Positive Train Control

PTC 101

2010 Discipline Conference

Denver, Colorado

PRESENTATION OVERVIEW

- THE CONCEPT?
- WHY PTC?
- WHAT IS PTC?
- HOW DOES PTC WORK?
- WHERE IS PTC REQUIRED?
- WHAT ARE SOME EXISTING SYSTEMS?
- FRA's EFFORTS?
- QUESTIONS?

THE CONCEPT?

- Probably all of you either have or are familiar with navigation systems in your car.
- These use a digital mapping system and it functions to continuously plot your position as you traverse the roadways.
- What if the navigation system warned of and enforced every stop sign, yield sign, traffic light, roadway speed limit, merging lane of traffic, etc. – actually slowed you down or put on the brakes automatically – maybe even sounded your horn.
- That is essentially what a PTC system is and what it does.

WHY PTC?

- Over the years, only about 3-4% of route miles of railroad main lines have been equipped with cab signals and automatic train stop or automatic train control, systems which have provided some protection for single point human failure.
- Since about 1971, the National Transportation Safety Board has been demanding better technology to prevent more accidents.
- Since 1985, the railroad industry has been promising it.

WHY PTC?

- Through assistance of the RSAC PTC working group, FRA published on March 7, 2005, the performance-based Part 236, Subpart H addressing processor-based signal and train control systems.
- The required level of safety was that a proposed system must be shown to be at least as safe as the previous condition.
- Railroads had been implementing PTC under Subpart H, but very slowly.
- Major train accidents preventable by PTC continued to occur.

WHY PTC?

