Memorandum

U.S. Department of Transportation
Office of the Secretary of Transportation
Office of Inspector General

Subject: ACTION: Report on Review of Slow Orders and Track Reclassification
Federal Railroad Administration
MH-2004-007

Date: December 10, 2003

From: Alexis M. Stefani
Principal Assistant Inspector General
for Auditing and Evaluation

Reply to Attn. of: JA-40

To: Federal Railroad Administrator

This report presents the results of our review of slow orders and track reclassification, as discussed in our meeting with you on September 12, 2003. Slow orders are temporary speed restrictions used when work activities or track conditions restrict the safe movement of trains at regular designated speeds. Track reclassification involves a permanent change in the speed allowed over a section of track.

Our objective was to evaluate the Federal Railroad Administration's (FRA) oversight of the use of slow orders and track reclassification and the effects of their use on railroad track safety and service schedules. In addition, we sought to determine whether slow orders were used to defer maintenance, crossties and rail were replaced at an adequate rate, and delays were increasing due to reductions in track investment.

BACKGROUND

Slow orders to lower the speed limit for trains are required when tracks do not meet FRA standards for the designated speeds, are weakened due to construction or maintenance work, or are damaged by accidents. In addition, slow orders may be imposed when adverse weather conditions are present. Slow orders are only temporary, but no industry-wide definition exists for the term "temporary." Because slow orders may be imposed for varying durations of time (hours, days, weeks), a simple count may be misleading when analyzing slow orders. Other considerations include the length of track involved and the reason for the slow orders. For example, slow orders may be imposed not only when track conditions have worsened, but also during repair work and after track rehabilitation has been completed, to allow the roadbed to settle.

The roadbed provides the foundation for the railroads' rails and crossties. Improper use of ballast—material, usually crushed stone gravel, placed on the roadbed to anchor the track—could allow the rails to shift position, resulting in derailment.

Track may be reclassified to a different speed limit if economic and engineering conditions permanently change. Permanent track speed is based on factors such as customer service requirements, total system schedules, the ability of rail yards to receive and process trains, the terrain that the track traverses, local government requirements, the train control system, and track construction.

RESULTS

FRA has no recordkeeping and reporting requirements governing slow orders, and neither FRA nor two of the three railroads we visited maintain detailed historical records of slow orders. CSX Transportation (CSXT) maintained detailed slow order data, Norfolk Southern (NS) could not provide data on all operating divisions, and Amtrak did not maintain a historical database of its slow orders. The differences in the availability of data on slow orders and the lack of data comparability between the railroads made a detailed analysis difficult. Therefore, we focused our review on analyzing investment data covering the last 20 years for the four largest Class I railroads[1]: CSXT, NS, Burlington Northern Santa Fe (BNSF), and Union Pacific (UP). Exhibit A describes our audit methodology.

From the data available to us, we could not determine whether slow orders had an impact on railroad track safety or were the source of increasing train delays and on-time performance problems, particularly for Amtrak passenger trains. However, slow order data for CSXT, which was the most complete for the three railroads we visited, indicated that 91 percent of the 16,150 slow orders issued in 2002 that were related to track defects were removed within 30 days. Given the growing congestion on the entire freight railroad network, the more likely explanation for poor on-time performance may be the difference in corporate priorities between freight carriers and Amtrak and the inability of Amtrak's incentive payments to promote better on-time performance. However, without

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[1]Class I railroads are the largest railroads, having annual carrier operating revenue of more than $250 million.

sufficient slow order data, FRA cannot determine whether the use of slow orders has a bearing on rail service and congestion or seek the appropriate accommodations from the railroads, including Amtrak.

In general, we found overall levels of roadway investment by Class I freight railroads have increased steadily since 1980 (see Exhibit B). We also found the rate of crosstie and rail replacements for the four major Class I railroads we reviewed to be consistent with FRA's safety standards. However, we identified certain situations that FRA should monitor. For example, the long-term rate of CSXT ballast replacement was significantly lower than that of the other three Class I freight railroads in our review, which could impact track stability, and over time, track quality. In addition, while the 20-year trend does not indicate a problem, replacement of crossties and rail by some railroads has declined in recent years and should be monitored.

Maintenance Practices

The reclassification of railroad track to permanently change its speed limit is primarily an economic decision and used very infrequently, according to the senior railroad officials we interviewed. Slow orders to reduce the speed of trains to the current condition of the track, however, are used extensively as a necessary, but temporary, tool for ensuring railroad track safety.

When conducting inspections, FRA informs the railroads of any safety defects (instances of noncompliance with the standards) that require slow orders. In those cases where voluntary compliance has not been undertaken by the railroad, FRA inspectors may issue a special notice for repairs to slow down train speeds until repairs are completed. In Fiscal Year (FY) 2002, FRA issued only two special notices for repairs.

For CSXT─the only railroad with detailed slow order information─16,150 or 53 percent of the slow orders issued in 2002 were related to track defects and 12,658 or 42 percent were related to maintenance. In addition, 14,666 or 91 percent of the slow orders related to track defects and 12,388 or 98 percent of those related to maintenance were removed within 30 days, indicating that track maintenance was not being deferred.

