



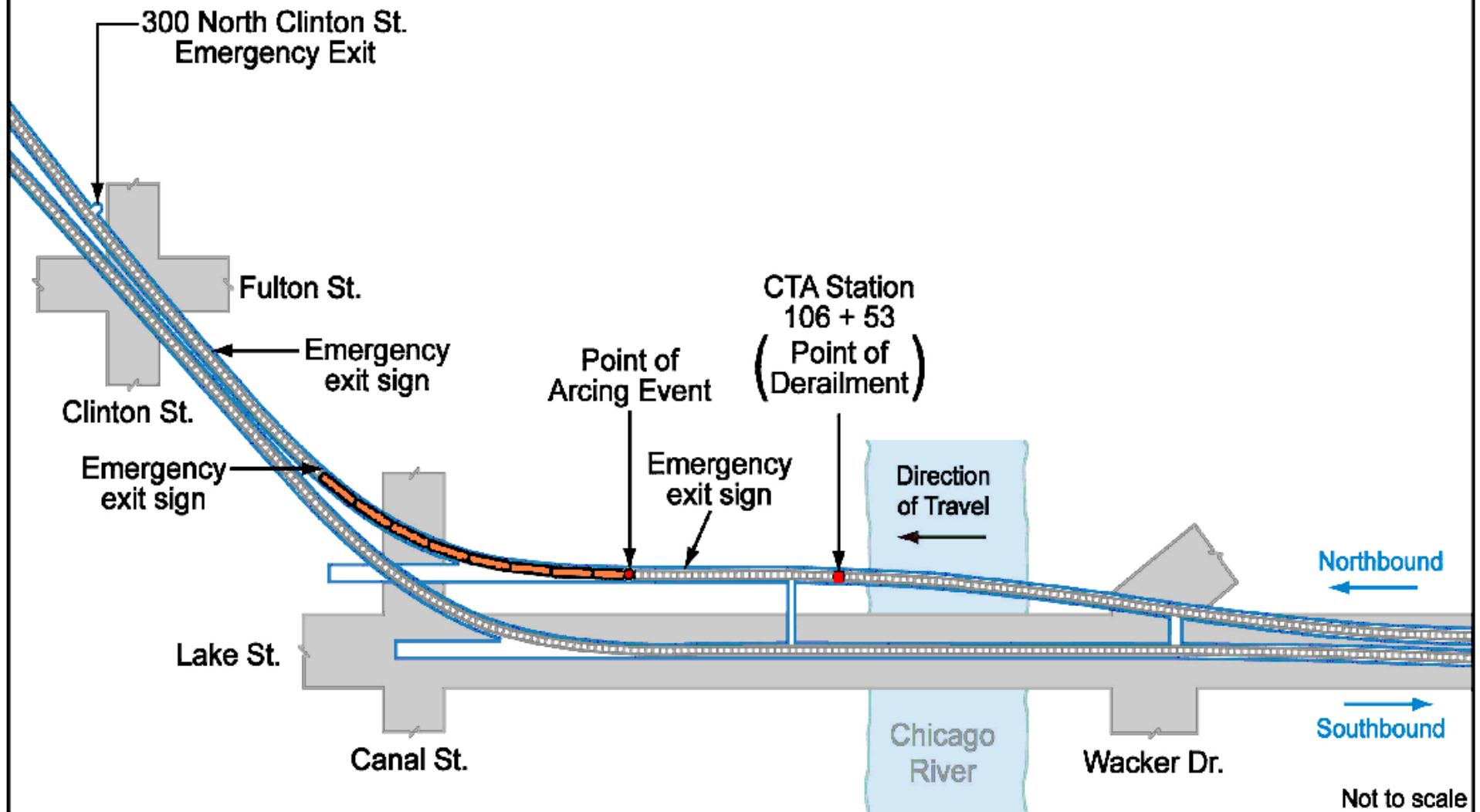
NTSB National Transportation Safety Board

