State of Safety 2019

Our work in 2019 that enhanced safety in the province, plus analysis, trends, and learnings.

Understanding safety risks

We use data as an indicator to understand the risks that can impact British Columbia's technical safety system.

Read more

Managing safety risks

At the core of the safety system is the infrastructure we have created and the tools we use to manage and improve safety.

Read more

Key initiatives

The major activities we undertook in 2019 to make British Columbia safer, which included adapting our approach to regulating safety.

Read more

Data by technology

Key data, such as incidents, injuries, permits, and inspections, we use to understand and manage safety risks for each technology.

Read more

Previous State of Safety reports

2018 2017 2016 2015 2014

Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

Sign up for newsletter

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Report an incident ›

Contact us

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Office locations

Cookie policy

Privacy policy

Terms of use

Injuries

State of Safety 2019 | Understanding safety risks | Managing safety risks | Key initiatives | Data by technology

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.

Please 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 these are not reflected in our statistics.

Key statistics

3

fatal injuries

10

injuries were rated as *major*

16%

decrease in number of injuries reported to us compared to 2018

Injuries by technology

In 2019, there were three fatalities reported to Technical Safety BC—all of which were railway incidents. One was attributed to suicide, another was the result of passenger and train contact (non-suicide), and the third was due to a collision between a garbage truck and train.

Compared to 2018, the number of injuries reported has decreased; however, the number of *major* injuries has increased from three to ten. Further details below.

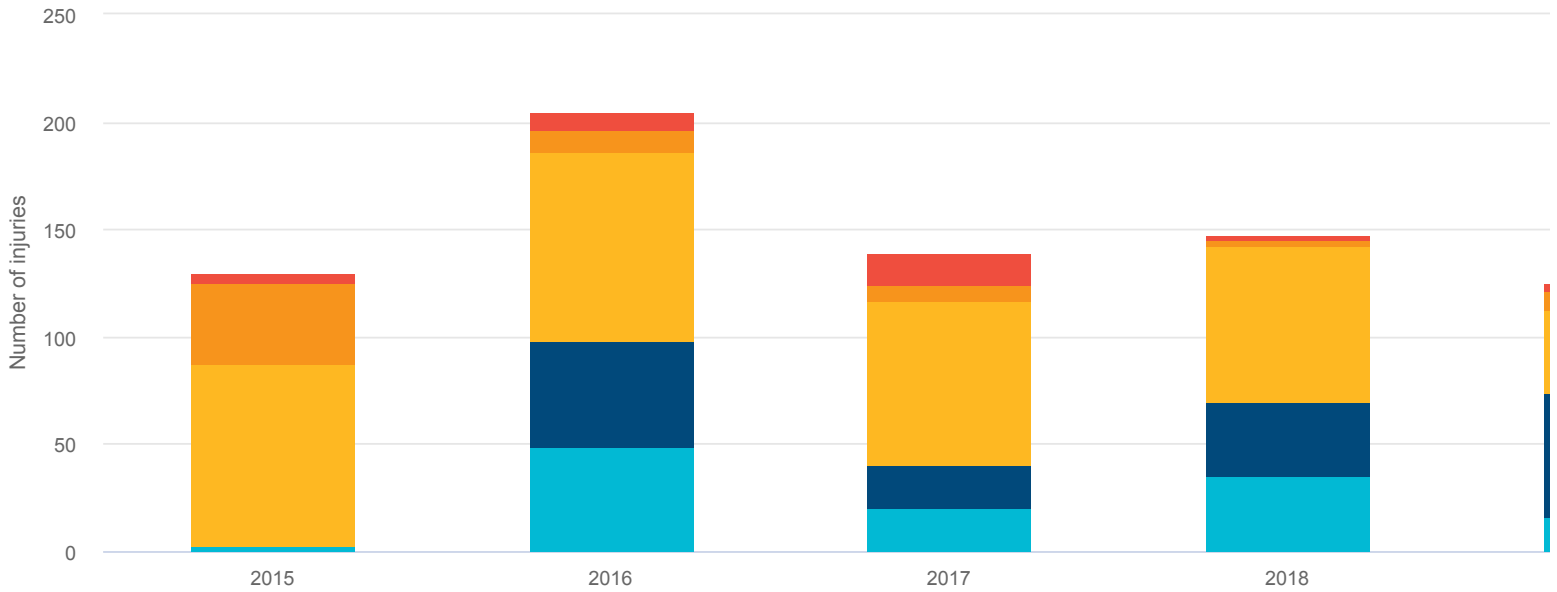
- 3 concussions or fractures
- 2 injuries from a railway incident
- 2 burns from a fire/arc flash incident
- 1 bleeding and bruising
- 2 not-specified injuries

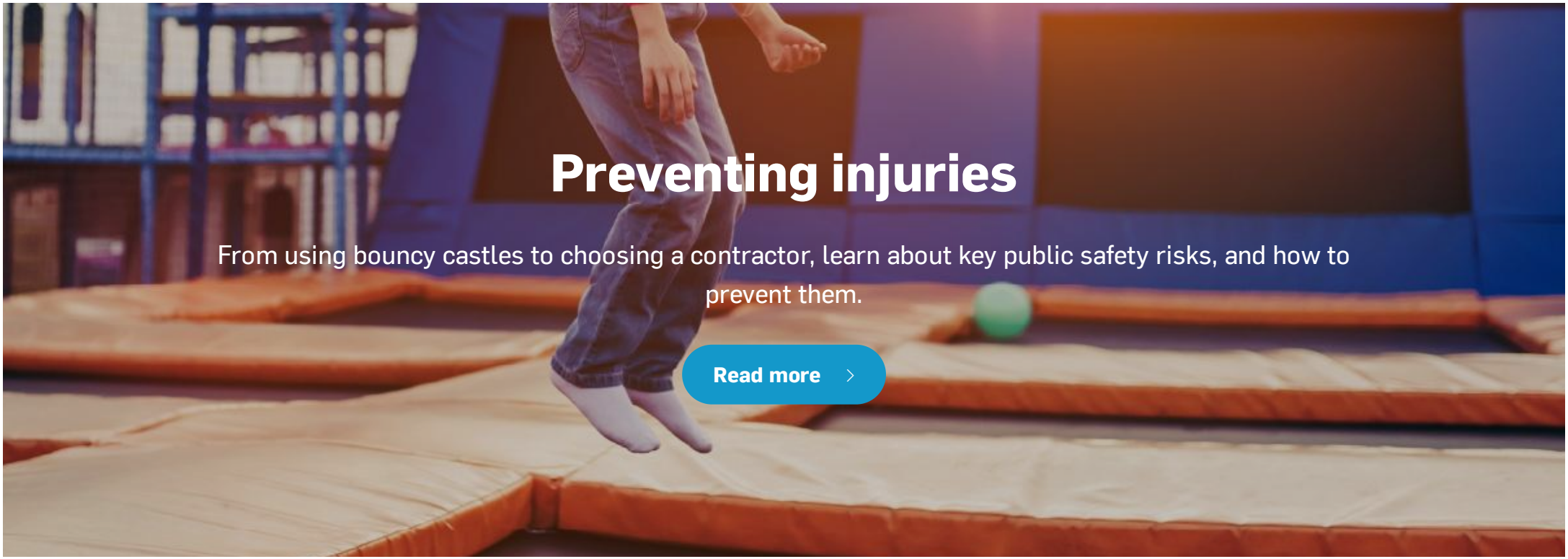
Please note that injuries associated with incidents still under assessment are excluded.

Categories are:

- Fatal
- Major
- Moderate
- Minor
- Insignificant

Injuries by technology in 2019


250
200
150
100
50
0
Number of injuries
2015
2016
2017
2018


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

Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

Sign up for newsletter

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Report an incident ›

Contact us

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Office locations

Cookie policy

Privacy policy

Terms of use

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TECHNICAL SAFETY BC

Products About Careers My Accounts

Incidents

State of Safety 2019 | Understanding safety risks | Managing safety risks | Key initiatives | Data by technology

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

600
incidents reported to us in 2019

7.5%
increase in number of incidents reported to us compared to 2018

67
incident investigations completed

Reported incidents in 2019

Technical Safety BC completes investigations on certain incidents reported to us in all technologies except for Rail. The Transportation Safety Board of Canada is the lead investigative body for all railway incidents in BC for the purpose of determining causes. We investigate incidents reported to us when:

- Regulated work or regulated equipment is involved.
- 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 2019, we received 600 notifications of incidents involving regulated equipment or work, compared to 558 in 2018. The nature and volume of incidents reported is similar to previous years with a moderate increase in 2019 involving fires related to failures in electrical and gas technologies.

Categories are:

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

Severe incidents in 2019

In 2019 there were four incidents rated as *severe*:

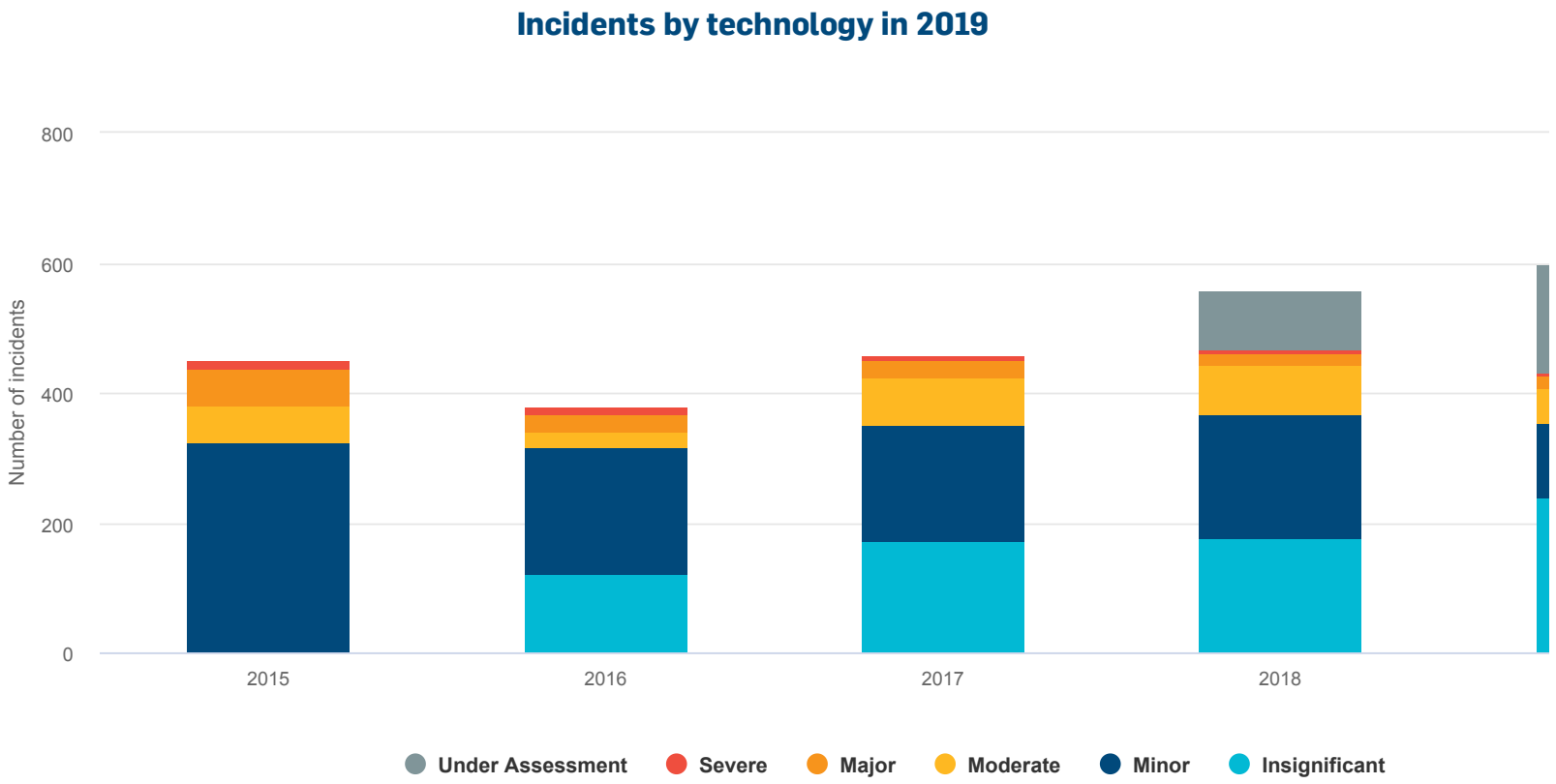
- 3 railway incidents
- 1 electrical failure in a cannabis cultivation facility

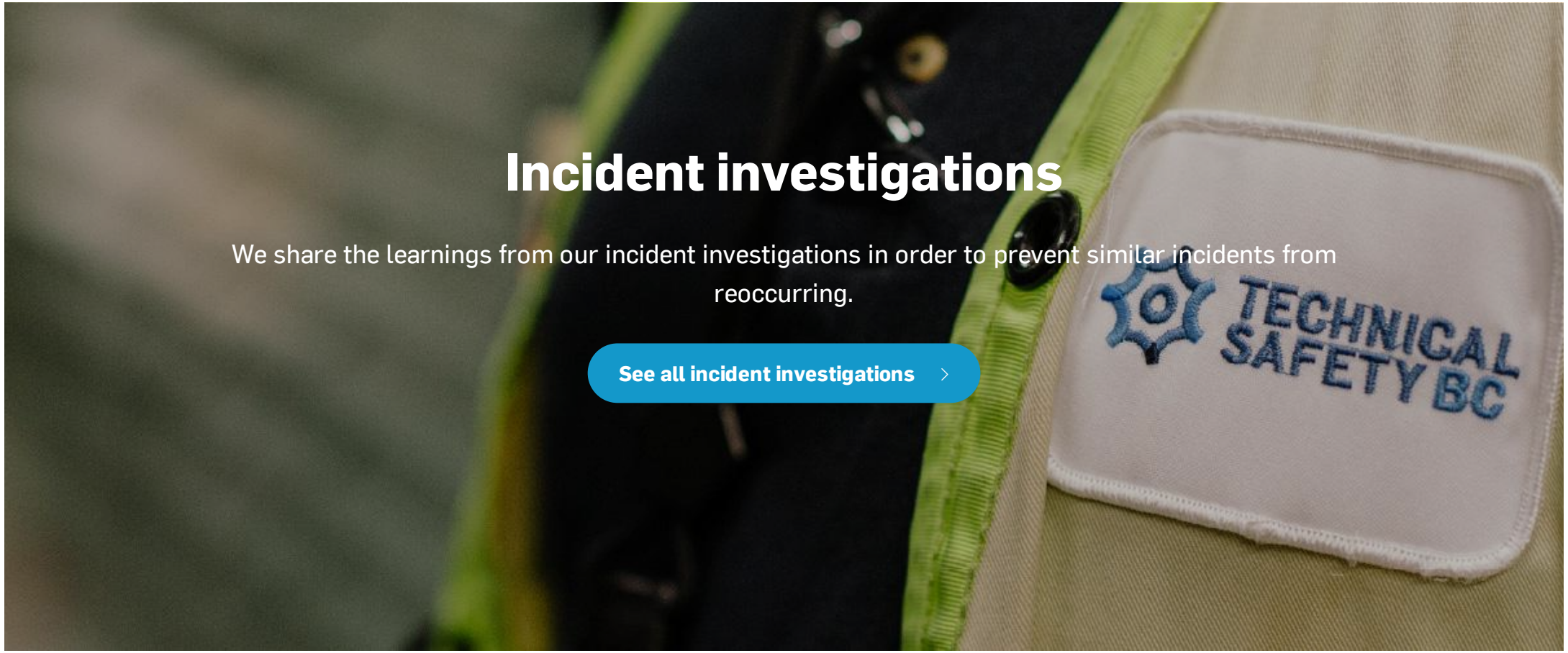
Major incidents in 2019

There were 19 incidents rated as *major*. These include a *major* gas explosion in two fireplaces of an apartment building, a boiler explosion in a recreational facility, and the Sea-to-Sky gondola cable failure. Further details below.

- 6 fire incidents
- 4 falls, collisions and unintended contact with transportation equipment

- 3 railway incidents
- 2 elevator did not operate as intended
- 1 gondola cable failure
- 1 arc flash
- 1 electrical equipment (meter) failure
- 1 water ingress in elevator





Incident investigations

We share the learnings from our incident investigations in order to prevent similar incidents from reoccurring.

See all incident investigations ›

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

Related stories

Richmond apartment explosion and fire

Our investigation into the root causes of an explosion that took place in a Richmond apartment building in July 2019.

Read more

Ammonia leak at Port Alberni Multiplex

In November 2019, we were made aware of an ammonia leak at the Alberni Valley Multiplex in Port Alberni.

Read more

Sea to Sky Gondola collapse

On August 10, 2019, the Sea to Sky Gondola in Squamish collapsed due to an intentional cut to the haul rope.

Read more

Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

Sign up for newsletter

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Report an incident ›

Contact us

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Office locations

COVID-19 client service update

Safety critical assessments and incident investigations are continuing. Read the latest **COVID-19 information**.

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TECHNICAL SAFETY BC

Products About Careers

My Accounts

Compliance and enforcement

State of Safety 2019 | Understanding safety risks | Managing safety risks | Key initiatives | Data by technology

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

$36K
highest monetary penalty in 2019

238
compliance orders issued

25
compliance audits conducted in 2019

Compliance and enforcement

In 2019, we conducted 555 compliance and enforcement actions, of which 238 were compliance orders and 25 were compliance audits. This reflects an increase in resources dedicated to data analytics and assessment tools,

allowing us to better find non-compliant work.

Activities detailed are:

- Compliance Audit
- Warning Notice
- Compliance Order
- Monetary Penalty
- Discipline Order
- Bond Called

Compliance audit

Our compliance audits speak to the fairness of the selection process and the impact that audits have on the safety system. The criteria is organized into three distinct categories for determining compliance audits:

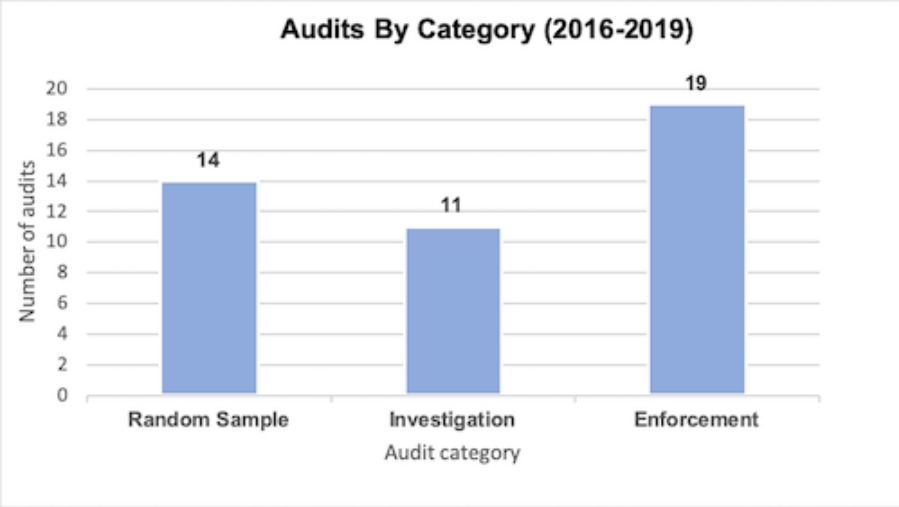
1. **Random:** An independent computer algorithm randomly selects a sample of contractor license data within all technologies, in all regions, on an annual basis.

2. **Investigation:** Analysis of the following indicators:

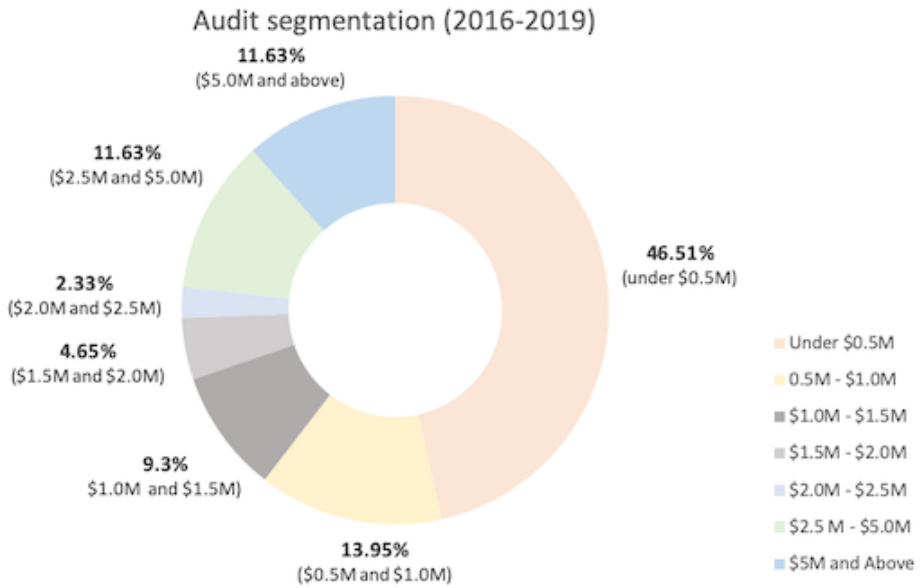
    - the average rate of obtaining permits in a given period of time compared to industry average and other companies of same size and scope;
    - the number of non-compliances associated with a licence;
    - the hazard level associated with any non-compliance(s);
    - the company's payroll compared with their permitting activities; and
    - other factors such as previous enforcement history and the effectiveness of previous enforcement.

3. **Compliance Monitoring:** When enforcement action does not achieve the desired behavioural effect, a deeper dive into the duty holders activities is warranted. Audits on repeat offenders will reveal the root cause

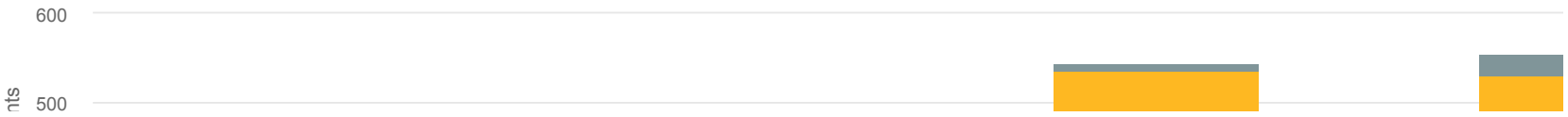
of why the non-compliant behaviour continues.



This chart demonstrates the distribution of audits based on contractor size (source data: WorkSafeBC, 2016-2019).



Compliance and enforcement by technology in 2019



Monetary penalties in 2019

Duty Holder	Technology	Category	Value
Westgate Resorts Ltd.	Boiler & Pressure Vessels and Electrical	Failure to comply with a compliance order	$36,000
LK Kitchen Cabinet d.b.a. LK Wood Works	Electrical	Failure to comply with a compliance order	$15,000
Daniel Pfefferkorn d.b.a. Pfeffie Contracting	Boiler & Pressure Vessels	Failure to comply with a compliance order	$6,000
Alouette Heating & Gas Ltd.	Gas	Failure to comply with a compliance order	$500
AllStar Mechanical Ltd.	Gas	Failure to comply with a compliance order	$12,500
West Bay Mechanical Ltd.	Gas	Failure to comply with a compliance order	$4,500
J & J Electric (1992) Ltd.	Electrical	Failure to comply with a compliance order	$12,500

Strata Plan LMS 1043 c/o FirstService Residential BC Ltd. d.b.a. FirstService Residential.	Electrical	Failure to comply with a compliance order	$12,000
A Z Plumbing & Gas (2017) Inc.	Gas	Failure to comply with a compliance order	$2,000
Langfield Heating Inc.	Gas	Failure to comply with a discipline order	$17,500
Ryan Watkins	Gas	Failure to comply with a discipline order	$17,500

Related stories

Compliance and enforcement activities

Our compliance and enforcement activities allow us to collect, analyze, and act on the data to achieve safety outcomes.

