NTSB National Transportation Safety Board

Investigating and Preventing Organizational Accidents

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NTSB Board Member

Two types of accidents

- Individual accidents – those resulting from the actions/inactions of people.
  - i.e., An individual, following properly established procedures, loses balance and falls of ladder
- Organizational accidents – those resulting largely from actions/inactions of companies/organizations.
  - i.e., A train runs into back of another train, claiming multiple lives
    - Employees develop work-arounds instead of following procedures
    - Organization does not learn from prior events and precursors
    - Senior management is focused on finances and customer service
    - Organization uses wrong safety metrics to gauge safety
    - Regulatory oversight is not sufficient

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Organizational accidents

- "Organizational accidents have multiple causes involving many people operating at different levels of their respective companies."

  – James Reason, *"Managing the Risks of Organizational Accidents."*

NTSB report of Washington, DC Metro subway accident

" … the accident did not result from the actions of an individual but from the 'accumulation of latent conditions within the maintenance, managerial and organizational spheres' making it an example of a 'quintessential organizational accident.'"

Columbia Accident Investigation Board

- "Many accident investigations make the same mistake in defining causes. They identify the widget that broke or malfunctioned, then locate the person most closely connected with the technical failure: the engineer who miscalculated an analysis, the operator who missed signals or pulled the wrong switches, the supervisor who failed to listen, or the manager who made bad decisions."
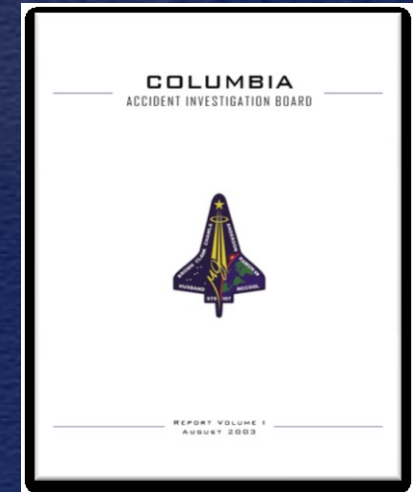
(continued)

Columbia Accident Investigation Board

- "When causal chains are limited to technical flaws and individual failures, the ensuing responses aimed at preventing a similar event in the future are equally limited: they aim to fix the technical problem and replace or retrain the individual responsible. Such corrections lead to a misguided and potentially disastrous belief that the underlying problem has been solved."

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Latent organizational failures

- Lack of top-level management safety commitment or focus

- Conflicts between production and safety goals

- Poor planning, communications, monitoring, control or supervision

- Organizational deficiencies leading to blurred safety and administrative responsibilities

- Deficiencies in training

- Poor maintenance management or control

- Monitoring failures by regulatory or safety agencies

 - Maurino, Reason, et al, "*Beyond Aviation Human Factors*."

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Organizational accidents involve active and latent factors

