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Statistically Driven Inspection Guidance for Motive Power & Equipment Inspectors and Safety Specialists

Federal Railroad Administration
Office of Safety Assurance and Compliance
Motive Power & Equipment (MP&E) Division
April 2007

Statistically-Driven Inspection Guidance for Motive Power & Equipment Inspectors and Safety Specialists

Overview: The FRA has collected railroad safety data for decades, and now has the information and databases available for direct use by Motive Power & Equipment (MP&E) Inspectors via the Internet. With increasing traffic over the North American freight railroads with ever-increasing axle loads and payloads, increased demand for high-speed passenger trains, new-technology commuter railroad equipment and service, new wayside train inspection devices, and ever increasing duties for MP&E inspectors, the use of statistically driven inspections will provide a baseline to plan inspection itineraries and optimize the regulatory enforcement strategies and use of the MP&E inspection workforce.

Background: FRA developed the National Inspection Plan (NIP) that provides the overall inspection philosophy for the Office of Safety Assurance and Compliance. In conjunction with the NIP, each FRA Region develops an Annual Inspection Plan tailored to the specific railroads, traffic, and personnel unique to their Region. The guidance provided, herein, builds upon the Regional Inspection Plans (RIP's), and does not supercede them. By formulating data queries tailored to an Inspector's territory, a report unique to that area or railroad can be generated, indicating the "top five" or more causes of accidents/incidents, train accidents, or casualties historically found at that location and also the identification of detrimental or higher "safety risk" trends. In addition, rail car and locomotive defects can be identified in the RISPC Database and additional trend-line "drill-downs" performed.

Applicability: At this time the"Drill-down" procedures to evaluate potential trends in the safety data will only be applied to the Accident/Incident, Train Accident, and Casualty Databases. In accordance with the criteria stated in the Regional Inspection Plan, an MP&E Inspector or Safety Specialist will select the railroad(s) and location(s) to be inspected based upon past experience and knowledge of traffic patterns. This also builds on the "expert" knowledge base of the MP&E Inspector. Based upon the railroad selected, the corresponding Class of railroad is determined: Class I (Major Railroad), II (Regional), or III (Shortline) and noted for use in generating the "Drill-down" Report (see "Drill-down Procedure, page 5).

Pilot Project: To validate the statistically-driven inspection procedures developed by the MP&E Division, Inspectors from FRA's Region 2 participated in a short evaluation program in 2006 (Pilot Project) to use the goals of the NIP, RIP, and FRA's Safety Database to predict what type of defects with a potential to cause a derailment or serious incident may be present in the Inspector's territory. The locations visited by the project team were CSX Transportation at Cumberland, Maryland and Crofton, West Virginia; Appalachian and Ohio Railroad at Buckhannon, West Virginia; and Norfolk Southern Railway (NS) at Pittsburgh, Pennsylvania.

The findings from this pilot project were that the methodology proposed by the MP&E Division was viable in determining the mechanical issues associated with a railroad/region. Further, FRA's MP&E's Inspectors found the proposed methodology, and FRA's safety data on the web site practical and easy to use.

The "top-five" mechanical causes for derailment were identified for the example inspection area, Allegheny County, Maryland. The validation team visited the location(s) and the process for determining the "top-five" items for all railroads and just for Region 2 were found not to be cumbersome, as there are similarities between these two lists. Wheel-caused derailments were indicated in the query as being one of the top-five causes. During the inspection on CSXT at Cumberland, Maryland a high-flange wheel was identified. However, the Inspectors' knowledge of his/her inspection locations is key to the success of this approach as the number of accidents/incidents is not statistically significant (too few incidents randomly occurring) compared to the number of car movements per year .

During the pilot project it was discovered that the FRA safety database not appear to have reported all accidents that occurred, and in some cases the reported cause contained errors. For example, the Appalachian and Ohio Railroad filed four accident/incident reports between May, 2005, and February, 2006. However, the FRA database only indicated three derailments. One of the reports indicated a cause code of "T-316" for track, but the actual cause was found to be a burnt-off wheel journal bearing. Thus, it was verified that FRA MP&E Inspectors are not working with a "perfect" database and the Inspector's knowledge base is ever more important in cross checking of "drill-down" data summaries and determining "high-risk" causes and in identifying detrimental trends.

Based upon the experience gained by the first field pilot trial, a refinement was made to the data-acquisition procedures. A matrix may be created at the Regional level for each inspection point that correlates to an identifier (symbol) of a train which was involved in an accident/incident to the origination location. That is the point where an inspection can yield a benefit to prevent a future accident/incident, as the defect that caused the derailment may have been present at the origin location. By using the top-five causes of accident/incident identified from a query, a search of the accident/incident report will provide the train identifier (symbol). The procedure will then tie the train involved in the accident/incident to the originating point where a focused inspection can then be scheduled. Thus, the procedure solves for the "where" and "what" to inspect for at the originating location.

A second validation inspection was conducted at the NS Conway Yard, Conway, PA using the revised procedures. Similar results to the first inspection were observed in that the team found the procures easy to use, and the "Top-five" derailment causing defects verified only one defect related to those being given focused attention was identified (related to defective roller bearings).

Based upon a review of FRA's safety database there are very few MP&E-caused accidents/incidents. From January 2002, to December 2005, there were only 7

accidents/incidents in Region 2 in Maryland. Their causes were: brakes cause code (E0) - two (2) incidents, axles & journal bearings (E5) - two (2) incidents, coupler & draft system (E3) - one (1) incident, truck components (E4) - one (1) incident, and wheels (E6) - one (1) . With the number of accidents/incidents being so few, the potential for finding a targeted defect by trend analysis is extremely low. However, one of the "top-five" causes, high-flange wheel was found in Cumberland yard on CSX in an outbound train during the pilot project inspection.

Pilot Project Summary: The proposed procedures for using a "drill-down" method of predicting elevated levels of mechanical defects were found easy to use by the MP&E Inspectors. One of the "top-five" causes of derailment nationwide was identified during the pilot program inspection. However, the number of MP&E-related defects that cause derailments are very low on an annual basis, and extremely low on an individual Regional or inspection location (not statistically significant). Therefore, the overall usefulness of a statistical approach to defect identification should only be used in combination with the "expert" judgement of the MP&E Inspector and trends develops on a nationwide basis as identifying in safety oversight of the railroads and received and review of headquarters trends analysis.

The number of MP&E related defects that may cause a derailment appear to be too low to be statistically significant. However, a defect predicted to be present was identified during both validation inspections. Based upon even these marginal results, a program could be developed to use a statistically driven approach to assist MP&E Inspectors in the identification of critical safety defects. If an Inspector queries the FRA database on a bi-annual basis to develop a list of the "top-five" causes of derailment on a nationwide and Regional basis, they will have a heightened awareness of these defects during their regular inspections. Later sections in the in the MP&E Compliance Manual will be useful in explaining the process and providing the MP&E Inspectors with examples using the database and trend charts (see page 6). It is obvious that this process is not a "perfect science" and greatly dependent upon the knowledge base and judgement of the MP&E Inspector.

"Drill-down" Procedure: The"Drill-down" procedures below apply only to the following databases:

Accident / Incident, Train Accident, and Casualty Database

Inspection Data Selection:

1. The MP&E Inspector or Safety Specialist selects the railroad to inspect based upon past experience, and knowledge of traffic patterns in accordance with the criteria stated in the Regional Inspection Plan; also, in consultation with the Regional MP&E Safety Specialist.

