ASPR ANNUAL STATE OF PUBLIC SAFETY REPORT FY 2016
SAFETY FIRST
AND FOREMOST

Keeping Ontario Safe Through Sound Judgement

TSSA’s summary of the Annual State of Public Safety Report paints a clear picture of the state of safety in TSSA’s regulated sectors and the strategies TSSA has undertaken to make them even safer.

Whether you are an owner, operator, homeowner, member of the public or a public safety advocate seeking to better understand TSSA’s safety strategies, we are committed to providing relevant and succinct information.

The report contains safety information about TSSA’s regulated sectors: amusement devices; boilers and pressure vessels; elevating devices; fuels; operating engineers; ski lifts; and upholstered and stuffed articles – for the fiscal year May 1, 2015 to April 30, 2016. It includes trend analysis on occurrences and resulting injuries, innovative compliance metrics, and insight into the full scope of TSSA’s oversight activities aimed at enforcing and promoting public safety.

This report is one facet of TSSA’s annual public reporting and should be read in conjunction with our safety risk analysis in the complete Annual State of Public Safety Report, our corporate achievements in the Annual Report and our strategic priorities for the next fiscal year in our Business Plan. All reports are available at www.tssa.org.
The Technical Standards and Safety Authority (TSSA) is Ontario’s public safety regulator mandated by the Government of Ontario to enforce the Technical Standards and Safety Act, 2000 and its associated regulations in four key areas: Boilers and Pressure Vessels and Operating Engineers; Elevating and Amusement Devices and Ski Lifts; Fuels; and, Upholstered and Stuffed Articles.

Founded in 1997, TSSA works in partnership with our regulated industries, the Ministry of Government and Consumer Services and the public to identify opportunities to prevent and mitigate safety risks. Our activities aim to both promote and enforce public safety and include licensing, registration, certification, training and examinations, engineering reviews, inspections, audits, investigations, prosecutions, public policy analysis, research and public education.
Whether we are reviewing a design, conducting an inspection or investigation, issuing a licence, administering examinations, certifying tradespeople, registering companies or individuals, or educating the public, our core purpose – to promote and enforce public safety – is paramount in all that we say and do.

Driven by a ‘safety first’ attitude, our approach to public safety is more than a mindset. It’s recognizing that safety is a shared responsibility. It’s understanding customer needs. It’s about collaborating with industry, government and the public toward a safer future for Ontario. Ultimately, it’s about ensuring safety in all the sectors we regulate – Amusement Devices, Boilers and Pressure Vessels, Elevating Devices, Fuels, Operating Engineers, Ski Lifts, and Upholstered and Stuffed Articles – by enforcing the safety rules and raising awareness.

Once again, I am delighted to present the abridged or ‘public’ version of our Annual State of Public Safety Report which highlights the synergy of all these efforts and so much more.

I am pleased to report that the overall level of safety in the sectors we regulate continues to remain high – in fact, well above the international benchmark. This speaks to the exceptional state of safety across the broad scope and breadth of TSSA-regulated industries and the critical role TSSA staff play in working with our partners to ensure safety in Ontario.

Of course, we recognize there’s still much more to do. Carbon monoxide risks at multi-unit residences and fuel-related risks in homes and at commercial establishments continue to concern us. And, user behaviour remains the dominant cause of incidents on amusement and elevating devices and ski lifts. We will continue to explore effective risk mitigation strategies for these safety issues.

I invite you to read this report for specific details on our top safety priorities, causes and behaviours contributing to risk and our mitigation strategies to address these findings. As a public safety organization, we are deeply committed to transparency and accountability and I welcome your feedback to help us improve this report.

Michael Beard
President and CEO
“…the overall level of safety in the sectors we regulate continues to remain high – in fact, well above the international benchmark.”
TSSA uses an evidence-based, scientific approach to analyze and manage safety risks to Ontarians in TSSA-regulated sectors.

**Identifying and Analyzing Public Safety Risk**

We gather and analyze information such as inspection and incident reports to understand the nature and source of risk in each area we regulate.

**Examining Options for Managing Risks**

We consider a variety of tools such as regulatory changes, technological solutions, enforcement activities and public education to help us best manage public safety risks.

**Selecting the Most Effective Risk-Management Techniques**

Working with stakeholders in government, industry and the public we analyze the impacts each of our risk management strategies will have on public safety and select the best approach for managing each risk.
Risk-informed decision-making (RIDM) is all about understanding safety issues in the areas we regulate, identifying the level of risk and prioritizing those that require the most attention.

While the concept may sound simple, the steps taken to understand risks and develop mitigation strategies are intricate, involved and above all else 'informed'.

We start off by gathering and analyzing information from the occurrences reported to TSSA (the who/what/where/when/how of an incident), quantifying data (number of incidents, injuries and/or fatalities) and identifying the level of safety risk (high, medium or low) Ontarians are exposed to through their interactions with the technologies, devices, equipment and/or products TSSA regulates.

We then prioritize those issues requiring the most attention and focus our resources, including working in partnership with stakeholders, to develop appropriate strategies to address safety hazards and determine and select the best technique for enhancing safety outcomes.

Last, but not least, we measure results, and validate efforts – all aimed at ensuring continuous improvement in our overall performance – and publicly report on our findings and activities.

