

***THE NATIONAL SHORT LINE RAILROAD DATABASE PROJECT  
1995-1996***

*A report to the Federal Railroad Administration*

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## **Disclaimer**

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## **ABSTRACT**

The objective of this project was to create a central database containing information representing the American short line railroad industry. The project continues and expands the initial effort to establish the database. In this report, processes involved with obtaining, developing, and maintaining the information in the database are discussed. Several data analysis procedures used to help ensure the integrity of the data are addressed. The second annual American Short Line Railroad Association Data Profile for the 1994 calendar year is also presented in the paper. Further information extracted and comparisons made during the analysis process are described in detail.

Discussions on the development of the paper survey and an electronic survey for the third annual data profile for the 1995 calendar year are also presented. The design and implementation of the electronic survey software package are reviewed in detail. The final process presented is the distribution and collection of the 1995 electronic and paper surveys.



## Table of Contents

CHAPTER 1	INTRODUCTION .....	1
CHAPTER 2	DATA COLLECTION METHODS .....	5
	Changes to the 1994/1995 Survey .....	7
CHAPTER 3	SURVEY RESPONSE .....	9
CHAPTER 4	DATA ANALYSIS EFFORTS .....	11
	Comparison With AAR Data .....	12
	Requests for Information from the Database .....	13
	Presentations .....	14
	The 1994 Database and Dentry 2.0 .....	19
	Distributing Individual 1994 Railroad Information .....	21
	Comparisons Between 1993 and 1994 Data .....	21
	Overview Of The 1994 Data Profile .....	22
CHAPTER 5	PROGRAMMING EFFORTS FOR DENTRY 2.0 .....	25
	Analysis of the 1993 Data Entry Software .....	25
	Form Design for 1995 .....	26
	Functionality .....	26
	Creating Distribution Setup Disks .....	29
	Beta Testing .....	29
CHAPTER 6	THE 1994 MAILING PROCESS .....	31
	1995 Survey Distribution .....	31
	1994 Database Distribution .....	31
Appendix A	Preliminary Overview of the Sections of the 1994 ASLRA Annual Data Profile .....	33
Appendix B	An Analysis of the Response to PART VI. Employee and Benefit Data .....	39
Appendix C	Comparisons of the Sections of the 1993 ASLRA Survey With the Sections of the 1994 ASLRA Survey .....	43
Appendix D	Dentry 2.0 User's Guide .....	51
Appendix E	1994 Annual Data Profile of the American Short Line & Regional Railroad Industry ..	63
Appendix F	Short Line Railroad Database Technical Information .....	133

## List of Figures

Figure 3.1	1993 and 1994 Response Rates by Railroad Type . . . . .	9
Figure 3.2	1993 and 1994 Response Rates by Railroad Region . . . . .	10
Figure 4.1	Comparison of 1993 and 1994 FRA Track Class Distribution . . . . .	23
Figure 4.2	Comparison of 1993 and 1994 Customers Served . . . . .	23

## List of Tables

Table 2.1	Brief Description of the Properties of the Tables in the Database . . . . .	5
Table 4.1	Listing of the Descriptive Statistics Computed from the Survey and from the AAR . . . . .	13
Table 4.2	Grain Traffic Base of Local Line-Haul Carriers . . . . .	16
Table 4.3	Differences in System Characteristics of Grain and Non-Grain Local Line-Haul Railroads . . . . .	16
Table 4.4	Comparison of Operating System Characteristics of Grain and Non-Grain Local Line-Haul Railroads and Two Class I Grain Railroads . . . . .	17
Table 4.5	Comparison of Equipment Inventories for Grain and Non-Grain Short Lines . . . . .	18
Table 4.6	Comparison of Equipment Characteristics of Grain and Non-Grain Local Line-Haul Railroads and Two Class I Grain Railroads . . . . .	19
Table 4.7	Differences in Labor Characteristics of Grain and Non-Grain Local Line-Haul Railroads . . . . .	19
Table 4.8	Comparison of Labor Characteristics of Grain and Non-Grain Local Line Haul Railroads and Two Class I Grain Railroads . . . . .	20

## CHAPTER 1. INTRODUCTION

The short line railroad industry contributes significantly to rural freight transportation. Hard, credible data is needed for presenting the importance and the characteristics of this contribution. The importance and the characteristics of the short line railroad industry's contribution to rural freight transportation needs to be recorded. To meet that need, the Federal Railroad Administration (FRA), in conjunction with the American Short Line Railroad Association (ASLRA), the University Transportation Centers Program (UTCP), and the Upper Great Plains Transportation Institute (UGPTI) initiated an annual data profile of the short line industry to provide statistical data for the industry and to illustrate the contribution of the short line industry. The first annual data profile was conducted in 1994 for the 1993 calendar year. It included valuable information on the short line industry and provided valuable guidance on the design and usability of the profile survey. After several revisions to the survey, the second annual data profile was conducted in 1995 for data from the 1994 calendar year. Several more refinements were made to the survey after the program's second year and in June of 1996, the third annual data profile was sent out to the industry.

The main objective of the annual data profile is to establish a permanent database, providing information and analysis detailing the short line industry. There are two years of data currently stored in the database with another data collection process underway. The stability and makeup of the database is important for any analysis to give a true representation of the industry and, after analyzing the first two years' data, the decision was made to consider the first two years a testing and development phase. The base year to be used in future analyses will be the 1995 data, currently being developed. Additional uses for the database, such as new analysis techniques of estimation of true industry totals and trend analysis, will be reviewed in future years.

This report presents the collection and analysis efforts for the second annual ASLRA Data Profile along with development of the third annual survey. The project involved a variety of major work tasks

including the creation and maintenance of the main database, data analysis efforts, programming efforts for the 1995 electronic survey, generation of annual reports, the distribution of reports and the electronic survey. These tasks are delineated and the methods used to complete these tasks are discussed in detail in this report.

The report begins by describing the collection and storage of the annual profile data in chapter 2. This chapter illustrates the methodology used for data entry and the data storage utilized for this project. Section 2.1 outlines the changes in the annual data profile survey from 1993 to 1994 and 1995. Overall response numbers for the 1994 survey are compiled and compared to the 1993 response rate in chapter 3.

Chapter 4 presents the data analysis methods and begins with discussing input and data error checking. The program utilized for statistical analysis and paper on response rate analysis are discussed in this section. Comparisons between the survey data and the AAR data are reported in section 4.1. Section 4.2 presents an overview of the requests made for information from the 1994 database. A discussion of the presentations utilizing the database is included in section 4.3. Also included in this section is a review of the survey and database information produced for the Canadian Transportation Research Forum. Section 4.4 discusses several options for including the 1994 data into the 1995 electronic survey. Also reviewed in section 4.4 is the method used for extracting the individual database records from the central database. This was necessary to facilitate the process of mailing 1994 data to the railroads that responded to the 1994 survey.

Section 4.5 presents a comparison between the 1993 and 1994 data. The final part of the 1994 data analysis provides an overview of the 1994 data profile in section 4.6.

Programming efforts are discussed in chapter 5. Section 5.1 discusses the analysis of the original data entry software program code. The next section 5.2, presents the form and screen design while section 5.3 describes functionality new to the 1995 versions of the data entry software. Section 5.4 discusses the



distribution and setup disks followed by section 5.5 which outlines the beta software testing process. The final part of the report, chapter 6, reviews the 1995 mailing process.

Several appendices are included for additional information on the development of the project. Appendix A is a preliminary overview of 1994 data. Each survey section is briefly discussed and the response rates for each individual question of the survey are given. Appendix B provides an analysis of the responses to the Employee and Benefit data section of the 1994 survey. Appendix C gives a comparison between the 1993 and 1994 data. This report breaks down the survey into each survey section and compares the 1994 survey totals to the 1993 data. Appendix D is a copy of the Dentry 2.0 user's guide. Appendix E includes a copy of the 1994 Annual Data Profile. Appendix F contains the technical specifications for the 1994 American Short Line Railroad Association central database.



## CHAPTER 2. DATA COLLECTION METHODS

There were many types of data being collected for this survey. To insure data integrity and maintain easy access to the data, the data storage method was formalized. Several database formats, including Microsoft Access, Paradox, and FoxPro, were evaluated for permanent data storage. These programs each provided very similar capabilities, but several key factors led to the continued use of the Microsoft Access database format. The compatibility of Microsoft Access with Visual Basic, the functionality of Microsoft Access, and the fact that the 1993 data is already stored in an Access database format were the deciding factors for staying with the Microsoft Access format for 1994. The Microsoft Access tables were exported to the Xbase format for the DOS version of the data entry software. The Xbase format is a generic format that provided standardization and allowed for the consideration of several developmental environments for the DOS software.

Microsoft Access was used to develop a data entry interface to the 1994 database. Forms were developed, similar in style to the paper survey pages, to provide for a user-friendly interface to the database tables. The data entry program was used to enter the 1994 data received from the paper surveys into the main database. After all the responses were received, every 1994 record was stored in one, easily accessible, database file. Table 2.1 gives a brief description of some of the properties of the tables in the database.

<b>Table Name</b>	<b>Contents</b>	<b>Data Types Stored</b>
Annual Operating Statistics	Total number of carloads handled by commodity	Integer
AnnOp2	Hazardous carloads, number of trailers and containers shipped	Integer
Auxiliary Financial Information	Financial data from income statement	Currency
Base Financial Information	Financial data from the balance sheet	Currency
Benefit Plans Information	Health, pension, and benefit plan statistics	Percentage, Yes/No, Currency, and Text
Capital Investment Information	Projected capital investment data for the next 5-year period	Percentage and Currency
Comments	General comments received about the project	Text
Computer Systems and Applications	Computer hardware and software components utilized for the operation of the railroad	Yes/No and Text
Customer Information	Number of customers served for each type of commodity	Integer
Equipment Information	Number of cars owned and leased by type and by age	Integer
Equipment Table 2	Number of locomotives owned and leased by type and by age	Integer
FRA-Track Class Information	Inventory of structures owned and track owned by FRA track class	Integer
FRA 2	Number of intermodal and transloading facilities by type	Integer
GENPROF	Annual line-haul operating statistics, annual fuel consumption, and locomotive idling policy	Integer, Currency, Text, and Yes/No
Passenger Service Information	Types of passenger services, number of passengers, and passenger revenue	Yes/No, Currency, Integer
Railroad Names	Basic information about the railroad	Text
Roadway Information	Inventory of roadway owned and operated by state	Text and Integer

**Table 2.1**

For the 1994 database, the decision was made to keep the database structure similar to the 1993 database. Keeping the storage structure consistent will facilitate the annual analysis and charting of industry trends through time. The 1994 and the 1995 tables both follow a design similar to the 1993 database. The only changes are a result of changes from the 1993 to 1994 and 1995 surveys. A list of these changes, which needed to be incorporated into the 1995 software, is presented next.

## **2.1 Changes to the 1994/1995 Survey**

1. In the Customer Profile section, the Year Established as a Short Line and Total Number of Customers Served fields were added.
2. The Inventory of Roadway, Track, and Structures section requested responses to the Rails Laid in Replacement and Rails Laid in New Lines, Extensions, or Sidings be given in track feet. The Intermodal and Transloading Facilities section and the Grade Crossing Improvement's section were added. In 1994, the average operating speed for the different FRA classes of road was deleted.
3. The horsepower ratings for locomotives were changed in 1994.
4. In the Annual Operating Statistics section, the STCC commodity code was added to assist in the filling out of this section. The 1994 survey added a Hazardous Materials field, the Shipped Intermodally fields and took out the total number of S&T Carloads Handled field.
5. The Annual Line-Haul Operating Statistics added Yard Miles and End of Train Device fields. The Annual Fuel Consumption and Locomotive Idling Policy Section remained the same although this was eliminated in the 1995 version.
6. The Financial Data Section remained similar to 1993's with the exception of breaking down the expense sections into several more distinct fields.

