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# RAILROAD SAFETY PROGRAM

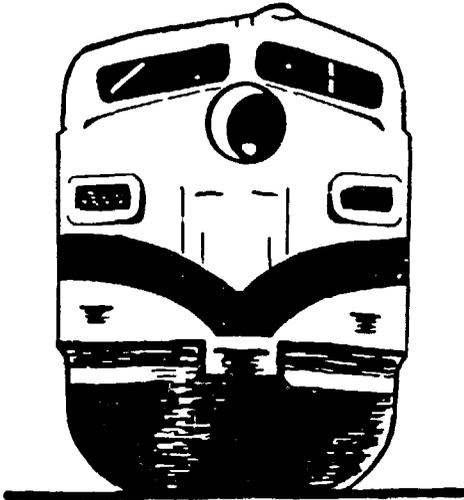
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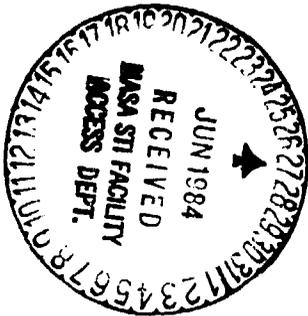
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TASK II FINAL REPORT

PREPARED FOR:  
NASA HEADQUARTERS  
CODE: LGT-1



BY:  
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OCTOBER 1983

**RAILROAD SAFETY PROGRAM**

**TASK II - FINAL REPORT**

**CONTRACT NO. NASw 3789**

**PREPARED FOR:**

**NASA HEADQUARTERS  
CODE LGT-I  
WASHINGTON, D.C.**

**BY:**

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## I. INTRODUCTION

The Federal Railroad Administration (FRA) began the development of a National Inspection Plan (NIP) in 1981. Since 1981, FRA has annually prepared an NIP which summarizes the activity of its field personnel in the pursuit of rail safety improvement during the year. The NIP provides FRA with a comprehensive tool for utilizing its personnel and its safety resources in the field.

The NIP is comprised of Regional Safety Plans from each of the eight FRA Regions. Each Regional Plan includes the overall safety objectives specified by the FRA, as well as a comprehensive set of priorities to meet unique safety problems existing within that particular Region.

The purposes of this contract agreement are to prepare the 1983 NIP, recommend procedures to improve future NIPs, develop a standard format for the 1984 NIP, develop a methodology for the allocation of inspection resources and other specialized Regional activities, manage the development of the 1984 NIP, and prepare an NIP instruction manual for use in future years. Additionally, guidelines will be prepared to provide clear instructions on DOT regulations pertaining to the movement of hazardous materials. A test will be devised to apply these guidelines to ten commodities and a User's Manual will be prepared.

The contract agreement is divided into seven Tasks to be completed within 15 months. This Report provides a summary of the work concluded on Task II, discusses problems that were encountered, and provides recommendations for work on future Tasks.

The purpose of Task II is twofold. First, to prepare a thorough National Inspection Plan (NIP) which will provide a standard format for the preparation of the 1984 NIP, to develop a methodology for the allocation of inspection resources by discipline and second, other specialized Regional activities. The underlying goal of Task II is to reduce the risks to passengers, employees and material transported throughout the United States.

In order to fulfill the purpose and augment the goal of Task II, two documents were developed. The Standard Outline for the 1984 Regional Inspection Plan provides guidelines to each of the eight FRA Regions, to be used in the preparation of the 1984 Annual Regional Inspection Plan. The Regional Statistical Analysis Report provides each of the eight FRA Regions with results of analyzed data and provides guidelines on incorporating the data from each Region into the 1984 Annual Regional Inspection Plan.

## II. 1984 REGIONAL INSPECTION PLAN

In preparing a National Inspection Plan (NIP), which would provide a standard format for the preparation of the 1984 NIP, FRA's safety standards and goals, as well as its missions and functions, were reviewed.

From the review of FRA's safety standards and goals, it was found that the underlying goal of the FRA is safe transportation of passengers, employees, and material throughout the United States. Furthermore, the 1984 Office of Safety Goals are to:

- Reduce the number or rate of train accidents
- Reduce the number or rate of hazardous material releases
- Improve the safe operation of passenger trains
- Reduce the number or rate of railroad employee casualties
- Improve the safety record at rail-highway grade crossings
- Reduce passenger fatalities

In order to incorporate these goals into a standard format for the National Inspection Plan, it is necessary for each Region to develop a comprehensive Regional safety analysis plan consistent with FRA goals. Each of these Regional Inspection Plans (RIPs) should be comprised of the logical and analytical processes that were used to develop safety and inspection criteria on the National level.

A revised format, emphasizing rationale as well as summarizing and consolidating information, was developed for the 1984 RIPs. Figure 1 presents an outline of the revised format, while Figure 2 depicts the format that was used in the 1983 Inspection Plan. A comparison of Figures 1 and 2 shows that the 1984 Regional Inspection Plan no longer contains passenger and hazardous material route maps and a management section. In lieu of these sections, the "INTRODUCTION" of the 1984 Regional Inspection Plan will include a brief one paragraph discussion of personnel numbers, training, and EEO plans.

In the 1984 RIP, under the "PROJECTED SAFETY IMPROVEMENT ACTIVITIES" section, several subsections have been added. Each subsection builds on the next subsection so that a clear rationale for planned activities will be emphasized. The first subsection deals with a statistical overview of Regional problem areas. The second

## FIGURE I

### 1984 REGIONAL INSPECTION PLAN

- I. HIGHLIGHTS
- II. INTRODUCTION
- III. PROJECTED SAFETY IMPROVEMENT ACTIVITIES
  - A. Regional Statistical Overview
  - B. Regional Goals and Objectives
  - C. System and Special Assessments
  - D. Accidents, Complaints and Applications
  - E. Major Deficiencies and Remedial Recommendations
- IV. REGIONAL INSPECTION PLANS BY DISCIPLINE
  - A. Hazardous Material and Operating Practices
  - B. Signal and Train Control
  - C. Track
  - D. Motive Power and Equipment
- V. METHODOLOGY FOR REDUCTION OF ACCIDENTS
  - A. Methods for Assessment of Accidents
  - B. Methods for Assessment of Noncompliance
  - C. Evaluation Procedures of System and  
Special Assessment Projects
- VI. STATE PLANS

## FIGURE 2

### 1983 REGIONAL INSPECTION PLAN

- I. HIGHLIGHTS
- II. GENERAL
- III. MANAGEMENT
  - A. Personnel
  - B. Equal Employment Opportunities
  - C. Training
- IV. PROJECTED SAFETY IMPROVEMENT ACTIVITIES
  - A. Accident Investigation
  - B. System and Special Assessments
- V. REGIONAL OBJECTIVES BY DISCIPLINE
  - A. Hazardous Material
  - B. Signal and Train Control
  - C. Track
  - D. Motive Power and Equipment
  - E. Operating Practices
- VI. STATE PLANS
- VII. APPENDIX - MAPS  
  
(Passenger and Hazardous Material Routes)

section deals with Regional goals and objectives which will be geared toward correcting Regional problems and improving the Region's safety record. System and special assessments, the third subsection will be based on the Region's objectives and past safety record. The fourth subsection, "Accidents, Complaints and Applications", will cover previous records from which a forecast for 1984 may be derived. The last subsection, "Major Deficiencies and Remedial Recommendations", describes the causes of particular Regional problems, together with the logic for selecting corrective actions deduced from Regional trend analyses.

The "REGIONAL INSPECTION PLANS BY DISCIPLINE" section combines Operating Practices and Hazardous Materials into one subheading in the 1984 RIP. Additionally, a standard format for reporting inspection activities has been introduced in Figure 3. This standard format will consolidate planned inspection activities and relate these to the goals and objectives of the Region and the amelioration of unfavorable safety trends.

The fifth section of the 1984 RIP outline, entitled "METHODOLOGY FOR THE REDUCTION OF ACCIDENTS", allows each Region to discuss its methods of collecting and analyzing information regarding accidents, noncompliance, and system and special assessments.

In Section VI of the 1984 RIP, a standard outline for the State inspection plans is provided. This outline will provide a clear and concise method for the reporting of planned State inspection activities.

In conclusion, besides summarizing and consolidating information, the 1984 Regional Inspection Plan is expected to emphasize rationale. However, due to the evolutionary nature of the National Inspection Plan, each Regional Inspection Plan will be subject to change over the years as input is obtained from Regional and other pertinent personnel.

FIGURE 3

PROJECTED SIGNAL AND TRAIN CONTROL INSPECTION ACTIVITIES

<u>CARRIER NAME</u>	<u>PERCENT OF INSPECTION ACTIVITY</u>
<b>†1. Railroad Involved</b> <u>Southern Pacific</u>	<b>†2. % of inspection Activity</b> 15%

**†3. Rationale**

- Key hazardous materials moves over 2,310 miles of signaled track involving many interlockings and drawbridges. The defect percentage for S&TC on this carrier was 30%. This carrier moved over 45,180 cars of hazardous materials out of the Houston area alone in 1980. Operates through the heart of downtown Houston, Dallas, Fort Worth, San Antonio, New Orleans, and several other key cities in the region. Of 27 HAZMAT releases in the Region during 1980, 7 occurred on this carrier.

**†4. Discipline Objectives**

- The planned inspection activities will be conducted to determine compliance and prevent defective and dangerous conditions from occurring.

### III. STATISTICAL ANALYSIS OF ACCIDENT DATA

The second requirement of Task II was to develop a methodology for the allocation of inspector resources by discipline and other specialized Regional activities. Initially, a review of FRA's safety records, safety programs, and data bases was conducted. Safety records for the last five years (1978 through 1982) indicate that the number of railroad accidents on the National level has decreased by 59.3 percent. This impressive safety record may indicate that the railroad safety inspection program has been successful in finding and alleviating unsafe conditions or operations. Moreover, while examining the accident/incident reports and the railroad safety inspection reports within FRA's data bases, it was found that it is impossible to merge and correlate the two data sets. Therefore, it can only be assumed that there is a negative correlation between safety inspections and accidents. In other words, as the frequency of inspections increases, the frequency of accidents decreases.

Despite the decreased number of railroad accidents over the last five years, the possibility of a serious accident always remains. By implementing a plan to improve the allocation of inspection resources, a reduction in accidents, injuries and risks to the public should occur. A review of the FRA data bases revealed that the best possible method to advance the allocation of safety improvement activities would be to utilize accident ratios for each railroad within a Region. The accident ratio is based on a formula which compares the number of accidents by discipline for each railroad within the entire FRA Region. This simple accident ratio would highlight areas of safety risk to which inspection resources could be devoted.

The Office of Safety at FRA Headquarters, in Washington, D.C. has emphasized that accident ratios are of little value unless they are weighted by the consequences and risks associated with the various accidents. Accordingly, they have developed the following weight scale based upon their safety priorities.

- Accidents involving passengers received a weight factor of 20,
- Accidents involving the release of hazardous material received a weight factor of 10,

- The speed of the train at the time of the accident was divided by 10 and then weighted to the accident.

By using accident ratio formulas, Regional Directors compared the total number of weighted accidents for a particular railroad division and discipline to the total number of weighted accidents for the entire Region within the same discipline. For example, the accident ratio for track accidents would be based on the following formula:

$$\frac{WTD_i}{WTr} = TAR$$

where:

WTD <sub>i</sub>	=	total number of weighted track accidents for a particular railroad division
WTr	=	total number of weighted track accidents for the Region
TAR	=	track accident ratio for a particular railroad division.

Since accidents are a rare occurrence, one year totals are of little value. Therefore, totals are based on three year periods and seasonal and monthly fluctuations are disregarded. The data indicate that smaller railroads have a higher accident rate than larger railroads and more accidents occur on yard and other track than on mainline track. Thus, the Office of Safety suggests accident ratios for the railroads within a Region be divided into the following categories based on size and track:

- Larger carrier accidents occurring on mainline track,
- Larger carrier accidents occurring on yard and other track,
- Larger carrier accidents occurring on all track,
- Smaller carrier accidents occurring on mainline track,
- Smaller carrier accidents occurring on yard and other track,
- Smaller carrier accidents occurring on all track.

The purpose of the accident ratios is to facilitate the inspection activities among the various railroads within the Region by providing a base percentage of total inspection time for a given discipline that would be allocated to a particular division of a railroad. Other factors, however, influence the allocation of safety inspector activities as well. Defect ratios, compliance adjustment records, overall carrier track conditions, equipment, etc., and the previous interactions between Regional personnel and a particular railroad must all be considered in the allocation of safety inspector activities.

The eight Regional Statistical Analysis Reports are located in Appendix B. These Reports not only contain accident ratios for all Regions, but, overall Regional safety trend data for the years 1978 through 1982. The purpose of the reports is to provide each Region with analyzed accident data to be incorporated into the 1984 Regional Inspection Plan, and to formulate accident ratios in order to influence the allocation of safety inspector activities.

#### IV. RECOMMENDATIONS

The accident data ratios that are outlined in Appendix B compare the total number and causes of weighted accidents for a particular railroad division to the total number and causes of weighted accidents for the entire Region. The accidents are weighted by the following factors.

- Whether passengers were transported,
- Whether a hazardous material tank car was damaged,
- Whether hazardous material was released, and
- The speed of the train.

These weights, developed by the FRA Office of Safety, deal principally with the consequences and not the causes of accidents. The mere transportation of passengers and hazardous material do not cause accidents. Although speed can be a cause of an accident, less than 3 percent of all train accidents in 1982 were attributed to speed. The weights should be based on causes since FRA inspection activities cannot prevent or correct the consequences of any accident.

Another problem with the present weighting scale is that there appears to be no significant difference between weighted and unweighted accident ratios. If this fact is statistically proven, then the present weighting system will be of no apparent value.

The third problem with the weighted accident ratios is the breakdown by size of carrier. It was suggested by FRA officials that accident ratios for the various railroads within a Region be divided by the size of the carrier, since smaller railroads have a higher accident rate than larger railroads. However, a report published by the Office of Safety provides contradictory information. In the report titled, Railroad Safety Statistical Report Train Accidents and Hazardous Material Movements, published in March of 1979, the following conclusion is made:

"...size does not determine safety. Some large railroads tend to have lower accidents rates, but this relationship is statistically weak. Seven of the ten safest railroads are among the top ten in total car-miles. However, since some relatively safe railroads are also small, it cannot be concluded that a railroad must be large in order to achieve a low accident rate. In fact, there are also some large railroads which have high accident rates." (page 2)

In view of the problems indicated above, and taking into account FRA standards and goals, the following are guidelines for modifying the accident data ratios:

- 1) Test for a significant difference between weighted and unweighted accident ratios.
- 2) Test for a significant difference between large and small carriers, using accident data from safety records accumulated over the last three (3) years.
- 3) Create a new weighting scale for accidents based on their causes. This weighting scale should be proportional to the average monetary cost of the various types of accidents.
- 4) Categorize accident data into mainline accidents and yard and other accidents.
- 5) Test for a correlation between defect ratios and accident ratios for the various railroads.
- 6) If there is a correlation between the defect ratios and the accident ratios, attempt to combine the two ratios.
- 7) Assess the possibility of correlating FRA inspection activity to accidents.

APPENDIX A

**RAILROAD SAFETY PROGRAM**

**STANDARD OUTLINE FOR THE  
1984 REGIONAL INSPECTION PLAN**

**TASK II**

**CONTRACT NO. NASW-3789**

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STANDARD OUTLINE FOR THE  
1984 REGIONAL INSPECTION PLAN

## FOREWORD

This report provides the Region with guidelines to be used in preparing the 1984 Annual Regional Inspection Plan. The format of the 1984 Plan has not changed drastically from previous years, however, more emphasis is being placed on safety analysis and logical processes utilized by each Region to arrive at the proposed, detailed inspection and safety improvement activities.

This report should be used in conjunction with the Regional Statistical Analysis Report which provides the Region with results of analyzed data and guidelines on how to incorporate the Region's data into the 1984 Annual Regional Inspection Plan.

STANDARD OUTLINE FOR THE  
1984 REGIONAL INSPECTION PLAN

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- I. HIGHLIGHTS
- II. INTRODUCTION
- III. PROJECTED SAFETY IMPROVEMENT ACTIVITIES
  - A. Regional Statistical Overview
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  - C. System and Special Assessments
  - D. Accidents, Complaints and Applications
  - E. Recommendations
- IV. REGIONAL INSPECTION PLANS BY DISCIPLINE
  - A. Hazardous Material and Operating Practices
  - B. Signal and Train Control
  - C. Track
  - D. Motive Power and Equipment
- V. METHODOLOGY FOR REDUCTION OF ACCIDENTS
  - A. Methods for Assessment of Accidents
  - B. Methods for Assessment of Non-compliance
  - C. Evaluation Procedures of System and Special Assessment Projects
- VI. STATE PLANS

## I. HIGHLIGHTS

Each Region should give a brief description of each of the Region's major projected safety improvement projects. This section should not exceed one page in length. Each "highlight" should be bulleted. The following are some examples of appropriate material for the Highlights Section:

- o System assessments
- o Special assessments
- o Any major change

Since the Highlights Section is a summary of Region issues, it should generally contain an update on old information. Each "highlight" will usually be a restatement of important information, including any new items of interest pertaining to occurrences during the past year.

## II. INTRODUCTION

Specific information concerning the Region and the various railroads operating within the Region should be included in the Introduction Section of the Annual Plan. "Specific information" refers to: the number and names of states within the Region, the location of the Region's Headquarters, the railroads operating within the Region, the amount of hazardous material transported within the Region, the number of passenger trains within the Region, etc. The Introduction Section should also be used to give background information on the Region. A summary of the overall plan for assessments and inspections within the Region in the forthcoming year should also be included.

This section should also include a brief discussion on the utilization of Federal and State resources to accomplish regional objectives in the upcoming year. Include a short paragraph on personnel numbers, training, EEO and use of equipment such as railroad cars. Also include how the Region will utilize the O.P. Trainee Specialist for six months during the upcoming year.

### III. PROJECTED SAFETY IMPROVEMENT ACTIVITIES

#### A. Regional Statistical Overview

This Section should consist of a detailed narrative on the actual results of the Region's 1983 Inspections verses the Planned Inspections. The problems that were encountered within the Region, actions which addressed these problems, and the results of these activities should be discussed. Included within this discussion should be a description of the improvements or impairments in the overall safety of individual railroads or railroad divisions. If 1983 safety objectives were not achieved, an analysis should follow.

This Section should also incorporate the data from the Regional Statistical Analysis Report that was sent to your Region. Do not simply restate the data statistics given in the Report, but incorporate these statistics into two formal discussions. One Discussion should relate to the overall Regional Safety Profile, and the other should focus on specific problem areas within the Region and the planned corrective actions. The guidelines found within the Regional Statistical Analysis Report will be instrumental in forming your Region's statistical overview discussions.

#### B. Regional Goals and Objectives

The statistics in the above section should indicate problem areas. These problem areas should be discussed and corrective actions should be planned for the upcoming year 1984. For example, if the regional statistics indicate that the number of trespasser fatalities has increased, corrective actions such as presentations on the dangers of working or trespassing on railroad property should be scheduled within the Region during the year.

