

Amusement Rides Program

➤ Program Overview Manual



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Amusement Rides Program

Introduction

Amusement rides are meant for enjoyment and entertainment. Roller coaster riders may be propelled at speeds excessive to what they are accustomed to or waterslide users can reach speeds of up to 55 kilometers per hour. It is necessary for the Amusement Ride Program to oversee safety in relation to amusement rides. The program serves to oversee that all regulated rides and their operators in British Columbia are meeting the codes and regulatory requirements.

The Amusement Ride Program delivers safety services to the people of British Columbia. Standards are consistently applied by administering the *Safety Standards Act*, the *Safety Standards General Regulation*, and related sections of the *Elevating Devices Safety Regulation*.

The Canadian Standards Association provides the CAN/CSA Standard Z267, which has a number of regulations that apply to all amusement rides. A partial list of what is interpreted as an amusement ride or device in British Columbia is located in the schedule section at the end of the *Elevating Devices Safety Regulation*.

Whether it is a roller coaster, scrambler, or a Ferris wheel, under the *Safety Standards Act*, an amusement ride is a device that moves an individual over or through a fixed course or within a defined area for the purpose of amusement or entertainment. This definition also covers such rides as waterslides, inflatable air-supported devices, and zip lines.



A zip line rider can reach 90 kph.

A zip line is the latest product operating at Whistler, BC, where a fixed course is created by a wire rope suspended between two structures, such as trees or towers at different elevations. The rider is strapped into a harness that is hooked onto a carriage with rollers, which descends down the rope from one elevation to a lower elevation at speeds that could reach 90 kilometers per hour. A slight incline at the end of the course assists in the deceleration of the passenger.

Amusement rides may be portable or fixed. Portable rides are mobile and are assembled and dismantled at various sites around the province. Fixed rides are permanent structures as in the rides found at Playland at the Pacific National Exhibition. Of the two types, Safety Officers in the program spend much of their time inspecting and ensuring amusement rides that are portable are properly set up, operated, and maintained.

Amusement rides have been regulated since the early 1980s. Prior to 2004, elevator inspectors under the Safety Engineering Services branch of the provincial government inspected all amusement rides in British Columbia. With the advent of the BC Safety Authority, all elevator inspectors were phased-out of the program by 2006. It was decided that the inspections of amusement rides would be conducted by the Safety Officers of the Passenger Ropeway Program. Local governments are not involved with the inspections, which leaves the program with jurisdiction for all of British Columbia.

If, however, a company with portable amusement rides sets up in certain British Columbia communities, like Surrey or Coquitlam for example, the inspectors with jurisdiction in that community may ask to see the operating permits for the rides. This is to just ensure them that the rides have been inspected. An electrical inspector with jurisdiction may look at the company's generating power units and issue permits for those. But that inspector would not have jurisdiction on the ride itself.

With respect to the program's activities, any decision made by a Safety Officer may be reviewed by a Safety Manager upon the request of a client. If the client is not satisfied with the review, the client has the right to appeal the decision to the Safety Standards Appeal Board, which is independent of the BC Safety Authority. Some decisions, however, cannot be appealed.

It is important for the program to oversee that amusement rides and devices are assembled, dismantled, and maintained at safe levels. It is just as critical for operators of amusement rides and devices to know the safety requirements for operating them. Public safety is of the utmost priority for the Amusement Ride Program.

Services

There are more than 450 amusement rides and devices in British Columbia. The roles and responsibilities of the Safety Manager and Safety Officers focus on administering the *Safety Standards Act*, *Safety Standards General Regulation*, and related sections of the *Elevating Devices Safety Regulation*.



Safety Manager

The BC Safety Authority appoints the Safety Manager, who is given the authority to perform the following duties:

- Provide technical support and expertise to Safety Officers;
- Provide correct interpretation of the *Safety Standards Act* and regulations;
- Issue, suspend, or revoke a contractor's licence as necessary;
- Issue directives, discipline orders, monetary penalties, and safety orders; and
- Review a Safety Officer's decision upon a client's request.

Other responsibilities of the Safety Manager include recommending regulatory changes, providing input on the operational functions of the program, advising on risk management systems, and offering input into the ongoing development of the regulations.

Safety Officers

Safety Officers are at the forefront when dealing with owners and licensed contractors. They are an integral part of the program and report on wherever safety is compromised. Some of their responsibilities are as follows:

- Issue permits;
- Answer inquiries;
- Conduct safety inspections;
- Investigate, document, and follow up on incidents;
- Promote public and worker safety awareness;
- Educate and provide technical information to industry owners and contractors on changing technology, codes, and standards;
- Grant variances;
- Provide recommendations to the Safety Manager;
- Conduct compliance monitoring and audits; and
- Assess the need for changes to the regulations.