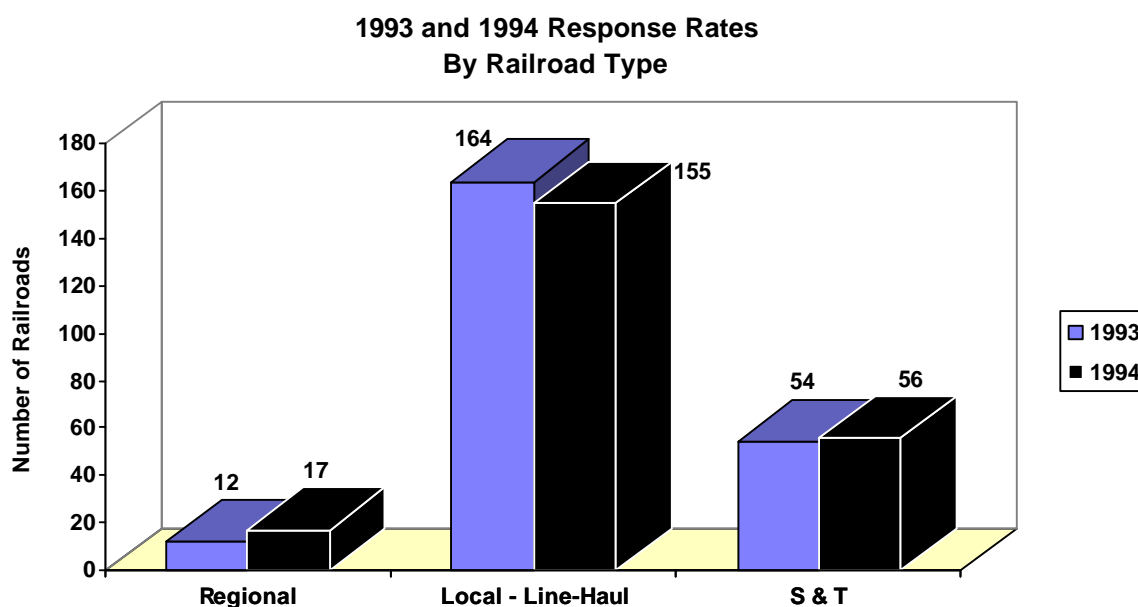
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7. The Projected Capital Investment section remained similar with the exception of breaking down the Road and the Equipment sections into more distinct fields.
8. Employee Data section changed in several ways. It was separated into Exempt vs. Non- Exempt for Total Employees and for Total Compensation. In 1995, the terminology was changed from Exempt/Non-exempt to Supervisory/Non-supervisory.
9. The Benefit section had many changes in it's appearance and composition. This section is discussed later in the report and in Appendix B.
10. Passenger Service section basically remained the same in 1994.
11. The Computer Systems and Applications section was new in the 1994 survey.
12. The End of Train Devices question in the Annual Line-haul Operating Statistics Section was changed for the 1995 survey. The response selection changed from Caboose, End of Train Device, or Other to Caboose, One-way End of Train Device, Two-way End of Train Device (Telemetry), or Other.
13. The Total Annual Employer Contribution for health and insurance plans question was dropped due to inconsistent responses. The Pension Plans section was redone. In the 1995 survey, these questions were reduced to three Yes/No response questions.
14. In the Passenger section, Total (Annual) Revenue Passengers was changed to total (Annual) Number of Revenue Passengers.

15. 1995 changes made to the Computer Systems and Applications section were the removal of the Apple II Series computer, the separation of Windows into Windows 3.0/3.1 and Windows 95, the addition of Personnel Records, FRA Safety Reporting, and Budget/Cost Control to the application question, and the addition of EDI functions ISS and Rate-EDI Network (REN).

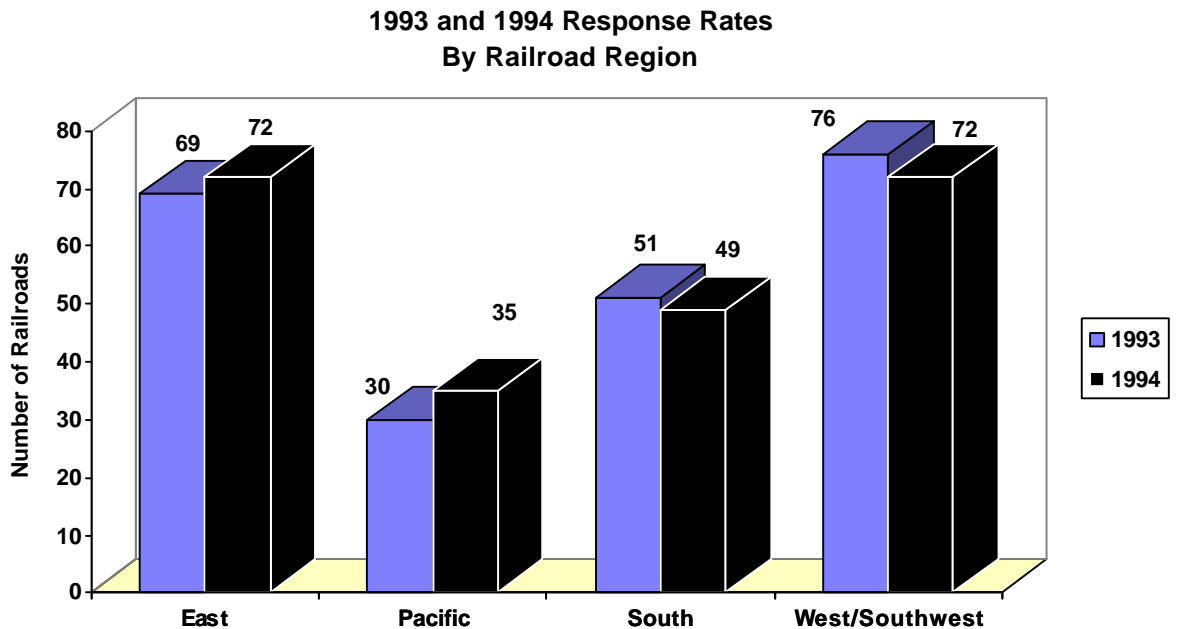
### CHAPTER 3. SURVEY RESPONSE

Of the approximately 435 paper surveys sent out in 1994, surveys were received from 233



**Figure 3.1**

different short line railroads, nearly a 54 percent response rate. These railroads were then grouped by type and by region for analysis. The response rates by type and by region showed fairly similar results for the survey data collected in 1993 and 1994. Figure 3.1 shows the survey response rates for 1993 and 1994 by type of railroad. Figure 3.2 shows the survey response rates for 1993 and 1994 by region of railroad operation.



**Figure 3.2**

Each response provides valuable information for the analysis. Statistics computed from the survey responses will be affected by who participates, and by how many participate. In 1994 there were five more regional railroads participating than in 1993. There also were several regional railroads that participated in 1993 that did not participate in 1994 and vice-versa. With only 12 to 17 observations, a change in one participant has the potential to greatly influence the statistical computations; this was noted in comparing the 1993 and 1994 annual data profile report. The higher the response rate received, the more accurate the analysis will become in characterizing the industry.

The local line-haul and S & T railroads have had enough responses to obtain a more stable statistical analysis for both types. Each year of the survey, these types of railroads have had more than 50



responses. Due to the number of responses for each of these type of railroads, a change in one or two railroads will not have as great an effect as with the Regional railroads. Thus trends over time may be analyzed more accurately with local line-haul and S&T railroads.

#### **CHAPTER 4. DATA ANALYSIS EFFORTS**

The data analysis effort involved several different activities. The first of these activities included entering the 1994 data into the central database. After the data was entered into the database, it was necessary to check for data entry errors and values that were unusual. A statistical software package on a mainframe computer, SAS, was utilized for the purpose of quickly checking means, medians, and ranges of values for various variables and statistics. Several questionable values were analyzed to test whether they were valid responses. As a result, various responses were eliminated due to their extreme value. These responses remain in the database, as reported by the participating railroad, but are not used in any data analysis. This kind of data validation process continued throughout the analysis period.

Another section of the data analysis process involved checking the response rates to the survey questions. After receiving a majority of the surveys, a preliminary overview of the 1994 survey response was developed. The response rates were computed for each of the survey questions, and the percentage of nonzero responses were computed for several of the questions. The purpose of this process was to help identify questions that might not be getting an adequate response rate. Broad based relationships cannot be produced if the response is not adequate enough to represent the population that is being described. In effect, the bias of the statistical computations might be too high, lowering the confidence in the results of the analysis.

The response rate analysis indicated that the majority of data items were receiving a good response rate. However, the analysis also identified a series of questions, predominately in the Benefits section, that did not generate a large response rate. The analysis of the Benefits section is discussed in more detail below. The response rate analysis was presented to and discussed with the American Short Line Railroad Association, and as a result, a more simplified Benefits section was developed for the 1995 survey. As well, minor revisions to the glossary were made in an effort to facilitate the responses to several questions. A copy of this response overview may be found in Appendix A.

The response rate analysis of the Benefits section included an analysis of the section to determine if the types of responses were acceptable and would provide information of value. Difficulties arose with developing some of the information for this section because of the many benefit plans utilized by companies. The 1994 survey benefit section format did not allow some railroads to represent their benefit information fully. Many railroads submitted information that described how their benefit plans worked, since their plans didn't match the survey's benefit format. This created some difficulty with properly representing all the responses in the analysis of data for this section. In addition, some of the response rates were inadequate in this section for statistical analysis. As described above, this analysis resulted in the the format for the 1995 benefits section being simplified and changed to a more general approach after consultation with the American Short Line Railroad Association. A detailed analysis of the benefits section in found in Appendix B.

#### **4.1 Comparison With AAR Data**

An additional step in the analysis process determined whether the information from the 1994 survey agreed with information from the American Association of Railroads (AAR). This check on the survey data compared total carloads for railroads responding to both the survey and to the AAR. Findings from the comparison showed no significant difference in the average number of carloads moved. This indicated that the survey obtained total carload numbers very similar to the AAR's total carload numbers. This does not imply, however, that there were no suspect total carload values in the survey. The analysis showed that, looking at the overall mean or overall median, there was not a statistically significant difference between the results from the survey and the results from the AAR list. Table 4.1 presents this analysis and provides a listing of the descriptive statistics computed from the survey and from the AAR.

<b>Descriptive Statistics</b> (For railroads responding to both the survey and the AAR)		
<i>Including railroads having zero cars in the survey response</i>	<i>Survey</i>	<i>AAR</i>
Mean Number of Cars	516	600
Median Number of Cars	165	175
Sample Variance	1,386,363	1,472,170
Pearson Correlation	0.85	
Minimum	0	1
Maximum	9,836	9,973
Number of Observations	111	111
<i>Excluding railroads having zero cars in the survey response</i>	<i>Survey</i>	<i>AAR</i>
Mean Number of Cars	556	582
Median Number of Cars	182	159
Sample Variance	1,472,616	1,454,716
Pearson Correlation	0.90	
Minimum	1	1
Maximum	9,836	9,973
Number of Observations	103	103

**Table 4.1**

#### 4.2 Requests for Information from the Database

Throughout the data analysis period, railroads and organizations made requests for information from the database. Data requests were first approved by the Washington, D.C. Office of the ASLRA and had to be requested in an aggregate form that would not identify any individual railroad's data. Once approved, preliminary statistics were developed using the database. Averages, medians, and ranges were computed for the requests. The statistics were stratified by type of railroad and by region of railroad

operation to maintain the confidentiality of any individual railroad's data and to help reduce the variation of each statistic. Numbers that did not fit the parameters set by the balance of the data were double checked for their correctness. Checks on several of these numbers helped isolate questionable numbers in the database.