2. Based upon the railroad selected, the corresponding Class of railroad is determined, such as Class I (Major Railroad), II (Regional), or III (Shortline) and noted for use.

3. Upon selecting the railroad and Class, the MP&E Inspector will then access the Internet, and go to the FRA's Home Page at www.FRA.DOT.GOV. On the Home Page, select the Icon for "SAFETY", then open "Safety Data". There are nine (9) categories to choose from regarding safety data, and many subcategories.

4. From the list of categories and subcategories, select the type of information desired, such as 2 - Query Accident/Incident Trends, 3 - Train Accidents, or 4 - Casualties for MP&E related data.

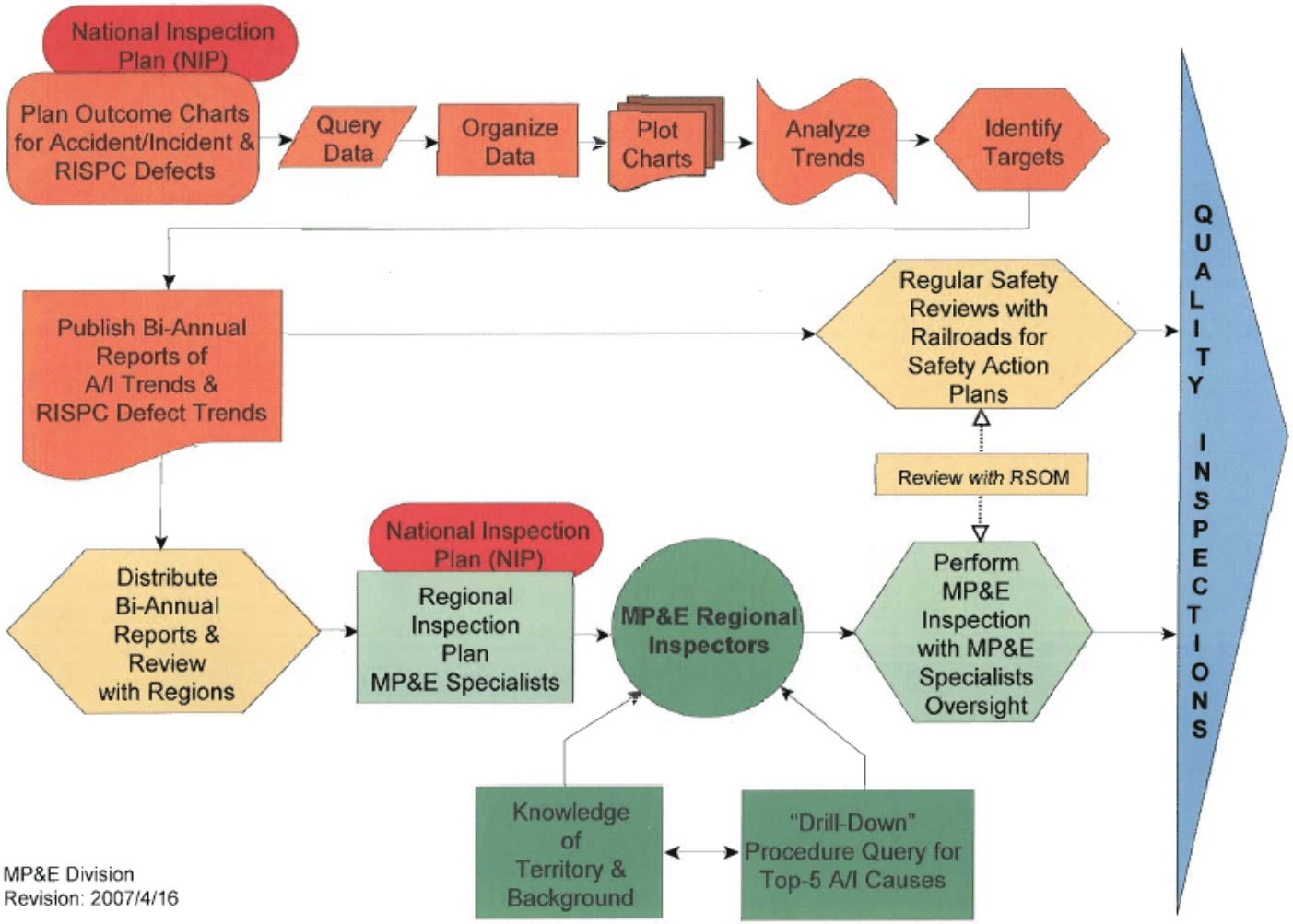
"Drill-Down" for the "Top Five" Causes of Derailments

5. For example, the Inspector selects "2-Query Accident/Incident Trends, 2.01 Train Accidents." From the Railroad Group, select Class I Railroads; then Region 6; then State - Missouri; then Type of Accident - Derailment; then Primary Cause of Accident - Mechanical and Electrical Failures; and finally the Inspector selects the time period (by year) 2005. Click on "Generate Report", and the "drill-down" results will be displayed. The "Top Five" causes of derailment, related to Mechanical and Electrical Failures are viewed as:

   Year 2005 Results to Date:
   - E40C Side bearing clearance insufficient;
   - E46C Truck bolster stiff;
   - E0HC Hnd brk link and/or connect defect;
   - E21C Center sill broken or bent;
   - E34C Draft gear/mechanism broke/defective

6. This process can then be repeated to assess other Accident/Incident trends by the MP&E Inspectors for as many states and locations as desired.

Statistically-Driven Inspection Guidance (Process)
Motive Power & Equipment Inspectors and Safety Specialists



Focused Enforcement: Focused enforcement entails concentrating enforcement efforts primarily on the types of violations most likely to cause an actual train accident or injury. FRA's accident/injury database provides a wealth of information on what these leading causes of accidents and injuries are. The basic principle here is allocating our finite enforcement resources on those areas where improvements in compliance are most likely to produce maximum safety benefits. The principle is the same with regard to allocating inspection resources; as discussed in a separate document on inspections, we need to use available information on safety risk criteria to better guide our selection of inspection priorities.

FRA Inspectors shall utilize FRA's accident, injury, and inspection data to gain better insight into the types of violations that are actually causing large numbers of accidents and injuries. While much of the information is already available to the field, FRA will distribute to the field data summaries showing the leading causes of train accidents and injuries by safety discipline, cause code, and regulatory section. The data will be industry-wide and broken down by railroad. With this information, Inspectors will be better equipped to weigh the discretion criteria concerning the inherent seriousness of violations and the level of risk posed in specific circumstances. This is not to suggest that enforcement decisions are to become entirely driven by data. Direct observations and experience will always be necessary elements of these decisions. However, because the agency has adopted certain performance goals linked directly to reducing the rate of certain unsafe events, we need to make better use of the data we collect to help guide our achievement of those goals.

In-depth accident analyses are conducted to determine if any laws, rules, or orders within FRA's jurisdiction have been violated and what remedial action should be taken. In addition, Inspectors must study accident trends in their inspection territory, especially those attributed to human factors and mechanical practices; to include inspections, tests and repairs. Information is available for each railroad in the Inspector's territory and will be helpful in outlining inspection plans and setting safety priorities. Site-specific inspections should be performed on the basis of each Inspector's knowledge of enforcement areas requiring more attention to ensure safety. An Inspector's knowledge of each railroad within the inspection territory should determine the types of inspections which must be performed. For example, if a recent human factors-caused accident was related to an improper air brake inspection, concentrated inspections of the railroad's air brake inspections should be conducted at various times throughout a 24-hour period, to include weekends. Where Inspectors are focusing on leading causes of accidents and injuries, their violation reports should summarize the factors underlying their decision.

