NATIONAL TRANSPORTATION SAFETY BOARD

Office of Railroad, Pipeline and Hazardous Materials Investigations
Washington, DC

TRACK AND ENGINEERING GROUP CHAIRMAN
FACTUAL REPORT

DCA16FR007

Amtrak Train No. 89 Collision with a Backhoe and Engineering Employees Resulting in Derailment and Injuries to Passengers at Milepost 15.7 on Amtrak's PW Line

Chester, Pennsylvania
April 3, 2016

Factual Report Prepared by:
R. A. Hipskind,
Track and engineering Group Chairman

Date: November 17, 2016

Accident

NTSB Accident Number:	DCA16FR007
Date of Accident:	April 3, 2016
Time of Accident:	7:50 a.m. (EDT)
Type of Train and No:	SB Train 89
Railroad Owner/Operator:	National Railroad Passenger Corporation (Amtrak)
Crew Members:	1 Engineer, 1 Conductor, 2 Assistant Conductors and three on-board service attendants
Location of Accident:	Chester, PA

Accident Summary:

For a summary of the accident, refer to the *Accident Summary* report, within this docket.

Circumstances Prior to the Accident:

Maintenance Work:

The Amtrak engineering department routinely operates automated geometry test vehicles over passenger routes to determine locations of incipient geometry in order to schedule maintenance crews to address the data results and locations identified through the testing programs. Upon review a review of the data, engineering department managers scheduled a location on Amtrak's PW Line located at milepost 15.7 on main track 2 for ballast cleaning to provide a longer term solution to a challenging area of fouled ballast. Amtrak engineering personnel developed a program to eliminate a series of mud locations using a Loram ballast vacuum train, maintenances crews and a backhoe to facilitate loosening the ballast section of the track.

The planned 55-hour track outage necessitated taking main track 2 out-of-service between control points (CP) Baldwin (MP 11.7) and Hook (MP 16.8) due to a vacuum train occupying that track for the extended period of time. Amtrak engineering personnel working with transportation personnel implemented the outage that began on April 1, 2016, at 10:00 p.m. [Friday night] and continued through to April 4, 2016, at 5:00 a.m. [Monday morning] To staff the continuous operation of the ballast removal, the engineering department assigned a foreman to work a 12-hour night shift and an additional foreman to work during the 12-hour day shift [night shift began at 7:00 p.m. to 7:00 a.m.; the day shift began at 7:00 a.m. to 7:00 p.m.].

According to interviews with maintenance of way personnel, nothing remarkable occurred Friday night as the equipment moved into position at the work site or during Saturday's work shifts.

On the morning of the accident, the night shift foreman in charge of a ballast cleaning project on main track 2 had called the dispatcher at 7:29 a.m. to release foul times for main tracks 1, 3 and 4 that he had in effect with the dispatcher. After releasing the fouls, that foreman was in the process of leaving the work site and a relief or day shift foreman was in the process of taking charge of the work. Prior to the night foreman releasing the fouls, at 7:19 a.m. the day shift foreman had called the dispatcher to take over the out-of-service track authority and had the dispatcher place it in his name.

Amtrak Train 89:

On Sunday, April 3, 2016, Amtrak operated southbound train 89, a locomotive pulling nine passenger cars and a baggage car on Amtrak's PW Line. The train originated at New York City's Penn Station, New York, New York, and was destined for Savanah, Georgia. The crew reported for duty at 5:25 a.m. at New York, NY and departed about 6:05 a.m. The train made its last stop at Philadelphia prior to departing southbound on main track 3.

In the area of the accident, Amtrak maintains and operates on four main tracks, designated as No. 1. No. 2, No. 3 and No. 4. [the track numbering has No.1 track as the eastern most track, main track 4, the western most track]. The authorized timetable operating speed for the two middle main tracks is 110 mph and 90 mph for the two outside main tracks for the area between CP's Baldwin and Hook. A review of the event recorder data indicates that train 89 was operating at 106 mph just prior to the engineer placing the train into emergency braking.

Accident:

As train 89 traveled south on main track 3, the engineer sounded the horn (whistle) for what he perceived as men and/or equipment; however, as he gained a better view he realized that equipment was obstructing the train's route and placed the train into emergency. At 106 mph the train decelerated but impacted the equipment at about 88 mph. The collision obliterated the backhoe sending pieces of the equipment throughout the area and into the west side of the first passenger coach.[1] As a result of the sudden deceleration, passengers were thrown about and injured. As a result of the collision with the equipment the locomotive derailed its lead truck. No other equipment of train 89 derailed. When the train came to a stop, the engineer radioed the dispatcher with an emergency notification and emergency responders arrived.

Figure 1. A view at the resting position Amtrak 627 on main track 3. Note the damage to the front of the locomotive, window damage can be seen on the west side of the first passenger coach.

Damages

Amtrak determined there was about $2.5 million of damage, primarily due to the locomotive damage. The total track damages were estimated at $50,000.

1 Case 590N Super backhoe (equipped with a specialized cribbing bucket at the rear and a loader bucket at the front)

Figure 2. This is a view looking south at the scattered debris from the train strike of the MOW equipment.

Figure 3. This is a view of debris as found on main track No. 4.

Figure 4. A view looking northeast at the Loram vacuum train as found on main track No. 2.

Wreckage:

Equipment damage is summarized in table 1 below.

Table 1

Disposition	Car Type	Number	Estimated damage
Damaged	Locomotive	627	$2.1 Mil
Damaged	Passenger Coach	82993	$350,000.00
Damaged	Passenger Coach	82524	$50,000.00
Damaged	Passenger Coach	82781	$10,000.00
Damaged	Café Car	43364	$1000.00

Figure 5. This is a view of the damages on the west side of the first passenger coach car.

Mechanical and Equipment:

Train Consist

Passenger train 89 consisted of one controlling locomotive and 7 passenger coaches, 1 café car, 1 business class car and 1 baggage car. The train weighed approximately 1,172,000 lbs. and was about 912 feet in length. The consist is shown in table 2.

Table 2-Train 89 consist

Sequence	Car Type	Number	Capacity
1	Locomotive	627	2 (+ 1 jumpseat)
2	Business Coach	82993	72
3	Passenger Coach	82524	70
4	Passenger Coach	82781	72
5	Passenger Coach	25034	59
6	Passenger Coach	25040	59
7	Passenger Coach	25013	59
8	Passenger Coach	25088	59
9	Café Car	43364	0[2]
10	Business Class Car	81543	62
11	Baggage Car	61028	0

Event Recorder Data and Download:

The following are the results of a review of the event recorder data:

- The train was operating at 106 mph before the engineer initiated an emergency brake application while on straight track.
- The train decelerated to about 88 when the train struck the backhoe.
- Whistle, lights, bell, horn and headlights functioning

Method of Operations

The PW line of the Mid Atlantic Subdivision of the Amtrak Northeast corridor extends in a timetable north-south direction from MP 0.0 at Control Point Zoo in Philadelphia, PA, to MP 134.6 at Control Point Avenue, Washington Terminal in Washington DC. The maximum authorized timetable speed on the subdivision in the vicinity of the accident in the block between CP Baldwin and CP Hook is 110 mph for tracks 2 and 3 and 90 MPH for track 1 and 4 for passenger trains. In the vicinity of the accident area, Amtrak operates trains on four main tracks utilizing a Traffic Control System (TCS) controlled by a dispatcher located at the CNOC (Consolidated National Operations Center) in Wilmington, Delaware. Train movements on the Mid-Atlantic Subdivision between CP Phil MP 3.6 to CP Holly MP 20.3 are governed by operating Rule 261.[3] Additionally, on tracks where Rule 261 is in effect, automatic block system (ABS) rules and Cab Signal System (CSS) Rules 550-561 are in effect for movements in both directions. [4,5] Amtrak

2 The café car does not have assigned or ticketed seating, hence "0" seating is used for this car.
3 Amtrak defines operating rule 261; Track signaled in both directions. Signal indication will be the authority for a train to operate in either direction on the same track. At a hand operated switch that is not equipped with an electric lock, a train may clear the main track only where the maximum authorized speed on the main track over the switch is 20 MPH or less.
4 Amtrak defines ABS as a block signal system in which the use of each block is governed by an automatic block signal, cab signal, or both.
5 Amtrak defines CSS as a cab signal system that is interconnected with the fixed signal system to provide the Engineer with continuous information on the occupancy and/or condition of the track ahead.

timetable 6 'A' speeds for Acela (passenger) trains on the PW line are capable of doing up to 135 mph in certain locations.

Track Description

Amtrak's PW Line lies in a southerly direction from Amtrak's 30th Street Station in Philadelphia, Pennsylvania, to Washington, DC. Passenger train sets can operate on PW line at a maximum authorized speed of 90—100 mph in the vicinity of the accident. The milepost numbering increases in the southward direction with MP 0.0 near 30th Street Station in Philadelphia.

The track centers in the area of the accident are approximately 13 feet. Amtrak operates the main tracks in the vicinity of the accident as FRA Class 6 with a maximum authorized timetable operating speed of 110 mph for passenger trains. There is minimal freight traffic on this corridor. Amtrak estimates the gross annual tonnage at 23-25 million gross tons (MGT) for the express tracks (main tracks 2 and 3) and 17-19 MGT for the outside tracks (main tracks 1 and 4).

Approaching the accident site from the north going southward, the train traversed track with an ascending grade from MP 12 to MP 13.8, where the grade varied from 0.14% to 0.41%. At MP 13.8 the grade descends to MP 14.25 at 0.55%. From MP 14.25 to MP 14.45, the grade is nearly level. At MP 14.45 the grade is ascending at 0.40% and plateaus at MP 14.8. From MP 14.8 to 15.55 the track is level. Starting at MP 15.55 the track has a descending grade that varies from 0.14% to 0.47% up to MP 16.6. The alignment of the track is tangent from MP 15.0 to MP 15.8. The accident occurred at MP 15.7.

All four main tracks are constructed with continuous welded rail (CWR) fastened to concrete crossties on 24 inch centers with Pandrol elastic fasteners.

Point of Impact:

The area of the debris field at and around the collision point were extensively documented and photographed. The point of impact (POI) or point of collision (POC) was at MP 15.68, which is where the backhoe was occupying main track No. 3.

Point of Derailment (POD):

Investigators observed wheel flange marks departing the west rail down the gage face of the rail head to the base of the rail and trailing southward as those marks angled towards the center of the concrete crossties. A companion set of marks were observed where flange marks went up and over the east head of the rail and dropped outside to the field side of the east rail. The marks trailed southward and angled away from the on-track material towards the outside edge of the concrete crossties. The consensus POD was established at MP 15.69, or about half way between the POI and the center of Booth Street bridge (underpass).

Interviews:

Investigators conducted eight interviews while on-scene. The following employees were interviewed (job titles): [a synopsis of those interviews can be found in Appendix C]

- **Day Shift Foreman**
- **Assistant Track Supervisor**
- **Night Shift Watchman**
- **Electric Traction Lineman**
- **Day Shift Watchman (Trackman/Watchman)**
- **Loram Superintendent**
- **Night Shift Foreman**
- **Assistant Division Engineer**

In addition to the on-scene interviews, investigators, including members of the Track and Engineering group or their representative(s), as well as, Party Spokespersons and other NTSB personnel (the interview group) held several rounds of interviews beginning in August of 2016 to November 2016. A total of 19 individuals participated in the interview process. All of the interviews can be accessed via NTSB's docket for this accident.

On August 24, 2016, four Amtrak managers were interviewed; they included the Division Engineer/Director of Engineering; Senior Manager, Training and Development; Deputy Chief Engineer Construction and the Director of Operating Practices. On the following day, Amtrak's Senior Manager of Heavy Construction (Production Programs) was interviewed, as well as, a panel interview that included the General Chairman for Brotherhood of Maintenance of Way Employes Division (BMWED), the General Chairman of Brotherhood of Railway Signalmen (BRS) and a representative for the American Railway and Airway Supervisors Association (ARASA).

On September 7, 2016, the interview group spoke with the following personnel: three engineering department safety liaisons whose individual backgrounds include maintenance of way, signal and supervisory positions. On September 8, three Amtrak directors were interviewed that included: Chief Transportation Officer, Director of System Safety, Engineering and Amtrak's Deputy Chief Safety Officer.

On September 29, 2016, the interview group discussed safety issues with the following three Amtrak senior level managers: Amtrak's Chief Operations Officer; Senior Vice President and Chief Engineer; Vice President and Chief Safety Officer; as well as, a Member of Amtrak's Board of Directors.

The interview group concluded its series of interviews on November 3, 2016, with an interview of Amtrak's newly appointed President and Chief Executive Officer.

The following safety topics are reviewed for this accident; those topics include: [some interview footnotes appears in the topic sections listed below]

- Site Specific Work Plans (SSWP)
- Job Briefings
- Supplemental Shunting Device (SSD)
- Foreman Transfer
- Watchmen position

Site Specific Work Plans (SSWP)

According to Amtrak's Assistant Division Engineer (ADE), he said that a SSWP was not prepared for the ballast cleaning project at MP 15.7. The ADE said that SSWP's were used for bigger projects, but that Amtrak did have a formal form to prepare for a SSWP.[6] According to Amtrak's Division Engineer/Director of Engineering, he said that a SSWP should have been prepared.[7] He said that was his opinion and there was nothing in writing. He also said that the extended outage would be one consideration for developing a SSWP. The Senior Manager of Heavy Construction (Production Programs) stated that for the larger production programs that include undercutting and track laying machines, he routinely has his personnel (staff) prepare very detailed SSWP's.[8] The Senior Vice President and Chief Engineer stated in his interview that a SSWP was used for larger projects but not the work that was on-going at the accident site; he said the length of the outage was not a factor.[9]

Several Amtrak SSWP's were reviewed. The following are elements found in those SSWP's:

- Job Summary or Statement of work
- Scope of work
- Hazard Assessment worksheet
- Manpower and additional departments
- Equipment
- Tools and training
- Equipment line-up
- Job Briefings
- Safety and PPE
- Emergency phone numbers
- Community/public impact
- Clean-up disposal

6 Assistant Division Engineer interview, page 64, lines 3—25; page 65 and page 66, lines 1---14
7 Division Engineer/Director of Engineering interview, page 10, lines 2—25; page 11, lines 1—18; page 72, lines 10---25; page 73, lines 1---24.
8 Senior Manager of Heavy Construction interview, page 61, lines5---25; page62; page 63, lines 1---13; page 68, lines, 9---25; pages 69 & 70; page 71, lines 1---22; page 75, lines 13---25; page 76; page 77, lines 1---7.
9 Senior Vice President and Chief Engineer interview, page 11, 24---25; page 12; page 13, lines1---19.