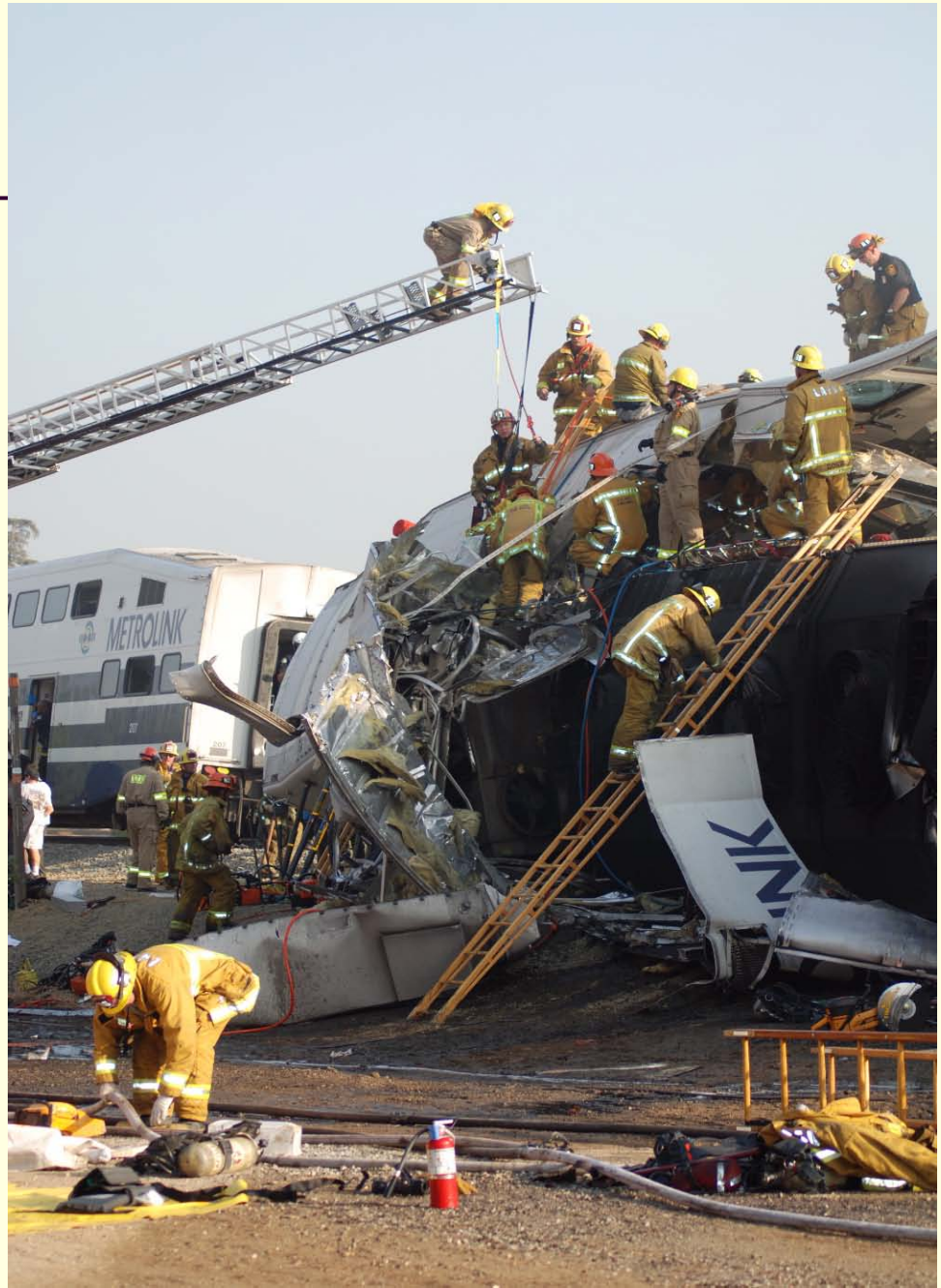
Graniteville, SC

January 5, 2006

WHY PTC?

Chatsworth, CA

September 12, 2008



THE RSIA'08 and THE RULE

- **The Rail Safety Improvement Act of 2008 was signed into law on October 16, 2008, mandating widespread PTC implementation, and specific PTC functionality.**
- **Again through significant effort and assistance of the RSAC PTC working group, FRA published the NPRM on July 21, 2009, consisting primarily of Part 236 new Subpart I addressing the mandate for PTC.**
- **The working group then addressed comments received and worked off most issues.**
- **The final rule was published on January 15, 2010, and was effective on March 16, 2010.**

THE RSIA'08 AND THE RULE

- **Primary topics of the rule include:**

  Required PTC by December 31, 2015;

  Required PTC core functionality;

  Required levels of safety;

  Line segments requiring PTC – including potential exceptions;

  Procedural requirements – necessary submissions for approval, content and timelines;

  System certification, use, and unequipped operations;

  Required manuals and training criteria.

WHAT PTC IS NOT?

- **PTC is not** a single specific system with only one acceptable system architecture or technology. It is rather specific required outcomes and functions of a system.
- **PTC is not** a system intended to provide for wholly automated train operation. An engineer is still relied upon to properly operate a train according to the operating authorities and limitations attained. PTC then enforces those limitations if the engineer does not operate accordingly.

WHAT PTC IS?

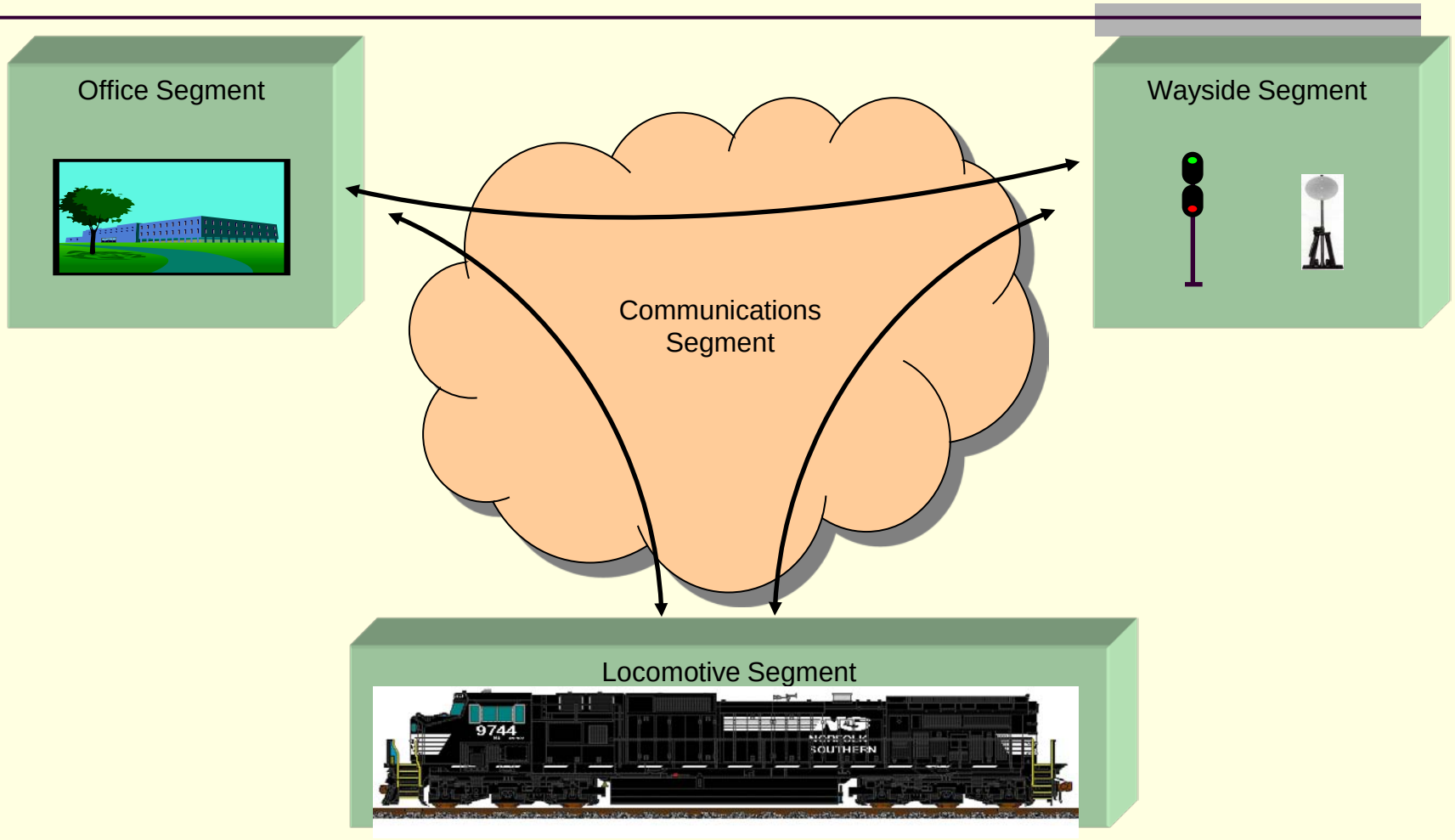
- **PTC is a processor-based/communications-based train control system.**
- **PTC can be any of four types:**
  1. **A non-vital overlay system;**
  2. **A vital overlay system;**
  3. **A stand-alone system; and**
  4. **A mixed system.**
- **Each must perform the four basic core functions of PTC.**