During the data request process, the project team was in direct contact with the requesting railroad or organization. The ASLRA did not participate in the analysis process, but did receive a final copy of each data request. To ensure data integrity, the project team members at the Upper Great Plains Transportation Institute were the only persons to see individual railroad records. Listed below are several examples of requested statistics:

Average Revenue Per Carload	Revenue Per Employee
Revenue Per Mile	Carloads Per Employee
Carloads Per Mile	MOW Expense Per Mile
Operating Ratio	Payroll Per Revenue
Carloads Per Locomotive	Carloads/Transportation Employee
Employee Compensation To Expense Ratio	FRA Track Class Totals
Projected 5-Year Investment	

### 4.3 Presentations

Presentations that described the project were prepared for several seminars and conferences. These included presentations to the upper management of the FRA, a regional short line association conference and seminar; the executive committee of the Mountain-Plains Consortium ( a University Transportation Center); and the Canadian Transportation Research Forum (CTRF). In addition, the 2nd Annual Canadian Short Line Conference was attended. The presentation at the CTRF is discussed next in some detail to provide an example of the use of the database.

The 1994 database provided the basic information necessary for the presentation and paper developed by Denver Tolliver, John Bitzan and Trent Byberg for the CTRF. The CTRF conference panel considered the process of analyzing the abandonment of branch lines versus the potential sale of these

branch lines to short-line operators. The paper presented an overview of grain short-line railroads in the U.S. based on data extracted from the 1994 ASLRA database. A definition for the difference between grain and non-grain railroads was derived from the information in the database. First, all the local line-haul railroads that moved a positive number of farm carloads in 1994 were grouped together, a total of 88 short lines. For each of these railroads, the percent of carloads moved that were of the farm commodity group were computed. Next, several cutoff percentage points that would define grain railroads were evaluated. After analyzing the database information and county grain production data, the breakpoint between grain and non-grain railroads was set at 44 percent of farm products. Comparisons of networks, equipment, labor, cost, and finance between grain and non-grain short line railroads were conducted in this paper. The following tables were extracted from the report and represent some of the grain and non-grain information discussed in the report.

Table 4.2 presents the frequency distribution of the railroads based on what percent of total carloads moved during 1994 were farm products. The percentage of farm carloads moved was less than 20 percent for the majority of the local - line-haul railroads analyzed. For 15 railroads, farm products comprised more than 44 percent of the 1994 traffic base. An analysis was conducted on these 15 railroads in terms of location, volume of farm shipments, and county grain production data. Each one of the railroads was found to operate in grain producing areas, and was classified as grain short line railroads. The remaining 73 short lines made up the non-grain short lines looked at in this study.

**Table 4.2. Grain Traffic Base of Local Line-Haul Carriers**

<b>Grain Carloads as a Percent of Total Carloads</b>	<b>Class Frequency</b>	<b>Cumulative Frequency</b>	<b>Cumulative Percentage</b>
0 - 10.99%	52	52	59.1%
11 - 21.99%	10	62	70.5%
22 - 32.99%	6	68	77.3%
33 - 43.99%	5	73	83.0%
44 - 55.99%	5	78	88.6%
56 - 66.99%	4	82	93.2%
67 - 77.99%	0	82	93.2%
78 - 88.99%	1	83	94.3%
>89%	5	88	100.0%

Table 4.3 compared several system characteristics between grain and non-grain railroads. The only significant system difference between grain and non-grain railroads found was in the traffic density.

**Table 4.3. Differences in System Characteristics of Grain and Non-Grain Local Line Haul Railroads**

<b>Variable</b>	<b>Mean Value: Grain Short Lines</b>	<b>Mean Value: Non-Grain Short Lines</b>	<b>T- Statistic</b>	<b>P-Value</b>
Track Quality (Track > 90 lb.)	77%	63%	1.71	0.155
Density (Carloads per Mile)	95.4	151.8	-2.06	0.043
Average Length of Haul	50.1	32.92	1.25	0.230
Percentage of Carloads Interchanged	71%	75%	-6.32	0.750

Table 4.4 compared two class 1 railroads with the grain and non-grain short-lines for the same statistics looked at in Table 4.3.

**Table 4.4. Comparison of Operating System Characteristics of Grain and Non-Grain Local Line Haul Railroads and Two Class I Grain Railroads**

<b>Variable</b>	<b>Mean Value for BN</b>	<b>Mean Value for CP Rail</b>	<b>Mean Value: Grain Short Lines</b>	<b>Mean Value: Non-Grain Short Lines</b>
Track Structure (Track $\geq$ 90 lbs.)	91%	77%	77%	63%
Density - Carloads per Mile	197	185	95	152
Density (Revenue Ton-Miles per Mile)	11,763,532	3,999,992	455,547	413,140
Average Length of Haul	793	393	50	33
Percentage of Carloads Interchanged	45%	64% *	71%	75%
* 1993				



Table 4.5 compared several equipment related statistics between grain and non-grain railroads. All statistics compared had insignificant differences. The most significant difference was found in the number of locomotives owned per 1,000 carloads moved. Yet, this difference was only significant at the 80 percent level.

**Table 4.5. Comparison of Equipment Inventories for Grain and Non-Grain Short Lines**

<b>Variable</b>	<b>Mean Value: Grain Short Lines</b>	<b>Mean Value: Non-Grain Short Lines</b>	<b>T-Statistic</b>	<b>P-Value</b>
Cars Owned per 1,000 Carloads of Traffic	4.48	5.50	-0.33	0.745
% of Cars Owned > 20 Years Old	48%	45%	0.17	0.867
% of Cars Owned 10 to 20 Years Old	44%	48%	-0.21	0.836
Locomotives Owned per 1,000 Carloads Moved	1.11	2.03	-1.29	0.198
% of Locomotives Owned > 20 Years Old	81%	82%	-0.05	0.963
% of Locomotives Owned 10 to 20 Years Old	16%	17%	-0.04	0.968

Table 4.6 looked at two of the equipment statistics from Table 4.5 and compared them with two Class I railroads. As would be expected, the Class I railroads have higher locomotives owned per thousand carloads traffic and higher cars owned per thousand carloads traffic.

**Table 4.6. Comparison of Equipment Characteristics of Grain and Non-Grain Local Line Haul Railroads and Two Class I Grain Railroads**

<b>Variable</b>	<b>BN</b>	<b>Soo Line</b>	<b>Avg. for Grain Short Lines</b>	<b>Avg. for Non-Grain Short Lines</b>
Locomotives Owned per 1,000 Carloads Traffic	2.45	NA	1.11	2.03
Cars Owned per 1,000 Carloads Traffic	14.80	9.55*	4.48	5.50
*1993				

Table 4.7 includes three measures of labor efficiency for the short line railroads. Although non-grain railroads show slightly fewer employees per mile and slightly higher carloads per employee, neither of these differences would be significant according to standard significance levels.

**Table 4.7. Differences in Labor Characteristics of Grain and Non-Grain Local Line Haul Railroads**

<b>Variable</b>	<b>Mean Value: Grain Short Lines</b>	<b>Mean Value: Non-Grain Short Lines</b>	<b>T-Statistic</b>	<b>P-Value</b>
Employees per Mile	0.411	0.338	0.55	0.589
Carloads per Employee	395	472	-0.98	0.340
Thousands of Revenue Ton-Miles per Employee	1,700	4,670	-1.54	0.130

Table 4.8 compared the same three statistics with two Class I railroads. There are large differences between the Class I carriers and the short lines in carloads per employee and employees per mile. These two differences are not unexpected, as many of the savings realized by short lines are due to labor savings. While these differences are positive for short line railroads, some of the differences in carloads per employee also are due to differences in the length of haul. This can be seen by comparing the revenue ton-miles per employee

**Table 4.8. Comparison of Labor Characteristics of Grain and Non-Grain Local Line Haul Railroads and Two Class I Grain Railroads**

<b>Variable</b>	<b>BN</b>	<b>Soo Line</b>	<b>Avg. for Grain Short Lines</b>	<b>Avg. for Non-Grain Short Lines</b>
Employees per Mile	1.38	0.80	0.41	0.34
Carloads per Employee	143	206*	395	472
Thousands of Revenue Ton-Miles per Employee	8,485	4,992	1,700	4,670
*1993				

#### **4.4 The 1994 Database and Dentry 2.0**

Extensive discussion considered whether an individual railroad's 1994 survey data should be included in the electronic survey software package. Many of the railroads' survey responses may not change from the previous year. Having the 1994 data available while filling out the 1995 survey would facilitate completing the 1995 survey. Different options were reviewed for sending out the 1994 data with the Dentry 2.0 survey data entry software package. The greatest concern with sending out a railroad's previous year's survey data is the security of this information. Additional efforts at ensuring the integrity

and confidentiality of any individual's railroad were performed to reduce any complications that could arise when sending this information out on disk.

There were several different methods examined for adding this feature to Dentry 2.0. One method was to have a command button on the toolbar that, when invoked, would fill in the entire 1995 survey with 1994 data. The concern with this method was that 1994 data could mistakenly be returned as 1995 data. The issue of integrity and accuracy of 1994 versus 1995 data militated against using this option. However, this method would facilitate the completion of the survey and will be considered again.

A second option evaluated was more complicated to incorporate into the software. This option would allow the user to split the screen and view the 1994 data while entering the 1995 data into the survey. Copying data from 1994 to the 1995 survey would become simple and much more efficient. This option would involve more complex programming, but would be extremely beneficial to the users and to the survey response. The resources required to develop this option precluded it from being in the 1995 software version. This idea will be given consideration for future upgrades.

Another option would again have a 1994 command button, visible whenever a person was at one of the survey forms. This command button would allow users to view the 1994 data. They would not have access to the input fields and would not be able to copy the 1994 data to the clipboard. When invoked, a 1995 button would become enabled to allow users to return to editing the unaffected 1995 survey. At this point in the software development, the project team determined this was the most secure option to implement.

Another option that might be implemented in the future placed the survey on a World Wide Web site. The railroad would select a login and its own password that would give it access to the survey. On the Internet, railroads would be able to access each survey they had previously filled out, along with the annual short line data profiles. If a railroad could not complete the current survey in one session, it would be allowed to save the survey, and regain access to the survey with its login and password at a later date.

When the survey was completed, the railroad could press a send command button that would electronically transfer its survey data to the main database. In the future, the Internet may provide another method of retrieving and sending data between short lines and the main database.