In the meantime, Inspectors are encouraged to make use of data already at their disposal, including accident data, inspection data, and their own experience about the most important safety hazards. Inspectors should give this information great weight and strongly consider enforcement action whenever these especially unsafe conditions occur, with a goal of maximizing the safety return on enforcement efforts. While some enforcement actions will continue to be necessary on matters that are not likely to actually cause accidents or injuries, but violate regulations that are important underpinnings of an effective regulatory program (e.g., recordkeeping), those matters that are serious safety concerns are more likely to be the prime candidates for enforcement actions. Reporting, recordkeeping, and inspection violations become more important to the extent they are widespread and/or bear directly on compliance with substantive requirements.

Over time, this more careful focus on how enforcement discretion is exercised should significantly improve FRA's utilization of limited resources regarding compliance oversight. On the other hand, as we refine the process, we may decide to adopt a "zero tolerance" (i.e., always enforce) policy for the most egregious and flagrant violations. The goal is not to achieve a particular volume of enforcement actions on the high or low side. The goal is a compliance program in which enforcement discretion is routinely exercised in a commonsense way to address important problems that more cooperative methods have not resolved.

Interpretation of the Nationwide Mechanical Equipment Accident/Incident Statistics & Trends (Bi-annual Report): The MP&E Division reviews the accident/incident database on a continuous basis throughout the year. A report is prepared tailored to a specific railroad on a bi-annual basis (i.e. UP, CSX, NS, BNSF, KCS, Amtrak etc.). These reports display the nationwide equipment caused accident/incident trend, and recommendations from the MP&E Division to the Regional Safety Specialists and Inspectors regarding focus areas.

The analysis process for these bi-annual reports uses a "feed-back"loop, in that it takes raw data that has been organized and interpreted looking for trends. Then the charts are reviewed with Regional MP&E Specialists, representatives from the railroads, and the FRA's RSOM's. The Regional MP&E Inspectors develop focused inspections, the railroads action plans, and the RSOM's an oversight plan based upon the trends and "top-10 defects".

From the FRA's Safety Database, Inspectors can develop queries based upon "All Regions" or just their own for the "Primary Cause of Accidents" (for MP&E use "Mechanical and Electrical Failures"). The output from this query will yield the "top-10" from the Primary Cause Code ("E" (for equipment) XX (specific defect code) and "C" car or "L" (for car/locomotive). The raw data is then summarized into a series of charts based upon the actual count of incidents, then normalized by million train-miles. By normalizing the data the MP&E Inspector can compare a large Class I railroad with other railroads, regardless of class.

By graphing the raw and again for the normalized data the MP&E Inspector and Specialist will gain a powerful tool to see trends in the data. One caution is that for many of the MP&E causes of accidents/incidents, the number on a nationwide basis is very small, and on a Regional or county level may be so small that no trend can be established. The other issue is that large variations in the data may be observed, as the count from a railroad may go from 1 occurrence in a year to three, then the following year to zero. These small changes in the count will yield a large change in the graph. By normalizing the count by million-train miles, then comparing the rate to other railroads within the Class, the MP&E Inspector will be able to make a determination whether the change is of concern, or statically not important.

Examples of the FRA Safety Database outputs for selected defects such as: The Total MP&E Caused A/I Count, Axle-Caused, and Journal Bering Overheated Caused are provided for reference, along with their corresponding normalized rate charts. In addition, the MP&E Division developed a "Bad-Actor" Chart with targeted area for focused inspections on various railroads. If an "X" is annotated on the matrix, then that specific defect (such as E30-30 Coupler & Draft Gear) is either higher in count or rate than that nationwide average, or the slope of the line on the graph indicates an undesirable increase (trend) over the previous 2-3 years.

In summary, by developing a specialized “top-10" list of defects, an MP&E Inspector will gain insight into the type of mechanical defects that are causing accidents/incidents on a nationwide and/or Regional level. By paying close attention to these type of defects when conducting routine inspections, more potentially unsafe conditions will be identified and re-mediated in the yard before they can become an Accident/Incident statistic.

Nationwide Mechanical Equipment Accident/Incident Statistics & Trends (Biannual Report)

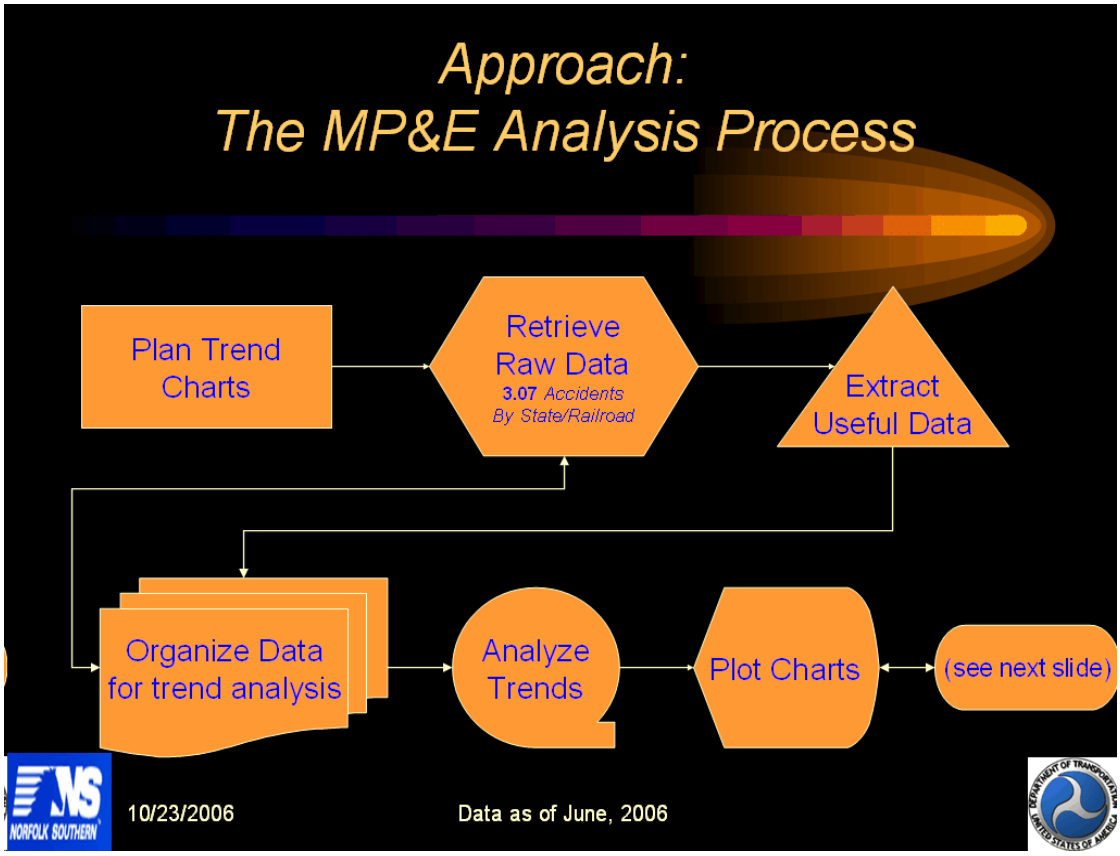
Norfolk Southern Corporation
Annual Mechanical Safety Review

