Dark Day at Second Narrows

Film Summary: On June 17, 1958, word quickly spread that the bridge crossing under construction across Second Narrows had collapsed. The film examines the reasons for the collapse and the impact it had on the Ironworkers who built it. In memory of the workers killed, the bridge is now known as the Ironworkers’ Memorial Bridge.

Curriculum Application:
Social Studies 11, Planning 10

The Essential Question:
What is the impact of workplace accidents on the lives of the workers and their families and the community at large?

Summary of the Lesson Activities

1. Focus questions for the vignette provides a short lesson option. (15 Minutes)
2. Students have a variety of writing assignments to complete after watching the vignette and reading the background information on the Second Narrows Bridge collapse.
3. An extension activity where the students investigate frequency and nature of workplace accidents since the collapse of the Second Narrows Bridge.

Learning Objectives

1. Locate the Ironworkers Memorial Bridge on a map and be able to provide examples of its economic importance to transportation in BC.
2. Be able to provide an explanation for the collapse of the Second Narrows Bridge.
3. Distinguish the similarities and differences of an industrial accident and a natural catastrophe and be able to explain how each is investigated.
4. To be able to identify steps to prevent accidents in schools and workplaces.
5. To understand the reasons for deaths amongst workers in BC with specific reference to the broad causes of death of young workers.
Materials and Resources Provided

- “Dark Day at Second Narrows” Episode 3- Working People – A History of Labour in British Columbia
- Lesson Activity 1: Outline for Class Discussion
- Lesson Activity 2 Extension Activities for Students
- Lesson Activity 3: Further Student Inquiries
- Appendix 1: Information Sheet For Class Discussion and Student Research

Additional Suggested Materials

- Iron Workers Memorial Bridge Tribute video: WorkSafeBC
- Worksafe BC 50th Anniversary news release
- Outline map of MetroVancouver http://www.metrovancouver.org/services/regional-planning/PlanningPublication/Map1.pdf

Vignette Questions

1. What was the design type for the Second Narrows Bridge? (For further information research the design elements of this bridge type and explain where its design is applied.)
2. Most of the workers killed on the bridge collapse were part of which union?
3. How does the collapse of the Second Narrows Bridge rank as an industrial accident in Vancouver?
4. What was the most dangerous job after the bridge collapsed? Explain.
5. What was determined to be the cause of the collapse of the bridge by the inquiry?
6. What was the Second Narrows Bridge renamed in 1996?

Lesson Activities

1. A short lesson option would involve showing the vignette and using the vignette questions to guide a follow-up discussion on the collapse of the Second Narrows Bridge.
2. For a more in-depth lesson use the suggested outline in Lesson Activity 1 to guide a more detailed class discussion on the collapse of the bridge. (1 class period)
3. Further understanding of the event and exploration of current dangers in the workplace, students can be assigned one or more of the questions in Lesson Activity 2: Extension Activity for students. Guiding questions for a debriefing of the activity are found on page 4 of Lesson Activity 2.
4. Further extensions on the lesson are provided in Lesson Activity 3 where students can undertake directed research into a related topic of workplace safety.

Credit: Teaching Activities and Lesson Plan developed by Al Cornes

Labour History Project: A partnership of the Labour Heritage Centre and the BCTF p.2
Lesson Activity 1: Outline for class discussion

Notes prepared by A. Cornes

ESSENTIAL QUESTION FOR CLASS DISCUSSION: What was the cause of the collapse of Ironworkers Memorial Bridge?

Introduction: Within the new proposed Secondary Social Studies curriculum, this lesson is designed to be taught in conjunction with Social Studies in relation to the economic, political, and social development of post World War II Canada with specific reference to British Columbia. The homework assignment and the class discussion touch directly on the content of Planning 10 with respect to health and safety inspections and the causes of injury to young workers. Through extended activities, discussion can also touch on aspects of Law 12 with specific reference to criminal law (Westray amendments to the criminal code), civil law (negligence, liability, contract law, legal remedies).

Prior to showing the vignette, the teacher should ask the class whether they have ever crossed the Second Narrows. Locate it on a map or have them do so.

Then go over (read), the first page of introduction of “The Tragedy In Brief: Then and Now” (Appendix 1) up to and including the sentence that reads: “There we no major challenges that could not be handled in the first two years of construction. Things ran smoothly until June 17, 1958.”