Job Briefings:

FRA regulations require that employees in charge of work on tracks must conduct a job briefing. FRA publishes a compliance document that is accessible via the web; it is titled *Track and Rail and Infrastructure Integrity Compliance Manual Volume III Railroad Workplace Safety, Chapter 3 Roadway Worker Protection (January 2014).* The document list five elemental principles on page 3.3.2 in the document: [additional regulatory language appears in Appendix B]

The rule is based upon a few very elemental principles:

1. A person who is not fouling a track will not be struck by a train.

2. A person who is fouling a track upon which a train will not move will not be struck by a train.

3. No person should foul a track unless that person knows either that:
   a. No train will arrive, or
   b. The person on the track will be able to move to a place of safety before a train arrives.

4. Each roadway worker bears the ultimate responsibility for his own on-track safety.

5. Each employer is responsible for providing the means for achieving on-track safety to each roadway worker employee.

FRA's Compliance Manual under the subsection entitled Supervision and Communication (214.315) lists the following regulatory language that governs how and when a job briefing is conducted and the responsibilities of those affected. Those regulations are as follows:

(a) *When an employer assigns duties to a roadway worker that call for that employee to foul a track, the employer shall provide the employee with a job briefing that includes information on the means by which on-track safety is to be provided, and instruction on the on-track safety procedures to be followed.*

(b) A job briefing for on-track safety shall be deemed complete only after the roadway worker has acknowledged understanding of the on-track safety procedures and instructions presented.

(c) Every roadway work group whose duties require fouling a track shall have one roadway worker designated by the employer to provide on-track safety for all members of the group. The designated person shall be qualified under the rules of the railroad that conducts train operations on those tracks to provide the protection necessary for on-track safety of each individual in the group. The responsible person may be designated generally, or specifically for a particular work situation.

(d) Before any member of a roadway work group fouls a track, the designated person providing on-track safety for the group under paragraph (c) of this section shall inform each roadway worker of the on-track safety procedures to be used and followed during the performance of the work at that time and location. Each

roadway worker shall again be so informed at any time the on-track safety procedures change during the work period. Such information shall be given to all roadway workers affected before the change is effective, except in cases of emergency. Any roadway workers who, because of an emergency, cannot be notified in advance shall be immediately warned to leave the fouling space and shall not return to the fouling space until on-track safety is re-established.

(e) Each lone worker shall communicate at the beginning of each duty period with a supervisor or another designated employee to receive a job briefing and to advise of his or her planned itinerary and the procedures that he or she intends to use for on-track safety. When communication channels are disabled, the job briefing shall be conducted as soon as possible after the beginning of the work period when communications are restored.

In addition to listing the regulatory language, FRA's Compliance Manual provides guidance language; the guidance language for 214.315, in part, is as follows:

Guidance. Section 214.315 details supervision and communication of on-track safety methods prior to working. Employees must be notified and acknowledge understanding of the on-track safety methods they are to use, prior to commencing duties on or near the track. Paragraphs (a) and (b) establish the duty of notification by the employer and the reciprocal duty of communicating acknowledgment by the employee. These sections essentially require a job briefing to inform all concerned of on-track safety methods at the beginning of each work period. The acknowledgment is an indication by the employee of understanding, or the opportunity to request explanation of any issues that are not understood.

Paragraph (c) requires that an employer designate at least one roadway worker to provide on-track safety while a group is working together. This designation can either be for a specific job or for a particular work situation. This section is vital to the success of any on- track safety program because the mere presence of two or more persons together can be distracting for all persons involved. FRA believes that awareness will be enhanced and confusion limited by requiring railroads to formally designate a responsible person. This designation must be clearly understood by all group members in order to be effective. An individual, such as a foreman, may generally be designated to be responsible for his or her group, but if two groups are working together or roadway workers of different crafts are assisting one another, it is imperative that this formal designation be communicated to and understood by all affected employees.

It is a common practice for two or more separate work groups to utilize the same working limits (and authority). The regulation clearly specifies that only one roadway worker can be in charge (RWIC) of the working limits. However, questions have arisen regarding the required qualifications for the workers providing on-track safety for a second or third roadway work group that may be utilizing the working limits held by the initial RWIC.

When working limits are established as a form of on-track safety, the provisions of §214.319(b) apply, which states: "Only one roadway worker shall have control over working limits on any one segment of track." Therefore, it is imperative that only one worker have control, even when multiple work groups may be using common working limits. This is necessary to avoid the complications of multiple or confusing instructions to trains and on-track equipment (OTE) that may be entering working limits.

Paragraph (d) explains the duties of the roadway worker designated to provide on-track safety for the work group. Before roadway workers foul a track, the designated person must inform each roadway worker in the group of the on-track safety methods to be used at that time and location. Essentially, the designated person must conduct an on-track safety briefing prior to the beginning of work on or near the track. This briefing might also fulfill the requirements of paragraph (a) of this section.

Before changing on-track safety methods during a work period, the designated roadway worker must again inform the group of the new methods to be used for their safety. If, for example, roadway workers are working on a track within working limits when the on-track safety method changes to train approach warning, all roadway workers fouling the track must first be informed that trains might approach on that track, and that they will be warned of the approaching train by watchmen/lookouts. They must also know that they can no longer depend on that track as a place of safety when a train approaches.

This provision also establishes methods to be used in the face of unforeseen circumstances. In these emergency situations, where notification of a change in methods cannot be accomplished, an immediate warning to leave the fouling space and not return until on- track safety is reestablished is required.

Given the above duties of the RWIC, it is important that he or she coordinate all on-track safety activities at a work site. This responsibility is an essential element of on-track safety especially when working limits are established and there are activities occurring such as train or on-track equipment movements within the working limits.

The Rule does not specify the location of the RWIC in relation to any work activity where on- track safety has been established or may be established. As such, it may be necessary for a RWIC to depart the work activity for a short period to travel to another area encompassing the same on-track safety (e.g., conduct on-track safety checks throughout a large mechanized production activity). However, during such periods where the RWIC may be away from a work site for short periods, it is imperative the roadway work group have readily available means to communicate with this employee. When a RWIC departs a work site for an extended period, a substitute employee, with the relevant qualifications may be designated. If any exclusive track occupancy authorities are involved, the change in the RWIC designation must be formally addressed in the railroad operating rule procedures.

The Compliance Manual further defines regulatory language about Working limits, generally, subsection 214.319, and the guidance for those paragraphs appear, in part, below:

> *Working limits established on controlled track shall conform to the provisions of § 214.321 Exclusive track occupancy, or § 214.323 Foul time, or § 214.325 Train coordination. Working limits established on non-controlled track shall conform to the provision of § 214.327 Inaccessible track. Working limits established under any procedure shall, in addition, conform to the following provisions:*
>
> *(a) Only a roadway worker who is qualified in accordance with § 214.353 of this part shall establish or have control over working limits for the purpose of establishing on-track safety.*
>
> *(b) Only one roadway worker shall have control over working limits on any one segment of track.*
>
> *(c) All affected roadway workers shall be notified before working limits are released for the operation of trains. Working limits shall not be released until all affected roadway workers have either left the track or have been afforded on-track safety through train approach warning in accordance with § 214.329 of this subpart.*
>
> **Guidance.** Working limits is an on-track safety measure which when established eliminates the risk of being struck by trains. Several methods of establishing working limits are found in this subpart. Those methods are distinguished by the method by which trains are authorized to move on a track segment, the physical characteristics of the track, and the operating rules of the railroad.
>
> Paragraphs (a) and (b) specifically refer to the roadway worker who is given control over working limits. These requirements assure that the roadway worker has the requisite knowledge and training, and prevent confusion by giving control to only one qualified roadway worker.
>
> Paragraph (c) provides the restrictions under which trains and roadway maintenance machines will be allowed to operate within working limits. The intent is that the roadway worker in charge will be able to communicate with a train while it is within the working limits, and to control its movement to prevent conflicts between trains, machines and roadway workers.
>
> The requirement that trains move at restricted speed in working limits unless otherwise authorized by the roadway worker in charge is intended as a fail-safe provision to afford the highest level of safety in the absence of authority for higher speed. FRA does not contemplate, nor would it condone, a situation in which a

roadway worker could authorize a higher speed for a train than would be otherwise permitted by the operating rules and instructions of the railroad.

Paragraph (d) addresses the procedure when working limits are released. It requires that all affected roadway workers be notified before trains will begin moving over the affected track. They must be either away from the track, or provided with another form of on-track safety.

In his interview, the day shift foreman stated the following about whether or not he had conducted a job briefing:[10]

"So had you held an on track safety briefing that morning at all?"

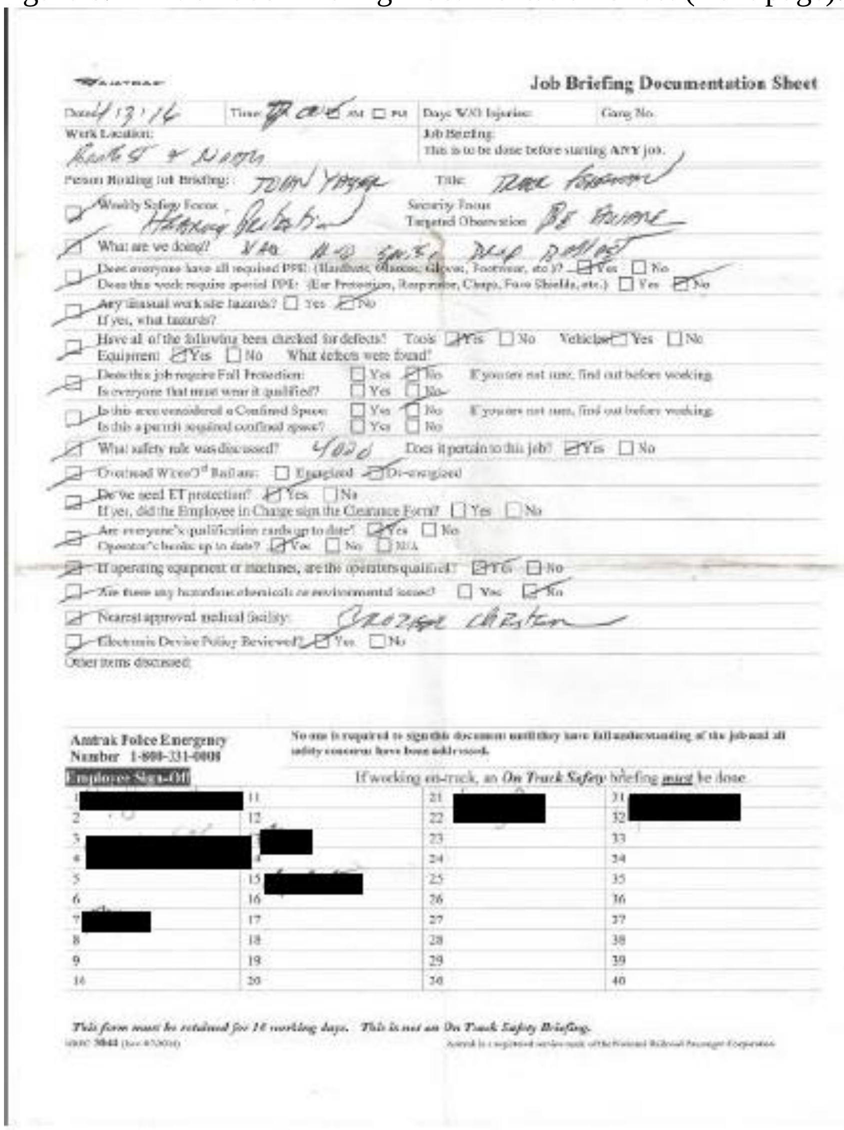
"I didn't do that until I was going to wait for the ET [electric traction] crew. Like I said, I wait for all the crews to -- the night crew from the (inaudible) people to leave, the day crew come in, the ET. So we are the people that are going to be there the rest of the day.

I feel it's better that way, instead of having people come at different times during the – especially when we're all in or around the same time being there, within 15-20 minutes, something like that."

The front page of the day shift foreman's job briefing is shown in figure 6. Page one is entitled "Job Briefing Documentation Sheet (JBD)." It contains 41 items, seven signatures and the notation NORAC Form 3044. This is not the On Track Safety Briefing sheet; that appears on the reverse side of the same document.

