

# **Benefit Cost Study of State Rail Safety Inspection Programs**

**DRAFT**

Prepared for

North Carolina Department of Transportation  
Rail Division

Institute for Transportation Research and Education  
North Carolina State University  
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## Purpose

The state-operated rail safety inspection programs serve as adjuncts to the program operated by the Federal Railroad Administration (FRA). The purpose of this study is to complete a benefit cost study of state rail safety inspection programs, which currently are in operation in 30 states. More specifically, this study determined the costs to the individual states, and the total cost to states, of operating the state programs, and estimated the costs to the federal government if the FRA were to directly operate those safety inspection programs. These costs are considered the benefits the FRA receives from the existence of the state-operated safety inspection programs.

The study also provides information that is not integral in identifying FRA benefits, but is useful for other analysis, such as information on costs and staffing that is reported by the five inspection disciplines, and state inspection productivity data.

## Methodology

### Develop Questionnaire

The study team worked with Rail Division staff of the North Carolina Department of Transportation to develop a questionnaire for the state rail safety inspection program managers. The questionnaire requested cost information, including salary, benefits, travel expenses, and supervisory overhead, for state rail inspectors engaged in the five principal safety disciplines. This cost information was requested for the portion of staff time that current and anticipated new inspectors dedicate to the inspection process, and for training expenses. The safety disciplines include: Hazardous Material; Motive Power and Equipment; Operating Practices; Signal and Train Control; and, Track Structures. The questionnaire did not request information on overhead expenses, such as office space rental, utilities, and equipment, because inspection managers rarely need to address these items, and therefore are unlikely to be able to provide reliable cost data related to overhead expenses. These salary, benefit, travel, and supervisory expenses were used to calculate program costs and expenses.

In addition, the questionnaire requested information on the annual productivity of the five rail safety inspection programs. This information included: total number of inspections; accident reports; accident investigations; total units inspected; defects or non-compliances; violation reports; and, violation defects. This productivity information was to be used on an aggregate level to assist in calculating program benefits, and not for the purpose of comparing productivity among state programs. A copy of the questionnaire is provided in Appendix A.

### Conduct Survey

There are 30 states with state safety inspection programs. The study team sent copies of the questionnaire to the rail safety inspection manager in each state by electronic mail, or in a few cases, by facsimile. The data was entered into a computer database as the team received the completed questionnaires. Inspection managers were contacted to provide additional information when a questionnaire was incomplete, or the data were outside of reasonable standards, e.g., fringe benefits that were listed as 75% of salary. Twenty-eight of the 30 states returned a completed questionnaire.

### Calculate Survey Data

#### Benefit Cost Data

The study team calculated the aggregate benefit cost data using data from the questionnaires. Basically, the portion of work time that a state inspector dedicated to rail safety inspections (i.e., FTE, or full-time equivalents of 250 workdays/year) was multiplied by the inspector's annual salary, fringe benefits, travel costs, and supervision costs to produce the total wage costs for that employee. These wage costs were calculated for each of the three cost tables in the questionnaire, including:

1. Current inspection program;
2. Additional safety inspectors (that are anticipated to be hired within the next year; and,
3. Program training.

Figure 1 provides summary cost data for the current inspection programs. It should be noted that some safety inspectors are engaged in safety inspection work on a less than full-time basis, and therefore the 126 total FTEs were worked by at least 141 different safety inspectors.

Figure 2 provides summary cost and staffing data for the current inspection programs by the five different disciplines. The three largest inspection programs, which are similar in size in terms of FTEs and costs, are Motive Power and Equipment, Operating Practices and Track Structures. Signal and Train Control was slightly more than one-half the size of these programs, and Hazardous Materials only one-third the size of the programs. The average salary and costs of the programs by FTE are very similar except for Operating Practices. This discipline had an average salary that exceeded the next highest discipline by about \$8,000.

Figure 3 provides detailed cost and staffing data for the current inspection programs. As reported in the survey, it shows that California has the largest program with an estimated total cost of \$2,413,982, followed by Texas, Illinois, and West Virginia, with total costs of \$995,315, \$863,879, and \$640,070, respectively. Figure 4 shows the cost and staffing data for additional staff that state programs plan to hire, and Figure 5 shows the staff time and other costs dedicated to training.

Some states did not provide fringe benefit and supervision cost data, or the data was suspected to be incorrect. If the study team was not able to clarify this data with the state manager, a proxy percentage of salary was used for purposes of this study. Estimated data are presented in *italics*.

Some states did not report fringe benefits. As a result, it was necessary to identify a reasonable portion of an inspector's salary that could be assumed to represent fringe benefits. The following procedure was conducted. Appendix B presents these calculation details.

1. Gather inspector wage data from the survey that included fringe benefits;
2. Delete those records that indicated a fringe benefit, as a percentage of salary, that appeared to be too low, i.e., 3%, or too high, i.e., over 40%;
3. Calculate the averages -- mean, 28% to 29%; median, 28%; and mode, (mode could not be calculated);
4. Select 28% as the estimate fringe benefit rate.

Some states did not report supervision costs. As a result, it was necessary to identify a reasonable portion of an inspector's salary that could be assumed to represent supervision costs. The following procedure was conducted. Appendix C presents these calculation details.

1. Gather inspector wage data from the survey that included supervision costs;
2. Delete those records that indicated a supervision cost, as a percentage of salary, that appeared to be too low, i.e., 3%, or too high, i.e., over 40%;
3. Calculate the averages -- mean, 20% to 21%; median, 20%; and mode, 20%;
4. Select 20% as the proxy fringe benefit.

