



Transportation Safety Board of Canada

Investigating Grade Crossing and Trespasser Accidents

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Outline

- About the TSB*
- Our investigation process and methodology*

About the TSB

- Independent organization investigating marine, pipeline, rail and air occurrences, 230 employees, a Board with 5 members including the chair.
- The TSB is independent from any other federal departments or organizations
- The TSB reports directly to Parliament
- It is not the function of the Board to assign fault or determine civil or criminal liability
- The Board shall not refrain from reporting fully because fault or liability may be inferred from findings
- Board's findings are not binding on parties to any legal, disciplinary or other proceedings

TSB Mandate

To advance transportation safety in the air, marine, rail and pipeline modes of transportation that are under federal jurisdiction by:

- conducting independent investigations
- identifying safety deficiencies
- identifying causes and contributing factors
- making recommendations
- publishing reports

TSB's Statistics

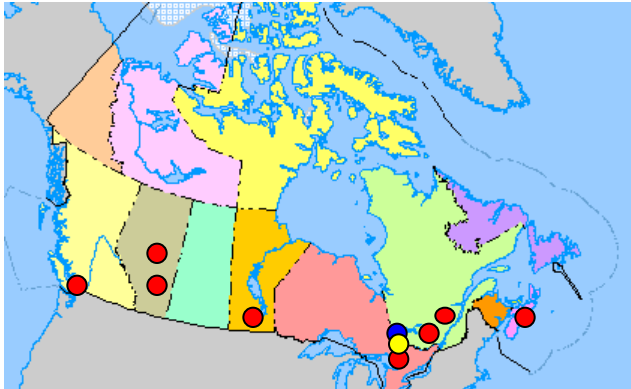
- Total Budget 08/09 - \$31m
- Rail Budget 08/09 - \$3m
- Total Agency Staff – 230
- Six Directorates
 - Air - 49 Investigators
 - Marine - 20 Investigators
 - Rail/Pipeline - 19 Investigators
 - Operational Services
 - Corporate Services
 - Communication

The Rail Pipeline Investigation Branch

- RPIB – 25 Staff
- 13 Regional Investigators (...8 Regional Offices)
- 5 Head Office Investigators (...Specialists, Standards, Technical Co-ordinator)
- 1 Pipeline Investigator
- 3 Regions (...East, Central, West)

TSB Offices

- The Head Office is in Gatineau, Quebec
- The Engineering Laboratory is in Ottawa, Ontario.
- Regional offices are located across the country to allow investigators to quickly reach the scene of an accident:



- Vancouver, British Columbia -1
- Calgary, Alberta -2
- Edmonton, Alberta -1
- Winnipeg, Manitoba - 2
- Toronto, Ontario - 4
- Montréal, Quebec - 1
- Québec, Quebec - 1
- Halifax, Nova Scotia -1

TSB Investigation process and Methodology

- The Investigation Process
- Integrated Safety Investigation Methodology (ISIM)

The Phases of a TSB Investigation

1 – Field Phase

2 – Analysis Phase

3 – Report Production Phase



Collision and fire, near Prince George, BC.

Field Phase



**Underwater retrieval of navigational equipment,
*Queen of the North***



On-site data gathering, near Carcross, YT

Data Collection

Data collected from initial site visit

- Site diagram and measurements
- Physical evidence (Perishable)
- Witness interviews (crews)

Additional Data

- Company third party records
- Recorded information
- Tests
- Literature review

Sequence of Events

- Construct a sequence of events.
- Effectively display the sequence of events graphically

Analysis Phase



Wreckage reconstruction, Swissair



Still image from animation, *Queen of the North*

Analysis

- **Safety Significant Events** – identify unsafe acts, unsafe conditions, and underlying factors
- **Data Analysis** – SHEL Model, Reason,

