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Safety critical assessments and incident investigations are continuing. Read the latest [COVID-19 information](#).

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THE STATE OF SAFETY 2018

Learn about the work we are doing to improve the safety of the technical equipment we regulate in British Columbia.

Trends in Safety

Common themes we saw over the last year, from incidents and injuries to inspections and certification. By viewing technical safety trends year-over-year, we can help identify the areas of highest risk and develop programs to protect the public from harm.

[Read More >](#)

Our Safety Culture

In 2018 we continued to build a strong safety culture in the province by introducing new certification requirements in some technologies, enhancing responsiveness to high risk events, and increasing the number of technical safety system insights we share with clients, stakeholders and the public. Together, all of these items help to improve connection and engagement with the safety system.

[Read More >](#)

2018 KEY INITIATIVES

Fault Tree Studies

Fault trees and studies are helping us identify the causal factors behind the hazards we see most often: ammonia release, escalator brake failure and electric shock.

[Read More >](#)

Trampoline Parks Review

Should trampoline parks be regulated? We've launched a review of our Amusement Devices aimed at addressing regulatory gaps that cause undue safety hazards for the public.

[Read More >](#)

Finding High Risk Hazards

We've introduced machine learning and artificial technology into the algorithms we use to find risks. Together with our safety officers' expertise, they can help us locate high-risk hazards, more effectively.

[Read More >](#)

Safety Stories

Ammonia Release

Carbon Monoxide

Our work to prevent ammonia releases, after a fatal incident in Fernie.

[Read More >](#)

Electric Shock

How we're working to mitigate the hazard of electric shock.

[Read More >](#)

Carbon monoxide hazard mitigation and prevention, following a fatality in Ashcroft.

[Read More >](#)

Safety by Technology

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Alternative Safety Approaches [Go >](#)

In the Community

We participate in a variety of community activities each year to help the public understand our role in technical safety. From participating in data hack-a-thons to hosting booths at the *Vancouver Home Show* and various community emergency preparedness events, we work hard to educate British Columbians about technical safety.

[Learn More >](#)

Previous State of Safety Reports: [2017](#) [2016](#) [2015](#) [2014](#)

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Trends in Safety

Incidents

Overview

Incidents involving work or equipment regulated by the *Safety Standards Act* are

required to be reported to the appropriate safety manager. We investigate many of these incidents to gain an understanding of safety hazards in BC and what actions can be taken to manage them.

Key Statistics

558

incidents reported to us in 2018.

+17%

increase in number of incidents reported to us compared to 2017.

72

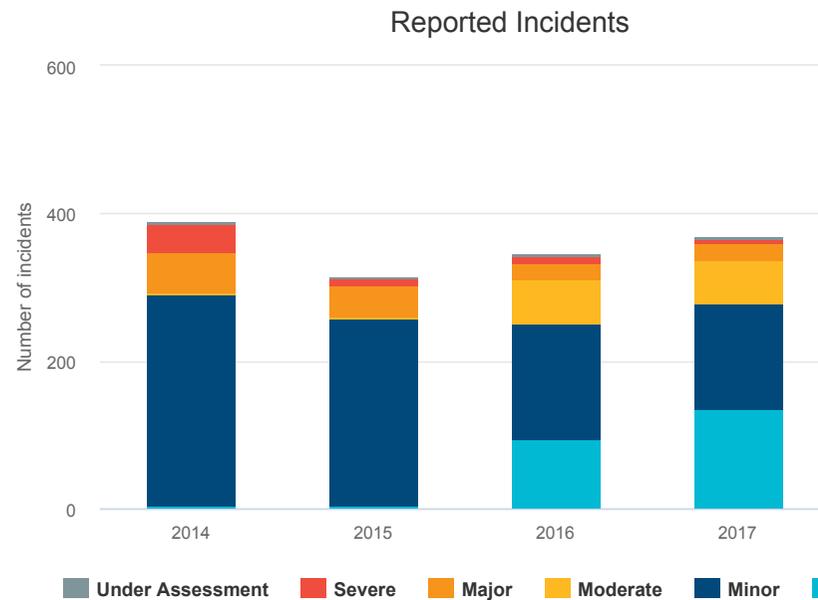
incident investigations completed to understand root causes.

Incidents Reported to Us

In 2018, we received 558 notifications of incidents involving regulated equipment or work, compared to 475 in 2017. We attribute this increase to both a bump in the frequency of certain incident types as well as improved reporting discipline by our clients.

Categories are:

- Under Assessment
- Severe
- Major
- Moderate
- Minor
- Insignificant



Click on 2018 to view number of incidents by technology.

View a basic summary of incidents reported to Technical Safety BC below.

- [Incidents - All Technologies except Rail \(.csv\)](#)
- [Incidents - Rail only \(.csv\)](#)

Severe Incidents in 2018

In 2018 there were 4 incidents rated as severe:

- 3 railway incidents
- 1 electrical fire incident

Major Incidents in 2018

There were 19 incidents rated as major, detailed below. Technical Safety BC completes investigations on certain incidents reported to us in all technologies but Rail.

We investigate incidents reported to us when:

- Regulated work or regulated equipment is involved (note: We do not have jurisdiction to investigate Railway incidents)
- Evidence is available to help determine causes and contributing factors
- A learning opportunity exists to understand and document what caused the incident, and to inform prevention of similar incidents.

In cases where we completed an incident investigation into a Major incident, it has been linked below.

Fire incidents (6)

- [Power bar kept in damp area causes electrical fire](#)
- [Boiler room fire in apartment building](#)
- [Unit heater fails and ignites warehouse fire](#)

- Work on energized electrical panels results in arcing, then fire

Railway incidents (4)

Escalator step pile-ups (3)

- Misaligned steps lead to escalator pile-up
- Incorrect setting causes escalator step pile-up
- Lack of maintenance contributes to escalator pile-up

Component failure/broken component (2)

- Weld component fails in personnel hoist
- Tube ruptures and engulfs boiler building in high-temperature steam

Electrical shock/arc flash (1)

Fall unloading from passenger ropeway (1)

Rider reported to have had a seizure during ride on amusement device (1)

Line hit and underground gas line damaged (1)

Report an Incident or Hazard

Incidents and hazards for the technologies we regulate can be reported to us 24 hours a day, seven days a week, online or by phone.

REPORT

Faulty wiring causes shock

Faulty electrical wiring energized a houseboat, which impacted kids swimming nearby.

[Read More](#) >

Ammonia release in Fernie

Our investigation into a fatal ammonia release at a Fernie ice rink that killed three workers.

[Read More](#) >

Steps on escalator collide

An escalator shut down after multiple steps collided with each other.

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Injuries

Overview

The number of injuries reported to us in a given year provides an important indicator

of the impacts of the hazards inherent in regulated equipment. Together with industry, our goal is to minimize incidents and, therefore, injuries.

It's important to note that Technical Safety BC receives its injury reports and descriptions from operators or first responders at the time of, or immediately following, the incident. As such, injuries may develop after the initial reports were made to us and the long-term effects of an injury may not be known to us — therefore not reflected in our statistics.

Key Statistics

5

incidents rated as *major* or *severe*. These were caused by electrical fire, railway incidents, and escalator step pile ups.

3

fatalities in 2018. Two were from suicide and one resulted from a fire incident.

52

injuries related to Elevating Devices — the most of any technology.

Reported Injuries

In 2018, the number of fatal and major injuries fell below the historical average.

In 2018, there were three fatalities reported to Technical Safety BC. One resulted from an electrical fire and two were attributed to suicide (railway).

There were also two *major* injuries reported: a hip fracture that resulted as a passenger unloaded from

a chairlift and a suspected seizure experienced by a passenger while on an amusement ride.

Categories are:

- [Fatal](#)
- [Major](#)
- [Moderate](#)
- [Minor](#)
- [Insignificant](#)

Click on 2018 to view breakdowns by technology.



Preventing Injuries

From using bouncy castles to choosing a contractor, learn about key public safety risks, and how to prevent them.

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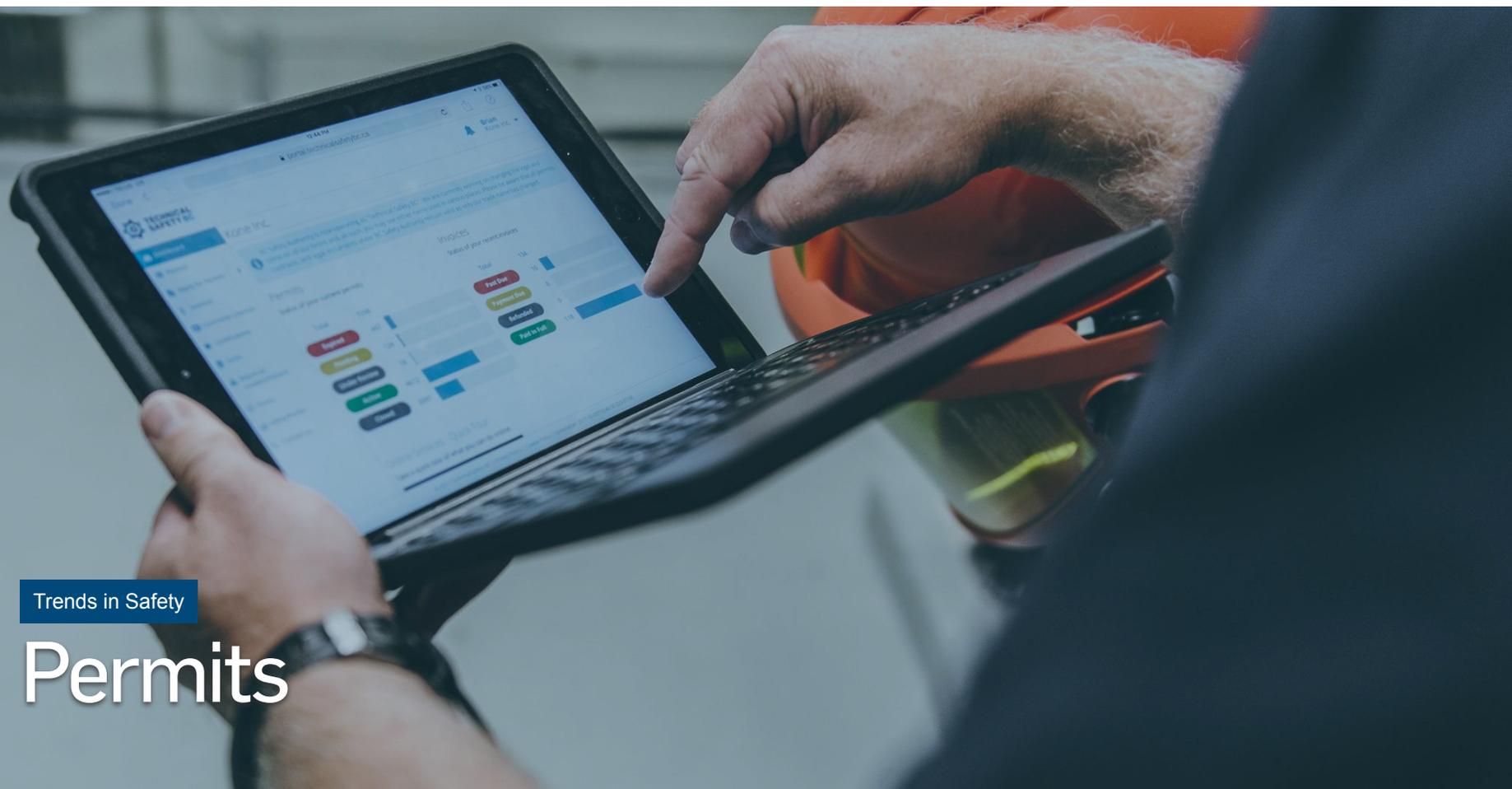
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Permits

Overview

We issue installation and operating permits to contractors and homeowners to ensure

work is being done correctly and to connect them to the safety system. The data collected helps us track where regulated work is being done and by whom, should compliance and enforcement action be needed to correct unsafe work.

Key Statistics

129,539

new installation permits issued to clients in 2018.

94,372

active operating permits in 2018.

+15.8%

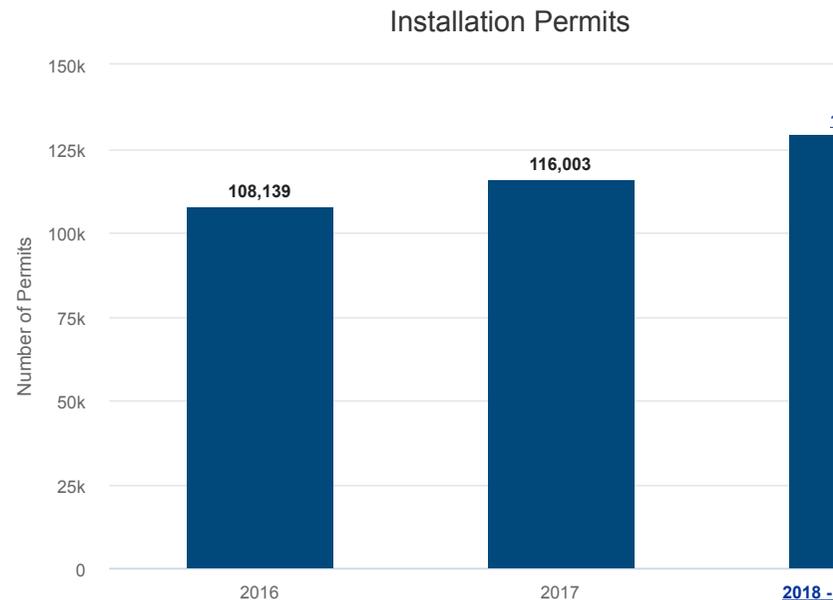
increase in commercial permits, particularly electrical and gas.

Installation Permits

Installation permits are required in British Columbia by anyone installing equipment regulated under the *Safety Standards General Regulation (B.C. Reg. 105/2004)*.

Click on 2018 to view the number of installation permits issued by technology.

Note: In 2018 we changed the methodology we use to count permits. Prior year results have been adjusted to align with this method.





Operating Permits

Operating permits are required in British Columbia by anyone operating or maintaining specific types of equipment that fall within the requirements of the *Safety Standards General Regulation (B.C. Reg. 105/2004)*.

Click on 2018 to view the number of installation permits issued by technology.

Note: In 2018 we changed the methodology we use to count permits. Prior year results have been adjusted to align with this method.

Do I need a permit?

Permits are typically required prior to installing, operating, or maintaining regulated equipment.

