Commercial Inflatable Amusement Devices

Inflatable amusements are a backyard party favorite and popular at street fairs and festivals alike. While they can be a fun activity, they can also cause serious injury and even death if proper precautions are not taken to ensure a safe environment, setup and operation, as well as good maintenance.

An article published in *Pediatrics* (Thompson, Chounthirath, Xiang & Smith, 2012) reports inflatable injuries have increased rapidly in recent years, with the rate more than doubling between 2008 and 2010. In 2010, a total of 31 children per day were treated in U.S. emergency departments for inflatable-related injuries. According to The Consumer Products Safety Commission (CPSC) August 2015 update of *AMUSEMENT RIDE SAFETY BULLETIN, Inflatable Amusement Devices, Residential and Commercial Guidance*, there were 3,991 known injuries (including 12 fatalities) between 2003-2013. The analyzed data indicated that the accidents “were attributable primarily to improper operation, supervision and set up.” As a result of this finding, the CPSC released the updated 2015 bulletin to provide additional guidance and best practices to owners, operators and renters of these devices.

**Inflatable Amusement Device Injury Prevention**
The following information, guidelines and recommendations are presented to assist owners, operators, rental companies and renters of inflatable devices in an effort to reduce the chance of inflatable device-related injury.

**General Guidelines**
Guidelines and inspection procedures for the safe set up and operation of inflatable devices vary from manufacturer to manufacturer and device to device. Follow all manufacturer requirements. Do not incorporate elements that are not approved (i.e. adding a water feature if the device
is not designed for use with water). Use ONLY inflatable devices that have been designed and manufactured in accordance with the requirements of ASTM F2374, Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices in any commercial setting or by any business.

Inflatable amusement devices designed for and sold directly to ordinary consumers are intended to be used in a non-commercial setting in private homes and should NEVER be used in any commercial setting or by any business. Rental devices must be commercial grade, designed in accordance with ASTM F2374, and rented only from commercial rental firms.

The importance of owning, operating and renting devices only designed and manufactured in accordance with ASTM F2374 cannot be stressed enough. ASTM F2374 specifically details how the device shall be designed and manufactured, including specific safety requirements. It also requires that the development of an acceptable anchorage system and the maximum wind speed rating is performed by a registered Professional Engineer. The design documents should be stamped by the design engineer and retained.

As per ASTM F2374-17, all inflatable devices must have permanent labeling attached to the device and include the information outlined below:

- A statement that the device was built in conformance with ASTM International Standard F2374
- An information plate or label with the following information:
  - Manufacturer, device name, model number and serial number
  - Date of manufacture
  - Number of blowers required and their size, horsepower, minimum air flow and minimum static pressure
  - Patron capacity and the maximum weight per patron
  - Number of attendants needed to supervise the patron use of the device
  - Maximum wind speed which, if exceeded, will require evacuation and deflation of the device
- In addition, other required labels may include:
  - Anchoring notices - statements that the device must be anchored and tethered in compliance with the device instruction manual
  - Safety labels permanently located near the device entrance outlining critical safety rules and restrictions that apply to each patron using the device
  - Other safety labels that the manufacturer feels are important to safe operations

If the above information and permanent labels are not affixed to the device, it should NOT be used, operated or rented.

Owners, operators and/or rental companies must have a copy of the operating instructions as provided by the manufacturer. If the operating instructions are missing, the owner of the device should contact the manufacturer to obtain a replacement copy. Another source of replacement documentation may be available on the internet. Rental companies MUST provide the operating instructions to renters along with specific training on how to set up the device, anchoring procedures and guidance, operational guidance, safety procedures and requirements. Renters should never rent a device that is missing the original manufacturer's operating instructions.
ASTM F2374 also states that owners and operators of inflatable devices have the responsibility to develop a program with the necessary knowledge and training needed to operate, maintain and inspect the device.

**General Guidelines for Renters of Inflatable Devices**

- Renters should only rent inflatable devices from legitimate rental companies
- Renters should verify that the rental device was designed and manufactured in accordance with ASTM F2374 and that the required labeling as described above is affixed to the device
- Renters should be given a copy of the device manufacturer’s operating instructions for the specific device being rented
- Renters should strictly follow the manufacturer’s instruction manual at all times
- Renters should request that the rental company provide them with a copy of the CPSC August 2015 update of the *AMUSEMENT RIDE SAFETY BULLETIN, Inflatable Amusement Devices, Residential and Commercial Guidance* document described above
- Rental companies must provide complete training to renters in the setup, anchoring and safe operations of rental devices
- Rental companies should provide training to renters in how to estimate wind speed
- For fully enclosed inflatable bouncers and combo devices, there will be a secondary escape opening in the roof of the structure. The rental company must show the renter where this is located and how it works
- Rental companies should provide a written statement to be signed by the renter that allows them to document that he/she has received and understands all installation, setup and operating procedures applicable to the device being rented
- Safety rules, restrictions and staffing level signs should be legible

**Setup Guidance**

One of the most important ways to mitigate inflatable amusement injuries is to ensure proper setup. The Consumer Product Safety Commission (CPSC) recommends the following guidelines for rental companies and owners/operators of commercial use inflatables. All additional state, county, municipality and other jurisdictional regulations, must be followed.