**Figure 1: Current Annual Cost of State Operated Rail Safety Inspection Programs -- Summary**

<b>Cost Item</b>	<b>Total Costs</b>	<b>Cost per FTE</b>	<b>Percent of Salary</b>
Salary	\$6,278,321	\$49,836	N/A
Fringe	\$1,774,922	\$14,089	28%
Travel	\$602,428	\$4,782	10%
Supervision	\$1,218,286	\$9,670	19%
<b>Total</b>	<b>\$9,873,957</b>	<b>\$78,377</b>	

Figure 2: Current Annual Cost of State Operated Rail Safety Inspection Programs – By Discipline

<b>Discipline</b>	<b>FTEs</b>	<b>Salary</b>	<b>Average Salary per FTE</b>	<b>Benefits</b>	<b>Travel</b>	<b>Supervision</b>	<b>Total Costs</b>	<b>Total Cost/FTE</b>
Hazardous Materials	12	\$543,936	\$46,770	\$157,215	\$74,237	\$92,680	\$868,068	\$74,640
Motive Power and Equipment	30	\$1,468,279	\$48,861	\$419,590	\$142,691	\$282,302	\$2,312,862	\$76,967
Operating Practices	30	\$1,708,844	\$56,342	\$398,103	\$77,661	\$325,645	\$2,510,254	\$82,765
Signal and Train Control	19	\$880,333	\$46,067	\$270,185	\$99,988	\$174,815	\$1,425,321	\$74,585
Track Structures	35	\$1,676,929	\$48,105	\$529,829	\$207,851	\$342,845	\$2,757,453	\$79,101
<b>Totals</b>	<b>126</b>	<b>\$6,278,321</b>	<b>(avg.) \$49,836</b>	<b>\$1,774,922</b>	<b>\$602,428</b>	<b>\$1,218,286</b>	<b>\$9,873,957</b>	<b>(avg.) \$78,377</b>

Figure 3: Current Annual Salary-Related Cost of State Operated Rail Safety Inspection Programs -- Details

- Figures in italics have been estimated because of missing or highly deviated data.
- Figures in total columns are the product of the annual amount multiplied by the FTE (full-time equivalent).

State	Discipline	FTEs	Salary	Total Salary	Fringe	Total Fringe	Travel	Total Travel	Supervision	Total Supervision	Total Costs by State
AL	MPE	0.95	\$45,000	\$42,750	\$18,000	\$17,100	\$6,000	\$5,700	\$0	\$8,550	
AL	MPE	0.95	\$45,000	\$42,750	\$18,000	\$17,100	\$6,000	\$5,700	\$0	\$8,550	
AL	TS	0.95	\$60,000	\$57,000	\$24,000	\$22,800	\$8,000	\$7,600	\$0	\$11,400	\$247,000
AZ	HM	0.9	\$44,000	\$39,600	\$1,184	\$11,088	\$12,750	\$11,475	\$0	\$7,920	
AZ	MPE	0.9	\$44,000	\$39,600	\$1,184	\$11,088	\$12,750	\$11,475	\$0	\$7,920	
AZ	OP	0.9	\$44,000	\$39,600	\$1,184	\$11,088	\$12,750	\$11,475	\$0	\$7,920	
AZ	STC	0.9	\$44,000	\$39,600	\$1,184	\$11,088	\$12,750	\$11,475	\$0	\$7,920	
AZ	TS	0.9	\$44,000	\$39,600	\$1,184	\$11,088	\$12,750	\$11,475	\$0	\$7,920	\$350,415
CA	MPE	6	\$64,368	\$386,208	\$11,586	\$69,516	\$0	\$0	\$0	\$77,242	
CA	OP	15	\$65,614	\$984,210	\$11,810	\$177,150	\$0	\$0	\$0	\$196,842	
CA	STC	2	\$64,368	\$128,736	\$11,586	\$23,172	\$0	\$0	\$0	\$25,747	
CA	TS	4	\$62,529	\$250,116	\$11,255	\$45,020	\$0	\$0	\$0	\$50,023	\$2,413,982
FL	MPE	0.9	\$44,075	\$39,668	\$15,425	\$13,883	\$5,000	\$4,500	\$14,297	\$12,867	
FL	OP	0.85	\$54,085	\$45,972	\$18,930	\$16,091	\$5,000	\$4,250	\$14,297	\$12,152	
FL	OP	0.85	\$53,530	\$45,501	\$18,735	\$15,925	\$5,000	\$4,250	\$14,297	\$12,152	
FL	STC	0.85	\$46,950	\$39,908	\$16,430	\$13,966	\$10,300	\$8,755	\$14,297	\$12,152	
FL	TS	0.9	\$54,575	\$49,118	\$19,100	\$17,190	\$10,300	\$9,270	\$14,297	\$12,867	
FL	TS	0.9	\$45,650	\$41,085	\$15,975	\$14,378	\$5,300	\$4,770	\$14,297	\$12,867	\$463,535
IA	TS	1	\$57,096	\$57,096	\$15,987	\$15,987	\$11,026	\$11,026	\$1,750.00	\$11,419	
IA	TS	1	\$57,096	\$57,096	\$15,987	\$15,987	\$17,387	\$17,387	\$1,750.00	\$11,419	\$197,417
ID	HM	0.65	\$43,036	\$27,973	\$11,931	\$7,755	\$2,561	\$1,665	\$13,532	\$8,796	
ID	MPE	0.09	\$43,036	\$3,873	\$11,931	\$1,074	\$2,561	\$230	\$13,532	\$1,218	
ID	STC	0.26	\$43,036	\$11,189	\$11,931	\$3,102	\$2,561	\$666	\$13,532	\$3,518	\$71,060
IL	HM	0.9	\$60,628	\$54,565	\$21,647	\$19,482	\$7,092	\$6,383	\$12,834	\$11,551	
IL	HM	0.9	\$66,606	\$59,945	\$22,953	\$20,658	\$12,585	\$11,327	\$12,834	\$11,551	
IL	OP	0.9	\$66,606	\$59,945	\$22,953	\$20,658	\$2,667	\$2,400	\$12,834	\$11,551	
IL	STC	0.9	\$66,606	\$59,945	\$22,953	\$20,658	\$8,888	\$7,999	\$12,834	\$11,551	
IL	STC	0.9	\$66,606	\$59,945	\$22,953	\$20,658	\$9,735	\$8,762	\$12,834	\$11,551	
IL	STC	0.9	\$66,606	\$59,945	\$22,953	\$20,658	\$9,735	\$8,762	\$12,834	\$11,551	