Based on the Regional Statistical Overview and the statistics within that section, the Region should develop its goals and objectives. A Goal is a statement of intent that is general and timeless and is not concerned with a particular achievement within a specified time period. The regional goals will be the same for all regions and is provided from Washington Headquarters. An Objective is a desired accomplishment that will be achieved within a given timeframe and under

specifiable conditions. Objectives must specify the method of achievement as well as the period of time within which it is to be attained.

### C. System and Special Assessments

The Regional Statistical Overview of the Region's problem areas and past experience will indicate the areas where assessments are needed. Special assessments are the efforts of one or more inspectors, or the application of one or more discipline on a specific section of a railroad. In the past, special assessments have been instrumental in achieving compliance to safety standards in problem areas.

The need for special assessments will vary by discipline; therefore, special assessments should be noted in each inspection plan. The number of assessments should be based on past experience, knowledge of new trends which may indicate that additional activity of this type would be beneficial, or other information such as complaints.

Each Region should submit the following information on planned special assessments:

- 1) The name of the railroad involved and the specific area to be covered by the assessment,
- 2) The starting and completion dates,
- 3) The disciplines and the number of inspectors (State and Federal) assigned to the project,
- 4) The reasons for the assessment, with specific details,
- 5) Anticipated follow-up activities.

System assessments are the combined efforts of all disciplines to examine an entire railroad system which usually encompasses more than one Region. A system assessment is normally assigned by the Washington Office; however, Regions are encouraged to make recommendations for system assessments.

#### D. Accidents Complaints and Applications

The planned activities for Accidents, Complaints and Applications are to be reported on the Table located in the Appendix of this report. Incorporate this Table into a brief discussion of the activities planned for the coming year.

Accident investigation activity will be reported based on each Region's past record of investigations including locomotive, train and employee fatality accidents. The number of accidents investigated will be reported on a regional basis. The investigation of these accidents will determine if the accident may have been caused by the carrier's failure to comply with regulations or if consideration should be given for the recommendations of a change or additional regulations in an effort to preclude a reoccurrence. The activity will reflect not only those accidents assigned by the Headquarters Office, but also those assigned by the Regional Director on an informal investigation. All accident investigations should be completed within 60 days. Hazardous materials incident investigations will also be included in this section.

Complaints will be reported on a basis of activities in past years. The number of complaints each Region anticipates receiving shall be shown by discipline. It is the goal of FRA to complete each of these assignments in no more than 60 days.

Applications filed by carriers for modifications, petitions, and waivers shall be reported by each discipline based on the past record of the average number of such assignments investigated. It is the goal of FRA to complete each of these assignments in no more than 45 days.

#### E. Major Deficiencies and Remedial Recommendations

Railroad investigation and inspection results should be combined with traffic forecasts and safety profiles to identify and describe particular regional problems. The causes of these problems together with the logic for selection of corrective actions as derived from analysis should be described within this section. This type of shared information will assist in making other regions aware of emerging situations and permit the translation of corrective measures before similar accidents occur elsewhere.

#### IV. REGIONAL INSPECTION PLANS BY DISCIPLINE

In previous RIPs, this Section has been entitled "Regional Objectives by Discipline." As in previous years, this Section will include the planned regular inspection activities among the various disciplines. In this RIP, the disciplines of Hazardous Material and Operating Practices have been grouped together under one discipline.

The purpose of regular inspections is to reduce non-compliances, which will reduce the potential for accidents. The number of regular inspections that will be scheduled should take into account the average number of inspections made during the past several years for each type of inspection activity and projected future requirements. Inspection activities will be planned using accident data, inspection information, and the inspector's knowledge of the overall conditions in his territory. It will be the responsibility of the Region's District Chief to analyze information for his district to assure that inspections are being made in the areas of highest risk and concern. The Region Specialists will also make an evaluation and if necessary, recommend changes in inspection plans. The Specialist will also recommend special assignments to the district field forces for increased enforcement in areas where the greatest potential for continued hazards exist. The District Chiefs and the Specialists must jointly plan these inspection activities.

The Specialist of each discipline in each Region shall carefully monitor the output of the Inspectors of his discipline to insure that a realistic number of units are inspected each month, proportional to the man-hours expended, and that inspections have been conducted at points of greatest need. It will be the responsibility of the Regional Specialist to keep the District Chief aware of the results of this analysis. Special emphasis on inspection procedures and frequency should be designated for 1984.

The planned inspection activities are to be reported by discipline on the sheets located in the Appendix of this Report. These sheets are to be incorporated into the discussion of the inspection activities of each discipline for the upcoming year. Guidelines for the Discussion Sections for the Inspection Disciplines are outlined in the text below.

For each of the four Inspection Disciplines, complete the tables on the various planned Inspection Activities. The Discussion Sections for each of the Inspection Disciplines should not be a restatement of the information found within the Planned Inspection Activity Tables nor should they be a detailed report on the Assignment. Each Discussion Section should include the following information:

- 1) The Areas and Railroads involved in the planned inspection activities,
- 2) The percent of inspection activity spent on each Railroad,
- 3) The rationale for the planned activities.
- 4) The Discipline objectives — expected results of the planned inspection activities,

The most important part of the Inspection Discipline Discussion is the rationale for the planned activities. Inspection activities should be related to the goals and objectives of the Region, as well as the improvement of unfavorable safety trends. Therefore, inspection activities should be justified by a consideration of why each type of inspection is occurring where it is occurring. The standard format for the Regional inspections by discipline, is located in Figure 1. Each inspection discipline discussion should follow this format exactly.

For each discipline, the rationale for inspection activity should be based on the following:

1. The number of accidents of carrier by division.
2. The defect percentages of carrier by division. (This rationale will be used mainly for MP&E and S&TC inspection activities.)
3. The amount of time it took for non-compliance situations be corrected.
4. The overall conditions of the track of carrier by division.

5. The past experiences of inspectors and regional personnel with a particular railroad. (This rationale will be used mainly for OP inspections, however, other disciplines may be applicable.)

FIGURE I

PROJECTED SIGNAL AND TRAIN CONTROL INSPECTION ACTIVITIES

<u>CARRIER NAME</u>	<u>PERCENT OF INSPECTION ACTIVITY</u>
<b>➤ 1. Railroad Involved</b> Southern Pacific	<b>➤ 2. % of Inspection Activity</b> 15%

**➤ 3. Rationale**

- Key hazardous materials moves over 2,310 miles of signaled track involving many interlockings and drawbridges. The defect percentage for S&TC on this carrier was 30%. This carrier moved over 45,180 cars of hazardous materials out of the Houston area alone in 1980. Operates through the heart of downtown Houston, Dallas, Fort Worth, San Antonio, New Orleans, and several other key cities in the region. Of 27 HAZMAT releases in the Region during 1980, 7 occurred on this carrier.

**➤ 4. Discipline Objectives**

- The planned inspection activities will be conducted to determine compliance and prevent defective and dangerous conditions from occurring.

## V. METHODOLOGY FOR REDUCTION OF ACCIDENTS

This Section is divided into three subsections: Methods for Assessments of Accidents; Methods for Assessment of Non-compliance; and Evaluation Procedures of System and Special Assessment Projects. Under each of the subsections provide an explanation of the methods that were utilized to collect and analyze the information regarding Accidents, Non-compliance, and System and Special Assessments.

## VI. STATE PLANS

Each Regional Headquarters is to provide guidance to each state which is submitting an inspection plan. Each state plan should be based on the outline below and approximate the brief descriptions which follow.

### STATE INSPECTION PLAN OUTLINE

- I. GENERAL STATEMENT
- II. INSPECTION PLANS\*
  - A. Track
  - B. Signal
  - C. Motive Power and Equipment
  - D. Hazardous Material and Operating Practices
- III. COMMENTS
- IV. SUMMARY

\* Please note that only some inspection disciplines will apply to the various states. Few states have inspection plans for every discipline.

## I. GENERAL STATEMENT

This Section should contain specific information concerning the state and the various railroads operating within the state. The state accomplishments during the past year, problems that were encountered, and the goals and objectives of the state should be included in this Section.

## II. INSPECTION PLANS

This Section should discuss the various planned inspection activities within the state for each Discipline. Each Discipline Discussion should include the following information:

- 1) The areas and railroads involved in planned inspection activities,
- 2) The percent of inspection activity spent on each Railroad,
- 3) The rationale for the planned activities.
- 4) Discipline Objectives — expected results from the planned inspection activities?

## III. COMMENTS

This Section should include any major problems, and remedial action planned to correct them.

## IV. SUMMARY

The Summary Section should clearly and briefly state the number of inspections activities planned within the state for the upcoming year.

Each state plan should average three (3) pages in length and should not exceed five (5) pages.

APPENDIX

SIGNAL AND TRAIN CONTROL INSPECTION ACTIVITIES FOR 1984

INSPECTION ACTIVITY	PLANNED	ACTUAL INSPECTIONS			
		1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER
ROUTINE					
ABS					
INTERLOCKING					
TCS					
TRAIN CONTROL					
CAB SIGNAL					
TRAIN STOP					
TECHNICAL MEETING					
GRADE CROSSING					
FALSE PROCEEDS					
RECORDS					

MOTIVE POWER AND EQUIPMENT INSPECTION ACTIVITIES  
FOR 1984

INSPECTION ACTIVITY		PLANNED	ACTUAL INSPECTIONS			
			1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER
REGULAR INSPECTION	SHOPS (MP&E)					
	LOCOMOTIVES					
	CARS					
TEST OBSERVATIONS	TRAIN BRAKE					
	SINGLE CAR					
	BLUE FLAG					
	NOISE LEVEL					
PRESENTATION						
OTHER						

TRACK INSPECTION ACTIVITIES FOR 1983

INSPECTION ACTIVITY		PLANNED	ACTUAL INSPECTIONS			
			1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER
REGULAR	MAIN LINE (MILES)					
	YARD (MILES)					
FEDERAL ASSISTANCE PROJECTS						
TECHNICAL MEETINGS						
GOVERNMENT OWNED TRACK						
OTHER						
RECORDS						





OPERATING PRACTICES AND HAZARDOUS MATERIAL INSPECTION ACTIVITIES

FOR 1984

INSPECTION ACTIVITY		PLANNED	ACTUAL INSPECTIONS			
			1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER
OPERATING PRACTICE INSPECTIONS	ROUTINE					
	YARD LIMITS					
	TRAINING PROGRAM					
	OPERATING TESTING					
	ACCIDENT REPORTING					
	RADIO STANDARDS					
	REAR END MARKERS					
	HOURS OF SERVICE					
	HAZMAT OPERATIONS					
	TRAIN OPERATIONS					
HAZARDOUS MATERIAL INSPECTIONS	ROUTINE					
	OPERATIONS INSPECTIONS					
	CAR INSPECTIONS					
	SHIPPER INSPECTIONS					
OTHER	CONSIGNEE INSPECTIONS					
	PRESENTATIONS					
	PRESENTATIONS					
	PRESENTATIONS					

APPENDIX B

RAILROAD SAFETY PROGRAM  
REGIONAL STATISTICAL ANALYSIS REPORT  
TASK II

CONTRACT NO. NASW-3789

PREPARED FOR:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION HEADQUARTERS  
CODE LGT-I  
WASHINGTON, D.C.

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SEPTEMBER 1983

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## SUMMARY

The following report is a composite of the 8 Regional Statistical Analysis Reports. Each report contains Regional safety trend data for the years 1978 through 1982 and accident ratios by railroad and division for each Region. The purpose of the reports is to provide each Region with analyzed accident data which is to be incorporated into the 1984 Regional Inspection Plan.

**REGION I - BOSTON**

# REGIONAL STATISTICAL ANALYSIS REPORT

## INTRODUCTION

This report provides the Region with results of analyzed accident data and guidelines on how to incorporate this data into the Regional Inspection Plan (RIP). It will not only provide information for the completion of the "Regional Statistical Overview" of the RIP, but should also be instrumental in assisting with the formulation of Regional objectives, locating areas where system and special assessments are necessary, and indicating major deficiencies. The report contains two sections:

- o The Regional Overview contains data which deals with the overall safety picture and safety trends of the Region for the years 1978 through 1982. It will not only provide each Region with a general overview of their past and present safety trends, but will also allow each Region to compare their Regional safety trends to the National safety trends.
- o The Regional Accident Data contains data which deals with specific problem areas within the Region.

## REGIONAL OVERVIEW

This section contains a graph and a chart which depicts the overall safety trend of the Region for the years 1978 through 1982. The graph indicates the number of accidents by cause and year for the Region. The causes of the train accidents are classified into four categories:

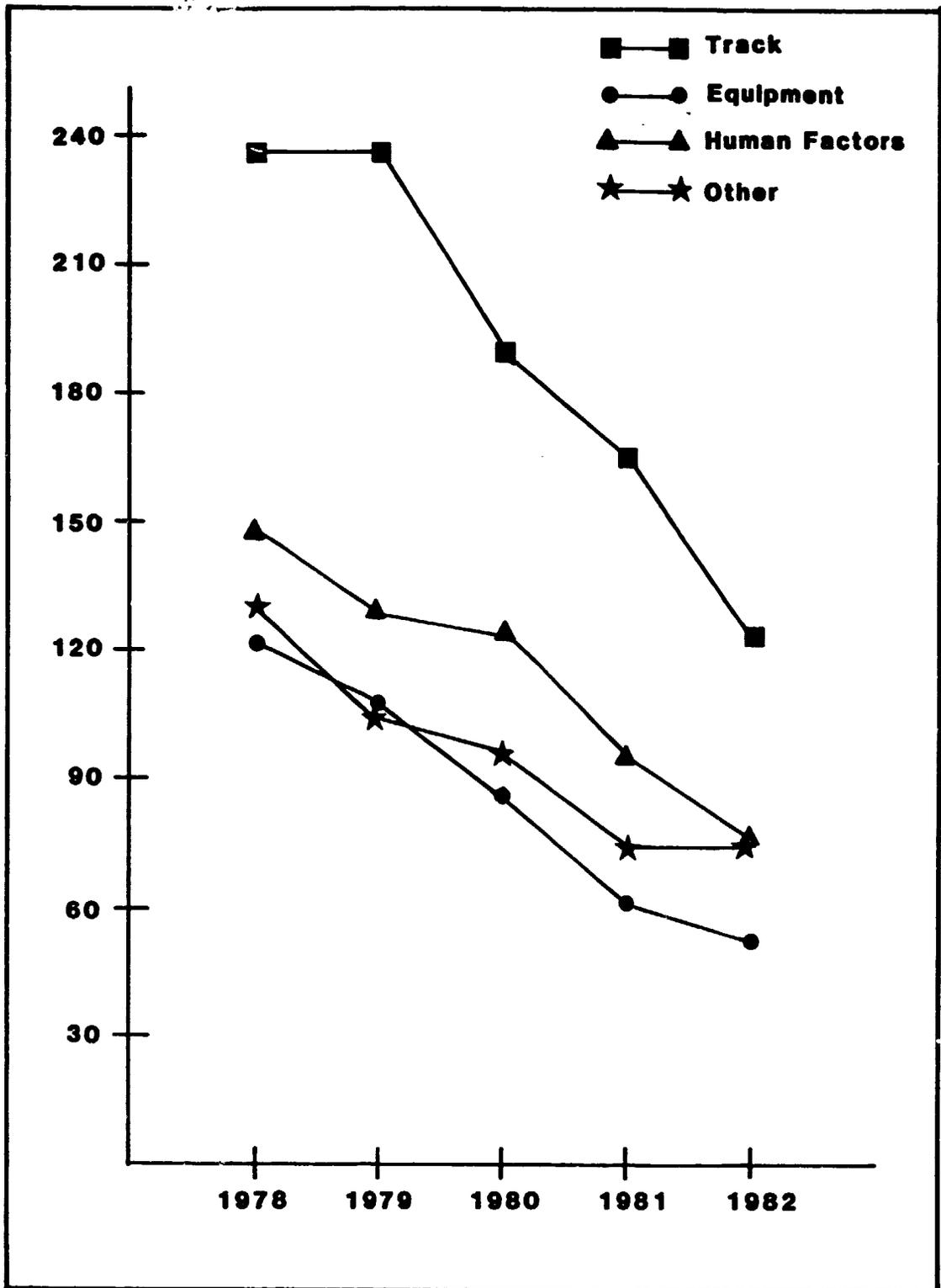
1. Track Accidents
2. Equipment Accidents
3. Human Factor Accidents
4. Other Accidents

The graph for Region I indicates that there has been a significant decrease in the number of accidents caused by track, equipment, and human factors. The graph also indicates that Region I had a slight increase in accidents due to other miscellaneous causes, however, this increase is not significant.

The chart in this section contains the percent changes on the National and Regional Levels for train accidents by cause, the number of persons killed in train accidents, the number of persons injured in train accidents, and the number of hazardous material releases due to train accidents. The percent changes on the National level are based on the total number of reportable train accidents that occurred in all of the eight FRA Regions within a given year. For example, the total number of train accidents that occurred in all of the eight FRA Regions during 1978 were compared with the total number of accidents that occurred during 1982 in all of the Regions. The percent changes on the Regional level, however, are simply based on the total number of reportable train accidents that occurred in one particular Region during a given year. The "National and Regional Safety Trends" chart allows each Region to note how the overall safety trends of their Region compare to the National safety trends.

The percent change data for Region I indicates that the number of accidents in which hazardous material was released decreased by 77.8% from 1981 to 1982. However, on the National level the number of accidents decreased by only 23.4% from 1981 to 1982. A discussion on past safety programs which Region I has utilized to accomplish this safety record, should be incorporated into the Regional Inspection Plan. On the

National level, the number of accidents caused by other factors decreased by 17.3% from 1981 to 1982. However, Region I experienced an increase of 2.7% in the number of accidents caused by other factors from 1981 to 1982. Also, a discussion on what factors may have contributed to this increase and what corrective actions are planned for 1984 needs to be incorporated in the RIP.



**REGION 1**  
**Summary of Train Accidents By Cause**  
**For 1978 Thru 1982**

**National and Regional Safety Trends  
Region 1**

	PERCENT CHANGE			
	NATIONAL LEVEL		REGIONAL LEVEL	
	1978-82	1981-82	1978-82	1981-82
TOTAL REPORTABLE TRAIN ACCIDENTS	59.3	20.6	46.7	17.6
ACCIDENTS CAUSED BY TRACK	63.1	22.2	47.7	26.3
ACCIDENTS CAUSED BY HUMAN FACTORS	54.9	19.6	48.0	19.8
ACCIDENTS CAUSED BY EQUIPMENT	63.3	21.7	56.2	14.5
ACCIDENTS CAUSED BY OTHER FACTORS	49.5	17.3	42.3	2.7+
PERSONS KILLED IN TRAIN ACCIDENTS	64.7	22.2	40.0	25.0
PERSONS INJURED IN TRAIN ACCIDENTS	75.3	16.0	58.8	25.0
NUMBER OF HAZ MAT RELEASES	57.2	23.4	66.7	77.8

+ DENOTES AN INCREASE

## REGIONAL ACCIDENT DATA

The Accident Ratio data in this section will provide a methodology to allocate inspectors, system and special assessments, and other specialized Regional activities. It is assumed that by implementing a plan to advance the allocation of safety improvement activities, a reduction in accidents, injuries, and risks to the public will occur. The number of railroad accidents on the National level has decreased by 20.6% from 1981 to 1982. Although the number of railroad accidents has been decreasing, safety efforts cannot be relaxed since the possibility of a serious accident always remains. The nature of the relationship between safety improvement activities and accidents is assumed to be a negative correlation. In other words, as the number of safety improvement activities increase, the number of accidents decrease. Therefore, by advancing the allocation of safety improvement activities, the number of accidents can be reduced.