Shel Model

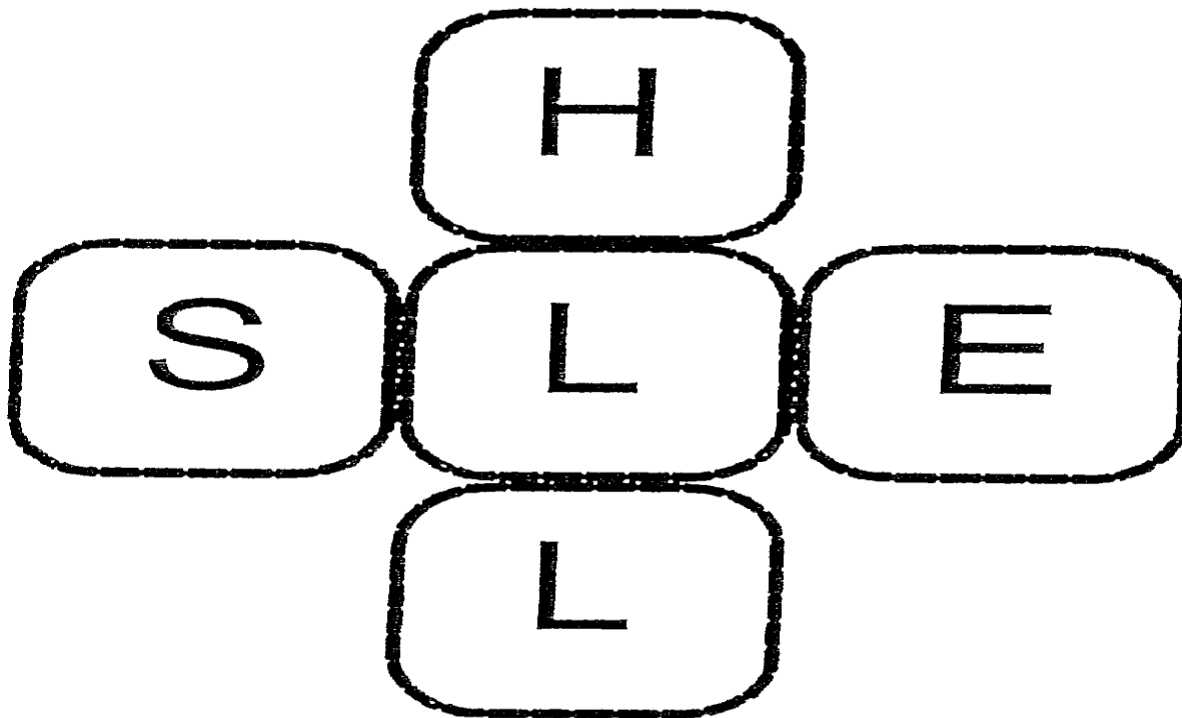
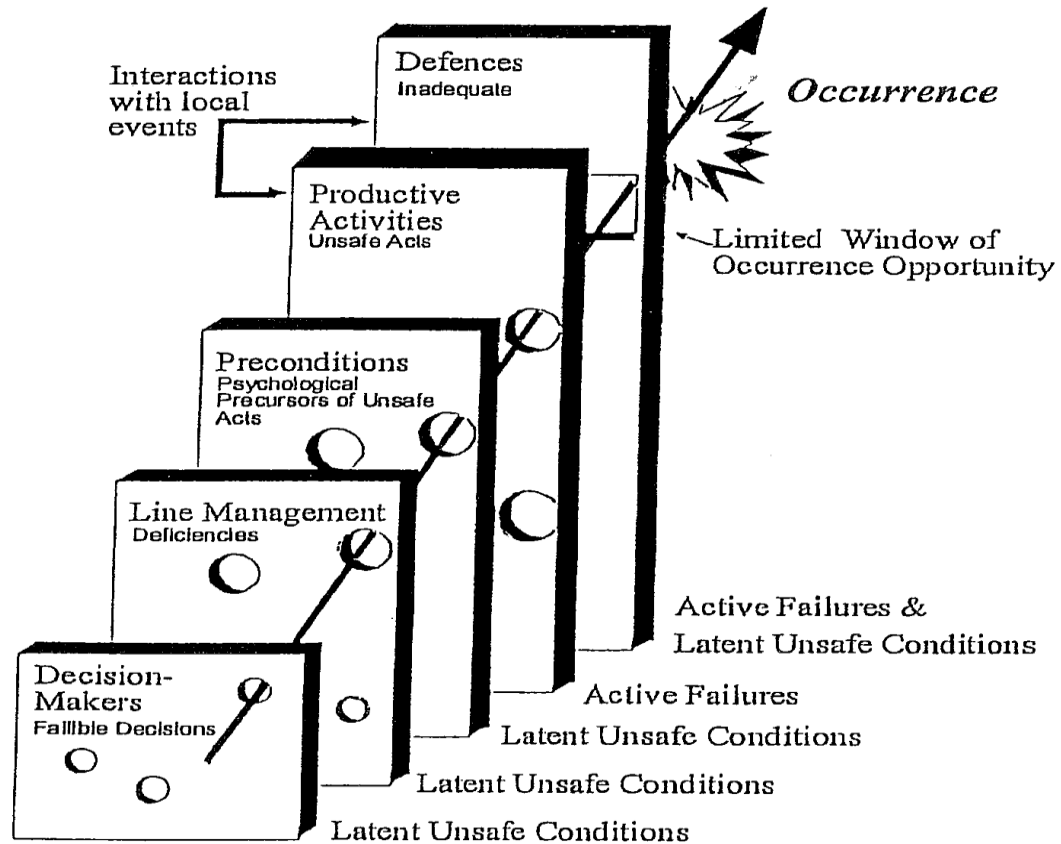