Information about events

of Failure

ACTIVE
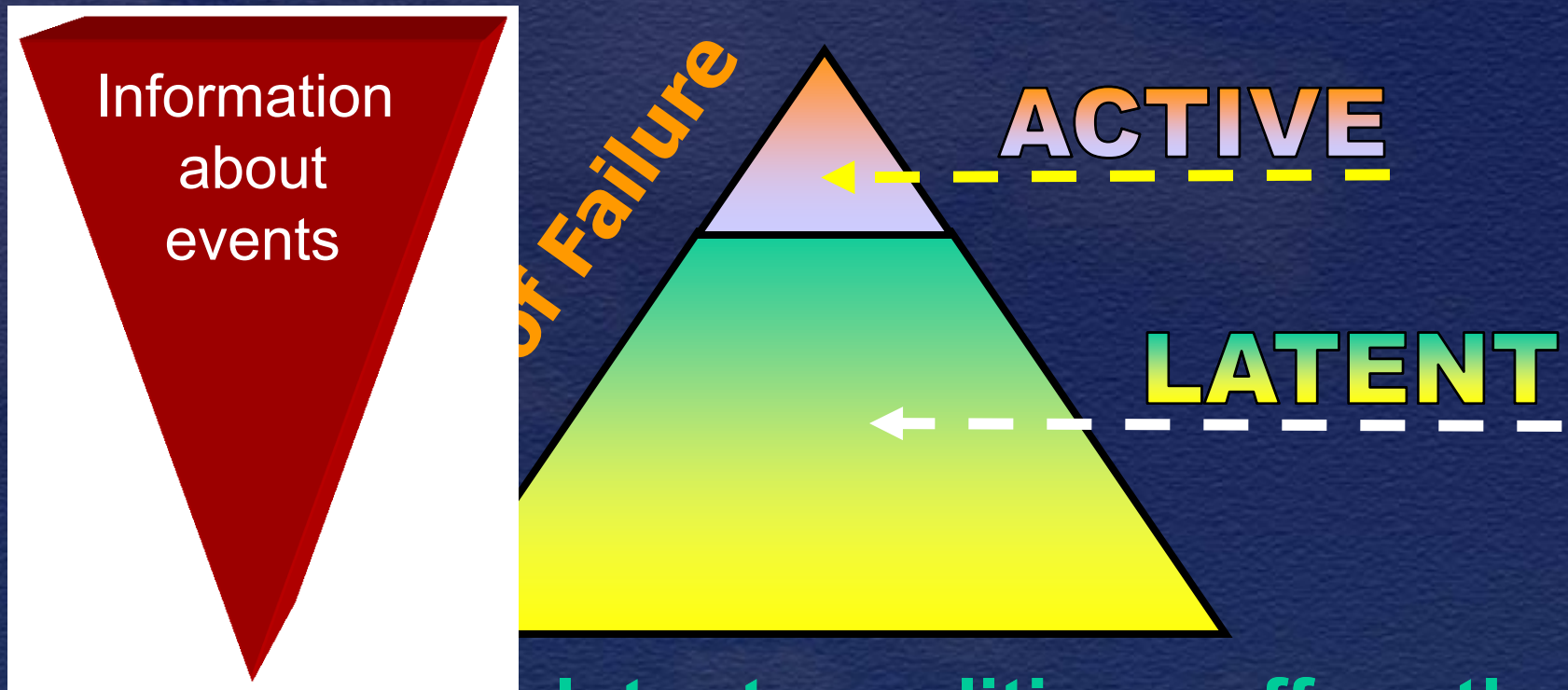
LATENT

Addressing latent conditions offers the greatest potential for safety improvements