Railroad Investment in Roadway

Our analysis of data covering the last 20 years disclosed that Class I freight railroads have consistently increased their total investments in roadway even though the amounts invested by individual railroads may have fluctuated (see Exhibit B-1). We considered an annual replacement rate of 63 crossties per mile to be adequate, based on the Code of Federal Regulations (CFR) criteria for track safety standards. In addition, we evaluated the adequacy of rail replacement based on an industry estimate of a 60-year useful life. We assessed ballast replacement based on comparative rates used by the Class I railroads we reviewed, because no industry standard exists for ballast replacement. In analyzing these railroads' annual R-1 reports,[2] we found with few exceptions, crossties, rails, and ballast were replaced at adequate rates from 1983 through 2002. (See Exhibits C, D, and E.) For example, in 2001 and 2002, CSXT reduced its capital expenditures, but maintained a high level of crosstie replacement at 91 and 86 crossties per mile, respectively.

The one exception that raised concern was the rate of CSXT ballast replacement, which was significantly below that of the other three Class I freight railroads reviewed. We are concerned the magnitude of this difference could affect track quality, particularly since 1998 FRA safety audits have repeatedly identified systemwide deficiencies in the condition of CSXT's ballast. These deficiencies, together with other serious track conditions, led to FRA's 1-year compliance agreement with CSXT in 2000, and a similar follow-up agreement in 2001.

Furthermore, from January through July 2002 two major Amtrak derailments occurred on CSXT trackage. FRA conducted a "focused inspection" in August 2002 of all CSXT track supporting passenger service, targeting CSXT's compliance with its own ballast standards as a major element of those inspections. Of the 4,770 CSXT route miles covered, FRA found that 511 track miles were not in compliance.[3] FRA should work with CSXT to determine whether CSXT ballast practices represent a safety issue and, if so, resolve them and prevent their recurrence.

We also noted two additional exceptions of potential concern. While our analysis of the last 20 years of data from the Class I freight railroads showed no indication of inadequate crosstie or rail replacement in general, the annual rate of replacement of crossties and rail by some railroads in recent years has declined. FRA should review the R-1 reports to monitor these trends and ensure adequate levels of roadway investments are maintained. Slow order data would also be useful for targeting individual railroads for FRA safety inspections.

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[2] Class I Railroad Annual Reports to the Surface Transportation Board (R-1 Reports).

[3] A route mile is the distance between terminals or stations and a track mile is the length of single track between two points. One route mile of double track, therefore, equals two track miles; one route mile of triple track equals three track miles; and so forth.

<u>Passenger Service Delays From Slow Orders, Scheduling, and Congestion</u>

Of great concern to passenger service is schedule adherence and the potential that a growth in slow orders could lead to schedule delays. (See Exhibit F for a description of Amtrak delays on CSXT, NS, BNSF, and UP track.) Amtrak's train delays due to slow orders, however, are only a part of its overall delays. More important are larger underlying issues involving conflicting corporate priorities between freight and passenger operations and the growth of congestion on the existing rail network.

Corporate Priorities. Amtrak conducts 70 percent of its operations over tracks owned by freight railroads. The corporate priorities of these host railroads are focused on providing low-cost freight service to their shippers, while Amtrak gives top priority to fast, on-time service for its passengers. Although the legislation that created Amtrak granted it preference over freight traffic regarding track use, these corporate priorities, nevertheless, often clash because of the differing attributes of efficient passenger and freight operations.

Amtrak tries to avoid schedule delays by offering incentive payments to its host railroads for providing on-time performance for its trains. Amtrak is at a distinct disadvantage, however, because it has had insufficient funds to offer incentives that would make it lucrative for freight railroads to provide the level of service it needs. None of the host railroads we reviewed took full advantage of the available incentives. For example, in FY 2002, one railroad we reviewed received only $484,000 in incentive payments from Amtrak for on-time performance and passed on the opportunity to earn an additional $23 million. Another large railroad we reviewed had also passed up nearly $14 million in incentive payments, and was penalized about $100,000 for delays that resulted in Amtrak meeting on-time performance less than 70 percent of the time.

If it made financial sense for the railroads, they would provide the service to capture these payments. However, according to management at the railroads we interviewed, the scheduling Amtrak requires does not fit their freight transportation operations, and the costs that would be incurred for such scheduling exceed the amount of the incentives.

Increasing Traffic Congestion. Despite the railroads' investments, certain parts of the railroad system have become severely congested and cannot accommodate the conflicting demands of both increasing freight movement and increasing commuter and intercity passenger rail traffic. Railroad traffic has increased 64 percent since 1980, and the U.S. Department of Transportation forecasts predict rail tonnage will increase well over 50 percent between 2003 and 2020.

Magnifying the congestion from traffic growth are numerous "choke points," which are bottleneck points in the overall rail network that adversely constrain the effective use of the rest of the railroad system. Choke points include antiquated and undersized bridges and tunnels, stretches of mainline track with inadequate vertical clearances for double-stack container traffic, inadequate connections between rail lines, and outmoded information and control systems. A 2002 Mid-Atlantic Rail Operations Study sponsored by Amtrak, CSXT, NS, and five state departments of transportation found a lack of capacity on critical segments of freight and passenger lines that must be rectified to reduce or eliminate operating conflicts between passenger and freight trains.