Product Exemptions

Certain amusement rides and devices are exempt from the regulations in this province. Listed below are some of the notable types of rides that are NOT overseen by the program nor covered under the regulations:

- Animal driven rides
- Go cart rides
- Hot air balloons
- Muscle-powered amusement rides
- Recoil tethered rides (bungee)
- Small gauge railways under 25.4 centimeters

Certain waterslides with the following features are exempt:

- Height of the slide is 3.05 meters or less from the platform to the pool
- Length of the flume is 30.5 meters or less, with a height/run ratio of 0.1 (6 degrees) or less
- Maximum rider velocity is not greater than 3.6 meters per second

Other specific items are:

- Dry slides not exceeding 4 meters high
- Coin-operated vending rides designed to carry no more than two passengers
- Children's playspaces and equipment conforming to CSA Standard Z614-03
- Soft contained play systems conforming to ASTM Standard F1918-98, other than stand-alone air supported structures
- Carousel not exceeding 1.5 meters in diameter and not exceeding speeds of 29 meters per minute

It should be noted that the CAN/CSA Standard Z267 specifically has regulations for go cart rides in one of its appendices. However, the Amusement Ride Program does not oversee the safety of go carts in the province.

Contractor's Licences

Any operator of an amusement ride must have a Class AM contractor's licence. The scope of this licence is restricted to designing, constructing, installing, altering, operating, repairing, maintaining, and testing of amusement rides. The person named on the licence is responsible for the maintenance and operation of the amusement ride. Some operators, such as those of certain waterslides, may not be aware that a contractor's licence is necessary and must obtain one.

Certificate of Qualifications

At the time of writing, the Amusement Ride Program does not issue any Certificates of Qualification. The program also does not administer exams nor monitor examination processes.



Permits

The licensed contractor is required to take out an installation permit for the installation of any new amusement ride and device. Every new ride must pass an acceptance inspection before it can be placed into service.

Certain alterations or changes to an amusement ride require an installation permit. Any change must comply with the manufacturer's specification and with the *Safety Standards Act* and the *Elevating Devices Safety Regulation*. The contractor must also submit a technical information package on the amusement device. This package is to be approved by a British Columbia Professional Engineer and sent to the Safety Manager if a following change to the amusement device is proposed:

- Changing the amusement device capacity or speed;
- Changing the load bearing structure in a manner that would reduce the original strength of the structure;
- Changing the power source for the main drive or control mechanism, except with the manufacturer's approval;
- Changing the method of guiding the passenger carrying units;
- Changing the classification of the ride;

- Relocating the ride that was designed as a park ride; and
- Changing the ride from ground mounted to trailer mounted.

Each individual amusement ride or device is required to have a separate operating permit, which must be renewed every year. This applies to all waterslides, inflatable air-supported devices, and zip lines, as well.

Design Registrations

Any major amusement ride requires product approval from a British Columbia Professional Engineer. This also applies to any revisions or alterations intended for the existing amusement ride.

Under the regulations, licensed contractors are to submit technical information packages (blueprints, technical drawings, and a maintenance manual) for their amusement rides to the BC Safety Authority for review and filing. The program does not provide product approvals but does conduct a review to ensure the blueprints meet the regulatory requirements. The technical drawings would outline how the amusement ride would be assembled. But a key document would be the maintenance manual, which must indicate the procedures workers would follow to properly maintain and operate the amusement ride.

An advantage of this service for licensed contractors is that if they ever lose their copies of the blueprints, drawings, and maintenance manuals for their amusement rides, the BC Safety Authority will have copies of these on file.



Inspecting a roller coaster with simulated riders.

Inspections

Safety Officers conduct inspections to ensure amusement rides and devices are safe to use and meet the code and regulatory requirements. The program provides two types of inspections as per the regulations: acceptance inspections and periodic inspections.

Any installation of a new ride or alteration to an existing ride must pass an acceptance inspection before it is put into service. Safety Officers conduct periodic inspections on amusement rides based on an analysis of risk. For example, an amusement ride that has had a number of prior incidents is likely to get inspected more periodically.