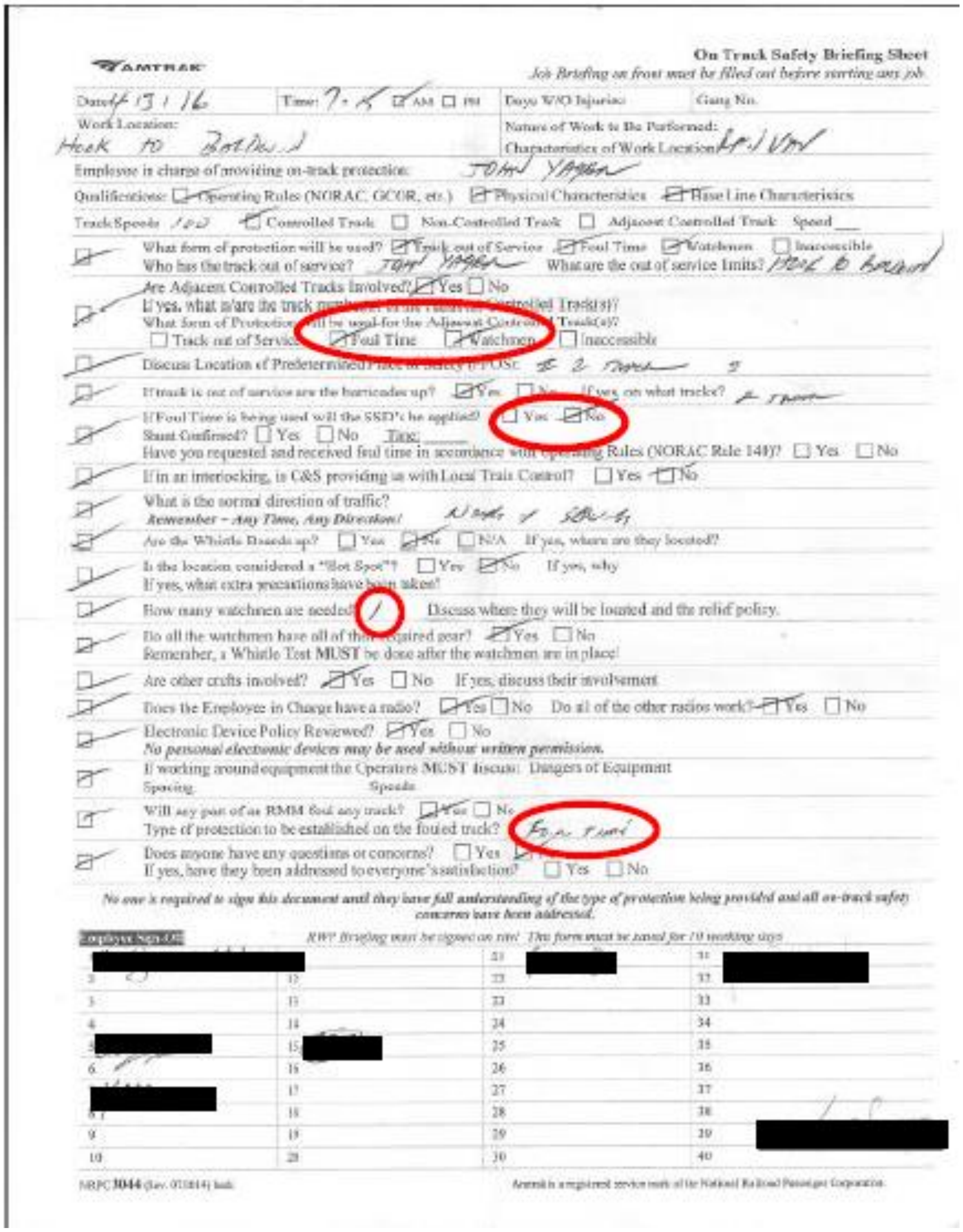
10 Day Shift Foreman interview, page 39, lines 3---14. As info, there were three different departments working or supporting this project who had different start times and associated travel from their respective headquarters.

Figure 6. Amtrak Job Briefing Documentation Sheet (front page).



The On Track Safety Briefing Sheet is shown in figure 7. The page covers 64 items and has seven signatures listed in the lower section of the sheet. Amtrak instructions state that it must be signed on site and must be saved for ten working days. Investigators requested and received the documents. The top highlighted areas in red show that the form of protection used are check boxed as foul time and a watchman; the second one down is blank in describing that the foreman has not requested foul time; the third area shows that one watchman will be needed and the bottom highlight shows that a RMM (roadway maintenance machine) will foul and be protected by foul time.

Figure 7. Amtrak On-Track Safety Briefing Sheet (reverse side)


AMTRAK

On Track Safety Briefing Sheet

Job Briefing on front must be filled out before starting any job

Date: Time: ☑ AM ☐ PM Days W/O Injuries: Gang No.

Work Location:

Nature of Work to Be Performed:

Characteristics of Work Location

Employee in charge of providing on-track protection:

Qualifications: ☑ Operating Rules (NORAC, GCOR, etc.) ☑ Physical Characteristics ☑ Base Line Characteristics

Track Speeds ☑ Controlled Track ☐ Non-Controlled Track ☐ Adjacent Controlled Track Speed ___

What form of protection will be used? ☑ Track out of Service ☑ Foul Time ☑ Watchmen ☐ Inaccessible

Who has the track out of service? What are the out of service limits?

Are Adjacent Controlled Tracks Involved? ☑ Yes ☐ No

If yes, what is/are the track number(s) of the Adjacent Controlled Track(s)?

What form of Protection will be used for the Adjacent Controlled Track(s)?

☐ Track out of Service ☑ Foul Time ☑ Watchmen ☐ Inaccessible

Discuss Location of Predetermined Place of Safety (PPOS):

If track is out of service are the barricades up? ☑ Yes ☐ No If yes, on what tracks?

If Foul Time is being used will the SSD's be applied? ☐ Yes ☑ No

Shunt Confirmed? ☐ Yes ☐ No Time: ___

Have you requested and received foul time in accordance with Operating Rules (NORAC Rule 140)? ☐ Yes ☐ No

If in an interlocking, is C&S providing us with Local Train Control? ☐ Yes ☑ No

What is the normal direction of traffic?

Remember – Any Time, Any Direction!

Are the Whistle Boards up? ☐ Yes ☑ No ☐ N/A If yes, where are they located?

Is the location considered a "Hot Spot"? ☐ Yes ☑ No If yes, why

If yes, what extra precautions have been taken?

How many watchmen are needed? 1 Discuss where they will be located and the relief policy.

Do all the watchmen have all of their required gear? ☑ Yes ☐ No

Remember, a Whistle Test MUST be done after the watchmen are in place!

Are other crafts involved? ☑ Yes ☐ No If yes, discuss their involvement

Does the Employee in Charge have a radio? ☑ Yes ☐ No Do all of the other radios work? ☑ Yes ☐ No

Electronic Device Policy Reviewed? ☑ Yes ☐ No

No personal electronic devices may be used without written permission.

If working around equipment the Operators MUST discuss: Dangers of Equipment

Spacing Speeds

Will any part of an RMM foul any track? ☑ Yes ☐ No

Type of protection to be established on the fouled track?

Does anyone have any questions or concerns? ☐ Yes ☑ No

If yes, have they been addressed to everyone's satisfaction? ☐ Yes ☐ No

No one is required to sign this document until they have full understanding of the type of protection being provided and all on-track safety concerns have been addressed.

Employee Sign-Off — *RWP Briefing must be signed on site! This form must be saved for 10 working days*

[redacted]	11	21 [redacted]	31 [redacted]
2	12	22	32
3	13	23	33
4	14	24	34
[redacted]	15 [redacted]	25	35
6	16	26	36
[redacted]	17	27	37
8	18	28	38
9	19	29	39 [redacted]
10	20	30	40

NRPC 3044 (Rev. 07/2014)

Amtrak is a registered service mark of the National Railroad Passenger Corporation.

Upon releasing on-track protection, two other Class I railroads do require that the employee-in-charge of a work group conduct a de-brief to assess that all personnel and equipment are in the clear. Amtrak does not have a similar de-brief initiative.

Supplemental Shunting Device(s) (SSD):[11]

The day shift foreman said that he did not have SSD's to use.[12] Amtrak operating rules require the use of SSD's when an employee in charge engages in covered fouling activities (for example, uses machinery that will foul a track in signaled territory). Amtrak only allows qualified employees to request and receive foul time. Those employees must be trained and pass tests that cover NORAC Operating Rules, as well as, timetable special instructions. The procedure for the use of SSD is found in Amtrak's timetable in the special instructions section. At the time of the accident, the following was the language contained in Amtrak's timetable special instructions section: [additional Amtrak Foul Time and SSD rule language can be found in Appendix A]

USE OF SUPPLEMENTAL SHUNTING DEVICE (SI 140-S2)

This instruction requires the employee in charge of "covered fouling activities" to apply an approved Supplemental Shunting Device (SSD) to the track(s) to be fouled, after receiving foul time from the Dispatcher or Operator. The purpose of the SSD is to **supplement, not replace,** blocking device protection provided by the Dispatcher or Operator.

A. Covered Fouling Activities:

Except as noted below, this instruction applies when equipment will be used to foul a track in signaled territory or within interlocking limits for more than 5 minutes. In addition to the above requirement and adherence to Amtrak training and qualifications, an employee using foul time comply with the following:

FOUL TIME (SI 140-S1)

The employee who was granted Foul Time by the Dispatcher or Operator must not release the Foul Time until they have ensured that all fouling activity under their authority has been cleared.

In their respective interviews, the night shift foreman stated that he released his three fouls (for main tracks 1,3, & 4) with the dispatcher knowing that the backhoe was occupying main track 3; the day shift foreman stated that he called the dispatcher to get the "track out" [main track 2 for the form D] and he said that he did not talk with the dispatcher again until

11 A device used to provide positive shunt through track occupancy with documented verification to the dispatcher.
12 Day shift foreman interview, page 77, lines 9----21.

after the train came.[13] The day shift foreman said that two foreman cannot have the same foul.[14]

Investigators interviewed Amtrak's Director of Operating Practices to learn more about the foremen's actions, their options during the transfer and avenues for safety improvements. He said that Amtrak does not currently have a process or procedure [mechanism] for two foremen to pass off or transfer their fouls with the dispatcher [meaning that the fouls would not be released but rather kept in force with a new foreman responsible for those fouls].[15]

Prior to the accident Amtrak did not have a specific efficiency testing code for SSD observation/compliance for supervisors and managers to use and input into Amtrak's efficiency testing program data.

Foreman Transfer:

When the night shift foreman was preparing to leave the job site, he and the day shift foreman took some time to discuss the work. According to the foremen, the supervisor on-scene was not present during their discussion. The characterization that each foreman related to investigators about what was said differ in content and detail. The day shift foreman prior to communicating with the night shift foreman had called the dispatcher to obtain the Form D for main track 2 and put it under his name with the dispatcher and he said that he advised the night shift foreman that he had done that. [see Radio Communication section of this report for the detail of the language used and time stamps for those communications with the dispatcher]. The night shift foreman said that he called the dispatcher after talking to the day shift foreman and that it was his [the night shift foreman's] understanding that the day shift foreman wanted him to release the fouls that he [the night shift foreman] had. The night shift foreman completed his conversation with the dispatcher at 7:29 a.m. [giving up his Form D and releasing all of the fouls he held] and during that conversation, informed the dispatcher that the day shift foreman "is gonna pick them [the fouls] up." [Note: a detailed review of the foreman transfer can be found in NTSB's Human Performance Group Chairman's Factual Report].

Shortly after releasing his fouls with the dispatcher, the night shift foreman claims that he informed the day shift foreman that he had released the fouls. The night shift foreman left the work area, but he later returned upon hearing about the accident.

13 The night shift foreman interview, page 49, lines 7—25; page 50; page 51, lines 1---19. The day shift foreman interview, page 33, lines 6---14.
14 The day shift foreman interview, page 29, lines 1—25, page 29, lines 1---3.
15 Director of Operating Practices, page 58, lines 17---25; pages 59 & 60; page 61, lines 1---13.

Watchman:

As noted earlier in this report, the day shift foreman circulated and had employees sign the On Track Safety Briefing Safety Sheet that noted one watchman would be used as part of the work group's protection (advance warning of train movement into the work limits). The night shift foreman used one watchman as well. Main track 2 was out-of-service (Form D). When foul times were released and train movements were allowed into the work zone, the watchman (regardless of the specific shift) was responsible for monitoring train movement from both directions on main tracks 1, 3 and 4. The sight distance testing section appearing in this report focused on movement of a train approaching from the north traveling southbound.

Postaccident Field Investigation Actions:

Ground Level Sight Distance Test:

On Sunday, June 12, 2016, after job safety briefings for each group of investigators, investigators conducted sight distance tests from a ground level position at the accident site to determine the advance warning time or distance of a train approach to the accident site. Exemplar watchmen attentively observed from outside of and in the clear of main track 4 for the southbound approach of equipment operating at a designated 106 mph and noted the first appearance of equipment on the horizon. Exemplar watchmen also observed and noted the time when the approaching equipment could be seen clearly on main track 3. To conclude each test, the exemplar watchmen marked the time that the equipment passed the accident site location. Below is a matrix with the test run designation, time of test, first appearance total time, the same for appearance on main track 3, and calculated distance for each category. The calculated footage (distance) was rounded and appears under the associated time reference.

In addition to the above tests to determine distance, investigators used an exemplar watchman standing outside main track 4 using a red disc (with a "W") to alert the oncoming train. This activity was recorded via the onboard forward-facing digital video recorder. Investigator downloaded video and event recorder data from all of the tests for further review.

To simulate the presence of equipment on main track 2, investigators arranged to park an Amtrak catenary maintenance/inspection car at the accident site location. Main track 2 was placed out-of-service for purposes of the testing.

Table 3 Sight Distance Data

Test Run	Test Time	1st Sight of Train and distance[16]	Clearly on 3 main and distance[17]	Comments
Acc'd time	6:39:30 a.m.	28.40—25.95 sec. 4415—4034'	11.22—10.83 sec. 1822—1684'	Adjusted acc'd time
2nd run with watchman	7:02 a.m.	28.25---26.35 sec. 4392—4097'	11.5—13.83 sec. 2150—1788'	Watchman in place[18]
3rd run with watchman	7:20 a.m.	28.46—26.35 sec. 4425---4190'	10.28—11.92 sec. 1853—1598'	Watchman in place Foul of main 4
Train 89	7:42 a.m.	25.88—22.58 sec. 4023—3510'	13.43—10.52 sec. 2088---1634'	Data retrieve only

Amtrak's Roadway Worker Protection Manual, System Safety (Rev 4 January 1, 2015) requires that employees and equipment clear the track 15 seconds prior to the arrival of a train. The following speed and distance chart aids employees in calculating the time and distance needed for watchmen to ensure compliance with the 15 second rule. The maximum authorized speed (MAS) for passenger trains on main tracks 2 and 3 in the area of the accident is 110 mph; for the outside main tracks, tracks 1 and 4, the MAS is 90 mph.