Benefit Cost Study of State Rail Safety Inspection Programs

State	Discipline	FTEs	Salary	Total Salary	Fringe	Total Fringe	Travel	Total Travel	Supervision	Total Supervision	Total Costs by State
IL	TS	0.9	\$66,496	\$59,846	\$22,929	\$20,636	\$5,471	\$4,924	\$12,834	\$11,551	
IL	TS	0.9	\$66,606	\$59,945	\$22,953	\$20,658	\$4,871	\$4,384	\$12,834	\$11,551	
IL	TS	0.9	\$49,284	\$44,356	\$19,169	\$17,252	\$5,808	\$5,227	\$12,834	\$11,551	\$863,879
MA	STC	0.5	\$48,000	\$24,000	\$13,000	\$6,500	\$5,200	\$2,600	\$6,200.00	\$6,200	\$39,300
MD	MPE	1	\$43,000	\$43,000	\$7,310	\$7,310	\$5,400	\$5,400	\$21,060.00	\$8,600	
MD	OP	1	\$43,000	\$43,000	\$7,310	\$7,310	\$5,400	\$5,400	\$21,060.00	\$8,600	
MD	STC	1	\$43,000	\$43,000	\$7,310	\$7,310	\$5,400	\$5,400	\$21,060.00	\$8,600	\$192,930
ME	TS	1	\$38,000	\$38,000	\$28,000	\$28,000	\$18,000	\$18,000	\$84,000.00	\$7,600	\$91,600
MO	OP	1	\$28,007	\$28,007	\$8,850	\$8,850	\$3,720	\$3,720	\$6,324	\$6,324	
MO	STC	1	\$36,820	\$36,820	\$11,427	\$11,427	\$2,954	\$2,954	\$6,324	\$6,324	
MO	STC	1	\$28,007	\$28,007	\$8,850	\$8,850	\$3,721	\$3,721	\$6,324	\$6,324	
MO	STC	0.25	\$36,820	\$9,205	\$11,427	\$2,857	\$2,954	\$739	\$6,324	\$1,581	
MO	TS	1	\$35,320	\$35,320	\$11,130	\$11,130	\$5,737	\$5,737	\$6,324	\$6,324	
MO	TS	1	\$33,930	\$33,930	\$10,855	\$10,855	\$5,490	\$5,490	\$6,324	\$6,324	\$280,818
MS	STC	0.5	\$30,000	\$15,000	\$12,000	\$6,000	\$3,000	\$1,500	\$7,500	\$3,750	
MS	TS	0.5	\$30,000	\$15,000	\$15,000	\$7,500	\$3,000	\$1,500	\$7,500	\$3,750	\$54,000
MT	MPE	1	\$31,487	\$31,487	\$7,002	\$7,002	\$3,946	\$3,946	\$3,336	\$3,336	
MT	MPE	1	\$28,328	\$28,328	\$6,691	\$6,691	\$1,231	\$1,231	\$3,336	\$3,336	\$85,357
NC	MPE	1	\$50,371	\$50,371	\$21,659	\$21,659	\$14,893	\$14,893	\$7,492	\$7,492	
NC	STC	1	\$45,715	\$45,715	\$19,657	\$19,657	\$14,332	\$14,332	\$7,492	\$7,492	
NC	TS	1	\$50,371	\$50,371	\$21,659	\$21,659	\$13,987	\$13,987	\$7,492	\$7,492	\$275,120
NE	MPE	0.7	\$40,000	\$28,000	\$9,500	\$6,650	\$500	\$350	\$10,000	\$7,000	
NE	TS	0.7	\$40,000	\$28,000	\$9,500	\$6,650	\$1,300	\$910	\$10,000	\$7,000	\$84,560
NH	TS	1	\$36,816	\$36,816	\$11,044	\$11,044	\$500	\$500	\$6,500	\$6,500	\$54,860
NJ	HM	1	\$45,000	\$45,000	\$8,200	\$8,200	\$1,825	\$1,825	\$3,630	\$3,630	
NJ	HM	1	\$47,000	\$47,000	\$8,500	\$8,500	\$1,825	\$1,825	\$3,630	\$3,630	\$119,610
NM	OP	0.75	\$32,989	\$24,741	\$10,240	\$7,680	\$3,452	\$2,589	\$59,997.30	\$4,948	
NM	STC	0.75	\$31,992	\$23,994	\$10,240	\$7,680	\$1,899	\$1,424	\$59,997.30	\$4,799	\$77,856
NY	MPE	0.7	\$46,500	\$32,550	\$14,000	\$9,800	\$2,100	\$1,470	\$13,334	\$9,334	
NY	MPE	0.7	\$44,000	\$30,800	\$14,000	\$9,800	\$3,200	\$2,240	\$13,334	\$9,334	
NY	MPE	0.7	\$40,000	\$28,000	\$13,000	\$9,100	\$650	\$455	\$13,334	\$9,334	
NY	TS	0.7	\$46,000	\$32,200	\$14,000	\$9,800	\$1,500	\$1,050	\$13,334	\$9,334	
NY	TS	0.7	\$44,500	\$31,150	\$14,000	\$9,800	\$2,200	\$1,540	\$13,334	\$9,334	

