; 383.115.

REFERENCES: DI.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent start-up/back-up accidents by anticipating the hazards involved and knowing how to safely control them.

Description:

During a typical start-up/back-up situation, a vehicle has been parked for a long enough time to allow pedestrians and other vehicles to approach and rest within a few feet of the parked vehicle. Starting up forward, backward, or steering left or right from a stopped position can create an unexpected hazard for both the driver and bystanders.

Questions for management:

- Are drivers aware of different types of hazards that may arise during start-up/back-up?
- Do drivers take time to walk around their vehicles and look under vehicles checking for people, vehicles, or other objects which may obstruct their start-up/back-up path?
- What do you do to encourage drivers to make a walk-around check?
- Are vehicles provided with adequate mirrors?

Maintenance checks:

- Check for proper mirror adjustment.
- Check for broken mirrors and loose mountings.
- Check for proper tail light, brake light, and turn signal function.
- Check for proper function of horn and back-up warning signal (if so equipped).

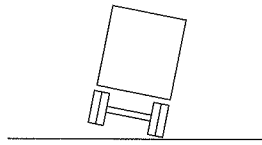
Driving tips:

- Before start-up or back-up, walk around vehicle and look underneath to ensure you have safe clearance for start-up.
- Don't forget to check blind area on right and in front as well.
- After your walk-around check, don't delay in moving vehicle. Do not allow time for another hazard to approach.
- Check mirrors for proper adjustment frequently.
- Start up slowly at first to allow other vehicles and pedestrians, who may have unexpectedly approached, to safely move away.
- Tap horn in congested areas or recruit a signalman.

REGULATIONS: FMCSR 383.111; 383.113; 383 Appendix to Subpart G.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent rollover accidents by a clear understanding of how and why rollovers occur and how to judge safe speed approaching and negotiating curves.

Description:

When negotiating a curve at an excessive speed, commercial motor vehicles will roll over. Automobiles will lose traction and slide out of a curve instead of rolling over. The more top-heavy a vehicle is, the more likely it will roll over than slide out of a curve. During a tractor-trailer rollover, the trailer usually begins to roll before the tractor. By the time the driver realizes that the trailer is rolling, there is not much that can be done to prevent a complete rollover.

Questions for management:

- Do drivers know that the posted advisory speed on curves is for automobiles, not commercial vehicles?
- Do your drivers know that commercial motor vehicles generally cannot negotiate curves at as high a speed as automobiles without the possibility of rolling over?
- Do your drivers know what conditions make rollover more likely?

Driving tips:

- Ensure that cargo loads are secured to prevent moving from side to side.
- Remember that top-heavy cargo will cause commercial vehicles to roll over in curves at speeds lower than those loaded with flat compact cargo.
- Reduce speed before entering curve. If you enter curves too fast, you may not have enough time to slow down before rolling over.
- Maintaining speeds at curve advisory may not be slow enough to prevent rollover of commercial vehicles.
- Since trailers usually begin to roll first, you may not know you are rolling over until it is too late. Slow down before you get into the curve.
- Stay off the shoulder in curves. Your right or left side wheels may drop or sink down into a shoulder and increase your chance of rollover.
- Slow down substantially for unfamiliar curves.

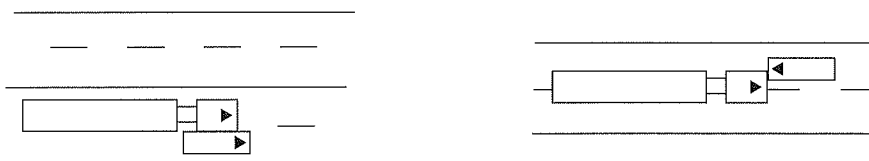
Maintenance Checks:

- Adequate fifth wheel lubrication.

REGULATIONS: FMCSR 383.111; 383.113; 383.115.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents during passing by anticipating the hazards involved and knowing how to safely avoid them.

Description:

Safe passing maneuvers require well developed skills and judgment. Passing tasks include checking sight distance ahead, checking mirrors for rear traffic, checking for traffic passing you, estimating speed and position of approaching vehicles, estimating time you need to safely pass, accelerating, steering, checking for traffic entering from side roads, etc. Because the driver must perform several tasks in a short time during passing, the chance of an error is high, unless the maneuver is done cautiously. Because it sometimes takes a long time before an opportunity to pass safely arises, some drivers take risks and assume other drivers will compensate for such aggressiveness.

Questions for management:

- Have your drivers ever been trained to perform safe passing maneuvers? How? When? By whom?
To what standard of performance?
- Do you know if your drivers are practicing safe passing maneuvers?
- Do you periodically have qualified personnel ride with your drivers to assess their driving habits?
- Do you have a step-by-step procedure for safely completing a pass?

Maintenance checks:

- Broken mirrors and loose mountings.
- Tail light, brake light, and turn signal function.

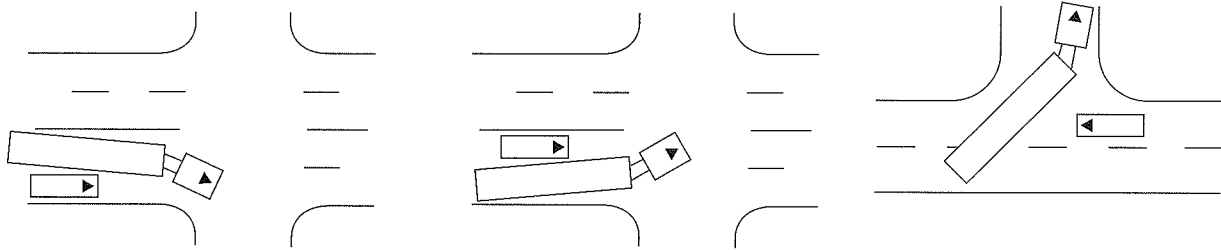
Driving tips:

- Before you pass, check to be certain no one is passing you.
- Assume the driver in front of you doesn't know you are passing. That driver may pull to the left to pass a vehicle in front or make a left turn.
- While you are passing, watch carefully for vehicles that may be entering the roadway from side roads or driveways.
- Assume vehicles approaching from the opposite direction will not see you or slow down for you to complete your passing maneuver.
- Watch out for vehicles passing other vehicles from the opposite direction.
- If the vehicle you are trying to pass speeds up, let it go. Don't get into a dangerous race.
- Don't take risks. If in doubt, don't pass.
- Signal your intentions to pass.