- Follow the manufacturer’s owner/operator/user manual regarding:
  - Site layout with proximity to overhead wires and/or other objects
  - Inflation procedures
  - Ropes, tethers, tie-downs, and anchors
  - Temperature range for use
  - Maximum number of users and size of users
  - Electrical codes, daily operation and daily inspection
  - Disinfection, repair, deflation, drying, storage, and transportation
always anchor the device according to the manufacturer’s requirements and instructions, including the number and type of anchors to be used for both indoor and outdoor use

- Use every anchor point every time the device is set up
- If manufacturer’s instructions are not available, obtain a replacement copy from the manufacturer, or search online for a copy
- Depending on the manufacturer’s requirements, anchors can be straight stakes, screw (auger) stakes, ground weights, sandbags, ballasts or ground anchors
  - Do not use sand bags or ballasts as weights unless specifically allowed in the manufacturer’s instructions. If the manufacturer permits the use of sand bags or ballasts instead of stakes, you must ensure that the manufacturer’s weight requirements are met in order to properly anchor the device

- Use the number of tie-downs specified at the locations identified by the manufacturer
- Anchor ropes, tethers, or tie-downs should be attached to an appropriate anchor device or permanent structure. They must be attached so that they cannot slip off the top of their stake or anchor point during use
  - DO NOT attach anchors to a motor vehicle or other non-stationary object
  - DO NOT use non-load bearing positioning loops as tie-downs or anchor points
  - Ropes, tethers, and tie-downs should be sufficiently strong to resist breaking during use
  - In the absence of manufacturer provided tie-downs, the CPSC recommends the use of ½-inch diameter solid-braided polypropylene rope with a minimum tensile strength of 3,700 pounds or a test rating of 370 pounds

**Anchoring Guidance:**
BEFORE any outdoor setup begins, always Call-Before-You-Dig by contacting the Utility Notification Center in your area (dial 811 in most areas). Underground utilities must be located and marked/flagged before any digging or driving of stakes, anchors, or other objects into the ground.

The manufacturer’s anchoring instructions must be followed every time the device is set up. If instructions regarding anchors are not available, the CPSC recommends using every anchor point every time the device is set up. Stakes and weights are the two types of anchors most commonly used. Stakes are rods driven into the ground. Weights use the weight of sand, water, or other heavy materials to anchor the device.

When selecting the proper stakes to use, consider that longer stakes with a wider diameter, set deeper into the ground, will have a greater holding power than smaller, shorter stakes.

**General Layout and Setup Guidelines:**
- Ensure that the ground is free of any sharp objects that could puncture the device. Cover the ground with protective material if specified by the manufacturer
- Anchor the inflatable device on level ground
Anchors must be fixed, stationary objects, and located so that they do not create additional hazards.
Anchors must not impede the evacuation of the inflatable device.
Anchors must not be installed at the entrance(s) to the inflatable so as to cause tripping hazards.
Anchors must be installed so as not to impale users who may fall against them from inside.

Staking:
- Stakes shall have a minimum tensile strength of 36,000 psi.
- Stakes can range from a minimum of 18 inches in length, fully driven into the ground (for use in hard or compact soil), to 42 inches in length, with at least 75% of its length in the ground.
- Stakes should always be installed in the vertical position, not pounded in at an angle.
- Stakes should be inserted perpendicular to the ground at the point of insertion and embedded so that no more than 2 inches of the top is exposed, unless otherwise specified by the manufacturer as noted above.
- Stakes or other anchors should have their exposed ends covered after installation to prevent a tripping or puncture hazard.
- Auger-style stakes provide extra holding power.
- If installed in sandy or loose soils, a longer stake is required to generate the same holding power as a shorter stake installed in hard or compact soil.
- Wet soil reduces friction; therefore a longer stake may be required.
- Stakes should not be used to anchor the device if the soil is so soft that stakes can easily be inserted into the ground using only the hand or foot (i.e. no sledge hammer required).