SPEED DISTANCE CHART

Miles Per Hour	Feet Per Second	Feet in 15 Seconds
70	102.7	1540
75	110.0	1650
80	117.3	1760
85	124.7	1870
90	132.0	1980
95	139.3	2090
100	146.7	2200
105	154.0	2310
110	161.3	2420
115	169.6	2530
120	176	2640
125	183.3	2750

16 Investigator watchman began time sequence upon first sight of oncoming equipment.
17 Investigator watchman began time sequence upon viewing equipment on main track 3.
18 Investigator watchman with watchman equipment, warning whistle, orange disc, air horn and watchman's vest positioned outside of main track 4.

Amtrak "Hot Spots"

Amtrak engineering in conjunction with union participation developed a document that identified areas where additional watchmen should be considered because of environmental concerns like curvature or other sight limitations. Amtrak RWP Rule 360 appears below.

360. HOT SPOTS

Definition: Hot spots are locations on the railroad where additional Roadway Worker Protection is required! These physical locations include a variety of conditions.

1. Curves with limited visibility.
2. Tunnels with limited and close clearance.
3. Track locations with heavy outside noise.
4. Track locations with limited or no clearance.
5. Bridge locations with limited or no clearance.
6. Track locations with limited or no visibility due to obstructions.

Potential Hot Spots:

1. Bridges—overhead, undergrade and movable—walkways, hand railings, and clearing bays.
2. Curves—simple (sharp/high degree of curvature), reverse, compound, brokenback, and vertical (grades).
3. Roadbed—fill section (elevated) and cut section (rock cut).
4. Tunnels—manholes (cut outs) and bench walls (ladders and handholds).
5. Fencing—right of way, intertrack and high level platforms.
6. Overbuilts—manholes (cut outs) and clearing bays.

Hot Spot Examples:

1. When a lone worker requires positive protection or a watchman to work safely at a given location, then that would qualify as a Hot Spot.
2. When a roadway work group (gang) requires positive protection or advance gang watchman to work safely, then that would qualify as a Hot Spot.
3. When you have less than 15 seconds to clear the work limits (location) safely, then that would definitely qualify as a Hot Spot.
4. When your working limits (location) require more than 15 seconds to clear safely because of limited or no clearance areas nearby, then that would qualify as a Hot Spot.

Operational Observations:

Investigators performed 3 test runs through the accident area. The constant speed of the locomotive during the test runs was 106 mph. Investigators used the locomotive horn to mark various points of observations during the test runs. The following are operational observations by investigators riding the test equipment for the various test runs conducted in conjunction with sight distance tests:

- Investigators could see equipment ahead at the overhead Commodore Barry Bridge (highway) location, curve begins south of (after) the bridge location.

- Investigators noted that immediately to the west of the catenary car during the first test run, shadows existed on main track 3 and 4; however, investigators found it difficult to discern between the Booth St. undergrade bridge and any shadow casting from the catenary car.

- Investigators first saw the catenary car at MP 14.88 and noted a darken area west of the catenary car appearing over main tracks 3 and 4.

- Investigators were able to see watchman west of main track four from MP 15.08, approximately 1½ catenary poles north of the 2nd undergrade bridge (north of the accident, Highland Ave.).

- Investigators were able to see watchman waving a red disc at MP 15.26, approximately 1½ catenary poles north of the 2nd undergrade bridge (north of the accident, Highland Ave.).

- At MP 15.52 investigators were able to discern between the shadow cast upon tracks 3 and 4 and the Booth St. undergrade bridge.

Video Comments:

Upon completion of the various test runs the test equipment was returned to 30th Street Station where event and video recorder data was downloaded. Investigators met and reviewed same and held a de-brief meeting to discuss the test activity. Below are comments from the review of images produced from the video data:

Investigators first see Catenary Car:

DVR Video Snapshot

C:\Train 89(03APR16) E-627 Colission with Backhoe Trainer, PA 04-03-2016\615 Event Recorderand LDVR\AMTK 615\Rend Cab\2016 06 12\06.58.59_07.28.58.avi : Locomotive AMTK 615
Sun, Jun 12, 2016, 6:21:09 AM (Central Daylight Time) (39.8392° N, 75.3813° W @ 104.3 mph)
Event: Horn high logged at Sunday, June 12, 2016 6:21:10 AM

Video Capture Size: 704 x 480 pixels
Video Frame Time: 6/12/2016 6:21:09 AM (Central Daylight Time)
Media Input Name: Rend Cab
DVR Location: AMTK 615
Locomotive: AMTK 615
DVR Serial #: KB0924A104-LDVR
DVR Station ID: 0

Investigators first see watchman:

DVR Video Snapshot

C:\Train 89(03APR16) E-627 Colission with Backhoe Trainer, PA 04-03-2016\615 Event Recorderand LDVR\AMTK 615\Rend Cab\2016 06 12\06.58.59_07.28.58.avi : Locomotive AMTK 615
Sun, Jun 12, 2016, 6:21:16 AM (Central Daylight Time) (39.8378° N, 75.3840° W @ 104.8 mph)
Event: Horn high logged at Sunday, June 12, 2016 6:21:18 AM

Video Capture Size: 704 x 480 pixels
Video Frame Time: 6/12/2016 6:21:16 AM (Central Daylight Time)
Media Input Name: Rend Cab
DVR Location: AMTK 615
Locomotive: AMTK 615
DVR Serial #: KB0924A104-LDVR
DVR Station ID: 0

Investigators can see orange disk:

DVR Video Snapshot

C:\Train 89(03APR16) E-627 Colission with Backhoe Trainer, PA 04-03-2016\615 Event Recorderand LDVR\AMTK 615\Rend Cab\2016 06 12\06.58.59_07.28.58.avi : Locomotive AMTK 615
Sun, Jun 12, 2016, 6:21:22 AM (Central Daylight Time) (39.8363° N, 75.3873° W @ 105.3 mph)
Event: No event selected

Video Capture Size: 704 x 480 pixels
Video Frame Time: 6/12/2016 6:21:22 AM (Central Daylight Time)
Media Input Name: Rend Cab
DVR Location: AMTK 615
Locomotive: AMTK 615
DVR Serial #: KB0924A104-LDVR
DVR Station ID: 0

Investigators can differentiate the shadow cast by the catenary car and the dark area of the open deck undergrade bridge:

DVR Video Snapshot

C:\Train 89(03APR16) E-627 Colission with Backhoe Trainer, PA 04-03-2016\615 Event Recorderand LDVR\AMTK 615\Rend Cab\2016 06 12\06.58.59_07.28.58.avi : Locomotive AMTK 615
Sun, Jun 12, 2016, 6:21:31 AM (Central Daylight Time) (39.8345° N, 75.3912° W @ 105.5 mph)
Event: No event selected

Video Capture Size: 704 x 480 pixels
Video Frame Time: 6/12/2016 6:21:31 AM (Central Daylight Time)
Media Input Name: Rend Cab
DVR Location: AMTK 615
Locomotive: AMTK 615
DVR Serial #: KB0924A104-LDVR
DVR Station ID: 0

Image of roadway workers:

DVR Video Snapshot

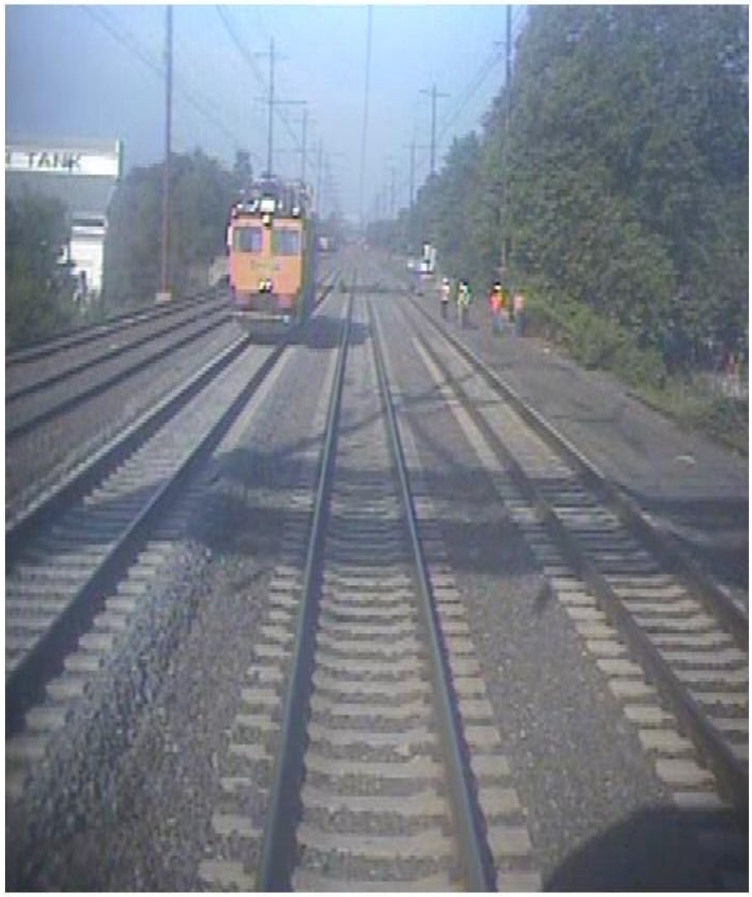
C:\Train 89(03APR16) E-627 Colission with Backhoe Trainer, PA 04-03-2016\615 Event Recorderand LDVR\AMTK 615\Rend Cab\2016 06 12\06.27.58_06.57.59.avi : Locomotive AMTK 615
Sun, Jun 12, 2016, 5:40:33 AM (Central Daylight Time) (39.8332° N, 75.3943° W @ 105.1 mph)
Event: No event selected

Video Capture Size: 704 x 480 pixels
Video Frame Time: 6/12/2016 5:40:33 AM (Central Daylight Time)
Media Input Name: Rend Cab
DVR Location: AMTK 615
Locomotive: AMTK 615
DVR Serial #: MS1407A584-LDVR
DVR Station ID: 0

Images recorded by Train 89 at accident site at approximately 7: 50 a.m.:

DVR Video Snapshot

D:\AMTK 602\Rend Cab\2016 06 12\07.36.56_07.51.57.avi : Locomotive AMTK 602
Sun, Jun 12, 2016, 6:49:44 AM (Central Daylight Time) (39.8332° N, 75.3943° W @ 104.1 mph)
Event: No event selected



Video Capture Size: 704 x 480 pixels
Video Frame Time: 6/12/2016 6:49:44 AM (Central Daylight Time)
Media Input Name: Rend Cab
DVR Location: AMTK 602
Locomotive: AMTK 602
DVR Serial #: MS1144A170-LDVR
DVR Station ID: 0

Image of roadway workers.

DVR Video Snapshot

D:\AMTK 602\Rend Cab\2016 06 12\07.36.56_07.51.57.avi : Locomotive AMTK 602
Sun, Jun 12, 2016, 6:49:44 AM (Central Daylight Time) (39.8332° N, 75.3943° W @ 104.1 mph)
Event: No event selected

Video Capture Size: 704 x 480 pixels
Video Frame Time: 6/12/2016 6:49:44 AM (Central Daylight Time)
Media Input Name: Rend Cab
DVR Location: AMTK 602
Locomotive: AMTK 602
DVR Serial #: MS1144A170-LDVR
DVR Station ID: 0

Radio and Cell Phone Communications:

The following table represents the communications recorded at Amtrak's Centralized Electrification Traffic Control (CTEC).

Table 4. Radio Communications

Time	Duration	From	To	Type	Summary of communication
7:11:11	:07	Robinson	CETC 4	Radio	Robinson receiving Foul on track 1 at 7:11
7:11:20	:05	CETC 4	Robinson	Radio	
7:16:34	:47	Frm Yager	CETC 4	Phone	Frm Yager saying he is on way to worksite and would need to take over Form D line 4 on 2 Track. Dispatcher (Mike): Oh you taking over for Robinson Yager: Ya
7:24:00	0:02:59	Frm Yager	CETC 4	Phone	Frm Yager called to take 2 track out of service with a Form D line 4. Between Hook and Baldwin. Effective 7:26 AM Dispatcher: Tell Robinson to call me whenever he's ready and I'll cancel his. Are you going to need all four tracks.. I mean all 3 tracks fouling? Yager: I ahh ya I got to check and see how much I got to do with this backhoe because he needs 3 and 4 umm and 1 for as much as possible for now. I don't know how much longer... My backhoe operator should be getting out of here in about an hour or two. Dispatcher: OK now right now Rob... [interupted] Rob... [interupted] Yager: In the mean time I'll tell Will to give you a call Dispatcher: OK Yager: and once he starts clearing his fouls up Then I'll be ahh... [interupted] Dispatcher: Taking yours. OK Yager: Thanks Dispatcher: Not a problem, I gotch you Yager: Alright Dispatcher: Here we go
7:27:14	0:02:28	Frm Robinson	CETC 4	Phone	Call starts out with dispatcher having a personal conversation and making plans for after work. Frm Robinson Calls Dispatcher to give back 2 track and clear fouls
7:42:44	:19	Yager/Loram	Loram/Yager	Radio	Loram: Yeah, go ahead John Yager: You full Loram: Negative. Machine's Empty Yager: Why don't you grab this stuff while we got foul Loram: Uh, You come up we sign on your briefing we'll go ahead and do it
7:49:12	0:01:57	Dispatcher	Female	Phone	Dispatcher made a personal phone call. - 35 seconds into call there is radio static heard in background and immediately dispatcher mentions he is seeing something he doesn't like. A light came up on 4 track and doesn't have anyone fouling - 66 seconds into call the first "Emergency, emergency, emergency" can be heard coming in over the radio. Dispatcher does not respond - 100 Seconds in more radio chatter coming through. Dispatcher does not respond - 112 seconds into call dispatcher realizes he has an emergency
7:51:00	0:02:26	Greco	Power Director	Phone	Train sitting in hook that went by us that was on fire and pieces are blowing off of it. Power Director told him to call CETC 4. Greco then begins to discover there are pieces of a backhoe all over and says he is going up to track gang to see whats going on
7:51:25	:41	Yager	CETC 4	Phone	Yager: Did robinson have his foul on 3 and 4? Dispatcher: No he gave up his fouls. Yager: Oh my gosh you've got to be kidding me. Oh man. The backhoe got plowed. I can't believe it. I need and an ambulance I need people down here a mile north of hook.