Slow Order Data. The limited availability of and inconsistencies in existing data on slow orders do not allow a determination to be made on the impacts that slow orders may be having on rail service or traffic congestion. Without such data, FRA will not be able to resolve current and future concerns about the use of slow orders, or pursue the appropriate accommodations from the freight railroads and Amtrak.

RECOMMENDATIONS

We recommend that the Federal Railroad Administrator:

1. Review CSXT ballast replacement practices, and follow-up on ballast deficiencies noted during previous FRA safety audits and inspections.

2. Monitor railroad R-1 reports on a continuous basis to identify potential problems in roadway investment, such as ballast, and use the information to target safety inspections on individual railroads.

AGENCY COMMENTS AND OFFICE OF INSPECTOR GENERAL RESPONSE

On December 9, 2003 FRA provided verbal comments on our report. The FRA Administrator stated that FRA was in agreement with our recommendations, which reflect sound business practices.

FRA's proposed actions address the intent of our recommendations. FRA has begun efforts to review CSXT ballast practices and monitor railroad R-1 reports to identify potential problems in roadway investment.

ACTION REQUIRED

In accordance with Department of Transportation Order 8000.1C, we request that within 30 days you provide milestones for completing intended actions for both recommendations.

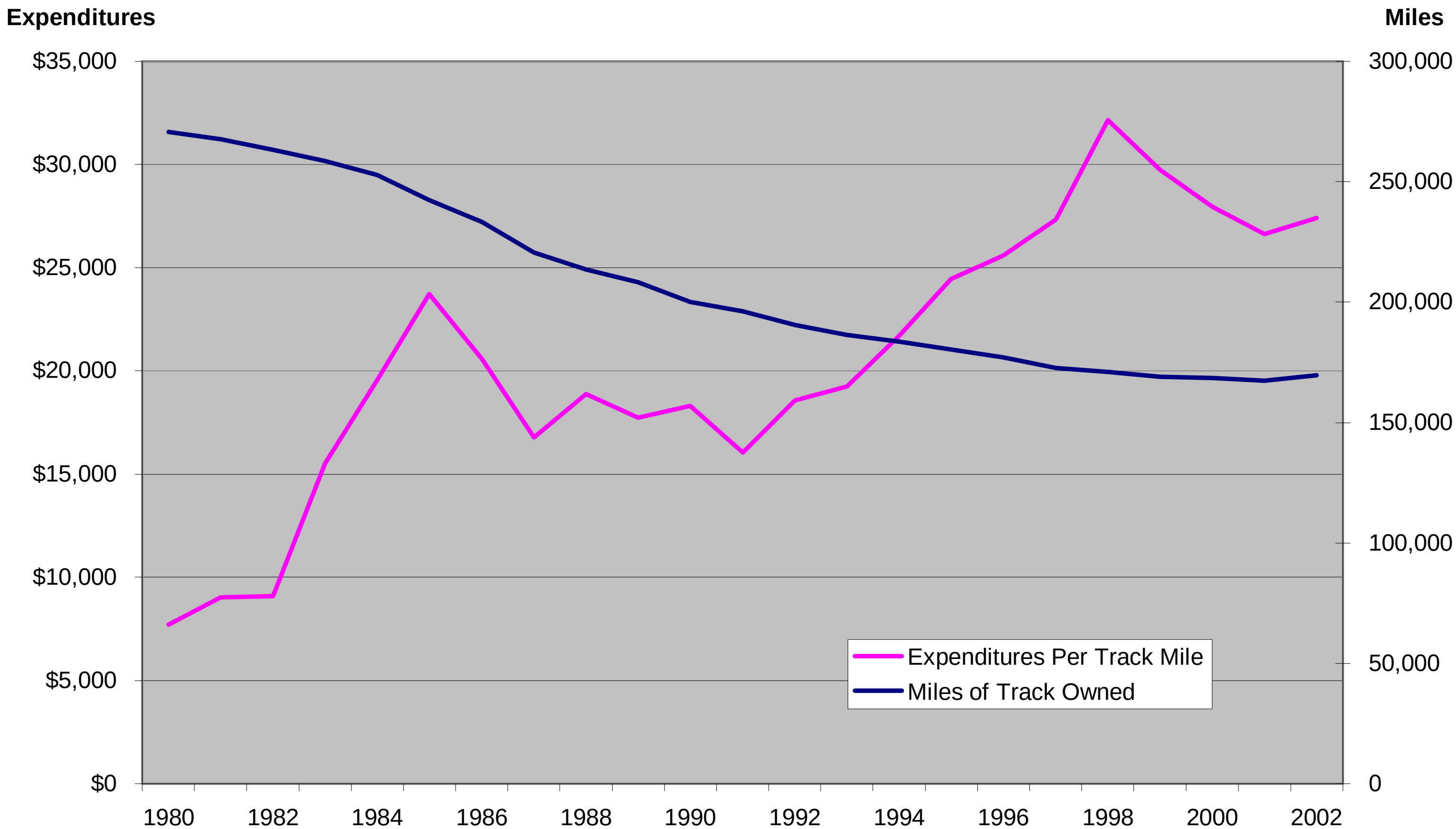
We appreciate the courtesies and cooperation extended by your staff. If you have any questions concerning this report, please call me at (202) 366-1992, or Debra S. Ritt, Assistant Inspector General for Surface and Maritime Programs, at (202) 493-0331.