Benefit Cost Study of State Rail Safety Inspection Programs

State	Discipline	FTEs	Salary	Total Salary	Fringe	Total Fringe	Travel	Total Travel	Supervision	Total Supervision	Total Costs by State
NY	TS	0.7	\$42,000	\$29,400	\$14,000	\$9,800	\$2,700	\$1,890	\$13,334	\$9,334	\$306,848
OR	HM	0.9	\$50,208	\$45,187	\$22,593	\$20,334	\$8,261	\$7,435	\$10,500	\$9,450	
OR	MPE	1	\$50,208	\$50,208	\$22,593	\$22,593	\$11,347	\$11,347	\$10,500	\$10,500	
OR	MPE	1	\$40,608	\$40,608	\$18,273	\$18,273	\$10,980	\$10,980	\$10,500	\$10,500	
OR	OP	1	\$50,208	\$50,208	\$22,593	\$22,593	\$7,023	\$7,023	\$10,500	\$10,500	
OR	STC	0.5	\$50,208	\$25,104	\$22,593	\$11,297	\$6,308	\$3,154	\$5,250	\$2,625	
OR	TS	0.9	\$50,208	\$45,187	\$22,593	\$20,334	\$8,333	\$7,500	\$9,450	\$8,505	
OR	TS	0.9	\$44,820	\$40,338	\$20,169	\$18,152	\$10,840	\$9,756	\$9,450	\$8,505	\$548,195
PA	HM	0.88	\$34,132	\$30,036	\$8,311	\$7,314	\$15,427	\$13,576	\$10,938	\$9,625	
PA	MPE	0.88	\$49,722	\$43,755	\$12,107	\$10,654	\$6,628	\$5,833	\$10,938	\$9,625	
PA	MPE	0.88	\$49,722	\$43,755	\$12,107	\$10,654	\$5,500	\$4,840	\$10,938	\$9,625	
PA	OP	0.88	\$44,558	\$39,211	\$10,850	\$9,548	\$7,050	\$6,204	\$10,938	\$9,625	
PA	TS	0.88	\$49,722	\$43,755	\$12,107	\$10,654	\$10,663	\$9,383	\$10,938	\$9,625	
PA	TS	0.88	\$44,558	\$39,211	\$10,850	\$9,548	\$11,445	\$10,072	\$10,938	\$9,625	\$405,757
SC	MPE	0.75	\$46,133	\$34,600	\$17,590	\$13,192	\$3,543	\$2,657	\$6,920	\$5,190	
SC	TS	0.75	\$44,536	\$33,402	\$17,073	\$12,805	\$3,744	\$2,808	\$6,680	\$5,010	\$109,664
TN	MPE	0.95	\$43,800	\$41,610	\$0	\$11,651	\$2,000	\$1,900	\$8,000	\$7,600	
TN	OP	0.7	\$43,800	\$30,660	\$0	\$8,585	\$1,280	\$896	\$8,000	\$5,600	
TN	STC	0.7	\$43,800	\$30,660	\$0	\$8,585	\$1,280	\$896	\$8,000	\$5,600	
TN	STC	0.7	\$43,800	\$30,660	\$0	\$8,585	\$1,280	\$896	\$8,000	\$5,600	
TN	TS	0.7	\$43,800	\$30,660	\$0	\$8,585	\$1,280	\$896	\$8,000	\$5,600	
TN	TS	0.7	\$43,800	\$30,660	\$0	\$8,585	\$1,280	\$896	\$8,000	\$5,600	\$291,465
TX	HM	3	\$45,000	\$135,000	\$12,150	\$36,450	\$4,000	\$12,000	\$4,500	\$13,500	
TX	MPE	3	\$51,000	\$153,000	\$13,770	\$41,310	\$5,500	\$16,500	\$4,500	\$13,500	
TX	OP	4	\$52,500	\$210,000	\$14,175	\$56,700	\$4,500	\$18,000	\$4,500	\$18,000	
TX	STC	1	\$51,000	\$51,000	\$13,905	\$13,905	\$3,500	\$3,500	\$4,500	\$4,500	
TX	TS	3	\$45,000	\$135,000	\$12,150	\$36,450	\$4,500	\$13,500	\$4,500	\$13,500	\$995,315
UT	MPE	1	\$44,453	\$44,453	\$19,965	\$19,965	\$2,000	\$2,000	\$6,000	\$6,000	
UT	STC	1	\$29,586	\$29,586	\$16,531	\$16,531	\$1,000	\$1,000	\$6,000	\$6,000	
UT	TS	1	\$37,756	\$37,756	\$18,329	\$18,329	\$2,000	\$2,000	\$6,000	\$6,000	\$189,620
VA	MPE	1	\$52,208	\$52,208	\$15,662	\$15,662	\$14,862	\$14,862	\$0	\$10,442	
VA	TS	1	\$62,441	\$62,441	\$18,732	\$18,732	\$10,374	\$10,374	\$0	\$12,488	
VA	TS	1	\$56,981	\$56,981	\$17,094	\$17,094	\$2,545	\$2,545	\$0	\$11,396	\$285,225