Figure 6 – SHEL Model

Reasons Model



Analysis

- Risk Assessment Process
- Defence Analysis
- Risk Control Options

Report Production Phase



Ramp launching trial, *Lady Duck*, Gatineau, QC



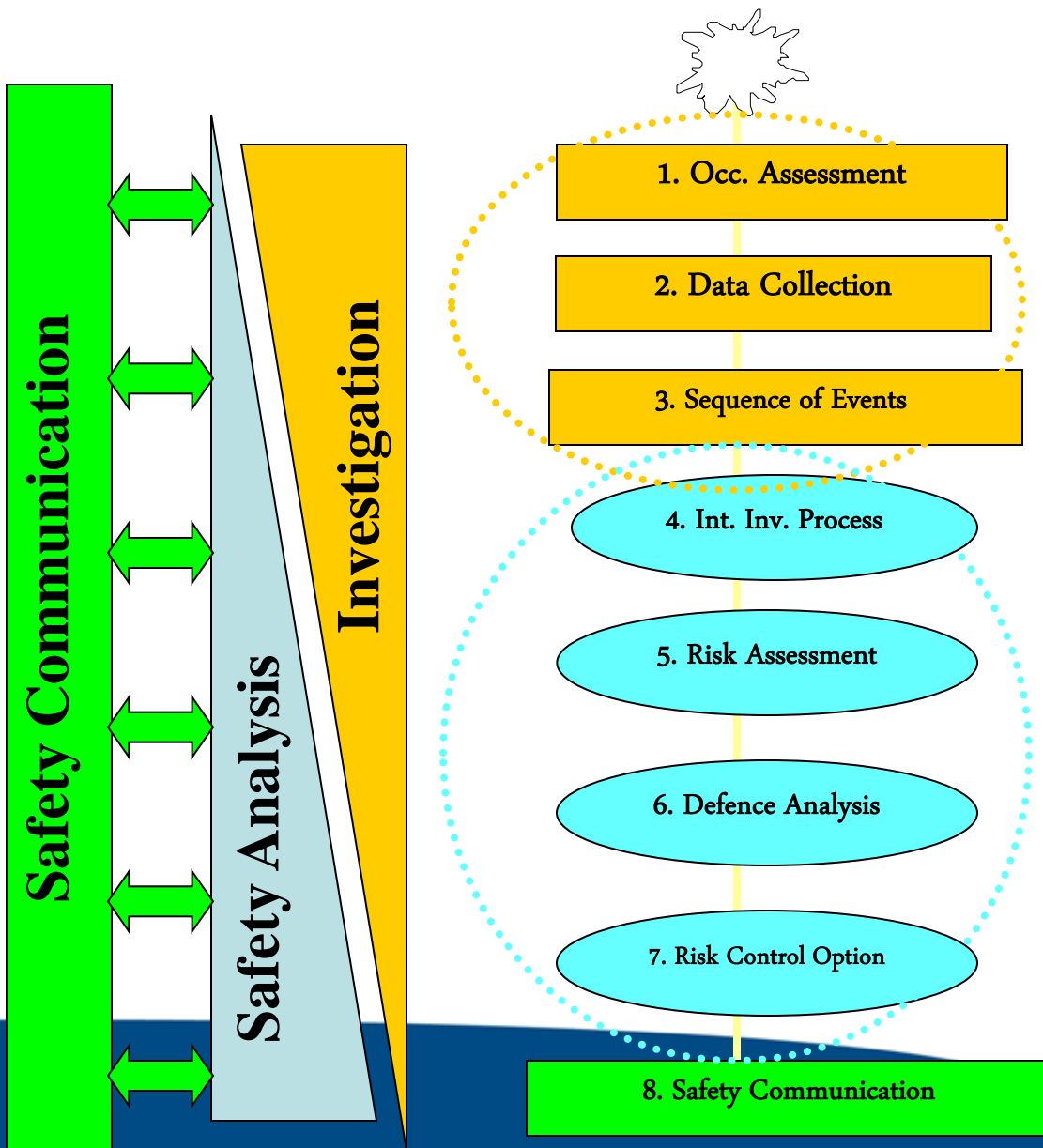
Still from animation of pedestrian crossing accident, Brockville, ON