Read more

Our Voluntary Disclosure Program

Duty holders can now step forward, correct their non-compliance(s), and comply with the regulations without enforcement or penalties.

Read more

Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

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Office locations

Cookie policy

Privacy policy

Terms of use

Inspections

Overview

Technical Safety BC assesses 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

52,314
physical assessments (inspections) completed

72%
pass rate for the 52,314 pieces of equipment inspected

10,211
total as found hazards

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

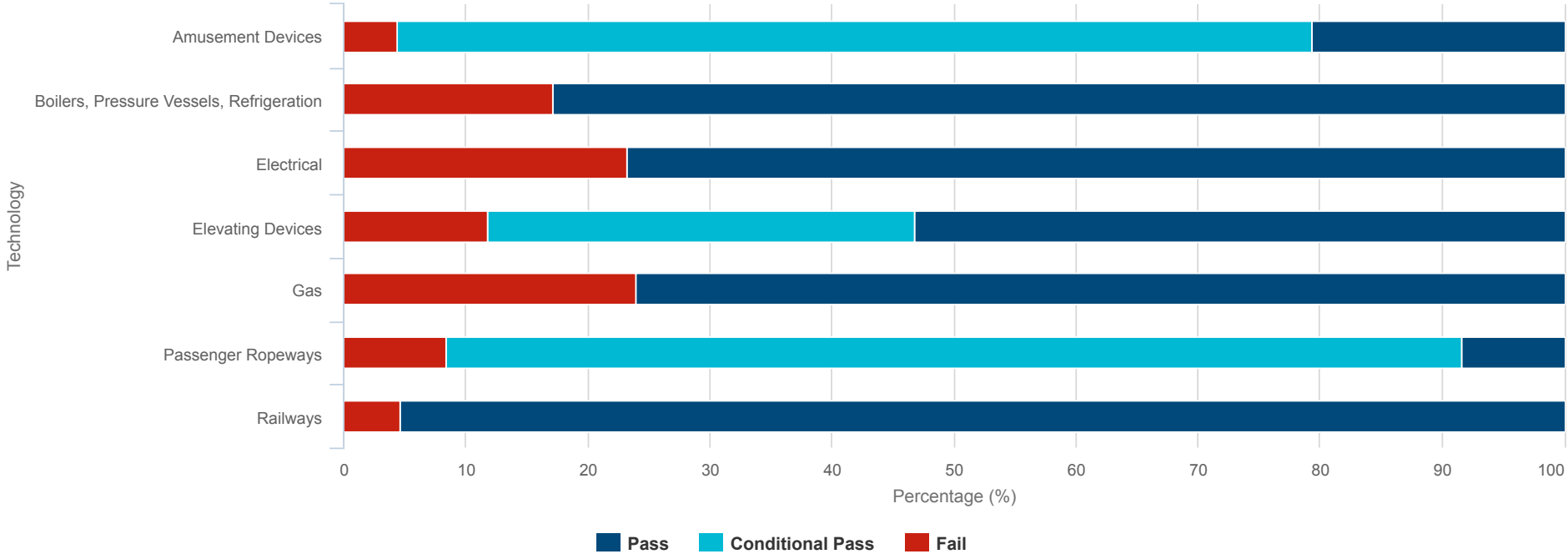
- Conditional Pass (where applicable)
- Fail

Over 10,000 hazards were found during safety officers' inspections in 2019. While 72% of the inspections confirmed duty holders to be compliant with their responsibilities, in other instances, 296 *severe* hazards were found, followed by 1,117 *major* hazards, and 4,217 *moderate* hazards. The rest of the hazards found were deemed *minor* or *insignificant*.

An example of a *severe* hazard is exposed bare live conductors that are accessible and pose an imminent shock hazard. An example of a minor hazard is cables, raceways, or conductors showing signs of wear and in need of replacement or repair.

Note: The BPVR, Electrical, and Rail technologies do not have a Conditional Pass rating. Alternative Safety Approaches audits and assessments are rated differently.

Compliance of duty holders' work by technology in 2019



As-found hazard assessments

Supported by data collection efforts and predictive algorithm technology, safety officers are able to prioritize sites and equipment with the highest safety risks and hazards.

In 2019, safety officers were able to significantly increase the number of physical assessments (inspections) conducted. The high yield was attributed to our Structure Resources Allocation project, which allows safety officers to focus on sites proven to have higher hazard levels.

The number of physical assessments (inspections) in 2019 decreased for ammonia plants in comparison with years past, as safety officers in 2017 and 2018 increased inspections in response to the Fernie ammonia release incident.

As-found hazard assessments by technology in 2019

Related stories

Physical inspections: How do safety officers decide and prioritize?

To increase their ability to find hazards, we use assessment tools that identity high risk areas.

Read more

Targeting high hazards through innovation

Sample plans, using machine learning coupled with our safety officer expertise, were created to identify high hazards.

Read more

Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

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Office locations

Cookie policy

Privacy policy

Terms of use

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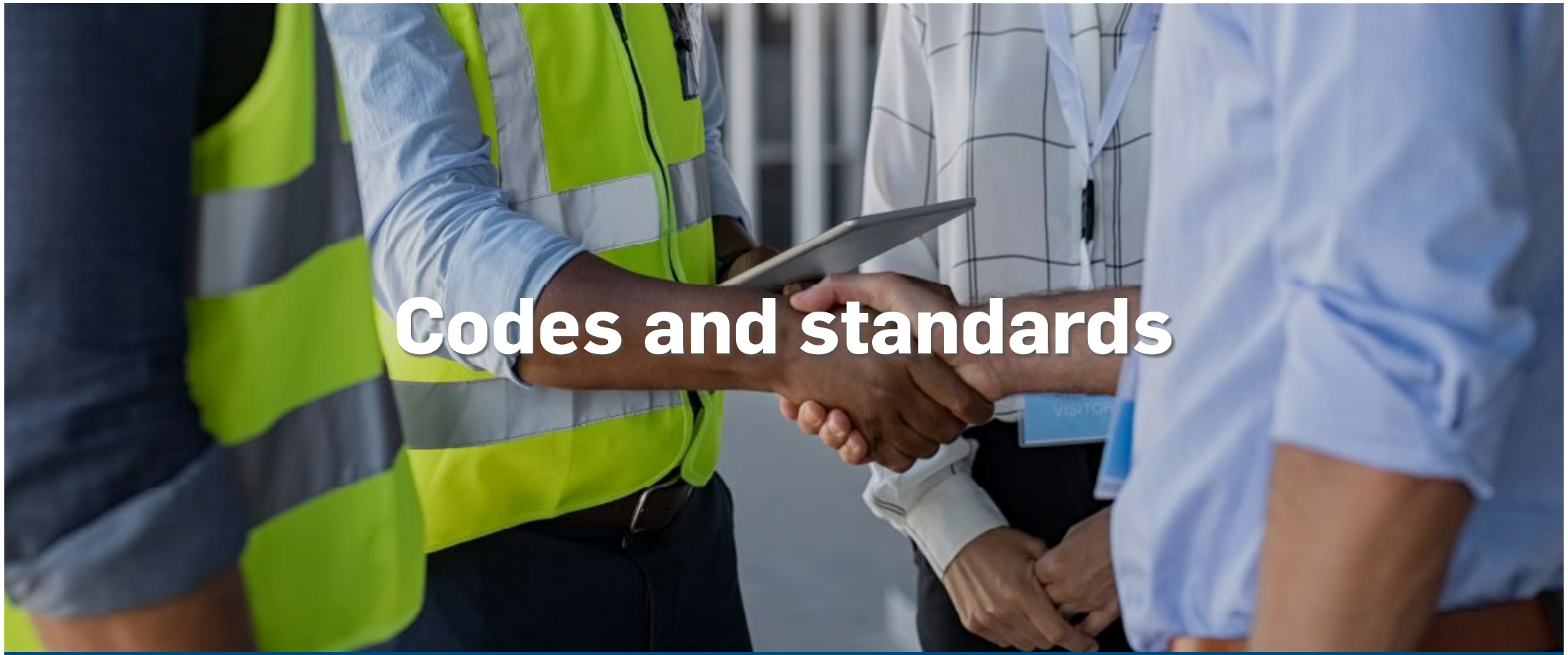
Products About Careers My Accounts



Codes and standards

State of Safety 2019 | Understanding safety risks | Managing safety risks | Key initiatives | Data by technology

Overview

As a regulator, we ensure BC's specific needs are considered during the development of technical codes and standards. The insights and knowledge gained from incidents help evolve and strengthen the safety system.

Key statistics

15

Regulatory instruments (safety orders, directives, information bulletins) issued in 2019

9

Issue-specific consultations in 2019

45

Associations/national codes and standards committees we participated in 2019

Codes and standards

The following list is of all industry associations and national codes and standards committees in which Technical Safety BC participated during 2019.

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
CACES Subcommittee on the Online Sale of Unapproved Products
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 30 Subcommittee, Installation of lighting equipment - TSC
CSA Part I, Section 34 Subcommittee, Signs and Outline Lighting - 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
UL Standards Technical Panel 8800, Horticultural Lighting Equipment
International Association of Electrical Inspectors (IAEI) –VP Canadian Chapter; President, BC Chapter

(IAEI) – VP, Canadian Chapter; President, BC Chapter
BC Electrical Association

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
Natural Gas Transportation Steering Committee
Fuels and Appliances, SSC

Boilers, pressure vessels, and

Association of Chief Inspectors Main Committee
CSA B51 Code Technical Committee
CSA B52 Code Technical Committee
National Board of Boiler and Pressure Vessel

refrigeration

National Board of Boiler and Pressure Vessel Inspectors

Standardization of Power Engineers Examination Committee (SOPEEC)
Association of Chief Inspectors Sub Committee
CSA B51 Code Technical Sub Committee
BCIT PAC Committee

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 Geoscientists of BC, Elevating Devices Sub Committee

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Amusement devices

ASTM F24 – Standards Development for Amusement Rides/Devices (F2783 Standard Practice for Canada Member)

Passenger ropeways

CSA Z98 Passenger Ropeways and Passenger Conveyors Committee

Railways

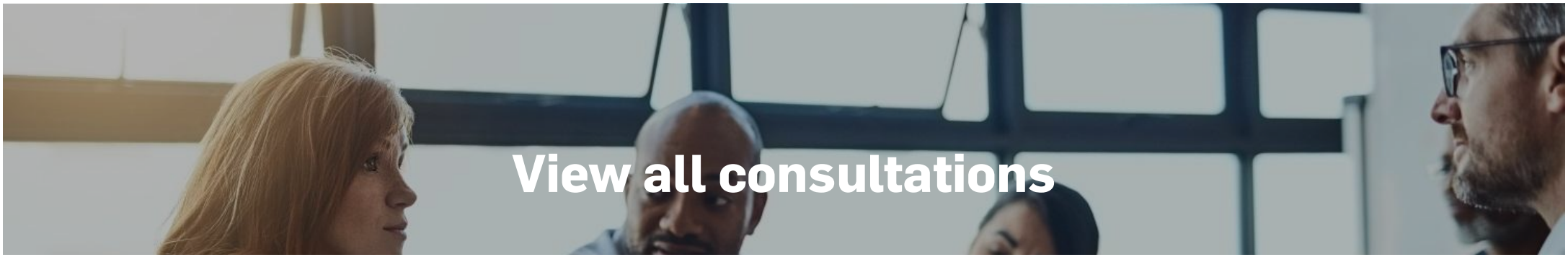
Advisory Council on Railway Safety (Canada - National Provincial Representative)
Federal / Provincial Working Group on Railway Safety (Canada)

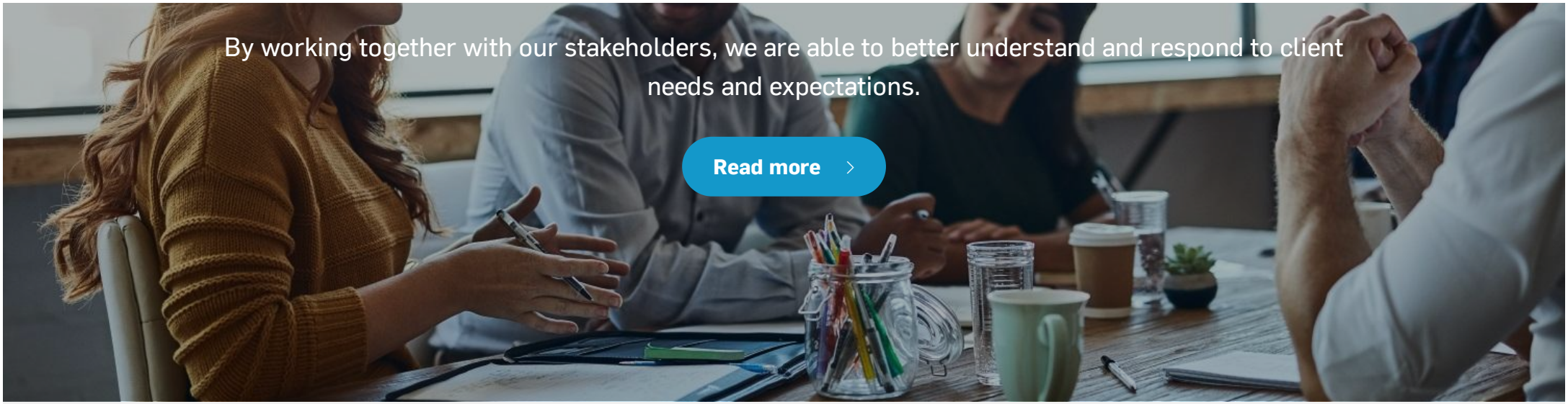
Alternative safety approaches

CSA Z276 Code Committee, Liquefied Natural Gas – Production, Storage and Handling

General

BC Common Ground Alliance, Board of Directors
Institute of Public Administration of Canada





Related stories

Amusement rides regulation

An adaptive approach to regulating safety around the changing technology in amusement rides and devices.

Pressure welder program

We consulted with industry on the details of the new pressure welder certification and licensing program and its associated fees.

Refrigeration maintenance guideline

In 2019 we consulted on maintenance guidelines that support equipment

Read more

Read more

integrity planning and safety management.

Read more

Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

Sign up for newsletter

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Report an incident ›

Contact us

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Office locations

Cookie policy

Privacy policy

Terms of use

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TECHNICAL SAFETY BC

Products About Careers My Accounts

Education and awareness

State of Safety 2019 | Understanding safety risks | Managing safety risks | Key initiatives | Data by technology

Overview

We use our educational courses and communications programming to help build awareness around common hazards, best safety practices, and industry regulations and standards to keep the public and our clients safe.

Key statistics

170

live educational events held in 2019

86%

satisfaction rating for our educational programming

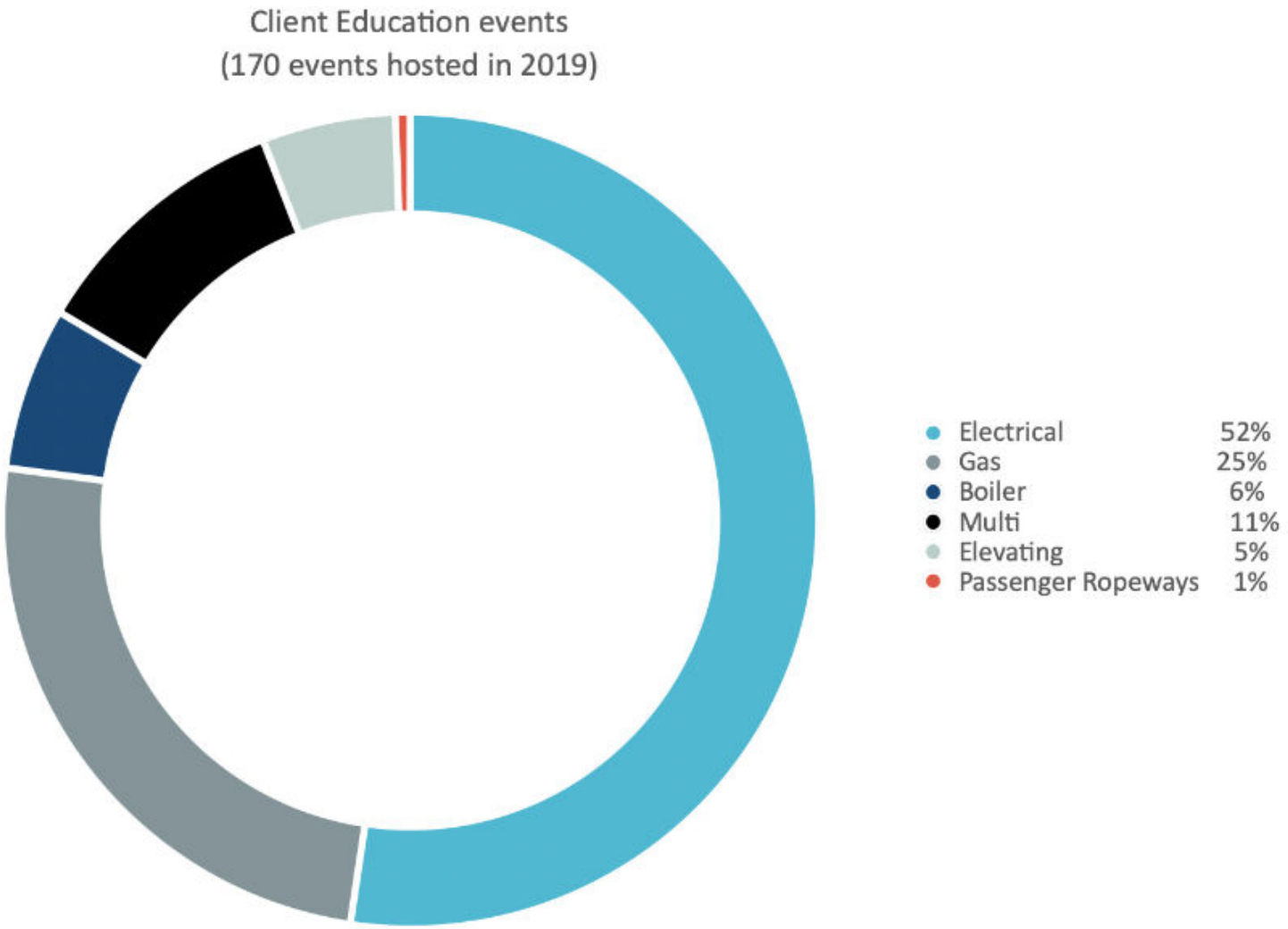
16%

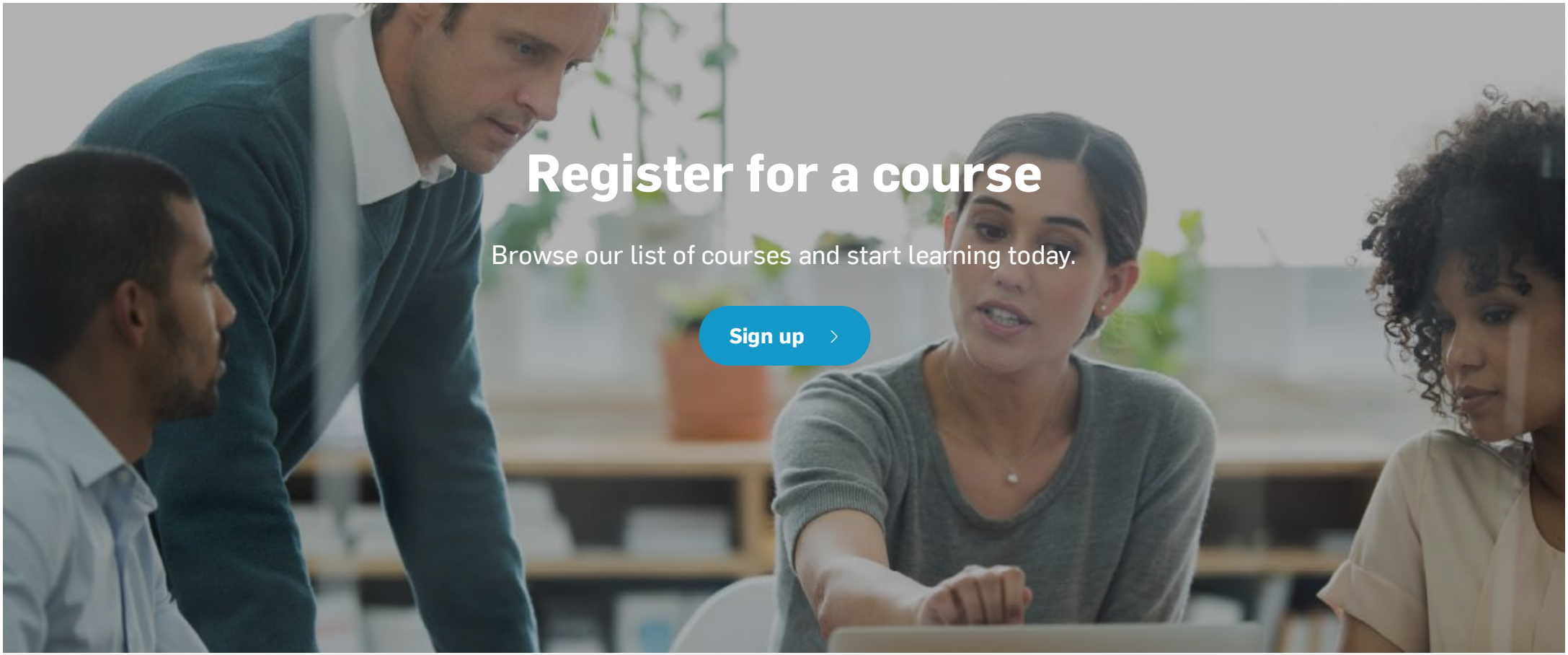
increase in our social media followers

In 2019, our Client Education team launched a new Learning Centre offering a more accessible and streamlined learning experience to our clients. 845 users registered to our new Learning Centre in 2019. We also delivered 170 learning events throughout British Columbia with a total attendance of 4,920.

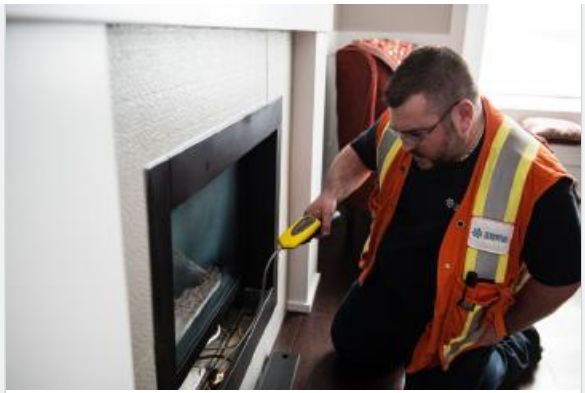
In response to identifying knowledge gaps in the Electrical technology, as well as the adoption of the 2018 Canadian Electrical Code change for January 2020, we produced 89 live Electrical educational events around the province in 2019, connecting more people to safety education training. These courses reflect the size and scope of our technologies, as shown below.