EXHIBIT A. AUDIT METHODOLOGY

To determine the railroads' use of slow orders and track reclassification, we reviewed slow order and track reclassification policies and procedures, documents, and R-1 reports from 1983 to 2002, at FRA and three judgmentally selected railroads: CSXT, NS, and Amtrak. CSXT and NS are respectively, the largest, and second largest, freight railroads in the Eastern United States. Amtrak, the sole intercity U.S. passenger rail carrier in the continental United States, owns only about 730 miles of track, primarily between Boston and Washington, D.C., and operates more of its trains over CSXT track than that of any other host railroad.

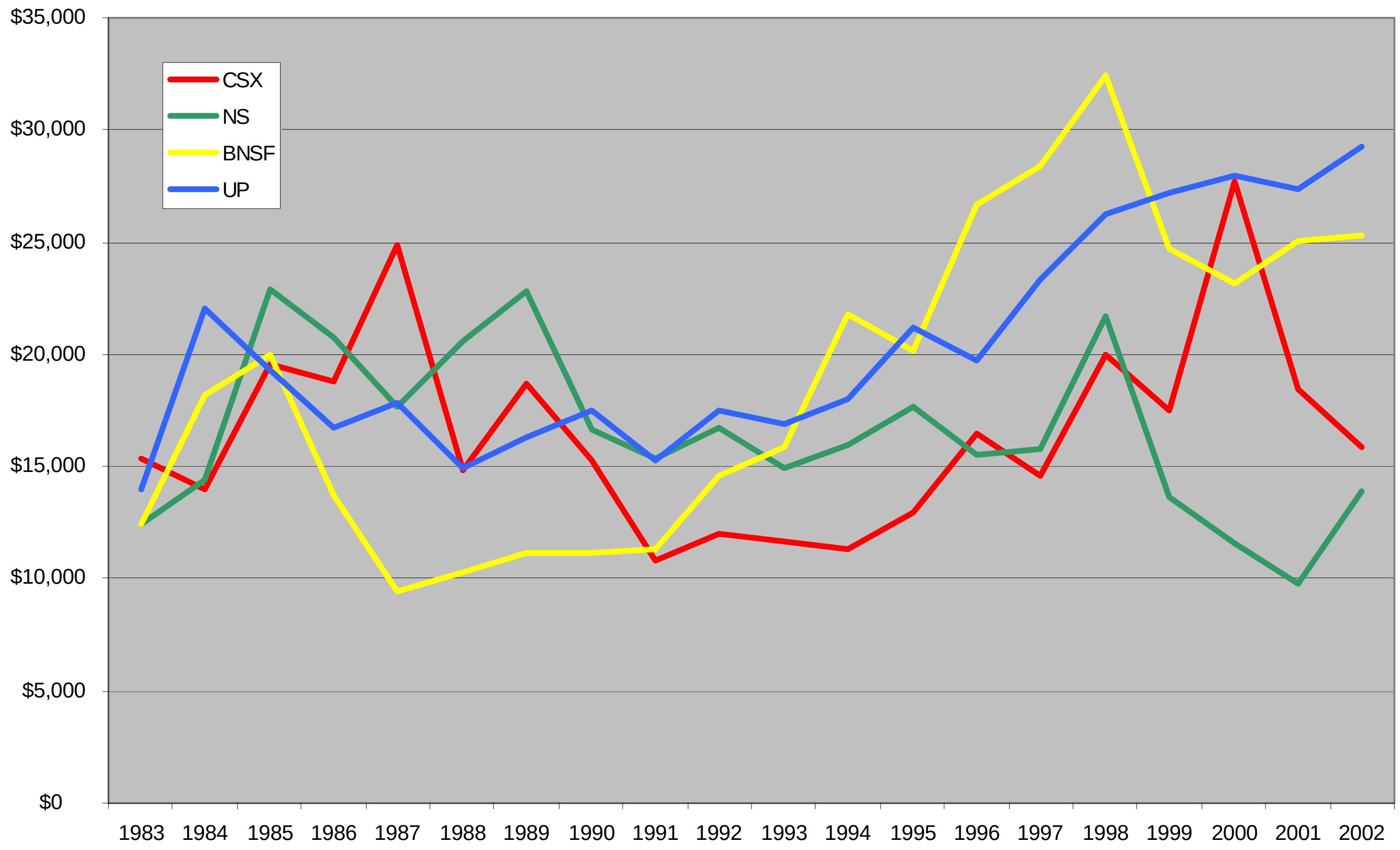
We interviewed officials at FRA, the three railroads above, the Association of American Railroads, the STB, and the NTSB. In addition, we analyzed investments made by the four largest Class I railroads─CSXT, NS, BNSF and UP─between 1983 and 2002 in crossties, rail, and ballast replacement. FRA has no Government Performance and Results Act measurements relating to slow orders or track reclassification. We performed our review in accordance with Government Auditing Standards prescribed by the Comptroller General of the United States.