The accident ratios for each railroad within a Region is based on a formula which takes into account the number of accidents by discipline for the railroad, the speed of the train, and whether hazardous materials were present or involved in the accident.

The number of accidents are based on a three year average. Since accidents are such a rare occurrence, a one year average is of little value. The seasonally and monthly fluctuations have been disregarded. The accident ratios for railroads within a Region are divided into six categories:

- o Larger carrier accidents occurring on mainline track,
- o Larger carrier accidents occurring on yard and other track,
- o Larger carrier accidents occurring on mainline, yard, and other track,
- o Smaller carrier accidents occurring on mainline track,
- o Smaller carrier accidents occurring on yard and other track, and
- o Smaller carrier accidents occurring on mainline, yard, and other track.

The accident ratios in the following Tables are railroads and divisions which have an accident ratio which is greater than two percent. The railroads and divisions which have been disregarded have a very low accident rate. This does not indicate that the railroads which have been disregarded do not require inspection activity, but that based on accident ratios of past years, these railroads have had a low accident rate. It is possible

that the railroads which have been disregarded may require inspection activity due to a recent increase in accidents and/or non-compliance situations, or due to the Regional inspector's knowledge of the railroad.

By using the accident ratios provided in the following Tables, a preliminary allocation of inspection activities may be made to the various railroads within the Region. It should be noted that inspection activities can not be allocated using only past accident records. The allocation of inspection activities should also be based on defect ratios, the amount of time it took for non-compliance situations to be corrected, the overall conditions of the carrier's track, equipment, etc., and the past experiences of inspectors and regional personnel with a particular railroad. The accident ratios assist in the allocation of inspection activities by providing a base percentage of total inspection time for a given discipline that would be allocated to a particular division of a railroad.

REGION I

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>
GNWR		0.00	100.00	0.00	71.43
GNWR	SYS	0.00	0.00	0.00	28.57
MSTR		100.00	0.00	0.00	0.00

REGION I

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
CLP	RUT	0.00	0.00	0.00	0.00	63.93
CN	BER	0.00	0.00	0.00	8.49	0.00
CPVM	QUE	0.00	0.00	19.39	0.00	0.00
CNWR		0.00	0.00	0.00	25.55	0.00
GU	SYS	0.00	0.00	0.00	8.52	0.00
LAL		0.00	0.00	51.35	0.00	0.00
LVRC		0.00	0.00	0.00	5.39	0.00
LVRC	EAS	52.05	0.00	10.83	0.00	0.00
LVRC	MAI	0.00	0.00	0.00	10.78	0.00
NYSW	#2	0.00	100.00	0.00	0.00	0.00
NYSW	NOR	0.00	0.00	18.43	0.00	0.00
OMID		0.00	0.00	0.00	11.49	0.00
VTR		0.00	0.00	0.00	0.00	36.07
VTR	BUR	47.95	0.00	0.00	29.79	0.00

REGION I

ACCIDENT RATIOS FOR LARGER CARRIERS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ATK	BOS	9.36	0.61	8.02	5.67	14.89
ATK	EMP	6.79	28.29	10.73	0.03	25.66
ATK	NEW	0.42	6.26	9.81	9.98	0.00
BAR		0.00	3.67	0.00	0.14	0.00
BM	BOS	12.12	2.39	18.26	2.14	11.52
BM	EMP	0.00	0.00	0.00	10.99	0.00
BM	NEW	8.70	1.99	5.79	7.20	0.00
BO	PEN	0.49	0.00	0.17	3.80	0.25
CR	BUF	0.97	5.05	0.49	0.75	27.27
CR	CLE	2.28	0.00	0.00	0.05	0.39
CR	LEH	3.08	0.92	0.27	3.10	0.00
CR	MET	40.21	8.56	15.65	7.51	1.09
CR	MOH	3.54	4.28	10.63	1.17	12.43
CR	NEW	3.00	13.00	4.18	3.28	0.85
CR	NJ	0.00	6.12	5.67	0.00	0.00
DH	#2	0.65	3.02	0.18	1.54	0.00
DH	#4	0.00	2.52	0.00	8.03	0.00
DH	EMP	0.00	0.00	0.00	7.72	0.00
LI		1.88	0.00	0.53	5.79	0.96
MEC	POR	0.61	0.47	1.78	11.71	0.00
MNCW	MET	0.00	0.00	5.80	0.00	0.00

REGION I

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>
ATK	BOS	1.75	0.47	1.73	3.90
BM	BOS	9.20	2.01	5.11	6.89
BM	NEW	1.15	5.71	7.67	6.77
CR	BUF	10.60	11.15	9.82	15.87
CR	MET	7.95	4.98	3.27	0.35
CR	MOH	8.84	11.15	11.13	7.41
CR	NEW	5.30	18.16	21.93	20.28
CR	PHI	0.88	2.14	1.96	2.12
DH	#2	0.00	4.88	2.15	2.32
MEC	EAS	2.71	2.54	5.01	1.89
MEC	POR	8.12	2.54	9.02	1.08
PTM	POR	8.44	3.63	8.75	2.70
PW		0.00	6.73	0.00	1.25
SB		17.68	6.78	0.00	5.04
SB	SYS	7.58	1.70	0.00	2.52

**REGION 2 - PHILADELPHIA**

# REGIONAL STATISTICAL ANALYSIS REPORT

## INTRODUCTION

This report provides the Region with results of analyzed accident data and guidelines on how to incorporate this data into the Regional Inspection Plan (RIP). It will not only provide information for the completion of the "Regional Statistical Overview" of the RIP, but should also be instrumental in assisting with the formulation of Regional objectives, locating areas where system and special assessments are necessary, and indicating major deficiencies. The report contains two sections:

- o The Regional Overview contains data which deals with the overall safety picture and safety trends of the Region for the years 1978 through 1982. It will not only provide each Region with a general overview of their past and present safety trends, but will also allow each Region to compare their Regional safety trends to the National safety trends.
- o The Regional Accident Data contains data which deals with specific problem areas within the Region.

## REGIONAL OVERVIEW

2

This section contains a graph and a chart which depicts the overall safety trend of the Region for the years 1978 through 1982. The graph indicates the number of accidents by cause and year for the Region. The causes of the train accidents are classified into four categories:

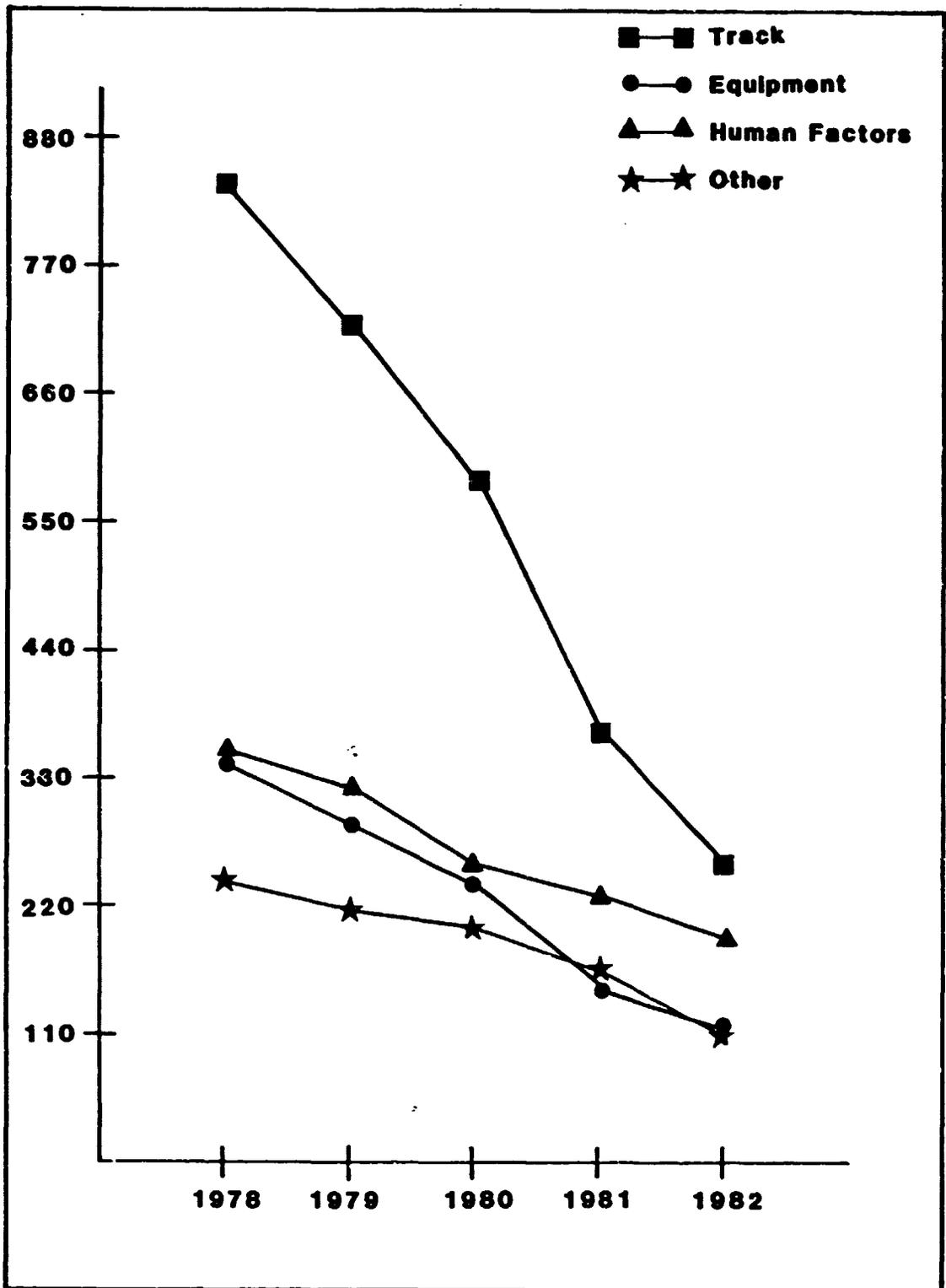
1. Track Accidents
2. Equipment Accidents
3. Human Factor Accidents
4. Other Accidents

The graph for Region 2 indicates that the number of accidents has continued to decrease significantly each year from 1978 to 1982. Track caused accidents within the Region have decreased by more than 60 percent from 1978 to 1982.

The chart in this section contains the percent changes on the National and Regional Levels for train accidents by cause, the number of persons killed in train accidents, the number of persons injured in train accidents, and the number of hazardous material releases due to train accidents. The percent changes on the National level are based on the total number of reportable train accidents that occurred in all of the eight FRA Regions within a given year. For example, the total number of train accidents that occurred in all of the eight FRA Regions during 1978 were compared with the total number of accidents that occurred during 1982 in all of the Regions. The percent changes on the Regional level, however, are simply based on the total number of reportable train accidents that occurred in one particular Region during a given year. The "National and Regional Safety Trends" chart allows each Region to note how the overall safety trends of their Region compare to the National safety trends.

The percent change data for Region 2 indicates that on the Regional level that the number of persons killed in train accidents decreased by 42.8% from 1981 to 1982. While on the National level for the same year period, the number of persons killed in train accidents decreased by only 22.2%. Although the number of persons killed in train accidents in Region 2 decreased by more than 20 percent over the National level, the number of persons injured in train accidents decreased by only 0.9 percent which is

almost 15 percent lower than the National level. A discussion on what factors may have influenced the number of persons killed and injured in Region 2 should be incorporated into the Regional Inspection Plan. Also, discuss the reason or reasons for the increase in the number of hazardous material releases in Region 2 from 1981 to 1982.



**REGION 2**

**Summary of Train Accidents by Cause  
For 1978 Thru 1982**

**National and Regional Safety Trends  
Region 2**

	PERCENT CHANGE		
	NATIONAL LEVEL		REGIONAL LEVEL
	1978-82	1981-82	1978-82
TOTAL REPORTABLE TRAIN ACCIDENTS	59.3	20.6	60.6
ACCIDENTS CAUSED BY TRACK	63.1	22.2	69.4
ACCIDENTS CAUSED BY HUMAN FACTORS	54.9	19.6	46.9
ACCIDENTS CAUSED BY EQUIPMENT	63.3	21.7	62.4
ACCIDENTS CAUSED BY OTHER FACTORS	49.5	17.3	47.1
PERSONS KILLED IN TRAIN ACCIDENTS	64.7	22.2	80.9
PERSONS INJURED IN TRAIN ACCIDENTS	75.3	16.0	71.2
NUMBER OF HAZ MAT RELEASES	57.2	23.4	31.6
			23.7
			30.8
			13.9
			20.9
			23.4
			42.8
			0.9
			30.8+

+ DENOTES AN INCREASE

## REGIONAL ACCIDENT DATA

The Accident Ratio data in this section will provide a methodology to allocate inspectors, system and special assessments, and other specialized Regional activities. It is assumed that by implementing a plan to advance the allocation of safety improvement activities, a reduction in accidents, injuries, and risks to the public will occur. The number of railroad accidents on the National level has decreased by 20.6% from 1981 to 1982. Although the number of railroad accidents has been decreasing, safety efforts cannot be relaxed since the possibility of a serious accident always remains. The nature of the relationship between safety improvement activities and accidents is assumed to be a negative correlation. In other words, as the number of safety improvement activities increase, the number of accidents decrease. Therefore, by advancing the allocation of safety improvement activities, the number of accidents can be reduced.

The accident ratios for each railroad within a Region is based on a formula which takes into account the number of accidents by discipline for the railroad, the speed of the train, and whether hazardous materials were present or involved in the accident.

The number of accidents are based on a three year average. Since accidents are such a rare occurrence, a one year average is of little value. The seasonally and monthly fluctuations have been disregarded. The accident ratios for railroads within a Region are divided into six categories:

- o Larger carrier accidents occurring on mainline track,
- o Larger carrier accidents occurring on yard and other track,
- o Larger carrier accidents occurring on mainline, yard, and other track,
- o Smaller carrier accidents occurring on mainline track,
- o Smaller carrier accidents occurring on yard and other track, and
- o Smaller carrier accidents occurring on mainline, yard, and other track.

The accident ratios in the following Tables are railroads and divisions which have an accident ratio which is greater than two percent. The railroads and divisions which have been disregarded have a very low accident rate. This does not indicate that the railroads which have been disregarded do not require inspection activity, but that based on accident ratios of past years, these railroads have had a low accident rate. It is possible

that the railroads which have been disregarded may require inspection activity due to a recent increase in accidents and/or non-compliance situations, or due to the Regional inspector's knowledge of the railroad.

By using the accident ratios provided in the following Tables, a preliminary allocation of inspection activities may be made to the various railroads within the Region. It should be noted that inspection activities can not be allocated using only past accident records. The allocation of inspection activities should also be based on defect ratios, the amount of time it took for non-compliance situations to be corrected, the overall conditions of the carrier's track, equipment, etc., and the past experiences of inspectors and regional personnel with a particular railroad. The accident ratios assist in the allocation of inspection activities by providing a base percentage of total inspection time for a given discipline that would be allocated to a particular division of a railroad.

REGION 2

ACCIDENT RATIOS FOR LARGER CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ATC		0.00	0.00	0.00	0.00	8.01
ATK	BAL	3.74	0.64	30.17	20.56	17.00
ATK	MID	0.00	0.00	0.00	0.00	9.16
ATK	PHI	10.79	1.15	1.31	3.28	0.52
ATK	YOU	0.00	0.00	0.00	0.00	5.23
BO	AKR	3.64	3.24	2.02	0.58	0.00
BO	MAR	3.66	2.71	2.58	3.01	2.14
BO	MON	2.43	2.09	1.32	4.05	0.32
BO	PEN	6.96	2.30	3.27	9.52	0.11
BO	WES	0.65	6.68	4.03	0.91	0.43
CO	WES	2.92	4.64	8.40	4.84	0.22
CR	ALL	6.50	4.35	0.64	3.69	0.40
CR	COL	3.48	0.97	0.58	3.78	1.58
CR	HAR	6.14	3.67	6.30	2.01	0.00
CR	PHI	5.53	8.12	11.92	1.49	3.27
CR	PIT	8.00	5.80	1.17	2.56	0.49
CR	SEP	0.00	0.00	0.00	0.00	12.47
CR	YOU	2.29	3.67	0.70	1.03	9.70
DH	#1	0.14	7.16	0.77	0.82	9.33
DTI	NOR	2.47	4.03	0.65	1.97	0.00
NW	NOR	2.65	0.75	0.06	0.15	0.77
NW	POC	2.94	4.04	1.28	3.85	0.67
NW	RAD	0.63	4.51	0.34	0.56	0.39
NW	SCI	2.57	1.32	0.23	0.61	3.56
PLE	PLE	0.76	2.96	0.38	0.75	0.00
RFP		2.11	0.44	0.07	0.00	0.00
SCL	ROC	0.17	0.47	2.49	0.03	12.20
SOU	BAL	0.00	0.00	0.00	4.35	0.00

REGION 2 (CONT'D)

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
SOU	EAS	0.67	0.00	7.30	6.09	0.38
WATC		0.00	0.00	0.00	2.05	0.00
WM	HAR	0.00	0.00	0.00	2.15	0.00
WM	MAR	1.09	3.53	0.57	0.56	0.28

REGION 2

ACCIDENT RATIOS FOR LARGER CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY. CROSSING</u>
ALQS		1.26	1.28	1.11	2.74	0.00
BO	AKR	4.94	6.96	1.35	3.52	0.00
BO	ARK	7.60	0.23	0.00	0.00	0.00
BO	MAR	0.76	9.05	5.38	2.31	0.00
BO	MON	1.52	0.62	1.01	2.92	0.00
BO	PEN	1.90	1.08	5.72	2.62	0.00
BO	WES	3.04	3.40	10.10	1.01	0.00
CO	OHI	1.34	3.75	1.02	2.24	0.00
CO	SOU	0.00	0.00	0.00	2.03	0.00
CO	VIR	5.38	3.91	18.20	1.42	0.00
CO	WES	2.30	2.03	1.70	4.17	0.00
CR	CLE	0.35	2.86	2.80	2.89	0.00
CR	COL	21.12	3.15	2.18	2.70	47.25
CR	HAR	4.75	3.44	1.56	2.14	0.00
CR	PHI	5.46	12.03	14.02	5.50	0.00
CR	PIT	3.17	7.16	2.80	6.80	0.00
CR	SEP	3.87	0.14	0.00	0.00	0.00
CR	TOL	2.11	3.08	1.25	1.30	0.00
CR	YOU	0.35	2.94	1.56	4.28	15.75
DH	#1	0.00	0.00	2.31	0.31	0.00
NW	POC	2.40	1.81	0.61	2.04	0.00
NW	SCI	2.40	0.56	0.61	0.82	0.00
PBR		0.32	0.39	0.84	0.08	28.31
RFP		2.20	4.81	3.37	3.66	0.00
RFP	RAL	0.00	0.00	0.00	2.12	0.00
RT		0.00	0.00	0.17	0.00	8.70
URR	MAI	2.61	0.71	1.15	1.03	0.00
WM	MAR	2.96	0.40	1.75	1.18	0.00