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Inspections

Overview

We assess the safety of work in a number of different ways, including both physical

assessments (inspections) and by using predictive algorithms that support safety officer decision making. Together, these methods allow us to target the areas of highest risk to the public, while maximizing efficiency and effort.

Key Statistics

51,292

physical assessments
(inspections)
undertaken by our
safety officers.

75%

pass rate for the 51,899
pieces of equipment
inspected.

1,243

hazards ranked
"severe" or "major"
recorded by our safety
officers.

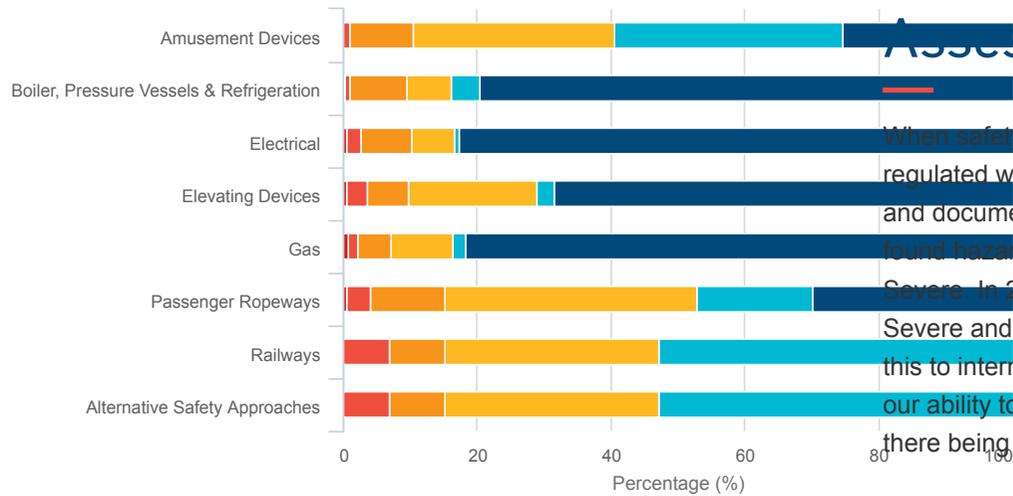
Compliance of Duty Holders' Work

At Technical Safety BC, we refer to a person who owns regulated products or performs regulated work as a duty holder. When physically assessing the work of a duty holder, our safety officers provide a rating of [Pass](#), [Conditional Pass](#) (where applicable), or [Fail](#).

In general, compliance rates in 2018 are consistent with those of previous years.

Note: The BPVR, Electrical, Gas and Rail technologies do not have a Conditional Pass rating.

As-Found Hazard Assessments 2018



As-Found Hazard Assessments

When safety officers complete inspections of regulated work, they identify the hazards they find and document the single highest hazard. These as-found hazard ratings range from Insignificant to Severe. In 2018, we found more instances of Severe and Major hazards. However, we attribute this to internal changes we have made to advance our ability to find high risk hazards, as opposed to there being more unsafe work being done.

As-found hazard ratings are as follows:

- Compliant
- Insignificant
- Minor
- Moderate
- Major
- Severe

Related Stories

When do inspections take place?

How our safety officer prioritize the sites that require physical inspection.

[Read More >](#)

Amusement devices inspections

Find out what amusement devices safety officers look for during inspections.

[Read More >](#)

Using sensors to prevent incidents

Could sensor technology and the Internet of Things (IoT) help predict elevator issues?

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Compliance & Enforcement

Overview

When non-compliances are identified, our first step is often to work with duty holders

to help them understand their obligations, and provide them with a clear pathway to resolution. However, when these interventions don't achieve the desired result, Technical Safety BC may take enforcement action to achieve compliance.

Key Statistics

\$36,000

highest monetary
penalty issued in 2018.

310

compliance
orders issued due to
risk of personal injury or
property damage.

8

compliance audits
undertaken in 2018.

2018 Activities

In 2018, we took 545 compliance and enforcement actions -- a 27% increase over 2017. This reflects the increased resources we have dedicated to this activity, and investments in data analytics and assessment tools to allow us to better find non-compliant work.

Click on 2018 to view details of compliance and enforcement activity by technology.

Activities detailed are:

- [Compliance Audit](#)
- [Warning Notice](#)

- [Compliance Order](#)
- [Monetary Penalty](#)
- [Discipline Order](#)
- [Bond Called](#)

Monetary Penalties

Note: Of the 30 Monetary Penalties listed in the above chart, 5 were under appeal at the time of data collection so not reflected in this table.

DUTY HOLDER	TECHNOLOGY	CATEGORY	VALUE
Vitrium Industries Ltd.	Electrical	Failure to comply with a compliance order	\$36,000
All Seasons Mushrooms Inc.	Boiler & Pressure Vessels	Failure to comply with a compliance order	\$12,000
Xiafang Zhou	Gas	Failure to comply with a compliance order	\$12,000
BMB Signs Ltd.	Electrical	Failure to comply with a compliance order	\$10,000
PML Professional Mechanical Ltd.	Electrical	Failure to comply with a compliance order	\$8,000
Simply Green Home Services (BC) Inc.	Electrical	Failure to comply with a compliance order	\$8,000
Four Brothers Plumbing and Drainage Inc.	Gas	Failure to comply with a compliance order	\$8,000
Richard D. Motruk d.b.a. Aquarius Metal Fabricators Inc.	Gas	Failure to comply with a compliance order	\$7,000
Jot Mechanical Ltd.	Gas	Failure to comply with a compliance order	\$7,000

		order	
Rahelu Plumbing & Heating Ltd.	Gas	Failure to comply with a compliance order	\$7,000
Farid Gilanikech eh	Gas	Failure to comply with a compliance order	\$6,000
Trotter and Morton Building Technologies Inc.	Refrigeration	Failure to comply with a compliance order	\$5,500
Glen Bilen d.b.a. Bilen Electric Inc.	Electrical	Failure to comply with a compliance order	\$5,500
Travis Molison d.b.a. Haven Contracting	Electrical	Failure to comply with a compliance order	\$5,500
British Columbia Rapid Transit Company Ltd.	Elevating Devices	Failure to comply with a safety order	\$5,000
Gateway Mechanical Systems Inc.	Boiler & Pressure Vessel	Failure to comply with a compliance order	\$4,000
593082 B.C. Ltd. d.b.a. Barry's Plumbing	Gas	Failure to comply with a compliance order	\$3,000
Wendell Massey d.b.a. Central Refrigeration	Multiple Technology	Failure to comply with a compliance order	\$3,000
Cobing Building Solutions Ltd.	Electrical	Performing regulated work without required permit	\$3,000
Michael Sallenback	Gas	Failure to comply with a compliance order	\$3,000
Haakon Industries (Canada) Ltd.	Boiler & Pressure Vessel	Failure to comply with a compliance order	\$3,000
David Evanson d.b.a. Evanston Electric	Electrical	Failure to comply with a compliance order	\$2,500

Action Plumbing and Heating Inc.	Gas	Failure to comply with a compliance order	\$2,000
James Miller d.b.a. Citysquared Communications	Electrical	Failure to comply with a compliance order	\$2,000
Erzsebet Kapas	Gas	Failure to comply with a compliance order	\$1,500

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Licensing & Certification

Overview

We issue licences to contractors and contracting companies who install, operate, and

maintain regulated equipment, and we issue certificates of qualification to individuals working on regulated equipment. Together, these two items provide the public with assurances that certain standards of knowledge and proficiency are being maintained around regulated work.

Key Statistics

927

licences issued in 2018 to contractors and contracting companies.

3,026

certificates of qualification issued to individuals who completed training.

2018 Activity

The number of licences issued in 2018 dropped slightly compared to 2017, while the number of certificates of qualifications rose. The latter reflects introduction of the new Electrical Field Safety Representative Renewal Program and Elevating Device Mechanics who must renew their certification every three years.

Click on 2018 to view number of licences and certification issued by technology.

Note: Railways and Alternative Safety Approaches do not have licences or certificates of qualification so are not reflected on this chart.

New Licenses and Certificates of Qualification

Renew Online

You can renew your licence or certificate of qualification 24/7 with our convenient online services!

RENEW

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Safety Culture

Our People

Safety in Numbers

We have more than 400 employees located across the province, dedicated to improving public safety and realizing our vision of *Safe Technical Systems. Everywhere.* We achieved a major milestone in 2018, moving to our new purpose-built office in East Vancouver. This new corporate space optimizes employee engagement and increases collaboration, learning, and adaptability for the benefit of our employees and clients. In the first six months, we hosted 48 events which were attended by more than 700 clients and stakeholders. We also held two corporate events which delivered industry and technical information to more than 400 Technical Safety BC employees across the province.

Women in STEM

At Technical Safety BC, we are committed to building a diverse and inclusive environment that supports and encourages women in skilled trades and science, technology, engineering, and mathematics (STEM). We support this through sponsorship of conferences and events, setting up leadership and mentoring sessions, and ongoing professional development.

[Learn More >](#)

Top 100

In 2018, we were thrilled to learn that our President and CEO Catherine Roome was recognized for her leadership abilities in 2018 with a Womens' Executive

Network (WXN) Canada's Most Powerful Women: Top 100 Award. Catherine is known for her visionary thinking and her ability to integrate technology and humanity to promote innovation for social good.

[Learn More >](#)

Diversity is our Strength

We're committed to advancing a culture that values diversity, inclusion and belonging, including recruiting and developing a well-qualified and diverse workforce that is representative of the people of British Columbia, embracing and encouraging different perspectives, and addressing bias in the workplace.

Work at Technical Safety BC

Our workforce is data-driven, tech-savvy, innovative, and adaptable. If you have a passion for safety, we encourage you to learn more about the positions we have available across the province.

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Digital Technology



Leveraging technology, in service to safety

We use a number of technological tools — including algorithms, machine learning, and advanced analytics — to help us identify risks. By continually enhancing how we collect, process and share safety data, we are able to work more efficiently and effectively, while bringing more participants into the safety system.

>

Using Technology to Find More Hazards

In 2018, we expanded our use of machine learning algorithms to improve our systems' ability to predict where high risk hazards can be found. As a result of this change, experiments we undertook in 2018 showed the algorithms improved the ability to predict high hazard electrical and gas installation work by 77% and 61% respectively.

[Learn more >](#)

Using Data Ethically

Artificial Intelligence (AI) and machine learning provide exceptional opportunities for our organization — but only if we use them in a way that aligns with our values. As we expand our algorithmic and

technological capabilities we align them with an ethics

roadmap, developed in partnership with local consultancy Generation R, which governs how we use technology and data for the greater good.

[Learn More >](#)

The Internet of Things and Elevator Safety

As part of our efforts to proactively identify risks and hazards, we are exploring sensor technology to determine if it can help improve elevator safety in the province, preventing potential incidents before they occur.

[Learn More >](#)

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Safety Culture

Education & Awareness

Overview

We use our educational courses and communications programming to help build

awareness around common hazards, safety best practices, and industry regulations and standards to keep the public and our clients safe.

Key Statistics

179

live educational events held in 2018.

92.3%

satisfaction rating for our educational programming.

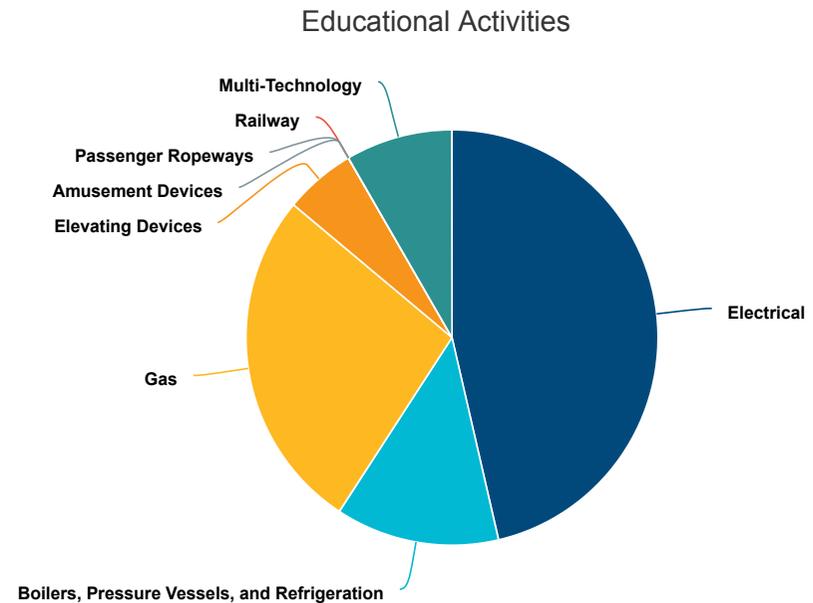
+20.2%

increase in our social media followers.

2018 Activities

In 2018, our Client Education team produced 30% more events than in 2017, connecting more people to safety education programming. Those courses reflect the size and scope of our technologies, as shown to the right.

Our Communications team also worked hard to expand Technical Safety BC's reach, significantly increasing its social media presence, attending more high profile events such as the Vancouver Home Show, and holding a major press conference to announce the results of the Fernie Ammonia Release incident.



Register for a Course

Browse our list of courses and sign up for one today!

[SIGN UP](#)

Major Awareness Activities

[View All Media
Releases](#) >

Fernie Ammonia Release

We held a press conference in July 2018 to announce the results of our investigation into the Fernie Memorial Arena ammonia release fatality.

[Read More](#) >

Wildfires

During the 2018 wildfire season, we promoted best practices around gas and electrical equipment when under evacuation.

[Read More](#) >

Carbon Monoxide

In Spring 2018, we held a major campaign to bring awareness to the issue of carbon monoxide poisoning, and to advise the public of the key risk factors and signs.

[Read More](#) >



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Codes & Standards

Overview

As a regulator, we contribute to technical code and standards development, ensuring

that BC's specific needs are considered prior to adoption. We contribute the learnings we've made through incidents, to help evolve and strengthen the safety system.

Key Statistics

18

regulatory instruments (safety orders, directives, information bulletins) issued in 2018.

3

issue-specific consultations in 2018.

50

associations/national codes and standards committees we participated in

Associations / National Codes & Standards Committees

The following is a listing of all industry associations and national codes and standards committees which Technical Safety BC participated in during 2018.