Implementing the Selected Techniques

Guided by the advice of stakeholders, we communicate and implement the best techniques for managing risk.

Monitoring Results

We measure results, validate efforts and re-focus our efforts in areas where they will have the greatest impact on public safety – all aimed at continuous quality improvement.
RISK-INFORMED DECISION-MAKING

TSSA’s risk framework assists our safety experts across all our programs in making day-to-day decisions while helping tackle larger and more complex strategic regulatory decisions.
As the pioneers of an innovative methodology called Risk-Informed Decision-Making (RIDM), TSSA’s Public Safety Risk Management team has been applying this framework to assess the state of safety in TSSA-regulated sectors and develop prevention and awareness strategies where they are needed most. During the past year TSSA advanced the science of risk management by leading a number of critical initiatives including:

- Organizing and participating in a workshop that brought regulators and government agencies from Canada, USA and Finland together to foster discussion on risk-informed regulatory decision-making.
- Initiating the development of a risk-informed mitigation strategy that identifies the need for greater collaborative efforts at national and international levels to better manage the risk of carbon monoxide poisoning.
- Working in partnership with external stakeholders, academia, expert groups and agencies to explore technological innovations as a means of addressing safety issues such as CO exposures, door-closing occurrences on elevators, and fuel oil leaks from residential oil tanks.
- Working with safety partners to develop a national guideline on Managing Risk in the Public Interest.

For more detailed information on our RIDM methodology and safety analysis, visit our website www.tssa.org for the full technical version of our Annual State of Public Safety Report.
Based on an analysis of all reported occurrences over the past nine years, the overall state of safety in TSSA’s regulated sectors remains excellent.

Across TSSA’s regulated sectors, the health impact of fatalities and injuries was low in 2016. In 2009, the health impact observed was high primarily due to carbon monoxide poisoning incidents involving fuel-fired appliances in private homes.

Using an innovative methodology, TSSA proactively assesses risk by analyzing occurrences and considering the injuries that could have been sustained in those incidents and not just what happened. As shown, the Fuels sector continues to demonstrate the highest level of risk across TSSA’s regulated sectors – primarily due to carbon monoxide-related occurrences in private dwellings.

Due to limited occurrence data, the level of safety risk cannot be calculated for BPV, OE or USA program areas.
2016 Reported Occurrences

<table>
<thead>
<tr>
<th>Category</th>
<th>Fatalities</th>
<th>Serious Injuries</th>
<th>Minor Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Engineers</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Boilers &amp; Pressure Vessels</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ski Lifts</td>
<td>0</td>
<td>2</td>
<td>51</td>
</tr>
<tr>
<td>Elevators</td>
<td>0</td>
<td>11</td>
<td>152</td>
</tr>
<tr>
<td>Escalators &amp; Moving Walks</td>
<td>0</td>
<td>5</td>
<td>455</td>
</tr>
<tr>
<td>Amusement Devices</td>
<td>0</td>
<td>41</td>
<td>828</td>
</tr>
<tr>
<td>Fuels</td>
<td>0</td>
<td>14</td>
<td>50</td>
</tr>
</tbody>
</table>

Reported occurrences include completed investigations only and are subject to change as investigations are concluded.

For additional details on how we define and analyze risk, visit our website www.tssa.org for the full version of our Annual State of Public Safety Report.
TOP SAFETY PRIORITIES

Fuel-related incidents continue to pose a high level of risk and consequently dominate TSSA’s top four safety priorities.

1. Carbon Monoxide in Private Homes

Poorly installed or maintained household appliances including furnaces, water heaters and boilers, and the use of appliances not designed for indoor use, continue to be at the crux of the single largest source of risk – carbon monoxide (CO) poisoning - across all sectors regulated by TSSA. As part of a larger CO strategy, we are exploring potential regulatory and technological solutions, seeking a better understanding of our public health impacts of CO poisoning, as well as enhancing our public education strategy.

2. Carbon Monoxide In Multi-Unit Residences

As a result of improved incident reporting, we have seen an increase in CO-related occurrences and associated injuries in community housing locations and apartments. With improper maintenance being the leading cause of these incidents, we are working with industry stakeholders to communicate the need for maintenance of fuel-fired equipment and the risk of inadequate maintenance or improper installation of equipment.
3. **Unsafe User Behaviour on Elevators**

With an increasing number of elevator incidents in apartments and condos caused by distracted users getting hit by elevator doors and/or tripping and falling, we will be piloting a new user behaviour checklist for incident investigators to better understand what happened. We are also engaging industry partners to explore potential new technologies such as door detection systems designed to better protect the public.

4. **Fuel-Related Risks at Commercial Food Establishments**

Poor maintenance of appliances such as stoves and ovens at food service locations, including restaurants and bakeries, pose the highest risk for fires, explosions and CO poisonings at these locations. TSSA is developing a strategy focused on communicating with owners and operators and partnering with other regulators to increase awareness and reduce risks in these locations.
While you’re relaxing by the gas fireplace, barbecuing your favourite meal, filling up at the gas station, or grabbing a bite from a food truck, TSSA is looking out for your safety.