At about 7:29, the night shift foreman said the following to the dispatcher: "Uh, also, *, uh, release these fouls, and, uh, Yager is gonna pick them up. Um, my fouls on number one, three, and four track between Hook and Baldwin."

Post Accident Actions:

FRA

FRA concluded its multi-discipline investigation of the accident. As a result, FRA has initiated a number of civil penalty actions (engineering and operating practices). In addition, FRA investigated Amtrak's compliance with 49 CFR Part 272, Critical Incident Plans.

FRA also directed Amtrak to conduct a Safety Stand-down with all their roadway workers to go over appropriate briefings and other safety procedures.

FRA recently published amendments to its Roadway Worker Protection (RWP) regulations and its Alcohol and Drug regulations at 49 CFR parts 214 and 219, respectively. Part 219 amendments become effective April 2017. Of note, these amendments added maintenance-of-way employees to the drug and alcohol testing programs and require redundant protection for roadway workers who depend on train dispatchers to provide protection in signalized territories.

FRA Regions 1 and 2 completed a Corridor On-Track Safety Initiative (COTSI) consisting of five inspection teams that conducted 59 days of field inspections on the Amtrak Northeast Corridor. The period covered for this project was from April 25, 2016, through May 20, 2016. The teams inspected 120 work groups totaling over 1,000 roadway worker contacts (some roadway workers were contacted more than once). In addition to the field inspections, FRA monitored several dispatching centers. According to FRA and partly because of the project, Amtrak is revising their RWP manual and training program.

Beginning July 18, 2016, FRA Regions 1 and 2, in cooperation with the carrier, initiated an Amtrak Roadway Joint Efficiency Testing (ARJET) project. This effort is intended to ensure a consistent understanding and application of Roadway Worker Protection rules, Railroad Operating Rules, and Railroad Safety Rules. FRA is monitoring the efficiency testing of Amtrak work groups on the Northeast Corridor (NEC) by designated Amtrak officers. FRA inspectors will grant "safe haven" to Amtrak (withhold violations) per FRA's Safe Harbor policy, whereby FRA will not use enforcement against Amtrak during these inspections as long as the Amtrak officer takes proper corrective action. The goal of this effort is to perform joint inspections of roadway workers throughout the NEC and branch lines. Inspections will cover every shift and every gang possible to look for proper RWP, Safety Rules and Operating Rules application. This project is ongoing and scheduled through the end of 2016.

According to FRA, Amtrak management, as well as, rank-and-file employees, has been receptive to FRA's initiatives. As demonstrated by the ARJET project, Amtrak management at all levels have been fully cooperative and proactive during this effort. Amtrak has revised training, rules, and standard operating practices based on FRA's findings. Shunts are now being used as intended, training has been changed, rules have been reconciled and its RWP manuals now contain shunting instructions.

Amtrak:

On May 25, 2016, Amtrak issued an Engineering Department Safety Bulletin entitled RWP Updates, Foul Time, and SSD Use. The changes to the foul time and the SSD procedure are listed, in part, below:

> The changes to **323 - Foul Time** more clearly define the instructions for the application of the protection, which includes:
>
> • Part (b): The information that must be given to foul is detailed, and the instruction that every roadway worker affected must be communicated to has been included.
>
> • Part (d) elaborates on the duties of the Employee In Charge prior to and during the release of foul time.
>
> • Part (e) is new and adds the instruction on the mandatory use of a Supplemental Shunting Devices (SSD) when foul will be used with equipment for 5 minutes or more and in accordance with the Operating Rules governing the territory.
>
> **Clarifying the use of SSDs with Foul Time:**
>
> 1. Foul Time is only permitted as an acceptable form of Roadway Worker Protection when the Operating Rules Governing the territory allow for its use.
>
> • NORAC allows Foul Time
>
> • GCOR allows Foul Time in areas where a General Order has been issued detailing its use (e.g. Michigan Subdivision General Order No. 2-219)
>
> 2.When Foul Time will be used with equipment for 5 minutes or more a SSD must be applied and confirmed.

3. The ONLY exceptions for SSD use under Foul Time are as follows:

• Track Inspection

• C&S Testing and troubleshooting

• If the fouling activity is within the approach circuit to a highway crossing that is not equipped with a device that will automatically interrupt the operation of the crossing's warning device.

• If the fouling activity is within 200 feet of any highway crossing that is equipped with automatic warning devices.

###

Parties to the Investigation - Acknowledgment Signatures

The undersigned designated *Party to the Investigation* representatives attest that the information contained in this factual report of the collision and derailment of Amtrak Train 89 with MOW equipment and employees on April 3, 2016, in Chester, Pennsylvania, is a factually accurate representation of the information collected during the on-scene investigation, to the extent of their best knowledge and contribution in this investigation.

_____

_____//s//_____ Date __12-15-16_____
Richard A. Hipskind, NTSB

_____//s//_____ Date __12-16-16_____
Louis Tomassone, FRA

_____//s//_____ Date __12-15-16_____
Matt Porto, Amtrak

_____//s//_____ Date __12-15-16_____
Andrew Keefe, Amtrak

_____//s//_____ Date __12-15-16_____
Michael Traina, ARASA

_____//s//_____ Date __12-5-16_____
Steve Stearn, BMWED

Appendix A

Amtrak Roadway Worker Protection (RWP) Manual:

Investigators requested and received the following excerpt language from Amtrak pertaining to their RWP rules and procedures as were revised on July 1, 2014.

From the current RWP Manual:
[The following Definition of SSD was added in this latest revision:
Supplemental Shunting Device (SSD): A device used to provide positive shunt through track occupancy with documented verification to the dispatcher.]

323 FOUL TIME

Working limits established on controlled track through the use of foul time procedures shall comply with the following requirements:

(a) Foul time may be given orally or in writing by the train dispatcher or control operator only after that employee has withheld the authority of all trains to move into or within the working limits during the foul time period.

(b) Each roadway worker to whom foul time is transmitted orally shall repeat the track number, track limits and time limits of the foul time to the issuing employee for verification by the dispatcher or control operator before the foul time becomes effective. Documentation must be recorded on the Foul Time Log (NRPC3045).

(c) The train dispatcher or control operator shall not permit the movement of trains or other on-track equipment onto the working limits protected by foul time until the roadway worker who obtained the foul time has reported clear of the track.

TRAINING AND QUALIFICATIONS

343 TRAINING AND QUALIFICATIONS, GENERAL

a) Amtrak supervision must not assign an employee to perform the duties of a roadway worker and no employee shall accept such assignment, unless that employee has received Roadway Worker Protection training associated with the assignment to be performed, and that employee has demonstrated the ability to fulfill the responsibilities for on-track safety that are required of an individual roadway worker performing that assignment.

b) Amtrak will provide Roadway Worker Protection training to all roadway workers once every calendar year.

c) Railroad employees other than roadway workers, who are associated with on-track safety procedures, and whose primary duties are concerned with the movement and protection of trains, shall be trained to perform their functions related to on-track safety through the training and qualification procedures prescribed by the operating railroad for the primary position of the employee, including maintenance of records and frequency of training.

d) Amtrak must maintain written or electronic records of each roadway worker qualification in effect. Each record must include the name of the employee, the type of qualification made, and the most recent date of qualification. These records shall be kept available for inspection and copying by the Federal Railroad Administration during regular business hours.

353 RWP TRAINING AND QUALIFICATIONS FOR ROADWAY WORKERS RESPONSIBLE FOR PROVIDING ON-TRACK SAFETY

Roadway workers and/or Flagmen who provide for on-track safety through the establishment of working limits by exclusive track occupancy (part 321), must have, as a minimum, the following qualifications:

(1) RWP
(2) Operating Rules
(3) Physical Characteristics

(b) Roadway workers and/or Flagmen who provide for on-track safety through the establishment of working limits by the use of foul time (part 323) must have, as a minimum, the following qualifications.

(1) RWP
(2) Operating Rules
(3) Physical Characteristics

(c) Roadway workers who provide for the on-track safety by the assignment, placement, and supervision of gang watchmen (part 329) must have, as a minimum, the following qualifications:

(1) RWP
(2) Operating Rules
(3) Relevant Characteristics (Example: Roadway workers must be familiar with the geographic layout of the territory in which they work.) Note: this is not a qualification

(d)Demonstrated proficiency and annual recorded examinations shall evidence initial and periodic qualification of all roadway workers who provide on-track safety.

The following are the responsibilities of all roadway workers who provide on-track safety.

(1) Conduct a job briefing with each roadway worker or the roadway worker in charge in multiple work groups are included within the working limits. Conduct a job briefing with additional roadway workers arriving after the initial On Track Safety Briefing. This may include each roadway worker or the roadway worker in charge of the additional work group.

(2) Have protection established before any roadway worker fouls a track.

(3) Inform each roadway worker or roadway work group before any change in the on-track protection becomes effective.

(4) Notify each roadway worker or work group before the working limits are released.

The following are the additional responsibilities of all roadway workers who provide on-track safety and are the roadway worker in charge of the work group.

(1) Assign, place, and supervise gang watchmen and advance gang watchmen.

(2) Ensure the protection of roadway workers and that location is adequate with watchmen provided.

(3) Conduct whistle tests before roadway workers foul any tracks.

315 SUPERVISION AND COMMUNICATION

When an Amtrak employee or contractor (roadway worker) is assigned a duty that calls for that employee to foul a track, an on-track safety job briefing must be provided prior to starting any work or fouling any track. This on-track job safety briefing must, at a minimum, includes the following:

(1) Information on the means by which on-track safety is to be provided for each track identified to be fouled;

(2) Instruction on each on-track safety procedure to be followed;

(3) Information about any adjacent tracks, on-track safety for such tracks, if required by this subpart or deemed necessary by the roadway worker in charge, and identification of any roadway maintenance machines that will foul such tracks;

(4) A discussion of the nature of the work to be performed, the characteristics of the work location to ensure compliance, and the predetermined place of safety (PPOS).

A job briefing for on-track safety shall be deemed complete only after the roadway worker has acknowledged understanding of the on-track safety procedures and instructions presented.

Work Groups

Every roadway work group whose duties require fouling a track shall have one roadway worker designated by Amtrak to provide on-track safety for all members of the group. The designated person shall be qualified under the rules of the railroad that conducts train operations on those tracks to provide the protection necessary for on-track safety of each individual in the group. The responsible person may be designated generally, or specifically for a particular work situation.

Before any member of a roadway work group fouls a track, the designated person providing on-track safety for the group shall inform each roadway worker of the on- track safety procedures to be used and followed during the performance of the work at that time and location. Each roadway worker shall again be so informed at any time the on-track safety procedures change during the work period. Such information shall be given to all roadway workers affected before the change is

effective, except in cases of emergency. Any roadway workers who, because of an emergency, cannot be notified in advance shall be immediately warned to leave the fouling space and shall not return to the fouling space until on-track safety is re-established.

Lone Worker

Each lone worker shall communicate at the beginning of each duty period with a supervisor or another designated employee to receive a job briefing and to advise of his or her planned itinerary and the procedures that he or she intends to use for on-track safety. When communication channels are disabled, the job briefing shall be conducted as soon as possible after the beginning of the work period when communications are restored.

However, Amtrak used the following prior to July 1, 2014. Only language that differs from the current rule is shown.

FOUL TIME (NORAC RULE 140) [Old Rule]

Foul Time may be issued only by the Dispatcher, or Operator when authorized by the Dispatcher.

a. Action Required Prior to Issuance

Before issuing or authorizing Foul Time, the Dispatcher must determine that no trains or other on-track equipment have been authorized to occupy the track segment to be fouled. In signaled territory, the Dispatcher must ensure that Stop Signals have been displayed and blocking devices applied to controls of switches and signals leading to the affected track. When trains are to be held at a TBS where blocking devices cannot be applied, the Dispatcher must issue Form D line 13 instructing the Operator to hold trains clear of the affected track.

b. Permission to Foul

Permission to foul the track must include the following information:
1. Title and name of employee receiving foul time
2. Track designation
3. Track limits (between/at)
4. Time limits

The receiving employee must repeat this permission and the Dispatcher or Operator must then confirm it before the Foul Time becomes effective.

c. Releasing Foul Time

Once protection has been provided, it must be maintained until the employee who was granted the foul time has released the foul time. The release must include the employee's title and name, and the track designation and limits being released. This information must be repeated by the Dispatcher or Operator, and confirmed by the employee releasing the foul time before blocking devices are removed.

FOUL TIME (SI 140-S1) [SI means Special Instruction]

In the application of Rule 140, Foul Time information must be recorded by the Dispatcher or Operator issuing the foul time, and recorded by the employee requesting the foul time on form NRPC 3045 "Authority to Foul Tracks Record".

Before allowing additional employees to join the work being performed under Foul Time permission, the employee who was granted Foul Time by the Dispatcher must conduct a job briefing with the additional employees, and must review the track(s) being protected, the Foul Time track and time limits, and all other factors affecting the work. The additional employees must not be permitted to foul the track(s) involved until they have verified their full understanding of all topics discussed during the job briefing.

The employee who was granted Foul Time by the Dispatcher or Operator must not release the Foul Time until they have ensured that all fouling activity under their authority has been cleared.

The Authority to Foul Tracks Record must be retained and held available for inspection for a period of 7 days.

USE OF SUPPLEMENTAL SHUNTING DEVICE (SI 140-S2)

This instruction requires the employee in charge of "covered fouling activities" to apply an approved Supplemental Shunting Device (SSD) to the track(s) to be fouled, after receiving foul time from the Dispatcher or Operator. The purpose of the SSD is to **supplement, not replace,** blocking device protection provided by the

Dispatcher or Operator.

