

Performing Arts Safety Bulletin #11

A HEALTH AND SAFETY OVERVIEW OF ORCHESTRA PITS

Orchestra pits can be dangerous to members of the crew during load-ins, set-ups, tech work and strikes, as well as to performers on the stage and musicians in the pit during rehearsals and performances. Janet Sellery of Sellery Health + Safety notes:

“There are lots of examples of people and objects falling into orchestra pits. There was a musician who was seriously injured during the performance of a large musical. When the curtain went up, it billowed out to the front of the stage where there was a wheelbarrow of logs. The curtain knocked the barrow over and the logs (real logs) rained down into the pit. The logs struck the musician and her injuries prevented her from playing during a long recovery period.”

Each venue and each production will have unique risks, which must be addressed. The process of identifying and resolving risks begins with a risk assessment. As per WorkSafeBC:

WHAT IS A RISK ASSESSMENT?

“A risk assessment is an examination of the aspects of a task that may expose workers to an increased risk of injury. The purpose of a risk assessment is to determine whether enough has been done to control the risk or whether further control measures need to be put in place.”

Considerations when conducting a risk assessment for an open orchestra pit might include:

- What kind of activity is taking place on the stage?
- How many performers are involved?
- Is the direction / choreography such that it creates additional risk?
- What are the lighting conditions and levels?
- Are there props / set pieces that could end up in the pit?
- Is the stage raked, which could cause objects to roll down into the pit?
- What type of ladder / equipment is being used for set-ups?
- Can you identify any other potential risks?

Once a risk assessment has been conducted, then the hierarchy of hazard controls should be considered:

1. **Elimination:** can the hazard be eliminated? One example might be locating the band upstage on a platform rather than down in the pit.
2. **Substitution:** can something else be substituted for the use of the orchestra pit?
3. **Engineering:** a pit net is one example of an engineered solution. Depending on the results of the risk assessment, LED's along the edge of the pit might be another engineered solution.
4. **Administrative:** perhaps no performers will be permitted to act / dance within 4' of the open pit; this would be an administrative solution.
5. **Personal Protective Equipment:** If the issue were a concern that props would fall on the musicians, one example – although perhaps an uncommon one – would be to have all the musicians wear hard hats.

It may be necessary to combine several controls to create an appropriate solution. The bottom line is there is no single correct answer as to how to deal with an Orchestra pit; the answers depend on the results of a risk assessment. Risk assessments need to be conducted every time the situation changes – for example, if the opera is coming in, a risk assessment needs to be conducted; another one should be conducted for the next production using a pit and so forth.



WORKSAFEBC REGULATIONS

Part 3 Division 3 - General Duties of Employers, Workers and Others: Among other responsibilities, every employer in British Columbia must ensure the health and safety of all workers working for that employer, and any other workers present at a workplace at which that employer's work is being carried out. They must also remedy any workplace conditions that are hazardous to the health or safety of the employer's workers.

This responsibility covers a wide range of potential risks and hazards. It would certainly cover an open orchestra pit if workers (performers, musicians, crew and others) were in the vicinity.

Orchestra pit nets are not specifically identified in WorkSafeBC regulations. However, a variety of regulations apply, including:

11.2 Obligation to use fall protection

(1) Unless elsewhere provided for in this Regulation, an employer must ensure that a fall protection system is used when work is being done at a place

- (a) From which a fall of 3 m (10 ft) or more may occur, or
- (b) Where a fall from a height of less than 3 m involves a risk of injury greater than the risk of injury from the impact on a flat surface.

An orchestra pit that is less than 10' deep may not require a fall protection system unless there is a likelihood of injury from someone or something falling from the stage into the pit.

There are two types of fall protection: Fall Restraint and Fall Arrest. The WorkSafeBC guidelines have this to say:

When assessing the requirement for personal fall protection where there is a relatively short potential fall distance, it is sometimes unclear if the situation should be treated as fall restraint or fall arrest. This guideline clarifies the difference between a fall restraint and a fall arrest system.

FALL RESTRAINT

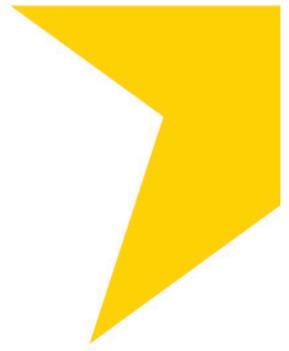
Fall restraint normally means a fall protection system arranged such that a worker cannot fall lower than the surface on which the worker was supported before the fall started. To allow their fall protection to be considered as fall restraint, their equipment should be arranged to limit the vertical drop as much as possible, and in no case, should the total fall distance be more than 30 centimetres (1 foot).

A fall restraint system should only be used where a worker likely can regain footing or otherwise self-rescue immediately after a slip or fall.

Falling into a pit net, stretched taut across the pit opening, should be like falling onto the stage floor, but with a little more give – it may even be a softer landing. The performer can also self-rescue. The anchoring requirements for a fall restraint system are different than a fall arrest system, which has to arrest the forces of a vertical drop. Specifically:

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G11.6-1 ANCHORS

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Regulatory excerpt

Section 11.6 of the OHS Regulation states:

- (1) In a temporary fall restraint system, an anchor for a personal fall protection system must have an ultimate load capacity in any direction in which a load may be applied of at least
 - (a) 3.5 kN (800 lbs), or
 - (b) four times the weight of the worker to be connected to the system.

If you were talking about a vertical drop, greater than 1 foot, from the stage floor down into a net, the anchoring requirements would be:

In a temporary fall arrest system, an anchor for a personal fall protection system must have an ultimate load capacity in any direction required to resist a fall of at least

- (a) 22 kN (5,000 lbs), or
- (b) Two times the maximum arrest force.

Keep in mind though, that WorkSafeBC is envisioning a person connected to either a single anchor point, or a lifeline stretched between two points. In the case of a pit net, where there are attachment points every 18" to 2' around the perimeter, the load on any one point is much less.

In this case, it is the total weight that the net must be able to handle. If the net is taut and the fall distance into the net is 1' or less, then the net must hold 800lbs, or 4 times the weight likely to fall into the net. If there is a vertical drop from the stage down into the net of greater than 1', then the net must be able to handle 500 lbs.

In terms of the nets themselves, there are usually two components: a fine mesh debris net, and a heavy duty cargo net (which bears the load).

LIVE PERFORMANCE AND WORKSAFEBC

WorksafeBC allows exceptions from guardrail requirements for performance stages and scenic units visible to audiences, as long as effective measures are taken to ensure that people are protected from injury. These measures could include placing rope light along the edge, marking off a control zone with contrasting tape to keep people back from the edge, restrictions on moving in the dark etc. In situations where guardrails are not practicable, a risk assessment should be done to identify and resolve health and safety issues.