EXHIBIT B. CLASS I EXPENDITURES PER TRACK MILE ON ROADWAY COMPARED TO MILES OF TRACK OWNED (2002 $)



Source: Railroad Facts by AAR

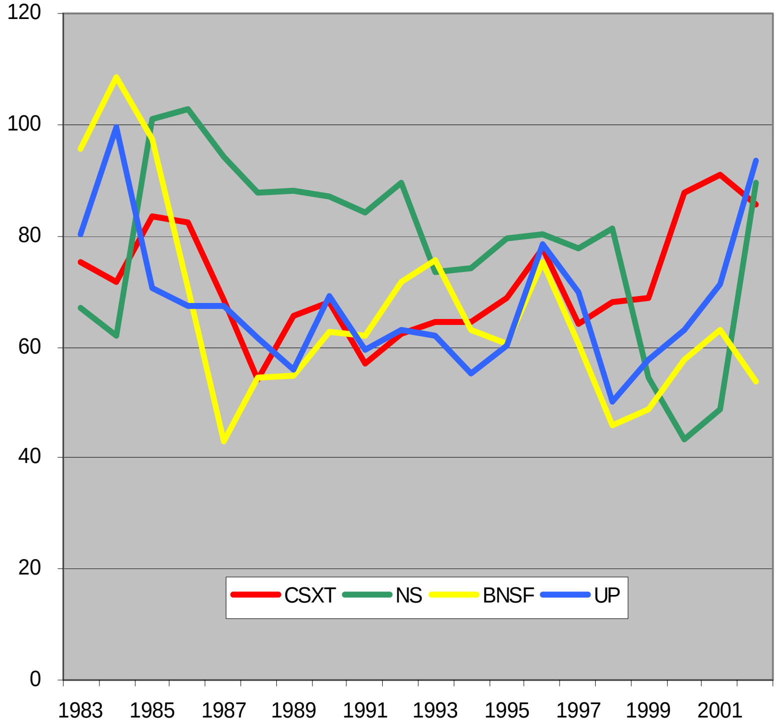
EXHIBIT B-1. EXPENDITURES PER TRACK MILE ON ROADWAY*
(CSXT, NS, BNSF, UP)
(2002 $)



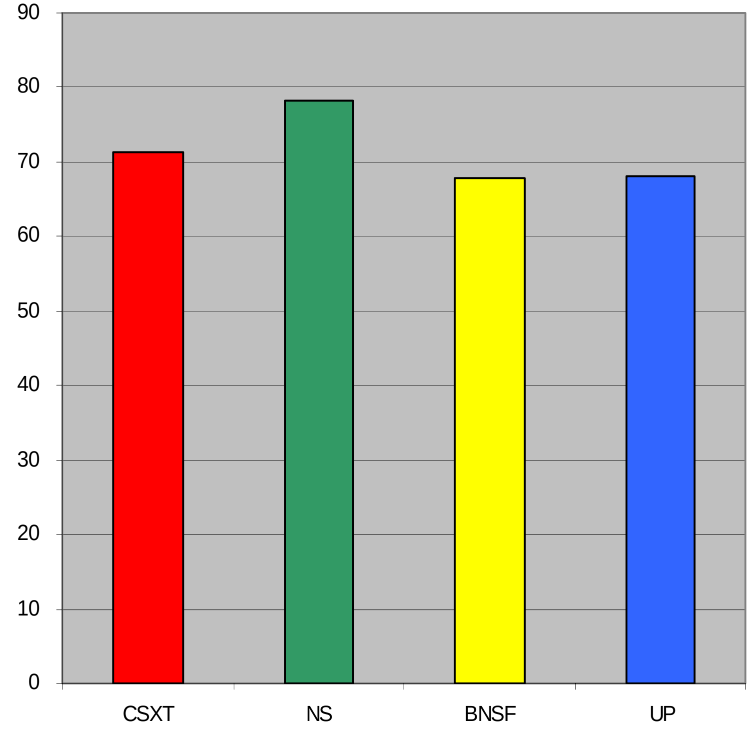
*Includes - Bridges, Trestles, and Culverts; Crossties; Rail and Other Track Material; Ballast; Signals and Interlockings
Source: R-1 Reports to STB

EXHIBIT C. CROSSTIES REPLACED (CSXT, NS, BNSF, UP)

Crossties Replaced Per Track Mile (1983 - 2002)