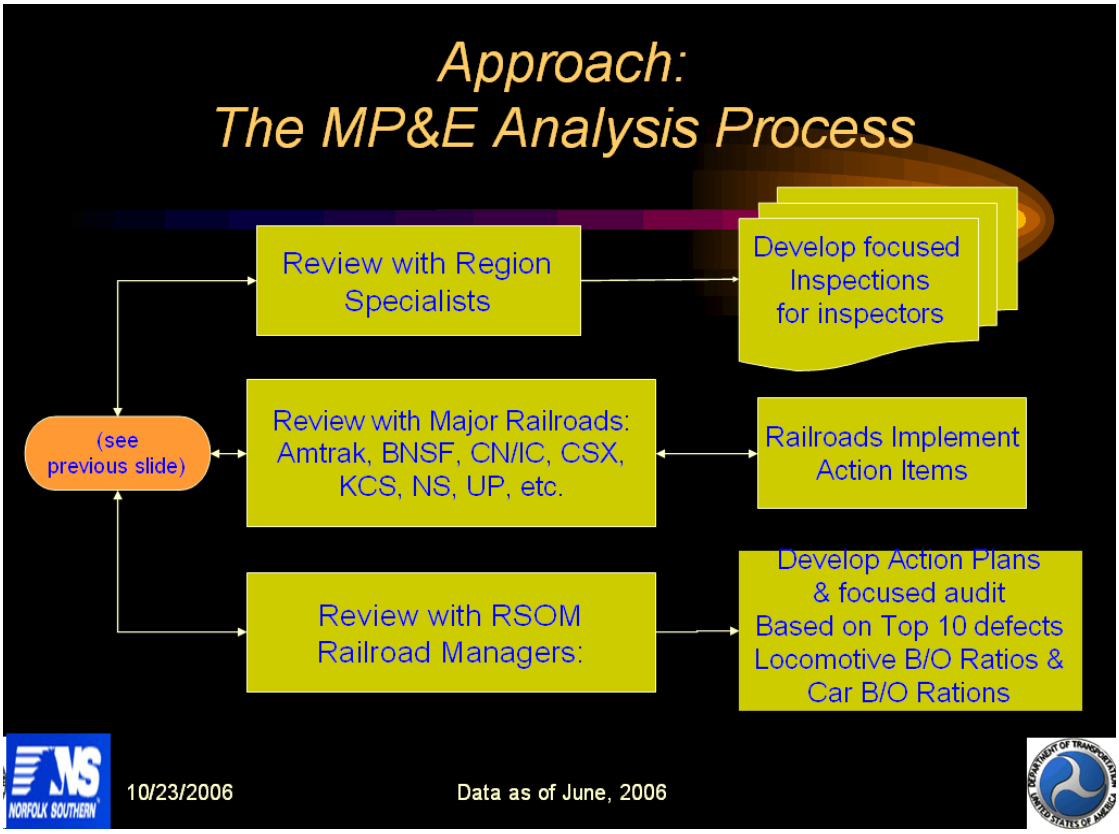
Motive Power and Equipment Division
Office of Safety Assurance & Compliance
Federal Railroad Administration