Benefit Cost Study of State Rail Safety Inspection Programs

State	Discipline	FTEs	Salary	Total Salary	Fringe	Total Fringe	Travel	Total Travel	Supervision	Total Supervision	Total Costs by State
WA	HM	0.5	\$47,000	\$23,500	\$9,000	\$4,500	\$4,000	\$2,000	\$9,250	\$4,625	
WA	OP	0.5	\$47,000	\$23,500	\$9,000	\$4,500	\$4,000	\$2,000	\$9,250	\$4,625	
WA	STC	0.5	\$47,000	\$23,500	\$9,000	\$4,500	\$4,000	\$2,000	\$9,250	\$4,625	
WA	TS	0.5	\$47,000	\$23,500	\$9,000	\$4,500	\$4,000	\$2,000	\$9,250	\$4,625	\$138,500
WV	HM	1	\$36,129	\$36,129	\$12,934	\$12,934	\$4,727	\$4,727	\$8,402	\$8,402	
WV	MPE	1	\$45,525	\$45,525	\$15,224	\$15,224	\$4,727	\$4,727	\$8,402	\$8,402	
WV	MPE	1	\$44,229	\$44,229	\$15,834	\$15,834	\$4,727	\$4,727	\$8,402	\$8,402	
WV	MPE	1	\$46,943	\$46,943	\$16,806	\$16,806	\$4,727	\$4,727	\$8,402	\$8,402	
WV	OP	1	\$37,945	\$37,945	\$13,584	\$13,584	\$4,727	\$4,727	\$8,402	\$8,402	
WV	OP	1	\$46,344	\$46,344	\$17,842	\$17,842	\$4,727	\$4,727	\$8,402	\$8,402	
WV	STC	1	\$37,035	\$37,035	\$13,258	\$13,258	\$4,727	\$4,727	\$8,402	\$8,402	
WV	STC	1	\$27,778	\$27,778	\$9,945	\$9,945	\$4,727	\$4,727	\$8,402	\$8,402	
WV	TS	1	\$27,778	\$27,778	\$9,945	\$9,945	\$4,727	\$4,727	\$8,402	\$8,402	
WV	TS	1	\$24,814	\$24,814	\$8,883	\$8,883	\$4,727	\$4,727	\$8,402	\$8,402	\$640,070
<b>Totals</b>		<b>126.0</b>		<b>\$6,278,321</b>		<b>\$1,774,922</b>		<b>\$602,428</b>		<b>\$1,218,286</b>	
<b>Grand Total</b>											<b>\$9,873,957</b>

Figure 4: Anticipated Annual Cost of Additional Rail Safety Inspectors -- Details

- Figures in italics have been estimated because of missing or highly deviated data.
- Figures in total columns are the product of the annual amount multiplied by the FTE (full-time equivalent).

State	Discipline	FTEs	Salary	Total Salary	Fringe	Total Fringe	Travel	Total Travel	Supervision	Total Supervision
FL	HM	0.9	\$48,000	\$43,200	\$16,800	\$15,120	\$7,000	\$6,300	\$0	\$8,640
MD	STC	1	\$43,000	\$43,000	\$7,310	\$7,310	\$5,400	\$5,400	\$0	\$8,600
MD	TS	1	\$43,000	\$43,000	\$7,310	\$7,310	\$5,400	\$5,400	\$0	\$8,600
NJ	HM	0.5	\$59,000	\$29,500	\$10,750	\$5,375	\$700	\$350	\$3,630	\$1,815
TN	MPE	0.5	\$57,800	\$28,900	\$0	\$8,092	\$1,280	\$640	\$6,000	\$3,000
<b>Totals</b>		<b>3.9</b>		<b>\$187,600</b>		<b>\$43,207</b>		<b>\$18,090</b>		<b>\$30,655</b>
<b>Grand Total</b>										<b>\$279,552</b>

Figure 5: Current Annual Training Cost of State Operated Rail Safety Inspection Programs -- Details

- Figures in italics have been estimated because of missing or highly deviated data.
- Figures in total columns are the product of the annual amount multiplied by the FTE (full-time equivalent).

State	Discipline	FTEs	Salary	Total Salary	Fringe	Total Fringe	Travel	Total Travel	Supervision	Total Supervision
AZ	HM	0.02	\$42,300	\$846	<i>\$11,088</i>	\$222	\$12,250	\$245	<i>\$7,920</i>	\$158
AZ	MPE	0.02	\$42,300	\$846	<i>\$11,088</i>	\$222	\$12,250	\$245	<i>\$7,920</i>	\$158
AZ	OP	0.02	\$42,300	\$846	<i>\$11,088</i>	\$222	\$12,250	\$245	<i>\$7,920</i>	\$158
AZ	STC	0.02	\$42,300	\$846	<i>\$11,088</i>	\$222	\$12,250	\$245	<i>\$7,920</i>	\$158
AZ	TS	0.02	\$42,300	\$846	<i>\$11,088</i>	\$222	\$12,250	\$245	<i>\$7,920</i>	\$158
FL	HM	0.05	\$48,000	\$2,400	\$16,800	<i>\$840</i>	\$0	\$0	<i>\$12,867</i>	\$643
FL	MPE	0.05	\$44,075	\$2,204	\$15,425	<i>\$771</i>	\$0	\$0	<i>\$12,867</i>	\$643
FL	OP	0.1	\$53,808	\$5,381	\$18,833	<i>\$1,883</i>	\$0	\$0	<i>\$12,152</i>	\$1,215
FL	STC	0.05	\$46,950	\$2,348	\$16,430	<i>\$822</i>	\$0	\$0	<i>\$12,152</i>	\$608
FL	TS	0.1	\$50,113	\$5,011	\$17,538	<i>\$1,754</i>	\$0	\$0	<i>\$12,867</i>	\$1,287
IA	TS	0.05	\$43,920	\$2,196	\$10,980	<i>\$549</i>	\$44,000	\$2,200	\$1,340	\$67
IA	TS	0.05	\$43,920	\$2,196	\$10,980	<i>\$549</i>	\$44,000	\$2,200	\$1,340	\$67
ME	TS	0.06	\$38,000	\$2,280	\$28,000	<i>\$1,680</i>	\$38,000	\$2,280	\$7,600	\$456
MO	OP	0.06	\$28,007	\$1,680	\$8,850	<i>\$531</i>	\$3,720	\$223	\$6,324	\$379
MO	STC	0.12	\$36,820	\$4,418	\$11,427	<i>\$1,371</i>	\$2,954	\$355	\$6,324	\$759
MO	TS	0.12	\$35,320	\$4,238	\$11,130	<i>\$1,336</i>	\$5,737	\$688	\$6,324	\$759
NE	MPE	0.04	\$40,000	\$1,600	\$9,500	<i>\$380</i>	\$500	\$20	\$10,000	\$400
NE	TS	0.04	\$40,000	\$1,600	\$9,500	<i>\$380</i>	\$1,300	\$52	\$10,000	\$400
NH	TS	0.02	\$36,816	\$736	\$11,044	<i>\$221</i>	\$500	\$10	\$6,500	\$130
NY	MPE	0.1	\$65,250	\$6,525	\$20,500	<i>\$2,050</i>	\$2,975	\$298	\$20,000	\$2,000
NY	TS	0.1	\$66,250	\$6,625	\$21,000	<i>\$2,100</i>	\$3,200	\$320	\$20,000	\$2,000
OR	HM	0	\$0	\$0	\$0	<i>\$0</i>	\$2,000	\$2,000	\$0	\$0
OR	MPE	0	\$0	\$0	\$0	<i>\$0</i>	\$500	\$500	\$0	\$0
OR	OP	0	\$0	\$0	\$0	<i>\$0</i>	\$500	\$500	\$0	\$0
OR	STC	0	\$0	\$0	\$0	<i>\$0</i>	\$500	\$500	\$0	\$0
OR	TS	0	\$0	\$0	\$0	<i>\$0</i>	\$1,000	\$1,000	\$0	\$0
OR	TS	0	\$0	\$0	\$0	<i>\$0</i>	\$1,000	\$1,000	\$0	\$0
TN	MPE	0.04	\$43,800	\$1,752	<i>\$11,651</i>	<i>\$466</i>	\$500	\$20	<i>\$8,000</i>	\$320
TN	OP	0.02	\$43,800	\$876	<i>\$11,651</i>	<i>\$233</i>	\$500	\$10	<i>\$8,000</i>	\$160