REGION 2

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ABB		0.00	0.00	70.47	8.20	0.00
ABB	SYS	0.00	0.00	0.00	0.00	28.78
ACY		0.00	0.00	2.79	9.09	0.00
LEF		0.00	12.85	0.00	0.00	42.45
MDDE	CAM	0.00	0.00	3.69	0.00	0.00
MGA	MON	2.70	0.00	0.00	0.00	0.00
MGA	PIT	2.70	0.00	0.00	0.00	0.00
MGA	RCE	2.70	34.86	0.00	4.92	0.00
MGA	RIV	35.05	34.86	0.00	27.87	0.00
MGA	TEN	21.57	17.43	0.00	3.28	0.00
MGA	WAY	13.48	0.00	0.00	1.64	0.00
MGA	WES	2.70	0.00	0.00	0.00	0.00
NFD		0.00	0.00	0.00	11.77	0.00
PNER	WIL	0.00	0.00	0.00	0.00	28.78
PS		4.41	0.00	23.05	10.72	0.00
TT		0.00	0.00	0.00	9.12	0.00
TT	OHI	2.50	0.00	0.00	0.00	0.00
WVN	SYS	10.78	0.00	0.00	0.00	0.00
YS		0.00	0.00	0.00	6.19	0.00

REGION 2

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>
ACY		0.00	41.99	0.00	0.00
BVRY		0.00	10.60	0.00	0.00
DIS	TOL	40.70	26.45	0.00	6.27
LEF		0.00	0.00	40.38	0.00
MGA	RCP	0.00	0.00	0.00	3.35
MGA	RIV	32.62	0.00	0.00	6.70
MGA	TEN	0.00	0.00	0.00	3.35
MKC		0.00	2.59	0.00	0.00
MKC	LOW	0.00	0.00	13.58	0.00
NSS		0.00	3.36	0.00	0.00
PCY		0.00	7.34	0.00	1.16
PS		26.68	0.00	45.44	10.96
PS	ALL	0.00	0.00	0.00	2.74
TT		0.00	0.00	0.00	20.19
55	OHI	0.00	0.00	0.00	34.16
II	PIT	0.00	0.00	0.00	3.11
TT	TOL	0.00	0.00	0.00	4.66
WVN		0.00	0.00	0.00	3.35
YN		0.00	7.68	0.00	0.00

REGION 3 - ATLANTA

3-0

# REGIONAL STATISTICAL ANALYSIS REPORT

## INTRODUCTION

This report provides the Region with results of analyzed accident data and guidelines on how to incorporate this data into the Regional Inspection Plan (RIP). It will not only provide information for the completion of the "Regional Statistical Overview" of the RIP, but should also be instrumental in assisting with the formulation of Regional objectives, locating areas where system and special assessments are necessary, and indicating major deficiencies. The report contains two sections:

- o The Regional Overview contains data which deals with the overall safety picture and safety trends of the Region for the years 1978 through 1982. It will not only provide each Region with a general overview of their past and present safety trends, but will also allow each Region to compare their Regional safety trends to the National safety trends.
- o The Regional Accident Data contains data which deals with specific problem areas within the Region.

## REGIONAL OVERVIEW

This section contains a graph and a chart which depicts the overall safety trend of the Region for the years 1978 through 1982. The graph indicates the number of accidents by cause and year for the Region. The causes of the train accidents are classified into four categories:

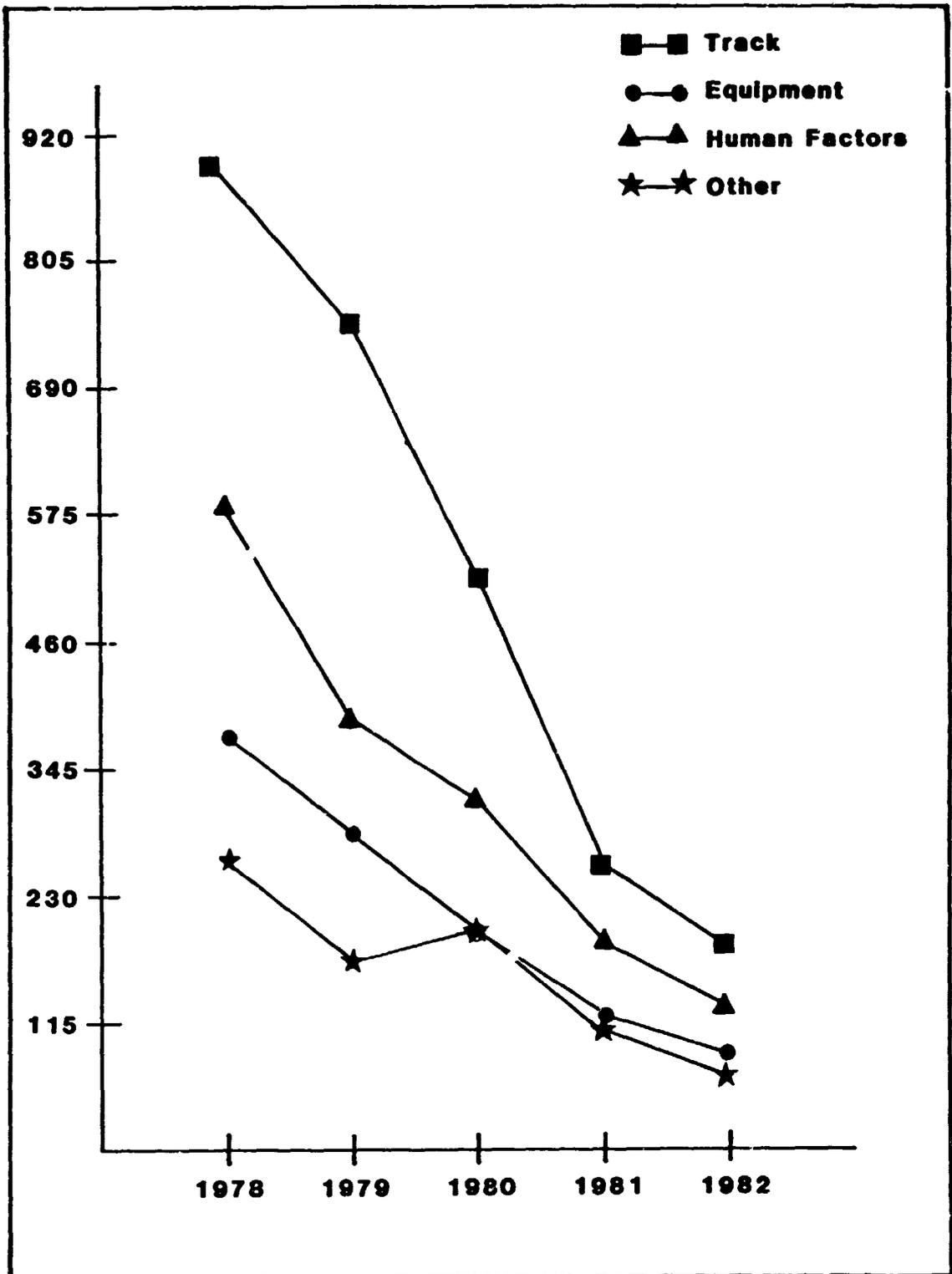
1. Track Accidents
2. Equipment Accidents
3. Human Factor Accidents
4. Other Accidents

The graph for Region 3 shows that there has been a continuing decrease in the number of train accidents by cause with the exception of other miscellaneous cause which had an increase in 1980.

The chart in this section contains the percent changes on the National and Regional Levels for train accidents by cause, the number of persons killed in train accidents, the number of persons injured in train accidents, and the number of hazardous material releases due to train accidents. The percent changes on the National level are based on the total number of reportable train accidents that occurred in all of the eight FRA Regions within a given year. For example, the total number of train accidents that occurred in all of the eight FRA Regions during 1978 were compared with the total number of accidents that occurred during 1982 in all of the Regions. The percent changes on the Regional level, however, are simply based on the total number of reportable train accidents that occurred in one particular Region during a given year. The "National and Regional Safety Trends" chart allows each Region to note how the overall safety trends of their Region compare to the National safety trends.

The percent change data for Region 3 indicates that the number of persons killed and injured in train accidents from 1981 to 1982 decreased by 40 percent and 64.3 percent respectively, while on the National level the change was 22.2 percent for persons killed and 16 percent for persons injured. Furthermore, the number of hazardous material releases decreased by 64.7 percent in Region 3 from 1981 to 1982, where the

National level decreased by 23.4 percent. Since the Regional data indicates that the overall safety trends are superior to the National level safety trends, discuss past safety programs which the Region has utilized to accomplish this safety record.



**REGION 3**

**Summary of Train Accidents By Cause  
For 1978 Thru 1982**

**National and Regional Safety Trends  
Region 3**

	PERCENT CHANGE		
	NATIONAL LEVEL		REGIONAL LEVEL
	1978-82	1981-82	1978-82
TOTAL REPORTABLE TRAIN ACCIDENTS	59.3	20.6	76.8
ACCIDENTS CAUSED BY TRACK	63.1	22.2	79.2
ACCIDENTS CAUSED BY HUMAN FACTORS	54.9	19.6	57.6
ACCIDENTS CAUSED BY EQUIPMENT	63.3	21.7	64.4
ACCIDENTS CAUSED BY OTHER FACTORS	49.5	17.3	55.9
PERSONS KILLED IN TRAIN ACCIDENTS	64.7	22.2	89.1
PERSONS INJURED IN TRAIN ACCIDENTS	75.3	16.0	83.6
NUMBER OF HAZ MAT RELEASES	57.2	23.4	80.6

+ DENOTES AN INCREASE

## REGIONAL ACCIDENT DATA

The Accident Ratio data in this section will provide a methodology to allocate inspectors, systems and special assessments, and other specialized Regional activities. It is assumed that by implementing a plan to advance the allocation of safety improvement activities, a reduction in accidents, injuries, and risks to the public will occur. The number of railroad accidents on the National level has decreased by 20.6% from 1981 to 1982. Although the number of railroad accidents has been decreasing, safety efforts cannot be relaxed since the possibility of a serious accident always remains. The nature of the relationship between safety improvement activities and accidents is assumed to be a negative correlation. In other words, as the number of safety improvement activities increase, the number of accidents decrease. Therefore, by advancing the allocation of safety improvement activities, the number of accidents can be reduced.

The accident ratios for each railroad within a Region is based on a formula which takes into account the number of accidents by discipline for the railroad, the speed of the train, and whether hazardous materials were present or involved in the accident.

The number of accidents are based on a three year average. Since accidents are such a rare occurrence, a one year average is of little value. The seasonally and monthly fluctuations have been disregarded. The accident ratios for railroads within a Region are divided into six categories:

- o Larger carrier accidents occurring on mainline track,
- o Larger carrier accidents occurring on yard and other track,
- o Larger carrier accidents occurring on mainline, yard, and other track,
- o Smaller carrier accidents occurring on mainline track,
- o Smaller carrier accidents occurring on yard and other track, and
- o Smaller carrier accidents occurring on mainline, yard, and other track.

The accident ratios in the following Tables are railroads and divisions which have an accident ratio which is greater than two percent. The railroads and divisions which have been disregarded have a very low accident rate. This does not indicate that the railroads which have been disregarded do not require inspection activity, but that based on accident ratios of past years, these railroads have had a low accident rate. It is possible

that the railroads which have been disregarded may require inspection activity due to a recent increase in accidents and/or non-compliance situations, or due to the Regional inspector's knowledge of the railroad.

By using the accident ratios provided in the following Tables, a preliminary allocation of inspection activities may be made to the various railroads within the Region. It should be noted that inspection activities can not be allocated using only past accident records. The allocation of inspection activities should also be based on defect ratios, the amount of time it took for non-compliance situations to be corrected, the overall conditions of the carrier's track, equipment, etc., and the past experiences of inspectors and regional personnel with a particular railroad. The accident ratios assist in the allocation of inspection activities by providing a base percentage of total inspection time for a given discipline that would be allocated to a particular division of a railroad.

REGION 3

ACCIDENT RATIOS FOR LARGER CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
AGS	CRE	1.26	0.95	0.33	2.27	12.67
ATC		5.35	0.00	0.00	0.00	0.00
ATK	BAL	3.50	0.00	0.00	0.00	13.75
ATK	SOU	0.00	3.71	0.00	0.00	8.68
BN	MEM	1.23	2.06	0.78	0.05	0.43
CAGY		0.23	3.90	2.22	3.69	0.00
CCO		2.90	4.73	2.42	2.64	0.74
CCO	CLI	0.00	4.73	0.00	2.72	0.00
GA	MAI	4.84	0.39	4.64	3.72	0.45
ICG	ALA	4.44	2.84	2.94	3.16	0.00
ICG	DEL	0.97	1.55	0.00	3.16	1.31
ICG	KEN	1.64	1.81	4.70	5.06	0.00
ICG	MID	0.12	0.26	8.06	0.65	0.00
ICG	MIS	2.13	1.55	3.97	9.52	0.81
ICG	ST	0.00	0.00	0.00	7.43	0.00
LN	ATL	1.24	3.10	5.44	2.45	0.56
LN	BIR	2.31	0.96	0.68	0.95	0.93
LN	COR	3.38	7.64	8.57	6.36	0.37
LN	EVA	0.39	0.72	3.40	0.34	0.28
LN	LOU	0.90	3.82	0.68	0.73	1.03
LN	MOB	4.67	5.25	0.54	3.65	0.75
LN	NAS	0.68	3.10	1.90	2.88	0.37
SBD	NAS	0.08	0.00	0.00	3.41	0.26
SCL	ATL	7.25	4.07	3.86	0.65	3.88
SCL	FLO	0.53	0.45	0.90	0.33	12.35
SCL	JAC	3.57	0.23	4.89	6.79	1.41
SCL	RAL	8.74	4.52	0.77	0.94	1.68
SCL	ROC	3.41	0.00	6.56	2.93	1.68

REGION 3 (CONT'D)

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
SCL	SAV	9.59	1.36	1.80	1.46	12.00
SCL	SOU	0.00	0.00	0.00	8.95	0.00
SCL	TAM	0.91	13.79	1.29	0.53	7.59
SCL	WAY	4.21	3.84	0.64	0.33	0.00
SLSF	SOU	1.00	1.70	0.24	2.75	1.33
SOU	ALA	1.05	1.70	2.67	0.15	1.99
SOU	PIE	2.33	0.43	1.70	0.00	1.66
SOU	TEN	0.80	1.49	5.57	0.61	1.99
WA	AWP	0.00	0.00	4.93	0.00	0.00

REGION 3

ACCIDENT RATIOS FOR LARGER CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
AGS	CRE	0.39	0.65	2.06	0.33	0.00
AWP	ATL	0.00	2.29	0.00	0.00	0.00
BN	MEM	2.78	2.08	1.27	1.89	0.00
CCO		13.41	1.06	4.37	3.67	12.15
CGA	GEO	0.00	0.25	0.34	0.38	5.68
CO	WES	1.24	7.82	24.08	10.10	0.00
GA	MAI	3.14	1.74	0.00	2.17	0.00
ICG	ALA	1.57	3.19	5.97	5.23	0.00
ICG	DEL	3.66	2.61	1.99	6.34	0.00
ICG	KEN	4.18	0.58	1.19	3.00	0.00
ICG	MIS	0.52	0.72	0.80	2.00	0.00
ICG	ST	0.00	0.00	0.00	2.23	0.00
LN	ATL	3.39	2.41	1.47	2.57	0.00
LN	BIR	0.00	0.27	0.74	0.31	18.42
LN	CIN	0.97	0.27	2.21	1.03	0.00
LN	COR	0.00	1.74	0.37	2.37	0.00
LN	EVA	2.90	1.07	0.74	0.82	0.00
LN	MOB	1.45	2.28	1.47	1.03	0.00
LN	NAS	2.42	1.07	4.42	0.62	0.00
LN	TIL	0.97	2.15	1.47	2.16	0.00
SBD	RAL	2.03	0.88	0.00	0.34	0.00
SCL	ATL	5.50	4.32	0.70	2.05	0.00
SCL	FLO	2.29	2.67	1.74	0.19	0.00
SCL	HAM	0.46	2.03	2.09	0.39	0.00
SCL	TAM	1.37	6.09	4.53	1.85	0.00
SCL	WAY	2.29	2.29	11.16	2.14	0.00
SCL	WY	0.46	0.51	2.44	0.00	0.00
SLSF	MEM	3.44	2.15	3.28	1.28	0.00

REGION 3 (CONT'D)

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
SOU	ALA	6.90	4.06	0.98	1.93	10.94
SOU	COA	2.59	3.17	0.66	2.39	0.00
SOU	EAS	3.02	0.60	0.33	0.37	5.47
SOU	GEO	2.16	3.76	0.33	1.65	0.00
SOU	PIE	0.43	2.39	0.66	2.61	0.00
SOU	TEN	4.31	3.58	0.00	3.49	27.36

REGION 3

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
AN		0.00	0.00	0.00	11.17	0.00
AN NEW		0.00	0.00	0.00	11.17	0.00
AN YAR		22.40	0.00	0.00	0.00	0.00
CARR		0.00	4.82	0.00	0.00	0.00
CCR		12.72	0.00	0.00	0.00	0.00
ECBR		0.00	54.33	0.00	0.00	0.00
ECBR	SYS	0.00	16.30	0.00	0.00	0.00
GANO	COA	0.00	0.00	0.00	4.17	0.00
GM	GAI	0.00	0.00	0.00	6.61	0.00
HB		0.00	0.00	0.00	16.18	0.00
NTR		0.00	0.00	0.00	11.00	0.00
PI	KEN	0.00	0.00	0.00	23.51	0.00
SAN	COA	0.00	10.87	0.00	0.00	0.00
TASD	MOB	0.00	13.68	100.00	0.00	0.00
TW.RY		64.88	0.00	0.00	16.18	0.00

REGION 3

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
AN		0.00	49.11	0.00	10.62	0.00
AN	SYS	0.00	0.00	64.91	0.00	0.00
ARC	SYS	0.00	15.69	0.00	0.00	0.00
CARR		0.00	0.00	0.00	2.28	0.00
CCR		13.56	0.00	0.00	2.01	0.00
FCIN		0.00	0.00	0.00	5.13	0.00
HB		0.00	0.00	0.00	10.25	0.00
HPTD	SYS	0.00	0.00	0.00	0.00	100.00
MSV	MSV	0.00	0.00	0.00	7.15	0.00
PI	KEN	0.00	11.48	0.00	40.95	0.00
SAN		51.87	0.00	0.00	0.00	0.00
TTIS		0.00	0.00	35.09	0.00	0.00
TWRY		34.58	23.71	0.00	20.50	0.00

REGION 4 - CHICAGO

# REGIONAL STATISTICAL ANALYSIS REPORT

## INTRODUCTION

This report provides the Region with results of analyzed accident data and guidelines on how to incorporate this data into the Regional Inspection Plan (RIP). It will not only provide information for the completion of the "Regional Statistical Overview" of the RIP, but should also be instrumental in assisting with the formulation of Regional objectives, locating areas where system and special assessments are necessary, and indicating major deficiencies. The report contains two sections:

- o The Regional Overview contains data which deals with the overall safety picture and safety trends of the Region for the years 1978 through 1982. It will not only provide each Region with a general overview of their past and present safety trends, but will also allow each Region to compare their Regional safety trends to the National safety trends.
- o The Regional Accident Data contains data which deals with specific problem areas within the Region.