Start the video; Dark Day at the Second Narrows

Once the video is finished, the teacher should review with the students the section of the reference notes (Appendix 1) dealing the Coroner’s Inquest, the findings of the Royal Commission, and Beyond the Commission of Inquiry. Teachers can then solicit some class discussion with the following prompts: (answers have been provided to assist with the discussion but should not be viewed as definitive)

1. Was the collapse of the Ironworkers Memorial Bridge (then the Second Narrows Bridge) preventable?

   Answer: Considering the findings of the Inquiry Commission and the comments of Eric Jamieson, author of Tragedy at Second Narrows, the collapse was preventable when the following four problems occurred:

   a. Only one supervisor approved calculations made by the assistant field engineer.

      Murray McDonald, was the only supervising engineer assigned to approve the work of John McKibbin, the assistant field engineer. McKibbin was twenty-three years old and two years out of university. This supervisory arrangement grew out of the company’s unwritten policy of (isolating major projects—meaning that one project group of the company worked in total isolation of another and did not use resources or staff of another project). In this case it meant that McKibbin’s work was only checked by McDonald who had many other significant responsibilities.

      Remedy Required: Ensure that at least one additional experienced, senior engineer approves calculations.
b. Lower standards for falseworks (temporary support structure) were applied making the structure unsafe.

**Remedy required:** Materials used in the construction of falseworks should have the same material strength requirements as materials used in the main construction of the bridge.

c. One I-beam in the structure that collapsed was not up to standard. *(The beam in cross section looks like an “I” and sits on top of a pillar.)*

**Remedy Required:** Review to determine what steps need to be taken with respect to quality control of component parts of the structure.

d. The use of “soft packing” for the beams that supported the temporary tower was a contributing cause of the collapse.

**Remedy required:** Review to determine how the beams that supported the temporary tower will be soft packed in the future.

2. The Ironworkers Memorial Bridge is one of three connections between Vancouver and the North Shore. Why is it so important?

Answer: The three current connections are Ironworkers, Lions Gate and the Seabus. The Ironworkers is a vital connection between the North Shore, the communities that lie to the north—Squamish, Whistler and Pemberton and the lower mainland. It is also a vital commercial corridor to Vancouver Island via BC Ferries.

3. What is a disaster? Would you call the collapse of the bridge a disaster?

Answer: The Oxford dictionary defines a disaster as “...a sudden accident or a natural catastrophe that causes great damage or loss of life.

4. What is the difference between a sudden accident and a natural catastrophe?

Answer: The term “**accident**” can be defined as an unplanned event that interrupts the completion of an activity and may (or may not) include injury or property damage. It can include both human error, human neglect or a natural catastrophe.

**A natural catastrophe** is a major adverse event resulting from natural processes of the Earth examples includes floods, volcanoes, earthquakes, tsunamis and other geological processes.
5. **Under what circumstances are authorities required to conduct investigations into workplace safety? What is the purpose of the investigation?**

Answer: In situations that present a high risk of causing a serious injury or death and accidents (incidents) and natural catastrophes that have caused a serious accident or death. Investigations determine the causes and underlying factors:

- Provide recommendations to industry to aid in the prevention of future injury and disease
- Gather information to help monitor and analyze industry trends on workplace fatalities, serious injuries, and diseases
- Identify associated compliance issues and help ensure compliance with law, regulation, and policy
- Refer cases for prosecution or administrative penalties, when necessary

6. **Why is it important to determine the causes of an accident?**

Answer: The term "accident" can be defined as an unplanned event that interrupts the completion of an activity, and that may (or may not) include injury or property damage. In addition to comments in #4, determination of cause is required to fulfill any legal requirements, to determine the cost of an accident, to determine liabilities and other financial obligations.

7. **Your school is used by students, teachers, other employees, your parents and the public. What steps are taken to prevent accidents and to ensure that the building and grounds are healthy and safe? What steps are taken to ensure that unwanted people don’t come into the building?**

Answer: The [BC Healthy School Initiative/Vancouver Coastal Health Authority School Inspection Guideline](http://www.bchc.org) provides for school inspections from the perspective of students: food services, communicable disease control, water supply, temperature, washrooms and change rooms, labs (handling of chemicals), exhaust ventilator, personal protective and safety equipment, indoor air quality, buildings and grounds, etc. Locate the Regional Health Authority Inspection Guideline document that applies to your school.