State	Discipline	FTEs	Salary	Total Salary	Fringe	Total Fringe	Travel	Total Travel	Supervision	Total Supervision
TN	STC	0.04	\$43,800	\$1,752	\$11,651	\$466	\$500	\$20	\$8,000	\$320
TN	TS	0.04	\$43,800	\$1,752	\$11,651	\$466	\$500	\$20	\$8,000	\$320
UT	MPE	0	\$0	\$0	\$0	\$0	\$1,000	\$1,000	\$0	\$0
UT	STC	0	\$0	\$0	\$0	\$0	\$6,000	\$6,000	\$0	\$0
UT	TS	0	\$0	\$0	\$0	\$0	\$2,000	\$2,000	\$0	\$0
WV	HM	0.04	\$36,129	\$1,445	\$12,934	\$517	\$2,220	\$89	\$8,402	\$336
WV	MPE	0.12	\$44,566	\$5,348	\$15,955	\$1,915	\$1,728	\$207	\$8,402	\$1,008
WV	OP	0.08	\$42,145	\$3,372	\$15,088	\$1,207	\$2,424	\$194	\$8,402	\$672
WV	STC	0.08	\$32,407	\$2,593	\$11,602	\$928	\$2,090	\$167	\$8,402	\$672
WV	TS	0.08	\$26,296	\$2,104	\$9,414	\$753	\$1,732	\$139	\$8,402	\$672
<b>Totals</b>		<b>1.8</b>		<b>\$76,662</b>		<b>\$25,277</b>		<b>\$25,237</b>		<b>\$17,086</b>
<b>Grand Total</b>										<b>\$144,261</b>

### State Inspection Productivity

The state rail inspection program questionnaire requested productivity data such as the number of inspections, inspection units, and other inspection unit data. The objective for collecting this data was to estimate the general productivity of the state programs, but not to compare productivity among different state programs. Twenty states provided productivity data for the inspection disciplines operated by their state, and this data corresponded with 76 of the total 126 FTEs identified in the current state inspection programs. Figure 6 and Figure 7 provide summary and detailed results.

Figure 6: Productivity of State Operated Rail Safety Inspection Programs -- Summary

Discipline	FTEs	Total Inspections	Accident Reports	Accident Investigations	Total Units Inspected	Defects or Noncompliances	Violation Reports	Violation Defects
Hazardous Material	8.3							
Total		2,029	9	11	19,029	15,004	33	61
Average per FTE		244	1	1	2,284	1,801	4	7
Motive Power and Equipment	22.9							
Total		5,816	74	58	319,507	42,999	223	358
Average per FTE		255	3	3	13,983	1,882	10	16
Operating Practices	11.0							
Total		3,698	26	29	14,038	12,546	34	54
Average per FTE		335	2	3	1,273	1,137	3	5
Signal & Train Control	10.3							
Total		1,854	12	12	19,528	4,699	47	51
Average per FTE		181	1	1	1,903	458	5	5
Track Structures	23.6							
Total		3,901	71	65	84,267	19,816	72	133
Average per FTE		166	3	3	3,577	841	3	6
All Disciplines	76.0							
Total		17,298	192	175	456,369	95,064	409	657
Average per FTE		228	3	2	6,002	1,250	5	9



Figure 7: Productivity of State Operated Rail Safety Inspection Programs – Details

State	FTEs	Discipline	Total Inspections	Accident Reports	Accident Investigations	Total Units Inspected	Defects or Noncompliances	Violation Reports	Violation Defects
FL	0.9	HM	196	0	0	4,410	545	10	44
ID	0.7	HM	456	0	0	456	119	2	0
NJ	1.0	HM	261	0	0	1,944	12,927	0	0
OR	0.9	HM	70	0	2	408	50	1	2
PA	0.9	HM	120	1	1	2,724	81	14	14
TX	3.0	HM	769	8	8	6,527	1,120	5	0
WV	1.0	HM	157	0	0	2,560	162	1	1
AL	1.9	MPE	194	4	4	31,020	972	0	0
FL	0.9	MPE	116	0	0	26,393	1,757	9	66
FL	0.9	MPE	146	0	0	18,564	1,045	22	27
ID	0.1	MPE	61	0	0	61	50	0	0
MT	1.0	MPE	72	9	0	8,450	451	0	0
MT	1.0	MPE	36	3	0	5,883	63	1	1
NC	1.0	MPE	151	0	0	26,242	1,015	2	5
NY	0.7	MPE	90	8	8	5,350	1,950	0	0
NY	0.7	MPE	125	6	6	3,709	1,012	3	9
NY	0.7	MPE	115	10	10	5,080	11,112	3	3
OR	1.0	MPE	147	0	3	22,361	835	25	28
OR	1.0	MPE	138	0	2	24,883	2,400	17	43
PA	1.8	MPE	631	1	3	23,658	2,103	29	29
SC	0.8	MPE	163	11	0	20,649	1,848	5	11
TN	0.5	MPE	80	2	2	0	0	15	0
TN	1.0	MPE	130	2	2	0	0	15	0
TX	3.0	MPE	2,661	16	16	26,740	7,197	49	0
UT	1.0	MPE	100	0	0	21,030	364	0	0
VA	1.0	MPE	169	0	0	7,855	3,420	11	99
WV	1.0	MPE	143	1	1	10,993	1,065	2	14
WV	1.0	MPE	169	1	1	16,386	2,507	15	23
WV	1.0	MPE	179	0	0	14,200	1,833	0	0
FL	0.9	OP	90	0	0	340	1	0	0