#### ***4.4.1 Distributing Individual 1994 Railroad Information***

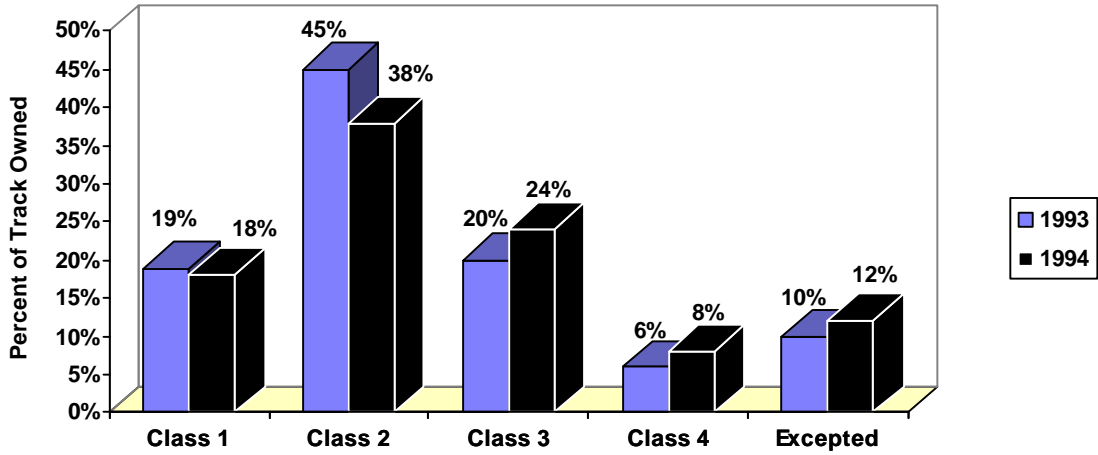
The 1994 database contains records covering 233 railroads. Each railroad that filled out a 1994 survey was sent its individual 1994 database record during the 1995 survey mailing. Extracting each individual record from the database was a tedious process. Microsoft Access does not have a simple function to extract one single record from an existing database and place it into a new, single record database. The only way to get a single record database is to manually go into each of the 13 tables and erase all the records except the one users wish to keep.

To assist in this process, a Visual Basic program was written. The program prompts the user for the railroad record number and the directory the database is located in. When the execute command is invoked, the program erases each record in each table of the database that does not correspond to the record selected. When the program is finished, a database now exists with just the record requested in it. This Visual Basic program cut in half the time needed to pull out each of the individual railroad records.

#### **4.5 Comparisons Between 1993 and 1994 Data**

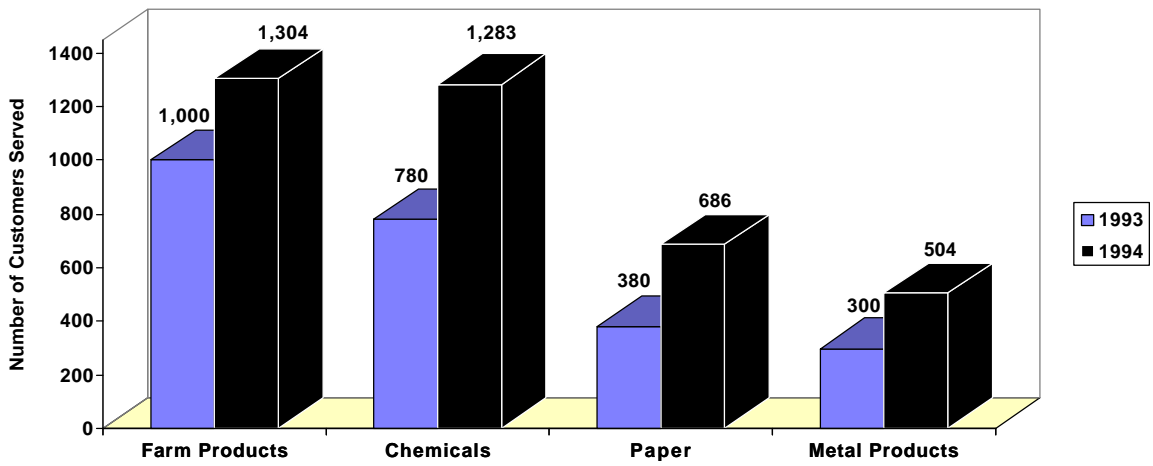
Once the 1994 database was complete, comparisons between the 1993 and 1994 data were made. The mix of railroads responding to the survey and the accuracy of the responses changed between 1993 and 1994. These were the two main factors contributing to most of the differences found between the two years' results. Figures 4.1 and 4.2 present examples of the types of comparisons made. The report comparing the 1993 survey data with the 1994 survey data can be found in Appendix B.

**Comparison of 1993 and 1994 FRA Track Class Distribution**



**Figure 4.1**

**Comparison of 1993 and 1994 Customers Served (the four largest changes)**



**Figure 4.2**

#### **4.6 Overview Of The 1994 Data Profile**

The 1994 annual data profile report was modeled after the 1993 version of the report. Industry statistics were compiled by railroad type, by railroad region and industry-wide. Industry-wide statistics are computed to document the major impacts of the short-line industry. Stratifying the data into different groups based on size or region is done to reduce the variation in the computed statistics. This also assures that the data will be presented in aggregate form to maintain the confidentiality of each participating railroad's data. With the report so designed, an individual railroad can compare its operations to railroads with similar type and location of operation.

Data compiled for the report is presented in tables, column charts, and pie charts to assist in comparing results across railroad types and regions. Employment of statistical interpolation and estimating techniques may be given consideration for future analysis of the short-line industry as a whole as part of an effort to present a more complete representation. A copy of the 1994 paper survey is in the back of the report that contains the industry-wide total values. The final section of the data profile contains a list of the railroads participating in the 1994 survey along with the name of their survey contact person.

A copy of the 1994 data profile is included in this report in Appendix E.

## **CHAPTER 5. PROGRAMMING EFFORTS FOR DENTRY 2.0**

### **5.1 Analysis of the 1993 Data Entry Software**

The original data entry software program, Dentry, was created using the Visual Basic 3.0 professional development environment in 1993. An evaluation of software development environments for the 1995 DOS version of the data entry software included FoxPro, dBASE, and Clipper 5.3. These three programs were reviewed and Clipper 5.3 was selected. However, the particular instance of the Clipper 5.3 development environment used for this project proved to be unstable and caused a delay in DOS program development. The development environment was stabilized with the assistance of Clipper technicians. Programming options for the new Windows version included Visual Basic, C++, or Delphi. After reviewing the Dentry code and the capabilities of Visual Basic along with third party vendor's software, the decision was made to stay with the Visual Basic development environment for the 1995 version of Dentry.

The first factor examined in creating the 1995 version of Dentry was the database structure. The decision was made to keep the underlying 1995 data structure very similar to the original version of Dentry. Minor adjustments were necessary to the original database tables to incorporate the changes required for the 1995 database tables. The modified database tables were exported into the Xbase format for inclusion and use by the DOS program. Several Xbase databases, each an independent database, were used in the DOS program. The Windows program's access to the database tables was controlled by snapshots and dynasets. Snapshots, a static picture of a set of records that are not updatable, were used to copy display information that would not be changed. Dynasets, dynamic sets of records that are updatable, were used for saving changes to the database via the program. When the save command was invoked, any changes that are made to the fields in the Window's program utilized dynasets to update the Microsoft Access database in contrast to the DOS program's direct access to the underlying database.



The error checking in the original program controlled data entry errors and data type entry errors in the program. Each field's value has checked every time values are input and each field restricted the type of information that was entered into it. The program checked the type and size of data entered. The DOS program restricted the data that was entered into a field while the Window's program responded to incorrect data with an error message and erased the entered value.

## **5.2 Form Design for 1995**

The paper survey was used as a guide to create the electronic survey forms. The design was coordinated with the paper survey making changes that accommodated screen size and utilized effective visual techniques for software interfaces. The program was created with the concept of keeping it as simple and consistent as possible, not making any assumptions about the end-user's computer literacy. The DOS program used a blue background with yellow and white lettering as suggested by Aaron Marcus, a noted interface designer. The Window's program forms were created with the same gray background with black lettering and MS San Serif, a standard Microsoft Windows font, as the original Windows program.

Two third party products that were utilized in the form design of the Windows program. These were VB Tools 5.0 and VB Assist. VB Tools functions were utilized to create the 3-D appearance in each of the survey forms. VB Assist was used to help keep the alignment and tab order of the form fields and labels. The Clipper Workbench provided an environment for form and screen development for the DOS program.

## **5.3 Functionality**

Survey printing capabilities have been added to the 1995 versions of the data entry software. Three different report writing software products were evaluated to assist with printing the survey 1) Crystal Reports, 2) ReportSmith, and 3) R&R Report Writer. None of the three products fit the project

perfectly, but writing a print program module to generate a paper copy of the electronic survey could be very resource intensive. A report writing add-on program could be incorporated into Dentry 2.0 thereby saving significant resources. The only report generator of the three that were examined that allowed for the creation of a three to four page pre-formatted report was R&R Report Writer. The other two programs were limited to pre-formatted reports two pages or less. Consequently, the decision was made to use R&R Report Writer Xbase Edition on the DOS side and R&R Report Writer's SQL version 6.5 for the Window's version.

The reports were created in R&R and connected to the Microsoft Access database with ODBC. The entire survey could not fit into one R&R report and had to be separated into several reports. The goal was to have a single report for each section of the survey. Due to the limitations of the report generator, some of the sections had to be divided into more than one report. Eleven reports were needed to accommodate the print facility.

The next step in the process of developing printing capabilities was attaching these reports to the software. Each time a report is printed, the R&R runtime executable is invoked, the report is printed, and the R&R runtime is closed. When printing the entire survey, the R&R runtime executable had to be opened and closed 11 times, once for each report. This process chewed up a lot of CPU time on the computer and slowed the print functionality. Future versions of the program will address the printing speed issue. The Windows version of R&R came with a visual basic control file, or VBX, which added print preview capabilities for R&R reports to Dentry.

R&R allowed the project team to create customized reports to present survey data in a form similar to the paper survey. Each report was attached to the database, and had access to all the fields in the database. In the report design, report fields which are attached to the database and text label fields were laid out to give the same appearance as the pages of the paper survey. The report fields displayed the corresponding database field contents. When a railroad responded to a question with a "not available"

response, a value of -1 was stored in the database. For values of -1 in the database, the corresponding field in the R&R report remained blank. Otherwise, report values were formatted according to their corresponding data type

Additional features added to Window's version of Dentry 2.0 included a toolbar, print preview of the survey, and the ability to view individual 1994 survey data. The toolbar was added just below the file menu. The toolbar contained command buttons that allowed a user to quickly access common functions in Dentry 2.0. Each button had either a title or a picture representing the function it activates. When the user dragged the mouse over one of the command buttons, a small yellow balloon appeared below the button describing the function the corresponding command completes. Another feature on the Windows program toolbar was the scrollbar. The scrollbar allowed a user to scroll freely between the survey pages. Below are examples of how several types of toolbar buttons appear in the program:



Picture buttons - Several buttons on the toolbar have a picture that visually describes the command.



Command Buttons - Several buttons on the toolbar have text on them describing the command.



Scrollbar - The scrollbar has a right and a left arrow allowing the user to scroll through the survey pages.

The next challenge encountered with the Windows program was with Open Database Connectivity (ODBC). The communications link between the R&R reports, the Microsoft Access Database, and Visual Basic was controlled by a program called ODBC Manager. Some computers that this program will be installed on will already have an ODBC Manager, while others will not. The setup disks must be able to recognize whether or not this manager exists on the computer. If it exists, several necessary lines will be added to the existing ODBC initialization file. If it doesn't exist, the manager is copied to the hard drive and is setup to work with the R&R reports. An installation utility program, Eschalon Setup Pro,

had several utilities that were utilized to help control the setting up of the ODBC Manager along with the program setup.

Another feature added to Window's version 2.0 of Dentry will allow the users to view their 1994 survey data. A command button on the toolbar becomes active when the user is in one of the data forms. When the button is pressed, a list of the user's 1994 railroads appears. If the users wish to view the 1994 data for one of the railroads, they can double click on the corresponding railroad. The 1994 response data will appear in the current form. When finished viewing, the users can press the 1995 button that now appears on the toolbar to return to the 1995 survey.