Worksafe BC/BCTF Workplace Inspections provide support and direction for safe schools. Go to the [Worksafe BC](http://www.worksafebc.ca) for their information and search for the BCTF Health and Safety Manual at [www.bctf.ca](http://www.bctf.ca) and locate the requirements for the conducting workplace health and safety inspections in your school. Refer to Section 4 of BCTF Occupational Health and Safety Manual. Consider school inspections from the perspective of employees (teachers, non-teaching staff); check with H&S reps for local forms. Examples: staff orientation to WHIMS, chemical spill protocols, Indoor Air Maintenance Plan, programs against racism, sexism, homophobia, Air Quality Questionnaires etc.
8. Where negligence can be shown arising from an accident, what remedies are available to parents, teachers, other employees, members of the public? (Answer: civil lawsuits for injury or death, if an injured person proves that another person acted negligently to cause their injury, they can recover damages to compensate for their harm. A worker injured in the course of employment cannot sue his or her employer, any other employer, or any worker who is a part of the B.C. workers’ compensation system and whose activities relating to the accident or disease also arose out of and in the course of employment. The Workers Compensation Act replaces lawsuits against employers and workers in a British Columbia workplace for injury, disease, or death caused to a worker acting in the course of employment. Compensation is provided without needing to establish that someone else was at fault for the accident.

See WorkSafeBC for further details
Lesson: Dark Day at Second Narrows

Lesson Activity 2: Extension Activity for students

Homework Assignment: Complete the following questions/inquiries as directed by your teacher

Compensation to Survivors

1. The Workman’s Compensation Act of 1958 (now Workers’ Compensation Act) forbade families from launching lawsuits against employers who paid into the WCB Fund. Dominion Bridge was a contributor to the WCB Fund. This meant that families could not sue either Dominion Bridge or the other sub-contractors who paid into the fund and were working on the site. There only remedy was to seek benefits from WCB.

Widows were given a one-time $100 carry-over allowance followed by a $75 monthly base pension plus $25 per month for each eligible child in the victim’s family. Your task is to research what financial support a surviving spouse would receive today in the event of a workplace death today. Consult the WorkSafe BC website for the brochure outlining survivor benefits. The brochure is entitled: For Families: A Guide For Families Coping With A Work-Related Death Or Terminal Illness (see pp 11-15) http://docplayer.net/512307-For-families-a-guide-for-families-coping-with-a-work-related-death-or-terminal-illness.html (Note: you are not required to provide the dollar amount of the benefit, only the descriptive details)

Who Are The Investigators?

2. Identify the investigators for the following serious events where death has occurred (Complete chart with the menu provided. In Most Cases, there will be more than one answer)

<table>
<thead>
<tr>
<th>Event</th>
<th>Serious incident/event where a death occurred.</th>
<th>Who are the investigators?</th>
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<tbody>
<tr>
<td>1.</td>
<td>Motor Vehicle Accident</td>
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<td>2.</td>
<td>Explosion in a building causing a fire</td>
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<td>3.</td>
<td>Airplane crash</td>
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<td>4.</td>
<td>Workplace accident at a school construction site</td>
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<td>5.</td>
<td>Student death at a school site where school is undergoing major renovation and expansion</td>
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### Day of Mourning: Accidents and Deaths in BC

3. Across Canada, April 28 has been designated the Day of Mourning, a time when workers, families, employers, and others come together to remember those who have lost their lives to work-related incidents or occupational diseases. Every year, WorkSafe BC, the B.C. Federation of Labour, and the Business Council of British Columbia co-host a public ceremony to honour the occasion.

Complete the following table: (use the Worksafe BC website for the most recent and reliable information - see the most recent WorksafeBC Annual Statistical report for updated information)

**Workers Injured on the Job 2005-2015**

<table>
<thead>
<tr>
<th>Year</th>
<th>Injured in BC</th>
<th>Observations on the type/severity of the injuries reported</th>
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<tbody>
<tr>
<td>2005</td>
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<td>2015</td>
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</tbody>
</table>
### BC Workers Killed On The Job 2005-2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Killed on the Job In BC</th>
<th>Three Tops Causes of Death Amongst Younger Workers</th>
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</thead>
<tbody>
<tr>
<td>2005</td>
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1. Are there number of deaths increasing or decreasing? What observations can be made about accidents over the ten year period? What observations can be made about deaths over the ten year period?

2. What observations can be made concerning the deaths amongst young workers over the ten year period?
Closure: (the following class)

A class discussion of the homework activity can follow. Key questions that you will want to consider include:

1. What observations can be made with respect to accidents over the ten year period?
2. What observations can be made with respect to deaths over the ten year period?
3. What observations can be made concerning the deaths amongst young workers over the ten year period?

Assessment

Students will submit their completed homework sheets for assessment.
Lesson Activity 3

Student Inquiry: Pick one of the following topics for further research.

1. Prepare a chart showing a list of the major bridge failures in Canada, the causes of the failure and the number of resulting deaths. 
   http://goo.gl/ixEJeB
   Investigate who paid the clean-up costs of the damaged/destroyed part of the bridge and how cleanup costs were assessed.