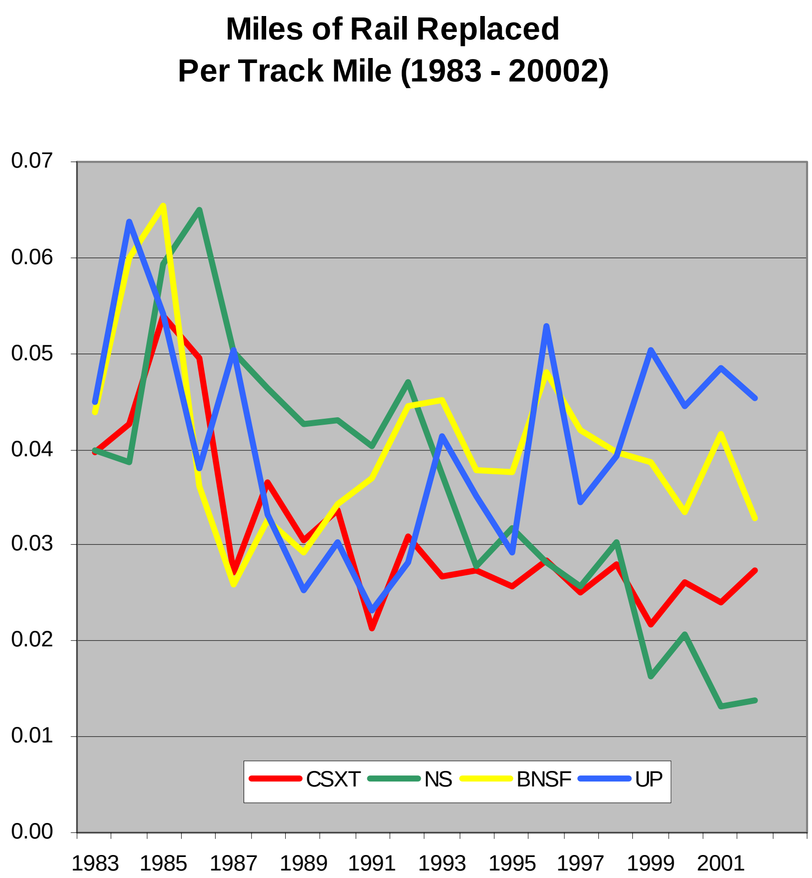


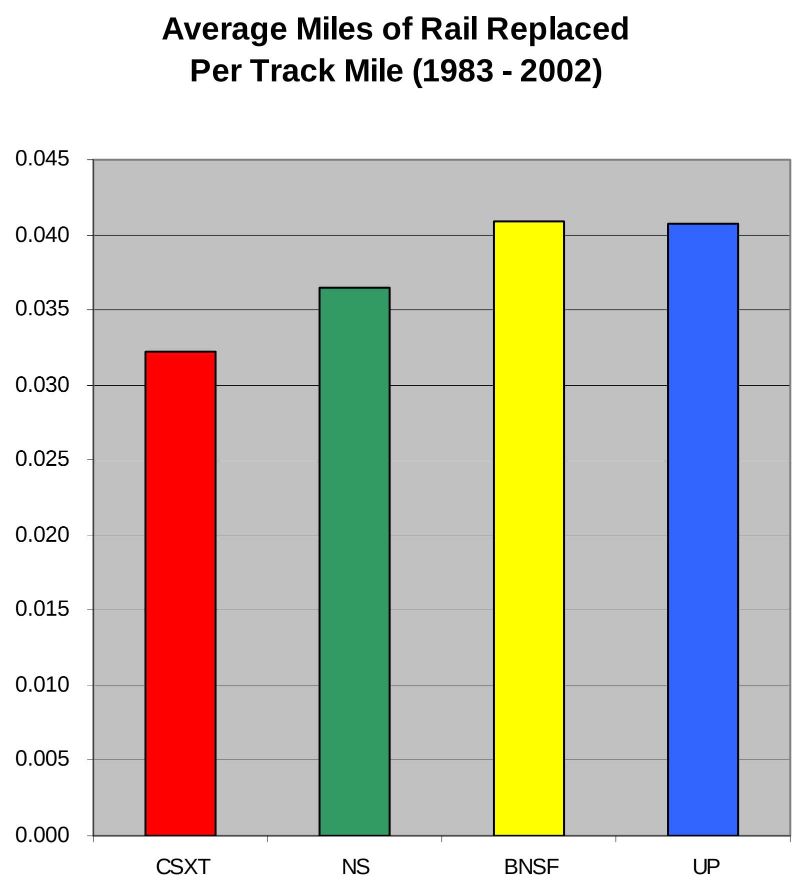
Average Annual Crossties Replaced Per Track Mile (1983 - 2002)



Source: R-1 Reports to STB

EXHIBIT D. RAIL REPLACED
(CSXT, NS, BNSF, UP)