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ISASI FORUM

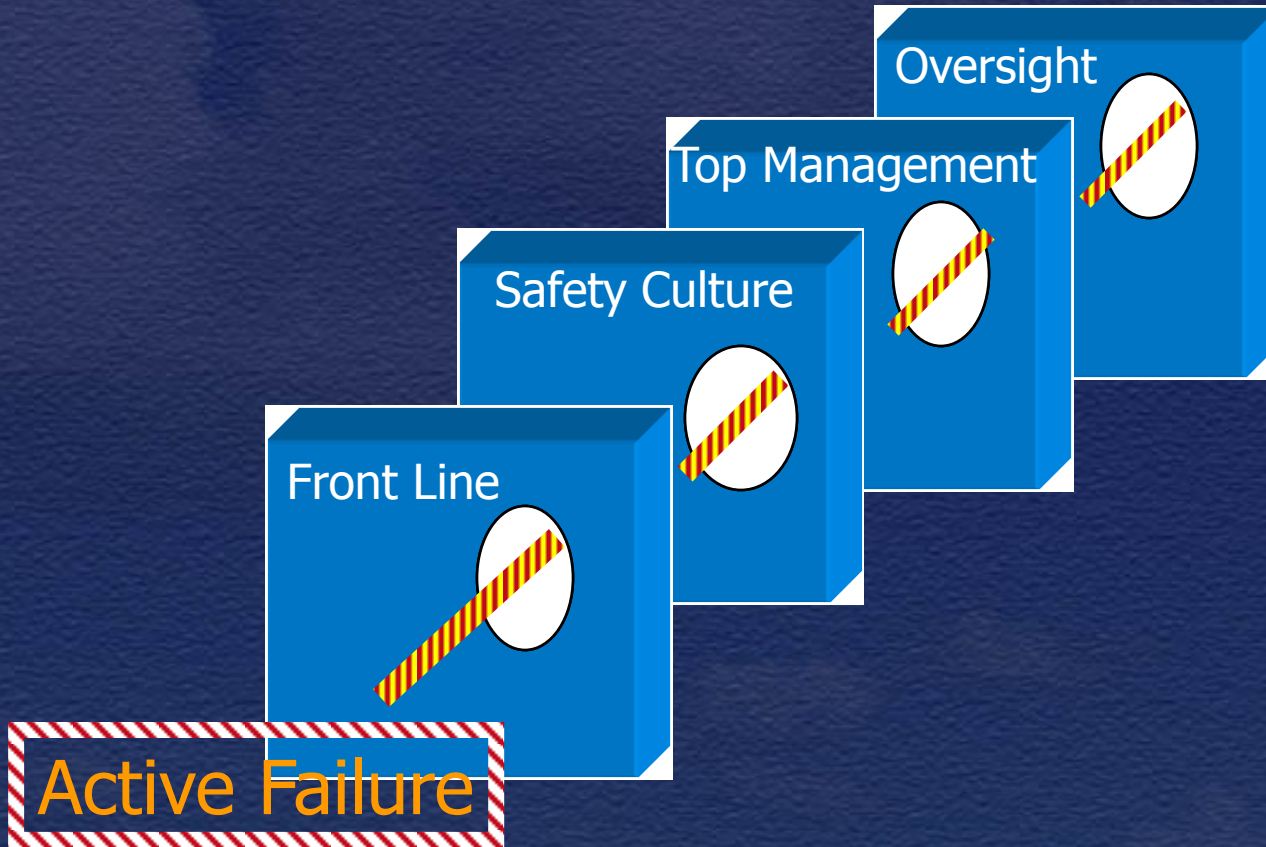APRIL–JUNE 1998

"AIR SAFETY THROUGH INVESTIGATION"

"The discovery of human error should be considered the starting point of the investigation, and not the ending point."

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Look through the layers

Accident

Oversight

Top Management

Safety Culture
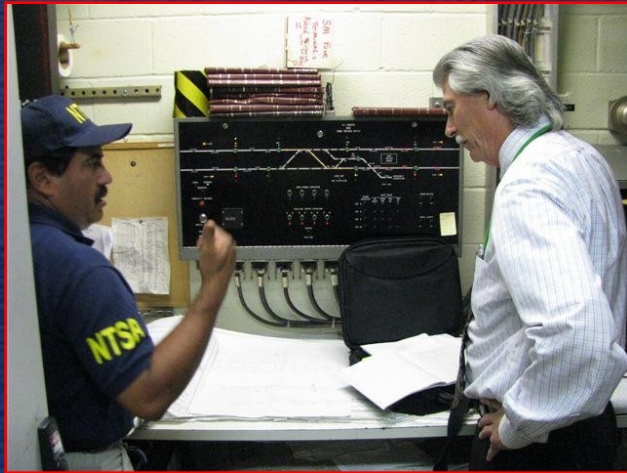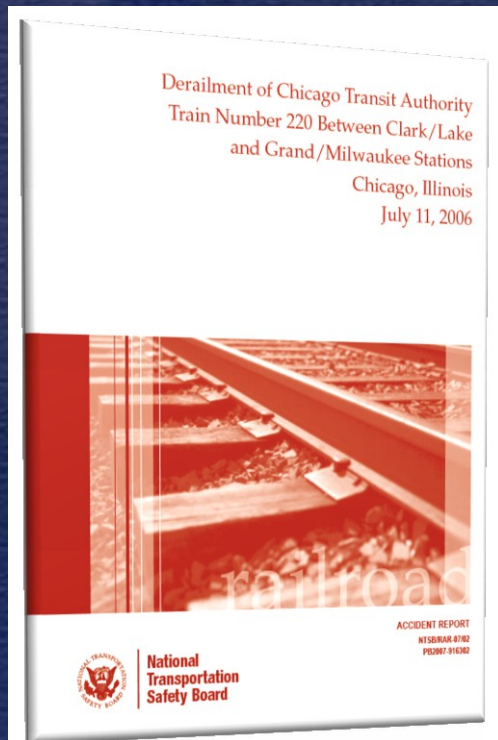
Front Line

Active Failure

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Investigating organizational accidents

- Don't stop at the obvious human error/ mechanical problem.

- Always attempt to understand the behaviors, conditions, circumstances behind the error or unsafe condition.

- Only then can you actually correct the underlying issues.