   Outline when an inquest must be conducted? What are the powers of investigation of a coroner? When is an Inquest held?
   A witness can be compelled to attend and give evidence at an Inquest. Can a witness be compelled to give self-incriminating evidence that could be used in a subsequent criminal or civil proceeding against them? Can evidence introduced at a Coroner’s inquest be introduced into a criminal or civil proceeding?

3. Prepare a brief summary of the Westray amendments to the criminal code and the reasons for them.

4. Investigate and write a short report on how the BC Healthy School Initiative inspections are conducted in your school or how health and safety (workplace) inspections are conducted at your school. Consult the school inspection guideline found at your regional health authority to help guide your investigation (Vancouver as an example is found at http://goo.gl/AxpIY5)

Workplace Health and Safety Inspections are designed to cover workers in your school but in many instances they also protect students (eg trip hazards, air quality etc). Examples of guidelines for Health and Safety inspections can be found at these websites.

   Occupational Health and Safety Regulations that require the conducting of health and safety inspections: http://goo.gl/ILpfjx

   BCTF Occupational Health and Safety Manual Section Four provides further references on inspections search for the BCTF Health and Safety Manual at www.bctf.ca and locate the locate Safety Manual Four.

Note: As a courtesy, the teacher should speak to the school administration and the BCTF staff rep before assigning this question.
5. British Columbia Royal and Special Commissions are established by government to investigate important questions. They can take the form of a study commission (should we build a pipeline across northern BC?) or a hearing commission (why did the Second Narrows bridge collapse?). Commissions are established by the Provincial Cabinet of Government which determines the scope of responsibilities and the powers of the commission.

Cabinet is given authority to establish Commissions under the Public Inquiry Act [http://goo.gl/51cdfC](http://goo.gl/51cdfC).

Visit the Legislative library [http://www.llbc.leg.bc.ca/commissions/rc_dates.asp](http://www.llbc.leg.bc.ca/commissions/rc_dates.asp) and review the list of commission reports between 1872 and 1980. Identify ONE report that is of interest to you and try to determine whether it is a “study” inquiry or “hearing” inquiry.
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Appendix 1: Information sheet for class discussion and student research

THE TRAGEDY IN BRIEF: THEN AND NOW

From the early 1950s to 1980, British Columbia embarked on a significant period of economic growth and development. The growth was driven by an increased external demand for primary resources—lumber, paper, minerals as well as significant increases in the post-war population. During that period of time, the government of the province initiated an ambitious program of hydroelectric development as well as highway, bridge and ferry development.

In addition to paving of existing highways, new bridges were built throughout the province. The Trans Canada Highway in British Columbia was completed in the early 1960s, connecting Victoria to the Alberta border.

In the lower mainland, the Trans Canada Highway was transformed into a multi-lane freeway throughout much of the stretch between Horseshoe Bay and the upper Fraser Valley. This massive project included the construction of two important bridges – the Port Mann and the Second Narrows Bridge (now named the Ironworkers Memorial Second Narrows Crossing).

The Port Mann Bridge was built to cross the Fraser River connecting North Surrey and Coquitlam and the Ironworkers Memorial (Second Narrows Crossing) was built to span Burrard Inlet connecting Vancouver and North Vancouver. Construction on the Second Narrows crossing began in July 1956.

There were no major challenges that could not be handled in the first two years of construction. Things ran smoothly until June 17, 1958.

The collapse occurred near quitting time on June 17, 1958. At about 3:40 pm ironworkers toiling 40 metres above the inlet heard a horrific noise as Span 5 began to crash into the inlet in a mass of tangled steel. The momentum dislocated the columns of Pier 14, causing Span 4 to lose its grip and tumble into the sea. Seventy-nine workers fell. Among the 19 dead were 14 ironworkers, 3 engineers, a painter and a commercial diver who died a few days later when he drowned trying to recover a body. Twenty others were seriously injured.

The disaster was immediately labeled Vancouver’s worst industrial accident.

On the same day, City of Vancouver, Glen McDonald made arrangements to start performing autopsies on the victims and making the necessary arrangement for an Inquest into the disaster. (1)

On June 18, within a day of the collapse, the Provincial Cabinet established a Royal Commission of Inquiry.