After the completion of an inspection, the Safety Officer records the results into the BC Safety Authority computer system and issues a Certificate of Inspection to the licensed

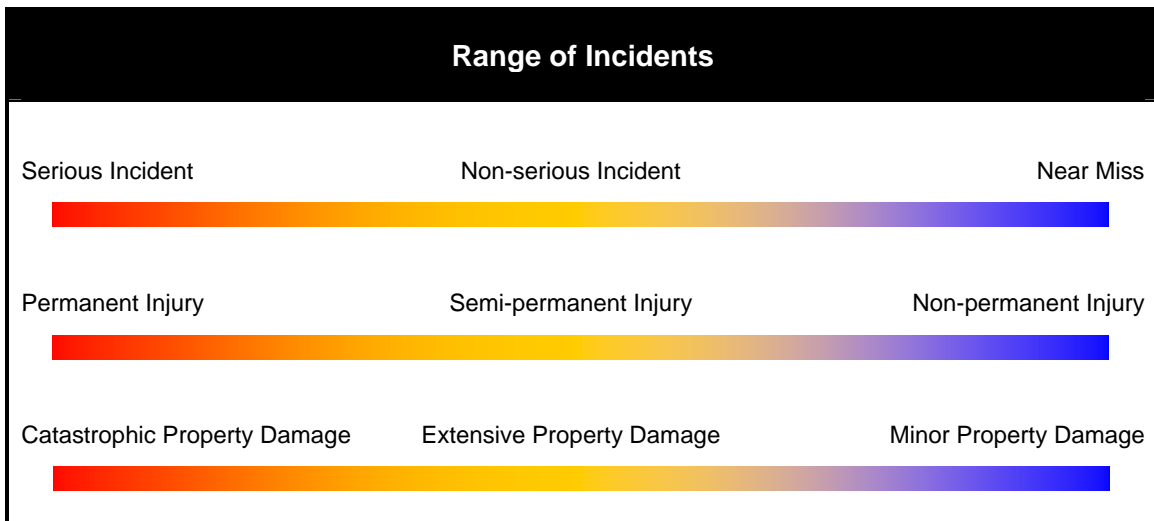


contractor. Any non-compliance will be noted on this certificate with a timeframe for when it has to be corrected. A non-compliance is any work or equipment that fails to meet the code and regulatory requirements.

Investigating Incidents

Any amusement ride incident will most likely involve the public, which includes children. The public can be quick to report any incidents or near misses. In almost half of the incidents reported so far, someone from the public contacted the BC Safety Authority before the licensed contractor had made a report. Often an actual incident took place or there was a concern about the safety of the ride.

A Safety Officer may investigate an incident as soon as it is brought to the attention of the BC Safety Authority. Under the *Safety Standards Act*, an incident is the occurrence of a death, personal injury, or damage to property, or the risk of personal injury or damage to property. In this case, an incident is the result of regulated work or the testing, use or operation of an amusement ride. The levels of an incident, personal injury, and damage to property can range from serious to minor.



Incidents involve personal injury or damage to property and range from serious to minor.

During an investigation, a Safety Officer gets a statement from the injured party if an injury took place, reviews the equipment involved in the incident, and determines if the amusement ride is still operable. The licensed contractor must resolve any equipment issues and put safety measures in place before re-opening the amusement ride. It may be necessary to make repairs to the amusement ride if there was damage or a mechanical malfunction or to retrain staff to ensure proper operation of the ride. If the incident was the result of a mechanical failure, the Safety Manager will notify other operators of similar amusement rides or post a directive on the BC Safety Authority website.

Whether it is a power outage on a Ferris wheel, a collision at the base of a waterslide, or a near miss, it is important to report all incidents. The BC Safety Authority has posted a directive on its website explaining what types of incidents are reportable and the timeframe to report them. Although the amount of incident data in the BC Safety Authority data base is limited for the moment, the program can use it to analyze and identify where potential high risk trends may exist. Proper management of these risks will help to keep users of amusement rides safe.

Technical Input

Becoming involved in the industry activities is important to the program for overseeing the safety of amusement rides and devices. New forms of rides such as zip lines continue to emerge. The program has a membership vote on the CAN/CSA Z267 code committee of the Canadian Standards Association to review changes and new technological advancements.

CAN/CSA Z267				
Safety Codes for Amusement Rides and Devices				
• Design	• Construction	• Assembly	• Operation	• Testing
• Manufacture	• Modification	• Dismantling	• Maintenance	• Inspection

This standard covers these industry activities regarding amusement rides and devices.

Usually there are two meetings per year for amusement ride operators. The program's Safety Manager and Safety Officers are invited to attend these meetings to offer their input. Often on the agenda is a review of the industry activities in the previous six months of the operating season.

Work is ongoing to harmonize the CSA Z267 code with the American Society for Testing and Materials International F Series code for amusement rides. Because most of the amusement rides are designed or built in Europe and the United States, manufacturers in Canada feel it would be more beneficial to adopt and harmonize the American code and standards, which are considered more detailed.