All of Dentry 2.0's current working Windows functions can be reviewed in the user's manual found in Appendix D.

#### **5.4 Creating Distribution Setup Disks**

The Clipper development environment provided a utility for creating an executable program for the DOS version of the software. This provided a straight forward mechanism for creating distribution disks for the DOS program. A third party product, Eschalon Setup Pro, was utilized for the creation of the distribution disks for the Window's version of the program. As part of this process, the Eschalon program automated the editing of several .ini files that needed changes during the Dentry 2.0 installation. The purpose of this function was to configure the ODBC Manager correctly to work with R&R and Microsoft Access, while not interfering with any currently enabled ODBC settings.

Another Eschalon Setup Pro feature utilized was file version checking. There were a number of .dll and .ini files included with the Windows program. If any of these files already existed on the computer, Eschalon ran a file check on them. If the file existing on the hard drive was newer, the setup did not copy that file onto the hard drive. If the existing file was older, the setup copied over that file with the newer version. Some files have older version that are not compatible with programs written for the

newer version. This process was necessary to ensure that the correct version of a file was in place on the user's hard drive.

### **5.5 Beta Testing**

After the setup disks were completed, the beta testing process was initiated. A computer science graduate student was added to the project team to assist with beta testing. Beta testing is the process of software testing at sites not involved in program development and is necessary to complete the testing cycle.

Beta testing involved testing the program several hundred times on approximately 20 different computer configurations. During the testing, most of the problems found involved illegal data types and illegal data conversions. Other errors were found in the form design and alignment, the print routines and the save routines. Additional revisions to the program will occur with any feedback generated from the nearly 400 railroads receiving the software.

## **CHAPTER 6. THE MAILING PROCESS**

### **6.1 1995 Survey Distribution**

Approximately 400 1995 annual data profile survey packets were assembled. Included in the packet were copies of the 3-disk Dentry 2.0 setup with labels placed on each corresponding disk. A cover letter, a postcard for requesting the DOS version of Dentry, the 1994 Data Profile, the Glossary, the paper survey, and Dentry's user's guide also were part of the packet mailed to all the members of the ASLRA. The annual data profile also was sent to approximately 100 individuals and organizations interested or active in the short line industry. The 1995 survey responses will form the basis of the 1995 annual data profile report.

### **6.2 1994 Database Distribution**

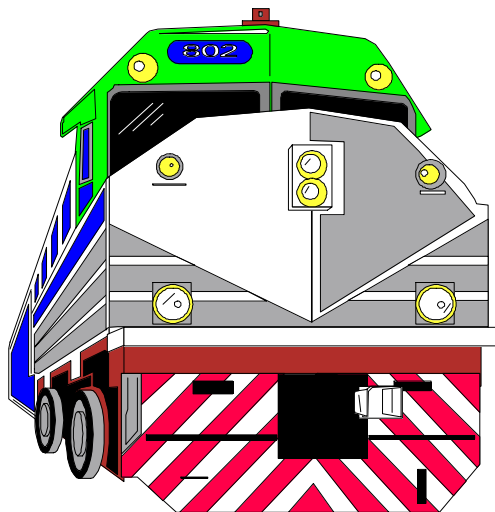
A separate 1994 database mailing was sent out two days after the survey mailing distribution to ensure the confidentiality of each railroad's data. This mailing contained a cover letter and a single disk that showed the 1994 survey response for each of the 233 railroads replying to the 1994 survey. The 1994 data could be copied into the Windows software directory structure for inclusion into the software program.



## Appendix A.

### Preliminary Overview of the Sections of the 1994 ASLRA Annual Data Profile

November 13, 1995



**Douglas Benson  
Trent Byberg  
Denver Tolliver**

As of November 13, 1995, we received 224 surveys out of 435 that were sent out. On September 22, we had 209 surveys available for the preliminary overview of the 1994 ASLRA Data Profile.

This report will break the survey down to assess each component, beginning with:  
**PART I. Railroad and Customer Profile:**



There were no major problems with this section of the survey. It appeared that the participants filled each part out with little difficulty. One noticeable trait was with the *other* commodity group in the customer profile. The majority of products listed in the *other* group could have been placed in one of the commodity groups listed.

The changes made to this section from last year's survey corrected a misunderstanding of how to report the total number of customers.

## **PART II. Inventory of Roadway, Track, and Structures:**

There were no significant problems with the FRA information on pages two and three. In the *Rails Laid in Replacement* and *Rails Laid in new lines, extensions, or sidings* section, almost all railroads entered a value in track feet, an improvement over 1993. The response rate to the new *Grade Crossings Improvements* section was around 70%. For the *intermodal and transloading* section 92% of the railroads surveyed responded, though only 40% gave a nonzero number. There were only two railroads who replied to the number of facilities and did not fill out the corresponding subsection.

The number of nonzero responses is computed for two of the new sections in the following table:

<u>Field</u>	<u>Total Number of Responses</u>	<u>Number of Positive Responses</u>	<u>Percentage of Positive Responses</u>
<b>Grade Crossing Improvements</b>			
New Automatic Warning Devices Installed	203	67	33%
Automatic Warning Devices Improved	204	48	24%
Number of Grade Crossings Resurfaced	204	114	56%
<b>Intermodal Terminal Facilities</b>			
# Circus Ramps	193	32	17%
# Top Pickup	193	19	10%
# Bottom Pickup	193	16	8%
# Bottom Pickup	193	4	2%
<b>Transloading Facilities</b>			
# Rail to Truck	193	72	37%
# Rail to Truck	191	53	28%
# Truck to Rail	192	38	20%
# Rail to Water	193	20	10%
# Water to Rail	193	17	9%

## **PART III. Equipment Inventory**

Respondents appeared to understand and fill this section out well. We received nearly a 100% response rate to the *locomotives* section. Of the 49,583 cars used by these railroads, roughly 50% were owned and 50% were leased. This is an interesting result when we compare it to 1993 where nearly two-thirds of the 52,310 cars used were leased. Of the 2,103 locomotives used by the reporting railroads in 1994, only about 12% were leased which is roughly the same percentage as in 1993.

## **PART IV. Annual Operating Statistics**

The *Carloads Handled by Commodity Code* section was excellent. The sections with the highest number of carloads handled were; *Food and Kindred Products; Pulp, Paper and Allied Products; and Other commodities*. One thing noticed several times was the placing of items in the *other commodity* section that could have been listed in one of the commodity codes already given. A few railroads also added new commodity codes at the bottom.

The *hazardous materials* question had a high response rate. One hundred thirty railroads entered a nonzero number for *hazardous materials* carloads while 71 railroads entered a zero. The *number of trailers and containers shipped intermodally* section received a low response. Only about 3% of the participants entered nonzero values into this section, while roughly 22% stated this information was unavailable.

We had an uneven response to the *Annual Line-Haul Operating Statistics* and the *Annual Fuel Consumption and Locomotive Idling Policy* sections. The new *End Of Train Device* section showed that 110 railroads reported an EOT device. The other new section, *Train Miles*, received a fair response rate of around 69%. We received good response to the *Average Revenue per Carload, Average Cost per Gallon, and Total Gallons of Locomotive Diesel Fuel Consumed* questions, while there was a 43% response rate to the *Revenue Ton-Miles* section. The values entered in the *Revenue Ton-Miles* section ranged from 122,910 to 8,143,221,000. The majority of values entered here were correctly figured, an improvement from 1993's results.

## **V. Financial Data**

Roughly 80% of the participants filled out the *Items From Income Statement* section. Some did not have their expenses broken down in a fashion similar to the survey's. We noted high response rates for all five total and net fields. The *Way and Structures* section received a lower response rate of around 57%, while the other sections all had above a 70% response. *Items From the Balance Sheet* questions all had a response rate above 71%; however, there were some unusual entries in this section. Several railroads placed negative values in for *Current Liabilities* and *Long-Term Debt*. Several respondents also placed a negative value in *Current Assets*.

One hundred twenty of the 209 respondents filled out the *Projected Capital Investments* section. *Track Investment* received the most responses followed by *Locomotive Investment, Structures Investment, Other Investment, and Rolling Stock*. The response to this section did improve from 1993.

## **PART VI. Employee and Benefit Data**

For the employee data section, there might be a need for a total employees field and a total annual compensation paid field. There were several railroads who reported only the totals and did not break them into two groups, *Exempt* and *Non-Exempt*. Also note that several of the railroads contracted out for their employees, therefore, they did not have any employee data to report.

Approximately 18% of the respondents had trouble representing their benefit plan with the format given. They had various combinations of medical, dental, and life totals. Some

combined medical and dental, or combined single and family. Others had different rates for a nonsmoker vs. a smoker, hourly vs. salaried or union vs. non-union employees, thus making it harder to compare with other railroads' benefits. With the pension plan's percentage of the employer's matching contribution, we ran into similar problems. Several companies have a sliding% contribution, or a maximum dollar amount that can be matched per year, and yet again others had different rates for union vs. non-union employees.

## **PART VII. Passenger Services**

Roughly 15% of the respondents offered a passenger service in 1994. Of the 39 that offered this service, 21 gave total revenue figures from this service.

## **PART VIII. Computer Systems and Applications**

We had a good response rate to this section of the survey. There were only 4 railroads who did not provide this information. Eight of the respondents stated they did not use computers.

## **PART IX. Comments and Recommendations**

We have received comments on some of the participating railroads' surveys. Here are several of the key points brought up:

(# of occurrences of this comment)

- 1.(4) Provide a larger envelope for the return of the survey
- 2.(3) Place the return address directly on the survey
- 3.(1) Data requested is not kept in a format compatible with the survey's format
4. (1) A good preformatted database passed out to the participants to be used during the year to gather data would be nice
5. This was not an easy task - trying to use two different companies financial statements - There are some blanks.
6. What direct benefit do we get? The concept is great & we support ASLRA 101%, but wouldn't each short line's's annual report do?
7. Put the STCC codes in numeric order on page 6
- 8.(9) The length of time required to complete this survey is tremendous

### **Response rates for each individual question:**

A response is counted if the respondent enters an appropriate value or a zero.