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Case study in an organizational accident

Derailment of Chicago Transit Authority Train Number 220 Between Clark/Lake and Grand/Milwaukee Stations Chicago, Illinois July 11, 2006

ACCIDENT REPORT
NTSB/RAR-07/02
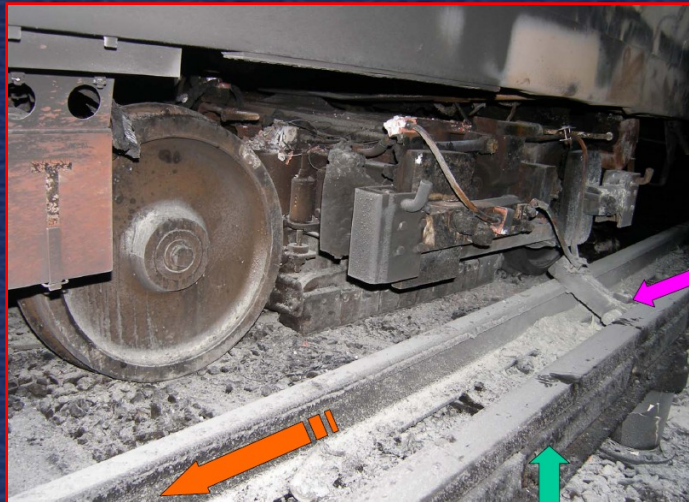PB2007-916302