Variations

A variance is a formal document that a client requests from the program. It allows the client to deviate from the codes and regulatory requirements for a one-time circumstance without compromising safety. A client's request for a variance is not always granted. Certain manufacturers have specific prohibitions for the operation of certain equipment. Before the variance for the amusement ride can be granted, the deviation must exceed or be equivalent to the existing level of safety.



Equivalent Standards Agreements

An Equivalent Standards Agreement is a formal agreement between a client and the Safety Manager. Although the program does not have any agreements at the moment, this type of agreement is an innovative way for the program to develop a working partnership with the client to oversee safety. It allows the client operational flexibility on performing regulated work or using a regulated product in a different manner than is set by the codes and regulations. Before an agreement can be reached, the Safety

Manager must be satisfied the alternative approach to the work or the use of the product is consistent with objectives of the regulations and does not increase or create additional risk of injury or damage to property.

Accessibility and Communications

Communicating information with regards to amusement ride safety is important to the program. Owners of amusement rides and devices, such as zip lines, waterslides, and inflatable air-supported devices, may not be aware that their products are regulated in British Columbia. They also need to know they require an operating permit, a contractor's licence, and to contact the BC Safety Authority for routine inspections and audits.

It is equally important for licensed contractors and the public to have access to BC Safety Authority employees. Information, forms, and documents are available at any BC Safety Authority office and accessible online. The various documents issued through the program are to inform the public, all clients, and industry stakeholders on safety issues, potentially hazardous products, and regulatory amendments.

Communicating Information		
Recipients	Documents	Methods
<ul style="list-style-type: none"> • Clients • Public • Stakeholders 	<ul style="list-style-type: none"> • Safety advisories • Directives • Information bulletins • Safety orders 	<ul style="list-style-type: none"> • Website • Phone call • Post and electronic mail • Notices

The Safety Manager may issue any of four documents to relay information to clients, stakeholders, homeowners, and the general public.

The Safety Manager can issue any of four types of documents. Safety advisories are non-binding and non-statutory and inform or remind the public of existing potential hazardous products or unsafe practices. The Safety Manager issues a directive to clarify the interpretation of the codes and regulations, to provide directions on the application of a regulation, or to exercise the powers granted under the *Safety Standards Act*, regulations, or code. Information bulletins are non-binding and non-statutory and are issued to provide general information to BC Safety Authority staff, stakeholders, clients, and the public. Finally, safety orders are binding and are issued to prevent, avoid, or reduce the risk of personal injury or damage to property.

With public safety in mind, the Safety Manager has issued a safety tip to the public on the rental or purchase of inflatable air-supported devices. As these items are popular with children, it is important to follow the manufacturer's assembly and operational requirements when using them. Lack of supervision and improper assembly, operation,

and anchoring of these devices may lead to injuries and fatalities. This safety tip can be found on the BC Safety Authority website.

The program may receive updates on hazard alerts or product safety bulletins from manufacturers, industry stakeholders, owners and operators, and other jurisdictions. However the program receives the information, affected owners and contractors may be contacted directly on these safety issues or the information will be posted on the website. This sharing of information within the industry has been beneficial to not only the program but to all regarding the safety of amusement rides.

Other Services

The Amusement Ride Program provides information to licensed contractors about code and regulatory requirements and will often attend any organization meetings they may have. The program also encourages industry stakeholders to attend and participate at technology committee meetings. The information and feedback obtained here can be useful in understanding the issues and challenges surrounding the industry. Another service the program offers is providing safety tips to the public whenever appropriate.



Inflatable air-supported devices require proper assembly and operational requirements.

Through the National Public Safety Advisory Committee, the program is involved in the development of a national database on incidents. A database like this would contain information and statistics on incidents occurring across the industry and would be an added resource for the program. Amusement ride operators would be alerted on safety trends, injuries, near misses, and equipment failure trends.

Resources

In the Amusement Ride Program, the Safety Manager is a major resource for providing technical expertise to the Safety Officers and offering information to industry licensed contractors. Several years of experience, competent technical knowledge, and excellent interpersonal communications skills are valuable assets.

Safety Officers play a crucial role in the program as they deal directly with clients. They conduct inspections and field audits and provide information on industry activities to the Safety Manager. In many cases, industry stakeholders receive all their information on code and regulatory requirements in relation to amusement rides from the Safety Officers.



Although there is no regulation certifying the program's Safety Officers, the National Association of Amusement Ride Safety Officials provides training, instructions, and certificates of qualifications to amusement ride inspectors. This association offers three levels of certification for inspectors. In addition, all of the program's Safety Officers are trained in a recognized trade, such as millwright or industrial mechanics. After six months of employment with the BC Safety Authority, Safety Officers are required to successfully pass the Elevating Device Inspector's Certificate of Qualification Examination.