Despite the collapse, the bridge was completed in August of 1960. In 1994 it was re-christened the Ironworkers Memorial Second Narrows Crossing, to honour the 19 men who died on June 17, 1958, as well as eight others who perished during the three-year construction of the bridge.
1. **CORONER’S INQUEST**

   Autopsies were performed on fifteen of the victims. The verdict of the jury was that the “deaths were “unnatural and accidental and that another man died of accidental drowning while looking for some of the missing bodies underwater.” (2)

**REPORT OF THE BRITISH COLUMBIA ROYAL COMMISSION, SECOND NARROWS BRIDGE INQUIRY 1958** [http://goo.gl/dL7qve](http://goo.gl/dL7qve)

A Royal Commission of Inquiry was established for the purposes of determining:

- what technical or engineering advice there was provided for the project;
- whether such advice was followed or disregarded;
- whether anyone in the employ of BC Toll Highways and Bridges Authority or contractor or sub-contractor was negligent or faulty in their judgments in any way that contributed to or caused the collapse

Justice Sherwood Lett was appointed the sole Commissioner with the responsibility of reporting to the BC Provincial Cabinet (3)

**PERSONS INTERVIEWED**

The Royal Commission interviewed eighty-five (85) witnesses and workers engaged on the bridge at the time of its collapse.

**TESTIMONY**

Sixty-seven (67) witnesses provided testimony before the Commission.

**CAUSES OF THE COLLAPSE (Findings)**

The Royal Commission called to investigate determined that it was an erroneous engineering calculation for a temporary support (temporary arm) compounded by other contributory factors.

The design for the Span 5 falsework was done by engineer John McKibbin, who made several errors that were not caught by the engineer in charge Murray McDonald.

**MAJOR CONTRIBUTING FACTOR**

The Royal Commission concluded that the use of plywood alone as “soft packing” for the beams that supported the temporary tower "was a contributing cause of the failure of the grillage solely because of the absence of stiffeners and effective diaphragming in the upper tier of the grillage."
BEYOND THE COMMISSION OF INQUIRY

Eric Jamieson, author of the comprehensive history of the bridge disaster, notes that the collapse was only one factor - others included questionable steel quality and lax engineering practices. McKibbin was killed in the collapse.

Jamieson's comments are as follows:

1. It is an irrefutable fact that McKibbin and McDonald were responsible for the dimensional errors on the critical falsework design sheet
2. In addition to the company’s unwritten policy of isolating major projects, thus removing them from the mainstream checking process, of burdening McDonald with an impossible load and placing an important design feature in the hands of a relatively inexperienced engineer, there was the startling admission by Professor Hrennikoff that the upper grillage I-beams were weak with respect to buckling strength.
3. Professor Armstrong’s investigation of I-beam no. 2, and his discovery that it was from a different heat and parts of it had a lower yield point and tensile strength than specifications required.
4. The falseworks were considered pieces of equipment and therefore not subject to the same scrutiny given steel erection, was also problematic, as was the difference on the shear strength calculation formulas between CSA and AASHO, the former of which was 30 percent more tolerant and according to Professor Hrennikoff, “at some level, actually unsafe.” (4)

Compensation to Families and Widows

The Worksman’s Compensation Act forbade families from launching lawsuits against employers who paid into the WCB fund. Dominion Bridge was a contributor. Widows were given a one-time $100 carry-over allowance followed by a $75 monthly base pension plus $25 per month for each eligible child. This was approximately a quarter of what most iron-workers made at the time, forcing many widows to seek work. Sixteen families benefited from the pensions, two of the victims being single. (1)

Closure

Dominion Bridge accepted the conclusion of the Commission of Inquiry and, in doing so, were forced to assume the responsibility for the $3 million cost of repairing the bridge. Despite the collapse, the bridge was completed in August of 1960. Dominion Bridge closed its Vancouver operations in 1975 and all of the files and drawings were thrown out

In 1994 it was re-christened the Ironworkers Memorial Second Narrows Crossing, to honour the nineteen men who died on June 17, 1958, as well as four others who perished during the three-year construction of the bridge. An annual memorial is held each year to commemorate the anniversary of the collapse.
Footnotes


3. Order-In –Council (No. 1466)—the above is a paraphrase of the wording of the original order.

4. Ibid


For Further information

SUGGESTED READING


SUGGESTED WEBSITES

Note: Stompin’ Tom’s lyrics makes reference to a big wind hitting the bridge. This did not happen and was not a contributing factor or the cause of the collapse.

Diachi Ishikawa, Collapse of the Second Narrows Bridge --interview with survivor Lucien Lessard and Patrick Glendinning (History of Metropolitan Vancouver) Ishikawa, a former student at Edith Cavell Elementary School in Vancouver, interviewed survivor Lucien Lessard and Patrick Glendinning, the son of a survivor of the collapse—Colin Glendinning. http://goo.gl/Uu73Te