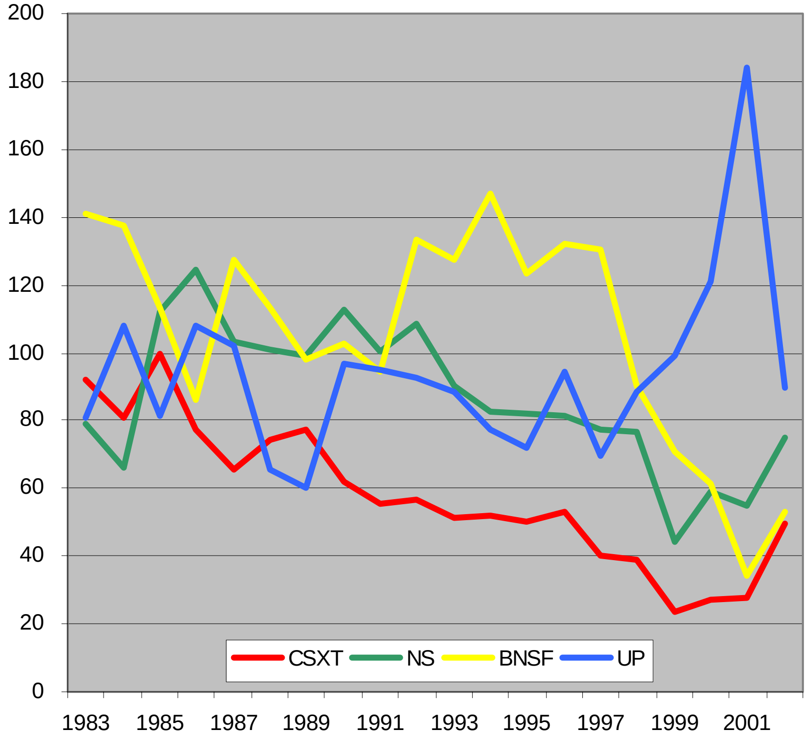




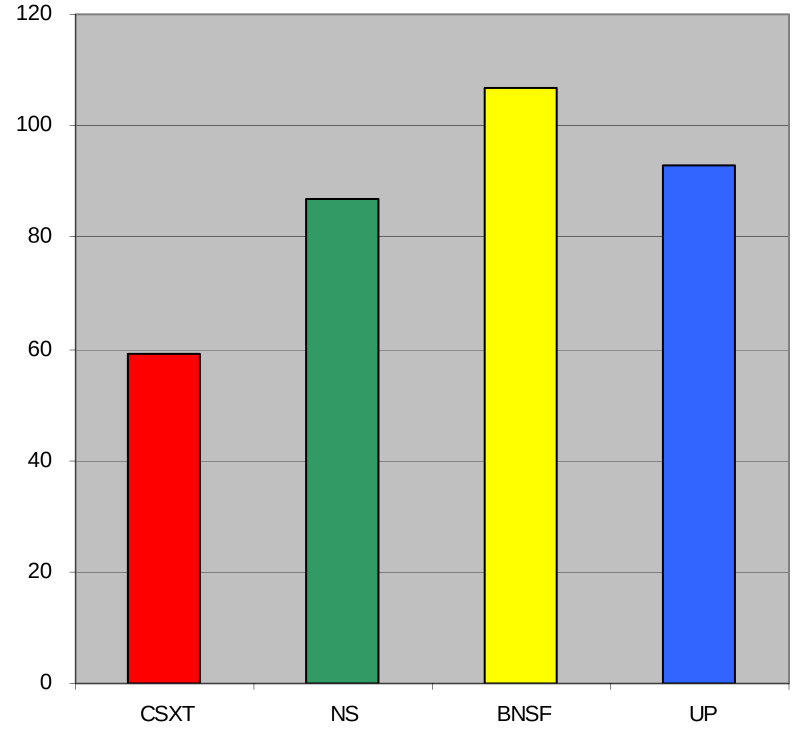
Source: R-1 Reports to STB

EXHIBIT E. BALLAST REPLACED
(CSXT, NS, BNSF, UP)

Cubic Yards of Ballast Replaced Per Track Mile (1983 - 2002)



Average Annual Cubic Yards of Ballast Replaced Per Track Mile (1983 - 2002)



Source: R-1 Reports to STB

EXHIBIT F. AMTRAK DELAYS ON THE FOUR LARGEST CLASS I RAILROADS IN FY 2002

Railroad	Total Minutes of Delay	Percent of Delay	Total Train Miles	Percent of Train Miles	Rate*
CSXT	1,058,766	29.9%	6,746,841	31.5%	1,569
NS	486,537	13.7%	2,994,620	14.0%	1,625
BNSF	686,069	19.4%	6,409,527	30.0%	1,070
UP	1,313,249	37.0%	5,238,804	24.5%	2,507
Total	3,544,621		21,389,792		1,657

*Rate = Minutes of delay per 10,000 train miles.

Source: Amtrak

EXHIBIT G. MAJOR CONTRIBUTORS TO THIS REPORT

THE FOLLOWING INDIVIDUALS CONTRIBUTED TO THIS REPORT.

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The following pages contain textual versions of the graphs and charts found in this document. These pages were not in the original document but have been added here to assist screenreaders.

EXHIBIT B. CLASS I EXPENDITURES PER TRACK MILE ON ROADWAY COMPARED TO MILES OF TRACK OWNED (2002 $)

Year	Miles of Track Owned	Expenditures Per Track Mile
1980	270,623	$ 7,689
1981	267,589	$ 9,039
1982	263,330	$ 9,093
1983	258,703	$ 15,518
1984	252,748	$ 19,557
1985	242,320	$ 23,719
1986	233,205	$ 20,567
1987	220,518	$ 16,793
1988	213,669	$ 18,867
1989	208,322	$ 17,725
1990	200,074	$ 18,306
1991	196,081	$ 16,040
1992	190,591	$ 18,572
1993	186,288	$ 19,259
1994	183,685	$ 21,690
1995	180,419	$ 24,453
1996	176,978	$ 25,599
1997	172,564	$ 27,319
1998	171,098	$ 32,142
1999	168,979	$ 29,746
2000	168,535	$ 27,959
2001	167,275	$ 26,624
2002	169,554	$ 27,398