REGULATIONS: FMCSR 383.111; 383.113; 383.115.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent turning accidents by anticipating the hazards involved and knowing how to safely avoid them.

Description:

Making left or right turns with long vehicles creates problems that automobile drivers do not have. Blind spots make it difficult to see other vehicles. Vehicle length forces drivers to make wide turns, encroaching upon adjacent lanes of traffic. Improper tracking of vehicles makes it difficult for the driver to judge position. Turning takes longer to complete, thus increasing exposure time to hazards. Drivers should recognize the hazards created while turning and follow proper procedures to minimize them.

Questions for management:

- Have your drivers been trained regarding safe turning procedures? How? When? By whom? To what standard of performance?
- Do you know if your drivers are practicing safe turning procedures?
- Do you ever have qualified personnel ride with your drivers to assess safe driving habits?
- Have you examined routes used to minimize travel and turning at difficult or hazardous intersections?
- Have you considered attaching "Wide Right Turn" decal on rear of vehicles?

Maintenance checks:

- Broken mirrors, loose mountings, and mirror adjustment.
- Tail light, brake light, and turn signal function.

Driving tips:

Right turns:

- Move to the right lane well in advance of intersection, positioned to make a safe turn.
- When turning, keep rear of vehicle to the right, blocking other vehicles from passing on the right.
- If encroaching upon other lanes, wait for other vehicles to clear and then turn slowly.
- Be careful that improper tracking does not cause the vehicle or trailer to ride up onto curb or strike stationary objects.

Left turns:

- As you approach turn with signal on, watch for drivers who may misinterpret this signal as an intention to turn somewhere before your intended turning point.
- Don't start turning until there is enough time for the rear of vehicle to clear the intersection without forcing opposing drivers to slow down or swerve.
- Don't assume opposing drivers will see you. They may be looking elsewhere.
- Be careful that improper tracking does not cause the vehicle or trailer to interfere with pedestrians and other vehicles.

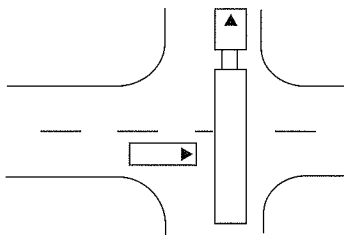
REGULATIONS: FMCSR 383.111; 383.113; 383 Appendix to Subpart G.

REFERENCES: M1; M2; C2; D1.

B7

CROSSING INTERSECTIONS

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent intersection accidents by anticipating the hazards involved and knowing how to safely avoid them.

Description:

Crossing intersections with long vehicles presents problems that automobile drivers do not have. Because of their length and their slow acceleration, trucks and buses take much more time to cross and clear intersecting roads than do automobiles. Also, at night, the sides of long vehicles may not be conspicuous to approaching drivers. Drivers of large vehicles must recognize these problems and take special care when crossing intersections, particularly when they are uncontrolled intersections.

Questions for management:

- Have your drivers ever been trained regarding safe procedures when crossing intersecting roads?
How? When? By whom? To what standard of performance?
- Do you know if your drivers are practicing safe road crossing procedures?
- Do you ever have qualified personnel ride with your drivers to assess safe driving habits?
- Do you have a step-by-step procedure for approaching, entering, and traversing intersections?

Maintenance checks:

- Side marker lights on tractors, trailers, and buses.
- Cleanliness of sides of vehicles.
- Reflectors and/or reflective tape on sides of vehicles.

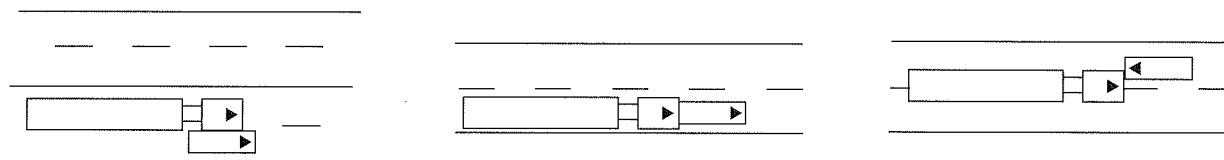
Driving tips:

- Approach intersection assuming that cross traffic may not obey traffic control and anticipate the need for avoidance.
- When crossing an uncontrolled intersection, allow enough time to clear entire road with rear of vehicle without interfering with cross traffic. Don't count on cross traffic slowing down to let you pass. They may not see you.
- Crossing uncontrolled intersections at night with large vehicles is especially hazardous. Although approaching drivers may see your headlights from the side, they may not realize you have a long trailer following.
- Keep sides of vehicle clean and keep side marker lights operational. Be very careful with dark-colored unloaded flatbed trailers.

REGULATIONS: FMCSR 383.111; 383.113; 383.115; 383 Appendix to Subpart G.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents during lane use and lane changing by recognizing the potential hazards and knowing how to safely control them.

Description:

Lane use and lane changing accidents primarily result from following too closely or being inattentive to traffic conditions ahead. In either case, defensive driving is the most effective countermeasure. Lane use and lane changing accidents primarily involve sideswiping and rear-end collisions. The existence of blind spots around large vehicles is a major contributing factor. Drivers must maintain a proper following distance and also take note of countermeasures involving right-of-way.