Integrated

Safety

Investigation

Methodology



Safety Communication

- Safety Information Letters
- Safety Advisories
- Railway Investigation Report
 - Board Concerns
 - Board Recommendations

TSB Recommendations

- As part of an investigation, the TSB may make one or several recommendations to the legislator or industry.
- The Minister involved has 90 days to respond to a recommendation.

TSB Website

www.bst-tsb.gc.ca

The screenshot shows the homepage of the Transportation Safety Board of Canada. At the top left is the Canadian coat of arms, followed by the text "Transportation Safety Board of Canada" and "Bureau de la sécurité des transports du Canada". To the right is the "Canada" logo. A large red maple leaf is centered over a banner image showing a ship, a pipeline, and an airplane. The banner text reads "Transportation Safety Board of Canada" and "www.bst-tsb.gc.ca". Below the banner is a navigation bar with links for "Français", "Home", "Contact Us", "Help", "Search", and "canada.gc.ca".

Main Links

- TSB Home
- About the TSB
- Occurrence Reporting
- Investigation Process
- Confidential Reporting
- Publications
- Acts and Regulations
- Standards and Policies
- Related Links
- Subscription Services
- FAQ

Welcome to the TSB

The Transportation Safety Board of Canada (TSB) is an independent agency created to advance transportation safety through the investigation of occurrences in the marine, pipeline, rail and air modes of transportation. Use our web site to learn more about the agency, our investigation process, and investigation reports.

Recently Featured

[TSB's 20th Anniversary](#)
March 29, 2010 marks TSB's 20th anniversary.

[Safety Issues Watchlist](#)
The Watchlist identifies the safety issues investigated by the TSB that

Features

- Featured Investigations
- Career Opportunities

Quick Links

- Media Room
- What's New Reports

Safety Communications

- Watchlist
- Types of Safety Communications
- Recommendations
- Safety Concerns

Two anniversary banners are visible: "Le BST aura 20 ans le 29 mars 2010" and "TSB is turning 20 29 March 2010". A small image at the bottom right shows "MARINE PIPELINE" with a close-up of a pipe.