About Us
Technical Safety BC is an independent, self-funded organization that oversees the safe installation and operation of technical systems and equipment. In addition to issuing permits, licences and certificates, we work with industry to reduce safety risks through assessment, education and outreach, enforcement, and research.

About the State of Safety
This document details a few of the highlights of how Technical Safety BC works towards our vision of Safe technical systems. Everywhere. Additional resources including downloadable files of hazards and incidents, are available in the full State of Safety Report at www.technicalsafetybc.ca/State-of-Safety-2017
## 2017 Safety Data

Each year, in accordance with the Administrative Agreement between Technical Safety BC and the Province of BC, Technical Safety BC publishes comprehensive data and insights on safety in the province. This year, we have published our data online in an interactive, digital format with hazard and incident data available as open data. By making the safety information that we gather throughout the year readily available to contractors, asset owners and the public, we feel we can better influence safety outcomes in the province. Full details of the scope of our activities, including our efforts around stakeholder engagement, regulatory change, client education and media relations/communications, as well as breakdowns by regulated industry technology, are available online at www.technicalsafetybc.ca/State-of-Safety-2017

<table>
<thead>
<tr>
<th>Category</th>
<th>2017 Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Permits</td>
<td>118,600</td>
</tr>
<tr>
<td>Installation Permits</td>
<td>119,521</td>
</tr>
<tr>
<td>Compliance Assessments</td>
<td>50,843</td>
</tr>
<tr>
<td>Incident Investigations Completed</td>
<td>68</td>
</tr>
<tr>
<td>Issue-Specific Consultations</td>
<td>3</td>
</tr>
<tr>
<td>New Certificates of Qualification Issued</td>
<td>2,846</td>
</tr>
<tr>
<td>Regulatory Instruments and Amendments Issued</td>
<td>61</td>
</tr>
<tr>
<td>As-Found Hazard Assessments</td>
<td>50,658</td>
</tr>
<tr>
<td>Compliance and Enforcement Actions</td>
<td>431</td>
</tr>
<tr>
<td>Issue-Specific Consultations</td>
<td>3</td>
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<tr>
<td>Technology Newsletter Subscribers</td>
<td>26,080</td>
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<tr>
<td>New Licences Issued</td>
<td>991</td>
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<tr>
<td>Client Education Events</td>
<td>121</td>
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</tbody>
</table>

- 67% More Compliance and Enforcement Actions over 2016
- 80% Pass Rate for Compliance Assessments
- Excluding those marked N/A or no rating
In March 2017, four people and the family dog were found deceased in their dwelling. Technical Safety BC concluded that the fatality was likely caused by carbon monoxide (CO) exposure due to an incorrectly-installed tankless, on-demand water heater in the living area of the home that was venting CO indoors. The fire department reported measuring in excess of 2,000 parts per million of CO in the air.

The installation of the water heater was unpermitted, unlicensed, and unsafe. This hazard was also preventable.

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

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

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

Each year Technical Safety BC seeks to inform the public about the dangers of CO poisoning. In 2017, we partnered with FortisBC and Preventables on an advertising campaign, conducted media outreach, and attended several safety-oriented events to raise awareness about preventing CO exposure.

Recognizing the potential need for greater awareness in remote communities, Technical Safety BC has since worked with graduate students on a research project which provided additional insights and analysis into the approximately 280 remote communities in BC, 54 of which are not serviced by utilities or considered “off-grid”. It’s hoped that the information gathered will help us improve outreach activities for those areas to inspire local safety leadership and achieve better safety outcomes.

Technical Safety BC receives reports of incidents and conducts assessments of regulated equipment and work. Through investigation, inspection, and audit, we aim to advance safety with a view towards managing risk.
Artificial intelligence (AI), open source data, sensor technology, information modelling, and machine learning are big buzz words in the technology industry. From Google’s new automated personal assistant booking hair appointments on your behalf, to AI systems helping medical professionals better treat patients, advanced technologies are already shaping the world we live in.

In fact, many of the world’s leading countries have made major AI strategy announcements and pledged significant new funding for AI research and developments, as well as its ethical considerations.

But, while many public bodies are just starting to explore the benefits of using advanced technology tools within their organizations, Technical Safety BC is actively integrating these processes into their day-to-day work.

As a regulating body, Technical Safety BC oversees the operation and installation of safety systems and equipment across BC. Electrical systems in condo buildings, commercial propane storage tanks, and hot water boilers in schools are just a small list of equipment and systems under their purview.