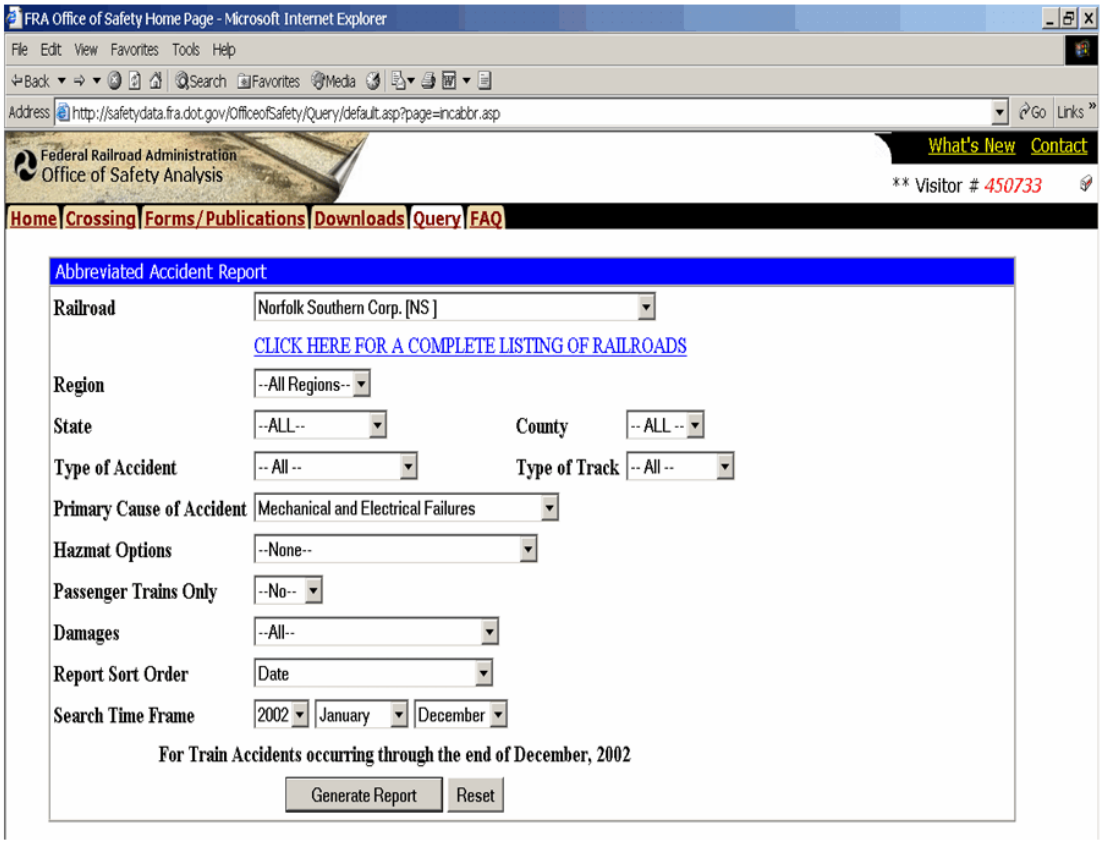
October 23, 2006
Washington DC

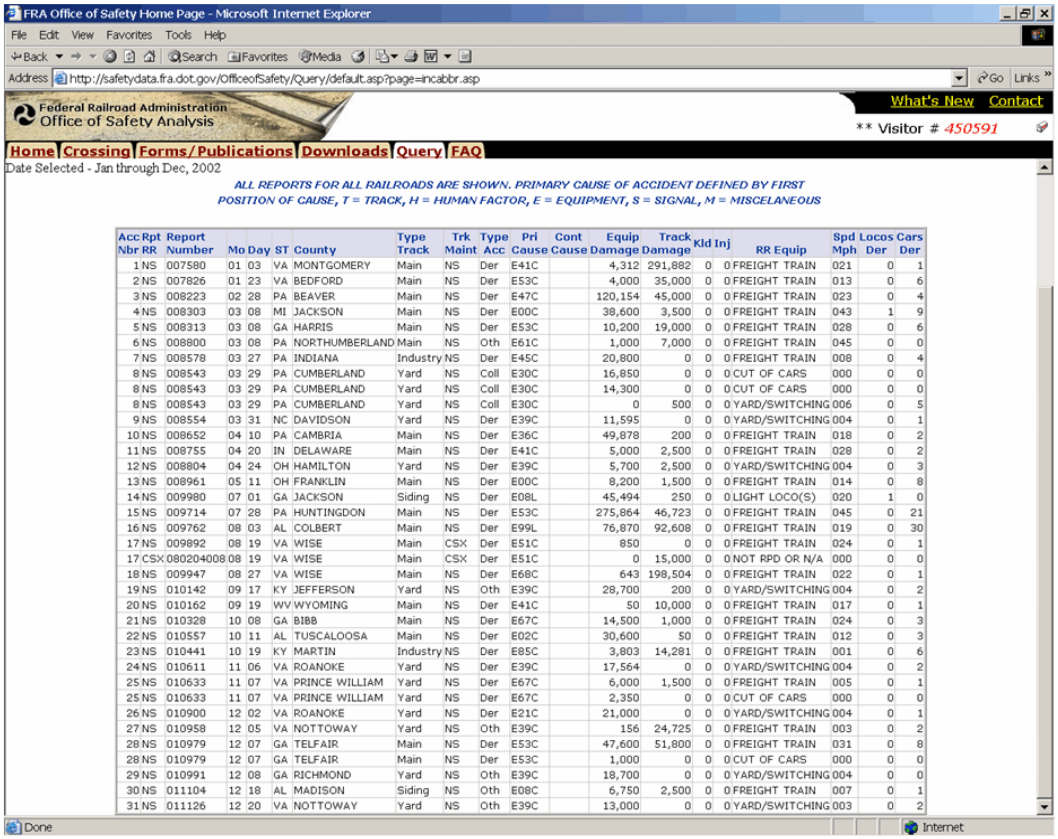
Overview

- Goal: Optimize use of available resources
- Approach: Develop periodic reports displaying nationwide equipment-caused accidents/incidents trends, and recommend MP&E inspection targets for the Regional Specialists
- The process: How the trend charts are created?
- Additional Option: Reference for NIP adjustments


Approach:
The MP&E Analysis Process
Plan Trend Charts
Retrieve Raw Data
3.07 Accidents By State/Railroad
Extract Useful Data
Organize Data for trend analysis
Analyze Trends
Plot Charts
(see next slide)
10/23/2006
Data as of June, 2006


Approach:
The MP&E Analysis Process
Review with Region Specialists
Develop focused Inspections for inspectors
(see previous slide)
Review with Major Railroads: Amtrak, BNSF, CN/IC, CSX, KCS, NS, UP, etc.
Railroads Implement Action Items
Review with RSOM Railroad Managers:
Develop Action Plans & focused audit Based on Top 10 defects Locomotive B/O Ratios & Car B/O Rations
10/23/2006
Data as of June, 2006





Acc Nbr	Rpt RR	Report Number	Mo	Day	ST	County	Type Track	Trk Maint	Type Acc	Pri Cause	Cont Cause	Equip Damage	Track Damage	Kld	Inj	RR Equip	Spd Mph	Locos Der	Cars Der
1	NS	007580	01	03	VA	MONTGOMERY	Main	NS	Der	E41C		4,312	291,882	0	0	FREIGHT TRAIN	021	0	1
2	NS	007826	01	23	VA	BEDFORD	Main	NS	Der	E53C		4,000	35,000	0	0	FREIGHT TRAIN	013	0	6
3	NS	008223	02	28	PA	BEAVER	Main	NS	Der	E47C		120,154	45,000	0	0	FREIGHT TRAIN	023	0	4
4	NS	008303	03	08	MI	JACKSON	Main	NS	Der	E00C		38,600	3,500	0	0	FREIGHT TRAIN	043	1	9
5	NS	008313	03	08	GA	HARRIS	Main	NS	Der	E53C		10,200	19,000	0	0	FREIGHT TRAIN	028	0	6
6	NS	008800	03	08	PA	NORTHUMBERLAND	Main	NS	Oth	E61C		1,000	7,000	0	0	FREIGHT TRAIN	045	0	0
7	NS	008578	03	27	PA	INDIANA	Industry	NS	Der	E45C		20,800	0	0	0	FREIGHT TRAIN	008	0	4
8	NS	008543	03	29	PA	CUMBERLAND	Yard	NS	Coll	E30C		16,850	0	0	0	CUT OF CARS	000	0	0
8	NS	008543	03	29	PA	CUMBERLAND	Yard	NS	Coll	E30C		14,300	0	0	0	CUT OF CARS	000	0	0
8	NS	008543	03	29	PA	CUMBERLAND	Yard	NS	Coll	E30C		0	500	0	0	YARD/SWITCHING	006	0	5
9	NS	008554	03	31	NC	DAVIDSON	Yard	NS	Der	E39C		11,595	0	0	0	YARD/SWITCHING	004	0	1
10	NS	008652	04	10	PA	CAMBRIA	Main	NS	Der	E36C		49,878	200	0	0	FREIGHT TRAIN	018	0	2
11	NS	008755	04	20	IN	DELAWARE	Main	NS	Der	E41C		5,000	2,500	0	0	FREIGHT TRAIN	028	0	2
12	NS	008804	04	24	OH	HAMILTON	Yard	NS	Der	E39C		5,700	2,500	0	0	YARD/SWITCHING	004	0	3
13	NS	008961	05	11	OH	FRANKLIN	Main	NS	Der	E00C		8,200	1,500	0	0	FREIGHT TRAIN	014	0	8
14	NS	009980	07	01	GA	JACKSON	Siding	NS	Der	E08L		45,494	250	0	0	LIGHT LOCO(S)	020	1	0
15	NS	009714	07	28	PA	HUNTINGDON	Main	NS	Der	E53C		275,864	46,723	0	0	FREIGHT TRAIN	045	0	21
16	NS	009762	08	03	AL	COLBERT	Main	NS	Der	E99L		76,870	92,608	0	0	FREIGHT TRAIN	019	0	30
17	NS	009892	08	19	VA	WISE	Main	CSX	Der	E51C		850	0	0	0	FREIGHT TRAIN	024	0	1
17	CSX	080204008	08	19	VA	WISE	Main	CSX	Der	E51C		0	15,000	0	0	NOT RPD OR N/A	000	0	0
18	NS	009947	08	27	VA	WISE	Main	NS	Der	E68C		643	198,504	0	0	FREIGHT TRAIN	022	0	1
19	NS	010142	09	17	KY	JEFFERSON	Yard	NS	Oth	E39C		28,700	200	0	0	YARD/SWITCHING	004	0	2
20	NS	010162	09	19	WV	WYOMING	Main	NS	Der	E41C		50	10,000	0	0	FREIGHT TRAIN	017	0	1
21	NS	010328	10	08	GA	BIBB	Main	NS	Der	E67C		14,500	1,000	0	0	FREIGHT TRAIN	024	0	3
22	NS	010557	10	11	AL	TUSCALOOSA	Main	NS	Der	E02C		30,600	50	0	0	FREIGHT TRAIN	012	0	3
23	NS	010441	10	19	KY	MARTIN	Industry	NS	Der	E85C		3,803	14,281	0	0	FREIGHT TRAIN	001	0	6
24	NS	010611	11	06	VA	ROANOKE	Yard	NS	Der	E39C		17,564	0	0	0	YARD/SWITCHING	004	0	2
25	NS	010633	11	07	VA	PRINCE WILLIAM	Yard	NS	Der	E67C		6,000	1,500	0	0	FREIGHT TRAIN	005	0	1
25	NS	010633	11	07	VA	PRINCE WILLIAM	Yard	NS	Der	E67C		2,350	0	0	0	CUT OF CARS	000	0	0
26	NS	010900	12	02	VA	ROANOKE	Yard	NS	Der	E21C		21,000	0	0	0	YARD/SWITCHING	004	0	1
27	NS	010958	12	05	VA	NOTTOWAY	Yard	NS	Oth	E39C		156	24,725	0	0	FREIGHT TRAIN	003	0	2
28	NS	010979	12	07	GA	TELFAIR	Main	NS	Der	E53C		47,600	51,800	0	0	FREIGHT TRAIN	031	0	8
28	NS	010979	12	07	GA	TELFAIR	Main	NS	Der	E53C		1,000	0	0	0	CUT OF CARS	000	0	0
29	NS	010991	12	08	GA	RICHMOND	Yard	NS	Oth	E39C		18,700	0	0	0	YARD/SWITCHING	004	0	0
30	NS	011104	12	18	AL	MADISON	Siding	NS	Oth	E08C		6,750	2,500	0	0	FREIGHT TRAIN	007	0	1
31	NS	011126	12	20	VA	NOTTOWAY	Yard	NS	Oth	E39C		13,000	0	0	0	YARD/SWITCHING	003	0	2