TECHNOLOGY	ASSOCIATIONS / NATIONAL CODES & STANDARDS COMMITTEES
Amusement Devices	<ul style="list-style-type: none">• ASTM F24 – Standards Development for Amusement Rides/Devices (F2783 Standard Practice for Canada Member)
Boilers, Pressure Vessels and Refrigeration	<ul style="list-style-type: none">• Association of Chief Inspectors (ACI Member)• CSA B51 Code Technical Committee (Member)• CSA B52 Code Technical Committee (Member)

- National Board of Boiler and Pressure Vessel Inspectors (Member)
- Standardization of Power Engineers Examination Committee (SOPEEC) (Member)

Electrical

- Canadian Advisory Council on Electrical Safety - (CACES)
- CACES Subcommittee on the SPE-1000
- CACES Subcommittee on Standard Effective Dates
- CACES Subcommittee on Energy Storage Systems (Chair)
- CACES Subcommittee on the Online Sale of Unapproved Products (Chair)
- Canadian Electrical Code, Part I (Inside Wiring Rules) - TC
- CE Code, Part I Regulatory Authority Committee - RAC
- CSA Part I, Section 22 Subcommittee, Locations in which corrosive liquids, vapours, or excessive moisture are likely to be present
- CSA Part I, Section 38 Subcommittee, Elevators, Dumbwaiters, Material Lifts, Escalators, Moving Walks, Lifts for Persons with Physical Disabilities, and similar Equipment - TSC
- CSA Part I, Section 58 Subcommittee, Passenger Ropeways and Similar Equipment - TSC
- CSA Part I, Section 66 Subcommittee, Amusement Parks, Midways, Carnivals, Film and TV Sets, TV Remote Broadcasting Locations, and Travelling Shows - TSC
- CSA Part I, Section 70 Subcommittee, Electrical Requirements for Factory Built Relocatable Structures & Non-Relocatable Structures - TSC
- CSA Part I, Section 72 Subcommittee, Mobile Home and Recreational Vehicle Parks - TSC
- CSA Part I, Section 74 Subcommittee, Airport Installations - TSC
- CSA Part I, Section 78 Subcommittee, Marine Wharves, Docking Facilities, Fixed and Floating Piers, and Boathouses - TSC
- UL Standards Technical Panel 2200, Stationary Engine Generator Assemblies
- UL Standards Technical Panel 8800, Horticultural Lighting Equipment
- UL 2577 Ed. 1 - Suspended Ceiling Grid Low Voltage Systems and Equipment
- UL 1088 Ed. 7 (Proposed) - Proposed Edition - UL 1088 Ed. 7
- TC1088, addressing Temporary Lighting Strings (UL 1088/ULC 1088)
- International Association of Electrical Inspectors (IAEI)
- BC Electrical Association (Member, Board of Directors)

Elevating Devices

- CSA B44 / ASME A17.1 Elevator Safety Codes Committee
- Association of Provincial Chief Elevator Inspectors
- CSA B44 / ASME A17.1 Escalator and Moving Walk Committee
- Engineers and Geo Scientists of BC, Elevating Devices Sub Committee

Gas

- CSA B149.1 Code Committee, Natural gas and propane installation code

- CSA B149.2 Code Committee, Propane storage and handling code
- CSA B149.3 Code Committee, Code for the field approval of fuel-related components on appliances and equipment
- CSA B149.5 Code Committee. Installation code for propane fuel systems and containers on motor vehicles
- CSA B149.6 Code Committee, Code for digester gas, landfill gas, and biogas generation and utilization
- CSA B108 Code Committee, Compressed natural gas fueling stations and installation
- CSA B109 Code Committee, Natural gas for vehicles installation code
- Interprovincial Gas Advisory Council
- SMC to ISO/TC 291, Domestic Cooking Appliances
- NGV Gas Transportation
- Fuels and Appliances, SSC
- ULC Advisory Council

Passenger Ropeways

- CSA, Z98 Passenger Ropeways and Passenger Conveyors Committee

Railways

- Advisory Council on Railway Safety (Canada - National Provincial Representative)
- Federal / Provincial Working Group on Railway Safety (Canada)
- Operation Lifesaver Western Canada

General

- BC Common Ground Alliance (Board of Directors)
- Cross-Government Compliance and Enforcement Collaborative

Recent Consultations

[View All Consultations](#)



Railway Consultation

In 2018 we sought feedback from the railway industry on the Canadian Rail Operating Rules, the Track Safety Rules, and the Safety Management System Regulations.

[Learn More >](#)

Renewable Energy

We consulted with industry on new, lower-priced electrical installation permit fees for interconnection equipment connecting to systems that produce and store electricity.

[Learn More >](#)

Canadian Electrical Code

We consulted with industry on adoption of the 2018 Canadian Electrical Code, with minor variations including enhancements to continuing education requirements.

[Learn More >](#)

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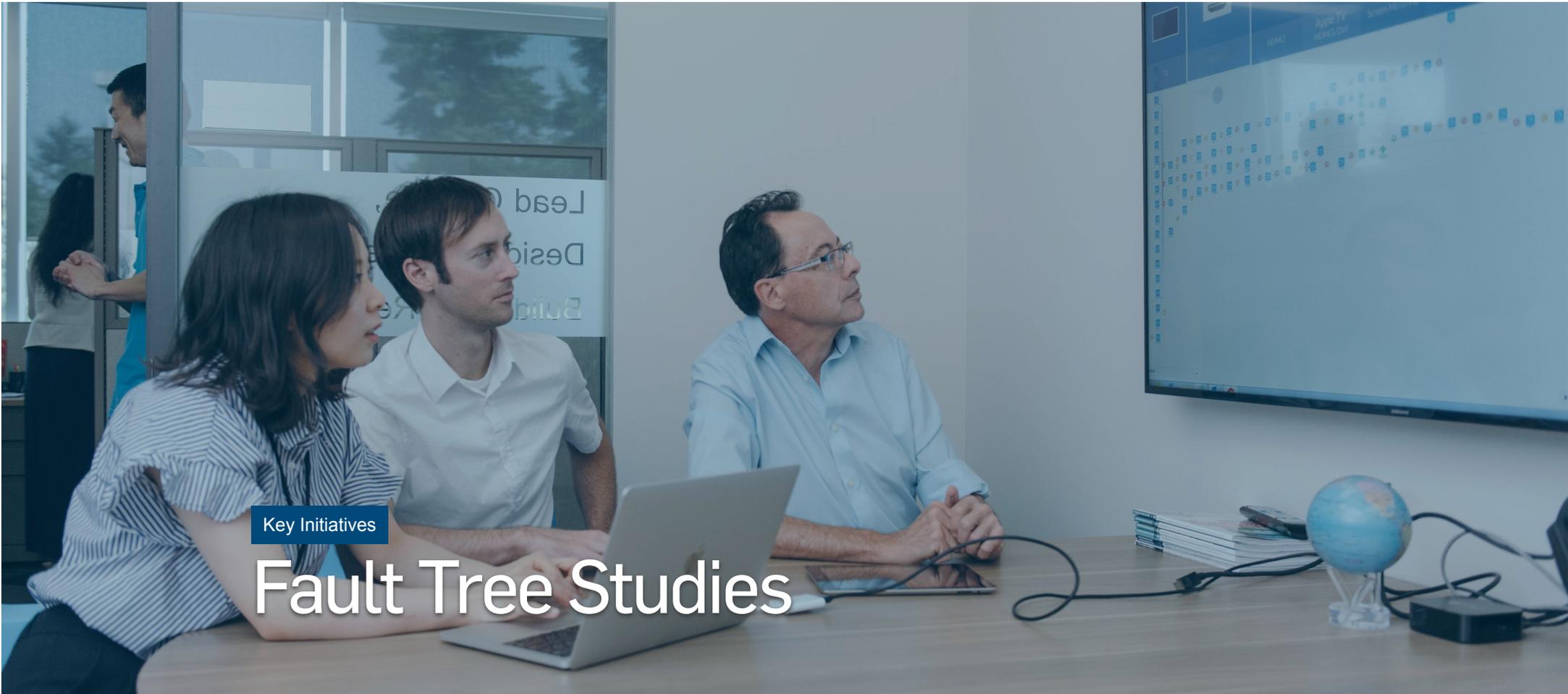
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Key Initiatives

Fault Tree Studies

Have you heard of a fault tree diagram? Commonly used in safety engineering and reliability engineering to provide a visual record that shows the logical relationships between events and causes that lead to failure, fault trees can help people quickly visualize and prioritize issues that need correction, leading to improved safety.

In 2018, we wanted to dig deeper into the four key high risk events we were commonly seeing. We chose the following areas of concern:

- ammonia releases;
- carbon monoxide exposure;
- electric shock; and
- escalator brake failures, entrapments and pile-ups.

We then engaged subject matter experts from each industry — Refrigeration, Gas, Electrical, and Elevating Devices — to help us look closely at each issue. Fault tree methodology helped us identify the conditions required for a high risk event to occur and all the possible causal factors leading up to that occurrence. By using a top-down, deductive method to analyze the undesired state of a system, we can then use Boolean logic to combine a series of lower-level events.

The Fault Tree reports, shown below, provide a number of recommendations to address causal factors. In 2019, Technical Safety BC will be using this information to help inform decision making around risk, and will focus on those which we believe will have the greatest impact on safety.

These fault trees will be used by Technical Safety BC to enhance our Accident Prevention Model which we use to prioritize assessment, education and outreach, enforcement, and research activities. By using research to enhance our decision making, we can better protect the public harm and work towards our goal of achieving *Safe technical systems. Everywhere.*

"Our goal is to improve the overall safety performance within targeted industry sectors and, over time reduce the number and impact of high risk events. By using fault trees to help us understand what activities lead to certain events, we are better able to target our efforts to enhance safety."

Alina Urloiu
Programs Manager, Safety Oversight

View the fault trees and their respective studies below:

Boiler, Pressure Vessels and Refrigeration

[Ammonia Release Fault Tree Study](#)

[Ammonia Release Fault Tree](#)

Electrical

[Electric Shock Fault Tree Study](#)

[Electric Shock Fault Tree](#)

Gas

[Carbon Monoxide Fault Tree Study](#)

[Carbon Monoxide Exposure Fault Tree](#)

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[Escalator Fault Tree Study](#)

[Escalator Brake Failure Fault Tree](#)

[Escalator Pile Up Fault Tree](#)

[Escalator Entrapment Fault Tree](#)

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Key Initiatives

Trampoline Parks Review

Following a [fatality](#) and [several serious injuries](#) at BC trampoline parks in 2018, this industry fell under scrutiny with several groups, including local health authorities, parents and municipal governments, began calling for trampoline parks to be regulated to protect public safety.

Trampoline parks are not currently regulated as an amusement device in BC under the *Safety Standards Act*. The current CSA Z267 Safety Code for Amusement Rides and Devices, which is adopted under the Elevating Devices Safety Regulation, does not address trampolines as an amusement device.

In response to the public's concerns, we are currently doing research and stakeholder engagement to explore aspects of potential regulation, and to determine what measures could help increase safety at trampoline parks and other similar facilities.

In reviewing options for potential regulation of trampoline parks, Technical Safety BC convened an advisory panel of experts; hosted a panel of risk management organizations, which included government stakeholders, insurance companies, health authorities, and other safety agencies; conducted a global jurisdictional scan; and has conducted an internal review of possible codes and standards that could be adopted to regulate trampoline parks.

Technical Safety BC will review the input from the various stakeholders together with the regulations, codes, and standards that are applicable to amusement devices in the province to make recommendations to the Ministry of Municipal Affairs and Housing by the end of May 2019. Public consultation may be sought if we generate a proposal that would impact industry or members of the public, such as recommendations to the province for regulatory changes.

Throughout 2019 Technical Safety BC will also be undertaking a comprehensive review of the amusement devices legislation. This includes revising how we oversee safety in existing devices such as waterslides, ziplines, and roller coasters, as well as examining what criteria should be applied to new, upcoming, and potential amusement devices such as trampoline parks.

“Technical Safety BC's role in safety oversight is not merely to uphold current regulation. We also play a central role in researching and proposing regulatory enhancements to the provincial government. Currently, we are in the process of reviewing amusement ride standards to determine whether and how additional technologies and activities should be included in regulation here in British Columbia.”

**Catherine Roome,
President & CEO, Technical Safety BC**

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Key Initiatives

Finding High Risk Hazards



As the province's population continues to grow, maximizing the safety oversight we can offer to contractors and clients is of critical importance. However, we can't be everywhere at once. As a result, we continue to evolve our business practices to maximize our resources to help us identify sites that pose the highest risk.

For many years, we have used a proprietary linear algorithm known as the Resource Allocation Program (RAP) to help prioritize sites that will be visited by a safety officer.

To help us better adapt to the ever-changing safety environment and leverage up and coming opportunities presented by artificial intelligence, we added machine-learning algorithms that predict where hazards are most likely to exist in British Columbia. As a result of this change, experiments we undertook in 2018 showed the algorithms improved the ability to predict high hazard electrical and gas installation work by 77% and 61% respectively.

Key Statistics

77%

increase in # of high hazards found with electrical installation permits

61%

increase in # of high hazards found with gas installation permits

4

sample plans produced and tested

Our work in 2018 showed that in areas where we are implementing machine learning, our systems have become more predictive for what we prioritize as high risk hazards. This means that every time our systems identify a potential technical safety hazard, there is a higher chance of our safety officers actually *finding* a hazard once they conduct an inspection. At the same time, by improving efficiency of the software to discover high risk hazards, machine learning is helping us increase the number of inspections driven by safety officers' discretion and other priorities identified by the organization as critical – for example, ammonia refrigeration units.

With more than 235,000 installation and operation permits issued in 2018, the scope of the safety system regulated by Technical Safety BC is significant. While our safety officers cannot be everywhere in the province at once, our focus on risk and innovation allows them to be in the places that matter the most – those that provide the highest risks. In 2019, we'll continue to implement machine learning in other areas beyond electrical and gas installation to help us further increase the effectiveness of our safety hazard assessments.



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Safety Story

Ammonia Release

In October 2017, an ammonia release at Fernie Memorial Arena resulted in the tragic death of three workers, and the evacuation of 95 area residents. The incident sent shockwaves throughout the close-knit community of Fernie, and raised questions and concern about the safety of other arenas in the province.

We launched an investigation into the root causes of the incident, working closely with WorkSafe BC and the RCMP, and with the cooperation of the City of Fernie. On July 25, 2018 we held a press conference and released our investigation report. The report provides an overview of the incident, the scope of the investigation, and key findings regarding contributing factors. Technical Safety BC also made [18 recommendations](#) to further improve safety in ice rink refrigeration systems.