A. Covered Fouling Activities:

Except as noted below, this instruction applies when equipment will be used to foul a track in signaled territory or within interlocking limits for more than 5 minutes.

This instruction does **not** apply when the fouling activity:

1. Requires Form D line 4 or line 5 authority, or

2. Is within the approach circuit to a highway crossing that is not equipped with a device that will automatically interrupt the operation of the crossing's warning devices (i.e., any crossing listed in Special Instruction 138 that does **not** have an "X" in Column 1 of that instruction), or

3. Is within 200 feet of any highway crossing that is equipped with automatic warning devices.

Note: Roadway Workers performing service without equipment may elect to use an SSD. Roadway Workers electing to use an SSD must do so in accordance with sections "B" and "C" of this instruction.

B. Actions to Be Taken Before Performing Covered Fouling Activities:

The following requirements apply to **each track** to be fouled. The person in charge of the work must take the following actions **before** permitting the fouling activity to begin.

1. Obtain verbal permission to foul the track from the Dispatcher or Operator.

2. Fouling Within Interlocking Limits:
For the purpose of this instruction, a "signal pocket" is defined as a section of track located between two interlocking signals that govern movement out of the pocket, with no switches between the two signals. Signal pockets are usually found where a passenger station exists within interlocking limits. Signal pockets are designed to allow the Dispatcher to route other trains around a train that is making a station stop or standing in the pocket.

a. Fouling Within Signal Pocket – When track is to be fouled within a "signal pocket", SSD will be applied within that interlocking signal pocket.

b. Fouling Outside of Signal Pocket – When necessary to foul an interlocking track that is not located within an interlocking "signal pocket", **prior to beginning work,** the employee in charge of the fouling activity must contact the Division Engineer or his designated C&S Department representative to determine the location(s) at which SSD device(s) must be applied within interlocking limits. SSD device(s) must then be applied within interlocking limits at the previously approved location(s).

c. Verify that the track is shunted by asking the Dispatcher or Operator if there is a track occupancy light (TOL) on the model board in the appropriate location.

3. Fouling Outside Interlocking Limits: For the purpose of this instruction, a "block" is defined as a length of track between fixed signals.

a. If only **one block** will be fouled, apply a SSD to the track in the block to be fouled.

b. If **more than one** block will be fouled, be governed as follows:

- On a Rule 251 Track, apply a SSD in the first block to be fouled (or in the block prior to that block), as determined by a train operating with the current of traffic.

- On a Rule 261 Track, apply a separate SSD in each block to be fouled.

c. Verify that the track is shunted by observing that the signal governing entrance to the block is displaying Stop Signal, Stop and Proceed, or Restricting, or asking the Dispatcher or Operator if there is a track occupancy light (TOL) on the model board in the appropriate location.

C. Actions to Be Taken Before Reporting Clear:
Before reporting clear of the track to the Dispatcher or Operator, the employee in charge of the work must remove the shunt(s) by either:

1. Disconnecting the coupler in the middle of the SSD
or
2. Removing the SSD from the track. The SSD must be removed from the track when reporting clear for last time.

FOUL TIME (NORAC RULE 140)

Foul Time may be issued only by the Dispatcher, or Operator when authorized by the Dispatcher.

a. Action Required Prior to Issuance

Before issuing or authorizing Foul Time, the Dispatcher must determine that no trains or other on-track equipment have been authorized to occupy the track segment to be fouled. In signaled territory, the Dispatcher must ensure that Stop Signals have been displayed and blocking devices applied to controls of switches and signals leading to the affected track. When trains are to be held at a TBS where blocking devices cannot be applied, the Dispatcher must issue Form D line 13 instructing the Operator to hold trains clear of the affected track.

b. Permission to Foul

Permission to foul the track must include the following information:

1. Title and name of employee receiving foul time
2. Track designation
3. Track limits (between/at)
4. Time limits

The receiving employee must repeat this permission and the Dispatcher or Operator must then confirm it before the Foul Time becomes effective.

c. Releasing Foul Time

Once protection has been provided, it must be maintained until the employee who was granted the foul time has released the foul time. The release must include the employee's title and name, and the track designation and limits being released. This information must be repeated by the Dispatcher or Operator, and confirmed by the employee releasing the foul time before blocking devices are removed.

FOUL TIME (SI 140-S1)

In the application of Rule 140, Foul Time information must be recorded by the Dispatcher or Operator issuing the foul time, and recorded by the employee requesting the foul time on form NRPC 3045 "Authority to Foul Tracks Record".

Before allowing additional employees to join the work being performed under Foul Time permission, the employee who was granted Foul Time by the Dispatcher must conduct a job briefing with the additional employees, and must review the track(s) being protected, the Foul Time track and time limits, and all other factors affecting the work. The additional employees must not be permitted to foul the track(s) involved until they have verified their full understanding of all topics discussed during the job briefing.

The employee who was granted Foul Time by the Dispatcher or Operator must not release the Foul Time until they have ensured that all fouling activity under their authority has been cleared.

The Authority to Foul Tracks Record must be retained and held available for inspection for a period of 7 days.

USE OF SUPPLEMENTAL SHUNTING DEVICE (SI 140-S2)

This instruction requires the employee in charge of "covered fouling activities" to apply an approved Supplemental Shunting Device (SSD) to the track(s) to be fouled, after receiving foul time from the Dispatcher or Operator. The purpose of the SSD is to **supplement, not replace,** blocking device protection provided by the Dispatcher or Operator.

B. Covered Fouling Activities:

Except as noted below, this instruction applies when equipment will be used to foul a track in signaled territory or within interlocking limits for more than 5 minutes.

This instruction does **not** apply when the fouling activity:

1. Requires Form D line 4 or line 5 authority, or

2. Is within the approach circuit to a highway crossing that is not equipped with a device that will automatically interrupt the operation of the crossing's warning

devices (i.e., any crossing listed in Special Instruction 138 that does **not** have an "X" in Column 1 of that instruction), or

3. Is within 200 feet of any highway crossing that is equipped with automatic warning devices.

Note: Roadway Workers performing service without equipment may elect to use an SSD. Roadway Workers electing to use an SSD must do so in accordance with sections "B" and "C" of this instruction.

C. Actions to Be Taken Before Performing Covered Fouling Activities:

The following requirements apply to **each track** to be fouled. The person in charge of the work must take the following actions **before** permitting the fouling activity to begin.

1. Obtain verbal permission to foul the track from the Dispatcher or Operator.

2. Fouling Within Interlocking Limits:
For the purpose of this instruction, a "signal pocket" is defined as a section of track located between two interlocking signals that govern movement out of the pocket, with no switches between the two signals. Signal pockets are usually found where a passenger station exists within interlocking limits. Signal pockets are designed to allow the Dispatcher to route other trains around a train that is making a station stop or standing in the pocket.

a. Fouling Within Signal Pocket – When track is to be fouled within a "signal pocket", SSD will be applied within that interlocking signal pocket.

b. Fouling Outside of Signal Pocket – When necessary to foul an interlocking track that is not located within an interlocking "signal pocket", **prior to beginning work,** the employee in charge of the fouling activity must contact the Division Engineer or his designated C&S Department representative to determine the location(s) at which SSD device(s) must be applied within interlocking limits. SSD device(s) must then be applied within interlocking limits at the previously approved location(s).

c. Verify that the track is shunted by asking the Dispatcher or Operator if there is a track occupancy light (TOL) on the model board in the appropriate location.

3. Fouling Outside Interlocking Limits:

For the purpose of this instruction, a "block" is defined as a length of track between fixed signals.

a. If only **one block** will be fouled, apply a SSD to the track in the block to be fouled.

b. If **more than one** block will be fouled, be governed as follows:

- On a Rule 251 Track, apply a SSD in the first block to be fouled (or in the block prior to that block), as determined by a train operating with the current of traffic.

- On a Rule 261 Track, apply a separate SSD in each block to be fouled.

c. Verify that the track is shunted by observing that the signal governing entrance to the block is displaying Stop Signal, Stop and Proceed, or Restricting, or asking the Dispatcher or Operator if there is a track occupancy light (TOL) on the model board in the appropriate location.

D. Actions to Be Taken Before Reporting Clear:

Before reporting clear of the track to the Dispatcher or Operator, the employee in charge of the work must remove the shunt(s) by either:

1. Disconnecting the coupler in the middle of the SSD

or

2. Removing the SSD from the track. The SSD must be removed from the track when reporting clear for last time.

Appendix B

Federal Railroad Administration RWP

The following are excerpts from FRA's Roadway Worker Protection Rule 214

Applicable FRA rules to ATK89

§ 214.311 Responsibility of Employers.

(a) Each employer is responsible for the understanding and compliance by its employees with its rules and the requirements of this part.

(b) Each employer shall guarantee each employee the absolute right to challenge in good faith whether the on-track safety procedures to be applied at the job location comply with the rules of the operating railroad, and to remain clear of the track until the challenge is resolved.

(c) Each employer shall have in place a written procedure to achieve prompt and equitable resolution of challenges made in accordance with §§ 214.311(b) and 214.313(d).

§ 214.313 Responsibility of Individual Roadway Workers.

(a) Each roadway worker is responsible for following the on-track safety rules of the railroad upon which the roadway worker is located.

(b) A roadway worker shall not foul a track except when necessary for the performance of duty.

(c) Each roadway worker is responsible to ascertain that on-track safety is being provided before fouling a track.

(d) Each roadway worker may refuse any directive to violate an on-track safety rule, and shall inform the employer in accordance with § 214.311 whenever the roadway worker makes a good faith determination that on-track safety provisions to be applied at the job location do not comply with the rules of the operating railroad.

§ 214.315 Supervision and communication.

(a) When an employer assigns duties to a roadway worker that call for that employee to foul a track, the employer shall provide the employee with a job briefing that includes information on the means by which on-track safety is to be provided, and instruction on the on-track safety procedures to be followed.

(b) A job briefing for on-track safety shall be deemed complete only after the roadway worker has acknowledged understanding of the on-track safety procedures and instructions presented.

(c) Every roadway work group whose duties require fouling a track shall have one roadway worker designated by the employer to provide on-track safety for all members of the group. The designated person shall be qualified under the rules of the railroad that conducts train operations on those tracks to provide the protection necessary for on-track safety of each individual in the group. The responsible person may be designated generally, or specifically for a particular work situation.

(d) Before any member of a roadway work group fouls a track, the designated person providing on-track safety for the group under paragraph (c) of this section shall inform each roadway worker of the on-track safety procedures to be used and followed during the performance of the work at that time and location. Each roadway worker shall again be so informed at any time the on-track safety procedures change during the work period. Such information shall be given to all roadway workers affected before the change is effective, except in cases of emergency. Any roadway workers who, because of an emergency, cannot be notified in advance shall be immediately warned to leave the fouling space and shall not return to the fouling space until on-track safety is re-established.

§ 214.317 On-track safety procedures, generally.

Each employer subject to the provisions of this part shall provide on-track safety for roadway workers by adopting a program that contains specific rules for protecting roadway workers that comply with the provisions of §§ 214.319 through 214.337 of this part.

§ 214.319 Working limits, generally.

Working limits established on controlled track shall conform to the provisions of § 214.321 Exclusive track occupancy, or § 214.323 Foul time, or § 214.325 Train coordination.

Working limits established on non-controlled track shall conform to the provision of § 214.327

Inaccessible track. Working limits established under any procedure shall, in addition, conform to the following provisions:

(a) Only a roadway worker who is qualified in accordance with § 214.353 of this part shall establish or have control over working limits for the purpose of establishing on-track safety.

(b) Only one roadway worker shall have control over working limits on any one segment of track.

(c) All affected roadway workers shall be notified before working limits are released for the operation of trains. Working limits shall not be released until all affected roadway workers have either left the track or have been afforded on-track safety through train approach warning in accordance with § 214.329 of this subpart.

§ 214.321 Exclusive track occupancy.

Working limits established on controlled track through the use of exclusive track occupancy procedures shall comply with the following requirements:

(a) The track within working limits shall be placed under the control of one roadway worker by either:

(1) Authority issued to the roadway worker in charge by the train dispatcher or control operator who controls train movements on that track,

(2) Flagmen stationed at each entrance to the track within working limits and instructed by the roadway worker in charge to permit the movement of trains and equipment into the working limits only as permitted by the roadway worker in charge, or

(3) The roadway worker in charge causing fixed signals at each entrance to the working limits to display an aspect indicating ``Stop.''

(b) An authority for exclusive track occupancy given to the roadway worker in charge of the working limits shall be transmitted on a written or printed document directly, by relay through a designated employee, in a data transmission, or by

oral communication, to the roadway worker by the train dispatcher or control operator in charge of the track.

(1) Where authority for exclusive track occupancy is transmitted orally, the authority shall be written as received by the roadway worker in charge and repeated to the issuing employee for verification.

(2) The roadway worker in charge of the working limits shall maintain possession of the written or printed authority for exclusive track occupancy while the authority for the working limits is in effect.

(3) The train dispatcher or control operator in charge of the track shall make a written or electronic record of all authorities issued to establish exclusive track occupancy.

(c) The extent of working limits established through exclusive track occupancy shall be defined by one of the following physical features clearly identifiable to a locomotive engineer or other person operating a train or railroad equipment:

(1) A flagman with instructions and capability to hold all trains and equipment clear of the working limits;

(2) A fixed signal that displays an aspect indicating ``Stop'';

(3) A station shown in the time-table, and identified by name with a sign, beyond which train movement is prohibited by train movement authority or the provisions of a direct train control system.

(4) A clearly identifiable milepost sign beyond which train movement is prohibited by train movement authority or the provisions of a direct train control system; or

(5) A clearly identifiable physical location prescribed by the operating rules of the railroad that trains may not pass without proper authority.

(d) Movements of trains and roadway maintenance machines within working limits established through exclusive track occupancy shall be made only under the direction of the roadway worker having control over the working limits. Such movements shall be restricted speed unless a higher speed has been specifically authorized by the roadway worker in charge of the working limits.