TSSA’s Fuels Safety Program regulates the transportation, storage, handling and use of fuels including natural gas, propane, fuel oil, gasoline, diesel, butane, hydrogen, digester gas, and landfill gas. We carry out inspections and license pipelines, gas stations, propane fuelling stations, marinas and tanker trucks. We also issue licences to operate fuel facilities, register contractors and certify tradespersons who install and service equipment. Additionally, we review and approve facility plans for TSSA-licensed sites and perform custom equipment approvals and inspections to ensure fuel is handled and used safely.

Our risk analysis continues to identify residential dwellings as the number one area for carbon monoxide-related incidents. Because of the limitations our inspectors face accessing private homes, we deliver public awareness campaigns throughout the province in an effort to increase awareness of the risks associated with fuel-burning appliances and what homeowners can do to protect themselves.

Transmission, distribution and transportation, storage and dispensing, and utilization are the key stages of the fuels life-cycle.

<table>
<thead>
<tr>
<th>Comprehensive Oversight</th>
</tr>
</thead>
<tbody>
<tr>
<td>59,000+ Certified Fuels Professionals</td>
</tr>
<tr>
<td>9,800+ Licensed Facilities</td>
</tr>
<tr>
<td>12,600+ Inspections</td>
</tr>
</tbody>
</table>
There is an increasing trend in the number of CO occurrences in private dwellings and multi-unit residences. Lack of, or improper maintenance and inappropriate use of fuels burning appliances continues to be the largest contributor to the risk, which continues to demonstrate a level of risk beyond acceptable levels.

Increase in CO Release in Residences

**Private Dwellings**

↑5%

**Multi-Unit Residences**

↑7%

There is an increasing trend in the number of CO occurrences in private dwellings and multi-unit residences. Lack of, or improper maintenance and inappropriate use of fuels burning appliances continues to be the largest contributor to the risk, which continues to demonstrate a level of risk beyond acceptable levels.
Fuels Safety

Sources of Risk

Non-Compliance 63%
Risks are attributed to owners, contractors and/or operators not adhering to legislation, codes and/or standards.

Unknown 24%
The root cause of related occurrences could not be determined.

External Factors 12%
Risks are a result of factors outside TSSA’s direct control such as user/consumer behaviour, environmental/weather issues, etc.

Potential Gaps in Regulatory System 1%
Risks caused by safety issues not currently addressed in legislation, codes and/or standards.

Non-Compliances with Regulatory Requirements

CO Release
There is an increasing trend in occurrences at private dwellings and multi-unit residences, predominantly related to boilers, furnaces and water heaters.

Explosion
Fuel-burning appliances such as cooking equipment, fireplaces and gas supply are the main contributors to explosion occurrences at food service locations and private dwellings.

Fire
Nearly 45% of fires in commercial establishments took place in food service locations and were related to cooking equipment.

Vapour Release
Nearly 75% of vapour releases in commercial establishments were related to gas supply equipment located outside the establishment, and were usually the result of improper work practices.

Approximately 63% of the risk is due to non-compliance with regulatory requirements resulting in either a CO release, an explosion or delayed ignition, a fire or vapour release.
CARBON MONOXIDE PREVENTION AT HOME

The best way to ensure that you and your family are not exposed to carbon monoxide (CO) is to know the sources and eliminate this poisonous gas at the source.

Protect Yourself and Your Family

- **Be Aware of the Hazard**  Carbon monoxide (CO) is a highly poisonous gas, often referred to as ‘the silent killer’ because you can’t see it, touch it or smell it.
- **Eliminate CO at the Source**  Have a TSSA-certified fuel technician inspect and maintain your fuel-burning appliances every year.
- **Install Certified CO Alarms in Your Home**  For installation locations, follow manufacturer’s instruction or ask your local fire department and remember to replace the batteries at least once a year.
- **Know the Symptoms of CO Poisoning**  They are similar to the flu – nausea, headache, burning eyes, confusion and drowsiness – except there is no fever. If they appear, immediately get everyone, including pets, outside to fresh air and call 911 or your local fire department.
CO SOURCES ON THE RISE

There is an increasing trend in the number of CO occurrences in private homes related to three common fuel-burning household appliances.

**Water Heaters**: 29% increase in occurrences. These were related to improper installation procedures, poor maintenance practices and defective or worn material involving venting and/or chimneys.

**Furnaces**: 10% increase in occurrences. These were related to defective or worn materials, such as cracked or failed heat exchangers, inadequate maintenance resulting in blocked heat exchangers and improper furnace activation.

**Boilers**: 9% increase in occurrences. These were related to a lack of maintenance procedures and poor installation of boilers.
TACKLING CARBON MONOXIDE (CO)

We are focused on raising awareness among regulators, industry partners, the public and policy makers of the risks associated with CO to mobilize a concerted response.

PUBLIC AND GLOBAL HEALTH BURDEN

We will collaborate with national and global partners to share data and best practices for managing and reducing the public health burden associated with CO poisonings.

RISK MANAGEMENT

We will consider regulatory policies, enforcement strategies, technological innovations and enhanced advocacy to assist us in managing the risk.
With CO-related incidents at private homes continuing to be the single largest source of risk across all TSSA-regulated sectors, we continue to consider CO an urgent public health issue.