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"The investigation found a series of latent conditions and active failures at many levels throughout the CTA corporate structure, which is characteristic of an organizational accident."
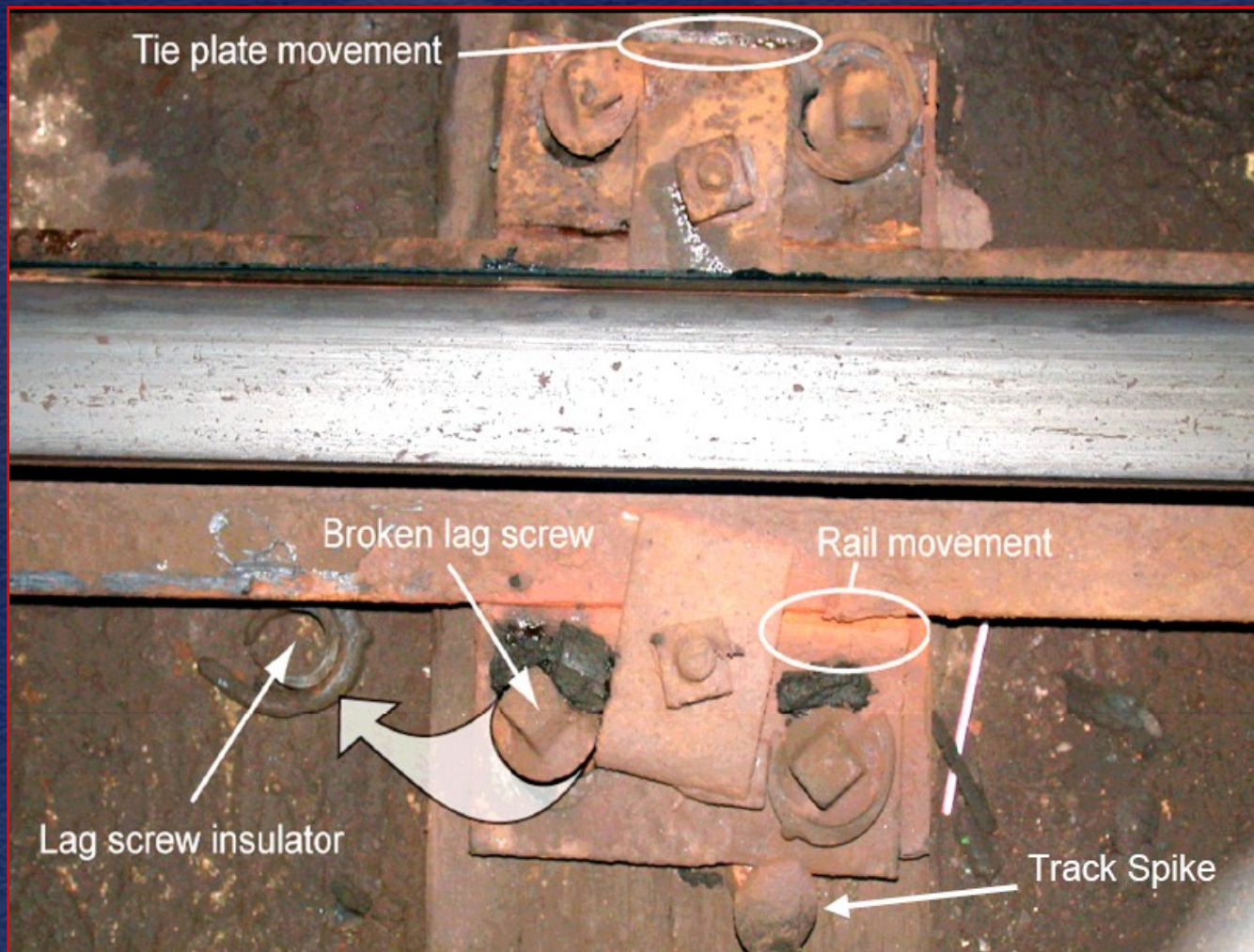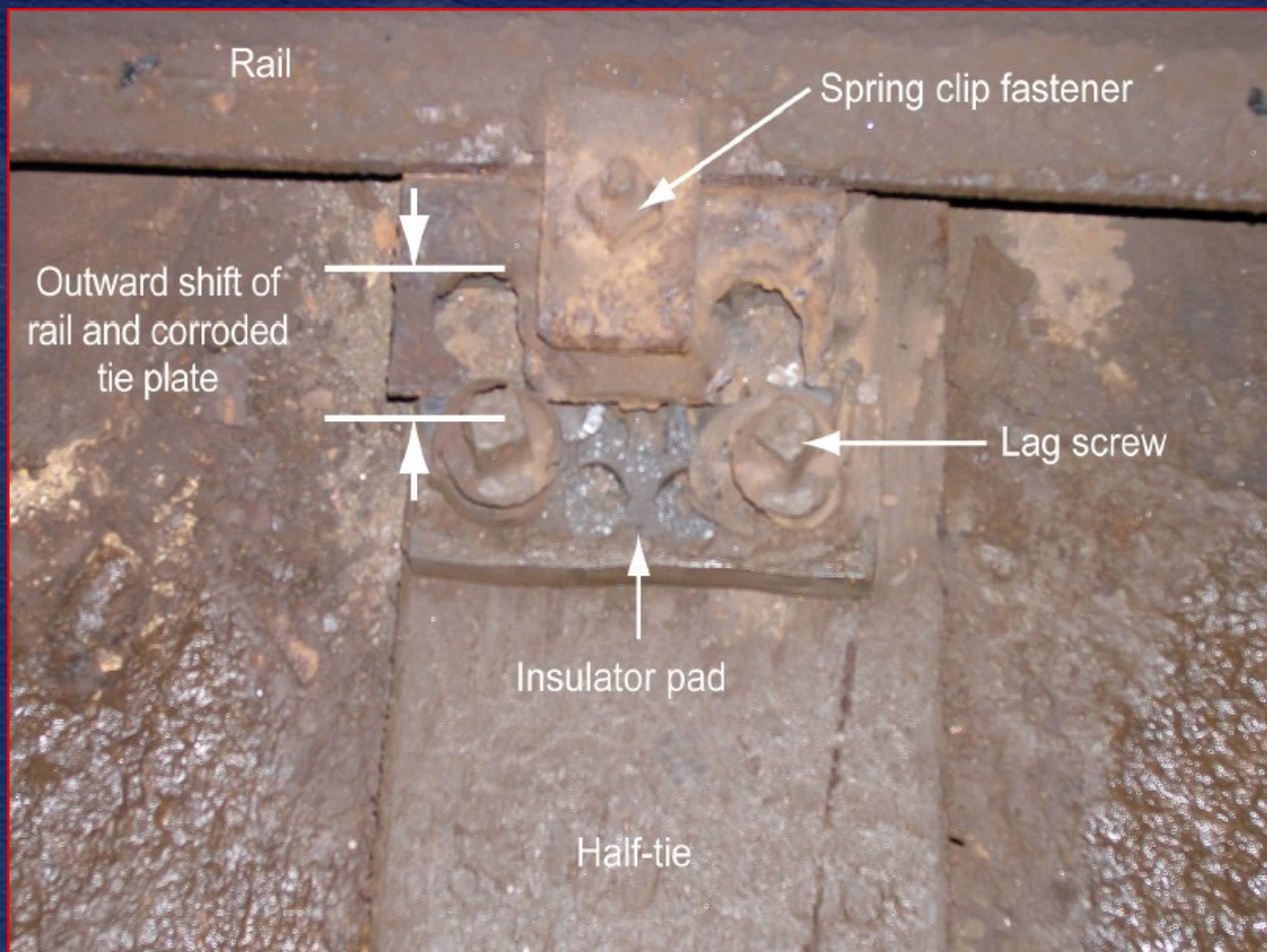
‐ NTSB Accident Report