## REGIONAL OVERVIEW

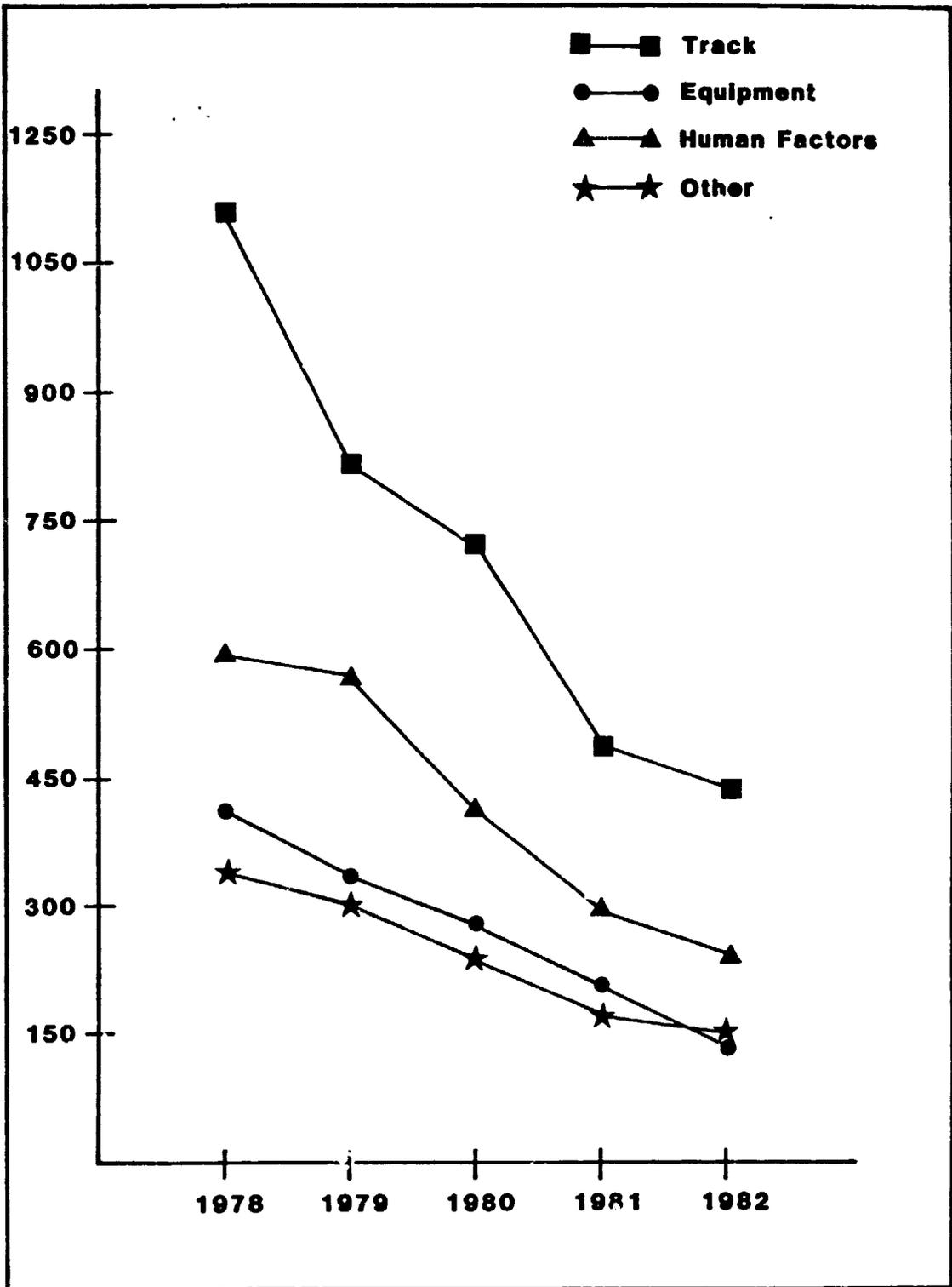
This section contains a graph and a chart which depicts the overall safety trend of the Region for the years 1978 through 1982. The graph indicates the number of accidents by cause and year for the Region. The causes of the train accidents are classified into four categories:

1. Track Accidents
2. Equipment Accidents
3. Human Factor Accidents
4. Other Accidents

The graph for Region 4 indicates that there has been a significant decrease in the number of accidents from 1978 to 1982. The greatest have occurred in the areas of track and human factors.

The chart in this section contains the percent changes on the National and Regional Levels for train accidents by cause, the number of persons killed in train accidents, the number of persons injured in train accidents, and the number of hazardous material releases due to train accidents. The percent changes on the National level are based on the total number of reportable train accidents that occurred in all of the eight FRA Regions within a given year. For example, the total number of train accidents that occurred in all of the eight FRA Regions during 1978 were compared with the total number of accidents that occurred during 1982 in all of the Regions. The percent changes on the Regional level, however, are simply based on the total number of reportable train accidents that occurred in one particular Region during a given year. The "National and Regional Safety Trends" chart allows each Region to note how the overall safety trends of their Region compare to the National safety trends.

The percent change chart for Region 4 reveals that the number of persons killed and injured in train accidents significantly decreased above that National level from 1981 to 1982. Discuss the past safety programs which the Region has utilized to accomplish this safety record in the "Regional Statistical Overview" Section of the 1984 Regional Inspection Plan.



**REGION 4**  
**Summary of Train Accidents By Cause**  
**For 1978 Thru 1982**

**National and Regional Safety Trends  
Region 4**

	PERCENT CHANGE			
	NATIONAL LEVEL		REGIONAL LEVEL	
	1978-82	1981-82	1978-82	1981-82
TOTAL REPORTABLE TRAIN ACCIDENTS	59.3	20.6	59.8	15.2
ACCIDENTS CAUSED BY TRACK	63.1	22.2	60.5	10.7
ACCIDENTS CAUSED BY HUMAN FACTORS	54.9	19.6	57.6	13.4
ACCIDENTS CAUSED BY EQUIPMENT	63.3	21.7	64.4	30.1
ACCIDENTS CAUSED BY OTHER FACTORS	49.5	17.3	55.9	19.0
PERSONS KILLED IN TRAIN ACCIDENTS	64.7	22.2	70.6	58.3
PERSONS INJURED IN TRAIN ACCIDENTS	75.3	16.0	91.9	28.2
NUMBER OF HAZ MAT RELEASES	57.2	23.4	52.4	28.6

+ DENOTES AN INCREASE

## REGIONAL ACCIDENT DATA

The Accident Ratio data in this section will provide a methodology to allocate inspectors, system and special assessments, and other specialized Regional activities. It is assumed that by implementing a plan to advance the allocation of safety improvement activities, a reduction in accidents, injuries, and risks to the public will occur. The number of railroad accidents on the National level has decreased by 20.6% from 1981 to 1982. Although the number of railroad accidents has been decreasing, safety efforts cannot be relaxed since the possibility of a serious accident always remains. The nature of the relationship between safety improvement activities and accidents is assumed to be a negative correlation. In other words, as the number of safety improvement activities increase, the number of accidents decrease. Therefore, by advancing the allocation of safety improvement activities, the number of accidents can be reduced.

The accident ratios for each railroad within a Region is based on a formula which takes into account the number of accidents by discipline for the railroad, the speed of the train, and whether hazardous materials were present or involved in the accident.

The number of accidents are based on a three year average. Since accidents are such a rare occurrence, a one year average is of little value. The seasonally and monthly fluctuations have been disregarded. The accident ratios for railroads within a Region are divided into six categories:

- o Larger carrier accidents occurring on mainline track,
- o Larger carrier accidents occurring on yard and other track,
- o Larger carrier accidents occurring on mainline, yard, and other track,
- o Smaller carrier accidents occurring on mainline track,
- o Smaller carrier accidents occurring on yard and other track, and
- o Smaller carrier accidents occurring on mainline, yard, and other track.

The accident ratios in the following Tables are railroads and divisions which have an accident ratio which is greater than two percent. The railroads and divisions which have been disregarded have a very low accident rate. This does not indicate that the railroads which have been disregarded do not require inspection activity, but that based on accident ratios of past years, these railroads have had a low accident rate. It is possible

that the railroads which have been disregarded may require inspection activity due to a recent increase in accidents and/or non-compliance situations, or due to the Regional inspector's knowledge of the railroad.

By using the accident ratios provided in the following Tables, a preliminary allocation of inspection activities may be made to the various railroads within the Region. It should be noted that inspection activities can not be allocated using only past accident records. The allocation of inspection activities should also be based on defect ratios, the amount of time it took for non-compliance situations to be corrected, the overall conditions of the carrier's track, equipment, etc., and the past experiences of inspectors and regional personnel with a particular railroad. The accident ratios assist in the allocation of inspection activities by providing a base percentage of total inspection time for a given discipline that would be allocated to a particular division of a railroad.

REGION 4

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY. CROSSING</u>
ATK	MID	0.57	3.43	12.09	0.00	14.56
ATK	ST	0.00	10.30	0.00	0.00	0.00
ATSF	CHI	0.00	3.98	0.00	0.00	0.00
ATSF	ILL	0.42	0.00	0.04	0.05	3.73
BN	CHI	11.37	8.52	21.96	1.46	2.95
BN	GAL	0.34	0.13	7.68	1.03	0.00
BN	MIN	1.49	4.77	6.69	1.05	0.10
BO	WES	3.01	0.70	3.69	3.98	0.09
CNW	ILL	2.47	1.12	2.32	3.16	0.03
CNW	TWI	5.24	2.46	1.70	5.96	0.12
CNW	WIS	3.78	3.13	0.83	2.77	0.15
CO	MIC	4.03	0.71	4.47	4.43	0.09
CO	WES	3.08	0.28	0.08	1.74	0.00
CR	CHI	0.78	1.43	3.30	1.38	2.61
CR	MIC	1.26	1.04	0.36	3.73	7.53
CR	MID	0.00	0.00	0.00	3.61	0.00
CR	SOU	5.30	2.08	1.16	1.52	1.56
CSS	WES	0.00	0.00	3.21	0.00	1.17
GTW	CHI	2.38	15.78	0.13	1.14	0.38
ICG	ILL	3.36	0.00	0.40	12.29	0.05
ICG	IOW	0.24	0.12	0.13	2.05	0.00
ICG	MID	0.34	0.00	0.00	14.01	0.00
ICG	ST	0.60	0.24	0.09	1.33	5.02
MILW	IL	0.99	0.00	0.00	0.37	11.47
MILW	ILL	1.26	0.27	4.48	0.56	4.31
MILW	MIN	1.26	0.27	0.20	2.30	0.18
MILW	NOR	3.64	0.67	1.29	1.15	0.35
MILW	PAS	0.00	0.00	0.40	0.00	11.23

REGION 4 (CONT'D)

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
MILW	PSG	0.00	0.00	0.00	0.00	7.82
MILW	SOU	2.97	3.76	0.00	0.81	0.30
MILW	WIS	3.51	5.38	2.49	1.37	0.21
MP	ILL	2.73	1.73	1.42	1.95	0.06
NW	DEC	1.78	0.13	2.15	1.67	0.02
SOO	CEN	3.29	0.59	0.66	4.33	0.26
SOO	EAS	9.62	9.94	1.24	4.19	0.31

REGION 4

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
AWN	ENO	0.00	21.01	0.00	0.00	12.82
CWI		5.35	0.00	0.00	1.96	0.00
CWI	CHI	0.00	26.15	6.44	9.80	0.00
DNE		0.00	0.00	0.00	0.00	6.38
DTS	TOL	55.09	16.38	0.00	0.00	0.00
ELS		13.20	0.00	21.17	11.28	26.33
LSI		0.00	0.00	4.05	1.23	0.00
LSTT	SYS	0.00	0.00	0.00	3.92	0.00
LSTT	WIS	8.03	0.00	0.00	9.80	0.00
MIGN	NOR	1.67	0.00	28.08	0.00	0.00
MIGN	SOU	1.67	0.00	12.03	1.22	0.00
MNS		0.00	36.36	3.92	1.36	0.00
MTFR		0.00	0.00	0.00	10.58	0.00
PACY		0.00	0.00	0.00	16.67	0.00
TSBY		0.00	0.00	0.00	0.00	23.08
TSBY	ANN	0.00	0.00	0.00	0.00	15.39
WSRY		5.35	0.00	0.00	3.92	0.00
WSRY	EAS	2.68	0.00	0.00	1.96	0.00
WSRY	FIF	0.00	0.00	0.00	3.92	0.00
WSRY	FIR	5.35	0.00	0.00	1.96	16.01
WSRY	THI	0.00	0.00	19.32	0.00	0.00

REGION 4

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ALS	ALT	1.36	3.17	12.99	2.25	0.00
ATK	MID	2.74	0.11	1.75	0.02	0.00
BN	CHI	2.32	2.08	3.63	1.59	0.00
BN	MIN	3.29	2.14	2.46	1.30	0.00
BN	WIS	2.71	0.82	3.63	1.28	0.00
BO	NEW	0.00	0.06	0.14	0.04	31.19
BOCT	CHI	0.00	0.93	1.20	0.34	21.90
BRC		4.59	7.34	5.72	5.22	0.00
CNW	CHI	4.76	5.78	3.19	4.53	0.00
CNW	ILL	2.38	1.54	1.14	1.95	0.00
CNW	TWI	4.76	3.37	4.10	8.89	0.00
CNW	WIS	4.25	2.17	2.28	4.10	0.00
CO	MIC	3.23	1.65	1.23	0.56	0.00
CR	CHI	1.78	2.80	2.65	1.25	0.00
EJE	G&S	3.12	1.05	6.01	1.90	0.00
GTW	CHI	4.38	2.95	1.21	0.84	0.00
GTW	DET	0.52	3.47	0.52	0.64	0.00
ICO	CHI	0.00	0.36	0.24	2.44	0.00
ICG	ST	0.91	6.89	0.12	1.29	0.00
IHB	EAS	3.09	0.66	0.26	1.78	0.00
ITC	SOU	0.59	0.67	0.39	2.37	0.00
MILW	ILL	1.63	2.31	4.66	2.58	0.00
MILW	MIN	1.63	2.55	3.29	1.88	0.00
MILW	NOR	2.86	3.12	4.38	5.20	0.00
MILW	SOU	0.82	2.26	1.51	2.15	0.00
MILW	WIS	3.27	1.85	2.46	3.21	0.00
NW	ST	0.29	0.11	0.00	0.15	14.05
SOO	CEN	1.94	5.34	1.40	2.03	0.00

REGION 4 (CONT'D)

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
SOO	EAS	5.53	2.33	2.61	1.60	0.00
SOO	WES	0.15	0.30	0.30	0.11	10.95
SSW	COT	2.83	0.27	0.42	1.39	0.00

REGION 4

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>
CHIT	CHI	2.69	0.00	0.00	0.64
CIW	CHI	0.00	0.00	0.00	10.68
CN	ASS	0.00	12.26	0.00	0.00
CWI		8.22	24.61	0.00	3.90
CWI	CHI	0.00	30.77	0.00	3.90
ELS		10.14	0.00	0.00	1.60
LSI		0.00	7.74	0.00	6.13
LSTT	CEN	0.00	0.00	0.00	3.90
LSTT	TWI	0.00	0.00	0.00	3.90
LSTT	WIS	24.67	14.61	0.00	5.85
MIGN	CAD	0.00	0.00	0.00	6.08
MNS		0.00	0.00	0.00	4.05
MTFR		44.38	0.00	0.00	10.35
PACY		0.00	0.00	0.00	9.76
WSRY	EAS	0.00	0.00	0.00	3.90
WSRY	4TH	8.22	0.00	0.00	1.95
WVRC	WVR	0.00	0.00	0.00	9.32

REGION 5 - FORT WORTH

# REGIONAL STATISTICAL ANALYSIS REPORT

## INTRODUCTION

This report provides the Region with results of analyzed accident data and guidelines on how to incorporate this data into the Regional Inspection Plan (RIP). It will not only provide information for the completion of the "Regional Statistical Overview" of the RIP, but should also be instrumental in assisting with the formulation of Regional objectives, locating areas where system and special assessments are necessary, and indicating major deficiencies. The report contains two sections:

- o The Regional Overview contains data which deals with the overall safety picture and safety trends of the Region for the years 1978 through 1982. It will not only provide each Region with a general overview of their past and present safety trends, but will also allow each Region to compare their Regional safety trends to the National safety trends.
- o The Regional Accident Data contains data which deals with specific problem areas within the Region.