We remain committed to reducing this source of risk by applying a variety of strategies including regulatory initiatives, technological solutions, public education, stakeholder partnerships and enforcement strategies. It is becoming clear that the issue will require a much broader partnership of stakeholders and exploration of innovative approaches to effectively manage.

As part of a renewed carbon monoxide risk mitigation strategy, we have begun establishing partnerships with public health agencies, industry, regulators and non-profit groups at provincial, national and global levels to share a common understanding to addressing an emerging global public health issue.

To date, an international collaborative network made up of partners from USA, England, France and Italy has been formed and met at an international summit organized by the US Centre of Disease Control in January 2016 with the following objectives:

- identify and establish means for sharing global data on mortality and injury rates associated with CO;
- identify common standards for analysis of risk factors and causal information associated with CO exposures; and,
- share best practices on intervention methods used to manage and reduce public health burden associated with CO poisonings.

TSSA has also begun pilot work examining the possibility of applying advanced sensor technologies to gather data to develop predictive models to detect and provide early warnings of CO. We will evaluate the effectiveness of this approach and in collaboration with our safety partners determine next steps.

EVALUATION AND CONTINUOUS IMPROVEMENT

We will continue to evaluate and report on the effectiveness of TSSA’s compliance and advocacy strategies and design evaluation plans with the overall objective of reducing the health impact associated with CO poisonings.
While the overall level of risk at food service locations is at a tolerable level, the increasing trend in occurrences at sites with commercial kitchens, such as restaurants and bakeries, is worrying.

Poor maintenance of appliances, such as stoves, fryers and ovens at food service locations, has led to an increasing number of grease fires and explosions resulting from delayed ignition.

Nearly 45% of occurrences at commercial establishments that resulted in fire took place at food service locations and were predominantly a result of either improper or negligent work practices or defective or failed equipment.

In an effort to address this emerging safety issue, TSSA is engaging key stakeholders in the restaurant industry sector and regulators such as the Ministry of Labour and municipal public health units to develop a comprehensive advocacy strategy.

Our focus will be on developing communication strategies to enhance awareness of the risks associated with kitchen equipment and provide information on how restaurant owners and kitchen staff can protect themselves and the public they serve.
Retirement homes and long-term care facilities are truly ‘special buildings’ not only from TSSA’s regulatory perspective but also because they house seniors.

With carbon monoxide occurrences the primary safety concern in multi-residential buildings and because the elderly may have evacuating a building, we initiated a pilot inspection program to better understand the risks associated with fuel-burning equipment at these locations.

Based on the pilot, which saw TSSA inspectors conduct fuels inspections at over 150 retirement home and long-term care facilities across Ontario, TSSA identified a number of common issues related to faulty installations and inadequate maintenance of fuel-burning appliances such as boilers and kitchen equipment.

To enhance safety at these sites, TSSA is working with partners, such as the Ontario Retirement Communities Association, the Retirement Homes Regulatory Authority and the Ministry of Health and Long-Term Care, to develop advocacy strategies and tools to help facility managers understand their regulatory responsibilities and better maintain their fuel-burning equipment.

While the overall risk associated with fuel-burning equipment at retirement homes and long-term care sites has been reduced to low, TSSA will continue to monitor this sector to ensure the risk remains low.

CO-related occurrences at long-term care facilities or retirement homes were primarily associated with boilers, cooking equipment, and various types of defective equipment.
02 ELEVATING DEVICES
Whether you’re taking an elevator or escalator to get to your desired floor, a moving walk gliding you one step further to your destination or a chair lift to get you to the top of the ski hill - TSSA is with you every step of the way.

TSSA’s Elevating Devices Safety Program regulates devices in Ontario which transport people and/or freight such as elevators, escalators, moving walks, shopping cart conveyors, lifts for persons with physical disabilities, chair lifts and construction hoists – to name but a few.

We conduct design reviews and register elevating devices, issue licences, conduct inspections prior to start-up and periodically during operation, certify and register mechanics and contractors, and perform incident investigations. While we are responsible for all that, safety is not a one-way street. Through industry advisory councils and technical risk reduction committees, we work to propose improvements and implement safety solutions. Collectively we strive to ensure a safe environment for the riding public.
Elevator Safety

The overall level of elevator safety in Ontario remains high. Last year the health impact associated with elevator occurrences was extremely low. The biggest factor in elevator incidents is unsafe user behaviour.

Health Impact 2008-2016

Elevator Injuries

Door-Related Injuries

- Rental Locations: 84%
- Mercantile Locations: 6%
- Other Locations: 7%
- Office Locations: 3%

Trip and Fall Injuries

- Condominiums: 44%
- Office Locations: 25%
- Rental Locations: 20%
- Other Locations: 11%

The most common cause of injuries stem from riders coming into contact with elevator doors (either while entering/exiting or trying to stop a closing door) and trips or falls.
Elevator Safety

Sources of Risk

<table>
<thead>
<tr>
<th>Source of Risk</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Factors</td>
<td>78%</td>
</tr>
<tr>
<td>Non-Compliance</td>
<td>18%</td>
</tr>
<tr>
<td>Unknown</td>
<td>4%</td>
</tr>
<tr>
<td>Potential Gaps in Regulatory System</td>
<td>1%</td>
</tr>
</tbody>
</table>

- External Factors: Risks are a result of factors outside TSSA’s direct control such as user/consumer behaviour, environmental/weather issues, etc.
- Non-Compliance: Risks are attributed to owners, contractors and/or operators not adhering to legislation, codes and/or standards.
- Unknown: The root cause of related occurrences could not be determined.
- Potential Gaps in Regulatory System: Risks caused by safety issues not currently addressed in legislation, codes and/or standards.