One of the key factors behind the incident was an operational decision not to replace the curling chiller which had reached the end of its estimated service life – a recommendation made seven years prior to the incident by the City of Fernie’s maintenance contractor. As a result, one of our key recommendations is that arena owners ensure that their maintenance programs incorporate plans to replace aging equipment and not run them to failure.

18 Recommendations

Following the incident at Fernie, Technical Safety BC made 18 recommendations to improve safety in ice rink refrigeration systems and prevent a similar incident from happening again.

The recommendations reach out to different stakeholders who can help make ice rink refrigeration systems safer including: plant owners, maintenance contractors, training providers, municipalities and the Canadian Standards Association.

[Read More >](#)

“It was important for us to share the results of our investigation and the accompanying recommendations as widely as possible so we could raise awareness of how ammonia facility owners and operators can raise safety standards in their facilities. By sharing this information, people in the refrigeration industry will gain a better understanding of the hazards and the importance of robust maintenance programs and aging equipment management.”

Jeff Coleman

Director, Risk & Safety Knowledge

In Conclusion:

Since the release of our incident investigation, we have been encouraged by the many positive improvements taking place in the province and beyond, as facility owners and operators of rinks proactively improve rink safety. Several city councils have worked repairs into their budgets or have opted to replace aging equipment. Others have held ammonia release drills to ensure they are properly prepared for emergencies. We’ve learned of changes and upgrades being made to chillers in Alberta and New Brunswick. We even received a request from a refrigeration engineer in Poland to use our report as a training case study.

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Related Stories

Using Fault Tree Analysis to Prevent Incidents

To help identify potential causes of ammonia releases from industrial refrigeration systems in arenas and food storage facilities, we conducted a fault tree workshop.

[Read More >](#)

Preventing Ammonia Releases in British Columbia

Safety is a shared responsibility. Learn how we work with industry to prevent ammonia releases in BC's rinks and arenas.

[Read More >](#)

Fernie Ammonia Release Investigation Report

Our investigation report revealing the causes of the fatal ammonia release at Fernie Memorial Arena that tragically killed three people.

[Read More >](#)

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Electric Shock



What causes electric shock? According to our research, poor work practices or complacency, relying on others to ensure equipment is de-energized, and inadequate training in electrical safety and risk were among the key contributing factors.



This information was revealed by those working in the electrical industry in a research project we undertook in Fall 2018 to help better understand the sociocultural and behavioural conditions that could create the risk of electric shock.

The topic of electric shock came about through research and analysis into our as-found hazard and incident reports, where we identified electrical shock as one of four key areas of risk in our 2017-18 business plan.

To understand why people in the electrical industry were getting shocked and how to prevent people from working on live equipment, we conducted field research. From September to October 2018, we conducted five focus groups with 40 people. We received 1,196 survey responses from electrical contractors, Field Safety Representatives, apprentices and other industry members.

Of the survey responses we received, 95% reported they had worked on live or energized equipment and most had experienced electric shock.

In terms of influencing factors, most participants reported they had enough knowledge, skills, and training. The results showed their choice to work “live” was heavily influenced by economic, time, and social pressures (i.e., a desire to keep the boss happy and not risk losing out on future work), which mostly fell outside of their personal control. In fact, 42% reported working energized at least once a year even though they didn’t want to. That said, many participants felt confident in declining unsafe work and negotiating their safety with respect to electric shock. Approximately 63% reported they had refused or declined work due to concerns around electrical shock.



“You want to keep the boss happy. Being safe is generally slower and bosses don’t want that.... It may not be your employer’s intention but if you have two [workers] and one is safer and slower, the boss will go with the faster worker.”

- Workshop Participant

In Conclusion:

Our research suggests electric shock doesn’t happen simply due to lack of knowledge or awareness. Many of the contributing factors occur at the organizational or sociocultural level.

In 2019, Technical Safety BC will be connecting with key stakeholder groups to share research findings. It’s our goal to work collaboratively with other safety leaders in the electrical industry to promote change in industry practices and reduce occurrences of electric shock.

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Related Stories

De-energization

Failing to de-energize equipment before starting electrical work can lead to risk of shock and arc flash.

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Electrical Operating Permits

Do you own, operate, or maintain an industrial, commercial, or institutional facility? You likely need an Electrical Operating Permit.

[Read More >](#)

Hazard Reporting

Preventing hazards requires building a culture where your employees consistently report incidents, hazards, and near-misses.

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Carbon Monoxide

In March 2017, a family of four and their dog died in their home due to carbon monoxide (CO) exposure in the off-grid community of Ashcroft. Technical Safety BC concluded that the fatality was likely caused by a tankless, on-demand water heater that had been installed incorrectly by one of the homeowners. The water heater vented CO indoors, leading to tragic results and raising concerns about the safety of others in the area. Our efforts to address carbon monoxide risk in remote communities and raise awareness was a major focus of our activities in 2018.

To help the community understand the cause of the tragedy, and the hazards that can lead to CO exposure, Technical Safety BC's regional leaders partnered with local municipal organizations to conduct a collaborative community response. Representatives from the RCMP, Ashcroft Fire Department, Thompson-Nicola Regional District, and Interior Health held three community meetings.

Together with the support of community leaders, Technical Safety BC conducted site visits to 76 dwellings and met with occupants. Safety officers completed 35 hazard assessments and, of these, almost all had safety hazards needing correction. The safety issues included gas appliances venting within structures, incorrect assembly or installation, appliances situated too close to combustible surfaces, and some appliances that were not approved for use in Canada.

"Safety is our objective and one of our main activities to prevent unsafe conditions is to promote compliance with established codes and standards," explains Wayne Johnson, the gas safety officer who led the investigation and who worked extensively with community residents. "Rather than use a heavy-handed approach and focus on enforcement, we focused on education and awareness. Many of the residents simply lacked information about the risks and welcomed the opportunity to learn. By working one-on-one with the community and residents, it gave us the opportunity to create relationships and open up a dialogue about safety."

Guidelines for the Gas Service Industry

In May 2018, we introduced Guidelines for the Gas Service Industry. Aimed at gasfitters and contractors who perform maintenance on gas-fueled appliances, the manual shares information on common factors behind increased carbon monoxide levels and how to prevent them, as well as guidelines and protocols for

installation, servicing and maintenance. Training was also held in TechTalk sessions across BC, to help raise awareness of these issues among industry.

[Read More >](#)

In Conclusion:

The need to educate the public around the importance of having gas work done by licensed contractors or, for those wishing to complete the work themselves, under a homeowner permit which includes physical inspection by our safety officers, continues to be a key issue for our organization. Each year Technical Safety BC seeks to inform the public about the dangers of CO poisoning and to bring awareness around the issue. In spring 2018, we ran a province-wide campaign focused on preventing carbon monoxide poisoning in homes which leveraged printed advertorials, digital ads, and boosted social media posts. We also attended the Vancouver Home Show, where we displayed a mini house warning of the most common causes of carbon monoxide in the home. We also released a “Guidelines for the Gas Services Industry” manual which provides information for gas fitters and gas contractors who are installing, servicing or performing maintenance on gas appliances. The manual aims to bring awareness to how incorrect installation or maintenance; component failure and external factors such as exhaust fans or air handling equipment may all contribute to elevated carbon monoxide levels. Training was held via webinars and TechTalks all across the province.

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Related Stories

Pets and CO Exposure

Eight signs your pet may be experiencing carbon monoxide poisoning.

[Read More >](#)

Off-grid Communities

What research revealed into the state of technical safety in BC's off-grid communities.

[Read More >](#)

Top 3 Causes of CO

Our workshop revealed the top three potential causes of carbon monoxide exposure.

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Alternative Safety Approaches

Overview

Alternative Safety Approaches (ASAs) are developed with owners and operators in

the oil and gas, propane, bio-energy, LNG, and institutional sectors. They provide a way for an owner or primary operator to undertake regulated work or use regulated products in a way that is different from traditional prescriptive requirements, but consistent with the safety objectives of the *Safety Standards Act*.

We oversee the acceptance of ASAs for all technologies in accordance with the *Safety Standards Act* and the Alternative Safety Approaches Regulation.

Key Statistics

30

Equivalent Standard Approaches in 2018.

10

Safety Management Plans in 2018.

0

incidents or injuries related to Alternative Safety Approaches.

Incidents & Injuries

There were no incidents or injuries related to Alternative Safety Approaches in 2018.

Alternative Safety Approaches

There are two types of Alternative Safety Approach:

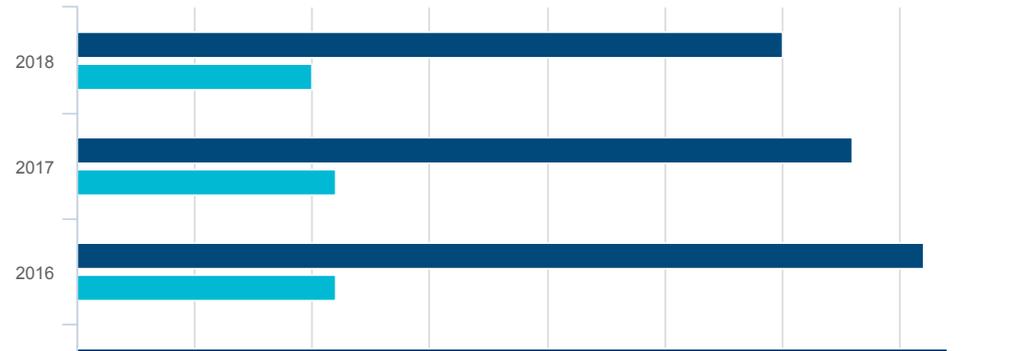
1. Equivalent Standard Approach (ESA), or

2. Safety Management Plan Approach (SMP).

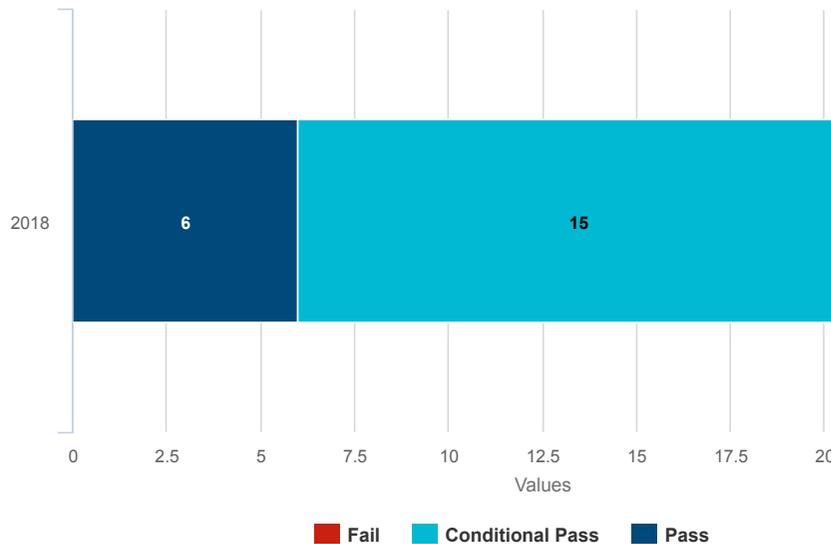
These options apply in different situations, based on a proponent's needs. However, the application process and Technical Safety BC's service delivery for each varies little, except in scale.

The number of ASAs in 2018 decreased slightly compared to 2017.

Alternative Safety Approaches: Two Types



Alternative Safety Approaches Assessment and Audit Results



Assessments & Audits

As a performance-based approach to achieving compliance with the *Safety Standards Act*, assessment of that performance is done using standard audit processes consistent with the International Standards Organization standard ISO19011—Guidelines for Auditing Management Systems. Audit findings for sites operating with an accepted ASA are categorized in a manner similar to as-found conditions for traditional inspection-based assessments. The audit process used by Technical Safety BC assesses how the procedures and processes identified in the ASA meet or exceed the objectives of the *Safety Standards Act*, to minimize risks, hazardous installation or operation.

Related Stories

Alternative Safety Approaches

How Alternative Safety Approaches (ASAs) help promote regulatory harmonization.

[Read More >](#)

How fees are set

Ever wonder how we set our fees? We explain.

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Hazard reporting

Why it's so important to always report incidents and hazards.

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Technology

Amusement Devices

Overview

Technical Safety BC oversees the safety of amusement device installation and

operation throughout British Columbia in accordance with the *Safety Standards Act* and the Elevating Devices Safety Regulation. The types of regulated amusement devices range from small waterslides and inflatable play equipment to larger rides such as roller coasters.

Key Statistics

38

incidents reported to us.

31

injuries reported to us.

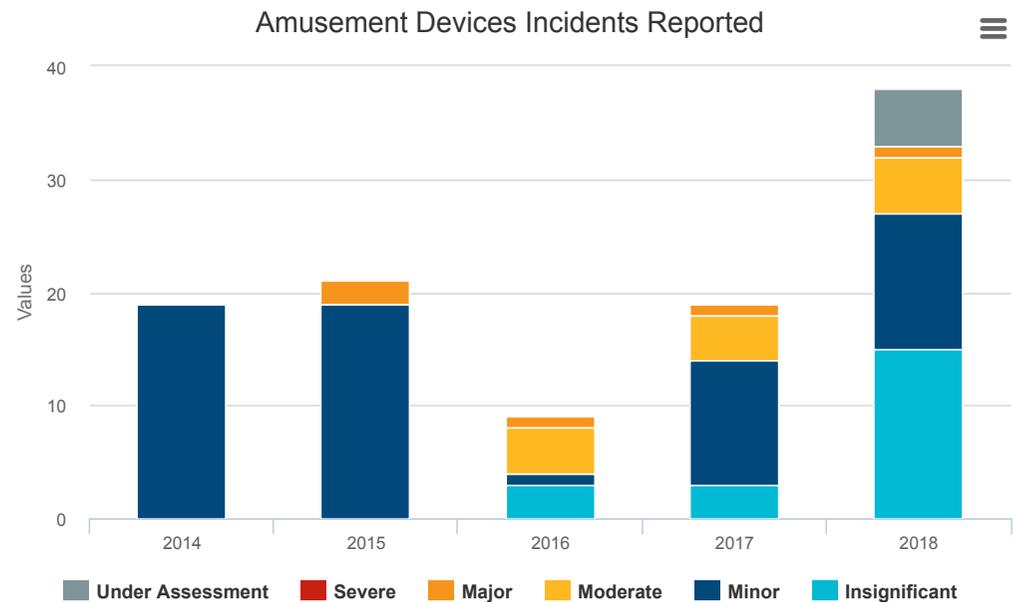
405

physical assessments
(inspections)
completed.