*Office of Railroad, Pipeline &
Hazardous Materials Investigations*

Track, Signal and Engineering



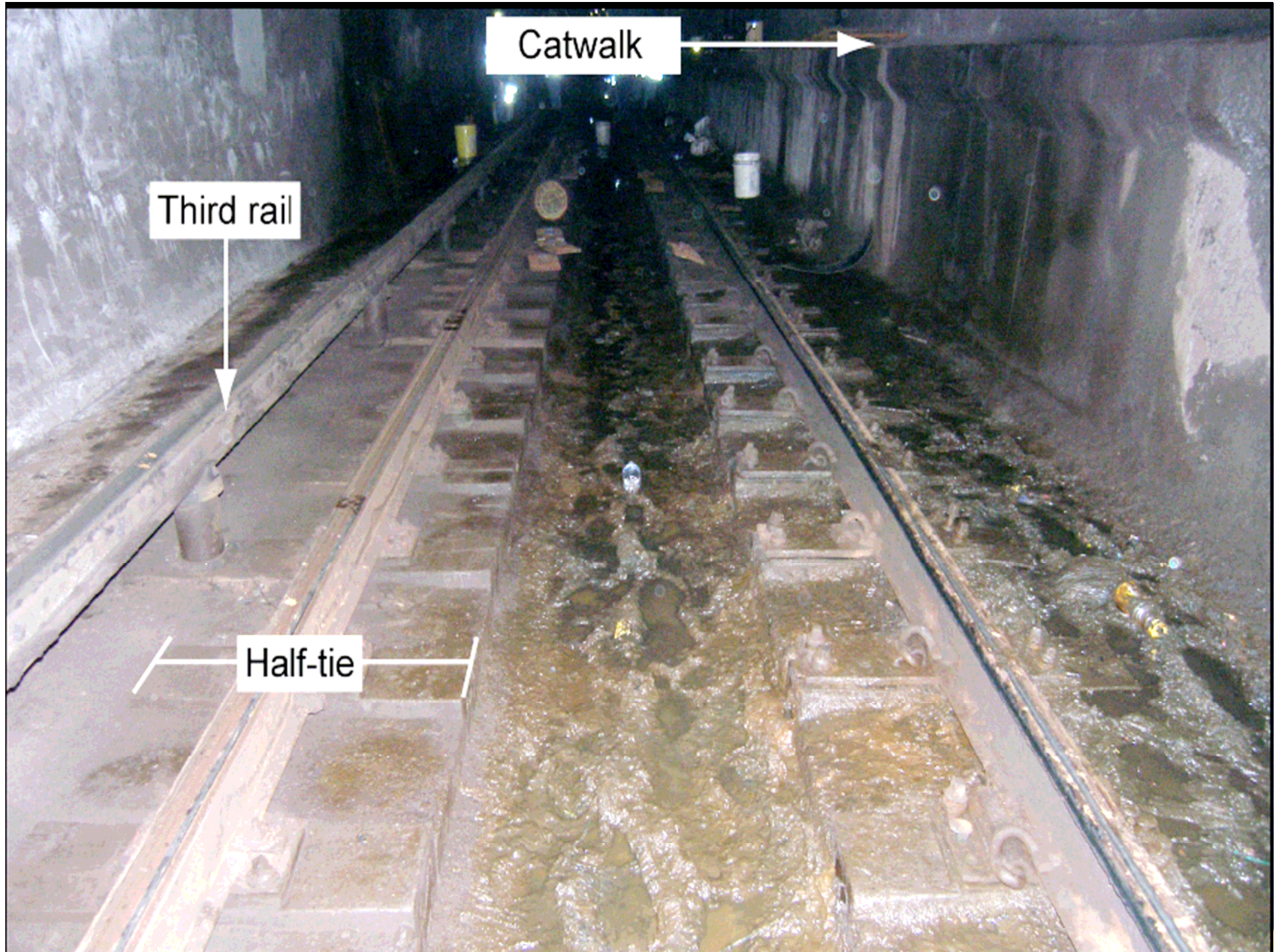
Accident Area

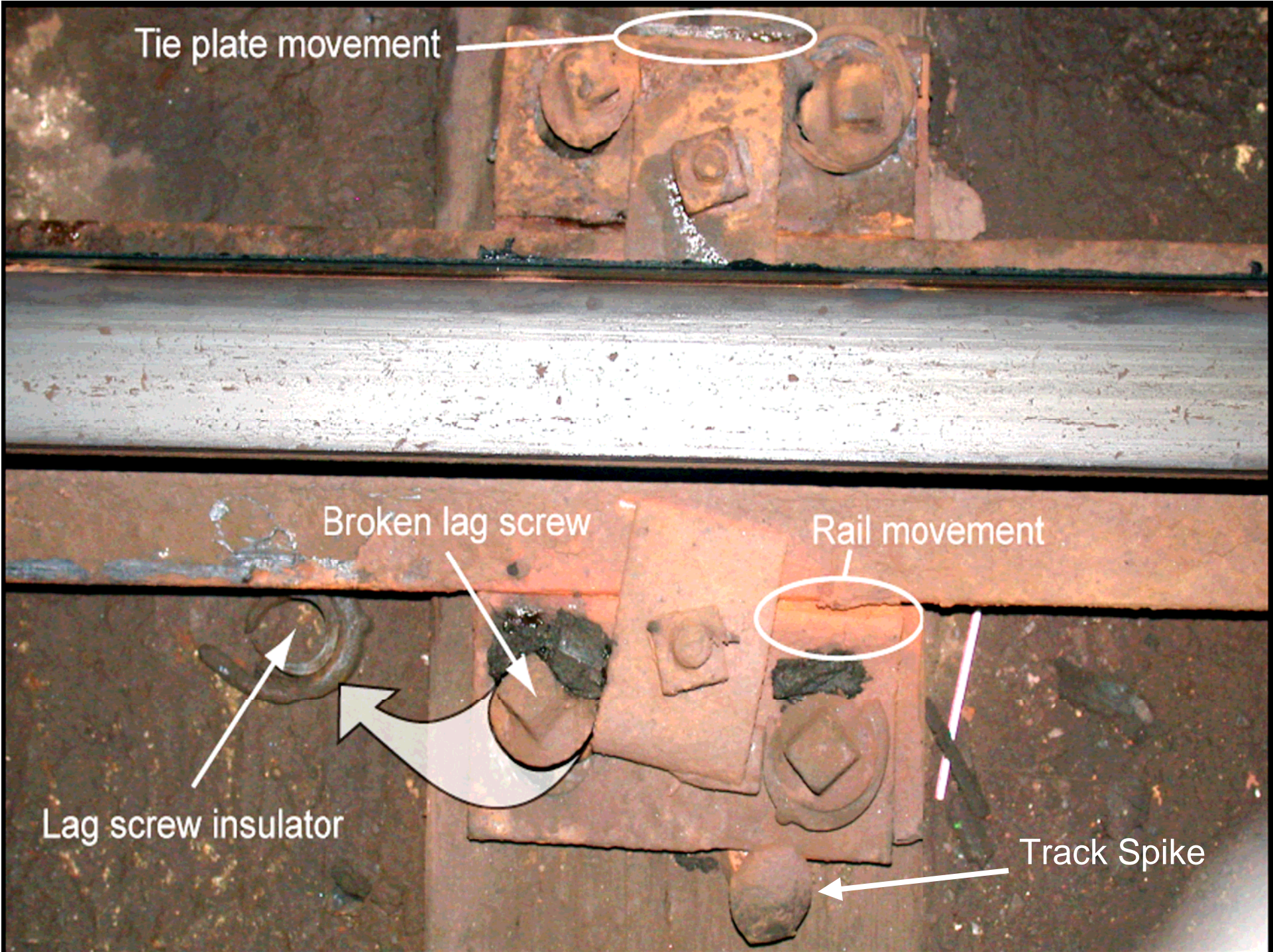


Catwalk

Third rail

Half-tie





Tie plate movement

Broken lag screw

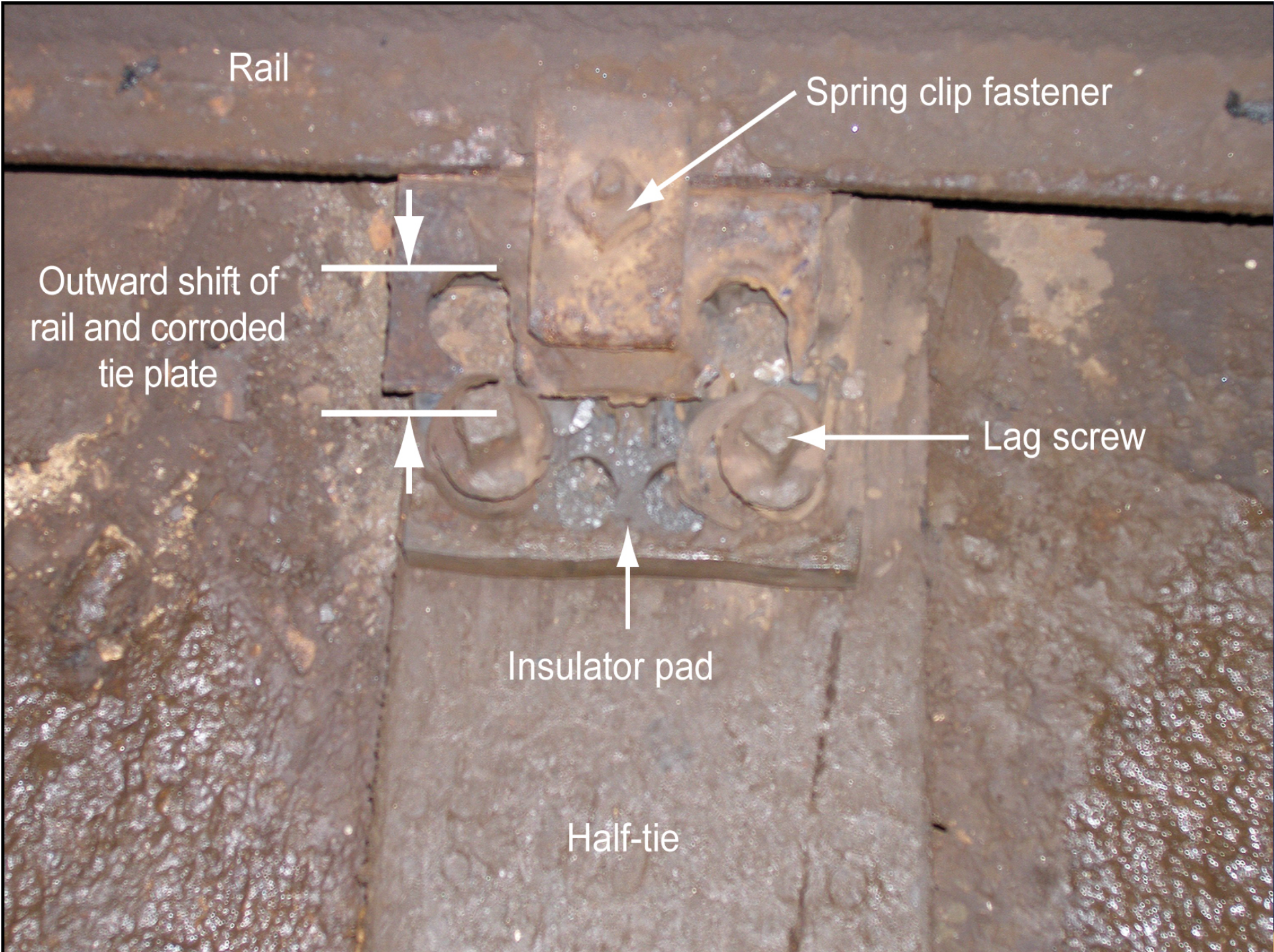
Rail movement

Lag screw insulator

Track Spike

Draft Conclusion

The dark area on the inner rail of the curve, the abrasion on the tie plates and ties, the broken lag screws, and the tie plates' elongated fastener holes in the area of the derailment were all readily observable and should have been documented during walking inspections.



Rail

Spring clip fastener

Outward shift of rail and corroded tie plate

Lag screw

Insulator pad

Half-tie

Exemplar lag screw



Accident lag screws



Draft Conclusion

The tie plates and fastener system failed to maintain the track gage because of the effects of corrosion and/or wear on the rails and rail fastener system, and degraded half-ties.

Why Did the Deteriorated Track Conditions Exist

- Missing track inspections