Questions for management:

- Have your drivers been trained regarding safe lane usage and lane changing? How? When? By whom?
To what standard of performance?
- Do you know if your drivers are practicing safe lane usage and lane changing habits?
- Do you ever have qualified personnel ride with your drivers to assess safe driving habits?
- Do you and your drivers know that most lane use and lane changing accidents result from following too closely?

Maintenance checks:

- Broken mirrors and loose mountings.
- Brake lights and turn signals.
- Brake performance.

Driving tips:

- The most important rule in lane usage is to maintain a safe following distance. Use any method you feel comfortable with. Just try to ensure that if the driver in front of you slams on his brakes, you can avoid a collision, stay in your lane and not be hit by the vehicle following you.
- Try to scan ahead of what is immediately in front of you.
- If you see trouble ahead, flash your brake lights to alert drivers following you.
- If you cannot see ahead of the vehicle you are following, increase your following distance. It might swerve into the next lane to avoid a slow or stopped vehicle and leave you exposed to a rear-end collision.
- Blind spots to the right of large vehicles are well known. However, automobile drivers may not know you cannot see them as they pass you on the right. Scan to the right thoroughly before steering into the next lane. Give right-of-way, don't take it.
- Clean mirrors and check adjustment frequently.

REGULATIONS: FMCSR 383.111; 383.113; 383.115; 383 Appendix to Subpart G; 392.15.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents when parked, by anticipating the hazards involved and knowing how to safely avoid them.

Description:

Parking on or partially on a travel lane creates a hazard. This is especially true at night. On congested metropolitan streets, drivers expect to see parked vehicles in their lane and are usually ready to react and avoid them. On rural and high-speed roads, drivers do not expect to see vehicles parked in their lane. Their attention level may be lower and they may not be able to react quickly enough to avoid a collision.

Questions for management:

- Have your drivers ever been trained regarding safe parking procedures? How? When? By whom?
- Do you know if your drivers are practicing safe parking procedures?
- Do you ever have qualified personnel ride with your drivers to assess safe driving habits?
- Are your vehicles equipped with required emergency warning devices?
- Do drivers know how to set up triangles?
- Do drivers know where to place triangles?
- Does the entrance to your terminal provide sufficient space to park off the roadway?

Maintenance checks:

- Clean vehicle; especially the rear.
- Tail light and flasher operation.
- Emergency reflective triangles and/or flares stored in vehicle.
- Battery condition.

Driving tips:

- Always try to park your vehicle off the road altogether. Even leaving a small portion of your vehicle on the travel lane creates a serious hazard.
- If you pull off onto the shoulder, turn on your flashers day or night. At night, drowsy drivers who see only tail lights on your vehicle may follow you onto the shoulder thinking you are still moving.
- If a sudden breakdown or other emergency forces you to park on a travel lane, turn on your flashers immediately. Then set up reflective triangles at the proper distances immediately. If you have a CB radio, call for help. At night, this is an especially hazardous situation for both you and other drivers. Be extremely careful.

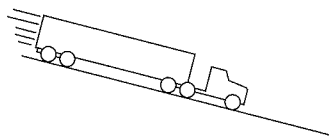
REGULATIONS: FMCSR 392.20; 392.22; 392.31.

REFERENCES: D1.

NEGOTIATING DOWNGRADES

B10

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent loss of control accidents on downgrades by proper brake system maintenance and by developing the skills and knowledge needed to safely negotiate a downgrade.

Description:

The main reason for loss of control on downgrades is loss of braking, and the main reason for this is the use of improper control techniques by the driver. The brake system may be damaged or maladjusted and may not have sufficient capacity for downgrade control. Primary countermeasures for preventing a runaway are: adequate driver skills, frequent checks on brake operation, proper adjustment, and adequate preventive maintenance.

Questions for management:

- Have drivers been trained to properly control their vehicles on downgrades? How? When? By whom?
- Do drivers know how to select proper gearing for downgrade descents?
- Do drivers know how to check the condition of braking systems?
- How often does the maintenance crew inspect and adjust brake systems? Is this frequent enough?
- If vehicles are equipped with brake application pressure gauges, do drivers know how to use them?

Maintenance checks:

- Frequent brake inspection and adjustment. Inspect and adjust brakes more frequently for vehicles used in mountainous terrain. For cross-country trips, check after every trip, in addition to driver daily inspections.
- Don't wait for slack adjuster stroke to exceed maximum permissible. Adjust to minimum acceptable stroke whenever convenient.
- Replace all aged brake lines, valves, and diaphragms.

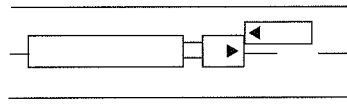
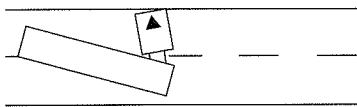
Driving tips:

- The gear to select for descending a grade should be no higher than that required for ascending the same grade. Some vehicles may require lower gears going down than going up. Know your vehicle.
- Know the speed limit or maximum safe speed and put the truck in the proper gear before starting downhill. When the maximum vehicle speed is reached, apply the brakes just enough to feel the vehicle slow down. Once the vehicle has slowed down by 5 m.p.h. – this should take about 3 seconds – release the brakes. Repeat this braking as needed.
- Don't use hand lever to apply only trailer brakes. You could overheat trailer brakes and not have enough capacity in tractor to control speed adequately.
- Stop, put truck in proper gear, and check brake function before descending long, steep grades.
- Never try to downshift while descending grade. You may not be able to get into gear and may end up in neutral.

REGULATIONS: FMCSR 383.111; 383.113; 396.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents by developing the driver skills and judgment necessary to operate vehicle safely during adverse traction and visibility conditions.

Description:

Failure to adjust to adverse conditions is a major factor in accident causation. The adverse conditions most frequently encountered cause reduced traction and reduced visibility. Reduced traction conditions include rain, snow, ice, slush, and gravel. Reduced visibility conditions include twilight, darkness, rain, snow, and fog. Drivers should not only develop the skills and judgment necessary to keep their own vehicles safely under control, they should also try to anticipate and be prepared to compensate for errors other drivers make during such poor driving conditions.