State	FTEs	Discipline	Total Inspections	Accident Reports	Accident Investigations	Total Units Inspected	Defects or Noncompliances	Violation Reports	Violation Defects
FL	0.9	OP	131	0	0	466	57	3	5
NM	0.8	OP	44	3	3	616	22	0	0
OR	1.0	OP	118	0	3	226	175	3	22
PA	0.9	OP	731	4	4	731	211	4	4
TN	0.7	OP	85	2	2	0	0	0	0
TX	4.0	OP	2,228	15	15	9,344	840	1	0
WV	1.0	OP	168	2	2	1,196	503	23	23
WV	1.0	OP	103	0	0	1,119	10,737	0	0
FL	0.9	STC	96	0	0	3,295	1,156	2	2
ID	0.3	STC	185	0	0	185	0	0	0
MA	0.5	STC	430	3	3	620	1,352	0	0
MO	1.0	STC	87	0	0	341	64	0	0
MO	1.0	STC	29	0	0	123	17	0	0
NC	1.0	STC	155	0	0	4,185	1,256	5	10
NM	0.8	STC	40	2	2	560	25	2	2
OR	0.5	STC	50	0	0	1,226	246	0	0
TN	0.7	STC	100	2	2	0	0	0	0
TN	0.7	STC	100	2	2	0	0	0	0
TX	1.0	STC	373	2	2	1,987	251	1	0
WV	1.0	STC	84	1	1	3,767	170	37	37
WV	1.0	STC	125	0	0	3,239	162	0	0
AL	1.0	TS	141	4	4	4,796	810	0	0
FL	0.9	TS	212	0	0	5,295	2,492	1	2
FL	0.9	TS	104	0	0	2,889	1,191	5	20
IA	1.0	TS	110	3	3	5,000	1,200	8	15
IA	1.0	TS	110	3	3	5,000	1,200	8	15
ME	1.0	TS	1	0	0	697	216	0	0
MO	0.0	TS	41	0	0	1,636	259	0	0
MO	1.0	TS	134	3	3	5,038	1,297	5	28
NC	1.0	TS	125	0	0	7,240	986	1	2
NY	0.7	TS	125	5	5	4,500	200	0	0
NY	0.7	TS	95	17	17	3,300	480	0	0
NY	0.7	TS	109	7	7	7,265	625	0	0

State	FTEs	Discipline	Total Inspections	Accident Reports	Accident Investigations	Total Units Inspected	Defects or Noncompliances	Violation Reports	Violation Defects
OR	0.9	TS	137	0	3	5,075	1,147	8	12
OR	0.9	TS	109	0	3	2,923	643	7	9
PA	1.8	TS	412	2	2	6,070	1,501	4	8
SC	0.8	TS	142	5	0	3,736	590	3	3
TN	0.7	TS	100	2	2	0	0	2	0
TN	0.7	TS	130	2	2	0	0	15	0
TX	3.0	TS	992	10	10	2,517	1,879	1	0
UT	1.0	TS	60	7	0	2,125	139	2	3
VA	1.0	TS	125	0	0	2,637	762	2	16
VA	1.0	TS	140	0	0	3,045	944	0	0
WV	1.0	TS	209	1	1	2,865	1,132	0	0
WV	1.0	TS	38	0	0	618	123	0	0
	76.0		17,298	192	175	456,369	95,064	409	657

## Identify Federal Program Costs

A key objective of this study is to estimate the costs to the federal government if the FRA were to directly operate those rail safety inspection programs that are currently operated by the states. In order to estimate the federal costs, the study team researched and identified several cost components that could be assumed in federal operation of the program. These components include the following:

**Salary** – The federal salary is assumed to be \$53,289, which is a basic GS-12 grade scale, with a step 3 in-grade increase. Federal Rail Safety Inspector positions (i.e., GS-2121) commonly start at the GS-11 and GS-12 grade scale. A Rail Safety Inspector who starts at a GS-11 pay grade would usually be promoted to a GS-12, Step 3 pay grade after four years of successful work. This progression includes a promotion to the GS-12 pay grade after one successful year, and a promotion of one in-grade Step after each additional year of successful work.

This assumed federal salary is most likely low. The salary is for a basic GS-12, Step 3 salary. However, the federal government uses “locality pay tables” that increase salaries for 31 metropolitan areas in the United States. These locality pay increases range from 8.85% in the Indianapolis, Indiana area to 19.04% in the San Francisco, California area. For the sake of brevity, these locality pay table increases were not incorporated in federal pay assumptions.

**Fringe Benefits** – The fringe benefit is assumed to be 27.85% of the salary cost. According to federal government reports, the U.S. Department of Transportation, which houses the FRA, provided employee fringe benefits that were 27.85% of salaries<sup>1</sup>. The fringe benefit average for the entire federal government in the same year, excluding postal employees, was 26.3%.