Our Marketing and Communications team worked hard to expand Technical Safety BC's reach by significantly increasing its social media presence, participating in two high profile Vancouver Home Shows as well partnering with the Office of the Fire Commissioner for carbon monoxide awareness week.





Related stories



Prevent carbon monoxide poisoning

We provide some important tips on what CO is, how to recognize the symptoms, and how to prevent it in your home.

Read more

Sign up for our Learning Centre

Further your safety education, register for courses or view your records of completion.

Read more

Changes in the 2018 Canadian Electrical Code

BC's Electrical Safety Regulation was amended to include the 2018 version of the Canadian Electrical Code.

Read more

Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

Sign up for newsletter

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Office locations

Cookie policy

Privacy policy

Terms of use

Licensing and certification

Overview

Technical Safety BC issues licences to contractors and contracting companies who install, operate, and maintain regulated equipment. We issue certificates of qualification to individuals working on regulated equipment. Together, they provide the public with assurances that certain standards of knowledge and proficiency are being maintained around regulated work.

Key statistics

979

licences issued to contractors and contracting companies

3,158

certificates of qualification issued to individuals who completed training

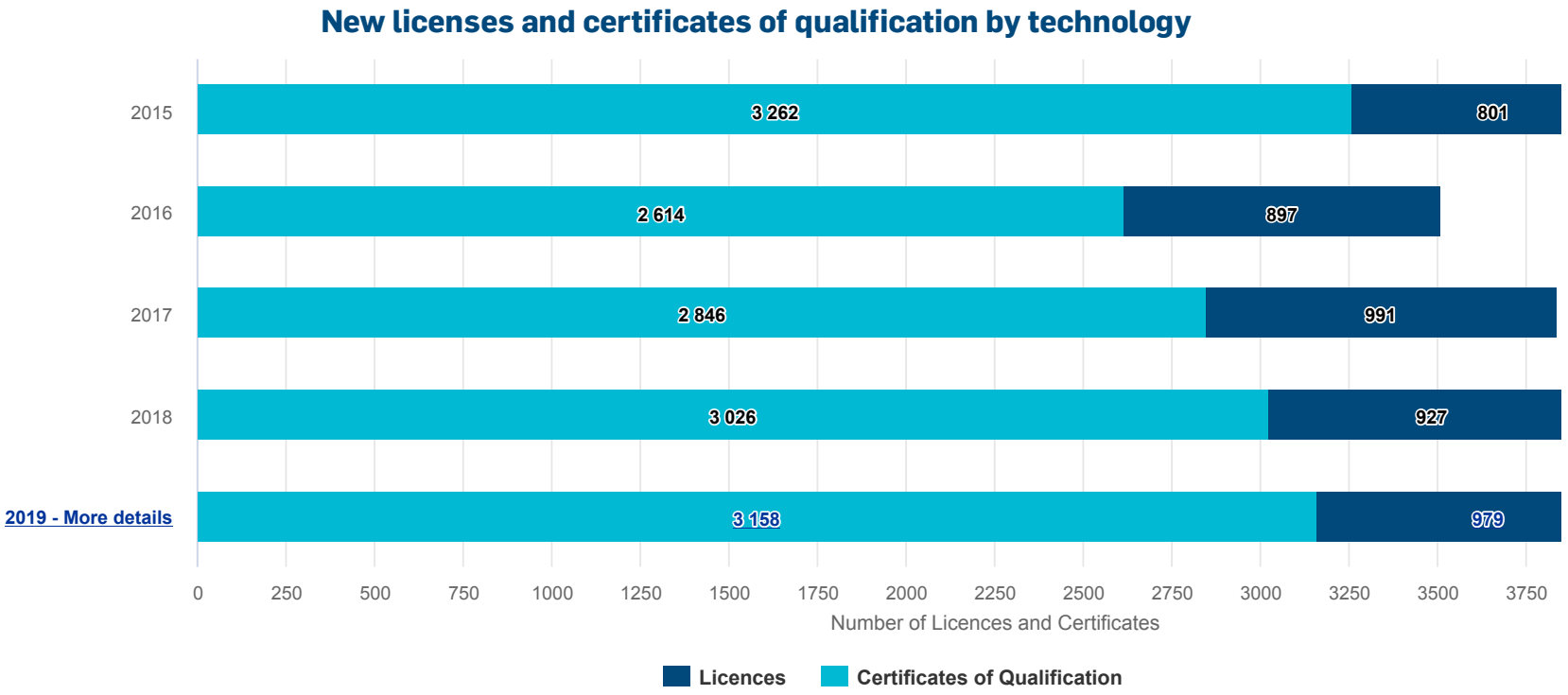
The number of licences issued in 2019 increased by 6% from 2018, with a significant jump in the number of amusement device licences issued of 60%. The increase in amusement device licences issued was due to:

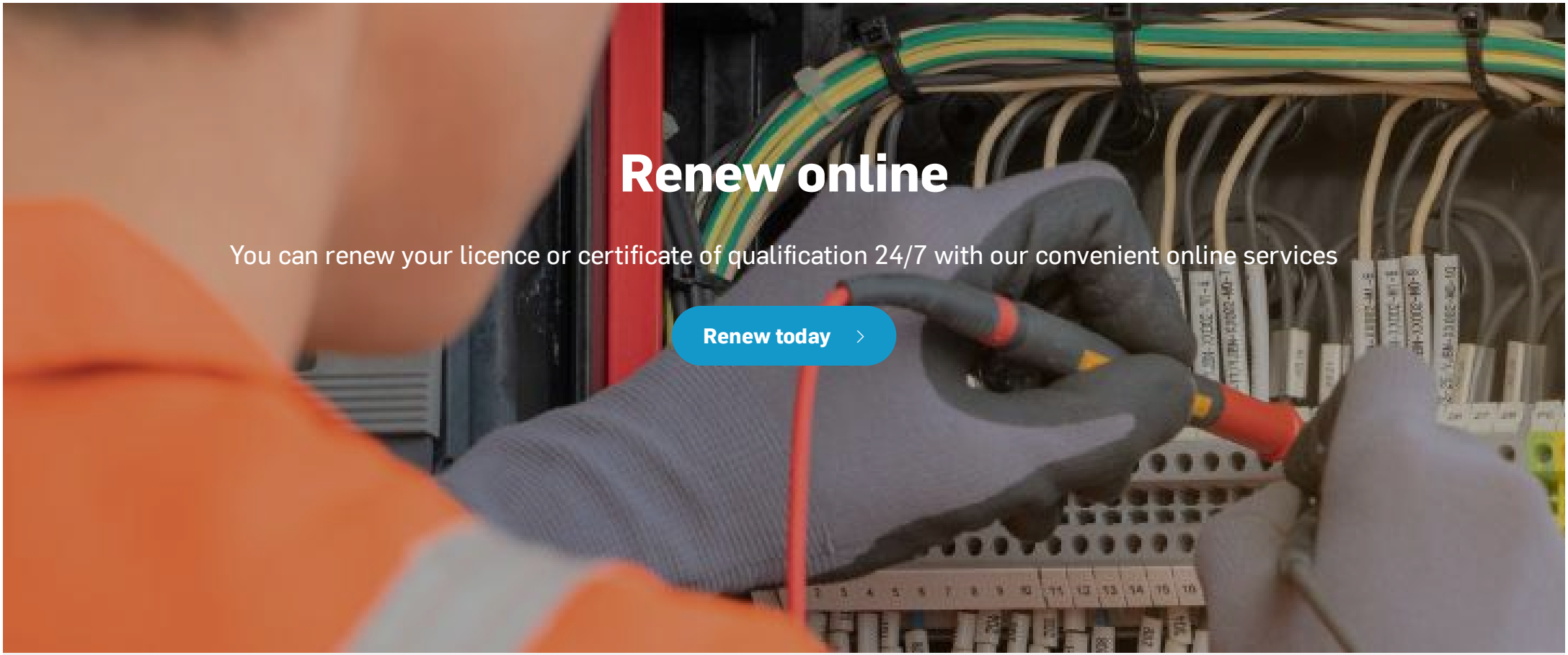
- increased outreach to owners of inflatable amusement devices regarding the need for a licence;
- additional inflatable amusement device operators joining the market;

- additional waterslides in hotels and aquatic centres; and
- changes in equipment ownership.

Certificate of qualifications increased in 2019 by 4% from 2018, with elevating devices seeing a 20% increase. This is due to an increase in labour market demand and the continued maturing of the elevating devices mechanic certification program, now in its fifth year.

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





Renew online

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

Renew today

Related stories

Streamlining the certification program

Minimizing redundant and conflicting processes to unify standards in our certification program.

Read more

A shift in safety regulation

An adaptive approach to regulating safety around the the changing technology in amusement rides and devices.

Read more

Education and awareness

We use our educational and outreach programming to build awareness around hazards and to improve safety-minded decision making.

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Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

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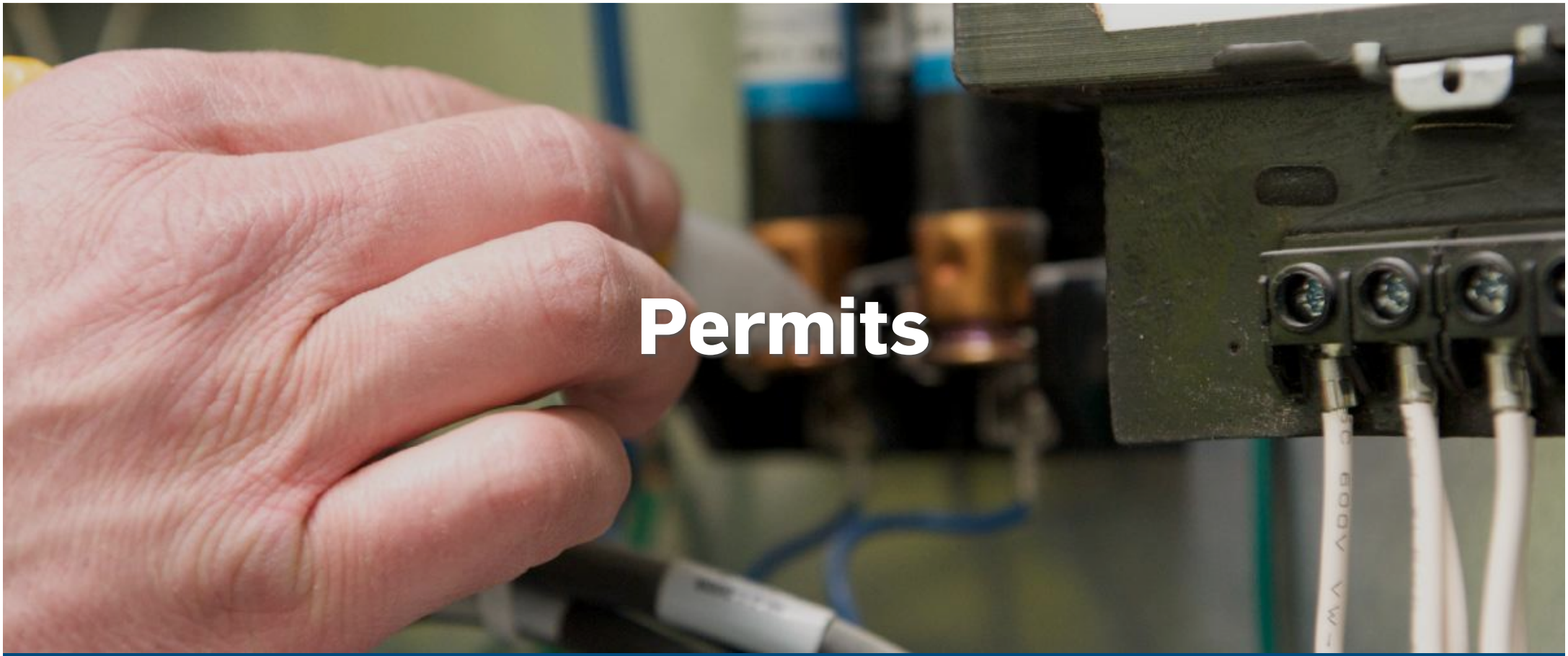


Permits

State of Safety 2019 | Understanding safety risks | Managing safety risks | Key initiatives | Data by technology

Overview

Technical Safety BC issues 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

9,400
new installation permits issued to clients in 2019

100,999
operating permits in 2019

15%
increase in commercial permits, particularly electrical and gas

Installation permits

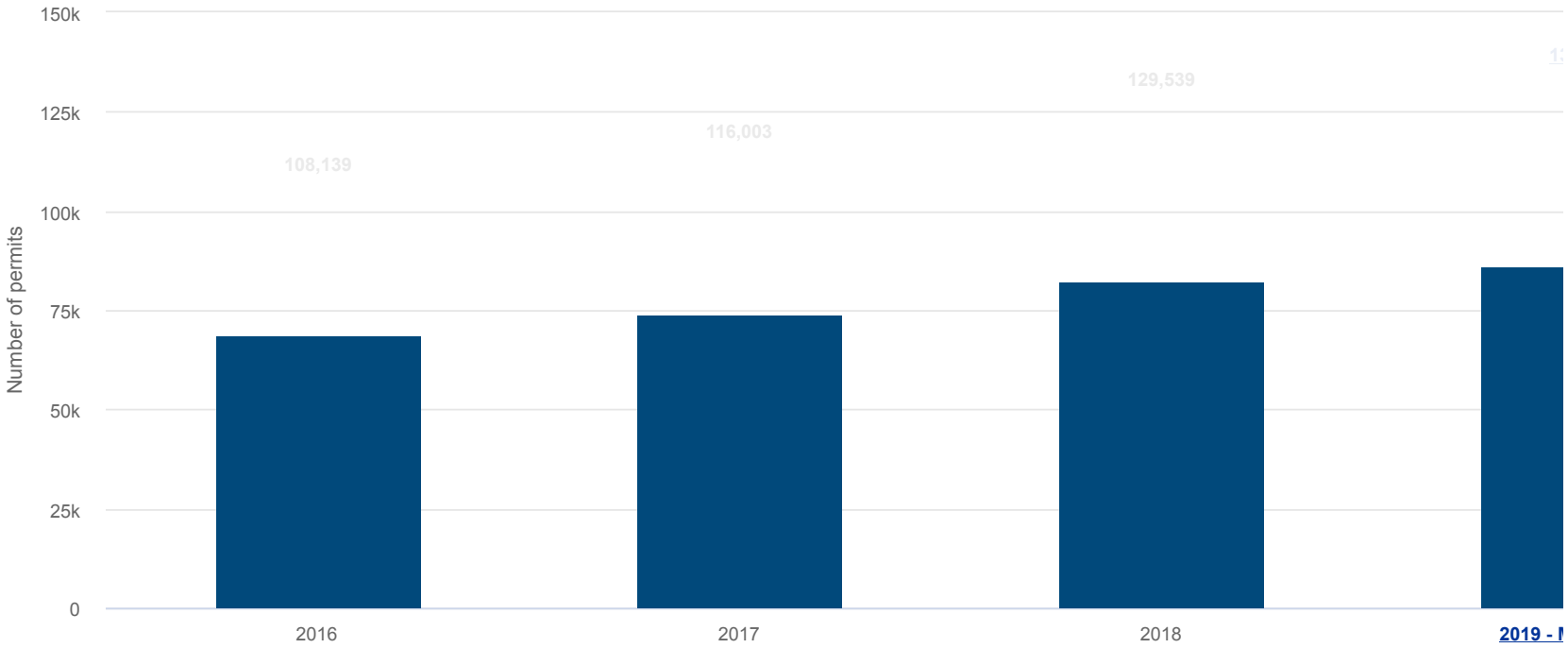
In 2019, 135,228 installation permits were issued. This is a 4% increase compared to 2018.

Electrical installation permits saw the greatest increase with 7,634 more permits pulled compared to 2018. Other technologies remained relatively steady with minimal growth.

The increase in electrical installation permits can be attributed to more multi-family dwelling units, such as town homes, row housing, and condominiums, being built due to their affordability. We also saw an increase in electrical commercial permits due to both new and established businesses setting up regional offices throughout BC.

Passenger Ropeways saw the biggest decline in permit volume, from 69 installation permits issued in 2018 to just 34 installation permits issued in 2019. The spike seen in 2018 was specifically for conveyor alterations in relation to a safety order that was issued.

Installation permits by technology in 2019

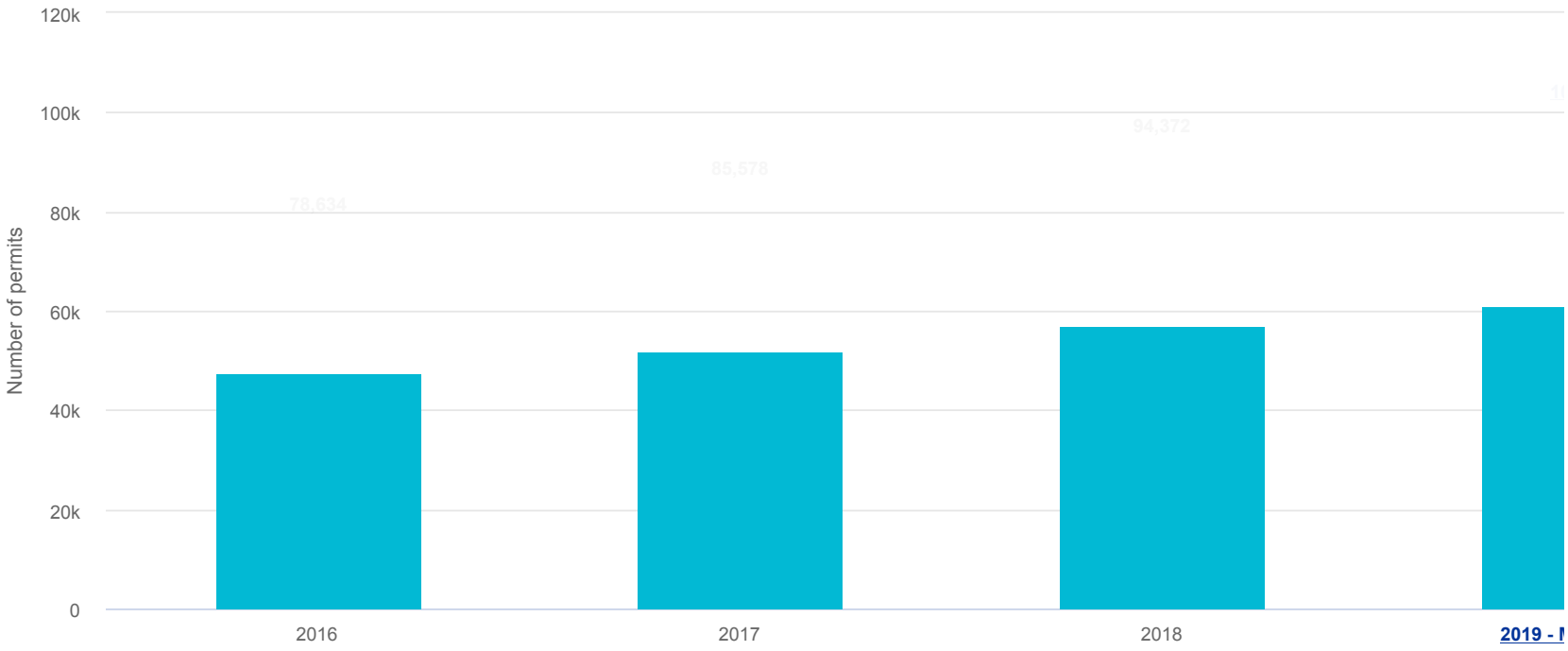


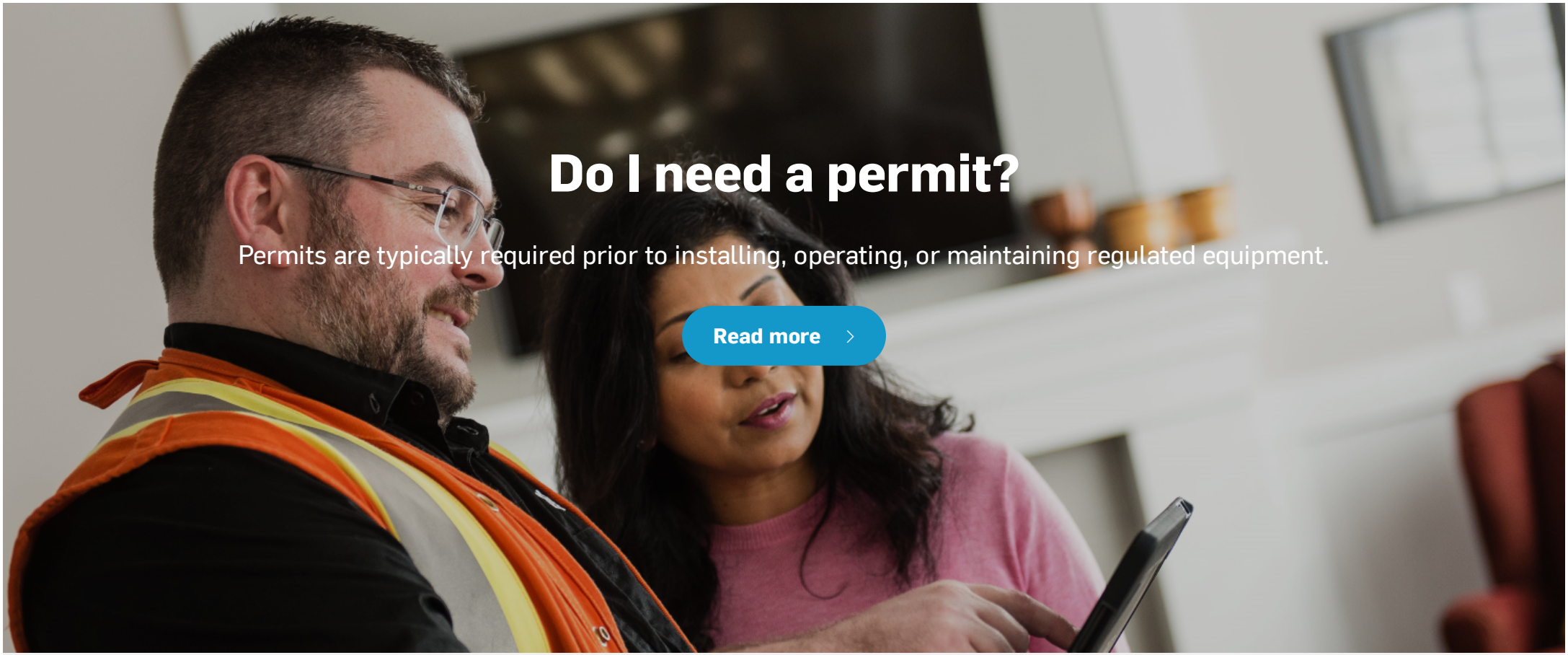
Operating permits

Overall, the number of operating permits increased by 7% compared to 2018. Most technologies remained relatively unchanged.

In late 2019, a pilot was launched to raise awareness around the benefits and legal requirements of electrical operating permits. This pilot pulled in 234 new electrical operating permits.

Operating permits by technology in 2019





Do I need a permit?