Risk Ranking of Elevators

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>95%</td>
</tr>
<tr>
<td>Medium Risk</td>
<td>5%</td>
</tr>
<tr>
<td>High Risk</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

- Low Risk: 95% of elevators in Ontario that have been ranked are classified low risk, demonstrating an exceptional level of safety of Ontario’s elevators.
- Medium Risk
- High Risk

*Numbers may not add up to 100% as they have been rounded.*
ELEVATING DEVICES

REDUCING ELEVATOR INJURIES

The vast majority of elevator incidents continue to be related to user behaviour with older and younger users at higher risk of injury.

While the overall level of elevator safety in Ontario remains high, an increasing trend in the number of reported occurrences related to user behaviour has TSSA’s Elevating Devices Safety Program acting to address this risk proactively before the safety risk reaches unacceptable levels.

Over the past eight years, TSSA has observed an increasing trend of 14% a year in the number of elevator occurrences, 75% of which are related to unsafe user behaviour, such as passengers distracted by their smart phones and hurried riders using their legs or arms to stop closing doors.

While the health impacts of these incidents are typically minor such as scrapes and bruises, the increasing trend in these occurrences has TSSA exploring ways to enhance its safety advocacy strategy to increase public awareness of the dangers of distracted riding or rushing closing doors.

We will also be engaging industry partners to explore the application of sensor technologies to better detect users to prevent doors closing on them.

Elevator Safety Tips

1. Don’t charge or run through closing doors
2. Use the button – not hands or legs – to stop a closing door
3. Watch your step when getting on or off
4. Stay in the elevator if power fails or elevator stops
Elevator Safety

Reported Occurrences

In 2016 there were 510 occurrences reported to TSSA that resulted in 0 fatalities, 11 serious and 152 minor injuries. The majority of occurrences typically involved unsafe user behaviour.

Increasing Trends

<table>
<thead>
<tr>
<th>Occurrences</th>
<th>Serious Injuries</th>
<th>Minor Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑14%</td>
<td>↑8%</td>
<td>↑6%</td>
</tr>
</tbody>
</table>

We are seeing increasing trends in occurrences, serious injuries and minor injuries.
ELEVATING DEVICES

ESCALATORS AND MOVING WALKS

With the number of trips and falls on the rise, we will be piloting a new behaviour checklist to better understand what is happening on escalators and moving walks.

While Ontario’s 2,200 escalators and moving walks regulated by TSSA are very safe, riders can be injured if they are not paying attention, playing around, or overloaded with luggage and bags.

Last year there were 709 occurrences reported to TSSA resulting in zero fatalities, 5 serious injuries and 455 minor injuries. As seen in previous years, user behaviour continues to be the leading cause of incidents, with the majority of incidents occurring at mass transit locations such as subway stations and bus terminals.

Specifically, people tripping or falling account for the largest proportion of incidents related to user behaviour, making up 80% of such incidents.

With incidents related to riders not paying attention increasing at a rate of 4% each year, TSSA will continue to build on our advocacy work to increase public awareness about escalator safety. This past year, we produced ‘Be Safe, Not Sorry’ a series of safety videos that were distributed through social media that emphasized the importance of riding escalators safely.

The videos highlighted the dangers of taking strollers on escalators, wearing loose clothing such as scarves, being mindful of young children, and being considerate of the elderly. The videos are available on TSSA’s YouTube channel and available for public use.

User behaviour continues to be the leading cause of incidents on escalators and moving walks, occurring predominantly at mass transit locations.

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**Escalator Safety Tips**

- Hold on to the handrails
- Stand in the middle of the stairs and hold your child’s hand
- Be careful of footwear
- Use elevators not escalators for strollers or other mobility devices
Most snowboarders and skiers only think about the fun going down a hill, but getting up a hill and doing so safely is as important to having a great time on the slopes.

Ontario’s ski resorts operate more than 260 chair lifts and other devices to get you to the top of their hills. While last winter saw one of the lowest number of occurrences since 2008, virtually all of those incidents were related to user behaviour such as not paying attention, getting on or off the lift or horsing around while on the lift.

Falls from lifts make up half the incidents, a third of the incidents involved physical impact with the lift, and 10 per cent of the incidents were entanglements. These incidents predominantly occurred when passengers were loading or unloading and fortunately the vast majority of injuries were minor.

This past year, we partnered again with the Ontario Snow Resorts Association and the Canadian Ski Instructors’ Alliance to educate skiers and snowboarders about lift safety. We also continued our on-site safety program with RideSmart Safety teams teaching users how to safely load and unload from the chair lifts.

Next year, we will continue to work with our industry partners to explore new technologies that may allow control systems to automatically detect riders who may be at risk of falling out of their chairs and stop the lift.