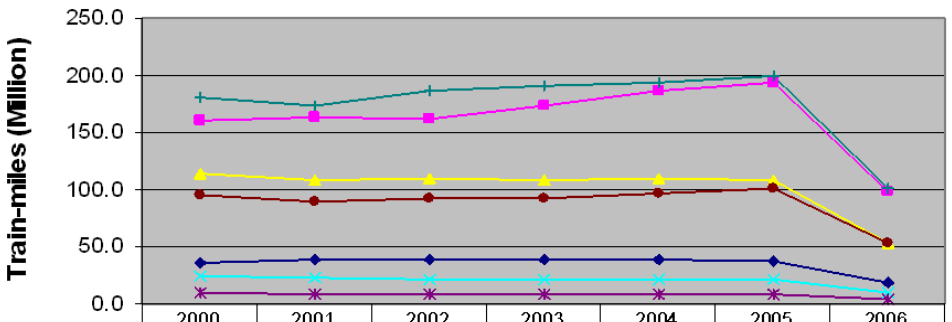
Results-Nationwide Trends

- Summary charts:
  - Train-miles—Normalization factor
  - Total equipment-caused trend
  - Chart of targets for MP&E inspection
- Detailed charts–A/I counts & rates, A/I causes breakdown by system:
  - Brake
  - Body
  - Coupler & Draft
  - Truck
  - Wheels, Locomotive
  - Wheels, Car
  - Axle & Journal Bearing
  - Locomotives
  - Door

10/23/2006 Data as of June, 2006

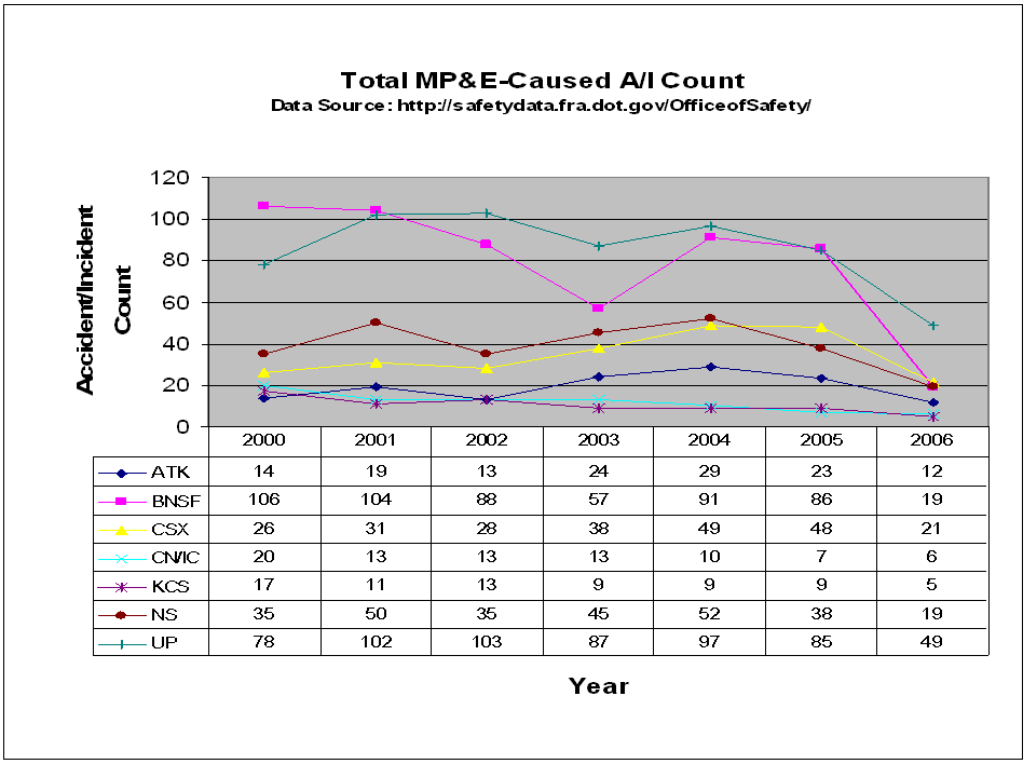
Normalization Factor: Train-Miles (Millions)

Data Source: http://safetydata.fra.dot.gov/OfficeofSafety/

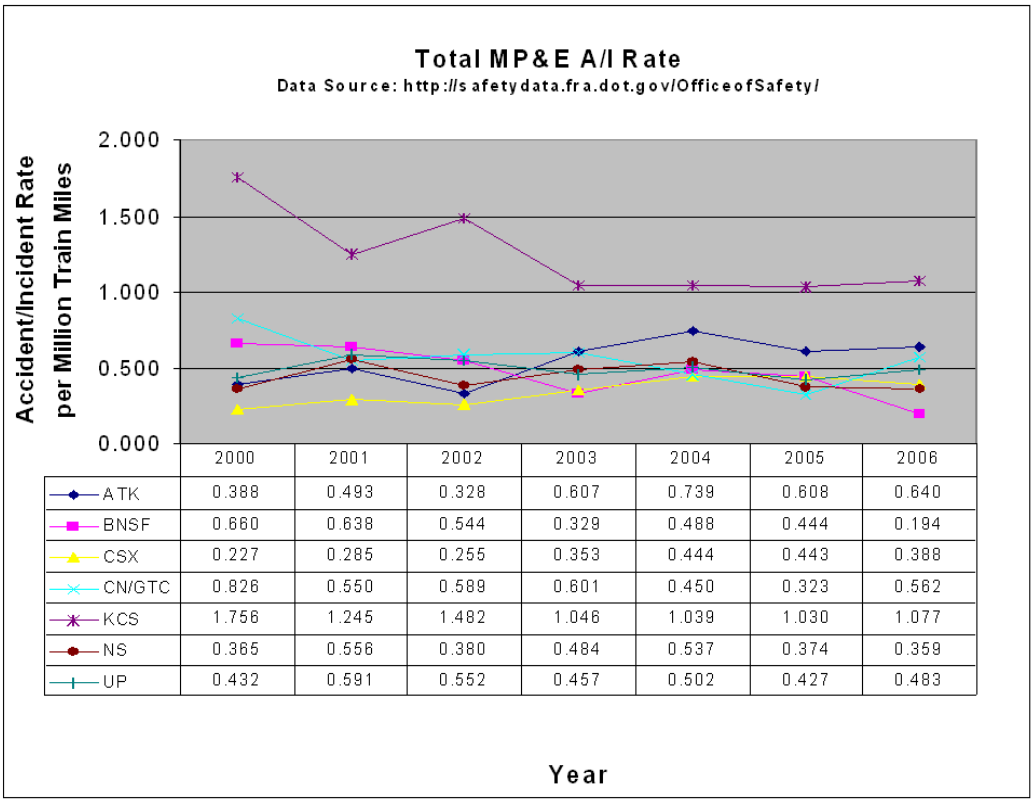


	2000	2001	2002	2003	2004	2005	2006
ATK	36.1	38.6	39.7	39.5	39.2	37.9	18.7
BNSF	160.6	162.9	161.8	173.4	186.5	193.5	98.2
CSX	114.3	108.6	109.9	107.8	110.3	108.5	54.1
CN/GTC	24.2	23.6	22.1	21.6	22.2	21.7	10.7
KCS	9.7	8.8	8.8	8.6	8.7	8.7	4.6
NS	95.8	90.0	92.2	93.0	96.9	101.7	52.9
UP	180.8	172.7	186.8	190.2	193.1	199.1	101.5