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

Read more

Related stories

Connecting to the safety system

Strategic targeting increased the annual electrical operating permits, bringing more clients into the safety system.

Read more

Our Voluntary Disclosure Program

Duty holders can now step forward, correct their non-compliance(s), and comply with the regulations without enforcement.

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Safety and behaviour change

Creating and implementing tools and processes to help guide participants to make better safety-minded decisions.

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Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

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A shift in safety regulation

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Amusement devices have been a part of Technical Safety BC's oversight for many years. In 2019, our team undertook a comprehensive review of amusement devices regulations in BC and identified areas that could be improved, including clarifying the definitions of amusement rides and devices.

With the balance of amusement, thrill, and safety in mind, Technical Safety BC proposed an updated regulatory approach that featured the adoption of a new safety code (ASTM International F2783-17) for the design, maintenance, and operation of amusement rides and devices.

Technical Safety BC has proposed changes to how we oversee safety for waterslides, ziplines, and roller coasters. Additionally, we've proposed introducing safety regulation around new and emerging amusement devices, like trampoline parks.

Industry and public consultation on the proposed changes to amusement ride regulations was carried out from July 17, 2019 to September 30, 2019. Technical Safety BC engaged with over 800 stakeholders, including facility owners and operators, industry associations, interest groups, municipalities, and members of the public.

A survey of 570 members of the public showed that:

- 81% agree or strongly agree that further regulations are needed around the amusement ride industry in BC.
- 50% would be willing to pay 5% or 10% more on the price of admission to bring in changes.

Taking the feedback received from both industry and the public into account, Technical Safety BC then submitted recommendations for potential regulation improvements to the provincial government who will ultimately decide whether regulatory changes will be introduced.

"*As technologies change and new devices come onto the market, safety regulation needs to thoughtfully adapt to reduce hazards and make the public safer*," said Catherine Roome, President and CEO at Technical Safety BC.

A shift in the regulatory approach to amusement rides will ensure that regulations keep up with innovation in the industry, and put new practices, like operational safety management plans, into effect in BC.

Related stories

Lifecycle oversight

Oversight of the safety system depends on partnership with our clients and stakeholders to reduce reporting barriers.

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Amusement devices consultation

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Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

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Cookie policy

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Equipment lifecycle

Safety through the entire lifecycle

Our 2019 Lifecycle Oversight project focused on re-designing a number of tools, methods, and programs to support the installation, operation, maintenance, and disposal stages of the equipment lifecycle.

The project's objectives were to:

- **Engage** partners and participants in the safety system and identify opportunities to improve lifecycle management of technical systems.
- **Identify, develop, and share** safety insights to support the implementation of effective maintenance programs that incorporate procedures and training for mitigation of hazards and end of service life strategy.
- **Enhance** the safety oversight model for operating systems, including tools, methods, and programs, as well as supporting infrastructure by which we hold duty holders accountable.

To support these objectives, we worked on bettering our resources for those in the elevating and ammonia refrigeration industries.

For the elevating technology, we designed new online tools for maintaining and submitting elevating maintenance control programs. A new online maintenance control program registration and verification process was built into the installation permit inspection process.

These new tools were implemented on April 30, 2020 with the release of the amended Elevating Devices Safety Regulation and adoption of the new CSA B44-16 code. The new features are allowing clients to connect their units with their maintenance control programs more easily, providing a more effective maintenance control program auditing process for our elevating safety officers.

For the ammonia refrigeration technology, we continued to help clients overcome some of the barriers to safety identified in our Fernie incident investigation report.

We raised awareness, provided education, and shared resources about risks associated with aging ammonia refrigeration systems to reduce the potential of ammonia release. Our CEO contacted over 220 Chief Administrative Officers from communities across BC with ammonia release information, and we presented at industry conferences and delivered education to asset owners about supervision requirements and responsibilities. We also consulted with industry stakeholders on our draft Refrigeration Maintenance Guideline.

The 2019 Lifecycle Oversight project helped support the elevating industry and influenced refrigeration facilities to demonstrate safety leadership by assessing and replacing aging equipment in public arenas and rinks, enhancing safety for two critical stages in the technical equipment lifecycle.

Related stories

Lifecycle oversight

Ammonia leak at Port Alberni

New B44-16 elevating safety code

Oversight of the safety system depends on partnership with our clients and stakeholders to reduce reporting barriers.

Read more

On November 5, 2019, Technical Safety BC was made aware of an ammonia leak at the Alberni Valley Multiplex in Port Alberni.

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BC's Elevating Devices Safety Regulation has been amended to include the adoption of the new code for elevators and escalators.

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ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

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Streamlining the certification program

In 2019, Technical Safety BC made enhancements in the electrical field safety representatives and pressure welder certificate of qualification programs. These enhancements created better harmonization across technologies, which improves safety outcomes and the value of our certification program.

The year marked the first certification renewal for electrical field safety representatives (FSRs). The purpose of the renewal is to remove inactive FSRs in our systems, maintain client contact information, and help decrease the chance of fraudulent use of certification.

Renewing certification online was also a new experience for FSRs. The online component of the renewal was introduced to provide FSRs with a straightforward way of submitting their declarations and managing the permits they were named on.

By the end of July 2019, the FSR certification renewal deadline, over 9,345 FSRs had successfully renewed their certification.

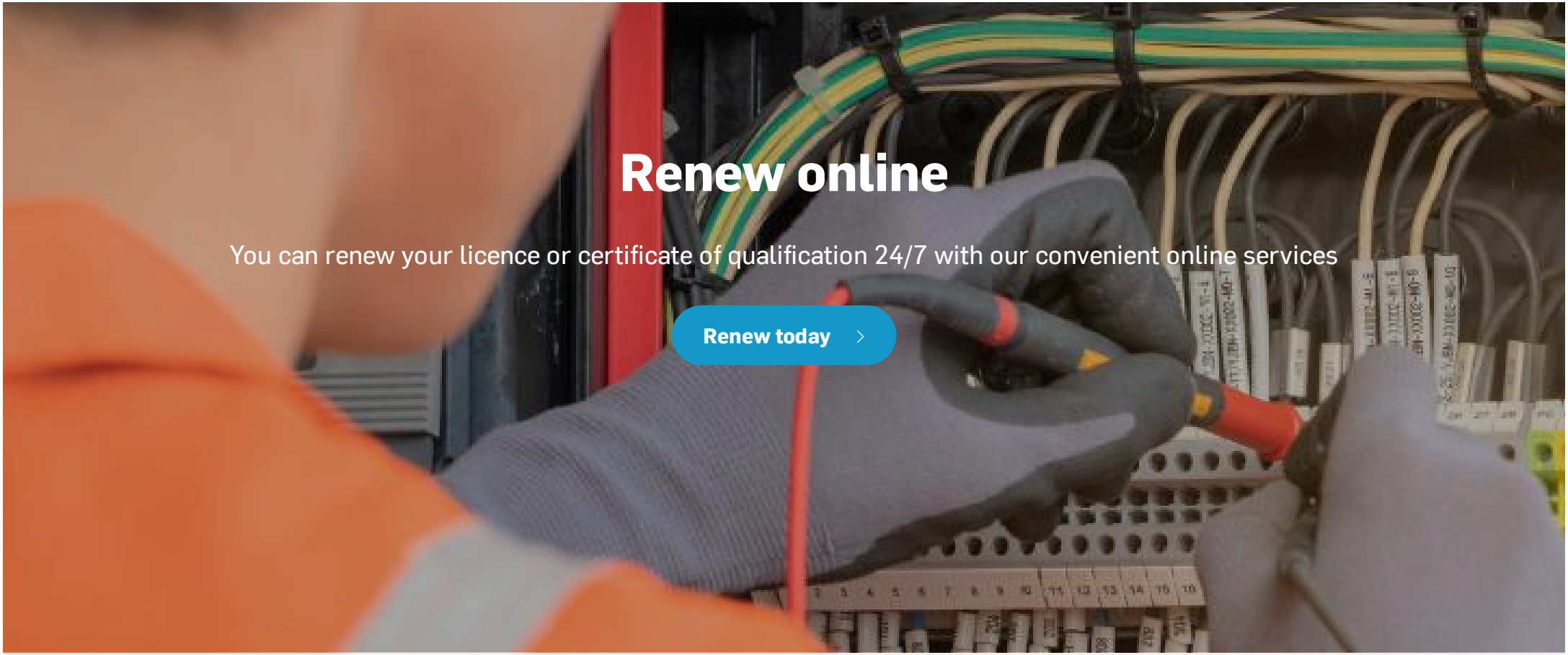
Going forward, all electrical FSR certificates must be renewed every three years with proof of continuing education. This requirement was made to ensure FSRs maintain a current knowledge of code and regulatory changes.

Following the success of the FSR renewals, pressure welder certification improvements commenced in late 2019. The changes to the pressure welder program included:

- updating pressure testing records in logbooks;
- standardizing pressure welder credentials;
- requiring practical experience for apprentices; and
- embedding a process to ensure pressure welders upkeep their skills and competencies.

Working with industry, we designed this nationally recognized pressure welders certificate of qualification program that assesses a welder's skills and abilities. This certificate of qualification program, which also replaced the BCP-100, ensures all pressure welders in BC have the capabilities that are required by the relevant codes and standards. The certification enables pressure welders to work in various provinces across Canada and ensures only qualified tradespersons are working in their field.

In the next several years, work is being done to streamline and enhance certification programs across technologies.



Related stories

Product and service delivery excellence

We use innovation to increase the effectiveness of our safety hazard assessments and to increase participation in the safety ecosystem.

Read more

FSR renewals: What you need to know, now

With many Field Safety Representatives (FSRs) in BC required to renew their certification we're answering your FAQs.

Read more

New pressure welder program here

Working with industry, we have designed a nationally recognized pressure welder certificate of qualification program that assesses a welder's skills and abilities.

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Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

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Safety and behaviour change

State of Safety 2019 | Understanding safety risks | Managing safety risks | Key initiatives | Data by technology

In 2019, Technical Safety BC increased its focus and resources on measuring and motivating behaviour change to address safety hazards.

Our objectives were to:

- **Expand** and maintain partnerships with other jurisdictions to create an 'information ecosystem'
- **Build** capacity for data analysis, resulting in new insights to drive better behaviour
- **Influence** participant decisions through behaviour change
- **Monitor** and measure changes in client and stakeholder behaviour

We worked with local governments and utilities to create a more comprehensive picture of technical safety across jurisdictions in BC. For example, we began collecting and analyzing permit data from ten local governments, and collaborated with the City of Vancouver and the City of Surrey to identify sites requiring electrical operating permits.

We also continued creating and implementing innovative tools and processes to help guide participants to safer behaviour.

For example, we improved and shared an online tool for clients to view their urgent technical non-compliances, such as code violations, more easily.

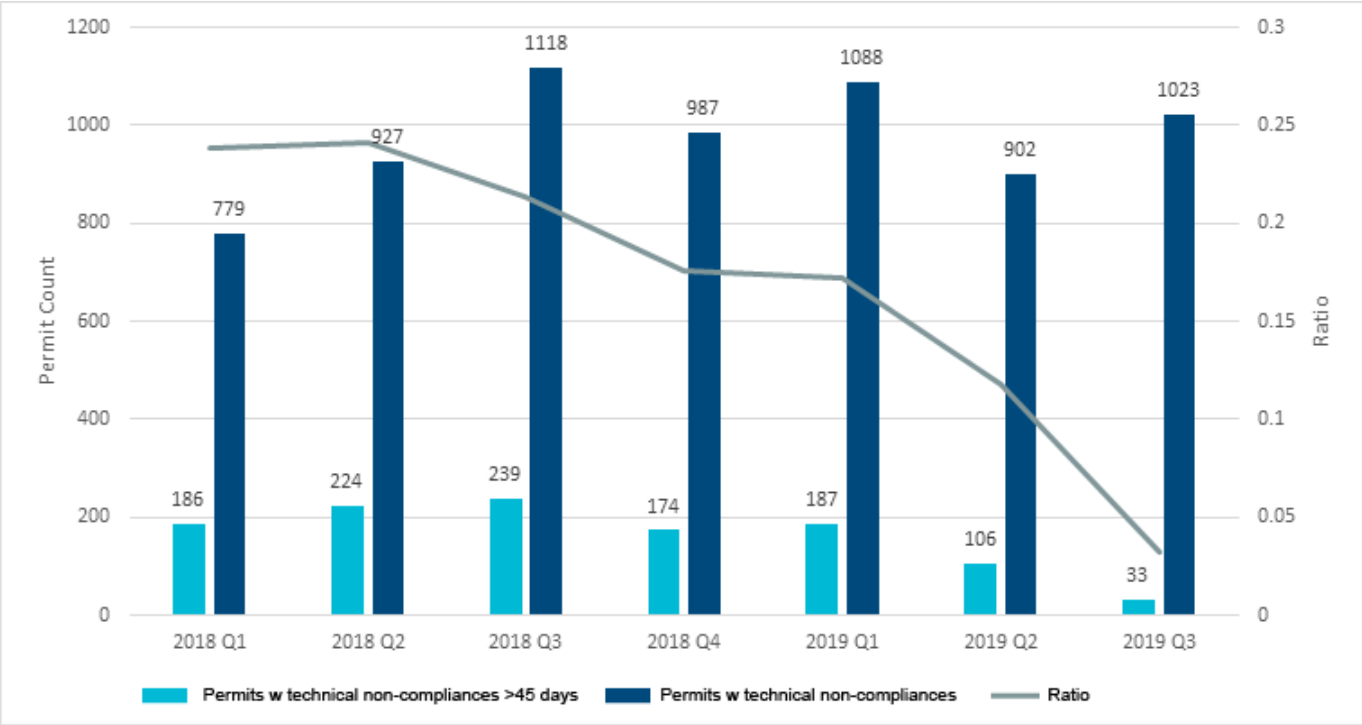
With an understanding as to why clients were not addressing their technical non-compliances by the due date, we implemented the following new tools and improved processes to support behaviour change. These were first shared with electrical contractors for installation permits, then rolled out to all other technologies for installation permits:

- Automated e-alerts reminding clients when their technical non-compliances were due;

- Summary listing of past due code violations in client's online account;
- Online function to submit correction declarations for individual code violations;
- Targeted and standardized client care follow-up; and
- Streamlined internal processes and procedures.

These new tools and improved processes resulted in technical non-compliances being addressed and closed more efficiently. As seen in Figure 1 below, the number of electrical installation permits that had technical non-compliances greater than 45 days decreased, as did the ratio of these permits to all electrical installation permits.

Figure 1 - Electrical installation permits with technical non-compliances



As behaviour change often requires long-term commitment, we're encouraged by our 2019 results and will continue our efforts to help decrease safety hazards through behaviour change. Behaviour change starts with insights gained through partnerships and data sharing. Once issues are identified, information awareness supported by new tools can encourage target groups to overcome behavioural barriers.

To view your urgent technical non-compliances, and to benefit from many of our other online services, simply login to your online account, or register for an account if you do not have one.

Related stories

Behaviour change through insight

Oversight of the safety system depends on partnership with our clients and stakeholders to reduce reporting barriers.

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Compliance and enforcement

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ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

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My Accounts

Connecting to the safety system

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Key statistics

1,000

new electrical operating permits in 2019, which is a 5% increase compared to 2018

702

clients were contacted and notified about requiring an electrical operating permit

234

electrical operating permits were pulled as a direct result of our three-month pilot

In 2019, Technical Safety BC set out to better understand internal data relationships and leverage external resources to generate behaviour change. Based on an enhanced analytical capability, we have been able to identify and correct non-compliance patterns, which informs how we can design behaviour interventions to support safety initiatives.

From this analysis, Technical Safety BC found that electrical installation permits were not necessarily being converted to electrical operating permits, even though in many cases they were required. Coupled with this was a lack of awareness and understanding within the industry on the type of work electrical operating permits cover, how they connect to installation permits, and who should hold them.

By regulation, owners of most industrial, commercial, residential, and institutional facilities must have an operating permit to operate and maintain regulated electrical equipment and systems under the *Safety Standards Act*.

This problem presented an opportunity for Technical Safety BC to pilot a project to change the behaviour of building managers and asset owners. Therefore, we launched a three-month pilot that used internal permit data

and external data to identify a group of non-compliant clients and businesses who were legally required to have an electrical operating permit.

A two-tiered campaign was developed. The first objective was to obtain the outstanding operating permits and the second objective was to educate contractors, asset owners, and building managers about their legal requirements.

At the end of three months, our outreach team had contacted and followed up with over 702 clients. Technical Safety BC also presented at stakeholder events, ran a targeted ad campaign, and created educational resources around operating permits. The campaign yielded 234 additional electrical operating permits that otherwise would have gone unnoticed and unattached to the safety system. The year ended with 1,000 new electrical operating permits issued, a 5.2% increase compared to 2018.

Additionally, with the success of the pilot project, Technical Safety BC will continue to drive towards an increase of operating permits in 2020. We remain focused on prioritizing education and collaboration to address non-compliance issues.

Related stories

Behaviour change through insight

Build partnerships and share what we have learned, so we can help participants make informed safety decisions.

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Save time and money with electrical operating permits

Building owners and strata managers, could save time and money by obtaining an Electrical Operating permit from Technical Safety BC.

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ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

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Forms

Fees

Safety in BC

Safety stories

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

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Targeting high hazards through innovation

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One of our priority goals for 2019 was to "*use innovation to increase the effectiveness of our safety hazard assessments*." Our Structured Resource Allocation project used machine learning and sample plans to more effectively target our assessment resources on high hazards.

Machine learning

Machine learning allows systems to automatically learn and improve from experience, such as prioritizing assessments to identify high hazards. Sample plans build on these efforts by helping to measure the current status of high hazards across a specific population.

In 2018 we developed a pilot project that used machine learning to help prioritize gas and electrical installation permits. Once fully implemented, the results showed an improved ability to predict high hazard electrical and gas installation work. Due to its success, we implemented this model to gas and electrical operating permit assessments.

Sample plans

There were eight sample plans conducted in 2019 that contributed to:

- supporting our Compliance and Enforcement program;
- validating the machine learning model; and
- investigating various hypotheses related to specific industry areas.

Conducting these sample plans provided insight into how we improve the way we measure certain safety hazards and the impact of machine learning in the gas and electrical technologies.

Those who own, manage, install, maintain and operate regulated technical equipment are ultimately responsible for the oversight of their equipment.

The Structured Resource Allocation project is an example of how Technical Safety BC continues to improve its assessment model to better serve clients.

Related stories

Product and service delivery excellence

We use innovation to increase the effectiveness of our safety hazard assessments and to increase participation in the safety ecosystem.

Physical inspections: How do safety officers decide and prioritize?

Ever wonder how safety officers determine which sites to inspect? This article reveals the

details.

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ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

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Privacy policy

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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. This approach provides an alternative to safety requirements that are 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

0

incidents or injuries related to Alternative Safety Approaches

13

Safety Management Plans in 2019

33

Equivalent Standard Approaches in 2019

Incidents and injuries

There were no incidents or injuries related to Alternative Safety Approaches in 2019.

Alternative safety approaches

There are two types of alternative safety approaches:

1. An Equivalent Standard Approach, which usually applies to one aspect of an installation or operation; or
2. A Safety Management Plan, which is a broader approach and can apply to the safety of an entire facility.

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

In 2019, 33 Equivalent Standard Approach and 13 Safety Management Plans were reported to us.

Alternative safety approaches in 2019

Assessments and audits

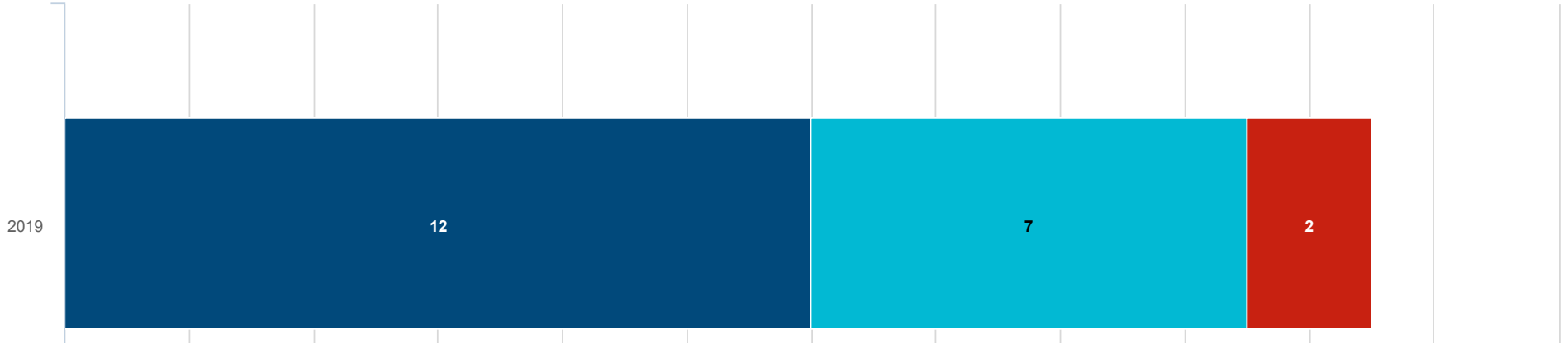
As a performance-based approach to achieving compliance with the *Safety Standards Act*, assessment of that performance is done using standard audit processes consistent with the International Standards Organization standard ISO19011—Guidelines for Auditing Management Systems.

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.

The assessments and audits were rated as follows:

- Effective
- Effective, except for
- Not effective

Assessments and audits in 2019



Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

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Office locations

Amusement devices

Overview

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

Key statistics

26
incidents reported to us

15
injuries reported to us

436
physical assessments (inspections) completed

Incidents

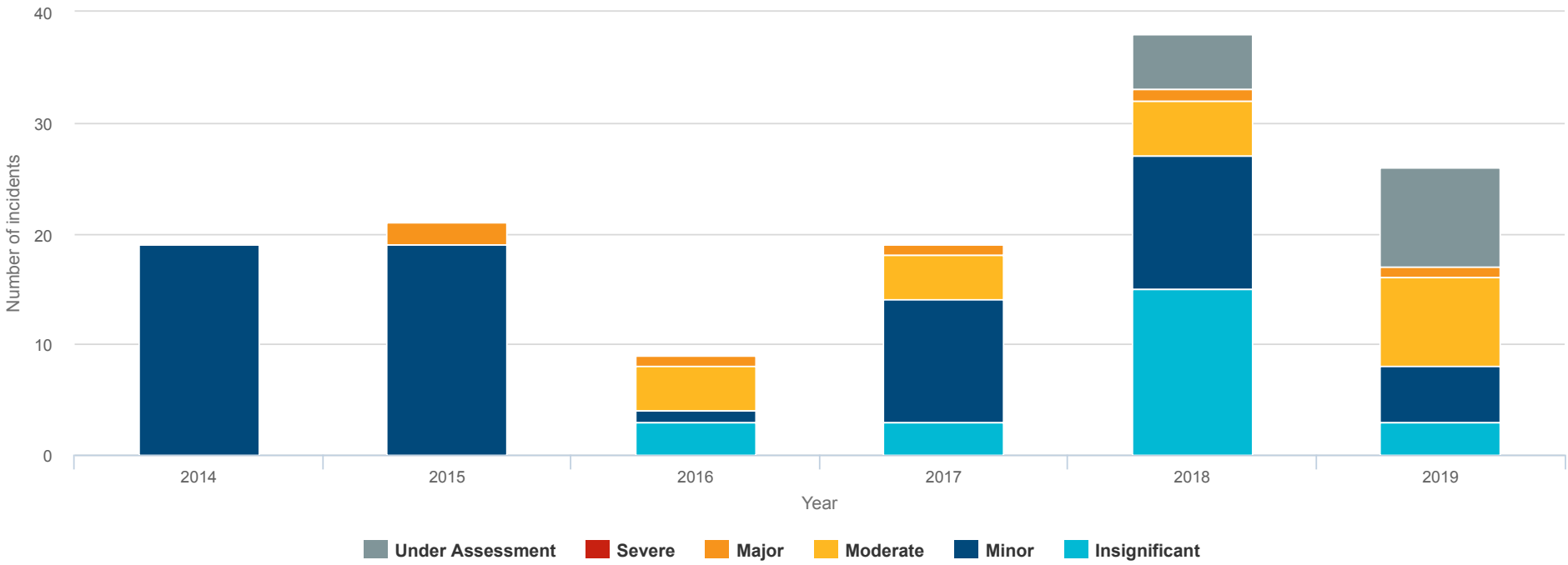
In 2019, the number of amusement device incidents reported to Technical Safety BC decreased by 12 (32%), with almost all of them being caused by operator, passenger, or operational. Operational could include a combination of

passenger and operator error, for example: a passenger or operator may have been injured by the forces of the ride and we do not have an exact cause.