§ 214.323 Foul time.

Working limits established on controlled track through the use of foul time procedures shall comply with the following requirements:

(a) Foul time may be given orally or in writing by the train dispatcher or control operator only after that employee has withheld the authority of all trains to move into or within the working limits during the foul time period.

(b) Each roadway worker to whom foul time is transmitted orally shall repeat the track number, track limits and time limits of the foul time to the issuing employee for verification before the foul time becomes effective.

(c) The train dispatcher or control operator shall not permit the movement of trains or other on-track equipment onto the working limits protected by foul time until the roadway worker who obtained the foul time has reported clear of the track.

§ 214.343 Training and qualification, general.

(a) No employer shall assign an employee to perform the duties of a roadway worker, and no employee shall accept such assignment, unless that employee has received training in the on-track safety procedures associated with the assignment to be performed, and that employee has demonstrated the ability to fulfill the responsibilities for on-track safety that are required of an individual roadway worker performing that assignment.

(b) Each employer shall provide to all roadway workers in its employ initial or recurrent training once every calendar year on the on-track safety rules and procedures that they are required to follow.

§ 214.345 Training for all roadway workers.

The training of all roadway workers shall include, as a minimum, the following:

(a) Recognition of railroad tracks and understanding of the space around them within which on-track safety is required.

(b) The functions and responsibilities of various persons involved with on-track safety procedures.

(c) Proper compliance with on-track safety instructions given by persons performing or responsible for on-track safety functions.

(d) Signals given by watchmen/lookouts, and the proper procedures upon receiving a train approach warning from a lookout.

(e) The hazards associated with working on or near railroad tracks, including review of on-track safety rules and procedures.

§ 214.353 Training and qualification of roadway workers who provide on-track safety for roadway work groups.

(a) The training and qualification of roadway workers who provide for the on-track safety of groups of roadway workers through establishment of working limits or the assignment and supervision of watchmen/lookouts or flagmen shall include, as a minimum:

(1) All the on-track safety training and qualification required of the roadway workers to be supervised and protected.

(2) The content and application of the operating rules of the railroad pertaining to the establishment of working limits.

(3) The content and application of the rules of the railroad pertaining to the establishment or train approach warning.

(4) The relevant physical characteristics of the territory of the railroad upon which the roadway worker is qualified.

(b) Initial and periodic qualification of a roadway worker to provide on track safety for groups shall be evidenced by a recorded examination.

§ 214.503 Good-faith challenges; procedures for notification and resolution

(a) An employee operating an on-track roadway maintenance machine or hi-rail vehicle shall inform the employer whenever the employee makes a good-faith determination that the machine or vehicle does not comply with FRA regulations or has a condition that inhibits its safe operation.

Appendix C

On-scene Interviews:

Synopsis of Interviews:

Investigators conducted eight interviews beginning on April 5, 2016, through to April 7, 2016, while on-scene. The following are a synopsis of the interviews.

Day Shift Foreman:

The foreman has 36 years of experience in his current capacity with a total of 39 years of railroad experience. The foreman has held previous jobs as track inspector, construction foreman and tie gang foreman. The foreman has also worked as foreman for the Loram vacuum train since it began working on Amtrak 3 years ago.

The work being performed at the time of the accident was part of a 55 hour track outage that began on April 1, 2016, at 10:00 p.m. on Amtrak's Northeast Corridor at milepost PW 15.7[19]. The scope of work was to remove ballast and spoils at various locations of mud with the Loram vacuum train that were causing surface conditions on No.2 track between Baldwin Interlocking and Hook Interlocking. During the night shifts of this outage, a backhoe loader was brought in to cut the mud underneath the ties. This was done at night due to the track availability during this shift.

The foreman worked Saturday, April 2, 2016, and Sunday, April 3, 2016. His daylight shifts were from 6:00 a.m. to 6:00 p.m. during the 55-hour outage. His responsibilities were to go over the job briefing and on-track job safety briefing with all employees and contractors at the work location. Typically, the daylight track gang consisted of three Amtrak employees, one Amtrak supervisor and three Loram contractors. This group would meet at 7:00 a.m. to discuss the job briefings. The foreman stated the main form of protection for the track occupied by the Loram vacuum train was established by taking No. 2 track out of service (using a Form D) from Control Point (CP) to CP for the entire 55-hour outage that began on Friday, April 1, 2016 at 10:00 p.m. and ended April 4, 2016 at 05:00 a.m. The adjacent tracks would be protected through the use of foul time when needed. Foul time is typically taken from CP to CP.

On April 2, 2016, the day prior to the incident, the foreman did not take exception to anything out of the ordinary. When he arrived at the job site, the Loram vacuum train was not working and the backhoe loader was in the resting position on the access road next to Track No. 4. The foreman conducted a job briefing and his gang and worked without incident for twelve hours.

19 Amtrak's PW Line stands for Philadelphia to Washington.

On the day of the incident, April 3, 2016, the foreman reported to the Wilmington track office at 6:00 a.m. He instructed the two track workers to assist the night shift gang at the work location until he arrived. The foreman arrived on the job site at 7:00 a.m. As he drove into the access road south of the work site, he pulled up next to the night shift foreman who was also in his vehicle. The foreman briefly spoke to the night shift foreman to ascertain which tracks were currently protected. The night shift foreman informed him that Track No. 2 was out of service and Tracks No. 1, 3 and 4 had foul time between CP Baldwin and CP Hook. At 7:26 a.m., the foreman called Amtrak dispatcher on his cell phone to take Track No.2 out of service in his charge. The foreman then exited his truck and walked approximately 500 feet north to the work location.

At 7:28 a.m., the night shift foreman canceled his Track No.2 out of service with the same Amtrak dispatcher.

When the foreman arrived at the work location, the Loram vacuum train was not working on Track No. 2 and the backhoe loader was in the resting position on Track No.3. The day shift supervisor and trackman were using hand tools on Track No. 2 and a day shift watchman was posted on the field side of Track No.4. The two trackmen from the night shift along with the night shift supervisor had already left the job site. The night shift backhoe operator was asked to stay until 11:00 a.m. and was sitting inside the backhoe loader. After the foreman spoke with the day shift supervisor about the work load for the day, he entered the Loram vacuum train to talk to the contractors inside.

At 7:50 a.m., while the foreman was still in the Loram vacuum train, Amtrak train No. 89 struck the backhoe that was resting on Track No. 3 fatally injuring the backhoe operator and track supervisor.

The foreman stated that he was not aware that the night shift foreman had released the three fouls with the dispatcher---he said he never heard anything over the radio. This was later confirmed in an interview with the Loram superintendent that nothing was heard about the three main tracks being released over the radio.

One of the differences to the work that occurred on this day was that backhoe operator's shift was changed from 6:00 p.m. - 6:00 a.m. to 11:00 p.m. – 11:00 a.m. The foreman was not aware of this change until he arrived at the job site.

Assistant Track Supervisor (AS):

The AS has two years and eight months of experience with Amtrak Railroad. The AS began his career as management associate and spent time in various engineering disciplines. The AS has two years of experience in the current position working under the supervision of the Track Supervisor (TS-deceased). They are both headquartered at Wilmington.

The AS and TS, were tasked with correcting a mud spot with a track profile defect on number 2 track at milepost 15.7 on the PW Line. The work required a 55-hour track outage between Hook and Baldwin.

The work began on April 1, 2016 at 10 p.m. and was scheduled to end in the early morning hours of April 4, 2016. This work called for use of the Loram vacuum equipment (to vacuum up old ballast from affected area of track) and a backhoe (used to undercut and breakup hard spots in ballast within tie cribs on number 2 track). This work required the backhoe to foul number 1, 3, 4 main tacks while the Loram occupied number 2 main track which was to be out of service.

During the 55-hour outage, the TS scheduled the AS to work the overnight shifts. The TS was scheduled to work the daylight shifts.

Friday night, April 1, 2016, the AS stated that the Loram was piloted from Penn Coach Yard and arrived at Hook at 2 a.m. Saturday morning, April 2, 2016. The AS stated that work was done at Hook and progressed to Booth at 4 a.m. Saturday morning, April 2, 2016.

The AS left the job site on Saturday morning, April 2, 2016 with instructions from (TS-deceased) to return Saturday night at 8 p.m. and not 6 p.m. as originally scheduled.

The AS returned to do the Wilmington Headquarters at 8 p.m. April 2, 2016. The AS drove over the road to the work location milepost 15.7. At approximately 8:40 p.m., the AS was briefed by the Track Foreman (TF) who reported for duty at 6 p.m.

The AS stated that the backhoe operator (BHO-deceased) did not report for duty until 11 p.m. This was a change from the original schedule and the AS was not aware until arriving on job site. The TS had made a change in scheduling. The TS and the AS did not see each other during the shift change at milepost 15.7.

Foul weather halted work that night for an hour. Work began again early on April 3, 2016 at approximately 1:30 a.m. Through the remainder of that early morning, the AS heard the TF on the radio requesting foul time on number 1, 3 4 tracks. The AS said that radio communications were heard between backhoe operator (BHO-deceased), TF and Loram Operator regarding foul time.

The AS stated that he did notice that supplemental shunting devises (SSD) were not being used on tracks receiving foul time, including tracks 3, 4 where that Backhoe was directly fouling. The AS stated he did not question the TF about this exception. The AS could not verify if a track barricade was in place on the out of service number 2 track, north of the Loram equipment. The AS did recall seeing a track barricade on number 2 track of said equipment.

The AS recalled that the TS arrived at milepost 15.7 at approximately 6:30 a.m. that Sunday morning April 3, 2016. The AS left shortly after to return to Wilmington Headquarters.

Night Shift Watchman:

The watchman has less than 2 years of railroad experience. The watchman currently holds the thermite welder job in the Wilmington, DE track office.

The worked being performed during the fatality, was part of a 55-hour track outage that began on April 1, 2016 at 10:00 p.m. on Amtrak's northeast corridor at milepost PW15.7. The scope of work was to remove various locations of mud that were causing surface conditions on No. 2 track between Baldwin and Hook interlocking(s) with the Loram vacuum train. During the night shifts of this outage, a backhoe loader was brought in to cut the mud underneath the ties. This was done at night due to the track availability during this shift.

The watchman worked Saturday, April 2, 2016, into April 3, 2016. His night shift was from 6:00 p.m. to 6:00 a.m. during the 55-hour outage. His responsibilities were to provide train approach warning for the work gang. Typically, the night time track gang consisted of four Amtrak employees, one Amtrak supervisor and three Loram contractors. This group would meet at 7:00 p.m. to discuss the job briefings.

On the day of the incident, April 3, 2016, the night shift watchman reported to the Wilmington track office at 5:30 p.m. The watchman called the night shift foreman who instructed him to meet the rest of the gang at the job site. At approximately 7:00 p.m. the night shift foreman conducted an on track safety briefing with the night shift work gang. The foreman instructed the watchman that he would be providing train approach warning for the work gang. The watchman stood on the west side of Track No. 4. The watchman interviewed, was alternating the train approach warning responsibilities with another watchman every hour. At 6:30 a.m., the day shift

supervisor arrived at the job site. Shortly after, the day shift watchman arrived and relieved the night shift watchman. The night shift watchman departed the job site and returned to the Wilmington track office. From the Wilmington track office, the night shift watchman headed north and stopped in Philadelphia for breakfast at approximately 8:00a.m. While eating breakfast, the night shift watchman received a phone call from a co-worker that was not part of the 55-hour outage. The co-worker informed the night watchman that there had been an accident at the job site he had just left. After receiving this information, the night shift watchman headed back to the job site.

Electric Traction Lineman (ETL):

The ETL has a total of 24 years' experience, all within the same territory. On Tuesday, March 29, 2016, the ETL noticed the overtime request for Electrical Protection during the upcoming weekend. The protection was needed for a 55-hour outage between Baldwin and Hook interlocking(s) which required a Loram Vacuum Train (vacuum train) and contractor operators to be present. Electrical protection is done with at least 2 Electric Traction Linemen with Class A qualifications in Amtrak's Electrical Procedures (AMT-2). The ETL originally put in for the

Friday 19:00 to Saturday 07:00 shift but the start time was later changed to 22:00 on Friday. Due to this change the ETL decided to put in for the Saturday 07:00 – 19:00 and Sunday 07:00 – 19:00 shifts.

The Saturday shift was uneventful. The ETL worked with the same track supervisor (deceased) and daytime foreman on both days. Besides the vac train there was no other equipment used during the Saturday shift. There was a backhoe parked on the field side of 4 track but there was no operator on the day shift. The end of the shift was staggered with when everyone was finished. The day time foreman and track supervisor both finished their shift at 18:00, the linemen were scheduled until 19:00 and the Loram contractors until 20:00. The ETL stated this created a time delay at the shift changeover because of the 3 different start/end times.

On Sunday, April 3, 2016, the ETL reported to the Wilmington Headquarters at 07:00. The ETL recalls arriving to the site location somewhere around 07:40 and immediately met the lineman he was relieving on the access road at the site. They discussed where the electrical grounds were located and called the power director to transfer the power over from the night lineman to the ETL. The night lineman then departed the site and the ETL parked the vehicle along the right of way. As soon as the ETL parked the second lineman working the day shift pulled up. They were located approximately 3 catenary poles [700'—750'] south from the Booth Street Bridge. The ETL started going over their Electric Traction Job Briefing and discussing the electrical protection they had. It was at this time the ETL stated all of a sudden they heard an explosion. The ETL turned and looked, seeing flames, blue and black smoke, and pieces flying everywhere. The train passed by

them at what the ETL stated to be approximately 80 mph. The ETL called the dispatcher on the radio multiple times with the proper notification but did not receive a response. The ETL then used the cell phone call the power director. The ETL first thought the impact was caused by debris from the adjacent junk yard being blown onto the tracks from the high winds in the area. While on the phone with the power director the ETL noticed it was the backhoe.