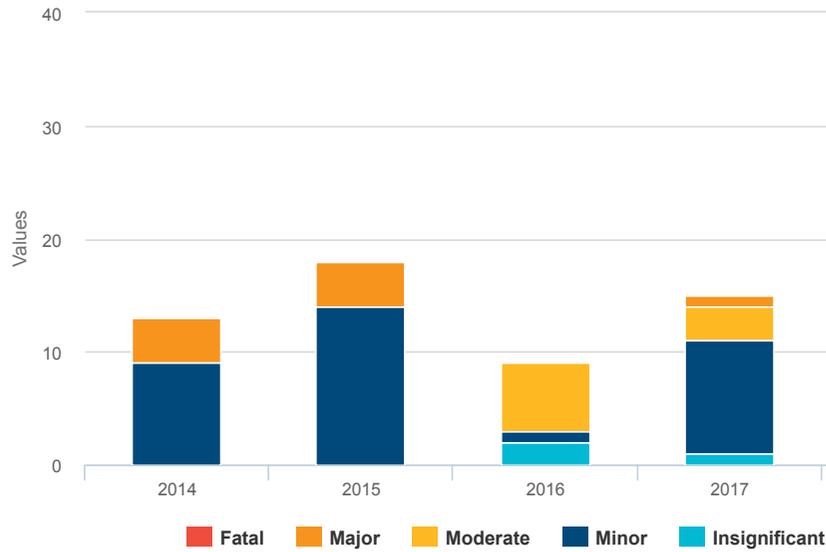
Incidents

In 2018 the number of amusement devices incidents reported to us increased. The category *under assessment* refers to incidents reported to Technical Safety BC, but which were still under investigation at year-end.

There was one *major* incident related to a passenger who reportedly had a seizure while riding an amusement ride.



Amusement Devices Injuries Reported



Injuries

The number of injuries reported to us increased over past years. This could be attributed to better reporting discipline by our clients. It's important to note that we receive injury reports and descriptions from operators or first responders at the time of, or immediately following, the incident. Injuries may develop after the initial reports were made to us and the long-term effects of a resultant injury may not be recorded as part of our investigation.

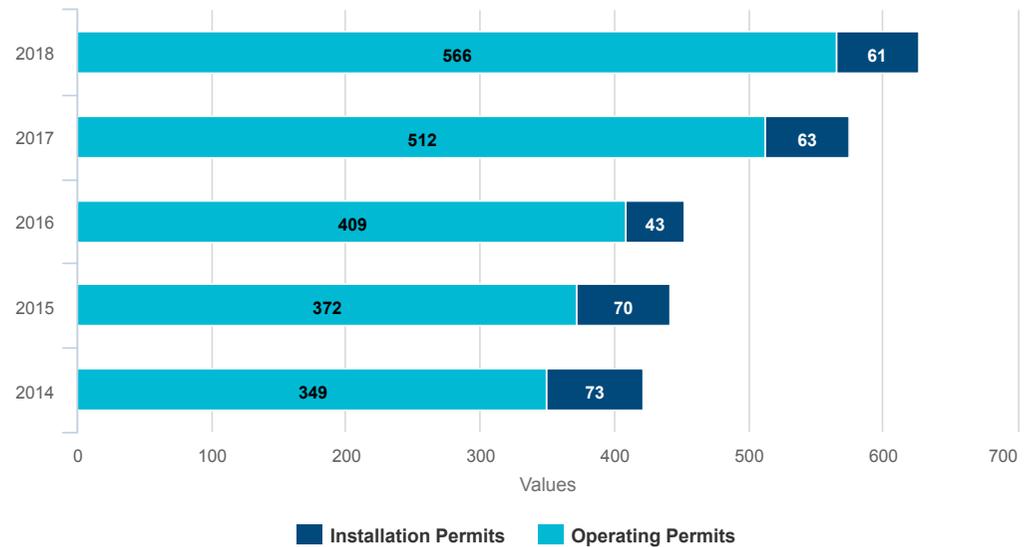
There was one injury rated *major* in 2018 which was attributed to an individual having a seizure while on an amusement ride.

In this technology, injuries can be quite common, and are often attributed to user behaviour rather than technical equipment failure.

Permits

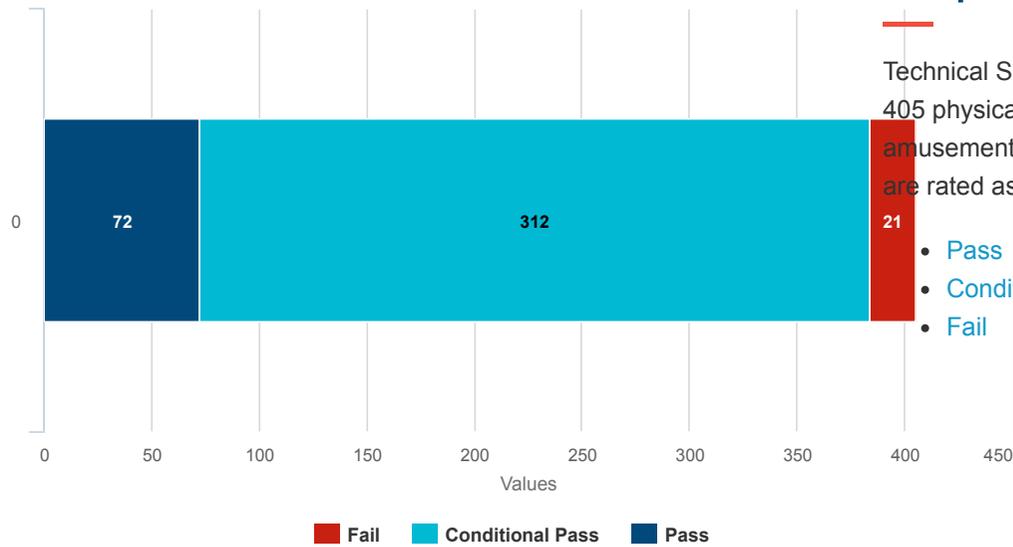
In 2018, there were 61 installation / alteration permits related to Amusement Devices in 2018. There were 566 active operating permits.

Amusement Devices Permits



Amusement Devices Inspection Results in 2018

Inspections



Technical Safety BC safety officers completed 405 physical assessments (inspections) of amusement devices in 2018. Those assessments are rated as follows:

- Pass
- Conditional Pass
- Fail

Related Stories

Bouncy castle safety

Important things to know before your kids bounce.

[Read More >](#)

Trampoline parks

Technical Safety BC is exploring if trampoline parks should be regulated to improve safety.

[Read More >](#)

Incident reporting

4 reasons why reporting all incidents and hazards is so important.

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Technology

Boiler, Pressure Vessels and Refrigeration

Overview

Technical Safety BC oversees the design, construction, installation and operation of

boilers, pressure vessels and refrigeration plants throughout British Columbia in accordance with the *Safety Standards Act* and the Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation.

Key Statistics

38

incidents reported to us.

1

injury reported to us.

6,372

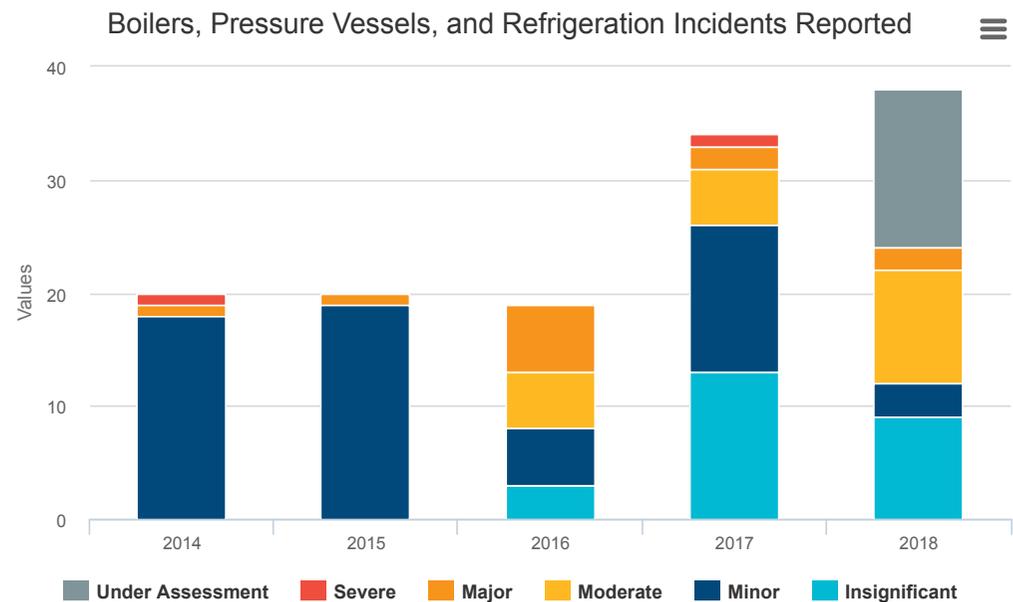
physical assessments
(inspections)
completed.

Incidents

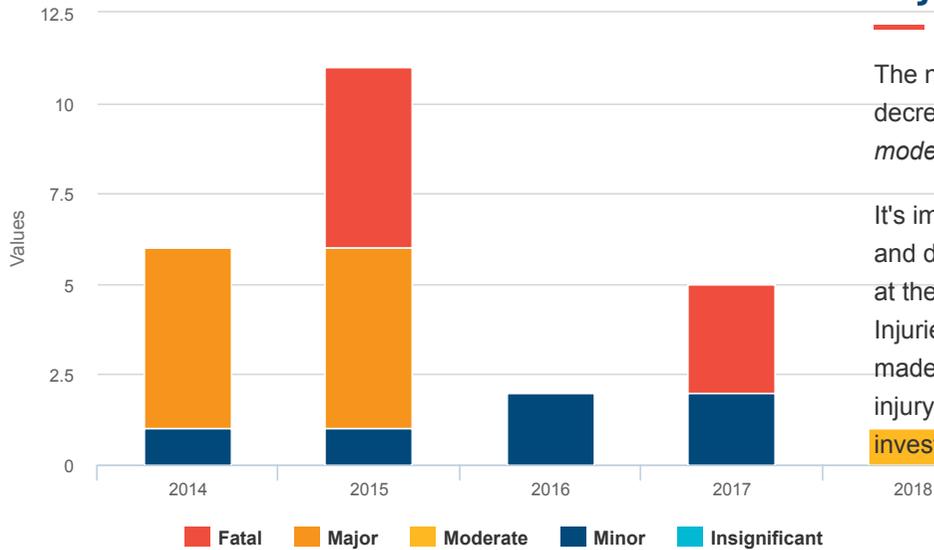
In 2018 the number of incidents related to Boiler, Pressure Vessel, and Refrigeration incidents increased.

There were two incidents related as *major*. One was caused by a tube rupture in a high-pressure steam boiler and one involved a fire in a boiler room at a residential apartment.

The category *under assessment* refers to incidents reported to Technical Safety BC, but which were still under investigation at year-end.



Boilers, Pressure Vessels, and Refrigeration Injuries Reported



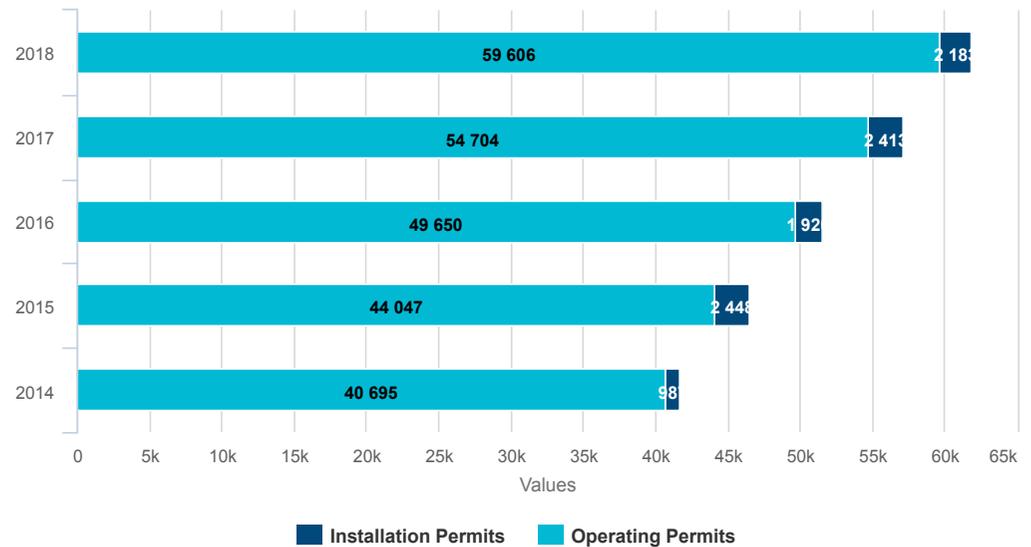
The number of injuries reported to us decreased over previous years. There was one *moderate* injury reported in 2018.

It's important to note that we receive injury reports and descriptions from operators or first responders at the time of, or immediately following, the incident. Injuries may develop after the initial reports were made to us and the long-term effects of a resultant injury may not be recorded as part of our investigation.

Permits

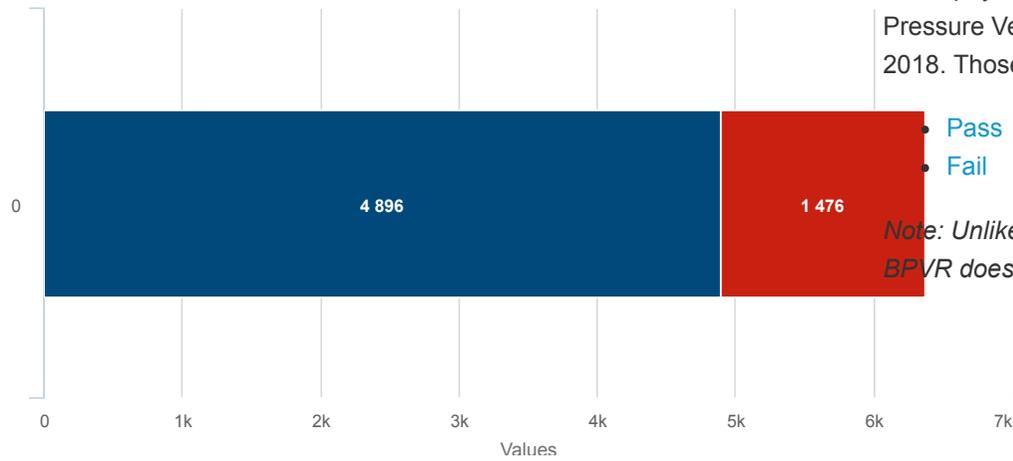
In 2018, there were 8,345 installation permits and 59,606 active operating permits in the Boiler, Pressure Vessel and Refrigeration technology.