The one *major* amusement device incident involved a collision between a zipline tour operator and guest. As in this case, most zipline incidents in 2019 involved the braking system.

Note: The category *under assessment* refers to incidents reported to Technical Safety BC that were still under investigation at year end.

Amusement device incidents in 2019



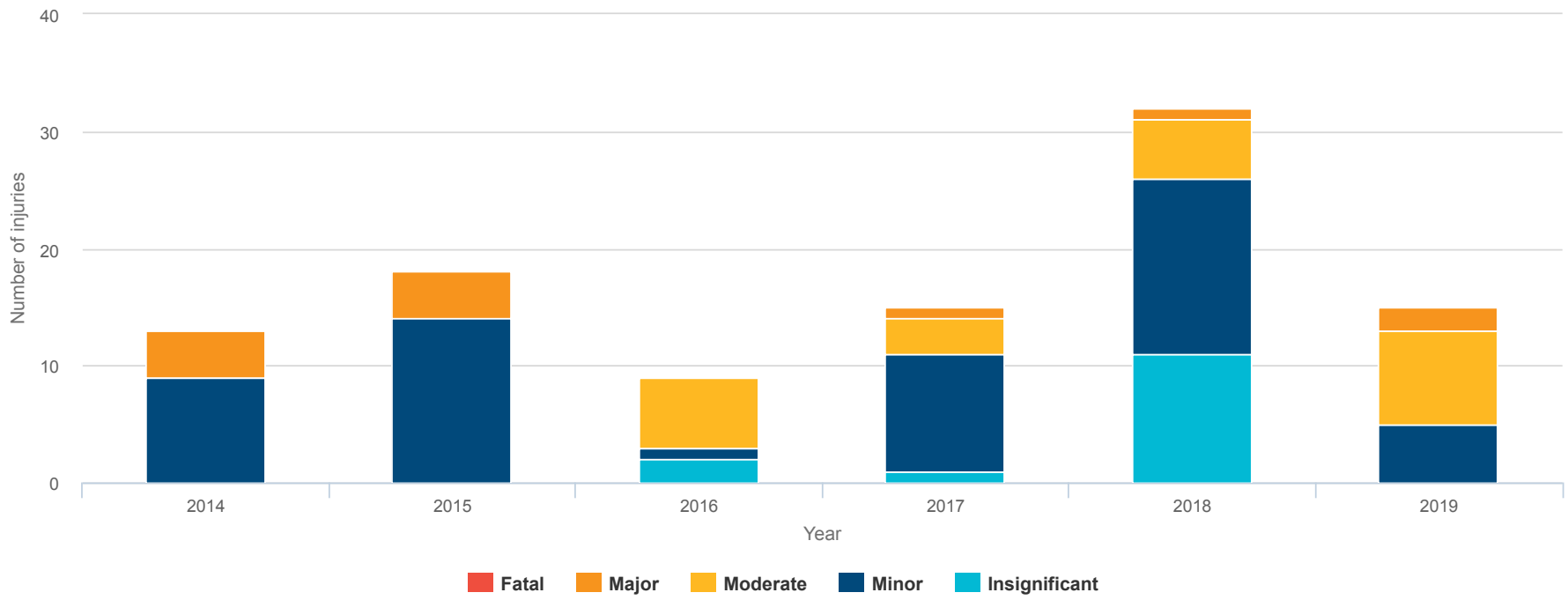
Injuries

The number of injuries reported to us decreased by 53% compared to 2018. There were two injuries rated as *major* in 2019, both related to the *major* incident involving a zipline.

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

Please 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.

Amusement device injuries in 2019



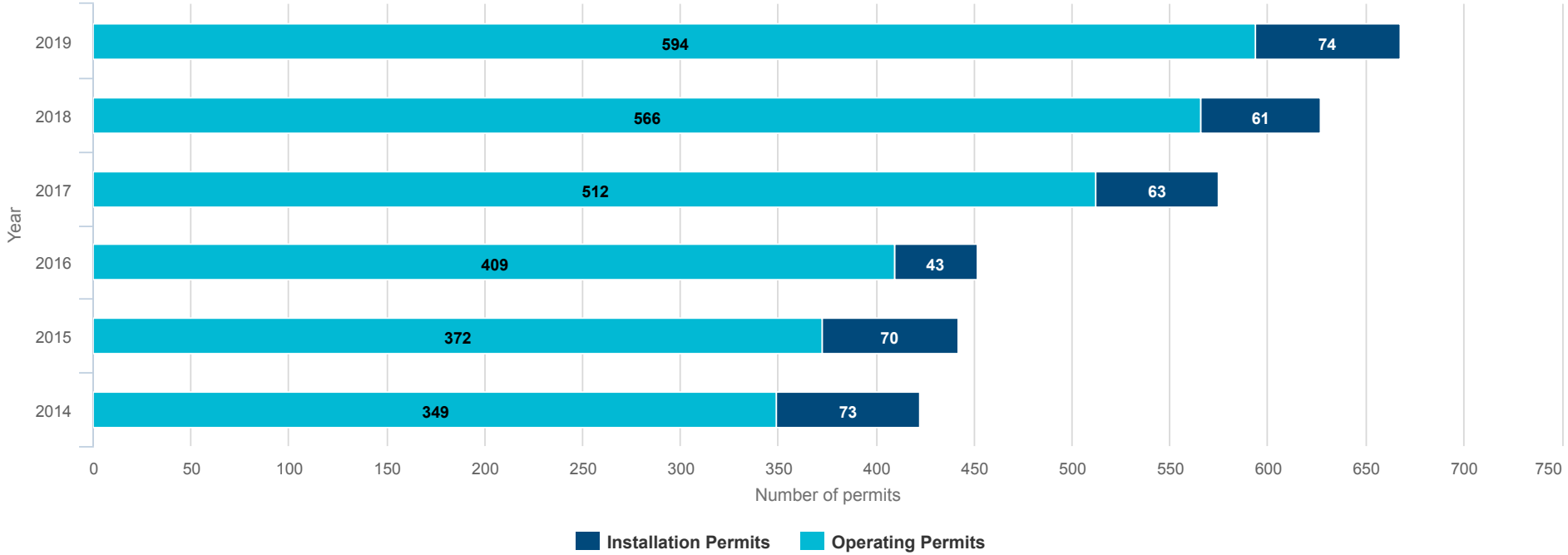
Permits

In 2019, there were 74 installation permits and 594 operating permits in the amusement devices technology.

Installation permits in 2019 increased by 21% compared to 2018. These results are due to an increase in inflatable and major rides.

Despite the increase in new installation permits, operating permits issued in 2019 are comparable to 2018. An investigation into our renewal and permit issuance process is underway to identify if system errors have caused the decline in operating permits due to clients not receiving a notification. This investigation has led us to further investigate if there are a population of units operating with expired permits.

Amusement device permits in 2019



Inspections

Technical Safety BC safety officers completed 436 physical assessments in 2019. The 8% increase over 2018 was in part due to the addition of a full-time safety officer.

The assessments were rated as follows:

- Pass
- Conditional Pass
- Fail

In 2019, there was a 25% increase in Pass assessments. Although the timing within the season and type of inspection can affect the Pass rate, the results were also likely influenced by the increased education and outreach efforts that occurred as part of the 2019 review of the amusement device program.

Amusement device inspections in 2019

Related stories

Ask a safety officer about amusement devices

Answers to commonly asked questions from the public and clients about amusement device permits, contractor licensing, and fines.

Read more

Licence to thrill

Amusement parks can be a source of injuries, if you don't follow the necessary precautions.

Read more

Amusement ride inspection list

Our safety officers have pulled together a list of what they look for when inspecting rides during amusement season.

Read more

Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

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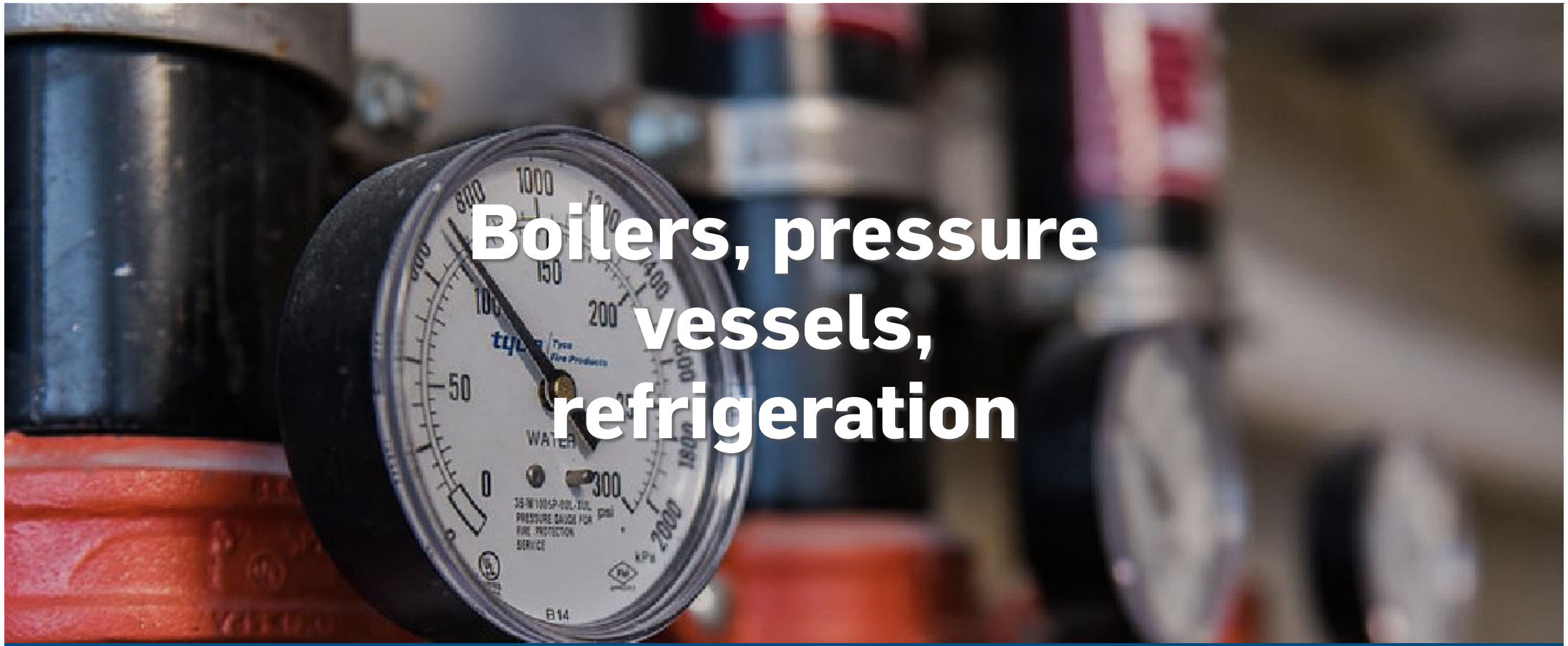
Office locations

Cookie policy

Privacy policy

Terms of use



Boilers, pressure vessels, refrigeration

Overview

Technical Safety BC oversees the design, construction, installation and operation of boilers, pressure vessels and refrigeration equipment in accordance with the *Safety Standards Act* and the Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation.

Key statistics

42
incidents reported to us

0
injuries reported to us

6,129
physical assessments (inspections) completed

Incidents

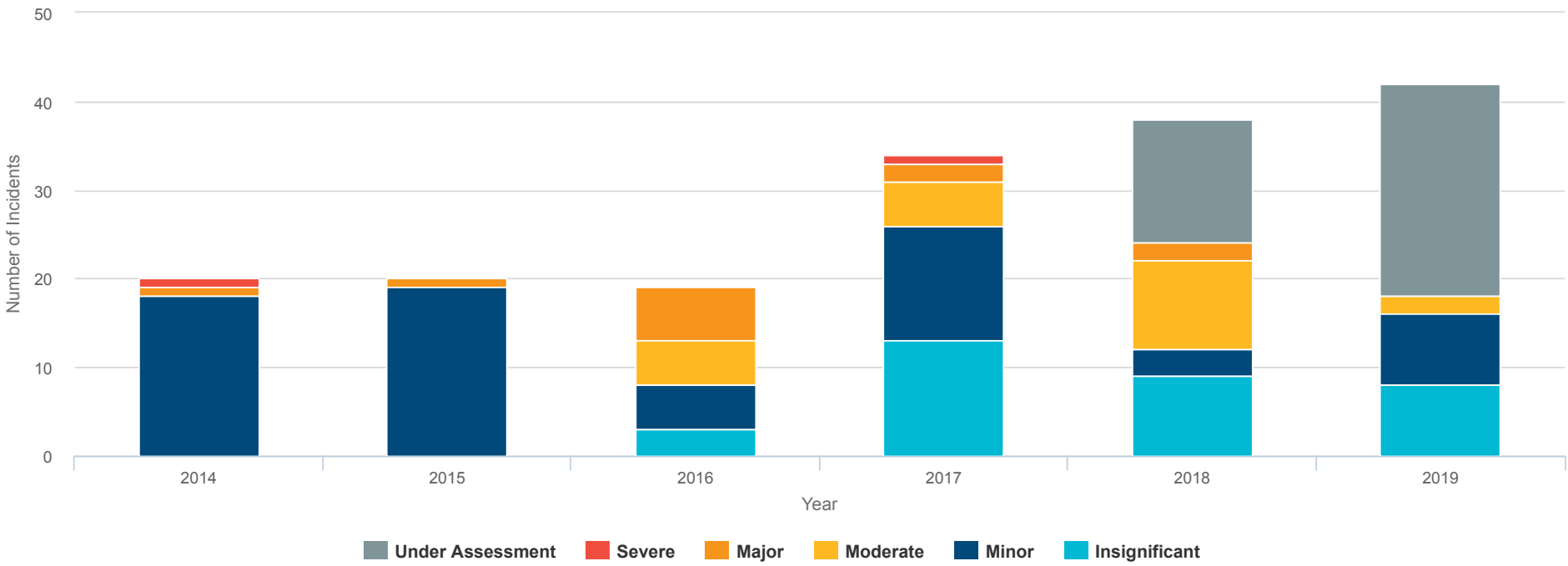
In 2019 the number of boiler, pressure vessel, and refrigeration incidents reported to us increased by 4 (11%) compared to 2018. Most of the incidents reported were from the refrigeration arena industry.

Following the fatal incident at Fernie Memorial Arena, industry awareness around the risks presented by refrigeration equipment and incident reporting has increased.

No incidents were rated as *major*. The most significant incident was the ammonia leak at the Port Alberni Multiplex.

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

Boiler, pressure vessel and refrigeration incidents in 2019



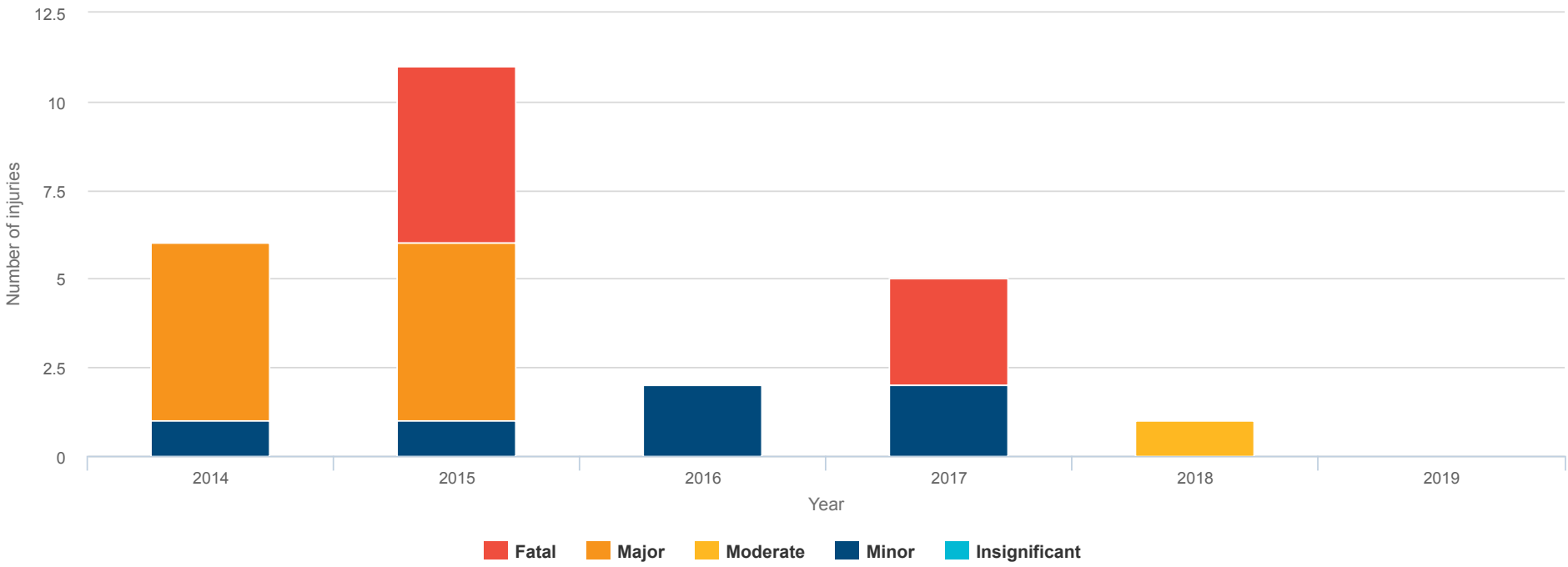
Injuries

No injuries were reported in 2019.

Please 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.

Boiler, pressure vessel and refrigeration injuries in 2019

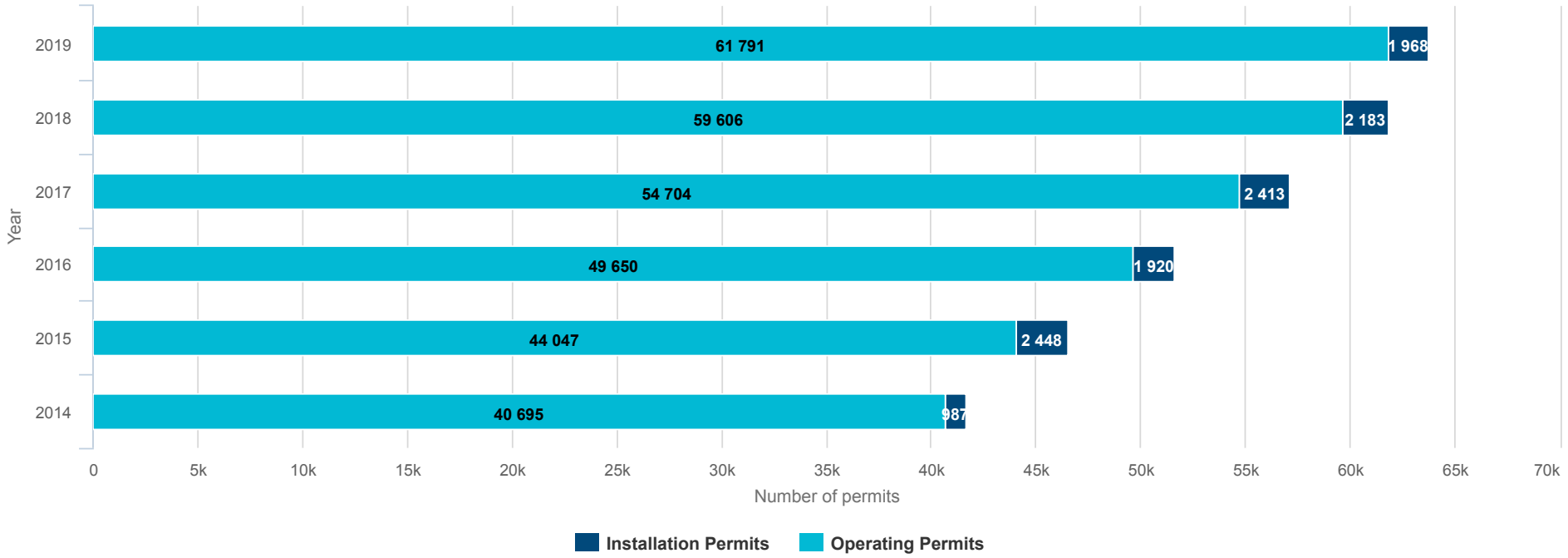


Permits

In 2019, there were 1,968 installation permits and 61,791 operating permits in the Boiler, Pressure Vessel and Refrigeration technology.

Commercial occupancy installation permits increased in response to recent growth in residential occupancy over the past few years. Also, growth in the number of agricultural product packaging in the Lower Mainland resulted in an increase in the number of refrigeration installation permits issued in the agricultural occupancy sector.

Boiler, pressure vessel and refrigeration permits in 2019



Inspections

Technical Safety BC safety officers completed 6,129 physical assessments (inspections) of boiler, pressure vessel, and refrigeration equipment in 2019.

Physical assessments were at the highest in 2017 and 2018 due to the mandatory inspection of all arenas in the province, following the ammonia incidents in Fernie and Langley. After the mandate was lifted at the end of 2018, the total number of inspections dropped in 2019.