Questions for management:

- Does the driver know how to judge safe speed on slippery surfaces?
- Does the driver know what causes jackknifing and how to prevent it?
- Have drivers ever been trained to safely maneuver on slippery surfaces? How? When? By whom?
- Is there a safe off-road area available to drivers for practicing vehicle handling on slippery surfaces?
- How do trip schedules take into account the effect of inclement weather?
- Should tire chains be used in severe weather conditions?

Maintenance checks:

- | | |
|--|--|
| • Tire tread wear and tire pressure. | • Availability of tire chains when needed. |
| • Windshield wiper and washer condition. | • Mirror system. |
| • Proper functioning of all lighting circuits, including emergency flashers. | • Headlight beam aim. |

Driving tips:

Reduced traction conditions:

- Increase following distance enough to avoid a rear-end collision if other driver brakes hard or loses control.
- Use moderation in judging safe speed. To maintain a safe stopping distance, slow down, but not so much that you become a hazard to drivers behind.
- Apply brakes gently and steer without jerky movements.
- Beware when running empty or bobtailing. Lightly loaded wheels lock up easily during braking and this induces jackknifing.
- Beware of travelling too slowly on slick, banked curves. The vehicle might slide sideways into opposing traffic or off the road.

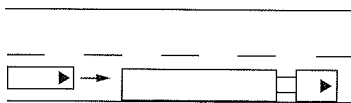
Reduced visibility conditions:

- Use moderation in judging safe speed. To maintain a safe stopping distance during reduced visibility, slow down, but not so much that you become a hazard to drivers behind.
- Keep vehicle clean, especially headlights, windshield, tail lights. Use emergency flashers in extreme conditions. Be prepared to get off road and wait for conditions to improve if necessary.

REGULATIONS: FMCSR 383.110; 383.111; 383.113; 383 Appendix to Subpart G; 392.14.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents during emergency situations by anticipating the hazards involved, knowing how to avoid them safely and using available emergency equipment.

Description:

Emergency situations include stalling in a travel lane, stopping for an accident in your path, engine compartment fire, wheel fire, burned-out light bulbs, blown fuse in lighting circuit, etc. Having emergency equipment available in your vehicle and knowing how to use it will greatly assist you in avoiding hazards that arise in these types of situations.

Questions for management:

- Have your drivers ever been trained regarding emergency equipment requirements and emergency procedures? How? When? By whom?
- Are all your vehicles equipped with the required emergency equipment?
- Have you ever questioned your drivers about how to place reflective triangles or how to use the fire extinguisher or what to do if their vehicle suddenly stalls on the roadway?
- Are your vehicles conspicuous enough when emergency equipment is used?

Maintenance checks:

- Emergency flashers – tractor and trailer
- Spare electrical fuses (if fuses are used)
- Reflective triangles
- Fire extinguishers
- Fusees

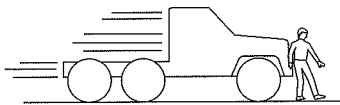
Driving tips:

- If you stall while driving, turn on emergency flashers immediately and try to coast off to shoulder if safe to do so.
- If you stall and stop on roadway, turn on emergency flashers immediately. Then set up reflective triangles. If you have a CB radio, call for help. At night, this is a very hazardous situation for both you and other drivers, so be extremely careful.
- Controlling and extinguishing fires safely require special knowledge. If you don't know how to handle a fire emergency, you can easily make the situation worse and injure or kill yourself as well. Select a good reference on vehicle fire control and study it well. Since you will seldom encounter a fire, it is easy to forget what to do. Refresh your memory by reviewing procedures frequently.

REGULATIONS: FMCSR 392.8; 392.22; 392.24; 392.25.

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: E5, R2.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS**COUNTERMEASURE***Objective:*

To prevent accidents involving pedestrians by anticipating likely hazards when maneuvering close to pedestrians and knowing how to handle such situations safely.

Description:

Most pedestrian accidents occur when the pedestrian walks onto a roadway and into the path of an approaching vehicle. Pedestrians often misjudge the speed and closeness of a commercial motor vehicle. Pedestrians assume you can and will slow down for them. Pedestrians think that because they can see you, you can see them. These kinds of errors in judgment are why pedestrian accidents frequently occur. Drivers should try to anticipate pedestrians making such errors and be prepared to compensate.

Questions for management:

- Have your drivers ever been trained to maneuver safely near pedestrians? How? When? By whom?
- Do you know if your drivers maneuver around pedestrian traffic safely?
- Do you ever have qualified personnel ride with your drivers to assess their safe driving habits?

Maintenance checks:

- Broken mirrors and loose mountings
- Horn operation
- Adequate indirect vision devices

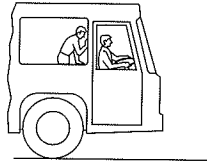
Driving tips:

- When maneuvering close to pedestrians, anticipate that the pedestrian may do the unexpected. Adjust your driving to safely avoid a pedestrian who jumps out in front of you.
- It is difficult for pedestrians to correctly judge how fast you are approaching. If you are going faster than normal for the area, you may count on the pedestrian judging there is time to cross when really there is not.
- Pedestrians will often assume that you see them and that you will slow down for them to complete their crossing. Don't assume they will give you the right-of-way until it is obvious they are waiting for you to pass.
- At night especially, pedestrians assume you can see them because they can see your headlights so easily. Be extra careful at night in pedestrian areas.
- Remember trailer tracking in turns may cause your trailer to run onto the sidewalk. Turn wide enough to avoid this and go very slowly.
- Pedestrians all too often walk or stand in the blind spots in front and to the right of your vehicle. Scan around vehicle thoroughly when pedestrians are present.