Boilers, Pressure Vessels, and Refrigeration Permits



Inspections

Boilers, Pressure Vessels, and Refrigeration Physical Assessment Results in 2018



Technical Safety BC safety officers completed 6,372 physical assessments (inspections) of Boiler, Pressure Vessel, and Refrigeration equipment in 2018. Those assessments are rated as follows:

• Pass

• Fail

Note: Unlike some other technologies we regulate, BPVR does not have a Conditional Pass category.

Related Stories

Arena safety

Our work with owners to keep arenas with ammonia refrigeration systems safe.

[Read More >](#)

Ammonia releases

Workshop reveals common causes of ammonia releases.

[Read More >](#)

18 recommendations

Our recommendations to improve safety of refrigeration systems in the province.

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Electrical

Overview

We oversee the safety of electrical systems across British Columbia in accordance

with the *Safety Standards Act* and the Electrical Safety Regulation. The exception are those municipalities that have separate administrative agreements with the provincial government.

Key Statistics

47

incidents reported to us.

7

injuries reported to us.

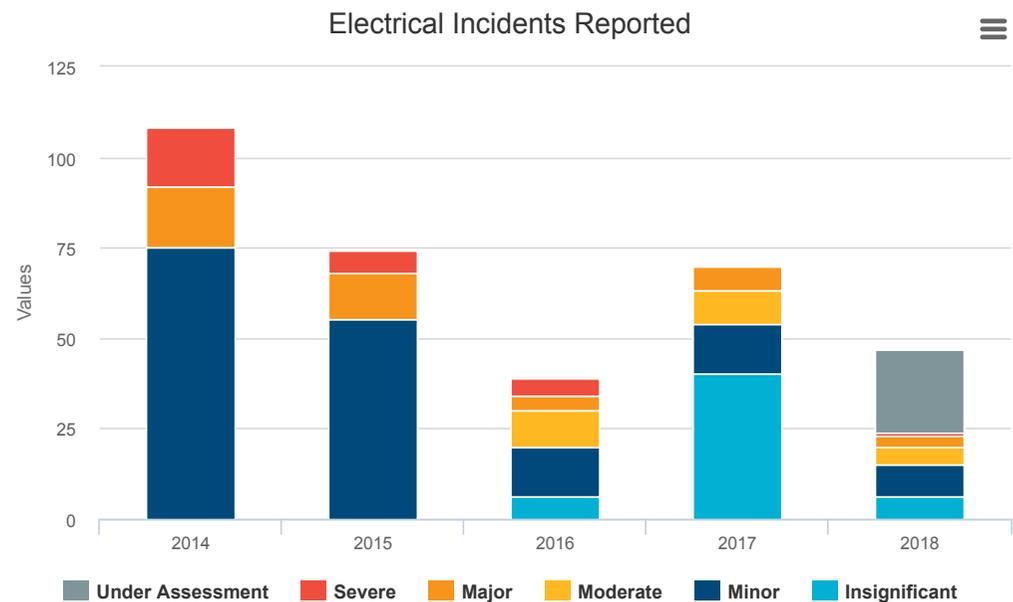
27,108

physical assessments
(inspections)
completed.

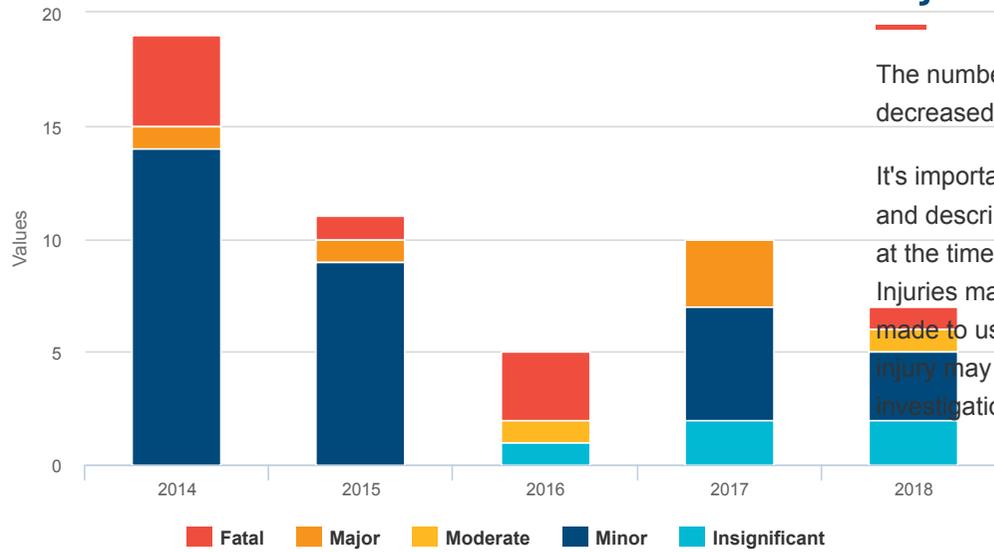
Incidents

The number of Electrical incidents reported to us in 2018 decreased.

There was one injury rated *severe* in 2018 where a house fire caused a fatality (possibly electrical in nature). There were six rated *major*.



Electrical Injuries Reported



Injuries

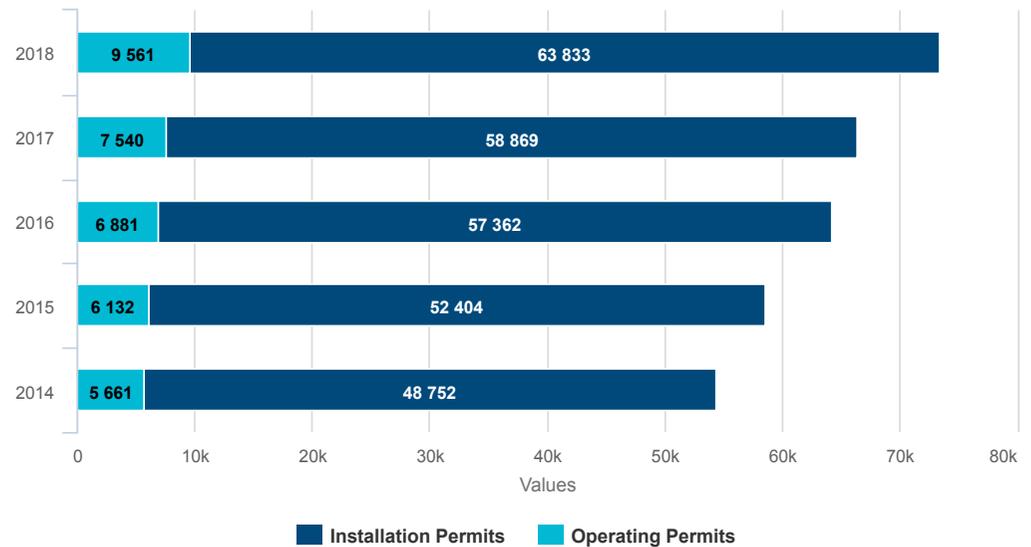
The number of injuries reported to us in 2018 decreased.

It's important to note that we receive injury reports and descriptions from operators or first responders at the time of, or immediately following, the incident. Injuries may develop after the initial reports were made to us and the long-term effects of a resultant injury may not be recorded as part of our investigation.

Permits

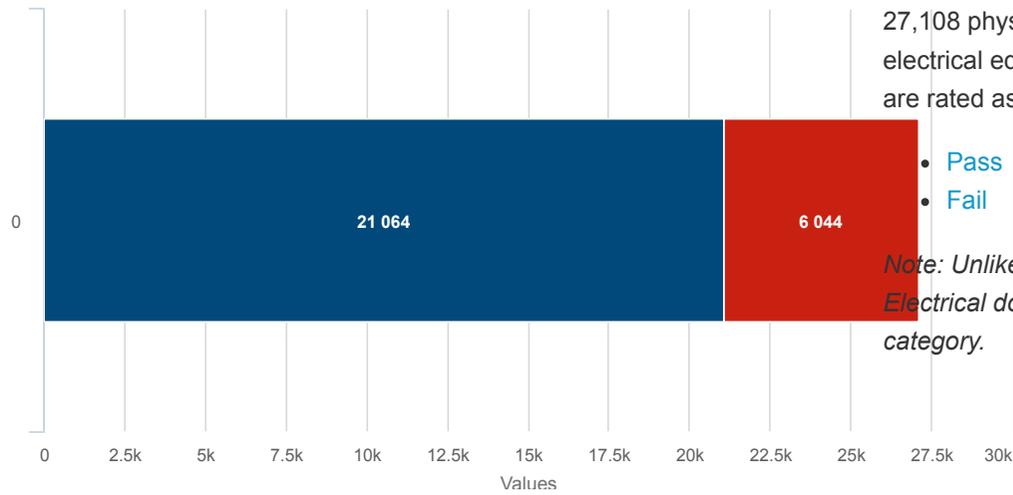
In 2018, there were 63,833 electrical installation permits and 9,561 active electrical operating permits.

Electrical Permits



Inspections

Electrical Inspection Results in 2018



Technical Safety BC safety officers completed 27,108 physical assessments (inspections) of electrical equipment in 2018. Those assessments are rated as follows:

- Pass
- Fail

Note: Unlike some other technologies we regulate, Electrical does not have a Conditional Pass category.

Related Stories

Electric shock

Our workshop reveals 3 common causes of electric shock.

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Incident Reporting

The importance of always reporting incidents and hazards.

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Electrical operating permits

How an electrical operating permit can save you and your clients time and money.

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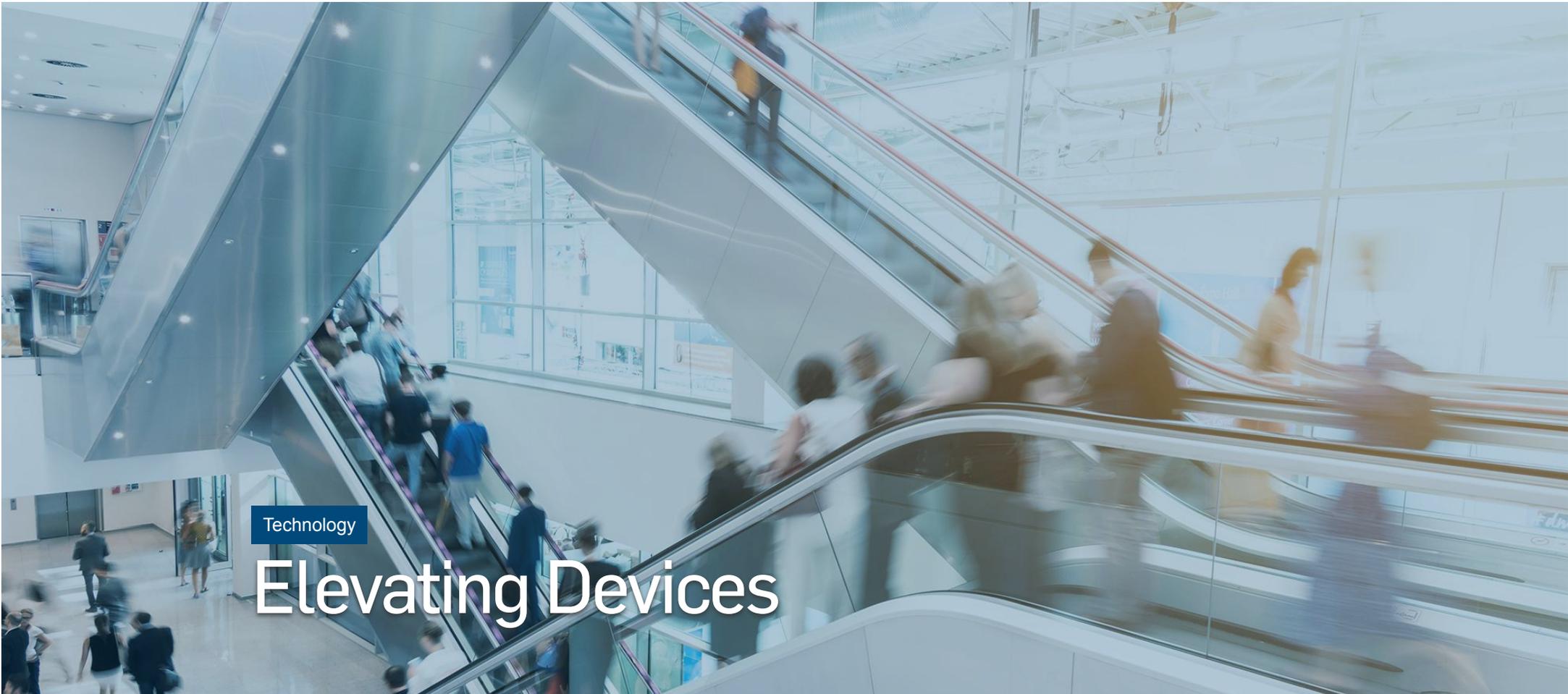
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Elevating Devices

Overview

Technical Safety BC oversees the safety of elevators, escalators, moving walkways,

dumbwaiters, lifts, and construction hoists in accordance with the *Safety Standards Act* and the Elevating Devices Safety Regulation.

Key Statistics

158

incidents reported to us.

52

injuries reported to us.

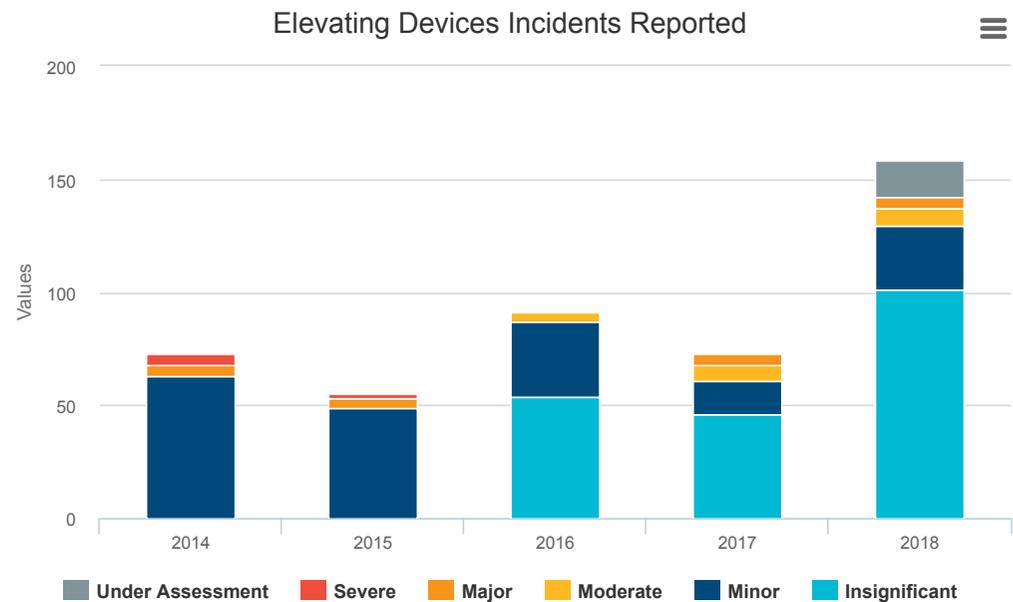
2,979

inspections (physical assessments).