<b><u>Question</u></b>	<b><u>Response Rate</u></b>	<b><u>Question</u></b>	<b><u>Response Rate</u></b>
<b><u>Railroad Profile</u></b>		<b><u>Items From Income Statement</u></b>	
Railroad Type	98%	Revenue From Freight	83%
Principal Owner	94%	Revenue From Other	81%

Survey Contact Person	98%	Total Gross Revenue	87%
Year established as a Short Line	94%	Way Expense	57%
<b><u>Customer Profile</u></b>	96%	Bridges Expense	57%
<b><u>FRA Information</u></b>		Facilities Expense	57%
Miles of Road	99%	Other Expense	56%
Number of Bridges	98%	Way and Structures Total	84%
Ties Laid in Replacement	98%	Freight Cars Expense	70%
Rails Laid in Replacement	99%	Locomotives Expense	70%
Rails Laid in new lines, ext., sidings	95%	MOW Expense	68%
Public Crossings	99%	Other Expense	69%
Private Crossings	98%	Total Equipment Expense	81%
Crossings with Automatic Devices	99%	Transportation Expense	81%
New Automatic Devices Installed	97%	Administrative Expense	81%
Automatic Devices Improved	98%	Other Expense	80%
Grade Crossings Resurfaced	98%	Total Operating Expense	86%
Number of Intermodal Facilities	92%	Net Railway Operating Income	85%
Number of Transloading Facilities	92%	Capital Road Expenditures	87%
<b><u>Freight Cars Owned &amp; Leased</u></b>	95%	Capital Equipment Expenditures	86%
		Capital Other Expenditures	86%
<b><u>Locomotive Information</u></b>	99%	<b><u>Items From Balance Sheet</u></b>	
<b><u>Annual Line-Haul Operating Statistics</u></b>		Current Assets	76%
Train Miles	77%	Current Liabilities	76%
Yard Miles	69%	Net Working Capital	71%
Locomotive Miles	68%	State and Federal Loans/Grants	74%
Average Length of Haul	79%	Total Assets	76%
Average Revenue Per Car	75%	Long-Term Debt	75%
Revenue Ton-Miles	41%	Stockholder's Equity	75%
Total Gallons of Fuel	91%	Total Capital Expenditures	73%
Average Fuel Cost per gallon	93%	Depreciation Amortization	74%
		Other Expense	72%
<b><u>Carloads Handled</u></b>		<b><u>Employee &amp; Benefit Data</u></b>	
Hazardous Materials Carloads	96%	Total Exempt Employees	88%
Intermodal Trailers Shipped	81%	Total Non-Exempt Employees	88%
		Total Employees	89%
		Total Exempt Compensation	78%
		Total Non-Exempt Compensation	76%
		Total Compensation	79%
		Employees Under Labor Agreement	87%
		Total Man-Hours	81%
		Benefit Plan	90%
		Single Medical Contribution	83%
		Family Medical Contribution	83%
		Single Dental Contribution	82%
		Family Dental Contribution	83%

Intermodal Containers Shipped	81%	Single Life Insurance Contribution	82%
		Family Life Insurance Contribution	81%
<b><i>Projected investment</i></b>		Total Medical Contribution	57%
Locomotive Investment	57%	Total Dental Contribution	64%
% Contributed	57%	Total Life Contribution	58%
Rolling Stock Investment	56%	Single Medical Costs	45%
% Contributed	56%	Family Medical Costs	44%
Track Investment	57%	Single Dental Costs	50%
% Contributed	57%	Family Dental Costs	47%
Structures Investment	56%	Single Life Insurance Costs	46%
% Contributed	56%	Family Life Insurance Costs	42%
Other Investment	57%	Single Total Costs	40%
% Contributed	57%	Family Total Costs	37%
		Medical Total Costs	49%
		Dental Total Costs	53%
		Life Total Costs	55%
		Total Costs	70%
		401K Matching %	95%
		401K % of Employer Matching	94%
		Vesting Schedule	67%
		Defined Benefit Percentage	96%
		Defined Vesting Schedule	83%
		Other Pension Plans	3%
		Total Costs for Health/pension/benefit plans	70%

**Appendix B.**

*AMERICAN SHORT-LINE RAILROAD ASSOCIATION*

*CLASS II AND CLASS III RAILROAD*

*ANNUAL DATA PROFILE (1994)*

**An Analysis of the  
response to**

*PART VI. Employee and Benefit Data*

**Doug Benson  
December 14, 1995  
Upper Great Plains Transportation Institute  
North Dakota State University**

***PART VI. Employee and Benefit Data***

The response to the Employee Data section was good. The specific response rates are noted for each category and includes 0 as an appropriate response. The numbers entered into the survey were good.

**Employee Data**

Total Employees (Average Mid-Month Count for 1994)	<u>Response Rate</u>
Exempt _____	<b>88%</b>
Non-Exempt _____	<b>88%</b>
Total Annual Compensation Paid	
Exempt _____	<b>78%</b>
Non-Exempt _____	<b>76%</b>
Number of Employees Covered by Labor Agreement _____	<b>87%</b>
Total Man-Hours Worked _____	<b>81%</b>

**Benefit Plans**

Does your company provide health and insurance plans?  Yes  No  
**90% (yes)**

If yes, please answer the following questions.

***The following response rates are for those answering yes to the first question in this section and are a percentage of the total number of surveys.***

What is the percentage of the Employer contribution for the following health and insurance plans?  
 (ie., 100%,75%,etc.)

	Single	Family
Medical	_____ <b>75%</b> _____	_____ <b>75%</b> _____
Dental	_____ <b>74%</b> _____	_____ <b>75%</b> _____
Life Insurance	_____ <b>74%</b> _____	_____ <b>73%</b> _____

**The numbers entered in this section look reasonable although the dental and life insurance numbers may differ notably from 1993.**

What is the Total Annual Employer Contribution for the following health and insurance plans? (ie., \$10,000,etc.)

*The following response rates are for those answering yes to the first question in this section and are a percentage of the total number of surveys.*

**Response rates including a 0 response.**

	Single	Family
Medical	<u>37%</u>	<u>36%</u>
Dental	<u>42%</u>	<u>39%</u>
Life Insurance	<u>38%</u>	<u>33%</u>

**Response rates with a non-negative number.**

	Single	Family
Medical	<u>28%</u>	<u>29%</u>
Dental	<u>22%</u>	<u>23%</u>
Life Insurance	<u>24%</u>	<u>12%</u>

**This section had a low response rate. The numbers that were entered in this section look reasonable. Note that we did not use the 1993 numbers in this section.**

Does your company provide pension plan(s) (contributory and non-contributory) in addition to Railroad Retirement?

Yes       No      **46% (yes)**

If yes, please answer the following questions.

*The following response rates are for those answering yes to the first question in this section and are a percentage of the total number of surveys.*

A. *Defined Contribution Plan*

If Your Company Has a 401(k) Plan:

What is the percentage of payroll that an employee can contribute that is matched by the employer? (i.e. 3%, 6%, 11%, etc.) \_\_\_\_\_ percent **42% (with 0, 27 were 0.)**  
**29%(positive response)**



**This section had a low response rate. The numbers that were entered in this section, with the exception of one 50% number, look reasonable. The range of the reasonable numbers is 1.5% to 15%.**

What is the percentage of the employer's matching contribution (if any)? (i.e., 10%, 25%, 50%, etc.) \_\_\_\_\_ percent **41% (with 0,32 were 0.)**  
**25% (positive response)**

**This section had a low response rate. There are several numbers equal to or greater than 100% and several 1.5% numbers. The range of the other numbers is 4% to 75%.**

What is your defined contribution plan's vesting schedule for employer-paid benefits? (i.e., one year, five years, sliding percentage, etc.) \_\_\_\_\_ **33%**

**The most common responses were five years and immediate vesting.**

**B. *Defined Benefit Plan***

If you have a defined benefit plan, what is the percent of payroll which was contributed to the plan last year? \_\_\_\_\_ percent **42% (with 0,67 were 0.)**  
**10%(positive response)**

**This section had a low response rate. The numbers appear reasonable. The range of the numbers is 2.6% to 15.2%.**

What is the defined benefit plan's vesting schedule for employer-paid benefits? (i.e., one year, five years, sliding percentage, etc.) \_\_\_\_\_ **16%**

**The most common response was five years.**

**C. *Other Pension Plan(s)***

**5%**

---



---

Total annual cost of health/pension/benefit plans **70% (with 0,35 were 0.)**  
**54%(positive response)**

## APPENDIX C:

### Comparisons Of The Sections Of The 1993 ASLRA Survey With The Sections Of The 1994 ASLRA Survey

The majority of the significant differences between the 1993 and 1994 numbers are due to the changes in the railroads responding to the survey, and possibly a more accurate response to the survey. The following is a breakdown of the comparisons between the 1994 data and 1993 Annual Data Profile data. Included are the comparisons showing the largest change from 1993 to 1994.

#### Customer Profile:

Figure 1: Customers Served By Commodity:

Farm Products	1993 ~ 1,000	1994 = 1,304
Chemicals	1993 ~ 780	1994 = 1,283
Paper	1993 ~ 380	1994 = 686
Metal Products	1993 ~ 300	1994 = 504

Figure 2: Regional RR Customers Served:

Farm Products	1993 ~ 425	1994 = 761
Chemicals	1993 ~ 250	1994 = 727
Paper	1993 ~ 125	1994 = 480
Metal Products	1993 ~ 80	1994 = 300
Lumber	1993 ~ 825	1994 = 624

#### *explanation of difference between 1993 and 1994:*

The differences were due mainly to changes within several large railroads and the addition of new railroads to the database.

Figure 3: Local/Line-Haul RR Customers Served:

Chemicals	1993 ~ 375	1994 = 406
Food and Lumber each decreased by roughly 100 customers served		

#### *explanation of difference between 1993 and 1994:*

Due mainly to the different railroad mix and changes within railroads

Figure 4: S & T RR Customers Served:

Results were very similar for 1993 and 1994

### **Traffic Profile:**

Figure 6: Total Carloads by RR Type:

The Regional RR's handled over a half million more carloads than both the S&T and the Local/Line-Haul RR's in 1994.

In 1993, the Regional RR's reported the smallest # of carloads of the three types.  
*explanation of difference between 1993 and 1994:*

This is due mainly to the addition of 5 new Regional RR's to the list.

Figure 8: RR Traffic Mix:

Metallic Ores increased in percentage of total traffic mix from 8% to 17%

The rest remained similar to 1993 results

*explanation of difference between 1993 and 1994:*

Due again mainly to the addition of several new railroads.

Figure 10: Carloads by RR Type:

There was an increase of nearly 300,000 carloads of metallic ores handled

*explanation of difference between 1993 and 1994:*

Due to the addition of several new railroads.

Figure 11: Eastern Carload Distribution:

Petroleum 1993 ~ 45,000 1994 = 158,673

Metallic Ore 1993 ~ 175,000 1994 = 266,740

Metal Products 1993 ~ 300,000 1994 = 410,893

The rest remained similar to 1993 results

*explanation of difference between 1993 and 1994:*

Due mainly to the change in railroad mix.

Figure 12: Pacific Region Carload Distribution:

Waste 1993 ~ 90,000 1994 = 31,299

Chemicals 1993 ~ 35,000 1994 = 70,255

The rest were similar to 1993 results

*explanation of difference between 1993 and 1994:*

The decline in Pacific waste carloads is due to the loss of several railroads from 1993 to 1994.

The increase in Pacific chemical carloads is due to the addition of several railroads in 1994.

Figure 13: Southern Region Carload Distribution:

Results were similar to 1993

Figure 14: West-Southwest Region Carload Distribution:

Chemicals, Food, and Lumber were up slightly, Metallic ores increased by over 500,000 carloads .  
 Farm was down ~ 100,000 while all other commodities rose slightly or remained about the same.

*explanation of difference between 1993 and 1994:*

Changes due to the different railroad mix in 1994

Figure 15: Railroad Movement Mix:

Results were almost identical to 1993.

Figure 16: Local/Line-Haul RR Movement Mix:

An increase in the percentage of interline carloads originated in 1994 of 7%

Originated & Terminated Online decreased by 5%

Bridge decreased by 3%

Terminated Increased by 1%

Figure 17: Regional RR Movement Mix:

% originated & terminated online nearly doubled. Each of the other types of movement dropped 4 to 8 %.

*explanation of difference between 1993 and 1994:*

Changes due to the addition of several regional railroads.