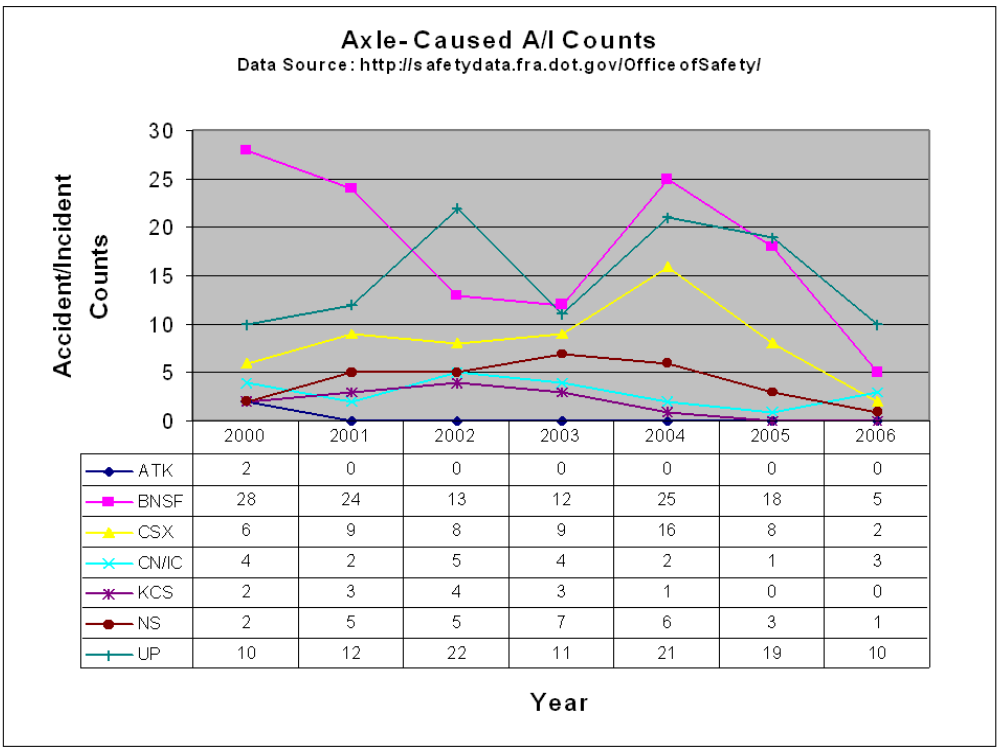
Year



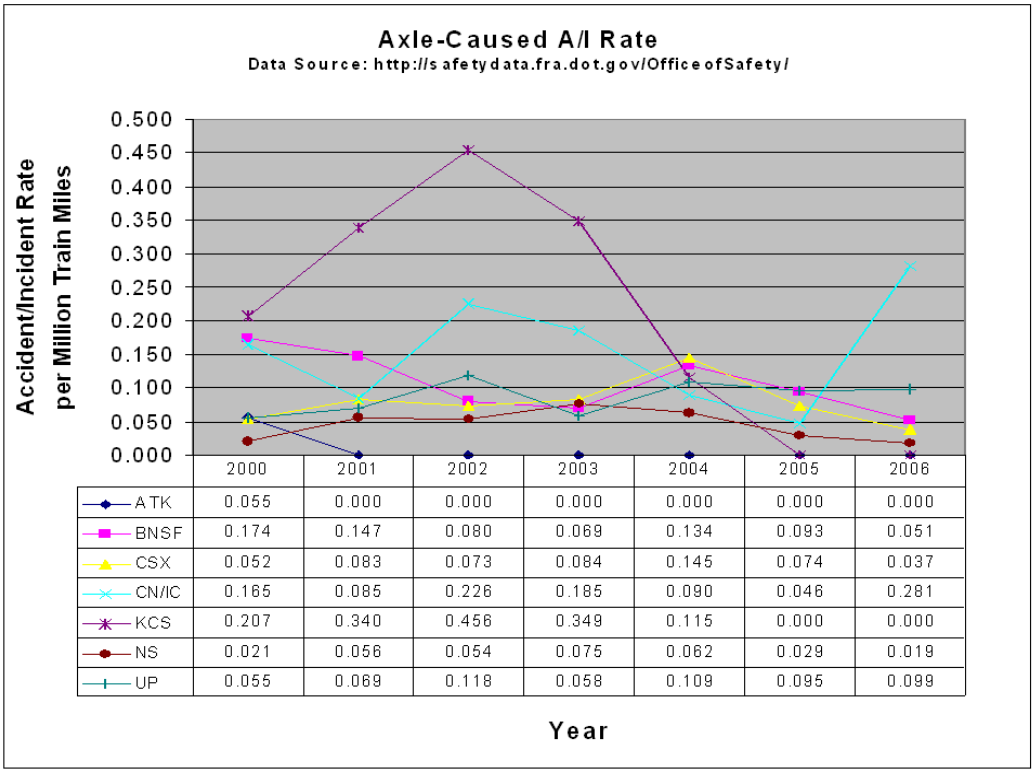
	2000	2001	2002	2003	2004	2005	2006
ATK	14	19	13	24	29	23	12
BNSF	106	104	88	57	91	86	19
CSX	26	31	28	38	49	48	21
CN/IC	20	13	13	13	10	7	6
KCS	17	11	13	9	9	9	5
NS	35	50	35	45	52	38	19
UP	78	102	103	87	97	85	49