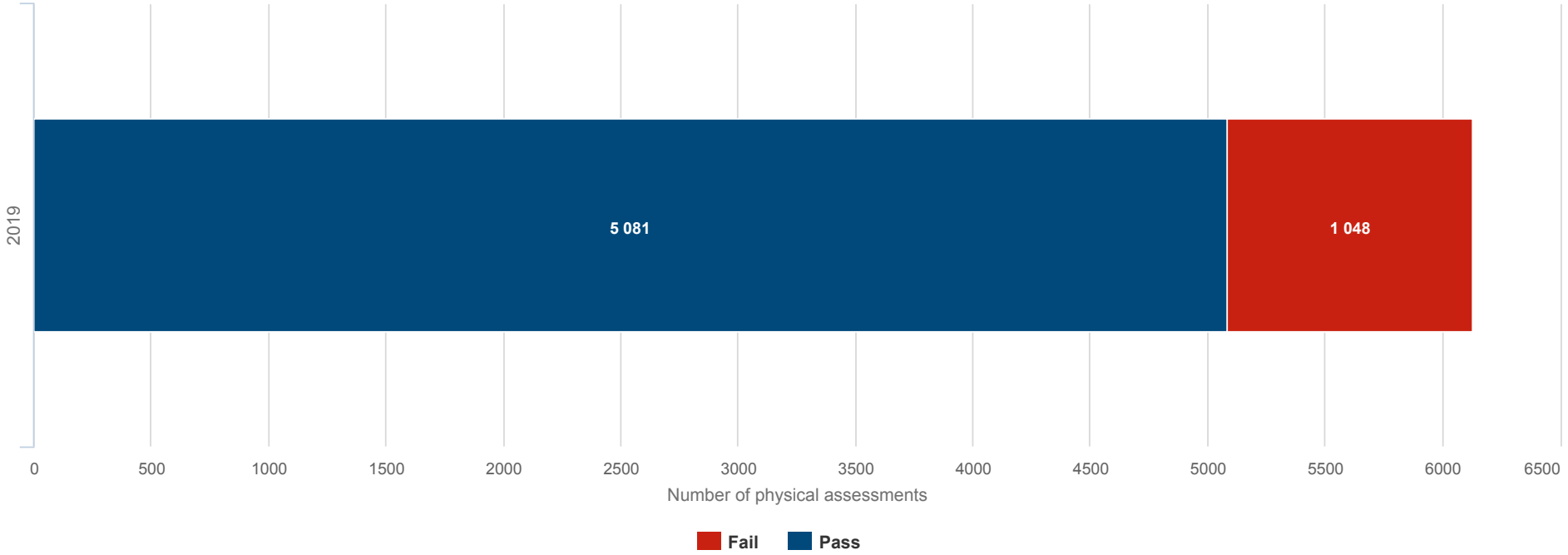
In 2019 our safety officers focused on first certification assessments, which are more comprehensive and therefore time-consuming. This resulted in a decrease in inspections being carried out in 2019.

Assessments are rated as follows:

- Pass
- Fail

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

Boiler, pressure vessel and refrigeration inspections in 2019



Related stories

Ammonia leak at Port Alberni

On November 5, Technical Safety BC was made aware of an ammonia leak at the Alberni Valley Multiplex in Port Alberni.

Read more

Refrigeration maintenance guideline

In 2019 we consulted on maintenance guidelines that support equipment integrity planning and safety management.

Read more

Pressure welder program

A new pressure welder program came into effect on December 3, 2019, which requires pressure welders in BC to be certified.

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Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

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Office locations

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TECHNICAL SAFETY BC

Products About Careers My Accounts

Electrical

State of Safety | Understanding | Managing | Key | Data by

Overview

Technical Safety BC oversees electrical equipment and 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

71
incidents reported to us

6
injuries reported to us

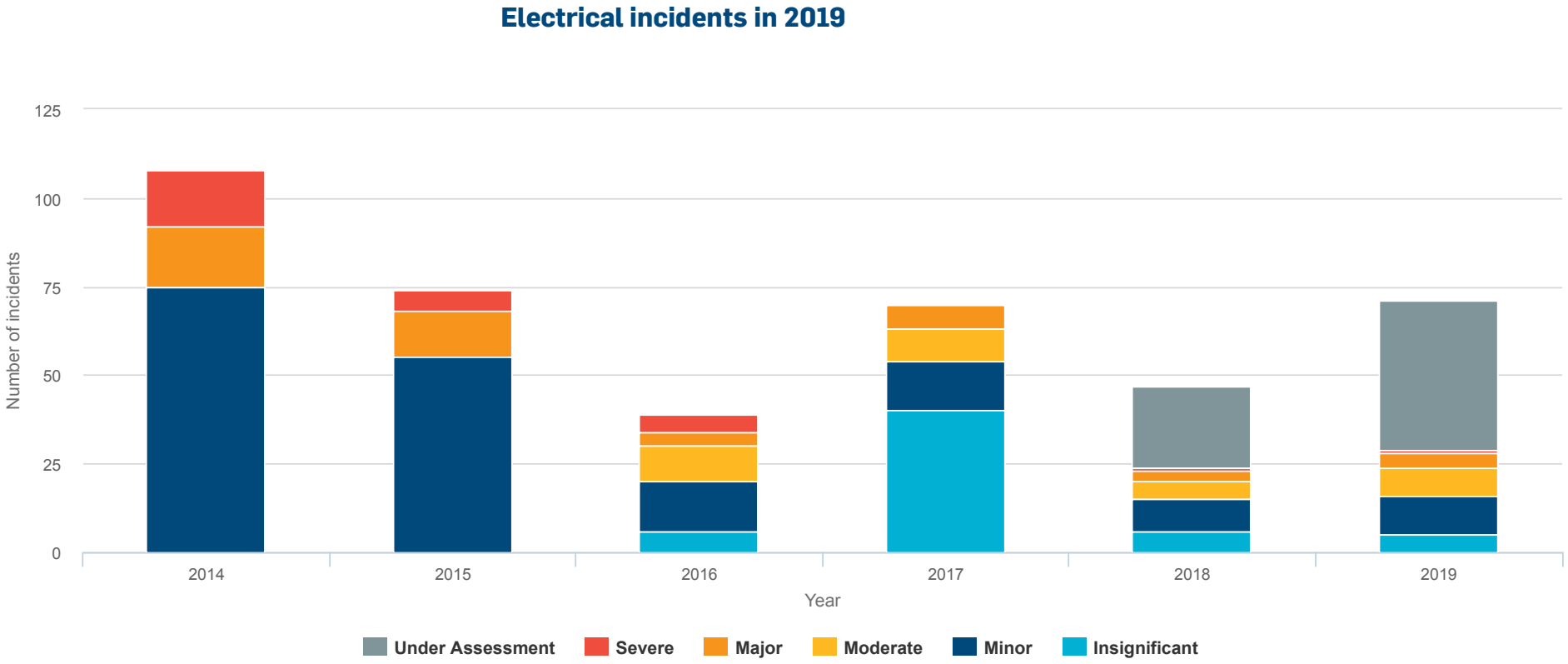
27,550
physical assessments (inspections) completed

Incidents

In 2019 the number of electrical incidents reported to us increased by 24 (51%) compared to 2018.

The majority of the incidents were rated *insignificant* to *moderate*, ranging from arc flash burns to the hand, to overheated receptacles. There was one *severe* incident that involved a structural fire in an industrial building.

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

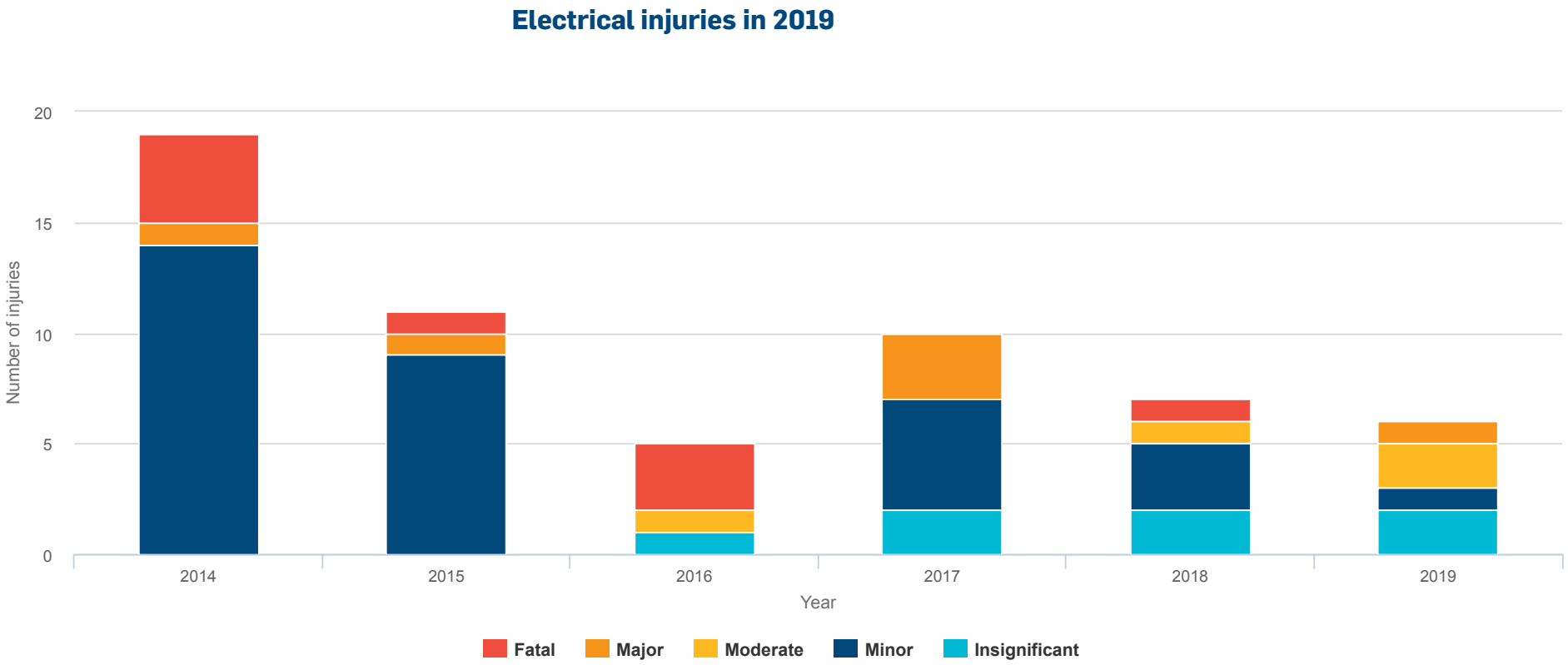


Injuries

Six injuries related to the electrical technology were reported in 2019, which is comparable to seven reported in 2018.

Please 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

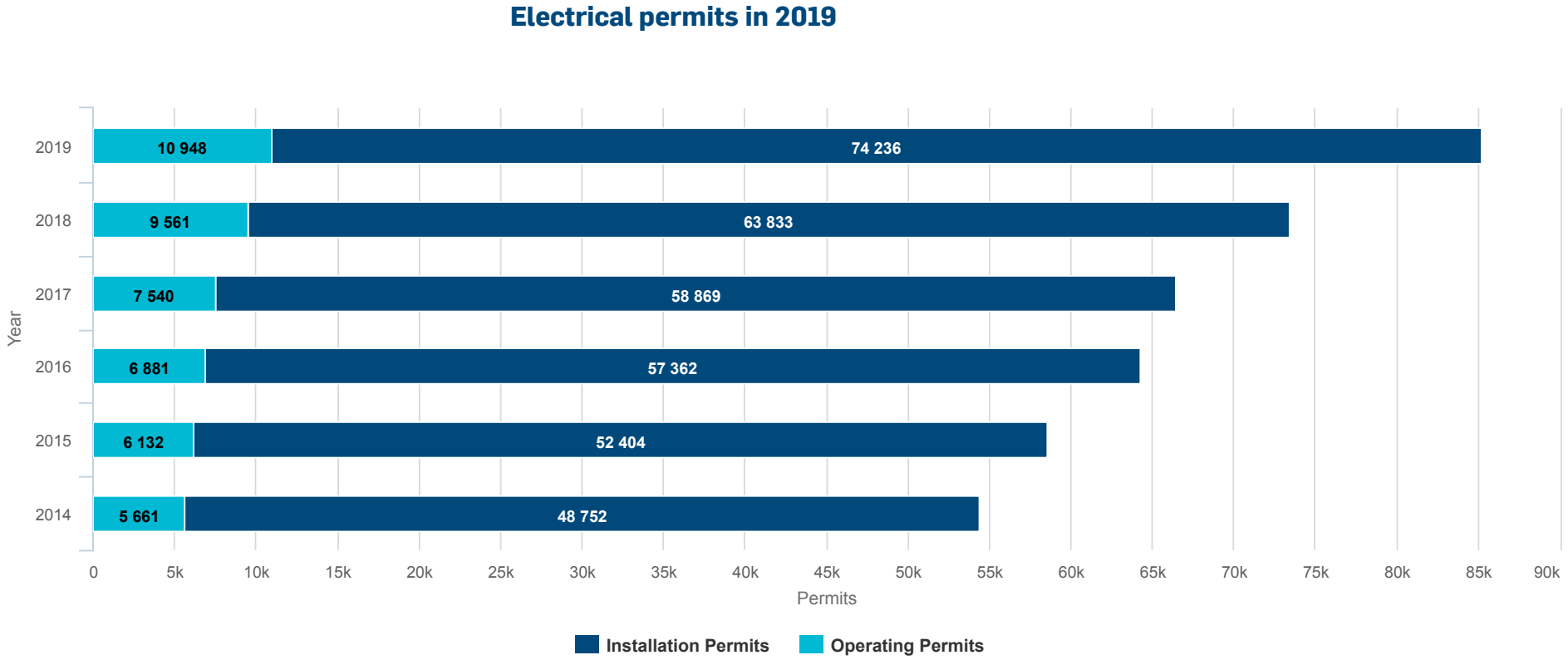
effects of a resultant injury may not be recorded as part of our investigation.



Permits

In 2019, there were 85,184 electrical permits issued, reflecting a 16% increase in permits issued in 2018. This includes 74,236 installation permits and 10,948 operating permits. The permit increase was due to BC's strong economy, with many housing starts in multi-family dwellings such as townhomes and condominiums.

Accordingly, we saw installation permits for single family dwellings decrease due to the rise in construction for these properties. Permits issued for commercial properties (which may also include a residential component) also increased as a part of BC's economic development.



Inspections

Technical Safety BC safety officers completed 27,550 physical assessments (inspections) of electrical equipment and systems in 2019.

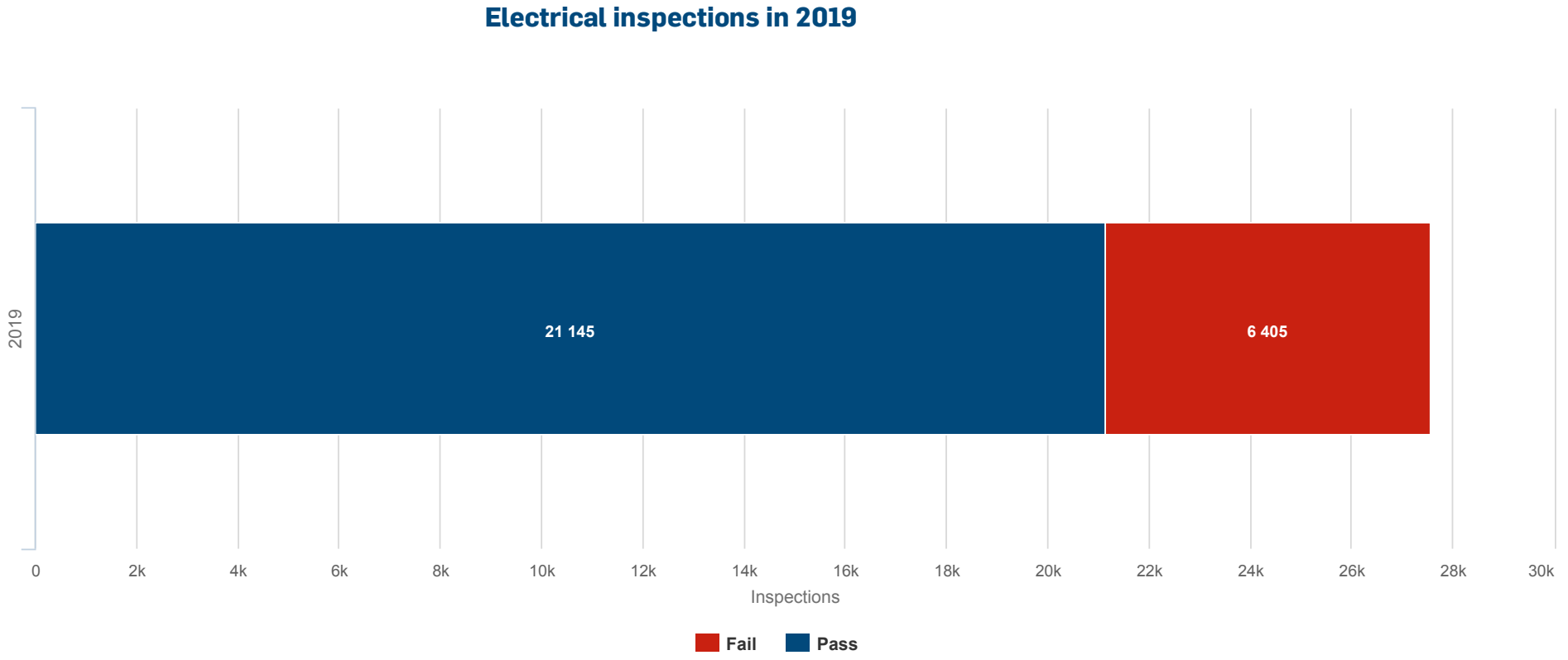
Physical assessments remain consistent year-over-year due in part to the number of safety officers assigned throughout the province has remained steady since 2017.

Assessments are rated as follows:

- Pass

- Fail

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



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Homeowner electrical safety tips

To help prevent injury and damage, check out our simple electrical safety tips you can perform in your home.

Read more

Streamlining the certification program

Minimizing redundant and conflicting processes to unify the standards in our certification program.

Read more

When workers fail to de-energize

Our electric shock research revealed 40% of respondents felt pressured to work in an unsafe environment.

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Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

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Cookie policy

Privacy policy

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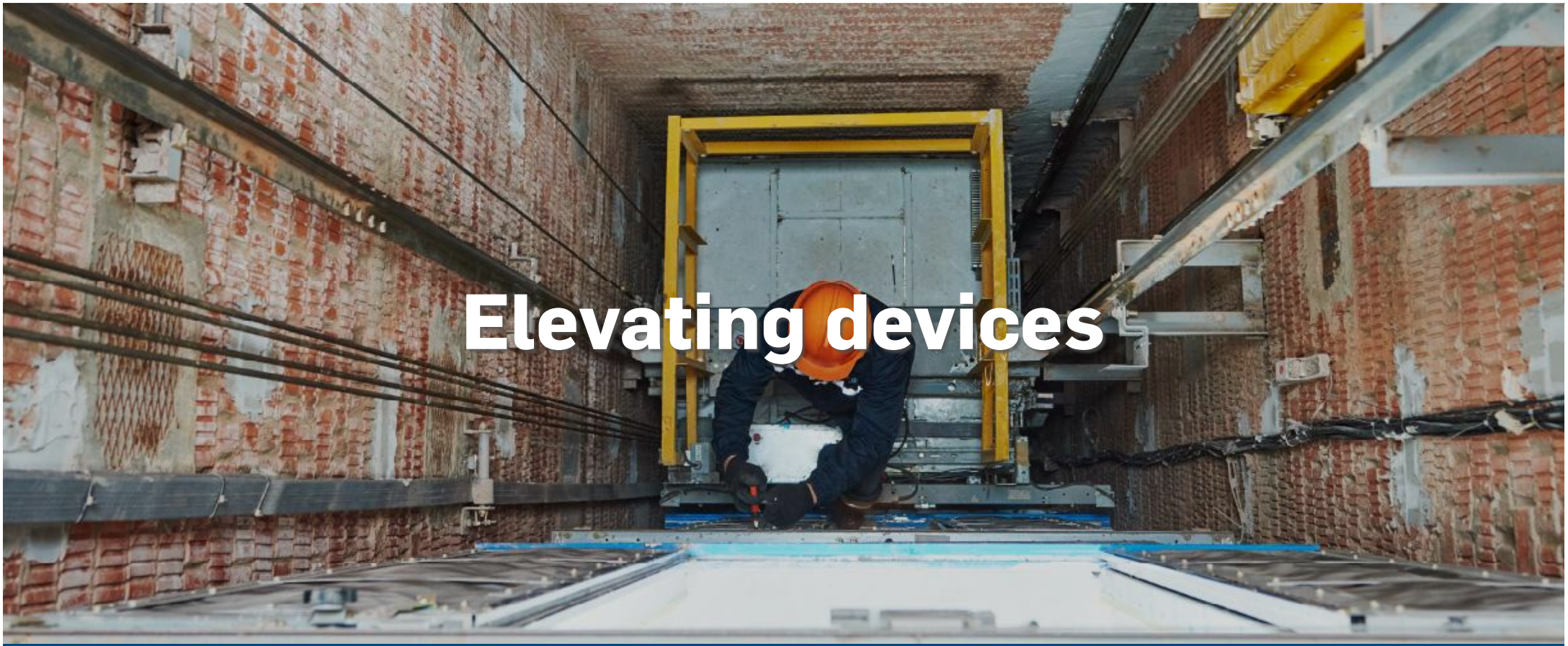


Elevating devices

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

123
incidents reported to us

29
injuries reported to us

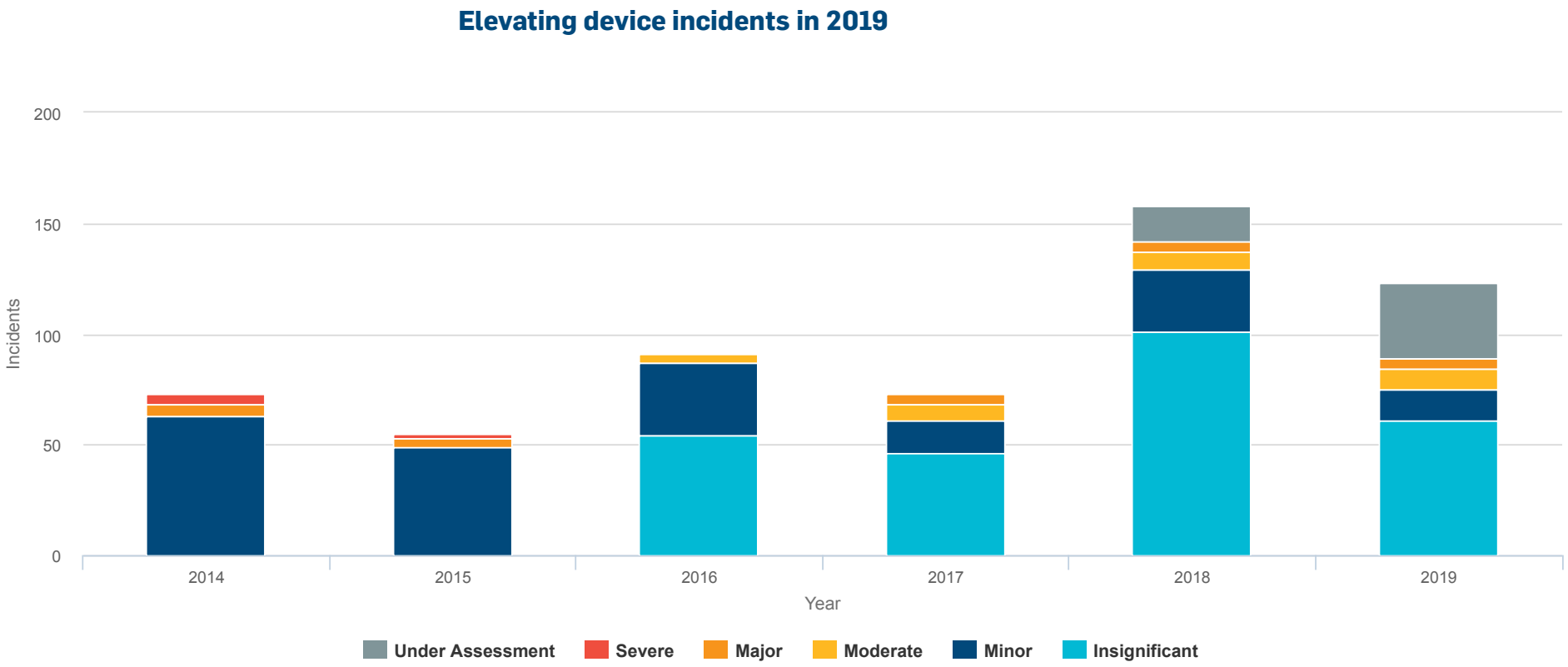
3,047
physical assessments (inspections) completed

Incidents

In 2019, the number of elevating incidents reported to us decreased by 35 (22%) compared to 2018.