Figure 18: Switching & Terminal RR Movement Mix:

Originated & Terminated Online down 5% of total S&T carloads, Originated up by 3% of total S&T Carloads

Figure 19: Eastern Region Movement Mix:

Originated & Terminated Online down by 8% of total East Carloads,

Originated up 11%, Bridge down 5%

Figure 20: Pacific Region Movement Mix:

Originated up 13% from 1993, Terminated up 13%, Originated & Terminated down 9%, Bridge down 17%

Figure 21: Southern Region Movement Mix:

Originated & Terminated Online up 10% from 1993, Carloads Originated down 8%, Terminated down 2%, bridge the same

Figure 22: West-Southwest Movement Mix:

Originated up 6% from 1993, Terminated down 14%, bridge up 7%

### **Physical Profile:**

Figure 23: RR Mileage by Region:

Similar to 1993 results, with the exception of a significant increase in Pacific Railroad Miles - due mainly to an increase in the number of Pacific RR's in the survey

Figure 24: FRA Track Class Distribution:

% of FRA Class 2 track was 38% in 1994 compared to 45% of track in 1993  
 % of FRA Class 3 track was 24% in 1994 compared to 20% of track in 1993  
 % of FRA Class 1 track was 18% in 1994 compared to 19% of track in 1993  
 % of FRA Excepted track was 12% in 1994 compared to 10% in 1993  
 % of FRA Class 4 track was 8% in 1994 compared to 6% in 1993

Figure 25: Ties Replaced per Mile of Track by RR Type:

Each type of RR showed an increase in ties replaced per mile. Regional RR's average increased by roughly 45 ties per mile.

*explanation of difference between 1993 and 1994:*

Due to the different railroad mix.

Figure 26: Short Line RR Bridge Inventory Distribution:

1993 and 1994 results were almost identical

Table 2: Inventory of Bridges:

The number of bridges reported increased in all regions except the south

Table 3: RR Grade Crossings by Type of RR:

The private crossings for Local/Line-Haul RRs was very different in 1994. 6,583 in 1994 compared to 18,351 in 1993

*explanation of difference between 1993 and 1994:*

There was an error in the 1993 data profile number - it should have been 4,915

Table 4: RR Grade Crossings by Region:

Generally a slight increase in the #'s reported  
 South private crossings = 14,707 in 1993; 1,271 in 1994

*explanation of difference between 1993 and 1994:*

There was an error in the 1993 data profile number - it should have been 1,271

## **Equipment**

Figure 27: RR Locomotive Power Distribution:

Used different horsepower ratings in 1994 than in 1993

Figure 28: RR Locomotive Age Distribution:

Very similar results in 1993 and 1994

Figure 30: RR Freight Cars Age Distribution:  
Similar results reported in 1993 and 1994

Figure 31: RR Car Type Distribution:  
A significantly higher percent of open hopper cars was reported in 1994  
12% in 1993, 25% in 1994

*explanation of difference between 1993 and 1994:*  
Due to the different railroad mix in 1994.

Figure 33: Regional RR Car Type Distribution:  
A significantly higher percent of open hoppers reported in 1994  
12% in 1993, 25% in 1994  
Boxcars & covered hoppers percent decreased by about 10% each in 1994

*explanation of difference between 1993 and 1994:*  
Due to several new railroads in the 1994 database.

Figure 34: Local-Line Haul RR Car Type Distribution:  
Open hoppers reported 9% of all car types in 1993 and 31% in 1994  
Boxcars had 55% of the total in 1993 compared with 42% in 1994

*explanation of difference between 1993 and 1994:*  
Due to several new railroads in 1994.

Figure 35: S & T RR Car Type Distribution:  
Boxcars reported 26% of all car types in 1993 and 39% in 1994  
Gondolas reported 35% in 1993 and 22% in 1994

## **Finances**

Figure 36: RR Expenses:  
Results were very similar to 1993

Figure 38: Projected Capital Investment - % allocated toward  
13% increase in Road's share of the projected capital investment  
9% decrease in Equipment's share of the projected capital investment

*explanation of difference between 1993 and 1994:*  
Due mainly to the improved response to this question.

Figure 39: Projected Capital Investment - Dollar amount allocated  
The total amounts reported were much higher in 1994

Figure 40: Percent Funded Internally  
Numbers were around 30% higher for road, equipment, and other

*explanation of difference between 1993 and 1994:*

Almost half the railroads responding to the Projected Capital Investment did not know or did not fill out the percent funded internally in 1994. Over 75% of the railroads responding to this question stated they funded 100% of their investments internally.

Figure 41: Operating Ratio by Type of RR  
S & T lower by about 7%  
Regional higher by about 2%  
Local/Line-Haul higher by about 2%

### **Operating Statistics:**

Figure 42: Train Miles by Region:  
West/SW went from 56% to 73% of train miles  
East, Pacific, & South all dropped in percent of total train miles.

*explanation of difference between 1993 and 1994:*

One railroad's response was higher than any other region's train miles total.

Figure 44: Average Length of Haul by Type of RR  
S & T increased from 12.9 to 15  
Local decreased from 56.9 to 32  
Regional decreased from 325.2 to 163

*explanation of difference between 1993 and 1994:*

There were several new railroads meeting the definition of regional railroad due to their financial status rather than the miles of track owned requirement. This helped drastically reduce the average length of haul for the regional railroads.

Figure 45: Average Length of Haul by Region:  
West/SW decreased by ~ 95 miles  
Pacific decreased by ~ 155 miles  
South decreased by ~ 35 miles  
East decreased by ~ 25 miles

*explanation of difference between 1993 and 1994:*

Due mainly to the different railroad mix in the 1994 database

Figure 46: Average Revenue Per Carload By Type of RR  
Regional dropped from \$577 to \$477

Local increased from \$221 to \$308  
S & T increased from \$100 to \$209

**Benefits:**

Figure 47: Percent of RRs Reporting Employee Benefit Plans  
All Percentages increased by > 20 %

Figure 48: Percent of RRs Reporting Employee Medical Plans  
All Percentages increased significantly

Figure 49: Percent of RRs Reporting Dental Plans  
All Percentages increased significantly

Figure 50: Percent of RRs Reporting Life Insurance Plans  
All Percentages increased significantly

Figure 51: Average Employer Contribution Percentage to Medical Plans  
All Percentages increased slightly

Figure 52: Average Employer Contribution Percentage to Dental Plans  
Slight increases in percentages were noticed

Figure 53: Average Employer Contribution Percentage to Life Insurance Plans  
Generally the same to slightly higher percentages





## APPENDIX D:

### Dentry 2.0 User's Guide Contents

<b>Chapter 1 - Getting Started</b>	<u>Page #</u>
Before You Begin .....	52
Installing Dentry .....	52
Installing 1994 Data .....	52
Starting Dentry .....	53
<b>Chapter 2 - Introduction</b>	
The Menu Bar .....	54
The Toolbar .....	54
<b>Chapter 3 - Filling Out Parts of the Survey</b>	
Movement .....	56
Main Page .....	56
Customer Profile .....	56
Road and Track Inventory .....	57
Structures .....	57
Intermodal and Transloading Facilities .....	57
Equipment Inventory .....	57
Annual Operating Statistics .....	57
Financial Data .....	57
Employee Benefit Data .....	57
Passenger Services .....	57
Computer Systems .....	57
Comments and Recommendations .....	58
<b>Chapter 4 - Printing</b> .....	59
<b>Chapter 5 - Returning the Completed Survey</b> .....	61
<b>Chapter 6 - Troubleshooting</b> .....	62

### Chapter 1 - Getting Started

This chapter explains how to install and start the Dentry on your system

### **Before You Begin**

Before installing Dentry, you must have an IBM compatible computer with a 486 or better processor, Microsoft Windows version 3.0 or higher, or Windows for Workgroups, a 3.5" floppy drive, a mouse, and a VGA or super VGA monitor. You will also need to have 3MB to 7MB of free disk space on your hard drive in order to install Dentry on your computer.

### **Installing Dentry**

1. To install Dentry, insert program disk #1 into the appropriate floppy drive. Please close all applications before you begin installing Dentry.
2. In the program manager, select file menu, and select run command from that menu.
3. In the run dialogue box type:
  - a:\setup  
( if the disk drive is A:)
  - b:\setup  
(if the disk drive is B )

WARNING: When the installation procedure prompts you for which directory to install the program to, DO NOT CHANGE IT FROM C:\DENTRY2!! The program will not work correctly if it is not installed in the c:\dentry2 directory.

### **Installing 1994 Data**

If you sent in a survey response for the 1994 data profile, you will receive a fourth disk in the mail. On this disk will be two files, slrd94.ldb and slrd94.mdb. Both of these files should be copied to c:\dentry2.

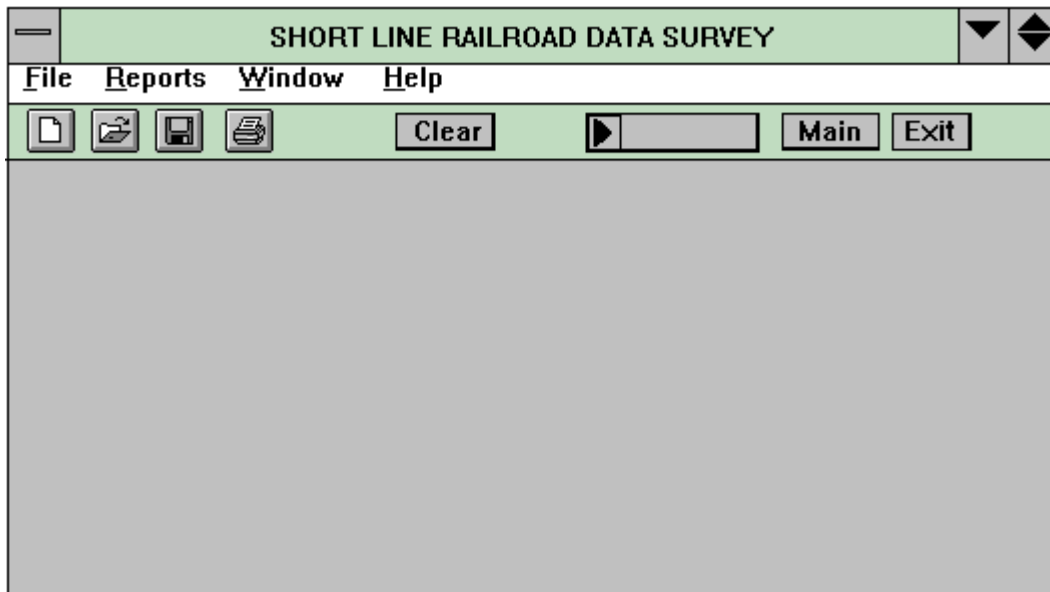
1. To install the 1994 data, insert the database disk into the appropriate floppy drive.
2. In the file manager, select file menu, and select copy command from that menu.
3. In the copy from dialogue box type:
  - a:\\*.\*  
( if the disk drive is A:)
  - b:\\*.\*  
(if the disk drive is B )
4. In the copy to dialogue box type:  
c:\dentry2\
  - 5. Then click on OK with the mouse.

Dentry will now allow you to view 1994 data. If you did not respond to the 1994 data survey, the 1994 data option in the program will not function.

**Starting Dentry**

Once the program is installed, a project group, 1995 Data Profile, is formed and an icon is created for the Dentry program. To run the program, place the mouse on this icon and double click the left mouse button. A startup form should appear in the center of your monitor. Press continue to enter the program or exit if you decide not to run the program.

## Chapter 2 - Introduction



(Dentry's Main Window)

- the Menu bar appears just below the title bar.
- the Tool bar appears just below the Menu bar.

### The Menu Bar

Each option in the Menu bar calls up a drop down menu of commands that you can use to create, modify, save, and print the database.

**File** This menu includes the commands to create a new record, open and close an existing one, save a record, and save the record to a different drive. The exit command exits the Dentry program. These commands can be enabled either using a mouse click or a keyboard stroke. The keyboard strokes are activated with a ALT and the underlined letter in the file menu.