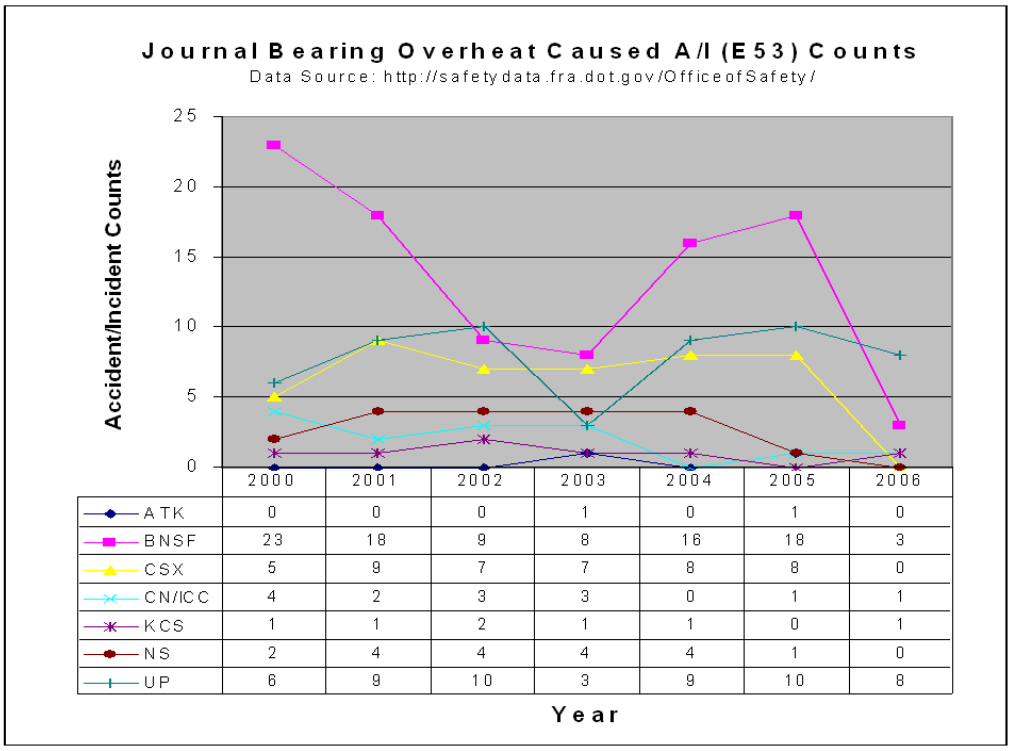
	2000	2001	2002	2003	2004	2005	2006
ATK	0.388	0.493	0.328	0.607	0.739	0.608	0.640
BNSF	0.660	0.638	0.544	0.329	0.488	0.444	0.194
CSX	0.227	0.285	0.255	0.353	0.444	0.443	0.388
CN/GTC	0.826	0.550	0.589	0.601	0.450	0.323	0.562
KCS	1.756	1.245	1.482	1.046	1.039	1.030	1.077
NS	0.365	0.556	0.380	0.484	0.537	0.374	0.359
UP	0.432	0.591	0.552	0.457	0.502	0.427	0.483



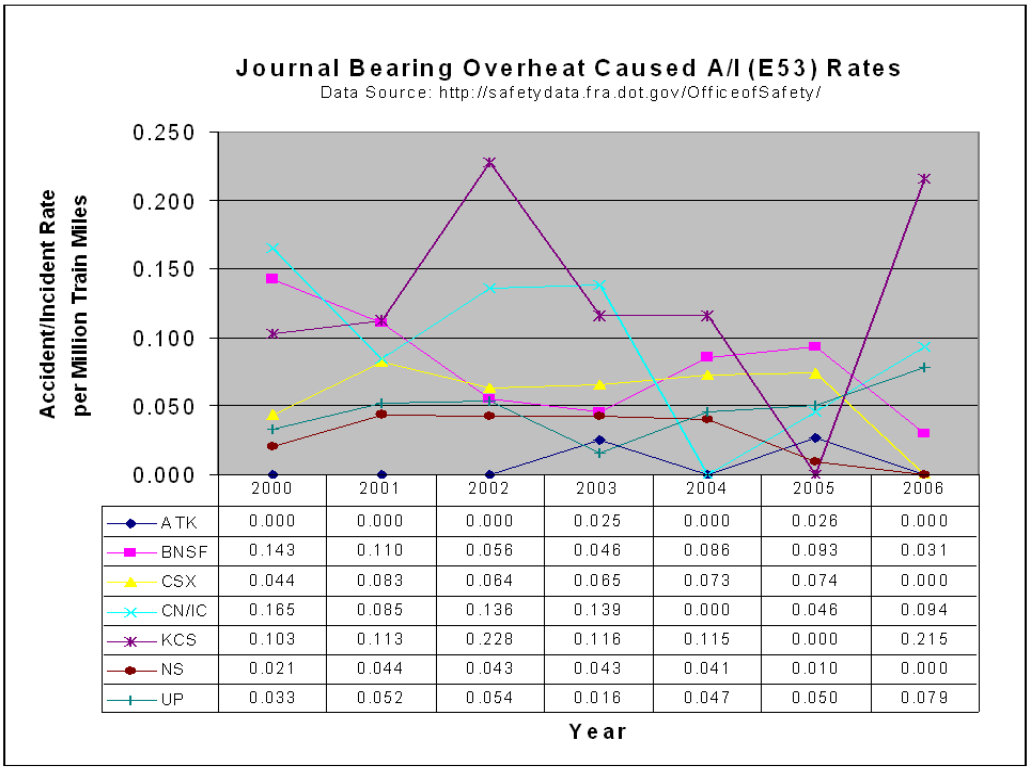
	2000	2001	2002	2003	2004	2005	2006
ATK	2	0	0	0	0	0	0
BNSF	28	24	13	12	25	18	5
CSX	6	9	8	9	16	8	2
CN/IC	4	2	5	4	2	1	3
KCS	2	3	4	3	1	0	0
NS	2	5	5	7	6	3	1
UP	10	12	22	11	21	19	10



	2000	2001	2002	2003	2004	2005	2006
ATK	0.055	0.000	0.000	0.000	0.000	0.000	0.000
BNSF	0.174	0.147	0.080	0.069	0.134	0.093	0.051
CSX	0.052	0.083	0.073	0.084	0.145	0.074	0.037
CN/IC	0.165	0.085	0.226	0.185	0.090	0.046	0.281
KCS	0.207	0.340	0.456	0.349	0.115	0.000	0.000
NS	0.021	0.056	0.054	0.075	0.062	0.029	0.019
UP	0.055	0.069	0.118	0.058	0.109	0.095	0.099



	2000	2001	2002	2003	2004	2005	2006
ATK	0	0	0	1	0	1	0
BNSF	23	18	9	8	16	18	3
CSX	5	9	7	7	8	8	0
CN/ICC	4	2	3	3	0	1	1
KCS	1	1	2	1	1	0	1
NS	2	4	4	4	4	1	0
UP	6	9	10	3	9	10	8



	2000	2001	2002	2003	2004	2005	2006
ATK	0.000	0.000	0.000	0.025	0.000	0.026	0.000
BNSF	0.143	0.110	0.056	0.046	0.086	0.093	0.031
CSX	0.044	0.083	0.064	0.065	0.073	0.074	0.000
CN/IC	0.165	0.085	0.136	0.139	0.000	0.046	0.094
KCS	0.103	0.113	0.228	0.116	0.115	0.000	0.215
NS	0.021	0.044	0.043	0.043	0.041	0.010	0.000
UP	0.033	0.052	0.054	0.016	0.047	0.050	0.079

"Bad-Actor" Chart
Targets for MP&E Inspection

Cause Code	E00 -09	E20 -29	E30 -39	E40 -49	E50 -59	E53	E60L -69L	E60C -69C	E70 -79	E80 -89	E90 -99
Category	Brake	Body	Coupler & Draft Gear	Truck	Axle	Journal Brg Overheat	Locomotive Wheel	Car Wheel	Locomotive	Door	General
AMTRAK									X		
Burlington Northern Santa Fe Railway					X	X	X				
CSX	X	X	X		X					X	
IC	X				X	X		X		X	
Kansas City Southern	X		X	X		X		X			
NS Norfolk Southern		X		X						X	
Union Pacific		X		X	X		X	X			

X: Indicates the a/l rate is relatively high or is on the rise in the last 2-3 years.
*Data cover a period from January 2000 through June 2006.
*Data have been normalized by million train-miles.