The number of *major* incidents was the same as the previous year. These five incidents were related to equipment damage to parts such as the door sensor, motor shaft, or flooding and leveling.

The category *under assessment* refers to incidents reported to Technical Safety BC that were still under investigation at year end.



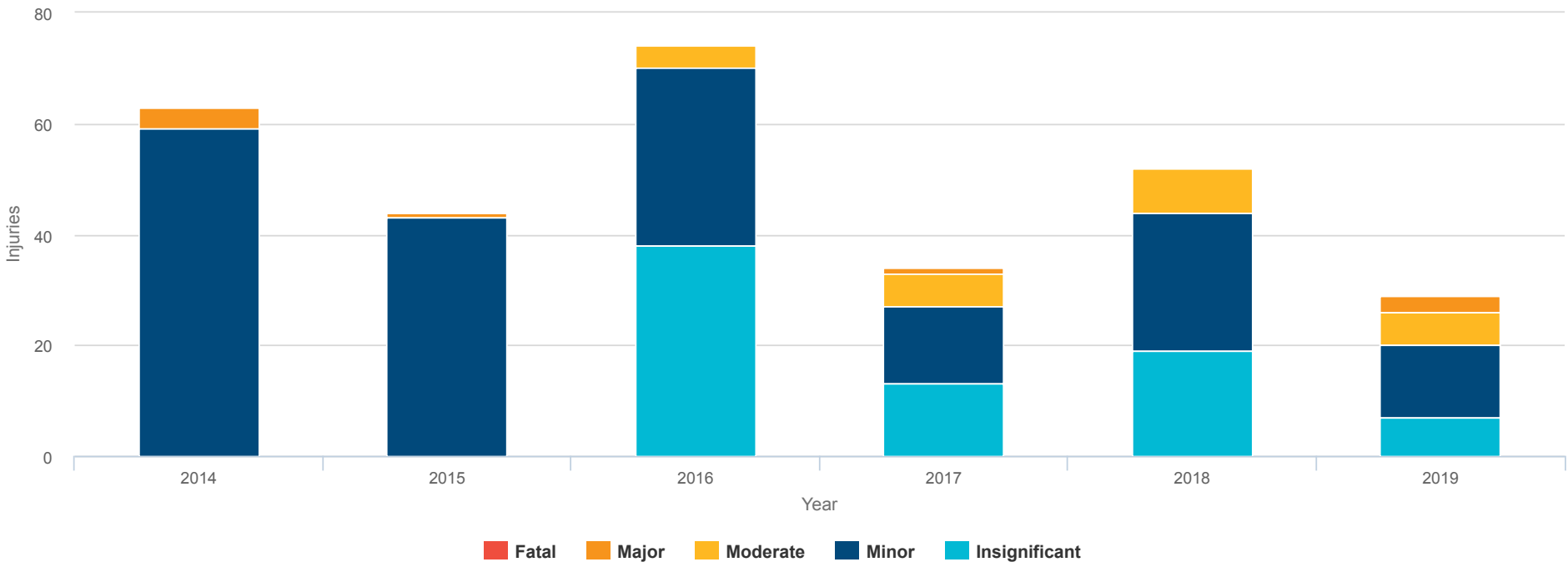
Injuries

29 injuries related to elevating devices were reported in 2019, which is a 44% decrease compared to 2018. Three injuries were rated *major,* all were equipment damage incidents.

Please 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.

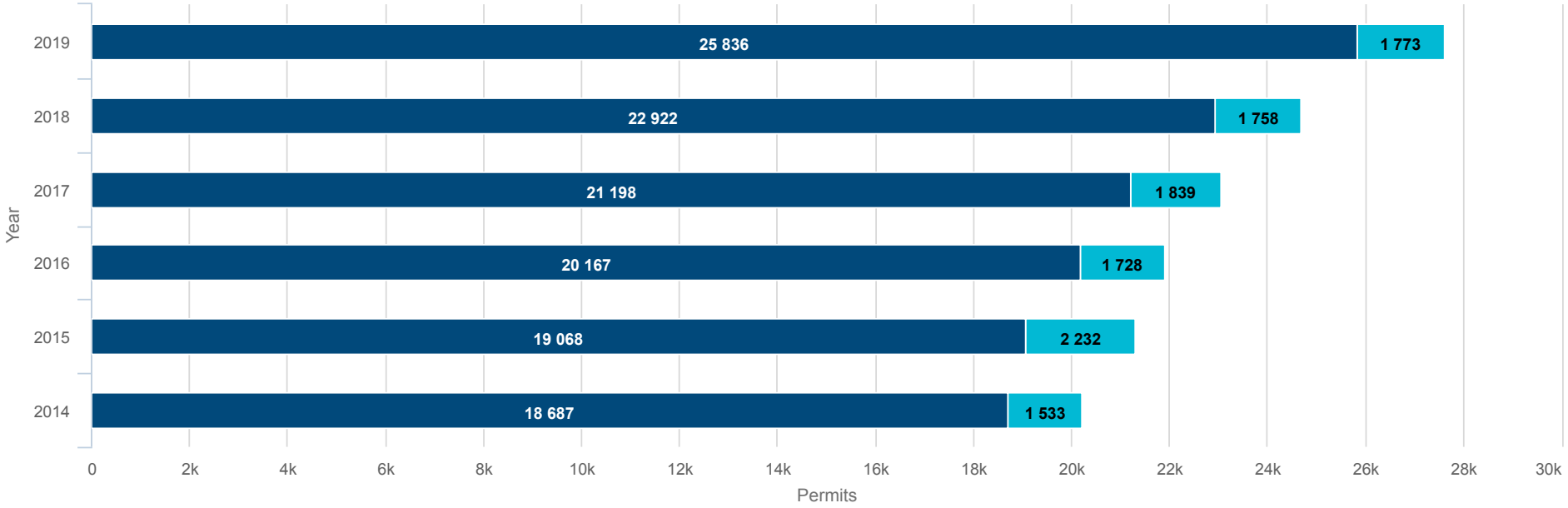
Elevating device injuries in 2019



Permits

In 2019, there were 1,773 installation permits (including those related to modifications of existing equipment) and 25,836 operating permits for elevating devices. This represented a 12% increase in permits compared to 2018.

Elevating device permits in 2019



Inspections

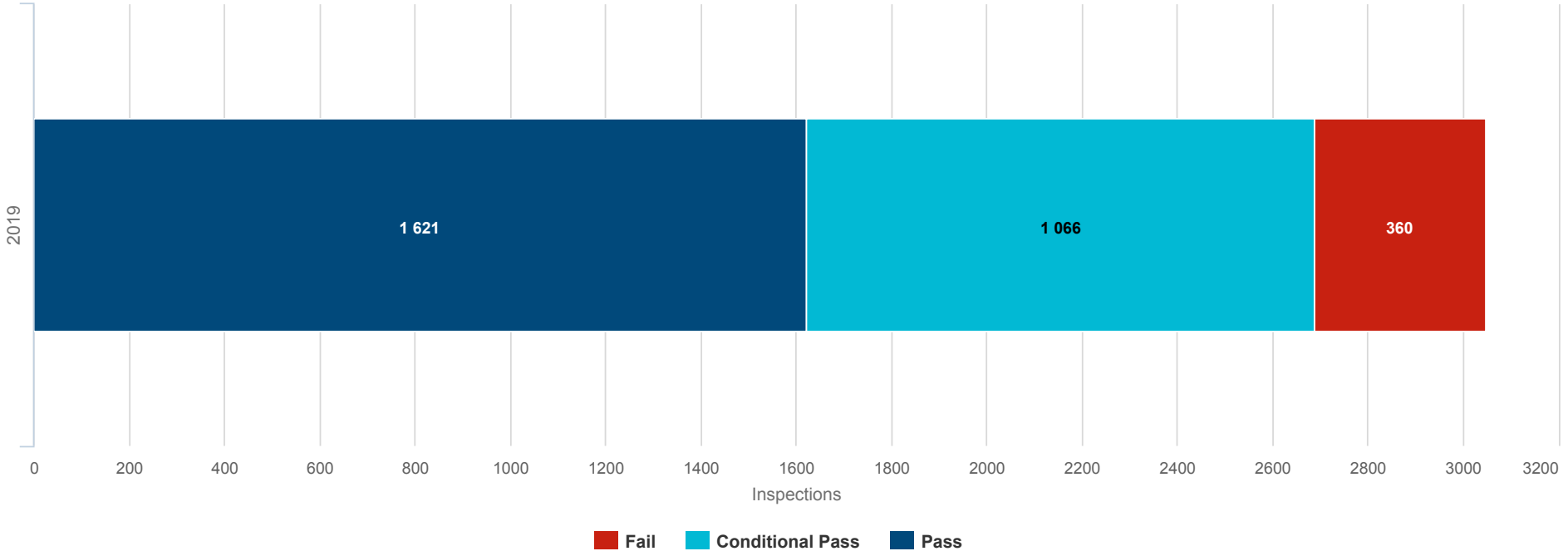
Technical Safety BC safety officers completed 3,047 physical assessments (inspections) of elevating devices in 2019, a 2% increase compared to 2018.

The severity of the hazards has increased, which can be attributed to the implementation of sample plans and increased audits in 2019.

Assessments are rated as follows:

- Pass
- Conditional Pass
- Fail

Elevating device inspections in 2019



Related stories

What to do when stuck in an elevator

Don't panic or do anything rash. Here's what you need to know if you are ever trapped in an elevator.

Read more

New B44-16 elevating safety code

BC's Elevating Devices Safety Regulation was amended to include the new code for elevators and escalators.

Read more

Elevating safety to the next level

As the pace of high-rise and commercial development has increased, passenger safety is critical on elevators and escalators.

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Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

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Office locations

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TECHNICAL SAFETY BC

Products About Careers My Accounts

Gas

State of Safety | Understanding | Managing | Key | Data by

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 785,000 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

44
incidents reported to us

11
injuries reported to us

14,995
physical assessments (inspections) completed

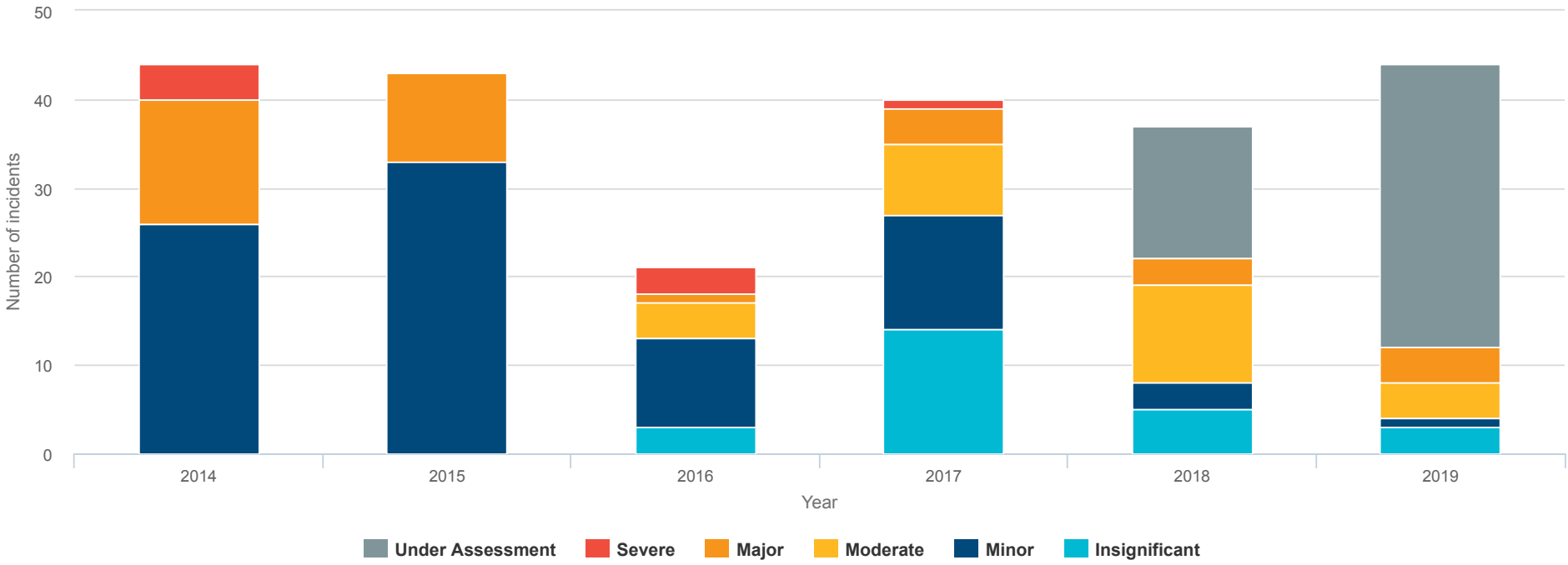
Incidents

In 2019 the number of gas related incidents reported to us increased by 7 (19%) compared to 2018.

Four of the incidents were rated as *major*. These included a fire and explosion in a Richmond apartment, a gas explosion in a recreation vehicle in Abbotsford, a fire in a mobile home, and a hard light off in a boiler which resulted in a small explosion.

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

Gas incidents in 2019

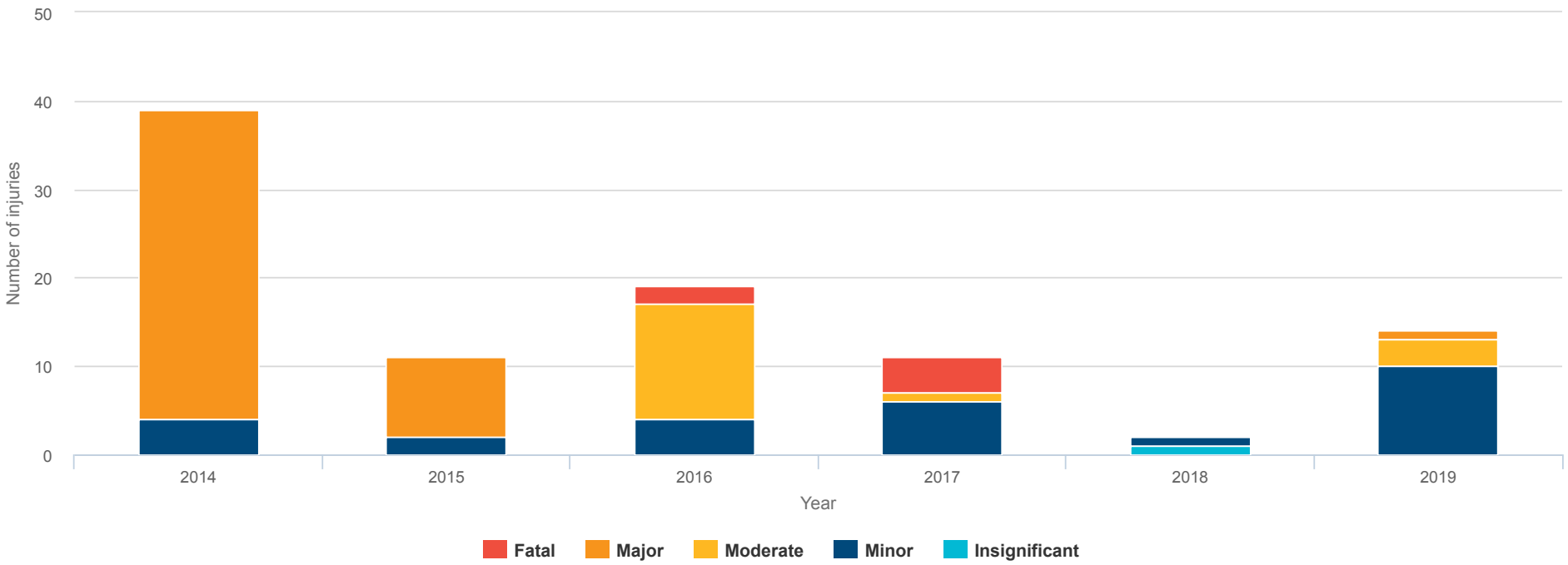


Injuries

In 2019 injuries increased by 12, compared to 2018. The majority of injuries reported were related to carbon monoxide leaks and poisoning.

Please note that we receive injury reporting and descriptions from operators of 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.

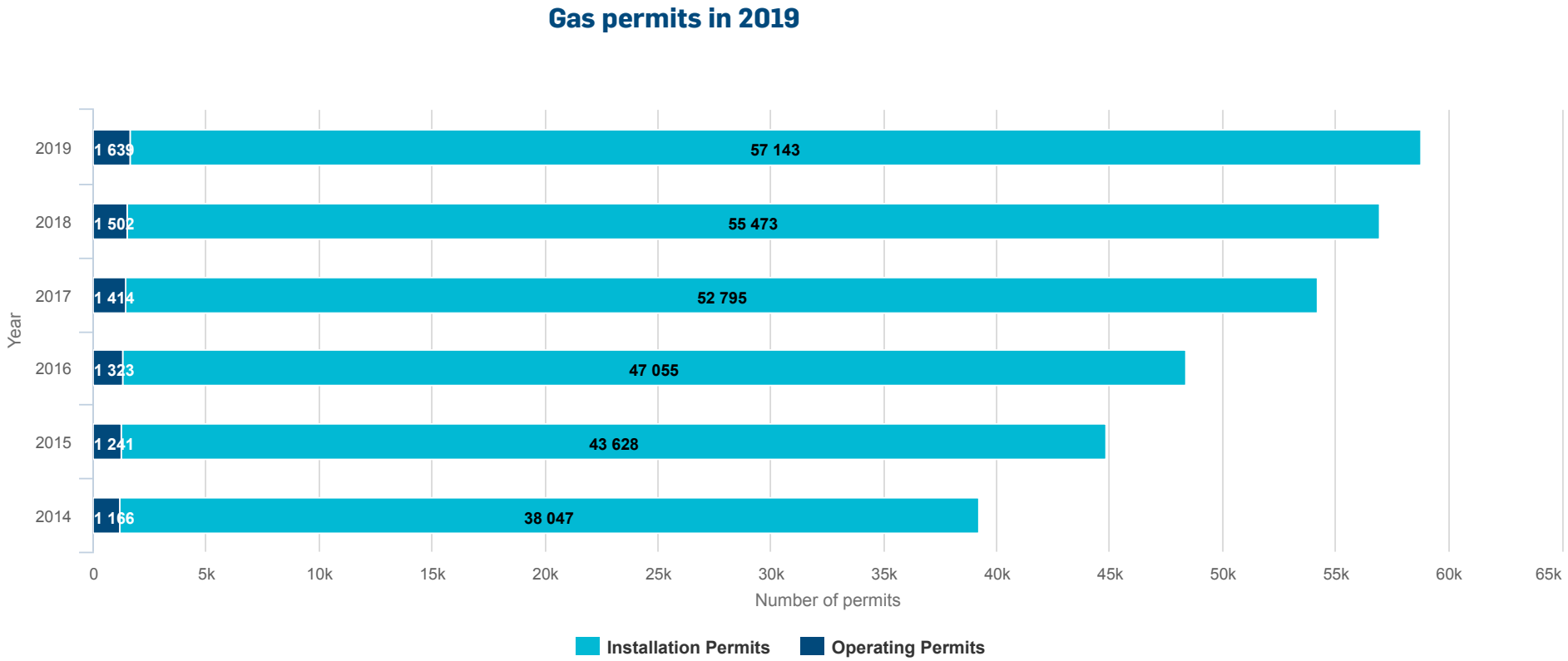
Gas injuries in 2019



Permits

In 2019, there were 58,782 gas permits issued. 55,441 were installation permits and 1,639 were operating permits.

Installation permits increased by 3%, compared to 2018. Residential occupancy installation permits remained steady in 2019, despite the decline in new home construction. An increase in multi-unit residential permits issued reflects the construction of condominium housing.



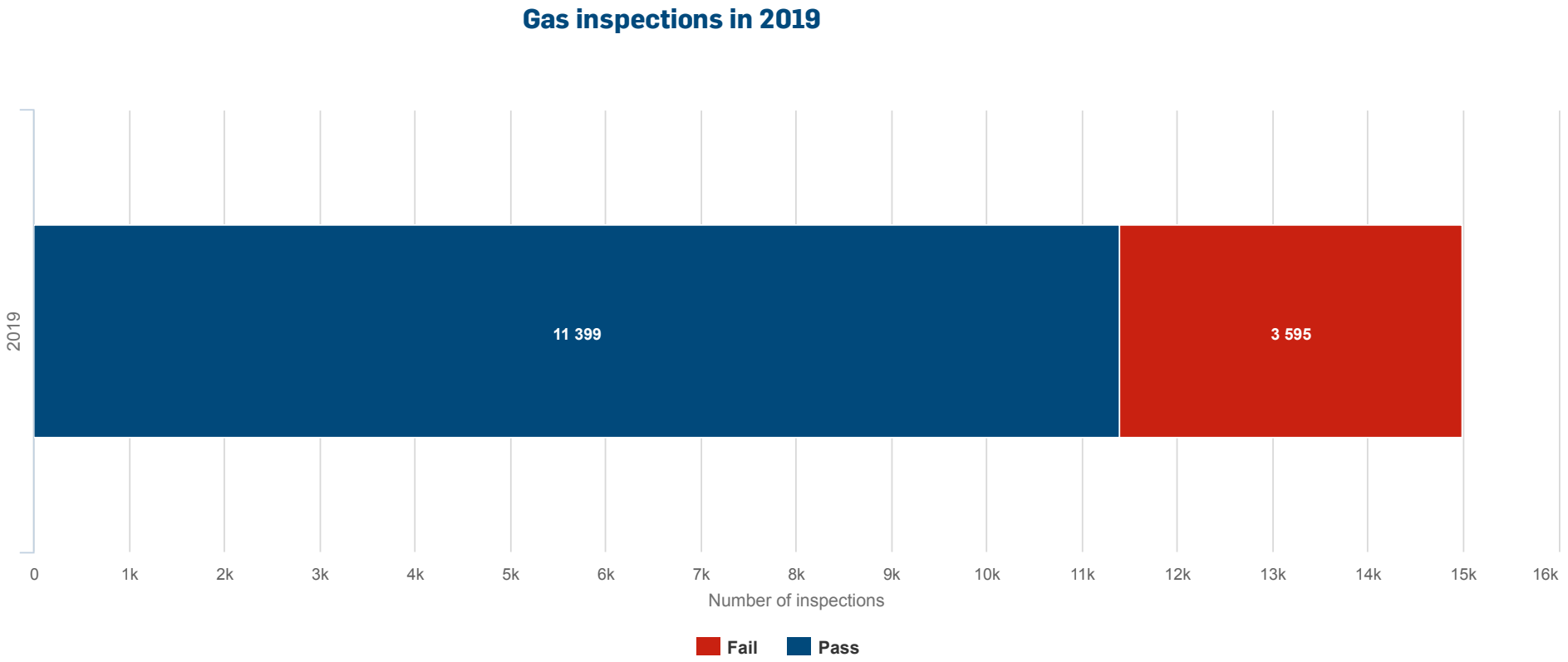
Inspections

Technical Safety BC safety officers completed 14,995 physical assessments (inspections) of gas equipment in 2019.