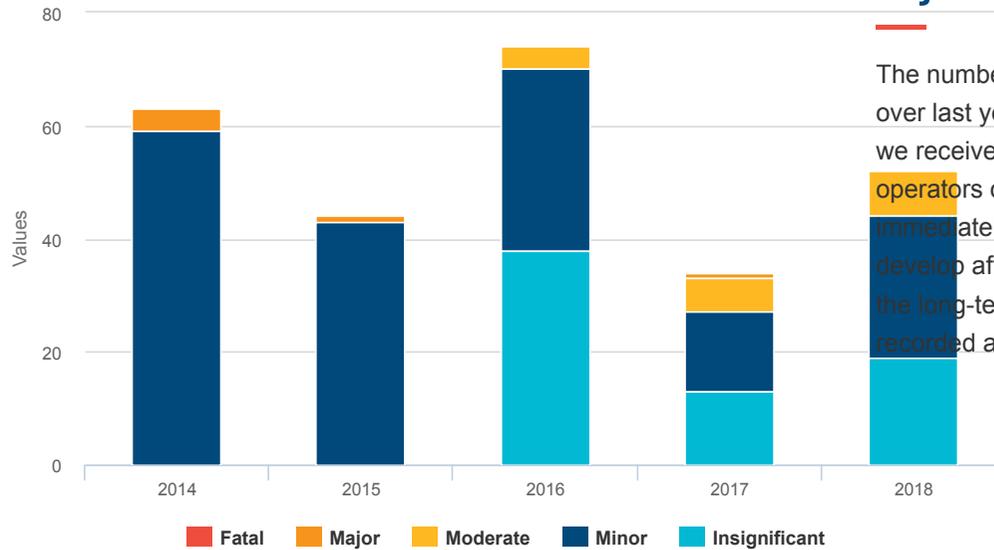
Incidents

In 2018 the number of incidents involving elevating devices reported to us increased over previous years. The category *under assessment* refers to incidents reported to Technical Safety BC, but which were still under investigation at year-end.

There were five *major* incidents, three of which were related to escalator step pile-ups. One involved an overheated elevator motor that got hot and started to smoke, and one involved a component failure which caused uncontrolled descent of a hoist.



Elevating Devices Injuries Reported



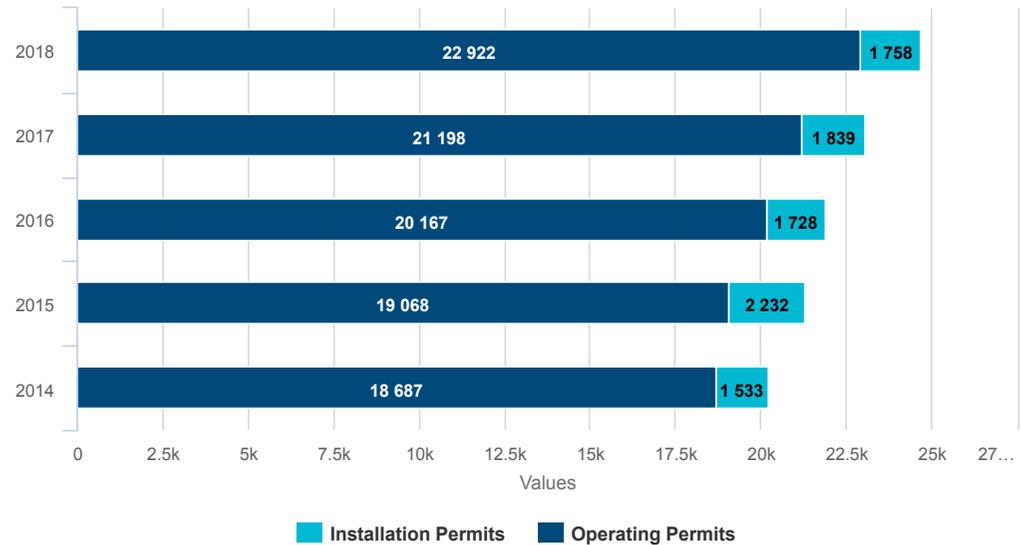
Injuries

The number of injuries reported to us increased over last year. It's important to note that we receive injury reports and descriptions from operators or first responders at the time of, or immediately following, the incident. Injuries may develop after the initial reports were made to us and the long-term effects of a resultant injury may not be recorded as part of our investigation.

Permits

In 2018, there were 1,758 installation permits (including those related to modifications of existing equipment) and 22,922 active operating permits for elevating devices.

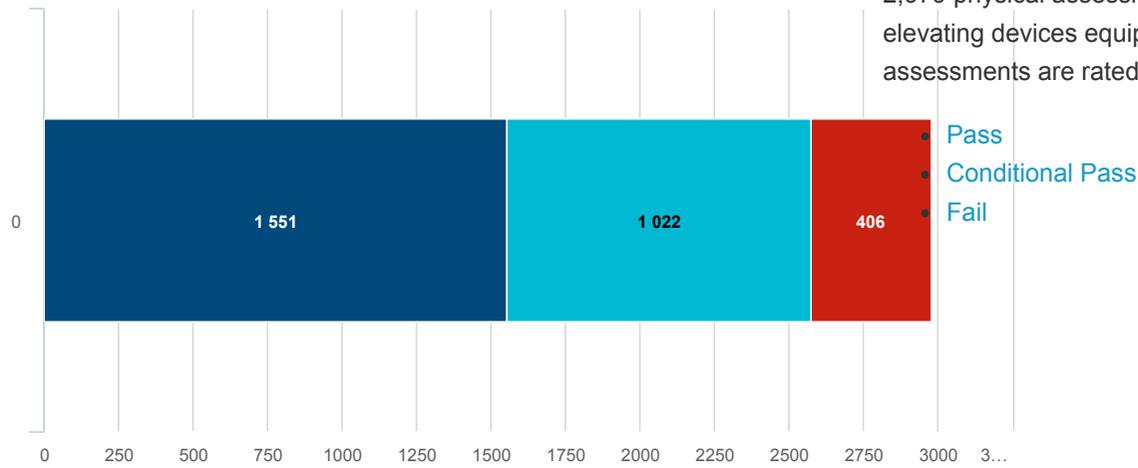
Elevating Devices Permits



Inspections

Elevating Devices Physical Assessment Results in 2018

Technical Safety BC safety officers completed 2,979 physical assessments (inspections) of elevating devices equipment in 2018. Those assessments are rated as follows:



Related Stories

Sensor technology

Could sensor technology and the Internet of Things (IoT) improve elevator safety?

[Read More >](#)

Escalator safety

9 must-know escalator safety tips to keep you and your family safe.

[Read More >](#)

Escalator incidents

Workshop reveals 2 factors behind escalator incidents.

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Gas

Overview

Technical Safety BC oversees industrial and commercial use of natural gas, propane,

digester gas, manufactured gas, liquified petroleum gas, landfill gas and hydrogen throughout British Columbia in accordance with the *Safety Standards Act* and the Gas Safety Regulation. We are responsible for delivering gas safety services to approximately 1.2 million homes in the province, though some municipalities have separate administrative agreements with the provincial government to oversee low pressure gas systems and work.

Key Statistics

37

incidents reported to us.

2

injuries reported to us.

14,248

physical assessments
(inspections).

Incidents

In 2018 the number of Gas incidents reported to us decreased.

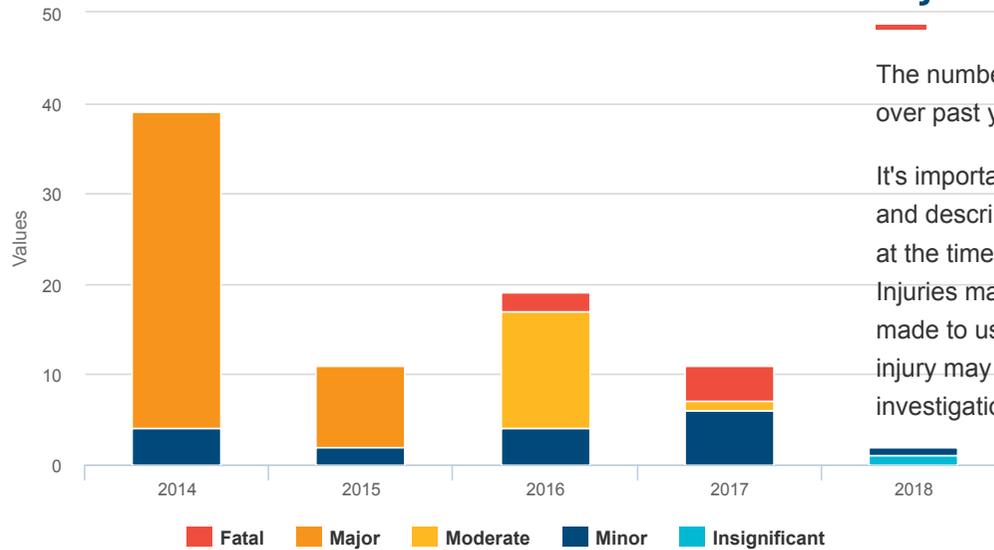
The category *under assessment* refers to incidents reported to Technical Safety BC, but which were still under investigation at year-end.

There were three incidents ranked as *major* in 2018. One was caused by a gas-line hit, one was caused by fire involving a gas-powered unit heater, and one was caused by a commercial coffee roaster which

caught fire during operation due to a failed exhaust fans and air-proving switch.



Gas Injuries Reported



Injuries

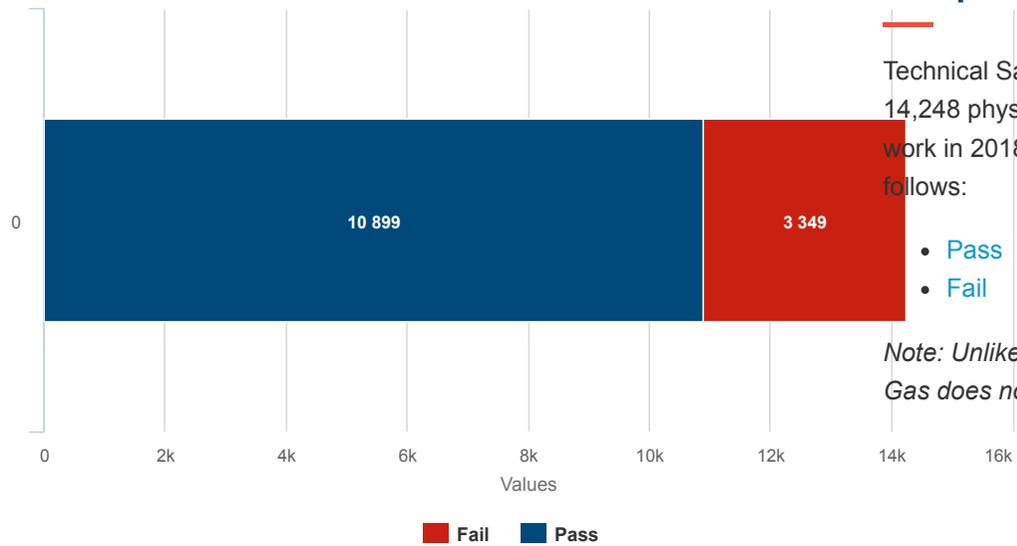
The number of injuries reported to us decreased over past years.

It's important to note that we receive injury reports and descriptions from operators or first responders at the time of, or immediately following, the incident. Injuries may develop after the initial reports were made to us and the long-term effects of a resultant injury may not be recorded as part of our investigation.

Permits

In 2018, there were 55,473 installation permits issued to clients and 1,502 active operating permits.

Gas Physical Assessment Results in 2018



Inspections

Technical Safety BC safety officers completed 14,248 physical assessments (inspections) of gas work in 2018. Those assessments are rated as follows:

- Pass
- Fail

Note: Unlike some other technologies we regulate, Gas does not have a Conditional Pass category.

Related Stories

Propane safety

Our top 4 propane safety tips for a safe barbecue season.

Carbon monoxide

Our annual CO campaign aims to raise public awareness around the risks.

Prioritizing inspections

How our safety officers prioritize which sites receive a physical inspection.

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Passenger Ropeways

Overview

Technical Safety BC oversees the safety of passenger ropeways throughout British

Columbia in accordance with the *Safety Standards Act* and the Elevating Devices Safety Regulation. These include tramways, gondolas, chairlifts, rope tows and passenger conveyors.

Key Statistics

78

incidents reported to us.

41

injuries reported to us.

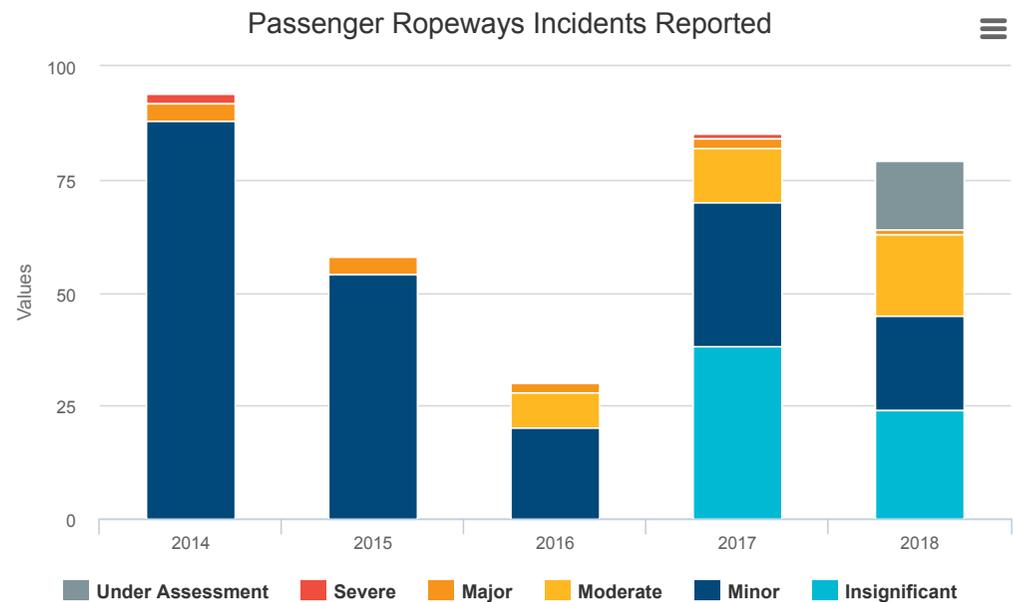
180

physical assessments
(inspections).