“As a regulator overseeing many industries throughout the province, there is a vast amount of territory and industries to cover. In the past, our work relied solely on in-person physical inspections of regulated work,” explains Ab van Poortvliet, Vice President, Data Analytics and Decision Science at Technical Safety BC.

“Our safety officers can’t be everywhere at once, so we wanted to explore if there was a way to use technology to better assist our clients and safety officers, help predict hazards and use our people more efficiently.”

Technical Safety BC is a public regulator in Canada who embraces artificial intelligence and data science by building its own proprietary in-house predictive algorithm and software that assists and supports its clients and safety officers in reducing the number of technical safety incidents.

Several years ago, the organization developed an in-house computer algorithm known as the Resource Allocation Program (RAP). Using permit and inspection data gathered by its own safety officers and a simple model to prioritize work for safety officers, the program’s goal was to identify areas with the highest risks, so the organization can better allocate its resources.

A dedicated data science team was then tasked with integrating advanced analytics into all parts of the business. The data science team engaged with Dataiku to help quickly prototype, test, iterate, and deploy innovative, data-driven solutions to affect the way Technical Safety BC manages risks. Now the program is generating safety-related, predictive insights from historical records of safety inspection data in real-time.

Built on the latest machine learning technologies, new models developed in this project adapt quickly to reflect any emerging risks and to help Technical Safety BC shift resources based on the most current knowledge.

“We tested how machine learning could enhance our RAP approach, and found that it improved our predictions by 80%,” van Poortvliet explains.

“Using machine learning makes better use of safety officers’ time so they can visit other sites, allowing them more time to be present in their community.”

“Public safety is our mandate and this means continuously learning about the best ways to find safety issues and see them addressed. It’s combining the passion and insights of our employees with digital technology that makes us an effective regulator.”

**EMBRACING EMERGING TECHNOLOGIES TO IMPROVE SAFETY IN BC**
**INCIDENTS**

Incidents involving work or equipment regulated by the Safety Standards Act are required to be reported to the appropriate provincial 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. The total number of incidents assessed by Technical Safety BC between 2013 and 2017 is shown below.

![Incident Trends](image)

**INJURIES**

Injuries reported to us over the last five years as a result of incidents related to regulated equipment are summarized below.

![Injuries Reported](image)

**PERMITS**

The volume of installation and operating permits issued and, in the case of Railways, the number of management plans provide an indication of the amount of regulated work being conducted within the safety system.

![Permits](image)

Note: Alternative Safety Approaches (ASAs) are not operating permits, but have similar characteristics. In 2017, there were 11 Safety Management Plans and 33 Equivalent Standard Approaches.

**LICENSING AND CERTIFICATION**

Technical Safety BC issues licenses to business that perform regulated work, and issues certificates of qualification to individuals who demonstrate a required level of knowledge and experience. Licensing and certification assures that minimum standards of knowledge and proficiency are maintained regarding the completion of regulated work.

![New Licences and Certificates of Qualification in 2017](image)
ASSESSMENT OF REGULATED WORK

To evaluate and enforce duty holders’ obligations under the Safety Standards Act and regulation, our safety officers conduct physical assessments of permitted and regulated work, and perform audits of safety management plans. These assessments and audits provide us with an understanding of the strengths and weaknesses within the safety system and help inform our proactive prevention, assessment and audit activities.

Compliance of Duty Holders’ Work 2017

![Compliance Chart]

Note: Railways and Alternative Safety Approaches are not listed above because the Railway Safety Act and Alternative Safety Approaches Regulation do not define the use of licenses or certificates of qualification.

COMPLIANCE AND ENFORCEMENT ACTIVITY

Technical Safety BC compels compliance with the Safety Standards Act where individuals have resisted attempts to make their work or equipment compliant. Safety officers and safety managers have a variety of tools at their disposal. The use of these tools in 2017 is outlined below.

Compliance and Enforcement Activity By Type

<table>
<thead>
<tr>
<th>Year</th>
<th>Compliance Audit</th>
<th>Warning Notice</th>
<th>Compliance Order</th>
<th>Monetary Penalty</th>
<th>Discipline Order</th>
<th>Bond Called</th>
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<tbody>
<tr>
<td>2016</td>
<td>3</td>
<td>107</td>
<td>130</td>
<td>15</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>8</td>
<td>150</td>
<td>210</td>
<td>49</td>
<td>12</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Active Licences and Certificates

![Licences and Certificates Graph]

Note: Railways and Alternative Safety Approaches are not listed above because there were no compliance and enforcement activities undertaken in these technologies during 2017.