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**Ski Lift Safety Tips**

**Getting On**
- Look over your shoulder for the chair
- Load safely onto the chair
- Lower the safety bar

**Getting Off**
- Lift the safety bar
- Stand up on your skis/snowboard
- Leave the unloading area immediately and safely

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TSSA safety strategies are aimed at educating skiers/snowboarders on safe riding practices and working with resort operators to improve loading and unloading procedures.
03 AMUSEMENT DEVICES
When you’re out for fun taking a few laps around a go-kart track, splashing down a waterslide ride, or getting an adrenaline rush on a roller coaster, TSSA is riding alongside with you.

TSSA’s Amusement Device Safety Program regulates a wide range of devices designed to entertain thrill seekers including roller coasters, Ferris wheels, merry-go-rounds, water slides, go-karts, bumper carts, inflatables, bungee devices and zip lines.

Before a new amusement device is registered, we review engineering designs to ensure compliance with Ontario’s safety requirements. We license amusement rides and operators, issue certificates to qualified mechanics and permits for each ride in every year it operates. We also conduct inspections of new devices prior to start-up and again at the start of every new season. And, when something does go wrong, we conduct investigations and if necessary conduct prosecutions.

With our risk analysis continuing to identify user behaviour as the leading cause of incidents, we also deliver public education campaigns throughout the province in an effort to increase awareness and understanding of the role people play when it comes to their own safety.

In collaboration with ride operators, our focus is on providing a safe environment and atmosphere for thrill seekers and ride enthusiasts.

### Comprehensive Oversight

<table>
<thead>
<tr>
<th>2,200+</th>
<th>Amusement Devices in Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>380+</td>
<td>Licensed Operators</td>
</tr>
<tr>
<td>2,100+</td>
<td>Inspections</td>
</tr>
</tbody>
</table>

Annual State of Public Safety Report FY 2016
Amusement Devices Safety

The overall level of amusement device safety in Ontario remains very high. Last year, the health impact, measured by injuries and fatalities, associated with amusement device incidents was extremely low.

Health Impact 2008-2016

Root Causes of Risk

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Factors</td>
<td>95%</td>
</tr>
<tr>
<td>Non-Compliance</td>
<td>4%</td>
</tr>
<tr>
<td>Unknown</td>
<td>1%</td>
</tr>
<tr>
<td>Potential Gaps in Regulatory System</td>
<td>0%</td>
</tr>
</tbody>
</table>

User behaviour continues to be the leading cause of incidents and accounts for virtually all reported amusement device occurrences.
Amusement Devices Safety

Reported Occurrences 2008-2016

We are seeing an increasing trend in occurrences and injuries, which is primarily a result of improved reporting practices enforced by TSSA. In 2016, 902 occurrences were reported that resulted in 0 fatalities, 41 serious injuries and 828 minor injuries.

Risk Ranking of Amusement Devices

93% of amusement devices that have been ranked are classified as low risk, demonstrating an exceptional level of safety.
While the overall state of safety in Ontario’s amusement devices remains excellent, the increasing trends in occurrences and injuries, virtually all related to rider behaviour, has TSSA’s Amusement Devices Safety Program focused on enhancing public awareness.

An increasing trend in occurrences of 8% per year is attributed primarily to better reporting by major operators during the past three years as a result of enhanced enforcement of reporting requirements by TSSA.

While analysis of these occurrences has identified that the vast majority of injuries are minor such as bumps and bruises, the increasing trend in those injuries are concerning nonetheless.

This past year, TSSA initiated a review of its public education programs at amusement parks to assess and identify ways to enhance its advocacy efforts to educate park patrons on how to have both a fun and safe time.

We also developed a new behaviour checklist to assist our incident investigators in better understanding behavioural factors underlying the increasing trend in occurrences. This information will in turn assist in refining both safety and advocacy strategies to enhance public safety.

As ride operators’ interaction with riders is also a key factor in amusement ride safety, our operational inspections will be enhanced next year as part of a broader strategy to address user behaviour-related incidents at Ontario’s amusement parks and fairs.

Engaging waterslide users at water parks and instantly rewarding riders for recalling safety messages and demonstrating safe and proper riding behaviour is having a positive effect on rider behaviour.

### Ride Safety Tips

- Check out ride requirements before getting in line
- Secure any loose items
- Listen to operators and follow instructions
- Ask operators or park staff for help
Have Fun by Staying Safe

Amusement Device Occurrences and Injuries 2010-2016

Over the last seven years, unsafe user behaviour on amusement rides has led to more than 2,600 injuries being reported to TSSA. The bulk of these injuries take place on popular rides/devices such as waterslides, roller coasters, circular rides and zip lines.

Regardless of the ride, it’s important to practice safe riding by following safety rules and listening to attendant’s/operator’s instructions.

Rider Safety

Waterslides
Bumping or banging against the slide and trips and falls make up the bulk of head-related injuries.

**Ride Safety**
Obey attendant’s Instructions.
Always go down feet first.
Don’t run in/around the pool area.

Coaster Rides
Bumping or banging in the passenger carrying unit and trips and falls are the primary cause of head-related injuries.