REGULATIONS: FMCSR 383.110; 383.111; 383.113; 383.115; 383.117; 383 Appendix to Subpart G.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents and on-board injuries caused by unsafe passenger behavior.

Description:

Passengers can distract the driver. Passengers can physically interfere with the driver. Passengers can restrict the driver's freedom to maneuver aggressively for accident avoidance. Passengers can injure themselves by not sitting properly in designated seating positions. Whatever the case, the driver must manage the passengers to avoid such problems.

Questions for management:

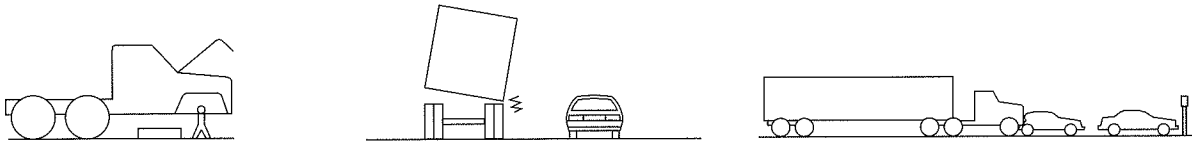
- Have drivers been trained to manage passengers for safe transportation? How? When? By whom?
- Do you know if your drivers are practicing safe passenger management?
- Do you ever have qualified personnel ride with your drivers as passengers so as to assess their passenger management habits?
- Do vehicles comply with applicable federal and state regulations regarding equipment?
- Do you require drivers to make pre-trip announcements to passengers requiring their cooperation in maintaining safe conduct?
- Do you inform customers of the need to follow rules of conduct and to act safely when they charter a bus?

Driving tips:

- Do not drive if your passengers are in an unstable position. You might feel restricted to aggressively brake or steer to avoid an accident.
- Do not drive if standing passengers are close to you, as they may fall over you unexpectedly, causing you to lose control.
- Do make announcements informing passengers of their responsibility to act safely.
- If passengers refuse to cooperate, stop the bus until you are satisfied that it is safe to continue driving.

REGULATIONS: FMCSR 383.117; 392.60; 392.63; 393.90.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents caused by vehicle defects or deficiencies.

Description:

Worn, failed, or incorrectly adjusted components can cause or contribute to accidents. Preventive maintenance and periodic inspection procedures help to prevent failures from occurring while the vehicle is being operated. Such procedures also reduce reliance on the driver, who may have limited skill and knowledge for detecting vehicle defects or deficiencies.

Questions for management:

- Are there excessive demands for the repair of your vehicles? This should be viewed as an indicator of inadequate maintenance and inspection procedures, and a vehicle maintenance situation which could cause or contribute to accidents.
- Do you use preventive maintenance management measures to schedule periodic inspection and maintenance activities?
- Do you have an adequate record-keeping system which tracks maintenance, repairs, and inspections?
- Do you have a way of determining when the wear of a component is such that it should be replaced or repaired?
- What guidelines or rules are used for placing vehicles out of service until necessary repairs are made? How are they enforced?
- Do you have a means for gauging the effectiveness of your preventive maintenance procedures?
- Would your vehicles pass the minimum periodic inspection standards set out by the FMCSR?
- Are your drivers sufficiently trained and knowledgeable to detect maintenance and repair needs, and to refer them for maintenance? Can they identify safety-sensitive defects?
- Does your preventive maintenance and inspection program recognize the following safety-related vehicle components whose deterioration directly affects vehicle control:
 - braking system - steering system - coupling devices
 - tires and wheels - suspension
- Do your preventive maintenance and inspection procedures:
 - recognize wear of consumable components which must be replaced or serviced periodically?
 - take account of indicators of deterioration which can be monitored at the driver inspection level?
 - make provisions for those components whose condition cannot be easily detected by drivers?
- Are your drivers trained in troubleshooting?
- Are your mechanics and maintenance supervisors adequately trained? How? When? By whom?

Driving tips:

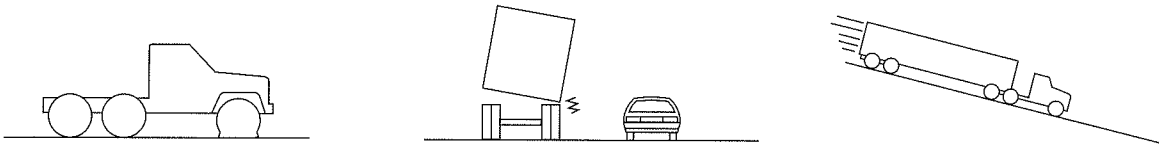
- Check whole vehicle carefully, pre-trip and post-trip.
- Pre-trip and post-trip inspection reports are an important (mandatory) part of the job.
- Ensure annual vehicle inspection report or decal is in or on the vehicle.
- Don't drive a faulty vehicle.

REGULATIONS: FMCSR 392.7; Part 393; Part 396.

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: M2.

REFERENCES: V1; V3.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective: To ensure that vehicles are in a safe operating condition while driven.

Description:

The driver is ultimately responsible for making sure that the vehicle being driven is in a safe operating condition. Appropriate inspection procedures and reports assist in ensuring this. The driver is also in a position to detect vehicle deficiencies and refer them to maintenance for repairs. Some vehicle deficiencies cannot be detected by periodic preventive maintenance and inspection procedures.

Questions for management:

- Are there established inspection and reporting procedures for drivers?
- Are these procedures in compliance with FMCSR rules?
- Are drivers adequately trained to inspect safety critical components and determine whether their condition is adequate? How? When? By whom?
- Are drivers equipped with inspection aids and the necessary report forms?
- Are maintenance personnel responsive to driver-reported deficiencies?
- Does the company have established standards for placing vehicles out of service?
- Are drivers encouraged not to drive when they discover a deficiency serious enough that the vehicle should be placed out of service?