Source: Railroad Facts by AAR

EXHIBIT B-1. EXPENDITURES PER TRACK MILE ON ROADWAY*
(CSXT, NS, BNSF, UP)
(2002 $)

Railroad	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
CSX	$ 15,338	$ 13,990	$ 19,570	$ 18,804	$ 24,858	$ 14,803	$ 18,678	$ 15,249	$ 10,771	$ 12,014	$ 11,651
NS	$ 12,398	$ 14,385	$ 22,897	$ 20,721	$ 17,671	$ 20,553	$ 22,784	$ 16,601	$ 15,372	$ 16,710	$ 14,923
BNSF	$ 12,481	$ 18,189	$ 19,973	$ 13,708	$ 9,475	$ 10,320	$ 11,168	$ 11,160	$ 11,288	$ 14,556	$ 15,896
UP	$ 14,017	$ 22,052	$ 19,266	$ 16,765	$ 17,806	$ 14,938	$ 16,282	$ 17,514	$ 15,266	$ 17,496	$ 16,914

*Includes - Bridges, Tresles, and Culverts; Crossties; Rail and Other Track Material; Ballast; Signals and Interlockings

Source: R-1 Reports to STB

Railroad	1994	1995	1996	1997	1998	1999	2000	2001	2002
CSX	$ 11,338	$ 12,938	$ 16,470	$ 14,592	$ 19,982	$ 17,499	$ 27,735	$ 18,458	$ 15,845
NS	$ 15,978	$ 17,668	$ 15,494	$ 15,803	$ 21,691	$ 13,674	$ 11,549	$ 9,787	$ 13,872
BNSF	$ 21,783	$ 20,150	$ 26,685	$ 28,431	$ 32,403	$ 24,734	$ 23,176	$ 25,022	$ 25,340
UP	$ 17,988	$ 21,202	$ 19,713	$ 23,312	$ 26,233	$ 27,183	$ 28,006	$ 27,388	$ 29,258

EXHIBIT C. CROSSTIES REPLACED
(CSXT, NS, BNSF, UP)

Crossties Replaced Per Track Mile (1983 - 2002)

Railroad	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
CSX	75	72	83	82	68	54	65	68	57	62	64
NS	67	62	101	103	94	88	88	87	84	90	73
BNSF	96	108	98	71	43	54	55	63	62	72	75
UP	80	99	71	67	67	62	56	69	59	63	62

Average Annual Crossties Replaced Per Track Mile (1983 - 2002)

Railroad	Average
CSX	71
NS	78
BNSF	68
UP	68

Source: R-1 Reports to STB

Railroad	1994	1995	1996	1997	1998	1999	2000	2001	2002
CSX	64	69	78	64	68	69	88	91	86
NS	74	80	80	78	81	54	43	49	89
BNSF	63	61	75	60	46	49	58	63	54
UP	55	60	79	70	50	58	63	71	94

EXHIBIT D. RAIL REPLACED
(CSXT, NS, BNSF, UP)

Miles of Rail Replaced Per Track Mile (1983 - 2002)

Railroad	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
CSX	0.040	0.043	0.054	0.049	0.027	0.037	0.031	0.034	0.021	0.031	0.027
NS	0.040	0.039	0.059	0.065	0.050	0.046	0.043	0.043	0.040	0.047	0.037
BNSF	0.044	0.060	0.065	0.036	0.026	0.033	0.029	0.034	0.037	0.045	0.045
UP	0.045	0.064	0.054	0.038	0.050	0.033	0.025	0.030	0.023	0.028	0.041

Average Miles of Rail Replaced Per Track Mile (1983 - 2002)

Railroad	Average
CSX	0.032
NS	0.037
BNSF	0.041
UP	0.041

Source: R-1 Reports to STB

Railroad	1994	1995	1996	1997	1998	1999	2000	2001	2002
CSX	0.027	0.026	0.028	0.025	0.028	0.022	0.026	0.024	0.027
NS	0.028	0.032	0.028	0.026	0.030	0.016	0.021	0.013	0.014
BNSF	0.038	0.038	0.048	0.042	0.040	0.039	0.033	0.042	0.033
UP	0.035	0.029	0.053	0.034	0.039	0.050	0.044	0.048	0.045

EXHIBIT E. BALLAST REPLACED
(CSXT, NS, BNSF, UP)

Cubic Yards of Ballast Placed Per Track Mile (1983 - 2002)

Railroad	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
CSX	92	81	100	77	66	74	77	62	55	57	51
NS	79	66	112	125	103	101	99	113	100	109	90
BNSF	141	137	113	86	128	113	98	103	94	133	127
UP	81	108	81	108	102	65	60	97	95	93	89

Average Cubic Yards of Ballast Placed Per Track Mile (1983 - 2002)

Railroad	Average
CSX	59
NS	87
BNSF	107
UP	93

Source: R-1 Reports to STB

Railroad	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
CSX	52	50	53	40	39	24	27	28	49
NS	83	82	82	77	77	45	59	55	75
BNSF	147	124	132	130	90	71	61	34	53
UP	77	72	95	70	88	99	121	184	90