**Travel Costs** – The travel cost is assumed to be \$4,782. This is the same amount, which is 10% of the total salary cost, that was calculated from the state program survey. There is travel cost data for the U.S. DOT, which is 5% of total salaries. However, this U.S. DOT cost rate, which is for the entire Department and includes headquarters offices, is very likely to be too low to estimate travel costs for an inspection staff that works in the field and often has multi-county and multi-state service areas. Therefore, the state inspection program rate is believed to be more accurate.

**Supervision Costs** – The supervision cost is assumed to be 20% of salary. This is the same rate used for state inspection program costs. There is no readily available federal data on this cost item. Appendix C presents the calculation for the survey travel cost as a percentage of state inspector salaries.

**Overhead Rate** – The overhead rate was calculated at 47% of the total salary, benefits, travel, training, and supervisory costs. The overhead rate represents the cost of facilities (office space and utilities), equipment, and supplies, and must be counted in order to estimate the fully allocated cost to the federal government for assuming operation of the state inspection programs. This overhead rate, 47%, was computed by summing the actual office rental, utility, supplies, equipment and other overhead expenses in the Fiscal Year 2001 Budget for the U.S. Department of Transportation, and dividing that sum into the total personnel costs from the same budget. Appendix D is a copy of the pertinent pages from this budget. In the experience of the project team, contract overhead rates for Universities are usually between 45% and 50% of personnel and direct expenses (e.g., supplies, travel, communications), and therefore this estimated overhead rate appears to be valid.

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<sup>1</sup> “Personnel Costs as a Percentage of Basic Pay,” Federal Civilian Workforce Statistics: Work Years and Personnel Costs for Fiscal Year 1999. U.S. Office of Personnel Management.

## Results and Analysis

Given the total costs identified in the Methodology section of this report, certain assumptions can be made concerning the costs and benefits of the state operated rail safety inspection programs.

### State Inspection Program Costs

The total cost of state programs for personnel and travel costs is estimated to be \$10,297,770, based on the totals in Figure 8.

It should be noted that these costs are an underestimate of the costs to state programs for two reasons. First, these costs do not include overhead expenses, such as office space, utilities, equipment, supplies, and administration costs, which are borne by the state budget. The study team did not collect overhead data because such information is difficult to identify. Rail safety inspection managers are commonly not aware of overhead costs and rates, and such information often requires an in-depth knowledge of fully-allocated costs. Second, two state rail safety inspection programs did not provide data.

*Figure 8: Current Annual Cost of State Operated Rail Safety Inspection Programs*

	FTEs	Salary	Fringe Benefits	Travel	Supervision	Total
Current Inspectors	126.0	\$6,278,321	\$1,774,922	\$602,428	\$1,218,286	\$9,873,957
Anticipated New Inspectors	3.9	\$187,600	\$43,207	\$18,090	\$30,655	\$279,552
Training	1.8	\$76,662	\$25,277	\$25,237	\$17,086	\$144,261
<b>Totals</b>	<b>131.7</b>	<b>\$6,542,583</b>	<b>\$1,843,406</b>	<b>\$645,755</b>	<b>\$1,266,027</b>	<b>\$10,297,770</b>

### Potential Federal Program Costs

This study estimated the cost to the federal government if state rail safety inspection programs ceased, and the FRA assumed responsibility for maintaining the current level of inspection and enforcement. This estimate was made using state inspection program survey data and information on likely costs for FRA inspectors. Figure 9 demonstrates that the estimated federal government cost for personnel and travel costs is \$11,014,927, which is approximately 7% higher than the calculated state costs for the same items. Given the similar fringe benefit, travel and supervision costs rate, this cost difference is a result of the higher federal inspector salary assumed in this study.

Data in Figure 9 also demonstrate that if the federal government were to directly operate the state rail safety inspection programs, the cost to the federal government would be \$15,899,987, including overhead expenses, or \$122,325 per FTE. These costs might be underestimated. For Fiscal Year 2003, the FRA is requesting an increase in the field inspector workforce equal to ten FTEs, i.e., six for Track Inspectors and four for Operating Practices, at a budgeted cost of \$139,300 per FTE<sup>2</sup>. Applying this FRA estimated budget

<sup>2</sup> Budget Estimates: Fiscal Year 2003, U.S. Department of Transportation, Federal Railroad Administration, pages 43-46.

cost for field inspectors, the total federal cost for assuming the state operated railroad inspection programs (or, 129.9 FTEs) would be \$18,095,070. This estimate exceeds that computed in Figure 9 by \$2,195,083, or 14%.

*Figure 9: Estimated Annual Cost for FRA to Operate State Rail Safety Inspection Programs*

<b>Cost Item</b>	<b>Calculation Method</b>	<b>Current Inspectors</b>	<b>Anticipated Additions</b>	<b>Totals</b>
FTEs	N/A	126.0	3.9	129.9
Salary	The estimated FRA inspector salary, \$53,289, is multiplied by the number of FTEs.	\$6,714,414	\$207,827	\$6,922,241
Fringe	The estimated FRA inspector fringe benefit factor, 27.85%, is multiplied by the total salary.	\$1,869,964	\$57,880	\$1,927,844
Supervision	The average state inspector supervisory costs factor, 20% (See Appendix C), is multiplied by the total salary. No FRA data is available.	\$1,342,883	\$41,565	\$1,384,448
Training	Total training costs, \$144,261, is 2.3% of the total salary costs, \$6,278,321, for state inspectors. This percentage is multiplied by the salary cost. No FRA data is available.	\$154,432	\$4,780	\$159,212
Personnel Subtotals		\$10,081,693	\$312,052	\$10,393,745
Overhead	Overhead cost is 47% of the total salary, benefits, training, and supervisory costs.	\$4,738,396	\$146,665	\$4,885,060
Travel	The average travel cost per FTE for state inspectors, \$4782. No reliable FRA data is available.	\$602,532	\$18,650	\$621,182
<b>Totals</b>		<b>\$15,422,620</b>	<b>\$477,367</b>	<b>\$15,899,987</b>
<b>Average per FTE</b>				<b>(avg.) \$122,325</b>