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# Derailment of CTA train

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Track problems not detected

Track problems not detected

Rail

Spring clip fastener

Outward shift of rail and corroded tie plate

Lag screw

Insulator pad

Half-tie

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Look through the layers

Accident

- Budget pressures
- Improper prioritization of need for adequate track inspections – (human capitol and proper equipment were missing)
- Did not correct deficiencies identified in RTA review

Oversight

Top Management

Safety Culture

Front Line
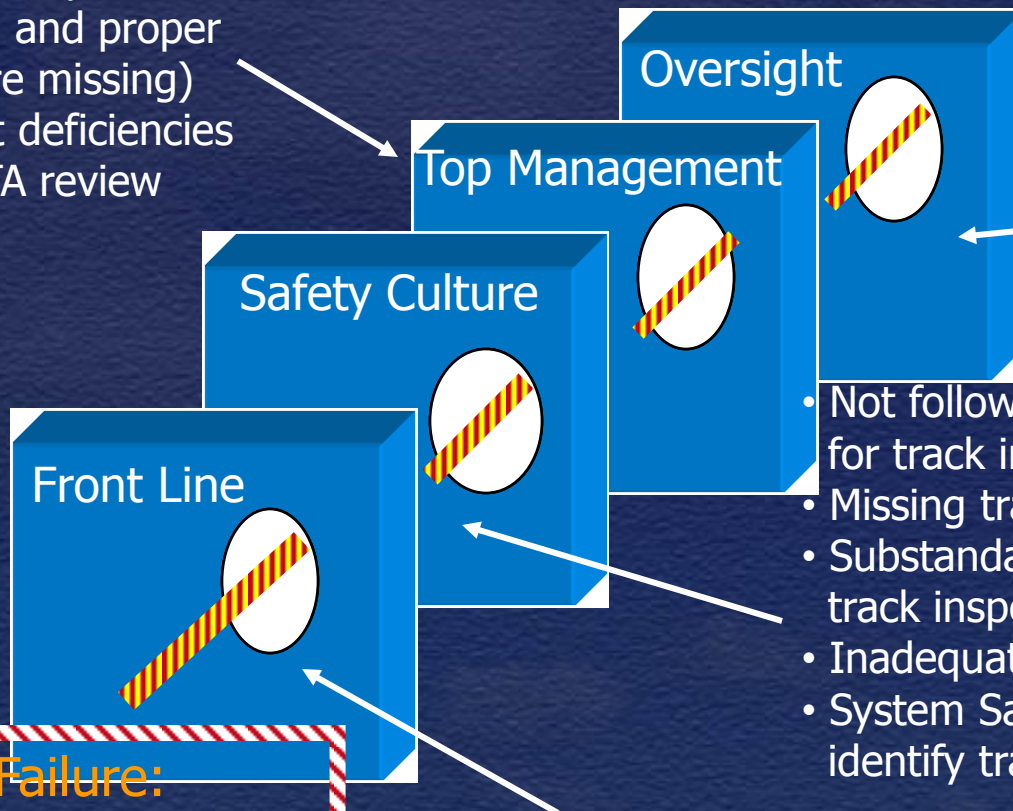
- RTA did not require correction of deficiencies
- FTA's ineffective oversight of RTA

- Not following industry standards for track inspection and testing
- Missing track inspection records
- Substandard training for track inspectors
- Inadequate supervisory oversight
- System Safety program did not identify track program deficiencies

Active Failure: Improper track inspections

- Inadequate time to perform required inspections
- Inadequate inspection equipment
- Inadequate staffing

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NTSB Probable Cause

- Chicago Transit Authority's ineffective management and oversight of its track inspection and maintenance program and its system safety program, which resulted in unsafe track conditions.

- Contributing to the accident were the Regional Transportation Authority's failure to require that action be taken by the Chicago Transit Authority to correct unsafe track conditions and the Federal Transit Administration's ineffective oversight of the Regional Transportation Authority.

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Recommendations to Prevent Future Accidents

NTSB Recommendations issued to	Number of Recs
Chicago Transit Authority	6
Chicago Transit Board	1
Regional Transit Authority	2
State of Illinois	1
Federal Transit Administration	4

These 14 recommendations were broad-reaching, aimed at correcting the system-wide deficiencies identified in the investigation.

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Summary

- The purpose of a safety investigation is to prevent future accidents and incidents.

- Organizational accidents are not caused by individuals.

- Therefore, focusing the investigation solely on the errors of front line employees will not provide a significant safety improvement.

- Looking at the various elements of the system can allow broad-reaching recommendations to correct systemic deficiencies.

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