WHAT ARE THE REQUIRED PTC CORE FUNCTIONS?

PTC Systems Must:

- **Prevent train-to-train collisions.**
- **Prevent overspeed derailments.**
- **Prevent incursion into established work zones.**
- **Prevent movement through a switch not in proper position.**

WHAT PTC LOOKS LIKE?



V-ETMS™ System Segments

WHERE IS PTC REQUIRED?

- **On Class I "main lines" (> 5 mgt) over which any PIH hazardous material is transported;**
- **On Class I, II, or III lines used for regularly scheduled intercity or commuter passenger service;**
- **Exclusions from PTC are possible for:**
  - **Where PIH, or passenger service, is removed from the line;**
  - **Where traffic falls below 5 mgt on a Class I line;**
  - **Where *de minimus* PIH risk exists (low train density, low speeds, less than 100 cars of PIH annually, or temporal separation);**
  - **Certain passenger terminals or limited operations associated with passenger service.**

WHAT ARE EXISTING SYSTEMS?

- FRA is continuing to work with railroads related to “grandfathering” for systems in service through a “short form” certification process:
  - **ACSES I, II**
  - **ITCS**
  - **BNSF’s ETMS**
  - **Others approved under Subpart H?**
- Credits were given for showings made under Subpart H until the effective date of the new rule.
- The option remains to proceed under Subpart H where PTC is not mandated by the new rule.

FRA EFFORTS?

- FRA staff has been steadily working with various railroads and suppliers on PTC system development; pre-revenue service testing; reviewing numerous PTCIP submissions for appropriate content; and addressing associated questions and issues.
- FRA is enhancing and expanding a PTC Branch of the S&TC Division staff.
- FRA has every intention of meeting our obligations toward successful facilitation of accomplishing the mandate for PTC.

FRA EFFORTS?

- Each railroad meeting the criteria for PTC being installed had to develop and submit by April 16, 2010 to FRA for approval a PTC Implementation Plan (PTCIP); 41 such plans have been received.
- FRA staff has been working hard to review those plans and provide written determination of their sufficiency within the 90 days required by the rule.
- FRA has met that time line and provided the submitting railroads each a letter indicating FRA's findings. The railroads are in the process of correcting any plan deficiencies and resubmitting.

PTC EXPECTED SCOPE?

The mandate for PTC is expected to result in:

- A total of 36 railroads implementing PTC;
- PTC being implemented on about 69,000 miles of track;
- PTC being equipped on approximately 8,000 locomotives;
- Many hundreds of new employees required to perform the associated installations.
- Perhaps the largest single regulatory impact in the railroad industry ever!

QUESTIONS ☺