## REGIONAL OVERVIEW

This section contains a graph and a chart which depicts the overall safety trend of the Region for the years 1978 through 1982. The graph indicates the number of accidents by cause and year for the Region. The causes of the train accidents are classified into four categories:

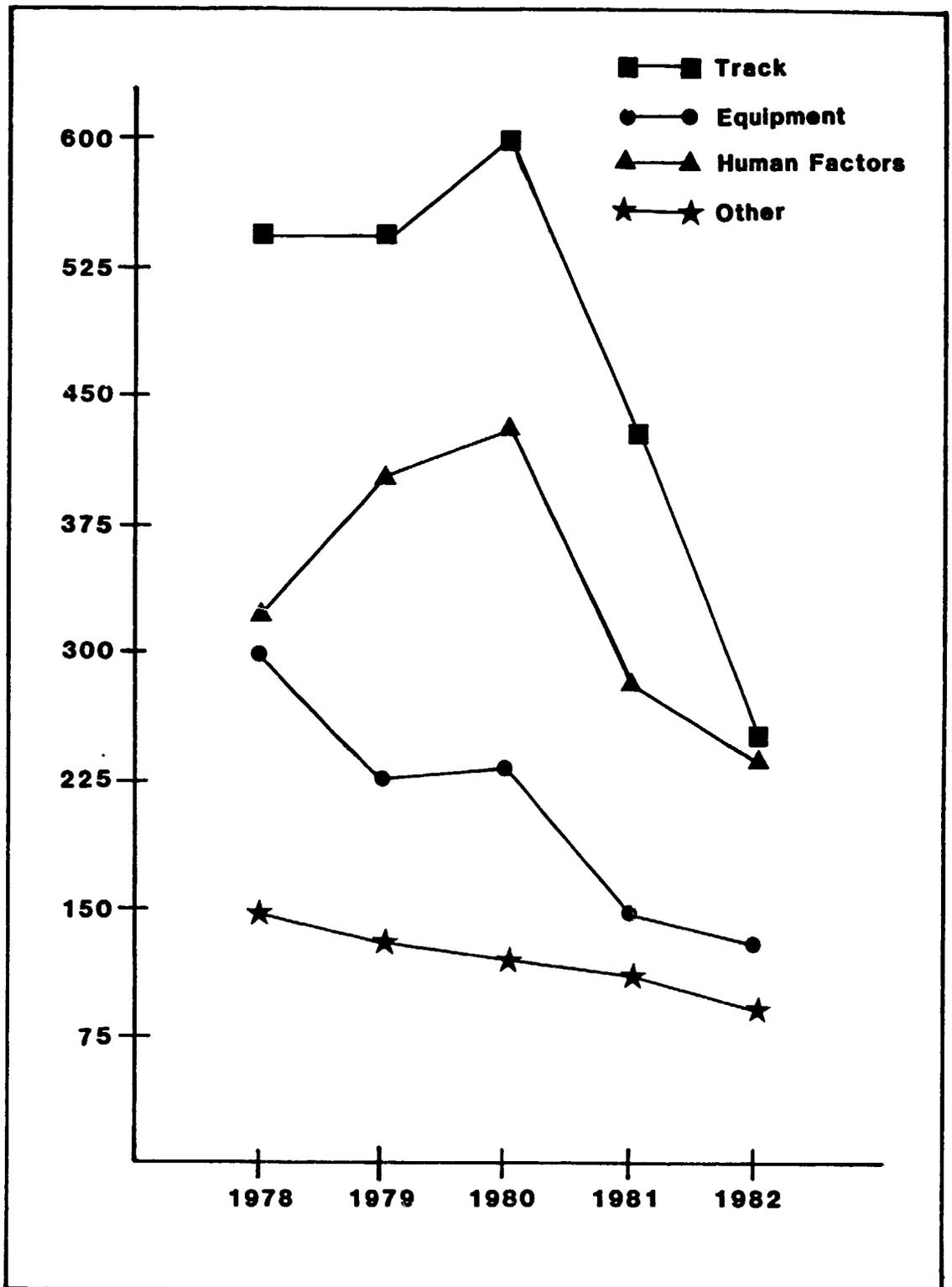
1. Track Accidents
2. Equipment Accidents
3. Human Factor Accidents
4. Other Accidents

The graph for Region 5 indicates that the number of accidents in Region 5 which occurred during 1982 was lower than the number of accidents which occurred during 1978. However, the Region experienced an increase in the number of accidents caused by track, equipment, and human factors during 1980. Since 1980, the safety record for Region 5 has significantly improved. In the "Regional Statistical Overview" Section of the 1984 Regional Inspection Plan (RIP), discuss the Regional deficiencies or weaknesses that existed in Region 5 and what corrective action were taken by the Region to accomplish its present safety record.

The chart in this section contains the percent changes on the National and Regional Levels for train accidents by cause, the number of persons killed in train accidents, the number of persons injured in train accidents, and the number of hazardous material releases due to train accidents. The percent changes on the National level are based on the total number of reportable train accidents that occurred in all of the eight FRA Regions within a given year. For example, the total number of train accidents that occurred in all of the eight FRA Regions during 1978 were compared with the total number of accidents that occurred during 1982 in all of the Regions. The percent changes on the Regional level, however, are simply based on the total number of reportable train accidents that occurred in one particular Region during a given year. The "National and Regional Safety Trends" chart allows each Region to note how the overall safety trends of their Region compare to the National safety trends.

The percent change data for Region 5 indicates that the number of persons injured in train accidents decreased by 47 percent from 1981 to 1982; while on the National level, the decrease was by 16 percent. Discuss the past safety programs which the Region has utilized to accomplish this safety record in the 1984 RIP. Since the percent changes from 1981 to 1982 for the number of train accidents caused by equipment and the number of persons killed in train accidents are lower than the National level, determine where the Regional weaknesses exist and discuss what corrective actions are planned for 1984.

C-2



**REGION 5**  
**Summary of Train Accidents By Cause**  
**For 1978 Thru 1982**

**National and Regional Safety Trends  
Region 5**

	PERCENT CHANGE			
	NATIONAL LEVEL		REGIONAL LEVEL	
	1978-82	1981-82	1978-82	1981-82
TOTAL REPORTABLE TRAIN ACCIDENTS	59.3	20.6	42.7	22.6
ACCIDENTS CAUSED BY TRACK	63.1	22.2	48.3	34.3
ACCIDENTS CAUSED BY HUMAN FACTORS	54.9	19.6	25.3	14.5
ACCIDENTS CAUSED BY EQUIPMENT	63.3	21.7	55.4	12.5
ACCIDENTS CAUSED BY OTHER FACTORS	49.5	17.3	35.1	11.9
PERSONS KILLED IN TRAIN ACCIDENTS	64.7	22.2	46.7	11.1
PERSONS INJURED IN TRAIN ACCIDENTS	75.3	16.0	51.2	47.0
NUMBER OF HAZ MAT RELEASES	57.2	23.4	63.9	18.8

+ DENOTES AN INCREASE

The Accident Ratio data in this section will provide a methodology to allocate inspectors, system and special assessments, and other specialized Regional activities. It is assumed that by implementing a plan to advance the allocation of safety improvement activities, a reduction in accidents, injuries, and risks to the public will occur. The number of railroad accidents on the National level has decreased by 20.6% from 1981 to 1982. Although the number of railroad accidents has been decreasing, safety efforts cannot be relaxed since the possibility of a serious accident always remains. The nature of the relationship between safety improvement activities and accidents is assumed to be a negative correlation. In other words, as the number of safety improvement activities increase, the number of accidents decrease. Therefore, by advancing the allocation of safety improvement activities, the number of accidents can be reduced.

The accident ratios for each railroad within a Region is based on a formula which takes into account the number of accidents by discipline for the railroad, the speed of the train, and whether hazardous materials were present or involved in the accident.

The number of accidents are based on a three year average. Since accidents are such a rare occurrence, a one year average is of little value. The seasonally and monthly fluctuations have been disregarded. The accident ratios for railroads within a Region are divided into six categories:

- o Larger carrier accidents occurring on mainline track,
- o Larger carrier accidents occurring on yard and other track,
- o Larger carrier accidents occurring on mainline, yard, and other track,
- o Smaller carrier accidents occurring on mainline track,
- o Smaller carrier accidents occurring on yard and other track, and
- o Smaller carrier accidents occurring on mainline, yard, and other track.

The accident ratios in the following Tables are railroads and divisions which have an accident ratio which is greater than two percent. The railroads and divisions which have been disregarded have a very low accident rate. This does not indicate that the railroads which have been disregarded do not require inspection activity, but that based on accident ratios of past years, these railroads have had a low accident rate. It is possible

that the railroads which have been disregarded may require inspection activity due to a recent increase in accidents and/or non-compliance situations, or due to the Regional inspector's knowledge of the railroad.

By using the accident ratios provided in the following Tables, a preliminary allocation of inspection activities may be made to the various railroads within the Region. It should be noted that inspection activities can not be allocated using only past accident records. The allocation of inspection activities should also be based on defect ratios, the amount of time it took for non-compliance situations to be corrected, the overall conditions of the carrier's track, equipment, etc., and the past experiences of inspectors and regional personnel with a particular railroad. The accident ratios assist in the allocation of inspection activities by providing a base percentage of total inspection time for a given discipline that would be allocated to a particular division of a railroad.

REGION 5

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ATK	MID	0.00	0.00	8.24	0.00	14.23
ATK	ST	0.00	0.00	0.00	0.00	3.56
ATK	WES	0.00	6.53	0.00	0.00	0.00
ATSF	COL	0.20	6.28	0.19	0.18	0.00
ATSF	NOR	1.61	1.89	0.67	3.66	0.69
ATSF	PLA	5.11	1.82	3.92	4.31	1.51
ATSF	SOU	2.57	6.13	1.72	2.62	1.71
BN	TUL	0.36	2.03	1.47	3.06	1.10
ICG	MIS	1.55	0.00	1.61	2.74	8.50
ICG	SOU	0.68	0.00	7.34	0.82	0.00
KCS	FIF	0.88	4.06	8.96	4.48	0.00
KCS	FOU	2.45	2.58	5.58	1.23	0.00
KCS	SEC	1.18	0.55	6.05	0.69	0.00
KCS	THI	2.74	3.13	1.40	2.74	0.00
LA	TEX	0.79	1.49	8.34	0.19	0.00
MKT	SOU	0.99	3.03	0.20	2.35	1.41
MP	ARK	1.60	0.56	0.12	5.44	0.77
MP	CEN	0.55	4.23	0.00	1.18	0.34
MP	DEQ	0.15	3.01	0.24	0.43	0.43
MP	KIN	1.60	0.94	0.47	2.03	0.34
MP	LOU	0.45	0.19	0.47	2.80	0.16
MP	MID	0.00	0.00	0.00	5.16	0.00
MP	NEW	2.35	1.03	0.00	0.44	0.17
MP	PAL	2.90	0.19	0.83	2.17	0.98
MP	RED	4.95	2.07	4.51	2.84	0.43
MP	RIO	1.50	2.45	0.59	2.99	1.20
SP	HOU	5.08	6.07	3.42	9.00	3.60
SP	LAF	1.75	1.85	1.67	4.01	29.25

REGION 5 (CONT'D)

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
SP	SAN	22.65	10.69	11.83	5.61	4.44
SP	TUC	4.56	0.59	3.75	0.26	0.72
SSW	COT	10.18	4.41	4.38	2.41	10.09

REGION 5

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ARW		0.00	0.00	0.00	40.11	0.00
BRR	BEL	0.00	0.00	60.50	0.00	0.00
DQE	D&E	0.00	28.39	0.00	2.91	0.00
DQE	DQE	0.00	0.00	39.50	0.00	0.00
EACH	ARK	0.00	17.55	0.00	0.00	0.00
FP	SYS	0.00	0.00	0.00	4.26	0.00
GHH	DEQ	0.00	0.00	0.00	4.46	0.00
LNW		0.00	0.00	0.00	0.00	100.00
LNW	SYS	86.20	0.00	0.00	0.00	0.00
LRWN		0.00	0.00	0.00	4.46	0.00
NCTR	FOR	0.00	0.00	0.00	10.15	0.00
NCTR	SYS	0.00	39.61	0.00	0.00	0.00
NLG	HOD	0.00	0.00	0.00	5.27	0.00
NLG	SYS	0.00	0.00	0.00	5.27	0.00
RSS		0.00	0.00	0.00	4.49	0.00
SRN	SYS	5.25	0.00	0.00	0.00	0.00
TOE	TOE	0.00	14.45	0.00	0.00	0.00

REGION 5

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
BN	TUL	0.49	1.53	2.92	0.61	0.00
FWD	FOR	1.15	0.75	2.10	0.88	0.00
HBT	HOU	5.57	8.02	4.08	2.29	18.13
ICG	MIS	0.46	1.20	2.11	3.70	0.00
KCS	SEV	1.40	2.31	1.71	1.43	15.22
LA	BAT	1.26	1.85	1.53	1.76	13.64
LA	TEX	2.10	1.20	0.77	0.25	0.00
MKT	SOU	2.76	3.17	0.00	2.15	0.00
MP	LEQ	2.62	1.30	0.44	0.37	0.00
MP	KIN	2.62	1.80	10.91	1.10	0.00
MP	LIT	3.82	0.80	3.93	0.66	0.00
MP	NEW	3.58	0.56	0.00	2.19	0.00
MP	RIO	5.97	0.68	1.75	0.64	0.00
OKT		0.89	0.46	1.62	2.20	0.00
PTRA		4.42	2.46	2.31	0.60	0.00
PTRA	HOU	0.00	6.63	0.00	1.63	0.00
SPA	HOU	23.11	16.38	12.85	0.41	21.79
SP	LAF	3.68	7.30	7.96	17.70	0.00
SP	RIO	0.00	0.00	0.00	4.16	0.00
SP	SAN	4.52	4.43	2.76	4.23	0.00
SP	TUC	6.36	4.04	3.67	1.73	0.00
SSW	COT	4.70	7.11	12.43	5.93	0.00

REGION 5

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>
ARW		0.00	0.00	0.00	5.74
BXN		0.00	3.69	0.00	0.00
DQE	D&E	0.00	0.00	0.00	3.74
DQE	DQE	0.00	0.00	0.00	3.74
EACH		0.00	9.45	0.00	4.63
FSVB		0.00	11.71	0.00	0.00
GHH		0.00	11.71	0.00	5.74
GHH	GAL	0.00	0.00	11.71	0.00
GHH	HOU	0.00	0.00	0.00	11.47
GHH	SOU	0.00	0.00	0.00	5.74
GWF	SYS	0.00	6.04	0.00	2.96
LRWN		0.00	0.00	76.12	0.00
LRWN	SYS	0.00	0.00	0.00	5.74
NCTR	SYS	0.00	10.66	0.00	0.00
NCTR	TEX	0.00	0.00	0.00	5.22
NOPB		0.00	0.00	7.02	0.00
TCT		0.00	0.00	0.00	9.35
TN		100.00	0.00	0.00	7.96
TOE	TOE	0.00	23.33	16.86	7.62
WRRC	STO	0.00	11.71	0.00	0.00

REGION 6 - KANSAS CITY

# REGIONAL STATISTICAL ANALYSIS REPORT

## INTRODUCTION

This report provides the Region with results of analyzed accident data and guidelines on how to incorporate this data into the Regional Inspection Plan (RIP). It will not only provide information for the completion of the "Regional Statistical Overview" of the RIP, but should also be instrumental in assisting with the formulation of Regional objectives, locating areas where system and special assessments are necessary, and indicating major deficiencies. The report contains two sections:

- o The Regional Overview contains data which deals with the overall safety picture and safety trends of the Region for the years 1978 through 1982. It will not only provide each Region with a general overview of their past and present safety trends, but will also allow each Region to compare their Regional safety trends to the National safety trends.
- o The Regional Accident Data contains data which deals with specific problem areas within the Region.

## REGIONAL OVERVIEW

This section contains a graph and a chart which depicts the overall safety trend of the Region for the years 1978 through 1982. The graph indicates the number of accidents by cause and year for the Region. The causes of the train accidents are classified into four categories:

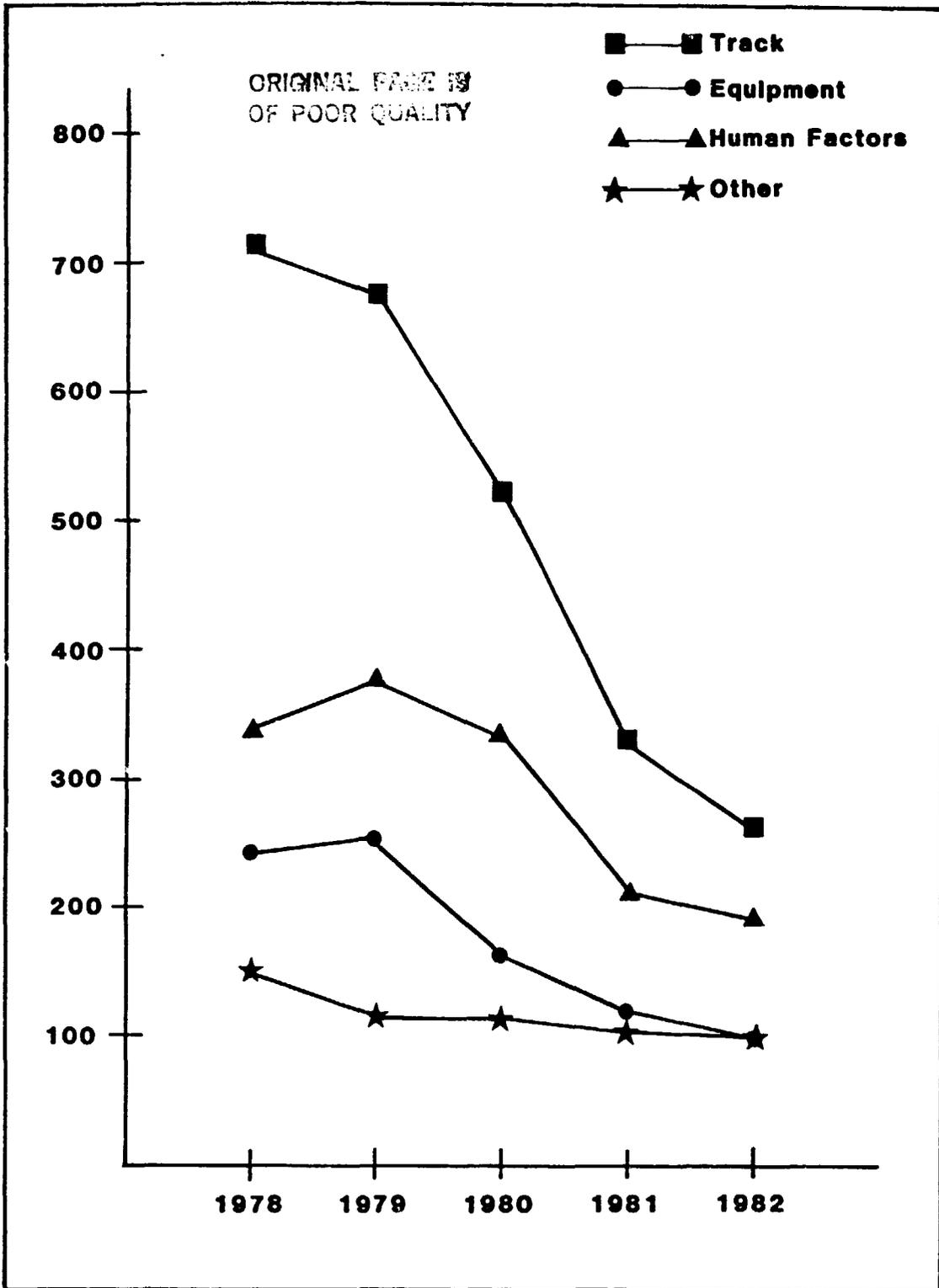
1. Track Accidents
2. Equipment Accidents
3. Human Factor Accidents
4. Other Accidents

The graph for Region 6 indicates that the number of accidents which occurred during 1982 was lower than the number of accidents which occurred during 1978. However, the Region experienced an increase in the number of accidents caused by human factors and equipment during 1979. Since 1980, the safety record for Region 6 has improved. In the "Regional Statistical Overview" Section of the 1984 Regional Inspection Plan (RIP), discuss the Regional deficiencies that existed in Region 6 and what corrective actions were taken by the Region to accomplish its present safety record.