The Safety Manager and Safety Officers must have full knowledge of the *Safety Standards Act*, the CSA Z267 code, and the related regulations. This enables them to oversee amusement ride safety. Safety Officers may also provide training to recently hired Safety Officers. To further guide the Safety Officers, the BC Safety Authority provides additional training and continues to update and develop internal policies and procedures for them to follow.

During inspections of amusement rides, the Safety Officer may use any of the following hand tools:

- Hand tachometers
- Inclinerometers
- Measuring tape
- Stop watches

When inspecting waterslides, the Safety Officer may use a radar gun to track and measure the speeds of riders. Riders can reach speeds close to 55 kilometers per hour on some waterslides. Another piece of equipment that might be used is a flow meter for pools to measure how much water is moving through certain waterslide flumes.



Clients, Partners, and Stakeholders

The Amusement Ride Program maintains an open and active relationship with clients and stakeholders. Owners and operators need to be aware which amusement rides and devices require permits and inspections.

One area in the program that needs enhancing is the exchanging of incident data and reports with other jurisdictions. The number of amusement ride incidents that are reported to the BC Safety Authority is limited and may not reflect the actual number or types of incidents that have occurred.

Working closely with clients and stakeholders and listening to their concerns will help the program identify trends within the industry, understand what changes might be necessary to the codes and regulations, and further develop its safety services.

These are some of the groups that the Amusement Ride Program liaises with:

- Canadian Standards Association (CSA)
 - National Association of Amusement Ride Safety Officials (NAARSO)
 - National Public Safety Advisory Committee (NPSAC)
 - Alberta Elevating Devices and Amusement Rides Safety Association (AEDARSA)
 - Technical Standards & Safety Authority (TSSA)
 - American Society for Testing and Materials International
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- Pacific National Exhibition (PNE)
 - Stockman Association
 - Council for Amusement and Recreational Equipment Safety (CARES)
 - International Association of Amusement Parks and Attractions (IAAPA)
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- West Coast Amusements Ltd. (WCA) :
 - Showmen's League of America – Canadian Chapter
 - Canadian Association of Fairs and Exhibitions (C.A.F.E.)
 - D.A. Campbell Amusements
 - World's Finest Shows
 - Homeniuk Rides Inc.
 - Albion Amusements Ltd.
 - Funland Outdoor Amusements
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- Saferparks (California)

The program is involved with a technology committee. The committee is made up of industry representatives and consults with ad hoc groups that deal with issues such as incident reporting and code harmonization. The program plays an active role and encourages clients and stakeholders to attend and participate at industry and technology committee meetings. Any information on issues and challenges within the industry would be conveyed to clients and stakeholders at these committee meetings.



Zip lines are the latest amusement devices to be regulated.



Future Growth

The biggest issues for the Amusement Ride Program are to promote safety through public education and increase its incident data sharing on an international level.

On the home front, many operators may not realize their amusement rides and devices are regulated in British Columbia. The program is making efforts to raise awareness to let these operators know what the requirements are for operating and maintaining the rides and devices. Another consideration for the program is to develop a strategic plan for raising public awareness on amusement ride safety.

There is definitely some growth within the industry in British Columbia. As the Pacific National Exhibition does not plan to relocate, some new rides may surface there. In addition, companies with portable rides are adding new rides and are selling or have decommissioned their older rides. Operators may pick these up and with a little reconditioning these units might show up again elsewhere. As well, five to six new waterslides have been emerging annually in recent years and this trend is not expected to change.

The program does not certify amusement ride workers nor is it involved in the examination process; but these are possibilities for the future. The program is considering certifying the people who would train the workers to operate and maintain the rides. A related step may be to review the syllabus for the course material and exams for these courses.

Abroad, the program is working to share incident data between jurisdictions at a national level and hopefully to continue on at an international level. With the increased collection of data, the program can analyze safety trends and prevent incidents from occurring. This exchanging of information may help increase the program's exposure of its safety services among other safety authorities.

The BC Safety Authority has a vision of being an internationally recognized authority by 2014 in the delivery of safety services. In order to reach that level, the program strives to offer the best and most up-to-date services and retain qualified people with expertise to deliver those services.

Revision History

Revision	Revision Date	Revision history	Revised by
00	2006/12/15	New release	Jeff Taylor

Approval

This document has been approved for adequacy by:



Greg Paddon
Provincial Safety Manager – Amusement Rides

December 15, 2006

Date