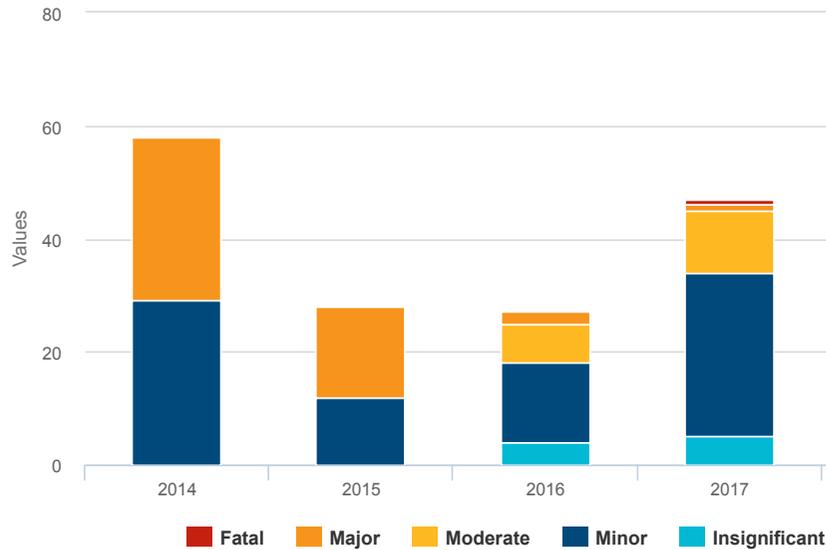
Incidents

In 2018 the number of passenger ropeways incidents reported to us decreased. The category *under assessment* refers to incidents reported to Technical Safety BC, but which were still under investigation at year-end.

There was one *major* incident related to a patron falling from a passenger ropeway.



Passenger Ropeways Injuries Reported



Injuries

The number of injuries reported to us decreased over last year. It's important to note that we receive injury reports and descriptions from operators or first responders at the time of, or immediately following, the incident. Injuries may develop after the initial reports were made to us and the long-term effects of a resultant injury may not be recorded as part of our investigation.

There was one *major* injury where a patron suffered a possible hip fracture after unloading from a chairlift.

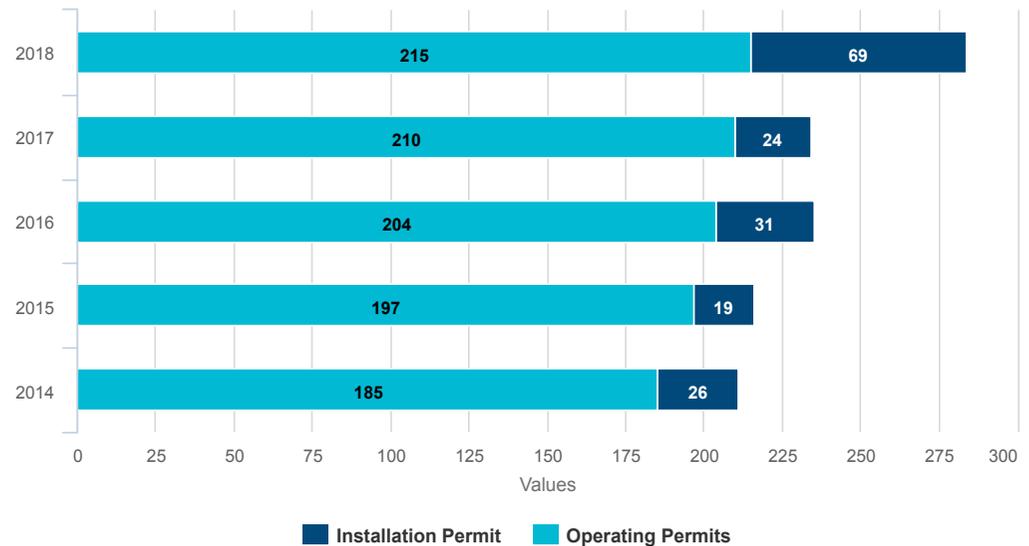
In this technology, injuries ranked *minor* and *moderate* can be quite common, and are often attributed to user behaviour rather than technical equipment failure.

Permits

In 2018, there were 69 passenger ropeways installation / alteration permits and 215 active operating permits.

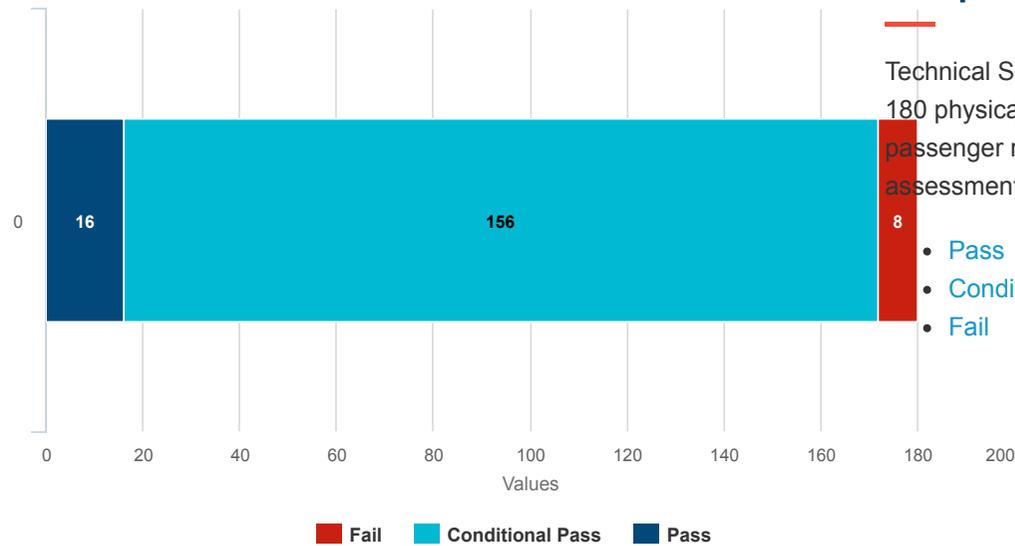
The higher volume of installation / alteration permits in 2018 reflects permits required in relation to a [conveyor-related safety order](#) we issued in 2017.

Passenger Ropeways Permits



Passenger Ropeways Inspection Results in 2018

Inspections



Technical Safety BC safety officers completed 180 physical assessments (inspections) of passenger ropeways equipment in 2018. Those assessments are rated as follows:

- Pass
- Conditional pass
- Fail

Related Stories

Common non-compliances

The non-compliances our safety officers see most often when inspecting passenger ropeways.

New requirements

We introduced new requirements for site fall protection verification and pre-operation inspection declarations.

Incident investigation

A detachable grip carrier slid backwards down the haul rope, making contact with the carrier behind.

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Railways

Overview

Technical Safety BC regulates railways that operate solely within British Columbia and

have a certificate issued by the BC Ministry of Transportation and Infrastructure. Provincial railways are subject to the *British Columbia Railway Act*, *Railway Safety Act* and adopted federal railway safety legislation. We regulate five different classes of railways: common carrier, heritage, commuter, industrial, and industrial sidings and spurs.

Key Statistics

161

incidents reported to us.

13

injuries reported to us.

153

inspections (physical assessments).

Incidents

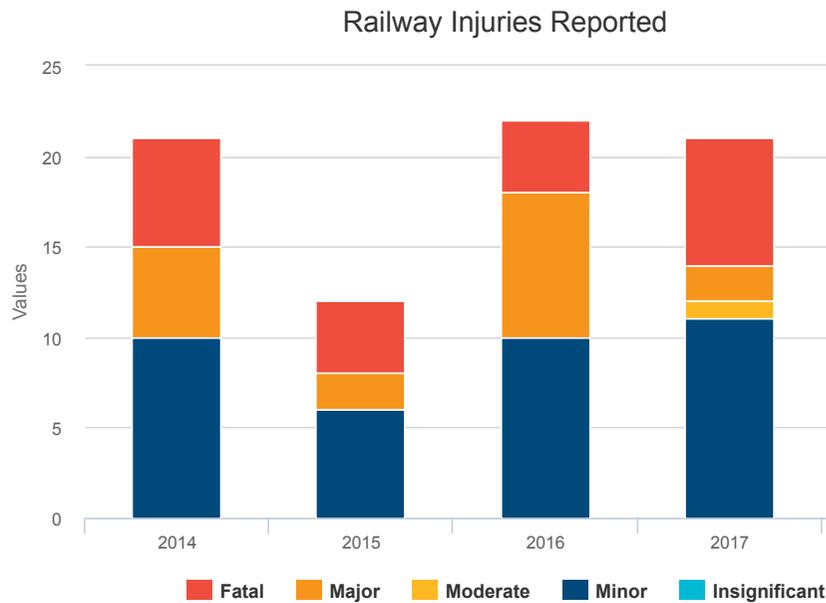
Railway accidents and incidents are reported in accordance with adopted federal regulations. Typically, these accidents and incidents are low speed and low risk.

In 2018 the number of Railway incidents reported to us increased. The largest proportion was associated with industrial railways.

There were two incidents ranked Severe in 2018, both attributed to suicide rather than failure of technical equipment.

The most prevalent type of incident was derailment (68), followed by run-through switch (20) and collision (18). These were found to be mostly caused by procedural error or human error.

The category Under Assessment refers to incidents reported to Technical Safety BC, but which were still under investigation at year-end.



Injuries

The number of injuries reported to us decreased compared to last year.

It's important to note that we receive injury reports and descriptions from operators or first responders at the time of, or immediately following, the incident. Injuries may develop after the initial reports were made to us and the long-term effects of a resultant injury may not be recorded as part of our investigation.

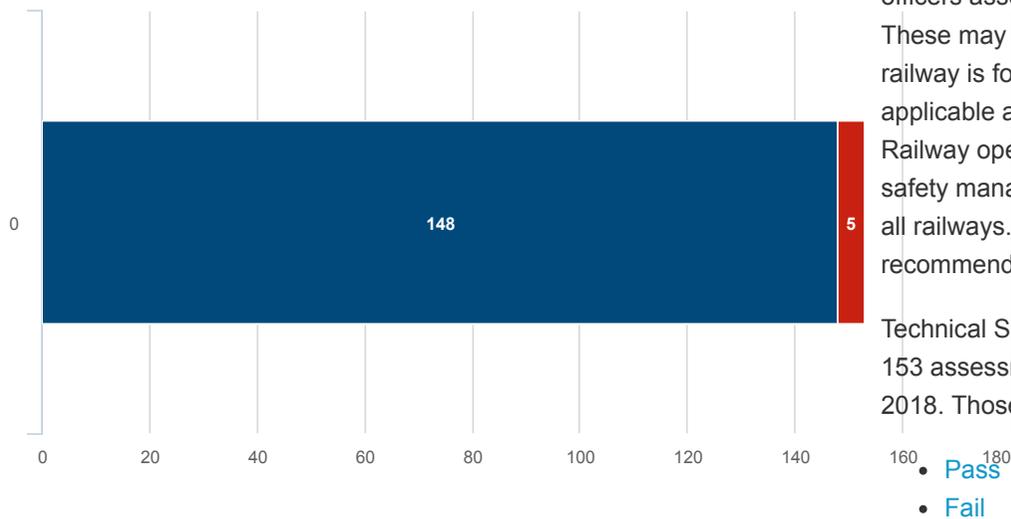
There were two fatal incidents in 2018 -- both attributed to suicide as opposed to technical failure.

Permits

Technical Safety BC does not issue operating or installation permits to Railways.

Assessments & Audits

Railway Assessment & Audit Results in 2018



As part of regular oversight, our Railway safety officers assess and audit all operating railways. These may result in non-compliances where the railway is found to not be in compliance with the applicable acts, regulations, rules and guidelines. Railway operations are also audited against their safety management systems, which are required for all railways. The Railway Safety Program issues recommendations as a result of these audits.

Technical Safety BC safety officers completed 153 assessments and audits of Rail equipment in 2018. Those assessments are rated as follows:

Note: Unlike some other technologies we regulate, Railways does not have a Conditional Pass category.

Related Stories

TransLink upgrades

Our work at the Commercial-Broadway Skytrain station

Common non-compliances

Operation Lifesaver

Our work to raise awareness about the risks of unsafe railway

upgrades.

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The top 8 non-compliances our safety officers see when auditing railways.

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crossing/trespassing.

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Community

Keeping our Communities Safe

We work in communities across BC to promote safety in a variety of ways, from participating in tradeshow to volunteering our time on local initiatives we feel contribute value to the province as a whole. Participating in events where we live and work and partnering with like-minded organizations is another way we work to promote safety-minded decision making.

Carbon Monoxide Awareness

In 2018, we held a variety of events across BC to bring awareness to carbon monoxide safety and the importance of pulling permits and using licensed contractors. We ran print ads in small communities across the province, attended the Vancouver Home Show where we educated the public on potential sources of carbon monoxide in the home, and held a number of media interviews. We placed a particular focus for our outreach on the Northern region and Vancouver Island communities given the higher than average number of people living "off grid" and due to the shortage of tradespeople available in these regions.

[Read More >](#)

Using Data to Improve

Safety Outcomes

Working with Data for Good Vancouver, we analyzed drug overdose data to help understand which harm-reduction methods might be most effective. While researching drug overdose data may not seem to be a natural fit for an organization focused on technical equipment safety, the exercise boosted our emotional intelligence and helped our analysts put a human face on data sets.

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Lieutenant Governor's Safety Awards

We presented Lieutenant Governor Safety Awards to five recipients in 2018. These awards bring together representatives from business, industry associations, government and labour to recognize individuals and organizations who demonstrate exceptional leadership, achievement or innovation in technical safety.

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