Driving tips:

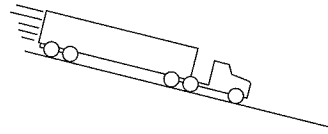
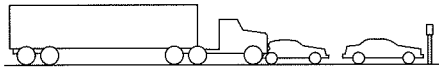
- Federal and state laws require that you may not drive a vehicle unless you are satisfied that it is in a safe operating condition.
- Carefully inspect the vehicle and report on its condition as you are required to do.
- During a trip you should monitor the condition of vehicle components which may affect the safety of the vehicle.
- If something seems to be wrong with the vehicle, stop and check it out. Do not continue with the trip until you are satisfied it is safe to do so.

REGULATIONS: FMCSR 392.7; Part 396.

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: M2.

REFERENCES: D1; D2.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To reduce accidents associated with insufficient braking performance.

Description:

The braking system is one of several key safety-related items. Catastrophic brake failure, such as sudden air loss, may lead to loss of control and the driver's inability to recover. Progressive brake deterioration, such as brake shoe wear without corresponding adjustment, can be even more troublesome because it may appear innocuous during normal driving, but may precipitate an accident during emergency braking applications.

Questions for management:

- Are preventive maintenance procedures and schedules adequate to detect and repair worn or defective brake system components?
- Do you have established standards for indicating out-of-service conditions for brake system components which deteriorate progressively: air leaks, brake shoe wear, drum wear, bearing seal leakage?
- Are drivers adequately trained to detect deteriorated conditions during their inspections? How? When? By whom?
- Are mechanics and maintenance supervisors adequately trained? How? When? By whom?
- Do you have an inspection lane for checking brake adjustment?

Driving tips:

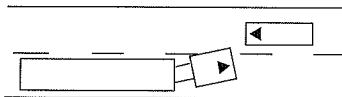
- Test your brakes for stopping performance before leaving company yard or parking area.
- Assure yourself that your brakes are properly adjusted.
- Learn how to determine if the air system is operating satisfactorily.
- Check to make sure that all low air warning devices (e.g., light and buzzer) are functioning.
- During a trip, before entering severe downgrades, stop and check brake adjustment.

REGULATIONS: FMCSR Part 393 Subpart C; Part 396.

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: E2.

REFERENCES: D1; D2; V1; V4; V6.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent loss of control accidents due to tire failure.

Description:

Tires are one of several key safety-related components. Improper tire pressure – either too little or too much – can lead to deterioration and eventual catastrophic failure.

Questions for management:

- Are drivers and maintenance personnel following the tire manufacturers' specifications for tire inflation and loading?
- Are tire inflation guidelines available to drivers?
- Are drivers trained in how to check tire inflation? Should they check it? Are they properly equipped to check it?
- Are drivers knowledgeable of the consequences of improper tire inflation?

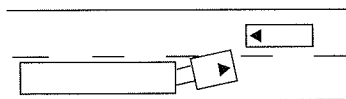
Driving tips:

- During extended trips, monitor tire inflation frequently.
- Do not operate tires with inflation pressures other than those specified by the manufacturer.

REGULATIONS: FMCSR 393.75, Part 396.

REFERENCES: D1; V1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent loss of control accidents due to tire failure.

Description:

The tires are one of several key safety-related items. A tire that is worn or damaged may fail as a blowout and result in loss of control of the vehicle. The principal indicators of deterioration are tread wear, tread and sidewall damage, and air leakage.

Questions for management:

- Does the company have an established standard for indicating when tires should be taken out of service?
- Is the company standard in compliance with the minimum tread depth standards as specified by the FMCSR?
- Are drivers and maintenance personnel trained and knowledgeable to make a determination during inspections as to whether or not a tire should be taken out of service?

Maintenance tips:

- Check tires regularly to ensure they meet the minimum DOT tread depth requirement.
- Do not mount mismatched sizes, or pair tires in duals with significantly different wear.
- Do not mix bias and radial tires on the same axle.
- Follow company standards for out-of-service conditions.
- Replace tread only on sound casings.

Driving tips:

- During vehicle inspections, check tires to make sure that their condition is within company-established out-of-service criteria.
- During a trip, monitor tires for road damage or deterioration. Look for:
 - tread or sidewall separation
 - cuts or gouges
 - flat spots or uneven wear
 - leaks (monitor tire inflation)
 - flat tires at duals

REGULATIONS: FMCSR 393.75, Part 396.

REFERENCES: D1; V1; V3.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent loss of control accidents due to wheel failure and accidents caused by wheels separating from vehicle.

Description:

The wheels are one of several key safety-related items. Incorrectly assembled, or damaged wheel components can result in collapse of the wheel assembly and consequent loss of control. Inadequately or incorrectly mounted wheels can result in loss of a wheel from the vehicle, which may impact opposing traffic or nearby pedestrians.

Questions for management:

- Are maintenance personnel sufficiently knowledgeable to be able to identify and take out of service worn or deteriorated wheel and rim components?
- Are maintenance personnel adequately trained in handling, mounting, and checking the assembled condition of wheels on the vehicle?
- Do you have company standards for identifying out-of-service conditions requiring replacement?
- Is the company standard in compliance with the minimum periodic inspection standards as specified by the FMCSR?
- Are drivers adequately trained to detect deteriorated component conditions during their inspections?

Maintenance tips:

- Use established company or industry guidelines to determine whether components should be returned to service.
- Attempt to determine cause of damage or deterioration. Such analysis may help identify improper use or maintenance procedures which should be corrected.
- Ensure wheels are properly mounted and fastened according to manufacturer's guidelines.

Driving tips:

- When inspecting wheels, look for:
 - cracks in wheels and rims
 - improperly seated lock rings
 - rust around wheel nuts - check for tightness
 - missing or loose components
- Be especially aware of wheel and mounting condition after recent tire change.