**Ride Safety**
Follow age, height and weight ride requirements. Keep arms and legs inside the ride at all times.

Circular Rides
Bumping or banging in the passenger carrying unit and trips and falls are the primary cause of head-related injuries.

**Ride Safety**
Follow age, height and weight ride requirements. Keep arms and legs inside the ride at all times.

Zip Lines
Grabbing the rope and/or the pulley cause the bulk of hand-related injuries.

**Ride Safety**
Wear protective safety gear.
Follow operator’s instructions.
04 OPERATING ENGINEERS
Whether you’re in a lecture hall at university, visiting someone in the hospital, watching a curling match, shopping in the frozen food section at your grocery store, or just having fun at your community ice rink, TSSA is there behind the scenes playing an important public safety role. The power plants that generate electricity, refrigeration, heating and cooling and the power engineers and operators who run those plants all fall under TSSA’s Operating Engineers Safety Program.

TSSA is responsible for registering, inspecting and regulating the safety of power plants in Ontario. In addition, we are responsible for the examination and certification of the professionals who manage power plant operations.

Our comprehensive registration, inspection and certification activities ensure that operating engineers and operators in Ontario have the skills and knowledge to safely manage, operate and maintain boilers, steam turbines and engines, gas compression plants, refrigeration plants, and associated mechanical and electrical systems in power generation, industrial processes and environmental system plants.

TSSA’s activities ensure that operating engineers and operators have the skills and knowledge to run the plants that power Ontario.
The overall level of safety in the OE sector is exceptionally high with an average of one incident reported each year. In 2016, there were two reported occurrences. One by an operator error that caused an ammonia release that resulted in a fatality and two serious injuries. The other was an equipment failure resulting in one individual sustaining a minor injury.

95% of plants in Ontario that have been ranked are classified low to medium risk, demonstrating an exceptional level of safety of Ontario’s plants. High risk plants are inspected more frequently, as often as every 6 months to ensure public safety.
Ontario’s Operating Engineers (OE) play a critical role in powering the province. More than 12,700 certified OEs and operators ensure everything from hockey rinks and grocery freezers to electricity power generating stations deliver power safely to keep Ontario humming along.

But those 12,700 certificate holders, many making six-figures, are in high demand because of a looming shortage. A recent study by the Institute of Power Engineers (IPE) found the average age of an OE is 54 and the average age of a Compressor and Refrigeration Operator is 51, with many set to retire in the next decade.

The IPE study found that many high school graduates are not pursuing a career as an OE, a trend many other high-paying trades are facing. The likely cause, according to the IPE, is a lack of interest or understanding of the profession.

Working with the IPE, industry, training providers and the government, TSSA is working to tackle the looming shortages of certified personnel to ensure both safety in the sector and continued economic growth in Ontario.

Last year, TSSA worked to assist students having difficulty finding co-op placements to become certified OEs by working with Ontario’s seven certified colleges and industry to open more co-op placements and to connect students with industry partners. This year, none of the colleges reported any issues finding co-placements for their students.

We also simplified and streamlined the process of becoming a certified OE and Compressor and Refrigeration Operators, as well as significantly improving our turnaround times.

Additionally, we harmonized Ontario’s requirements for Compressor and Refrigeration Operators with all other Canadian jurisdictions, with the exception of Quebec. This is expected to make it easier for certified operators to move between Canadian jurisdictions and help address demand for operators here in Ontario.

And, finally, in collaboration with our counterparts across Canada, all Ontario colleges certified by TSSA to offer the OE program will now be recognized by all other provincial jurisdictions and conversely all colleges certified in other provinces to offer OE programs will be recognized by TSSA.

To ensure there are sufficient OEs to power Ontario in the future, TSSA will continue to work closely with industry, colleges, other provincial regulators and government to entice more students to choose power engineering as a career choice, increase labour mobility across jurisdictions and to make the process of becoming an OE easier, all the while maintaining safety standards.

In collaboration with our safety partners, we continue to develop initiatives to encourage young people to choose the operating engineering profession.
05 BOILERS & PRESSURE VESSELS
Whether it’s the laughing gas at the dentist’s office, oxygen in the hospital room, refrigerant keeping dairy products fresh at grocery stores or dry cleaners giving clothes a fresh, clean feeling, TSSA plays a role by regulating the safety of boilers and pressure vessels.

TSSA’s Boilers and Pressure Vessels Safety Program is responsible for regulating the safe design, construction, maintenance, use, operation, repair and service of all pressure retaining components manufactured or used in Ontario. This includes equipment that produces and distributes hot water, steam, compressed air, and other compressed liquids and gases used in commerce and industry.

We are involved in all aspects of the lifecycle of pressure vessels: from design to manufacture to installation, operation and maintenance to decommissioning. Before pressurized equipment is registered, we conduct an engineering review to verify it meets safety requirements. We examine pressurized equipment and facilities prior to start-up and then conduct periodic inspections on uninsured boilers and pressure vessels in Ontario. We also certify inspectors employed by insurers licensed to conduct periodic inspections of insured equipment.

From design to manufacture, installation, operation, maintenance and decommissioning, TSSA is involved in the complete lifecycle of boilers and pressure vessels in Ontario.