- Insufficient inspection time
- Limited training and qualifications for track inspectors
- Technology advancements not utilized
- Incomplete track standards

Missing Track Inspection Records

- More than 80 percent of inspection records were missing for the Blue Line territory between May 1 and July 11, 2006

Systemwide Examination of Records

- Hundreds of inspection records were not available
- No territory had met CTA's required two inspections a week
- Large periods of time with no inspection records

Systemwide Examination of Records

- Many were not filled out correctly
- Many records identified defects, but not the repairs
- Defects concentrated in certain areas

Insufficient Inspection Time

- Inspections conducted between 9:00 a.m. and 3:00 p.m.
- Territory length about 6.22 miles long
- Inspector unable to complete assigned inspection route
 - About 1.5 miles short

Draft Conclusion

Track inspectors in the Dearborn Subway did not have sufficient time allotted for inspecting all of their assigned territory twice a week as prescribed.

Limited Track Inspector Training and Qualifications

- One year of construction experience
- One day classroom training did not include tunnel conditions
- Remainder of training was on-the-job
- No recurrent training to maintain competency

CTA Track Inspector Training and Qualifications Comparison

- Bay Area Rapid Transit District (BART)
- New York City Transit (NYCT)
- National Railroad Passenger Corporation (AMTRAK)
- Long Island Railroad (LIRR)
- Northeast Illinois Railroad (METRA)

Draft Conclusion

The Chicago Transit Authority track inspection training program did not adequately prepare inspectors to perform their required duties.

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Track Geometry and Rail Defect Detection

- Track geometry vehicles were not utilized
- Rail defect detector vehicles were not utilized
 - Ultrasonic inspection of rail confined in joint bars was conducted

Draft Conclusion

The use of a track geometry strength and condition test vehicle would have simulated train loads and better identified areas of poor track gage and the need for corrective action.

Standard for Rail Transit Track Inspection and Maintenance

- Minimum qualifications of qualified persons (2 years) and demonstrate knowledge
- Rail flaw detection
- Track geometry inspection
- Rail fastener requirements
- Corroded rail requirements

Draft Conclusion

Because the Chicago Transit Authority failed to establish an effective track inspection and maintenance program, unsafe track conditions and deficiencies were not corrected.

Postaccident Actions

- Replaced corroded track fasteners and tie plates in the area of the derailment
- Track geometry/strength test completed on all tracks
- Reorganized Engineering and Maintenance Departments
 - Separated maintenance from inspection
 - Thirty-six new positions added to inspection and maintenance

Postaccident Actions

- Three days refresher training for track inspectors
- Revised maintenance procedures for corrosion
- Replacement of 5,200 half-ties in the Blue Line Subway
- Replacement of 8,500 half-ties in the Red Line Subway
- Field testing handheld track inspection report computer data system



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