The chart in this section contains the percent changes on the National and Regional Levels for train accidents by cause, the number of persons killed in train accidents, the number of persons injured in train accidents, and the number of hazardous material releases due to train accidents. The percent changes on the National level are based on the total number of reportable train accidents that occurred in all of the eight FRA Regions within a given year. For example, the total number of train accidents that occurred in all of the eight FRA Regions during 1978 were compared with the total number of accidents that occurred during 1982 in all of the Regions. The percent changes on the Regional level, however, are simply based on the total number of reportable train accidents that occurred in one particular Region during a given year. The "National and Regional Safety Trends" chart allows each Region to note how the overall safety trends of their Region compare to the National safety trends.

The percent change chart for Region 6 indicates that the number of persons killed in train accidents and the number of hazardous material releases has significantly

increased from 1981 to 1982. Furthermore, there has been no significant decrease in these areas from 1978 to 1982. Determine where Regional deficiencies exist and discuss what corrective actions are planned for 1984 in the "Regional Statistical Overview" of the RIP.



**REGION 6**

**Summary of Train Accidents By Cause  
For 1978 Thru 1982**

**National and Regional Safety Trends  
Region 6**

	PERCENT CHANGE			
	NATIONAL LEVEL		REGIONAL LEVEL	
	1978-82	1981-82	1978-82	1981-82
TOTAL REPORTABLE TRAIN ACCIDENTS	59.3	20.6	54.7	16.2
ACCIDENTS CAUSED BY TRACK	63.1	22.2	62.4	19.3
ACCIDENTS CAUSED BY HUMAN FACTORS	54.9	19.6	44.0	10.8
ACCIDENTS CAUSED BY EQUIPMENT	63.3	21.7	59.8	21.8
ACCIDENTS CAUSED BY OTHER FACTORS	49.5	17.3	34.0	11.0
PERSONS KILLED IN TRAIN ACCIDENTS	64.7	22.2	42.8	33.3
PERSONS INJURED IN TRAIN ACCIDENTS	75.3	16.0	3.0	53.8+
NUMBER OF HAZ MAT RELEASES	57.2	23.4	0.0	50.0+

+ DENOTES AN INCREASE

REGIONAL ACCIDENT DATA

The Accident Ratio data in this section will provide a methodology to allocate inspectors, system and special assessments, and other specialized Regional activities. It is assumed that by implementing a plan to advance the allocation of safety improvement activities, a reduction in accidents, injuries, and risks to the public will occur. The number of railroad accidents on the National level has decreased by 20.6% from 1981 to 1982. Although the number of railroad accidents has been decreasing, safety efforts cannot be relaxed since the possibility of a serious accident always remains. The nature of the relationship between safety improvement activities and accidents is assumed to be a negative correlation. In other words, as the number of safety improvement activities increase, the number of accidents decrease. Therefore, by advancing the allocation of safety improvement activities, the number of accidents can be reduced.

The accident ratios for each railroad within a Region is based on a formula which takes into account the number of accidents by discipline for the railroad, the speed of the train, and whether hazardous materials were present or involved in the accident.

The number of accidents are based on a three year average. Since accidents are such a rare occurrence, a one year average is of little value. The seasonally and monthly fluctuations have been disregarded. The accident ratios for railroads within a Region are divided into six categories:

- o Larger carrier accidents occurring on mainline track,
- o Larger carrier accidents occurring on yard and other track,
- o Larger carrier accidents occurring on mainline, yard, and other track,
- o Smaller carrier accidents occurring on mainline track,
- o Smaller carrier accidents occurring on yard and other track, and
- o Smaller carrier accidents occurring on mainline, yard, and other track.

The accident ratios in the following Tables are railroads and divisions which have an accident ratio which is greater than two percent. The railroads and divisions which have been disregarded have a very low accident rate. This does not indicate that the railroads which have been disregarded do not require inspection activity, but that based on accident ratios of past years, these railroads have had a low accident rate. It is possible

that the railroads which have been disregarded may require inspection activity due to a recent increase in accidents and/or non-compliance situations, or due to the Regional inspector's knowledge of the railroad.

By using the accident ratios provided in the following Tables, a preliminary allocation of inspection activities may be made to the various railroads within the Region. It should be noted that inspection activities can not be allocated using only past accident records. The allocation of inspection activities should also be based on defect ratios, the amount of time it took for non-compliance situations to be corrected, the overall conditions of the carrier's track, equipment, etc., and the past experiences of inspectors and regional personnel with a particular railroad. The accident ratios assist in the allocation of inspection activities by providing a base percentage of total inspection time for a given discipline that would be allocated to a particular division of a railroad.

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REGION 6

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ATK	MID	4.27	0.00	3.42	0.00	0.00
ATK	NEB	0.00	0.00	0.00	0.00	6.11
ATK	ST	0.00	0.00	0.00	0.00	8.73
ATK	WES	0.00	0.00	10.27	0.00	21.83
ATSF	COL	1.03	1.29	12.49	0.07	9.62
ATSF	EAS	1.73	1.29	3.97	1.99	0.10
ATSF	KAN	0.00	2.72	0.00	0.00	0.00
BN	ALL	1.27	12.33	3.55	0.90	0.84
BN	COL	10.21	2.40	4.39	3.80	1.29
BN	GAL	1.63	0.83	13.78	0.00	0.00
BN	NEB	2.53	4.05	1.61	7.92	10.09
BN	OTT	6.49	1.16	0.59	1.09	0.00
BN	SPR	6.01	7.94	0.34	1.62	0.91
CNW	CEN	4.55	4.95	2.08	12.37	0.80
CNW	IOW	6.96	3.20	3.42	3.88	2.85
CNW	TWI	0.19	0.58	0.00	2.59	0.00
CS	COL	0.64	3.60	1.74	0.86	0.00
DRGW	COL	0.24	3.30	0.19	0.14	0.00
ICG	ST	0.10	0.00	3.18	0.04	0.00
KCS	FIR	0.00	0.32	0.97	2.16	0.00
KCS	SEC	1.21	5.68	0.32	1.76	0.12
MILW	ILL	5.35	5.94	2.50	6.39	0.27
MILW	MIN	0.00	1.05	0.18	2.93	0.00
MILW	SOU	4.68	2.62	3.30	5.50	1.09
MP	ARK	2.62	0.97	9.94	0.33	5.03
MP	CEN	0.41	0.64	0.33	2.33	0.00
MP	NOR	4.56	3.78	1.31	4.76	7.55
MP	ST	2.15	0.64	0.25	0.08	0.00

REGION 6 (CONT'D)

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
NW	MOB	0.05	1.15	1.18	3.13	0.00
SLSF	EAS	4.65	1.02	0.00	0.58	0.00
TRRA	MER	0.12	2.26	0.19	0.10	0.00
UP	KAN	2.52	1.85	0.15	1.05	0.67
UP	NEB	4.09	6.41	2.47	1.52	1.28
UP	WYO	0.18	0.29	0.22	0.00	18.11

REGION 6

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
DMU	SYS	0.00	0.00	0.00	3.72	0.00
DRI	CHI	0.00	0.00	0.00	3.72	0.00
DRI	DRI	11.23	0.00	33.33	3.72	0.00
DRI	FIR	0.00	0.00	33.33	0.00	0.00
DRI	IL-	0.00	0.00	0.00	3.72	0.00
DRI	ILL	0.00	0.00	0.00	3.72	0.00
DRI	SOU	0.00	0.00	0.00	3.72	0.00
DRI	IST	16.84	3.68	0.00	7.43	0.00
GWR		0.00	0.00	0.00	0.00	12.39
GWR	SOU	0.00	0.00	0.00	0.00	37.16
GWR	SYS	0.00	0.00	0.00	0.00	24.77
IRRC	CEN	0.00	0.00	0.00	0.00	25.68
KCT		33.68	90.06	33.33	39.02	0.00
KCT	KAN	0.00	0.00	0.00	11.15	0.00
KCT	KC	0.00	0.00	0.00	3.72	0.00
KCT	NOR	0.00	0.00	0.00	3.72	0.00
KYLE	SYS	38.26	6.26	0.00	12.67	0.00

REGION 6

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>
DMU		33.33	15.15	50.00	5.32
DRI	CHI	0.00	0.00	0.00	5.32
DRI	DRI	33.33	7.58	0.00	0.00
DRI	FIR	33.33	0.00	50.00	0.00
DRI	ILL	0.00	0.00	0.00	2.66
DRI	SOU	0.00	0.00	0.00	5.32
DRI	SYS	0.00	0.00	0.00	2.66
DRI	IST	0.00	7.58	0.00	5.32
IRRC	WES	0.00	0.00	0.00	2.87
KCT		0.00	7.58	0.00	3.99
KCT	CEN	0.00	0.00	0.00	5.32
KCT	ILL	0.00	0.00	0.00	2.66
KCT	KAN	0.00	0.00	0.00	15.97
KCT	MIL	0.00	0.00	0.00	7.98
KCT	OTT	0.00	0.00	0.00	2.66
KCT	ROC	0.00	0.00	0.00	2.66
KCT	SOU	0.00	0.00	0.00	5.32
KCT	SPR	0.00	0.00	0.00	5.32
SJT		0.00	60.61	0.00	0.00
SJT	CEN	0.00	0.00	0.00	18.63

REGION 6

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ATSF	COL	6.34	1.26	3.76	0.35	15.57
ATSF	KAN	2.24	2.37	0.00	0.42	0.00
ATSF	MID	1.12	1.70	0.00	2.08	0.00
BN	ALL	0.95	3.13	0.00	0.66	0.00
BN	COL	3.34	4.04	6.58	3.14	9.95
BN	NEB	3.82	5.70	5.57	3.28	9.95
BN	SPR	3.82	4.24	6.08	1.73	0.00
CNW	CEN	6.71	12.60	12.91	20.32	17.50
CNW	ILL	2.52	2.13	2.23	2.73	0.00
CNW	IOW	9.23	8.96	15.14	14.02	0.00
CNW	WES	0.00	0.53	0.00	0.62	35.01
CS	COL	1.73	0.73	2.45	1.82	12.02
MILW	IL-	8.07	0.21	0.00	0.56	0.00
MILW	ILL	2.02	4.69	3.21	2.81	0.00
MILW	SOU	6.05	3.63	2.14	3.74	0.00
MKT	NOR	0.77	2.35	3.26	2.28	0.00
MP	KAN	4.64	4.76	2.95	2.97	0.00
MP	NOR	0.93	1.28	0.00	2.54	0.00
MP	ST	0.00	1.08	10.83	0.34	0.00
NW	ST	0.95	2.41	0.00	0.35	0.00
RI	DES	3.12	0.00	0.00	2.03	0.00
RI	MO	3.12	0.33	0.00	2.03	0.00
SLSF	NOR	0.00	2.81	1.57	0.82	0.00
SSW	KAN	9.72	0.00	0.83	2.16	0.00
SSW	ROC	0.78	6.08	0.83	1.59	0.00
TRRA		2.17	0.92	1.15	0.00	0.00
UP	KAN	3.29	2.52	2.18	0.50	0.00
UP	NEB	4.11	2.56	2.62	0.99	0.00

REGION 7 - SAN FRANCISCO

# REGIONAL STATISTICAL ANALYSIS REPORT

## INTRODUCTION

This report provides the Region with results of analyzed accident data and guidelines on how to incorporate this data into the Regional Inspection Plan (RIP). It will not only provide information for the completion of the "Regional Statistical Overview" of the RIP, but should also be instrumental in assisting with the formulation of Regional objectives, locating areas where system and special assessments are necessary, and indicating major deficiencies. The report contains two sections:

- o The Regional Overview contains data which deals with the overall safety picture and safety trends of the Region for the years 1978 through 1982. It will not only provide each Region with a general overview of their past and present safety trends, but will also allow each Region to compare their Regional safety trends to the National safety trends.
- o The Regional Accident Data contains data which deals with specific problem areas within the Region.

## REGIONAL OVERVIEW

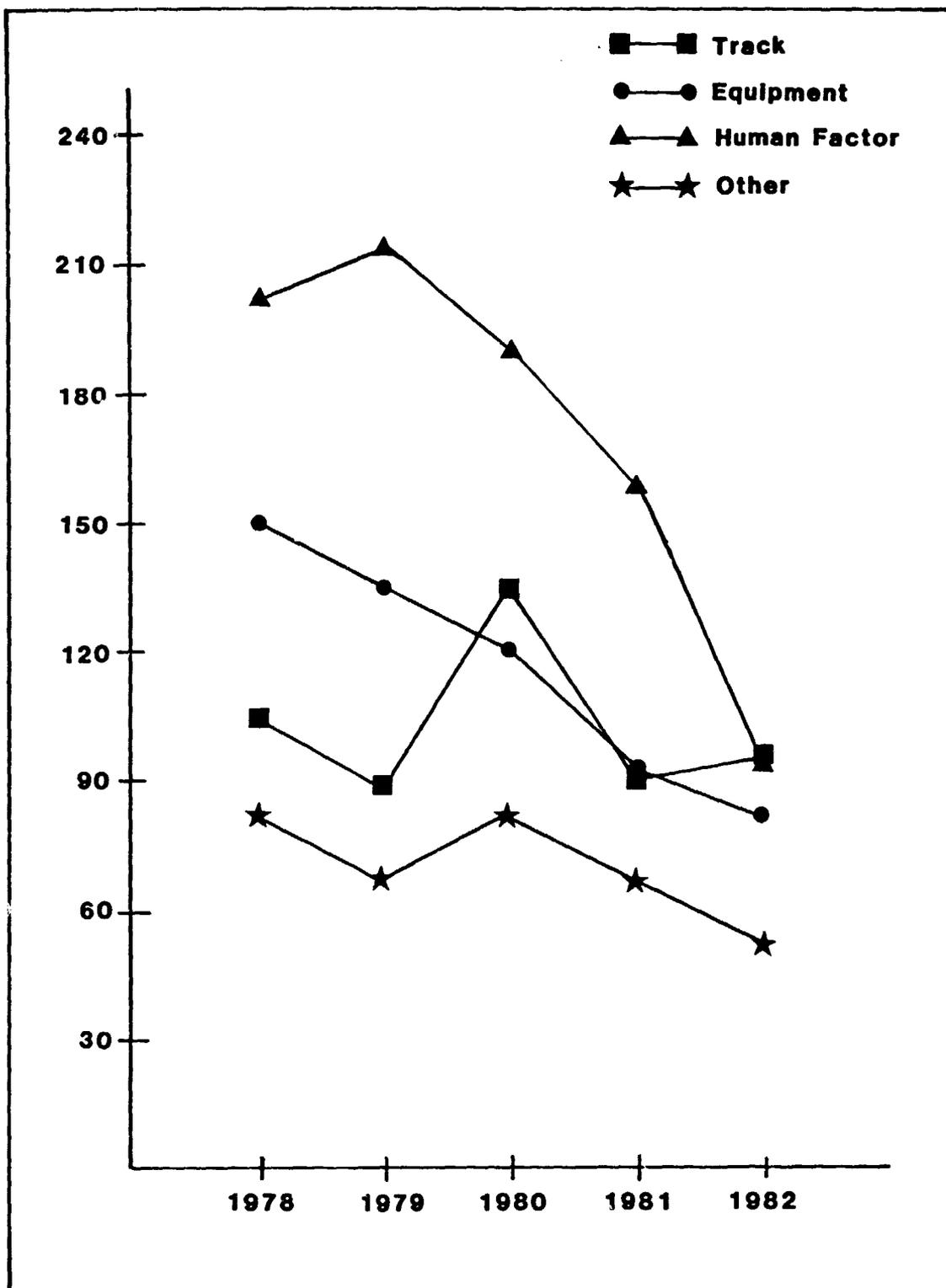
This section contains a graph and a chart which depicts the overall safety trend of the Region for the years 1978 through 1982. The graph indicates the number of accidents by cause and year for the Region. The causes of the train accidents are classified into four categories:

1. Track Accidents
2. Equipment Accidents
3. Human Factor Accidents
4. Other Accidents

The graph for Region 7 indicates that the number of train accidents caused by equipment has steadily decreased from 1978 to 1982. The number of accidents due to human factors has significantly decreased from 1978 to 1982 despite a slight increase in 1979. Also, the number of accidents due to other miscellaneous causes have significantly decrease despite an increase in 1980. On the other hand, track caused accidents show no significant decrease from 1978 to 1982. Furthermore, the number of track caused accidents have increased from 1981 to 1982. In the "Regional Statistical Overview" Section of the 1984 Regional Inspection Plan (RIP), discuss the Regional deficiencies that exist in Region 7 and what corrective actions are planned for the upcoming year.

The chart in this section contains the percent changes on the National and Regional Levels for train accidents by cause, the number of persons killed in train accidents, the number of persons injured in train accidents, and the number of hazardous material releases due to train accidents. The percent changes on the National level are based on the total number of reportable train accidents that occurred in all of the eight FRA Regions within a given year. For example, the total number of train accidents that occurred in all of the eight FRA Regions during 1978 were compared with the total number of accidents that occurred during 1982 in all of the Regions. The percent changes on the Regional level, however, are simply based on the total number of reportable train accidents that occurred in one particular Region during a given year. The "National and Regional Safety Trends" chart allows each Region to note how the overall safety trends of their Region compare to the National safety trends.

The percent change chart for Region 7 indicates that the decrease in the number of track caused accidents from 1978 to 1982 is inferior to the National level. Furthermore, track caused accidents increased by 4 percent from 1981 through 1982. Also, the number of persons killed in train accidents increased by 14.3 percent from 1978 to 1982 and increased by 64.3 percent from 1981 to 1982. The number of persons injured in train accidents has increased by 30.4 percent from 1981 to 1982. Determine where Regional deficiencies exist and discuss what corrective actions are planned for the upcoming year in the 1984 RIP. The Region, however, has experienced a significant decrease in the number of hazardous material releases and in the number of accidents caused by human factors. These decreases are also significantly greater than the National level. In the 1984 RIP, discuss what safety programs Region 7 has utilized in the past to accomplish these safety records.



**REGION 7**  
**Summary of Train Accidents By Cause**  
**For 1978 Thru 1982**

**National and Regional Safety Trends  
Region 7**

	PERCENT CHANGE			
	NATIONAL LEVEL		REGIONAL LEVEL	
	1978-82	1981-82	1978-82	1981-82
TOTAL REPORTABLE TRAIN ACCIDENTS	59.3	20.6	40.4	26.3
ACCIDENTS CAUSED BY TRACK	63.1	22.2	10.4	4.0+
ACCIDENTS CAUSED BY HUMAN FACTORS	54.9	19.6	54.2	41.0
ACCIDENTS CAUSED BY EQUIPMENT	63.3	21.7	44.4	10.6
ACCIDENTS CAUSED BY OTHER FACTORS	49.5	17.3	37.8	21.5
PERSONS KILLED IN TRAIN ACCIDENTS	64.7	22.2	14.3+	64.3+
PERSONS INJURED IN TRAIN ACCIDENTS	75.3	16.0	32.5	30.4+
NUMBER OF HAZ MAT RELEASES	57.2	23.4	50.0	50.0

+ DENOTES AN INCREASE

REGIONAL ACCIDENT DATA

The Accident Ratio data in this section will provide a methodology to allocate inspectors, system and special assessments, and other specialized Regional activities. It is assumed that by implementing a plan to advance the allocation of safety improvement activities, a reduction in accidents, injuries, and risks to the public will occur. The number of railroad accidents on the National level has decreased by 20.6% from 1981 to 1982. Although the number of railroad accidents has been decreasing, safety efforts cannot be relaxed since the possibility of a serious accident always remains. The nature of the relationship between safety improvement activities and accidents is assumed to be a negative correlation. In other words, as the number of safety improvement activities increase, the number of accidents decrease. Therefore, by advancing the allocation of safety improvement activities, the number of accidents can be reduced.