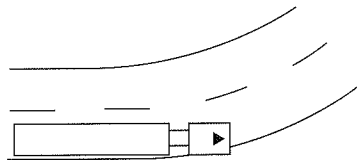
REGULATIONS: FMCSR 393.205; Part 396.

REFERENCES: D1; V1; V3.

C7

STEERING SYSTEM PERFORMANCE

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent loss of control due to steering system deterioration.

Description:

The steering system is one of the key safety-related items. It can fail catastrophically or deteriorate progressively. Progressively increasing play in the steering wheel will make it harder for the driver to steer and should be viewed as an indicator of deteriorating steering system components which may lead to a catastrophic failure. Steering wheel play is a principal indicator of steering system deterioration which can be monitored at the driver inspection level.

Questions for management:

- Is steering wheel play checked against an out-of-service criterion?
- Is steering system component deterioration checked during preventive maintenance and inspection procedures?

Driving tips:

- During pre-trip inspections, check for excessive steering wheel play.
- Follow established company guideline for taking vehicle out of service.
- Write up steering deficiencies on your vehicle inspection report.

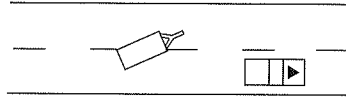
REGULATIONS: FMCSR 393.209; Part 396.

REFERENCES: D1; V1.

FULL TRAILER COUPLING

C8

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To prevent accidents due to trailer separation.

Description:

Trailer separation can occur due to improper hitching, or inadequate or damaged equipment. Pintle hooks and ball hitches can uncouple if improperly latched. Hitch mounts can separate due to damage or lack of maintenance.

Questions for management:

- Are towing vehicles and trailers equipped with properly rated ball hitches or pintle hooks?
- Are appropriate safety devices, such as chains and breakaway brakes available?
- Are hitches and safety devices being properly maintained?
- Are drivers trained and knowledgeable in proper use of hitching equipment? How? When? By whom?

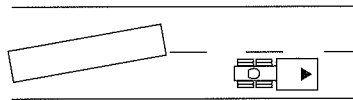
Driving tips:

- Check to see that hitch components are in good condition on trailer and truck.
- Adjust coupler if necessary.
- Ensure that the pintle hook or ball hitch is properly locked.
- Ensure that safety chains are properly connected.
- Ensure that electric and air lines are properly connected.

REGULATIONS: FMCSR 383.115; 393.70; 393.71.

REFERENCES: D1; V2.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To eliminate accidents due to trailer separation, inactive trailer brakes or running lights, or trailer axle separation.

Description:

Proper semitrailer coupling procedures ensure that the coupling equipment remains in good order, the landing gear is not damaged, the air lines and electric lines are hooked up, the axle loads are balanced, and the coupling is secure.

Questions for management:

- Are drivers trained in proper coupling procedures?
- Do drivers know how to check for proper condition of coupling equipment?
- Are preventive maintenance and service procedures being followed?

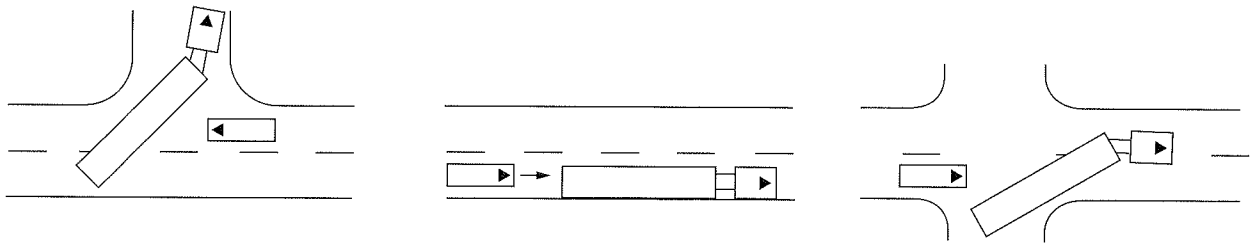
Driving tips:

- Adjust trailer height to minimize coupling impact.
- Check conditions of kingpin and jaws.
- Check that the jaws are locked after coupling.
- Ensure that the landing gear is raised.
- Hook up air and electric lines carefully.
- If the trailer axle is adjustable, make sure it is locked properly.
- Check to see that the kingpin is not riding on top of the jaws.
- If the tractor has an adjustable fifth wheel, make sure adjustment is locked. Do not pull the trailer with the slide stops.
- Before driving away, apply the trailer brakes and pull gently against them to check coupling.

REGULATIONS: FMCSR 393.70; 393.71.

REFERENCES: D1; V1; V2.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To reduce the number of accidents due to other drivers' inability to see the vehicle.

Description:

Trucks or tractor-trailer combinations, due to their length and lower maneuverability, may be struck by other vehicles because the other drivers do not see the vehicle and its movement in time. Such drivers can be assisted by making sure that the truck's lighting system and reflectors are adequate. The truck driver should use extra care in crossing traffic lanes and making turns during adverse visibility conditions.

Questions for Management:

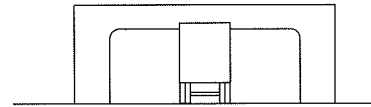
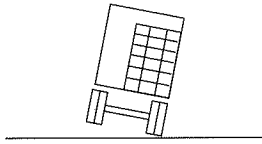
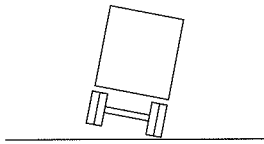
- Are proper lighting devices, reflectors, and reflective tape installed and maintained?
- Are proper visibility devices used when carrying unusual loads which project from the rear or sides of the truck?
- Are paint schemes being selected with the thought that they could enhance conspicuity?

Driving tips:

- Check to make sure that all lights and reflectors are operable and clean.
- Use extra care when making turns or crossing intersections during poor visibility conditions.
- Use extra care when pulling low profile trailers such as empty flat bed tractors, an empty container chasis, construction equipment trailers, or pole trailers.