### Achievements In FY16

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<th>Count</th>
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<tr>
<td>5,500+</td>
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<tr>
<td>Design Registrations</td>
</tr>
<tr>
<td>2,700+</td>
</tr>
<tr>
<td>Welder/Brazer Tests</td>
</tr>
<tr>
<td>13,900+</td>
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<tr>
<td>Inspections</td>
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Over the course of the year, TSSA’s Boilers and Pressure Vessels Safety Program staff has been engaged in a number of initiatives to modernize safety processes and requirements.

Working with the Canadian Boiler and Manufacturers Underwriters’ Association, we developed standardized inspection orders and the required time-to-comply associated with each order. This risk-based approach to issuing orders and timelines to comply with those orders will allow for consistency among inspectors when identifying safety risks and issuing orders to resolve them.

We are also leading the way with our plans to introduce electronic logbooks. Manufacturers’ logbooks are mandatory and crucial for recording all key safety steps required in the manufacturing of boilers and pressure vessels.

Currently, paper log books are the only accepted format and retrieving information can be challenging. The implementation of an electronic version would make collecting, accessing and sharing information a lot simpler and efficient.

And, working closely with government and industry partners, we advanced the regulatory review of periodic inspection requirements conducted by insurers. The review seeks to clarify the roles and responsibilities of insurers and strengthen TSSA’s oversight of insurers to enhance boilers and pressure vessels safety in Ontario.

Our collective goal is to ensure the safety of all regulated boilers and pressure vessels in Ontario.
Boilers and Pressure Vessels Safety

Reported Occurrences

A total of 19 occurrences reported to TSSA over the past nine years that resulted in zero fatalities, four serious injuries and one minor injury speaks to the excellent safety record in this sector.

In 2016 there were five occurrences reported to TSSA that resulted in 0 fatalities, 1 serious injury and 1 minor injury.
UPHOLSTERED & STUFFED ARTICLES
A plush pillow and a cozy mattress, your child's favourite stuffed toy, the down-filled jacket keeping you warm in winter; no matter which, TSSA is there to protect you from hazards associated with the use of unclean or unsafe filling materials in household and personal items such as these, and many more.

All filling materials used in Ontario must be new and free from contaminants. Upholstered and stuffed items also have to be labelled with the content used for filling and the manufacturer's registration number.

TSSA's inspectors conduct inspections of manufacturers, importers and distributors, and retailers to make sure their stuffed and upholstered products are properly labelled, clean, free of vermin or contamination, and to make sure the manufacturers of those products are registered with TSSA.

In addition to promoting health and safety, our aim is to protect consumers against fraud and misrepresentation of filling materials.

Our role is to protect Ontarians from hazards associated with the use of unclean or unsafe materials in every day household items and apparel.

<table>
<thead>
<tr>
<th>An International Focus</th>
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<tbody>
<tr>
<td><strong>13,200+</strong> Registered Licence Holders</td>
</tr>
<tr>
<td><strong>21,300+</strong> Non-compliance Orders Issued</td>
</tr>
<tr>
<td><strong>2,200+</strong> Inspections</td>
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UPHOLSTERED AND STUFFED ARTICLES

FROM AROUND THE WORLD TO ONTARIO

4% Canada
5% USA
1% Italy
The upholstered and stuffed articles that make their way to Ontario via online retailers and stores, come from around the world.

The largest source of such goods is China with 75% of manufacturers registered there. 4% of registered manufacturers are based in Canada.

Given the limitations of inspecting facilities around the world, TSSA focuses its inspections at retail locations in Ontario. The majority of inspection orders are related to manufacturers not being registered with TSSA.

Percentages reflects the majority of Upholstered and Stuffed Articles manufacturers worldwide. The remaining 3% is made up of other countries worldwide.
With rider behaviour being the leading cause of incidents, we will enhance our advocacy strategy to increase public awareness. We will also engage industry partners to explore new technologies and control systems that may be able to automatically detect users and prevent elevator doors from closing on riders and causing injury.

A TSSA-organized international conference on carbon monoxide will support our efforts to address this emerging global health issue. We will also continue to work with industry partners to address maintenance and installation of fuel-fired equipment in senior’s residences and the food services sector.

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03 Amusement Devices

- We will continue our work to make amusement rides more accessible to persons with disabilities. In partnership with industry and advocates, we are seeking to change or clarify design requirements and operating rules to allow more disabled persons to have fun and stay safe at Ontario’s parks and fairs.

04 Operating Engineers

- We will advance the review of the Operating Engineers Regulation by convening an expert panel to consider and develop proposals to modernize the regulation. We will also continue to work with the Institute of Power Engineers, the broader industry, training providers and government on how best to tackle the skills shortage for power engineers.

05 Boilers & Pressure Vessels

- We will continue to advance the review of the regulatory requirements for periodic inspections conducted by insurers and enhance TSSA oversight of the sector. We will also continue our work to introduce an electronic manufacturers’ logbook.

06 Upholstered & Stuffed Articles

- The regulatory review of the Upholstered and Stuffed Articles Regulation will be completed in the current year. The Ministry of Government and Consumer Services is currently reviewing industry and public feedback on two regulatory proposals - repeal or modernize the regulation. TSSA’s focus will be on implementing the government’s decision.