746 more inspections were performed in 2019 compared to 2018. This is a result of the implementation of Structured Resource Allocation project, allowing safety officers to focus on higher hazard assessments.

Assessments are rated as follows:

- Pass
- Conditional Pass
- Fail



Related stories

Richmond gas explosion

Our investigation into the root causes of an explosion that took place in a Richmond apartment building in July 2019.

Read more

Gas equipment safety in floods

Gas appliances exposed to flooding cannot be reconnected without being inspected by a licensed contractor.

Read more

Ask a gas safety officer

What is the best carbon monoxide detector to buy and tips on where to install and how to maintain it in your home.

Read more

Technology

ENERGY

Boiler, PV, Refrigeration

Electrical

Gas

Alternative Safety Approaches (ASA)

TRANSPORTATION

Amusement Devices

Elevating Devices

Passenger Ropeways

Railways

Products

Permits

Certification

Licences

Design registration

Assessments

Learning centre

Regulatory resources

Codes, standards and regulations

Regulatory notices

Find a licensed contractor

Find a certified individual

Forms

Fees

Safety in BC

Safety stories

Incident investigations

Compliance and enforcement

State of Safety

Safety education

Get involved

News

Events

Engagement

Connect with us

Governance and leadership

Careers

Contact us

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Products About Careers My Accounts

Passenger ropeways

State of Safety | Understanding | Managing | Key | Data by

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

104
incidents reported to us

46
injuries reported to us

157
physical assessments (inspections) completed by us

Incidents

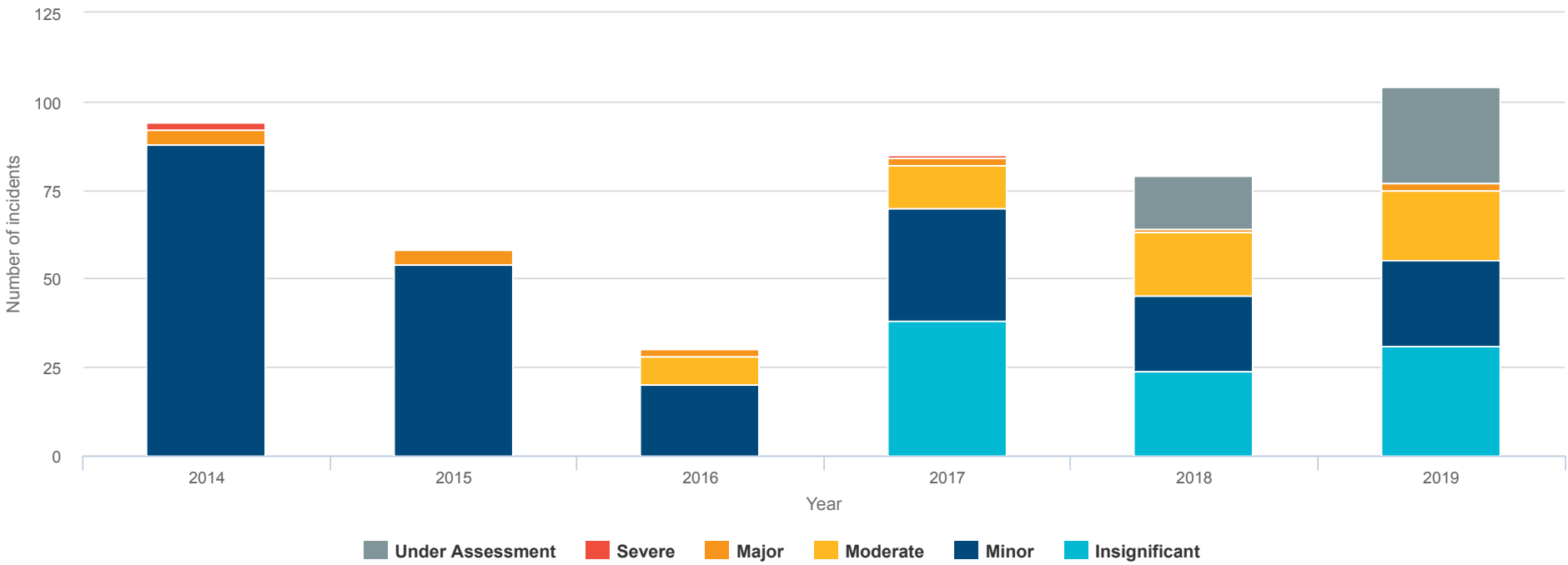
In 2019 there was an increase in 25 (32%) passenger ropeway related incidents, compared to 2018.

Of the 104 passenger ropeway incidents, 52% were due to human behaviour from passengers or operators.

There was also one incident that occurred due to vandals cutting the Sea to Sky gondola cable in August 2019. Technical Safety BC performed a thorough incident investigation.

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

Passenger ropeway incidents in 2019

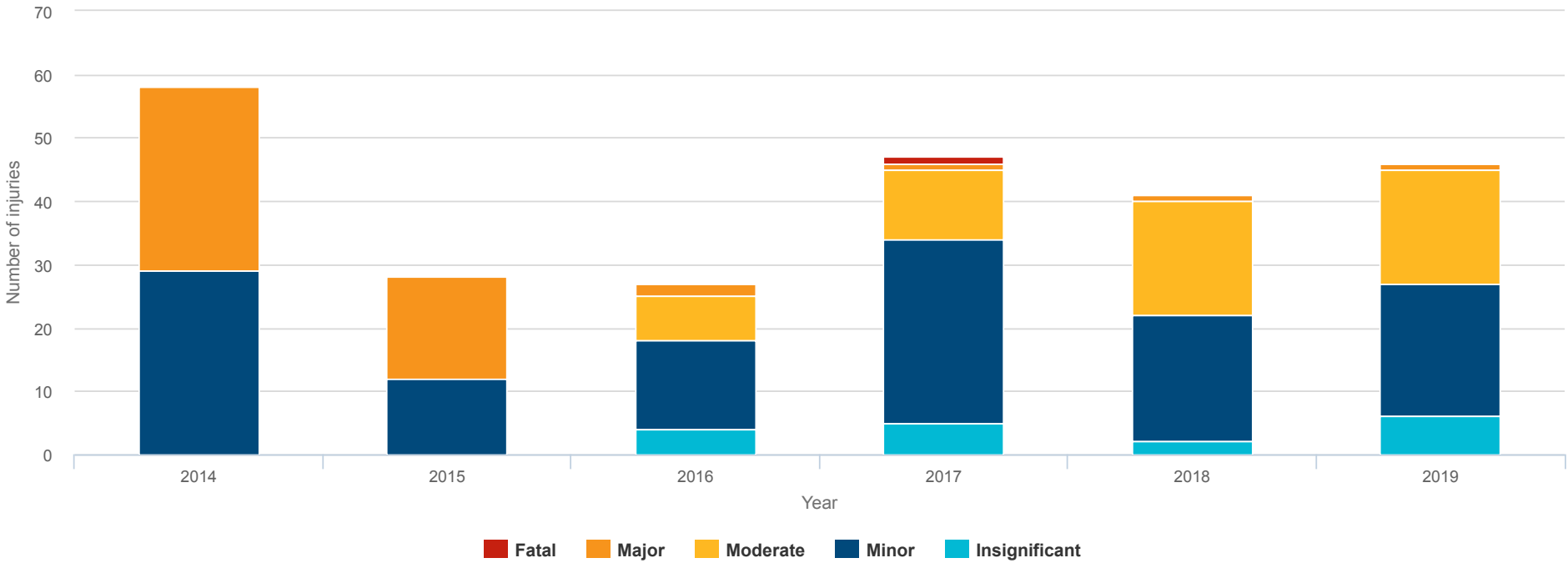


Injuries

Injuries in 2019 that were related to passenger ropeways increased by 12% compared to 2018.

Please note that we receive injury reporting and descriptions from operators of 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.

Passenger ropeway injuries in 2019



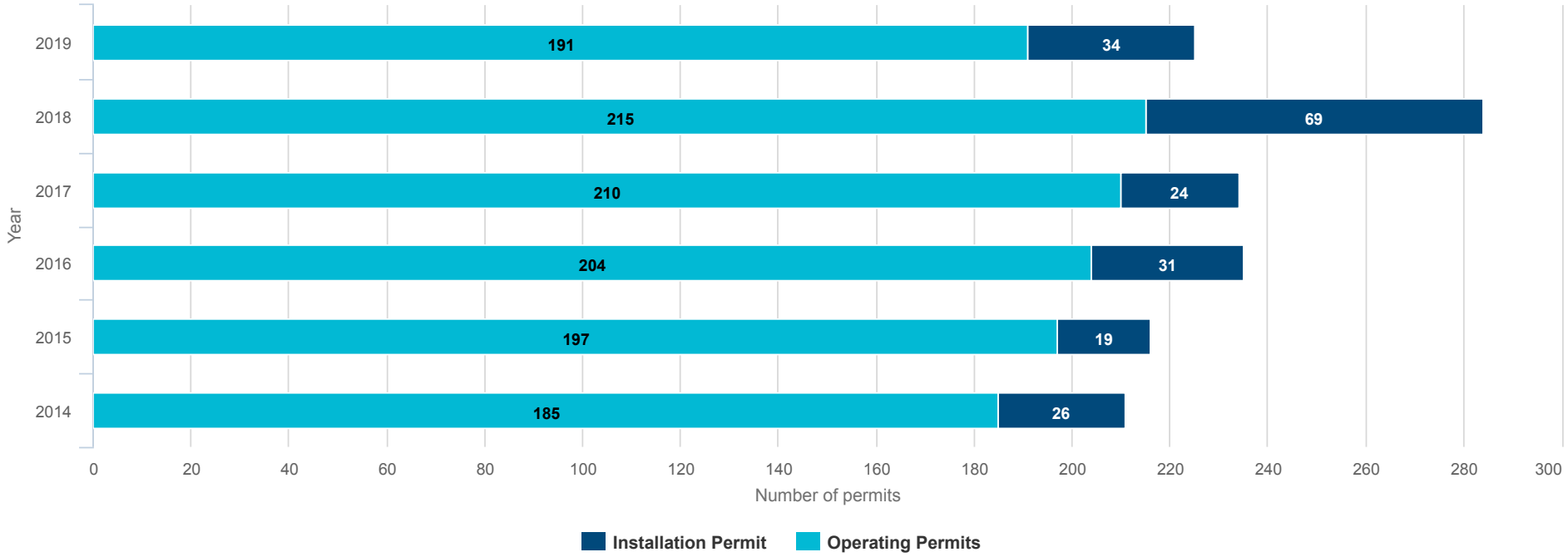
Permits

In 2019 there were a total of 225 passenger ropeway permits. 34 were installation permits and 191 were operating permits. Overall total permits decreased by 21% compared to 2018.

Passenger ropeway installation permits saw the most significant decrease from 69 permits in 2018, to 34 in 2019. The spike seen in 2018 was specifically for conveyor alterations in relation to a safety order that was issued.

A 13% decrease was noted for operating permits from 2018 to 2019. Passenger ropeway operating permits see fluctuation from year to year due to ski resorts not operating all their equipment, therefore not renewing their operating permit. Additionally almost all passenger ropeway operating permits expire on December 31, so if a renewal was late it would show in 2020.

Passenger ropeway permits in 2019

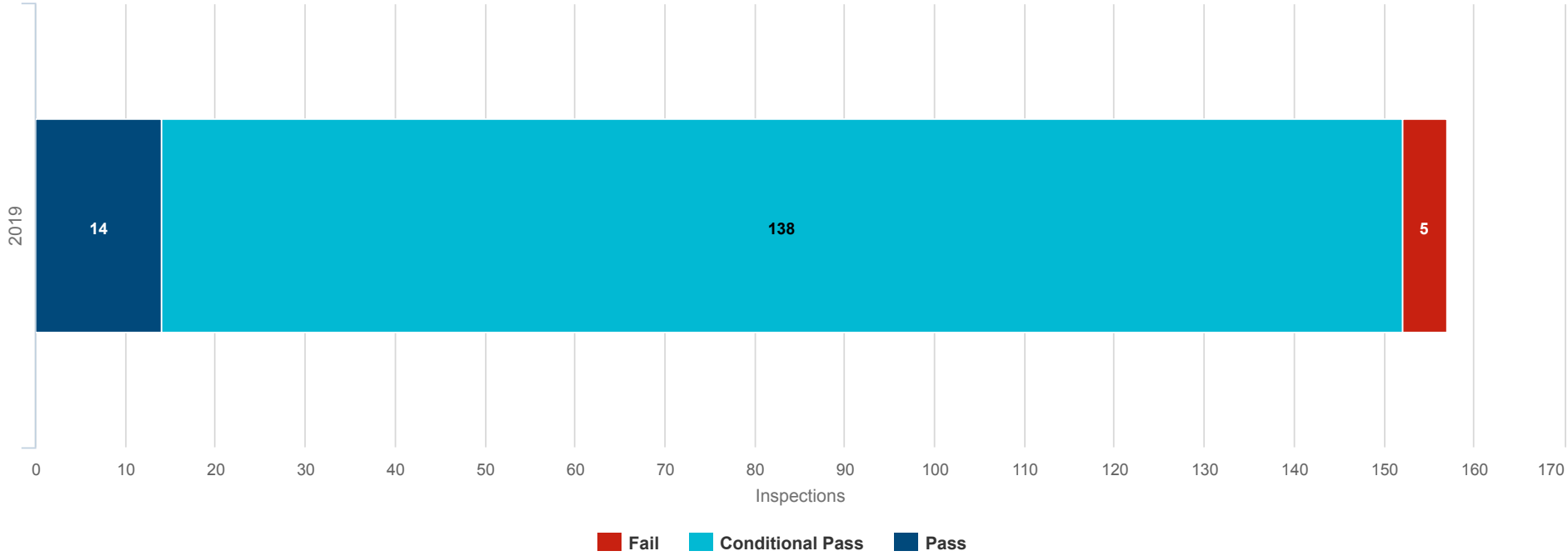


Inspections

Technical Safety BC passenger ropeway safety officers completed 157 physical assessments (inspections) in 2019, which is a 6% decrease compared to 2018.

Similar to installation permits issued in 2018, there was a spike in physical assessments due to requirements in a safety order.

Passenger ropeway inspections in 2019



Related stories

Sea to Sky Gondola collapse

We released our incident investigation report into the August 10, 2019, collapse of the Sea to Sky Gondola in Squamish.

Read more

Passenger ropeway and conveyor safety inspections

We periodically inspect ropeways or conveyors to ensure they are operating safely. Here's a list of what we look for.

Read more

Slope safety over selfie

Statistics show that 60% of ski lift injuries and incidents are caused by human behaviour and not technical equipment failures.

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Railways

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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

190
incidents reported to us

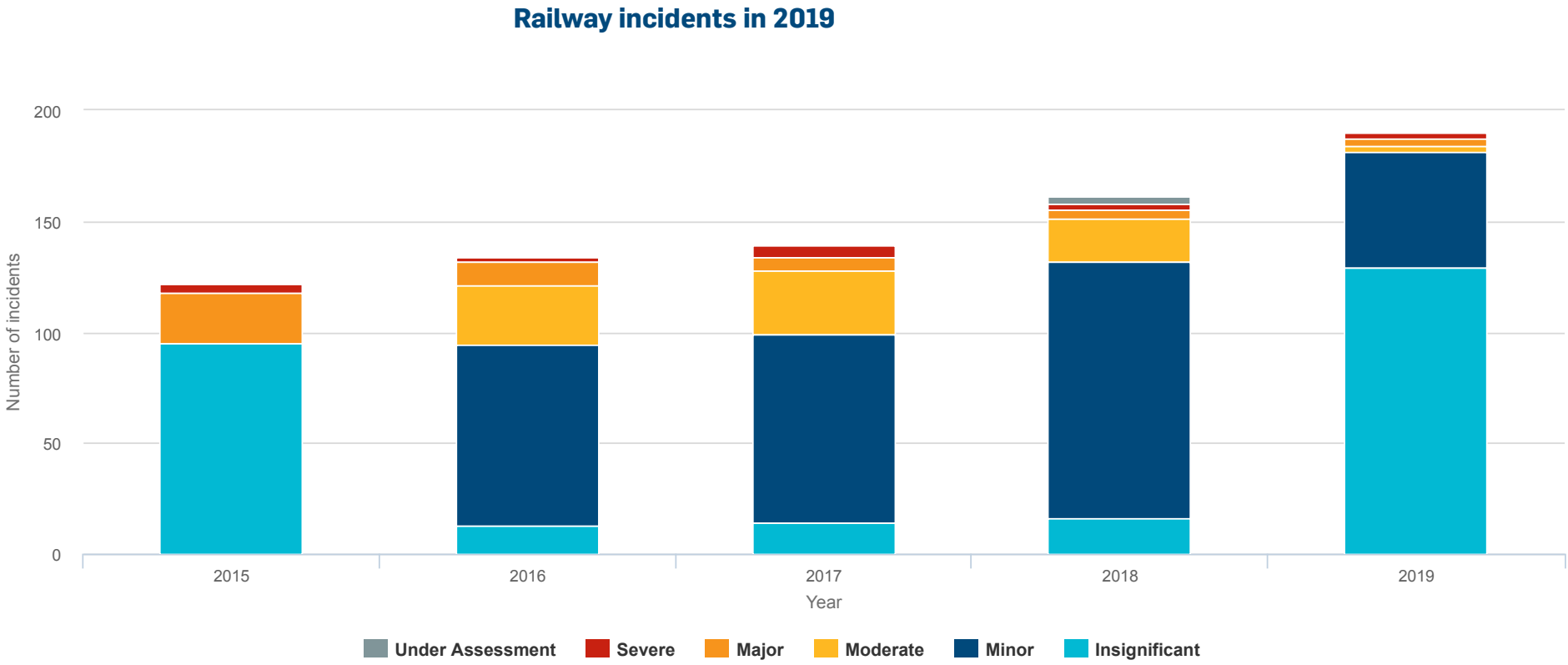
15
injuries reported to us

150
physical audits of Railways

Incidents

In 2019 the number of incidents related to railways increased by 29 (18%) compared to 2018.

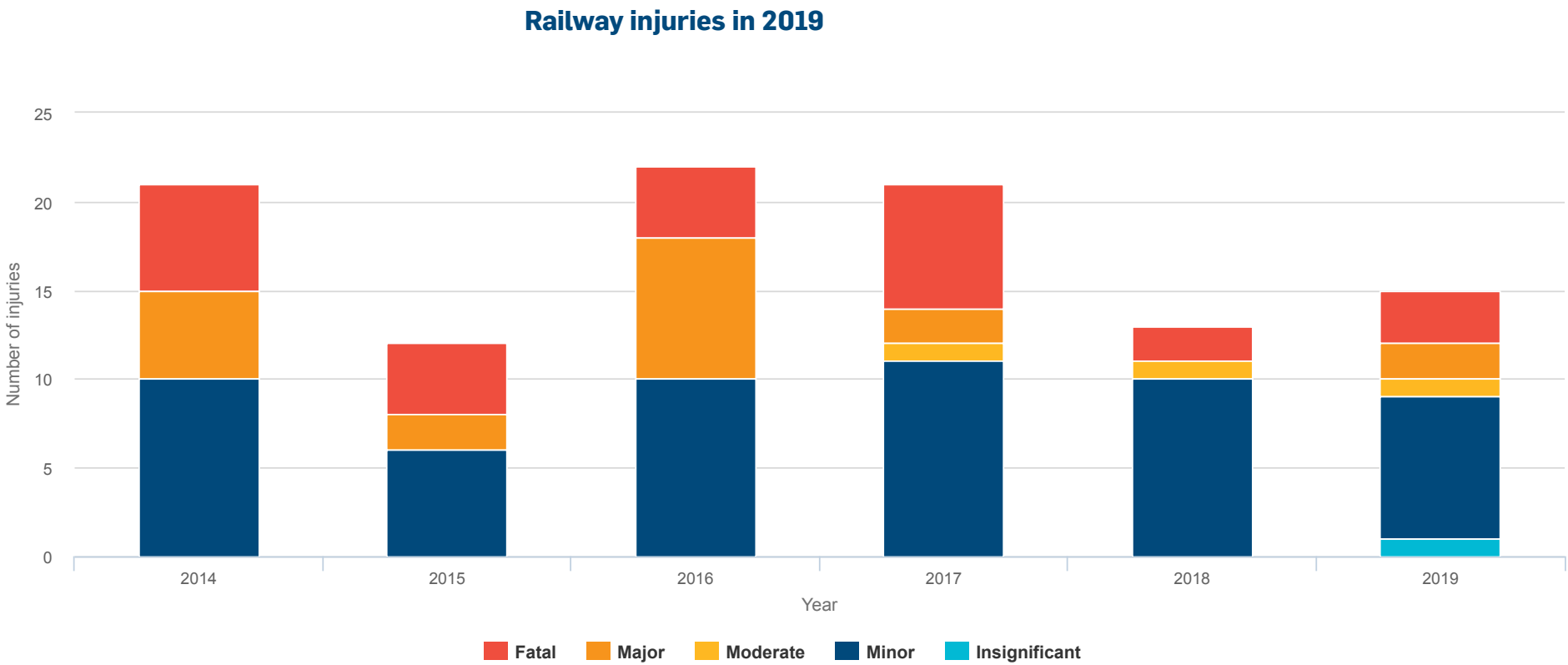
We continued railway awareness and engagement activities through our partnership with Operation Life Saver and Rocky Mountaineer during BC's Rail Safety Week. Our message to British Columbians was to exercise caution and follow the rules around railways, which we shared via social media and at a Rail Safety Week event at Renfrew Station.



Injuries

In 2019, 15 injuries related to railways were reported us, three of which were fatal. One was attributed to suicide, one resulted from passenger and train contact (non-suicide), and the last fatality was due to a collision between a garbage truck and train.

Please 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

Technical Safety BC does not issue railway installation permits.

Assessments and audits

Our railway safety officers assess and audit all operating railways in compliance with the applicable acts, regulations, rules, and guidelines. Railway operations are also audited against their required safety management systems. The Railway Safety Program issues recommendations as a result of these audits.

Technical Safety BC safety officers completed 150 assessments and audits of rail equipment in 2019. There is minimal fluctuation annually in our railway data due to our robust audit model and limited growth in BC's rail industry. The reduction of *severe* hazard ratings in 2019 is due in part to the growing use of the enforcement tools available under the *Railways Safety Act*.

Assessments are rated as follows:

- Pass
- Fail

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

Railway assessments and audits in 2019

Related stories

What are the common non-compliances found in annual audits?

Our railway safety officers review eight assessment areas where railways are most commonly receiving non-compliances.

Read more

What are Technical Safety BC's expectations regarding rail crew qualifications?

We assess whether railways and their crews understand and comply with the applicable rules and regulations.

Read more

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Boiler, PV, Refrigeration

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