Weights:
- Weights should not be used unless the manufacturer's instructions specifically permit it.
- Anchor ropes, tethers or tie-downs should be attached to a properly installed stake, weight, or permanent structure.
- Anchor ropes should be attached so that they cannot slip off the top of their stake during use.
- DO NOT anchor an inflatable to any vehicle, equipment or other non-stationary object (e.g., motor vehicle, ATV, trailer, recreational vehicle, tractor, etc.).

Operational Guidance
- Instruct all patrons on safety rules and usage prior to participation.
- Ensure that operators maintain a direct line of sight for all riders. There should be no blind spots. This may require additional operators.
- Active adult supervision must be maintained at all times. More operators should be added to supervise larger groups of users.
- Do not exceed the manufacturer’s requirements for maximum loads, both for total number of riders and maximum weight of any one rider.
There should be no deviation from the manufacturer’s suggested inflation pressures and the number of blowers used

All signs recommended by the manufacturer and/or rental company should be displayed whenever the device is being used

Inflatables must be constructed of flame-resistant materials

Participants should never:
  - Do flips or other acrobatic tricks that can lead to spinal injuries
  - Wear shoes, glasses, or sharp jewelry
  - Bring non-approved toys or other objects on the device
  - Bring food or drinks onto the device
  - Play on the outside or top of the inflatable device, unless that is the intended use

Participants should avoid becoming fatigued

The minimum number of operators required per the CPSC are as follows:

<table>
<thead>
<tr>
<th>Ride type &amp; height</th>
<th>Minimum no. of Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bounce or slides less than 15 feet tall</td>
<td>1</td>
</tr>
<tr>
<td>Slides greater than 15 feet tall</td>
<td>2</td>
</tr>
<tr>
<td>Rides used by young children</td>
<td>2: one to monitor capacity; one to monitor patrons</td>
</tr>
</tbody>
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Inflatable devices should never be used when wind speeds exceed the manufacturer’s recommendation. Recommended maximum wind speeds range from 15 to 25 mph. When wind speeds (including gusts) exceed 25 mph, the device must be evacuated and deflated immediately

Report accidents that result in injuries to your applicable jurisdiction and to the CPSC at www.saferproducts.gov

Additional guidelines that should be considered each time an inflatable device is operated:

**Electrical**

- “Call-Before-You-Dig”: Contact the Utility Notification Center before digging
- Ensure the inflatable device is installed away from power lines, including those overhead or attached to structures and poles
- Electric blowers should be plugged into properly grounded outlets protected by a GFCI (ground fault circuit interrupter)
- Extension cord use should be minimized or avoided. If used, they must be properly rated for the load and the environmental conditions. For example, if used outside, they must be rated for outdoor use
- Extension cords should be placed out of traffic areas and secured to prevent trips and falls
Fuel & Generators
If the blower is fuel/generator-powered, additional precautions must be taken:

- Consider carbon monoxide buildup inside and around the inflatable. Generators should be used outside, away from all doors, windows, and vent openings
- The safe handling of the flammable fuel (use proper cans) must be maintained. When refueling, the generator should be shut down and allowed to cool
- Implement a fire prevention plan that includes having a proper fire extinguisher nearby and maintaining combustible clearance from the generator and fuel area(s)
- A backup fuel supply should be on hand to allow a complete evacuation of the amusement device
- Generators must be used in strict accordance with the manufacturer’s instructions

Insurance, Legal and Safety Guidelines

- Whether you are an operator or a user of inflatable amusements, you should obtain adequate liability insurance. If you are hiring a company to operate an inflatable amusement device, ask them for proof of liability insurance. Your organization should be named as Additional Insured. Consult with your insurance agent or broker for guidance
- Insist that the rental company install and, if feasible, operate the inflatable. If you are operating the inflatable, ensure that all staff or volunteers are fully trained by the rental company in the safe operation of each inflatable. A minimum age of 18 is recommended for operators
- Operators and attendants should verify the conditions noted above at least once per day
- Have a procedure in place to respond to injuries
- Proper bloodborne pathogen protection, cleaning products and disposal methods should be in place to sanitize surfaces from bodily fluids
- Operators should sanitize and wipe down/dry the surfaces periodically to prevent slippery surfaces and contamination
- Barriers for crowd control must be provided to prevent injury to the users and observers, and/or damage to the inflatable
- The landing area should be appropriate for the speed at which users will exit (e.g. if there is a slide, the landing area should be capable of handling the highest speeds and longest distance to exit)
- Injuries should be reported to the CPSC for statistical purposes

Remember, the Specialty Insurance Group offers services to help you in your loss prevention efforts. If you would like more information about these services, visit our website at www.specialtyinsurancegroup.com.