The ETL began heading north towards the track gang. The ETL noticed the backhoe operator deceased and the windows blown out of the track supervisor's truck. The ETL continued over the Booth Street Bridge and asked the watchman if everyone was "ok". The ETL asked where the track supervisor was and they pointed to the body in the gauge of 2 track. The ETL felt the emergency response was on scene quickly. When the first responders arrived the ETL saw the daylight foreman come out of the Loram cab.

The ETL was asked about the usage of supplemental shunting devices; the ETL demonstrated knowledge of the applicable rules and appropriate application of the rules. When the ETL was asked for feedback on how to prevent reoccurrence the ETL stated that there should be more training with supplemental shunting devices. The ELT also stated that when these types of projects are being planned and scheduled all the different crafts should have consistent start and end times so that everyone can be briefed and do a hand off together.

Trackman/Watchman:

On April 5, 2016, a Trackman assigned to the Wilmington Sub-Division was interviewed in reference to Amtrak Train #89 train striking Roadway Equipment at or near Mile Post (MP) 15.7 on Amtrak's Mid-Atlantic Division. The information herein is a synopsis compiled from the responses to that interview.

The Trackman has 1 year and 8 months' service with Amtrak, all within this same territory, and for the past 2-3 months has primarily been assigned to perform watchman duties on various projects for various foremen, during both regular and overtime shifts. The Trackman is qualified on RWP rules and AMT-II.

The Trackman made himself available for overtime on the morning of Sunday, April 3, 2016. His duties would be to provide watchman protection for Roadway Workers who were to remove spoiled ballast and mud from between the crossties on No. 2 track between Control Points "Hook" and Baldwin". This maintenance project was planned as a fifty-five (55) hour weekend track outage, beginning on Friday night and ending Sunday night. Track No. 2 would be out of service for the duration of the project and foul time in conjunction with watchman protection would be used to protect on tracks 1, 3, and 4. The work was to be performed in two shifts, generally described as the day shift and night shift, and would utilize a contractor operated Vacuum Train

which was situated on No. 2 track. Additionally, a rubber tired backhoe operated by an Amtrak employee would be placed on No. 3 track, when necessary, to assist the Vacuum Train in dislodging mud from between the crossties of No. 2 track.

The Trackman reported to the Wilmington Track office for a 6:00am start, and was instructed by the day shift foreman to accompany a Truck Driver to MP15.7, and to then relieve the night shift watchman who's shift would be ending. The Truck Driver also started at 6:00am. The trackman stated that he was familiar with and had worked for day shift foreman on numerous occasions but did not receive a job briefing from him at the Wilmington Track office.

The Trackman and Truck Driver arrived at the work site just before 7:00am, and signed the night shift foreman's on-track briefing sheet after being advised only as to the fouls placed on tracks 1, 3, and 4. The Trackman knew the night shift foreman but had never worked for him. The Trackman then relieved the night shift Watchman. The Trackman stated that the night shift Foreman left the immediate work area shortly thereafter. The Trackman had positioned himself on the outside edge of No. 4 track opposite the on-track equipment and had good visibility in both directions. The Trackman stated that he saw the day shift foreman at the work site some 10 or 15 minutes later, and asked him "do we still have all the fouls", meaning tracks 1, 3, and 4 were still under foul time protection and was told "yes." The Trackman stated that he heard the day shift foreman instruct the operators of the Vacuum Train to "suck up this mud", to which they replied over the radio "not without a briefing". The Trackman saw the day shift foreman climb up into the cab of the Vacuum Train. At this time the backhoe was occupying No. 3 track just south of the Vacuum Train. Shortly thereafter southbound Train #89 approached the work site. The Trackman signaled using a watchman's disc and air horn, then realized Train #89 was on No. 3 track. The Trackman stated he frantically tried to warn the workers up until the time the train impacted the backhoe.

During the interview the Trackman confirmed his understanding as to the correct application of a Supplemental Shunting Device (SSD) but stated that he did not see a SSD in use at the work site and that SSDs are not readily available or regularly used. Further he stated that job briefings and on-track briefings are typically not given the attention required, and that safety bulletins and other published safety related materials are either absent or simply passed over.

Loram Superintendent:

The superintendent has one year of experience in his current capacity and a total of four years of experience with the Loram vacuum train. The superintendent has worked with Loram on Amtrak and the Norfolk Southern Railroad. Since July of 2015, he has been working exclusively on Amtrak between Baltimore, MD and New York, NY.

The work being performed during the fatality was part of a 55-hour track outage that began on April 1, 2016, at 10:00 p.m. on Amtrak's Main Line Philadelphia –Washington at milepost PW 15.7. The scope of work was to remove various locations of mud that were causing surface conditions on No. 2 track between Baldwin and Hook Interlocking's with the Loram vacuum train. During the night shifts of this outage, a backhoe loader was brought in to cut the mud underneath the ties. This was done at night due to the track availability during this shift.

The Superintendent was scheduled to work from 8:00 p.m. Saturday, April 2, 2016, through 8:00 a.m. Sunday, April 3, 2016. His responsibilities were supervising his two Loram employees, maintain the vacuum train, and filling out daily reports.

He reported for duty at approximately 7:45 p.m. on Saturday and was given an on-track safety briefing by the Amtrak night foreman and signed the on-track briefing sheet. He was shown the Form D showing that main track No. 2 was out of service, which was the track that the vacuum train was occupying. He stated that in order for the vacuum train to work, a foul would be needed on the adjacent main tracks No. 1 and No. 3.

Throughout the night, he was relayed via radio when fouls were obtained by the night foreman and when he needed to stop work and cease fouling adjacent tracks, so that the night foreman could cancel the fouls. He stated all communications with the night foreman were via the Amtrak radio channel and at no time did he have any cellphone conversations with the night foreman.

Around 6:30 a.m. Saturday, the night foreman and a watchman rode north with the vacuum train to side cast spoils down the embankment on the east side of Track No. 1. Shortly after casting the spoils, they returned south to just north of the Booth Street underpass bridge. He recalls the night foreman clearing up his foul on main track No. 1 over the radio.

The Amtrak track supervisor showed up around 6:30 a.m. and he recalls him having a conversation with the Amtrak assistant track supervisor. The Loram relief crew arrived on the access road around 7:30 a.m. and stayed in their vehicles. Between 7:30 a.m. and 7:45 a.m. the Amtrak day foreman, approached the Loram and asked the Loram employees to sign the on-track safety briefing sheet. The Loram superintendent stated the on-track safety briefing was not thoroughly discussed and they just signed it because they were getting ready to leave. The Amtrak day foreman verbally informed them that they had a foul on main tracks No. 1, No. 3 & No. 4.

They took no exception to this information because they never heard the night foreman cancel the any fouls over the radio.

Just prior to the accident, the backhoe operator was in the backhoe on main track No. 3 and the Amtrak track supervisor and a trackman were near the gage of main track No. 2 just south of the vacuum train. He heard the impact, but did not see the accident [his head was looking down at the time].

The superintendent stated he was qualified as a roadway worker by taking a contractor RWP class [via an e-rail computer course]. He stated that he had no official training on shunts. He stated that there were numerous times that a backhoe was fouling an adjacent track or they were casting spoils with their boom over an adjacent track and shunts were seldom used on Amtrak between Baltimore and New York. He stated he has worked with the Amtrak day foreman on numerous occasions and numerous times on the territory of the Wilmington track supervisor and he does not recall ever using shunts with them.

Night Shift Foreman:

The foreman has four months of experience in his current capacity as an Electric Arc Welder Foreman with a total of three years of railroad experience. His headquarters is located in Philadelphia, PA. The foreman has held previous jobs as trackman, thermite welder, truck driver and lubricator. The foreman is qualified in the physical characteristics on Amtrak's northeast corridor from milepost 76 to Ragan Interlocking. The foreman has previously worked with the Loram vacuum train gang but not as the Roadway Worker In Charge (RWIC) of on track protection.

The worked being performed during the fatality, was part of a 55-hour track outage that began on April 1, 2016, at 10:00 p.m. on Amtrak's northeast corridor at milepost PW15.7. The scope of work was to remove various locations of mud that were causing surface conditions on No.2 track between Baldwin and Hook Interlocking's with the Loram vacuum train. During the night shifts of this outage, a backhoe loader was brought in to cut the mud underneath the ties. This was done at night due to the track availability during this shift.

On the morning of April 1, 2016, the foreman was asked by the Philadelphia subdivision supervisor if he could work the Saturday night shift of the 55-hour outage in the Wilmington, DE subdivision. The foreman worked Saturday, April 2, 2016, from 6:00 p.m. until Sunday, April 3, 2016, at 8:00 a.m. during the 55-hour outage. His responsibilities were to go over the job briefing and on-track job safety briefing with all employees and contractors at the work location. Typically, the night track gang consisted of four Amtrak employees, one Amtrak assistant supervisor and three Loram contractors. This group would meet at 7:00 p.m. to discuss the job briefings. The foreman stated the main form of protection for the track occupied by the Loram vacuum train was established by taking No. 2 track out of service from Control Point (CP) to CP for the entire 55-

hour outage that began on Friday, April 1, 2016 at 10:00 p.m. and ended April 4, 2016 at 05:00 a.m. The adjacent tracks would be protected through the use of foul time when needed. Foul time is typically taken from CP to CP.

On the day of the incident, April 3, 2016, the foreman reported to the Philadelphia track office at 6:00 p.m. He got into an Amtrak truck and headed south to the job site where he met with the track supervisor and night time watchman at the job site around 6:50 p.m. The supervisor informed the foreman that the backhoe operator's shift was changed from 6:00 p.m. start to a 10 p.m. start. Then the foreman gave the night gang an on track safety briefing. Since the backhoe operator had not arrived, the night gang used the Loram vacuum train to remove dirt and ballast without undercutting the ties. The foreman only took fouls on Track No. 1 and Track No. 3 during this process. Around 11:00 p.m. the backhoe operator arrived at the job site and the foreman gave him a job briefing. After the briefing, high winds and rain prevented the night gang from working. At approximately 12:30 a.m. the foreman got foul time on Track No. 1, 3 and 4 and the night gang returned to work. The track supervisor arrived at 6:30 a.m. and the day shift watchman showed up at approximately 7:00 a.m. The foreman gave the day shift watchman a job briefing and instructed him to relieve the night shift watchman at the work location. The foreman had his vehicle parked at the work location and began to see the day shift vehicles arriving. The foreman took his vehicle and moved toward the access road. While he was driving, he noticed the day shift foreman eating in his vehicle. Shortly after 7:20 a.m. the night shift foreman pulled up next to the day shift foreman to discuss the current on track protection. The night shift foreman exited the vehicle and approached the day shift foreman's passenger window. The night foreman told the day foreman he had a Form D on Track No. 2 and foul time on Tracks No. 1, 3 and 4. The day foreman told the night foreman he also had a Form D for Track No. 2 and that he was waiting for a call. The day foreman took a brief phone call and then told the night foreman that he could cancel his Form D. The night foreman informed the day foreman that he would also have to cancel the fouls on all three tracks and the day foreman would have to get new fouls. The day foreman said, "I know what I have to do." The night foreman called the dispatcher and canceled his Form D and fouls. The night foreman said that he canceled the Form D and fouls with the dispatcher in view of the work gang and backhoe occupying Track No. 3. The night foreman also told the dispatcher that the day foreman would be taking over the fouls. The night foreman then told the day foreman he could get his on track protection. The day foreman stated, "I got it." The night foreman said goodbye to the day foreman and the day foreman said, "Goodbye Will." The night foreman got in his vehicle and headed back to Philadelphia, PA.

Throughout the night, the night foreman had to clear his fouls for several train traffic movements but he could not recall how many trains he cleared for. The night foreman rode with the Loram vacuum train approximately three times to cast the spoils east of Track No. 1.

Assistant Division Engineer:

The ADE has about two years of experience in his current capacity and a total of 39 years of railroad experience with Amtrak. He started on the railroad as a trackman and has worked as a machine operator, welder, track foreman, welding foreman, RWP trainer, assistant track supervisor, and track supervisor. In his current capacity as an ADE, he is responsible for 130 track employees on the Wilmington and Philadelphia subdivisions. He is responsible for about 70 route miles of main line track [the majority of the route miles are four main tracks] and numerous yards. His activities involve assisting in the planning of work based on ARMS and geometry data, inspection reports and FRA defects. He also monitors safety activities primarily on the daylight shift.

The work being performed during the fatality was part of a 55-hour track outage that began on April 1, 2016, at 10:00 p.m. on Amtrak's Main Line Philadelphia –Washington at Milepost PW15.7. The scope of work was to remove various locations of mud that were causing surface conditions on No. 2 track between Baldwin and Hook Interlocking's with the Loram vacuum train. During the night shifts of this outage, a backhoe loader was brought in to cut the mud underneath the ties. This was done at night due to the track availability during this shift.

He mentioned that he does monitor various safety rules by way of Amtrak's 1872 program [efficiency testing] and has observed shunts being used on occasions, but does not ever recall documenting those observations in the 1872 program. Regarding close calls, he believes some have occurred, but are covered up by field employees. He believes there is a close call reporting program, but does not ever recall receiving any feedback. He does interact with Amtrak's safety liaisons and Amtrak's system safety group.

He stated, as a RWP trainer, he taught all employees that any foul [of a main track] with equipment over five minutes required a shunt to be applied. The shunt after approval from the dispatcher to apply must be confirmed that it is applied properly. He recalls that this was always the Amtrak rule and it was only recently that a log book was instituted to record fouls.

He focuses his monitoring of new qualified foreman as opposed to more senior experienced foremen. He has more confidence in older foremen and he thinks some of the newly qualified foremen don't have the attitude or aptitude to be foremen.

He acknowledged that there are some problems reaching the dispatcher with the portable radio that are supplied to foremen. He said that Amtrak company policy states that a personal cellphone cannot be used except in an emergency and the reporting clear of fouls is not an emergency. He stated that some trucks have radio, but it's not necessary for all trucks to have radios.

There was no hazard assessment performed for this job because it was considered as routine maintenance. Site specific work plans are only created for large scale jobs like switch installation and bridge timber replacement.

###