REGULATIONS: FMCSR 392.33; 393 Subpart B.
HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: E3.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To reduce the number of accidents caused by overloading, poor load distribution, and lack of clearance under fixed objects.

Description:

Many accidents are caused by inadequate loading procedures or route planning. Heavy, high, or offset loads can precipitate rollovers during emergency steering maneuvers or when driving at excessive speeds. High trailers or oversize loads can result in collisions when routes are not planned.

Questions for management:

- Are dispatchers knowledgeable in matching cargoes and vehicles during dispatching?
- Are drivers instructed how to deal with sealed cargoes?
- How does the company deal with the problem of overloading?
- Are drivers trained how to deal with top heavy or offset cargoes, or improper axle weight distribution?
- Are drivers trained to understand how and why rollovers occur?
- Are equipment purchasing specifications matched to anticipated loads?

Driving tips:

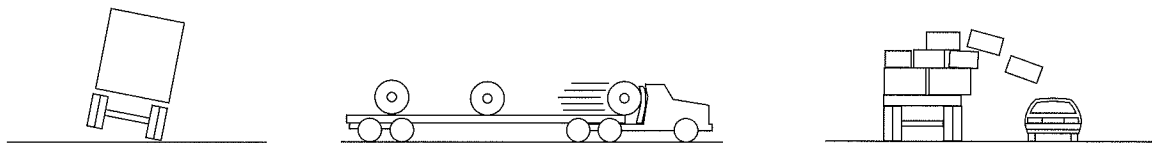
- Make sure your vehicle and axle weights are within legal limits.
- Make sure you know your vehicle weight rating.
- Make sure that tire ratings and inflations are compatible with the load and driving conditions.
- Make sure that suspension and coupling ratings are appropriate for the load.
- When trailer is being loaded with mixed cargo, have heavier articles loaded on the bottom.
- Check to see that heavy articles are not offset to one side of the trailer.
- When driving with heavy or high loads, use reduced speeds. Remember that you may have to make an emergency lane change.
- Curve speed advisory signs normally do not apply to heavily loaded commercial vehicles; go slower than posted speed.
- Be aware that trailer wheels offtrack and may collide with curbs, or track onto unimproved shoulders, leading to loss of control when vehicle is heavily loaded.
- Know your vehicle height and plan your route so that you are not surprised by low bridges.
- When picking up a sealed trailer, find out payload characteristics.

REGULATIONS: FMCSR 383.115; 383.117; 392.9; 393.100; 393.102; 393.104; 393.106.

HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: T2.

REFERENCES: D1.

TYPICAL ACCIDENT SITUATIONS



COUNTERMEASURE

Objective:

To reduce the number of truck rollover and falling cargo accidents.

Description:

Cargo which breaks loose on the road can create control difficulties for the driver and present a hazard for other drivers. Shifting cargo can cause loss of control and truck rollover.

Questions for management:

- Are your trailers equipped with proper tie downs and front-end structures?
- Are drivers and dock personnel knowledgeable in proper methods for blocking and bracing?
- Does your company carry unusual payloads which are prone to shifting and thus require special attention to securement methods?
- Are spare wheels and accessory equipment properly secured?

Driving tips:

- Check to make sure that the lading has been properly secured.
- Periodically check to see that tie downs and bracing are still intact and the cargo has not shifted.
- Some cargo or lading, such as liquids in cargo tanks or portable tanks, has a tendency to shift: you must drive at reduced speeds during turns or braking to guard against loss of control.
- Pay particular attention to bracing and tie downs when picking up unusual cargoes. Satisfy yourself that the loading personnel have done their job properly.

REGULATIONS: FMCSR 392.9; 393.100; 393.102; 393.104; 393.106.
HAZARDOUS MATERIALS INCIDENT PREVENTION MANUAL: 11.
REFERENCES: D1.

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- M3 *Emergency Response Guidebook, DOT P 5800.7*. 1996. U.S. Department of Transportation, Washington, DC.
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- D1 *Model Driver's Manual for Commercial Vehicle Driver Licensing*. C. Dennis Wylie & Ted Shultz. 1989. Essex Corporation. Order #G0010 from American Trucking Associations, 2200 Mill Road, Alexandria, VA 22314-4677. Call (800) ATA-LINE.
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- D3 *Professional Truck Drivers Handbook*. National Private Truck Council, Alexandria, VA 22314. Call (703) 683-1300.
- D4 *Schools with PTDIA Certified Courses* listed by state. Professional Truck Driver Institute of America, Inc., 8788 Elk Grove Boulevard, Suite M, Elk Grove, CA 95624. Call (916) 686-5146.

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- V1 *Recommended Maintenance Practices Manual*. The Maintenance Council, American Trucking Associations, 2200 Mill Road, Alexandria, VA 22314. Call 1-800-ATA-LINE.
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- V3 *North American Uniform Out-of-Service Criteria*. Commercial Vehicle Safety Alliance (CVSA), 1620 Eye St., N.W., Suite 1000, Washington, DC.
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- V6 *SAE Handbook*. Society of Automotive Engineers. 400 Commonwealth Drive, Warrendale, PA 15096-0001. Customer Service, Call (412) 776-4970. Fax (412) 776-5760.

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- C3 *National Safety Council General Materials Catalog.* 1121 Spring Lake Dr., Itasca, IL 60143. Call (630) 775-2278.
- C4 *Smith System Driver Training Aids.* Smith System, P.O. Box 81124, San Diego, CA 92138. Call (800) 777-SMITH.
- C5 *Films for Highway Safety and Traffic Engineers, Report No. FHWA-IP-86-25.* U.S. Department of Transportation Federal Highway Administration. Available from the National Technical Information Service, Springfield, VA 22161.
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- J4 *Journal of Traffic Safety Education* – Quarterly. Calif. Assn. For Safety Education, 5151 State University Dr., Los Angeles, CA 90032. Call (213) 343-4622.
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NOTES

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