**Reports** The report menu allows you to print the entire survey or just a section of the survey.

**About** Displays information about your copy of Dentry, including the version number and the copyright.

### The Toolbar

Command buttons exist on the toolbar for some of the more commonly used functions of Dentry. Each command button displays a graphic that visually describes the command. You activate the toolbar

commands by clicking the appropriate button one time with the left mouse button. After running the program, you will notice that certain commands are not always available. When they are not available to the user, they will either be invisible or they will have a dimmed appearance and will not function when pressed.

The buttons on the button bar perform the following functions:



**New Record:**

A new, blank record is created by a click on this button. A new record must be created for each railroad you are filling a survey out for.



**Open Existing Record:**

Clicking on this button opens an existing record. A dialogue box will appear showing the list of existing records you can choose from to edit. You can select a particular record by double clicking on the corresponding railroad name in the list.

view or



**Save:**

Saves changes made to the current record onto the database in the c:\dentry2 directory.



**Print:**

To print a hard copy of the survey or parts of the survey, click on this button. When clicked, a dialogue box prompts the user to select a survey. Then you can choose whether you want to print a specific section of the survey or print the entire survey by clicking on the corresponding button. To exit from print, click on the exit button at the bottom.



**Clear:**

Clears the fields in the current form.



**Scrollbar:**

Allows the user to scroll through the various pages of the survey - the quickest way to move through the survey.



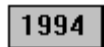
**Main:**

Brings you back to the main survey page.



**Exit:**

Exits the Dentry program.



**1994 Button:**

Displays the 1994 data, if available. When the 1994 data is displayed, the background style is changed and the values in the text are dimmed and are inaccessible. To turn to the 1995 survey click the 1995 button,

### Chapter 3 - Filling Out Parts of the Survey

Please fill out the survey as accurately as possible. If you leave a question blank, it is assumed that information is not available. If your response is 0, please fill in the corresponding text box with a 0. At any stage you can clear all the fields of the current form using the clear button. No changes to the survey are permanent until the save button or the save menu command are used.

### **Moving Around the Survey**

There are several ways you can move between the fields and pages of Dentry. After you enter data in one field, you can use the Tab key or the Enter key to continue to the next field. If you want to go to a previous field, hold the shift button down while pressing the tab button. To go to the next survey page, click the left mouse button while the pointer is over the right arrow of the scrollbar. To go to the previous survey page, click the left mouse button while the pointer is over the left arrow of the scrollbar. To move more than one page at a time, click and hold the left mouse button on the slider box between the arrows and slide it either left or right.

### **Main Page**

The main page contains general information about the railroad and the connections to the various pages or various parts of Dentry.

Railroad Name:	Enter the Railroad name (enter Alphanumeric Characters).
Name of the Principal Owner:	Enter the name of the principal owner (Enter Alpha numeric characters).
Survey Contact Person:	Person to be contacted regarding survey.
Year Established as a short Line:	Enter any years between 1850 - 1996 ( when your railroad became classified as a short-line railroad) or enter a 0 if unknown.
Railroad Type:	Enter Railroad type (Select from a list of types).
Railroad Region:	Enter Region of Railroad Operation (Select from a list of regions).

To continue after filling out the entire main page, either choose from one of the bottom option boxes, or use the scroll bar to move among the pages.

### **Customer Profile**

All the fields accept positive numeric integers.

**Road and Track Inventory**

Provide information on the amount of road & track owned and operated by state.  
Any two letter state abbreviation is accepted in the state fields and illegal entries are not accepted. In all the other fields the numeric values entered are rounded off to two decimal places.

**Structures**

Provide information pertaining to track and structures  
All the fields accept integer values.

**Intermodal Transloading Facilities**

Provide information on the number and types of intermodal and transloading facilities  
All the fields accept integer values.

**Equipment Inventory**

Provide information on train equipment owned or leased  
All the fields accept integer values.

**Annual Operating Statistics**

Provide information on different types of commodities shipped  
All fields in the Annual Operating Statistics section are rounded off to the nearest integer value.

**Financial Data**

Provide auxiliary, base, and future financial information  
All fields in the Financial Data section accept real values.

**Employee Benefit Data**

Provide information about employees, annual compensation paid, benefit plans, pension plans, insurance plans, etc.

**Passenger Services**

Provide information about the kind of passenger services provides over your track and check in appropriate boxes.

**Computer Systems**

Provide information on the various computer systems and applications utilized  
Check in the appropriate boxes to provide information about the computers, and the computer related information that are used by your railroad,

**Comments and Recommendations**

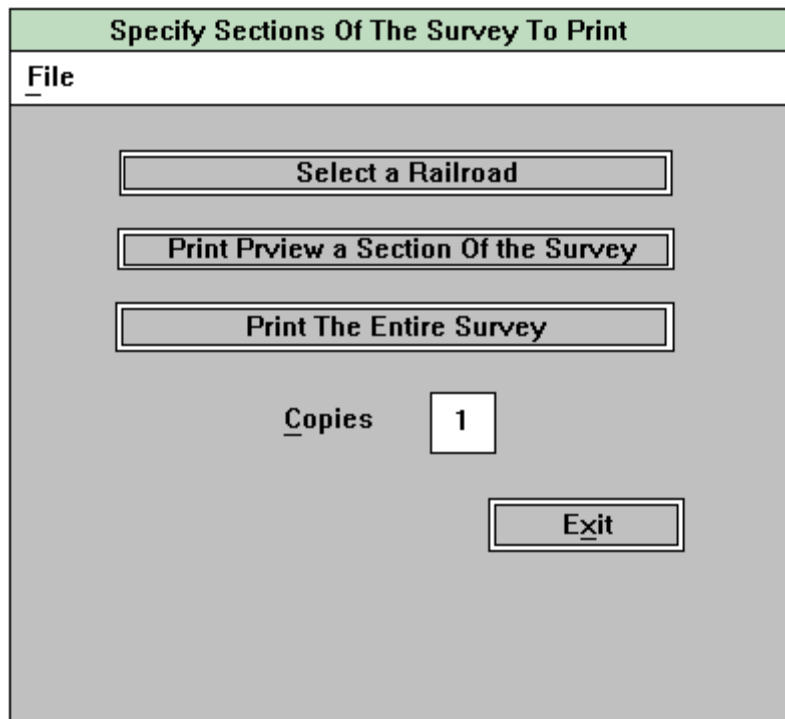
Provide any comments or suggestions about the survey or program, if you have any.





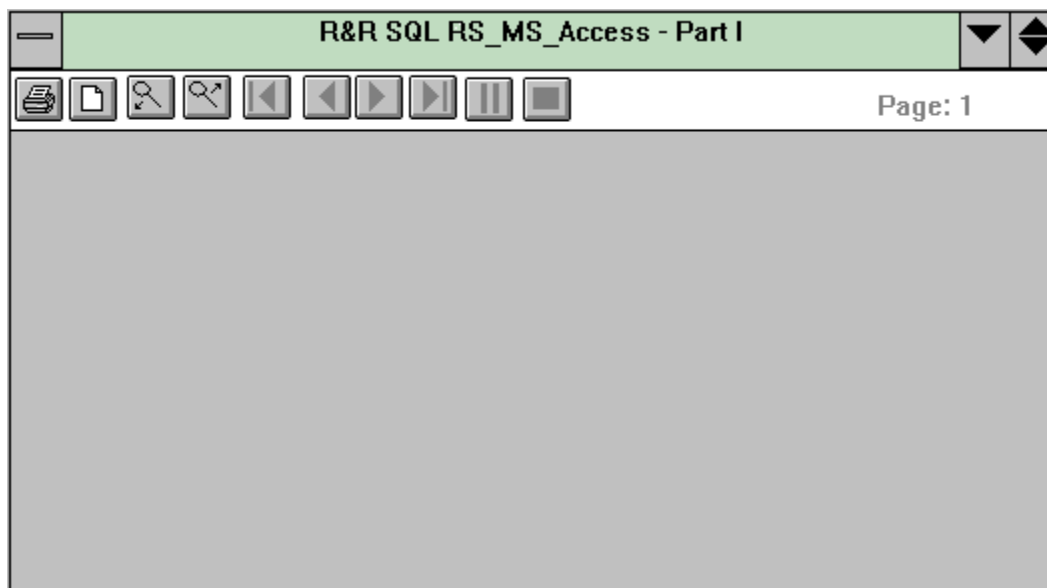
### Chapter 4 - Printing

To print the survey, click on the print button on the toolbar, or click Report, then Print from the file menu. Click on the Select Railroad button. A list of the different railroad records you can print will appear on a new form. Double-click on a railroad to print that railroad's survey. Two more command buttons should appear, Print Preview a Section of the Survey, and Print the Entire Survey. This form is shown in figure A.



The image shows a dialog box titled "Specify Sections Of The Survey To Print". The title bar is green. Below the title bar is a white menu bar with the text "File". The main area of the dialog box is gray and contains three buttons stacked vertically: "Select a Railroad", "Print Prview a Section Of the Survey", and "Print The Entire Survey". Below these buttons is a label "Copies" followed by a small white box containing the number "1". At the bottom right of the dialog box is an "Exit" button.

Figure A. print Window



*Figure B. Print Preview window*

If you click on Print Preview a Section of the Survey, a list of the various parts of the survey will appear in a combo box. To print preview one of the sections, click a section you would like to see from the list, then click OK. A print preview window should appear, similar to the form shown in figure B, with the information requested. To print the section being previewed, click the printer icon on the upper left of the toolbar. To close the print preview, click the square black button on the right side of the toolbar.

If you click on Print the Entire Survey, the entire survey will be printed to your default windows printer. A gauge will appear at the bottom of the form showing what percent of the survey has completed printing. Printing the entire survey can be very slow if printing to a network printer. During testing, we found that printing each section individually from the print preview window went much faster than using the Print the Entire Survey command on networked printers. If your printer is hooked directly to your computer, there should be no problem using the Print the Entire Survey option.

**Chapter 5 - Returning the Completed Survey**

When the entire survey has been completed, and saved, place a blank floppy disk in either drive a: or drive b:. While in the program, go to the file menu and click on SaveAs. Then click the drive letter corresponding to the drive containing the blank floppy drive. Seal the disk in the envelope supplied, and promptly return it by mail with the appropriate postage. Your participation is greatly appreciated.

## Chapter 6 - Troubleshooting

1. When you click on the 1994 data, if the data is either not in the correct directory or its not installed, a dialogue box appears prompting the user to copy the 1994 data into the C:\Dentry2\ directory. Copy the 1994 data into C:\Dentry2\ and try clicking on 1994 again.
2. If the program doesn't run at all, or quits after you press Continue from the startup form, you may want to check to make sure the program was installed in the c:\Dentry2\ directory. If it wasn't, you will have to reinstall the program, and make sure to install it to the c:\Dentry2\ directory.

If you have any further questions, please feel free to call Trent Byberg at:

(701) 231-1075

or Doug Benson at:

(701) 231-8388

between 7:30 A.M. and 4:00 P.M. Central Standard Time

or send e-mail to Trent at:

byberg@badlands.nodak.edu

to Doug at:

dbenson@plains.nodak.edu

**Appendix E:**  
**1994**  
**Annual Data Profile**  
**of the**  
**American Short Line**  
**& Regional Railroad Industry**

Developed by the  
American Short Line Railroad Association  
and the  
Upper Great Plains Transportation Institute

**Appendix F:**

**Short Line Railroad Association Central Database Technical  
Specifications**