The accident ratios for each railroad within a Region is based on a formula which takes into account the number of accidents by discipline for the railroad, the speed of the train, and whether hazardous materials were present or involved in the accident.

The number of accidents are based on a three year average. Since accidents are such a rare occurrence, a one year average is of little value. The seasonally and monthly fluctuations have been disregarded. The accident ratios for railroads within a Region are divided into six categories:

- o Larger carrier accidents occurring on mainline track,
- o Larger carrier accidents occurring on yard and other track,
- o Larger carrier accidents occurring on mainline, yard, and other track,
- o Smaller carrier accidents occurring on mainline track,
- o Smaller carrier accidents occurring on yard and other track, and
- o Smaller carrier accidents occurring on mainline, yard, and other track.

The accident ratios in the following Tables are railroads and divisions which have an accident ratio which is greater than two percent. The railroads and divisions which have been disregarded have a very low accident rate. This does not indicate that the railroads which have been disregarded do not require inspection activity, but that based on accident ratios of past years, these railroads have had a low accident rate. It is possible

that the railroads which have been disregarded may require inspection activity due to a recent increase in accidents and/or non-compliance situations, or due to the Regional inspector's knowledge of the railroad.

By using the accident ratios provided in the following Tables, a preliminary allocation of inspection activities may be made to the various railroads within the Region. It should be noted that inspection activities can not be allocated using only past accident records. The allocation of inspection activities should also be based on defect ratios, the amount of time it took for non-compliance situations to be corrected, the overall conditions of the carrier's track, equipment, etc., and the past experiences of inspectors and regional personnel with a particular railroad. The accident ratios assist in the allocation of inspection activities by providing a base percentage of total inspection time for a given discipline that would be allocated to a particular division of a railroad.

REGION 7

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ATK	WES	0.00	3.05	0.00	0.13	97.19
ATSF	ALB	1.12	2.13	2.32	0.59	0.00
ATSF	LA	2.80	0.88	0.46	0.00	0.00
ATSF	LOS	3.36	3.09	1.86	1.18	0.00
ATSF	VAL	3.36	2.13	3.02	1.33	0.00
SP	LOS	34.71	34.78	25.94	42.51	2.81
SP	SAC	32.27	17.71	25.13	9.53	0.00
SP	SAN	0.00	1.54	0.00	2.32	0.00
SP	TUC	7.82	5.26	2.43	5.54	0.00
SP	WES	7.81	10.14	17.43	13.27	0.00
UP	CAL	2.47	7.62	3.58	4.07	0.00
UP	UTA	1.85	4.70	6.14	5.20	0.00
UP	WES	0.00	0.00	0.00	6.51	0.00
WP	WES	0.72	4.42	3.56	1.41	0.00

REGION 7

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ATK	UTA	0.00	0.00	0.00	0.00	7.17
ATK	WES	0.00	0.00	32.95	0.00	25.98
ATSF	ALB	5.92	5.27	0.60	1.20	0.00
ATSF	LOS	2.37	15.50	12.50	1.64	7.71
ATSF	VAL	0.91	0.44	0.00	0.10	7.63
SP	LOS	23.05	24.88	2.71	7.73	11.05
SP	ORE	2.65	1.53	2.67	15.46	0.36
SP	SAC	13.78	9.44	15.99	1.09	1.63
SP	TUC	15.47	17.09	6.57	4.91	1.04
SP	WES	7.21	5.49	16.09	55.64	20.83
UP	UTA	10.64	4.19	2.34	0.69	9.26
WP	EAS	8.42	4.11	3.41	0.87	0.00
WP	WES	2.95	5.32	2.44	2.23	0.60

REGION 7

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
AMC	AMA	0.00	0.00	0.00	0.00	100.00
CBC		0.00	0.00	0.00	20.41	0.00
MCR		15.41	0.00	7.24	0.00	0.00
NN		30.52	0.00	0.00	66.89	0.00
SPAE		0.00	0.00	74.42	0.00	0.00
SDAE	EAS	0.00	0.00	7.44	0.00	0.00
SERA		8.38	0.00	0.00	0.00	0.00
SMV		10.94	0.00	0.00	0.00	0.00
STE	YAR	0.00	100.00	0.00	0.00	0.00
TRC		23.17	0.00	0.00	12.70	0.00
TRC	TRC	11.59	0.00	10.89	0.00	0.00

REGION 7

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
HBL	WIL	0.00	100.00	0.00	0.00	0.00
LAJ		0.00	0.00	100.00	0.00	0.00
LAJ	LA	0.00	0.00	0.00	100.00	0.00

REGION 8 - PORTLAND

## REGIONAL STATISTICAL ANALYSIS REPORT

### INTRODUCTION

This report provides the Region with results of analyzed accident data and guidelines on how to incorporate this data into the Regional Inspection Plan (RIP). It will not only provide information for the completion of the "Regional Statistical Overview" of the RIP, but should also be instrumental in assisting with the formulation of Regional objectives, locating areas where system and special assessments are necessary, and indicating major deficiencies. The report contains two sections:

- o The Regional Overview contains data which deals with the overall safety picture and safety trends of the Region for the years 1978 through 1982. It will not only provide each Region with a general overview of their past and present safety trends, but will also allow each Region to compare their Regional safety trends to the National safety trends.
- o The Regional Accident Data contains data which deals with specific problem areas within the Region.

## REGIONAL OVERVIEW

This section contains a graph and a chart which depicts the overall safety trend of the Region for the years 1978 through 1982. The graph indicates the number of accidents by cause and year for the Region. The causes of the train accidents are classified into four categories:

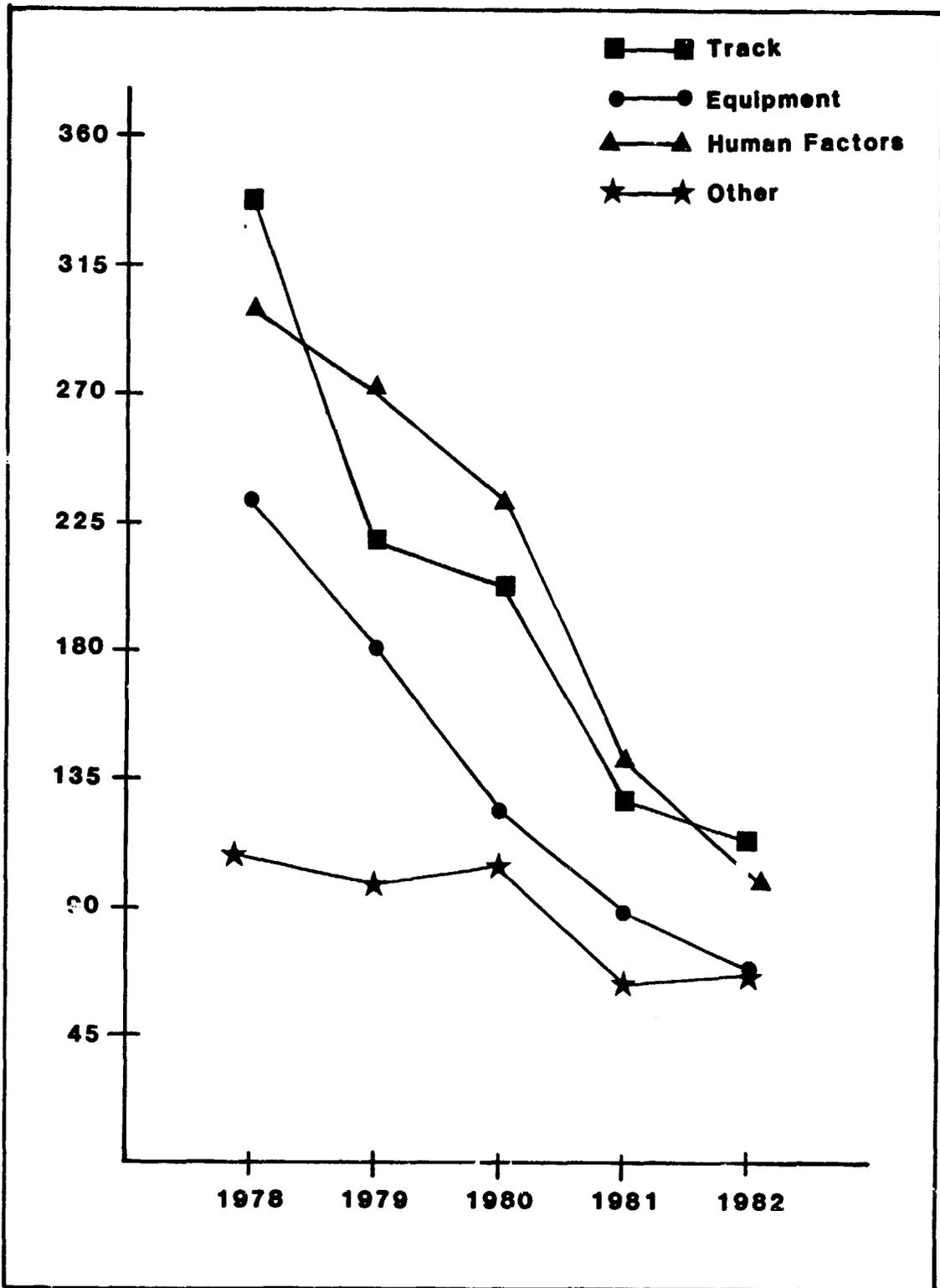
1. Track Accidents
2. Equipment Accidents
3. Human Factor Accidents
4. Other Accidents

The graph for Region 8 indicates that the number of accidents caused by track, human factors and equipment have continually decreased from 1978 to 1982. Accidents caused by other miscellaneous factors has decreased significantly from 1978 to 1982 despite slight increases in 1980 and 1982.

The chart in this section contains the percent changes on the National and Regional Levels for train accidents by cause, the number of persons killed in train accidents, the number of persons injured in train accidents, and the number of hazardous material releases due to train accidents. The percent changes on the National level are based on the total number of reportable train accidents that occurred in all of the eight FRA Regions within a given year. For example, the total number of train accidents that occurred in all of the eight FRA Regions during 1978 were compared with the total number of accidents that occurred during 1982 in all of the Regions. The percent changes on the Regional level, however, are simply based on the total number of reportable train accidents that occurred in one particular Region during a given year. The "National and Regional Safety Trends" chart allows each Region to note how the overall safety trends of their Region compare to the National safety trends.

The percent change chart for Region 8 indicates an increase in the number of accidents caused by other factors from 1981 to 1982, but this increase is not significant. Although the number of persons killed in train accidents increased by 33.3 percent from 1981 to 1982, the percent change from 1978 to 1982 was a decrease of 72.7 percent; hence, a 33.3 percent increase is not significant.

The number of hazardous material releases did not change from 1981 to 1982, however, from 1978 to 1982 the number decreased by 72.7. In the 1984 Regional Inspection Plan, discuss the safety program that the Region has utilized in the past to accomplish this safety record.



**REGION 8**

**Summary of Train Accidents By Cause  
For 1978 Thru 1982**

**National and Regional Safety Trends  
Region 8**

	PERCENT CHANGE			
	NATIONAL LEVEL		REGIONAL LEVEL	
	1978-82	1981-82	1978-82	1981-82
TOTAL REPORTABLE TRAIN ACCIDENTS	59.3	20.6	64.5	17.5
ACCIDENTS CAUSED BY TRACK	63.1	22.2	65.9	11.5
ACCIDENTS CAUSED BY HUMAN FACTORS	54.9	19.6	67.0	29.8
ACCIDENTS CAUSED BY EQUIPMENT	63.3	21.7	70.6	21.8
ACCIDENTS CAUSED BY OTHER FACTORS	49.5	17.3	40.4	3.1+
PERSONS KILLED IN TRAIN ACCIDENTS	64.7	22.2	72.7	33.3+
PERSONS INJURED IN TRAIN ACCIDENTS	75.3	16.0	59.2	27.9
NUMBER OF HAZ MAT RELEASES	57.2	23.4	72.7	0.0

+ DENOTES AN INCREASE

The Accident Ratio data in this section will provide a methodology to allocate inspectors, system and special assessments, and other specialized Regional activities. It is assumed that by implementing a plan to advance the allocation of safety improvement activities, a reduction in accidents, injuries, and risks to the public will occur. The number of railroad accidents on the National level has decreased by 20.6% from 1981 to 1982. Although the number of railroad accidents has been decreasing, safety efforts cannot be relaxed since the possibility of a serious accident always remains. The nature of the relationship between safety improvement activities and accidents is assumed to be a negative correlation. In other words, as the number of safety improvement activities increase, the number of accidents decrease. Therefore, by advancing the allocation of safety improvement activities, the number of accidents can be reduced.

The accident ratios for each railroad within a Region is based on a formula which takes into account the number of accidents by discipline for the railroad, the speed of the train, and whether hazardous materials were present or involved in the accident.

The number of accidents are based on a three year average. Since accidents are such a rare occurrence, a one year average is of little value. The seasonally and monthly fluctuations have been disregarded. The accident ratios for railroads within a Region are divided into six categories:

- o Larger carrier accidents occurring on mainline track,
- o Larger carrier accidents occurring on yard and other track,
- o Larger carrier accidents occurring on mainline, yard, and other track,
- o Smaller carrier accidents occurring on mainline track,
- o Smaller carrier accidents occurring on yard and other track, and
- o Smaller carrier accidents occurring on mainline, yard, and other track.

The accident ratios in the following Tables are railroads and divisions which have an accident ratio which is greater than two percent. The railroads and divisions which have been disregarded have a very low accident rate. This does not indicate that the railroads which have been disregarded do not require inspection activity, but that based on accident ratios of past years, these railroads have had a low accident rate. It is possible



that the railroads which have been disregarded may require inspection activity due to a recent increase in accidents and/or non-compliance situations, or due to the Regional inspector's knowledge of the railroad.

By using the accident ratios provided in the following Tables, a preliminary allocation of inspection activities may be made to the various railroads within the Region. It should be noted that inspection activities can not be allocated using only past accident records. The allocation of inspection activities should also be based on defect ratios, the amount of time it took for non-compliance situations to be corrected, the overall conditions of the carrier's track, equipment, etc., and the past experiences of inspectors and regional personnel with a particular railroad. The accident ratios assist in the allocation of inspection activities by providing a base percentage of total inspection time for a given discipline that would be allocated to a particular division of a railroad.

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OF POOR QUALITY**

REGION 8

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ARR		7.56	1.26	0.00	2.21	100.00
BN	ALL	1.36	7.83	7.58	5.65	0.00
BN	DAK	2.71	4.47	5.68	1.93	0.00
BN	MIN	1.36	1.22	0.95	2.68	0.00
BN	MON	0.00	1.83	0.00	2.83	0.00
BN	PAC	20.34	8.74	18.00	14.43	0.00
BN	POR	6.78	12.81	10.42	7.74	0.00
BN	ROC	4.07	4.27	4.26	2.68	0.00
BN	SOP	2.71	8.13	6.63	11.60	0.00
BN	WES	0.00	0.00	0.00	5.95	0.00
BN	YEL	8.13	6.51	4.26	5.50	0.00
CNW	WES	0.00	0.36	3.33	1.57	0.00
MILW	WAS	2.87	0.00	0.00	0.63	0.00
SOO	WES	0.00	4.09	2.93	3.22	0.00
SP	ORE	22.20	5.69	9.70	15.63	0.00
UP	IDA	4.67	11.56	12.24	2.31	0.00
UP	ORE	7.01	6.48	8.16	2.05	0.00
UP	WYO	2.34	9.46	1.63	2.05	0.00

REGION 8

ACCIDENT RATIOS FOR LARGE CARRIER ACCIDENTS  
OCCURRING ON MAINLINE TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>	<u>RAILROAD HWY.CROSSING</u>
ARR		0.29	0.00	2.45	0.80	12.22
ARR	FAI	0.00	0.00	0.00	2.68	0.00
ARR	MAT	0.00	0.00	0.00	0.00	9.78
ARR	NEW	0.24	0.00	0.00	0.00	6.72
ATK	WES	6.38	11.35	0.00	0.00	10.65
BN	ALL	7.25	3.36	4.48	6.05	1.58
BN	DAK	6.46	3.57	8.43	5.89	2.57
BN	MIN	0.08	1.05	2.11	2.48	0.20
BN	MON	10.16	3.05	6.85	13.99	12.63
BN	ORE	2.00	0.00	0.00	6.91	0.00
BN	PAC	4.65	6.62	10.80	5.78	2.17
BN	POR	5.91	1.05	8.83	1.51	1.58
BN	ROC	3.94	1.89	5.27	9.24	0.99
BN	SPO	6.97	23.76	11.86	4.97	0.00
BN	WES	0.00	0.00	0.00	12.96	0.00
BN	YEL	4.14	1.47	2.63	1.30	3.75
CNW	WES	0.55	1.11	0.93	7.51	0.00
MILW	MIN	1.66	0.89	0.00	3.42	1.67
SI		0.15	3.89	0.00	0.20	0.00
SOO	WES	1.10	1.95	2.04	4.01	0.00
SP	ORE	10.59	2.30	6.11	2.06	30.96
UP	IDA	14.25	5.61	4.08	1.40	1.02
UP	ORE	3.87	15.12	9.53	1.86	0.85
UP	WYO	9.87	7.43	7.72	0.74	0.68

REGION 8

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON YARD AND OTHER TRACK

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>
BAP		0.00	0.00	0.00	6.85
LPN	GAR	0.00	0.00	0.00	12.17
LPN	ORE	0.00	0.00	0.00	12.17
LS	PAC	0.00	0.00	0.00	12.50
OCE		0.00	0.00	0.00	24.34
PRTD		0.00	26.87	0.00	0.00
TMBL		100.00	73.13	0.00	0.00
TMBL	BEL	0.00	0.00	0.00	7.99
TMBL	PAC	0.00	0.00	0.00	7.99
TMBL	TMB	0.00	0.00	0.00	7.99
TMBL	YAR	0.00	0.00	0.00	7.99

REGION 8

ACCIDENT RATIOS FOR SMALL CARRIER ACCIDENTS  
OCCURRING ON MAINLINE

<u>RAILROAD</u>	<u>DIVISION</u>	<u>EQUIPMENT</u>	<u>HUMAN FACTORS</u>	<u>MISCELLANEOUS</u>	<u>TRACK</u>
CLC	MAI	31.50	0.00	0.00	0.00
COP		0.00	0.00	0.00	13.68
OCE		25.42	70.81	0.00	59.28
POVA		0.00	29.19	0.00	0.00
SNCT	MAI	43.08	0.00	0.00	23.18
SNCT	SEA	0.00	0.00	0.00	3.86