Pembina Trails
School Division
Accomplish Anything

Live Performance Safety Guideline

Acknowledgements: St. James S. D. & MSBA

Introduction

When planning school dramas or concerts issues and questions regularly arise regarding things like the use of fog machines, set construction, occupancy loads, security, fire regulations and emergency procedures to name a few.

In May of 2013 a committee of stake-holders was established to develop a *Live Performance Safety Guideline* to address issues that regularly arise as school staff plan performances in theatres and gymnasiums. This document provides general information and specific guidelines for schools to review when planning a performance.

These Guidelines are intended for use by anyone involved in live theatre productions in a school setting and may be used only to assist in ensuring safe practices. They do not cover every scenario. The responsibility for live performance safety remains primarily with the school principal.

Acknowledgements

St. James-Assiniboia School Division

Keith Thomas- Risk Manager, Manitoba School Boards Association

Live Performance Safety Guideline Summary

The guideline summary is intended to only provide basic information on various activities that must be considered when planning and presenting a live performance. Read the guideline summary to determine which section(s) apply to your performance. Check off the sections that apply to your performance. Then for each checked section review the detailed information contained in the *Live Performance Safety Guideline*.

□ **Responsibility**
The school principal is responsible for all activities taking place within the school including live performances. The school principal ensures responsibilities are assigned to others if required including: producer, director, prop manager, students, contractors, and others.

□ **Working at Heights**
Only trained & authorized users possessing a certified user card may operate the lifts. Only custodial and trades staff are trained and allowed to use ladders and scaffolding.

□ **Stage / Set Construction, Storage and Disposal**
The prop manager working under the authority of the principal shall ensure safety practices are provided and followed by everyone involved in the set design, construction, storage and disposal. Caretakers are responsible for setup and tear down of stages and risers. See the guideline for information on the proper use of tools, and set up of visual displays, choral risers and portable stages. SWP for set up of stages and risers are included in the **Appendix.**

□ **Moving Scenery (during performances)**
Movement of large set pieces and set flats must be done with proper adult supervision and with sufficient help to be managed in a safe way.

□ **Electrical Work, Sound Systems and Lighting**
ONLY qualified electricians are permitted to perform electrical work (wiring etc). Non-Electrical Workers MUST NOT re-set breakers that have tripped. Caretakers are permitted to reset breakers only once. All electrical work must be completed in conformance with the detailed live performance guidelines contained in this document.

□ **Hand Props, Costumes and Make-Up**
Performers must be given adequate instruction and rehearsal time to become accustomed to all props and costumes as they will be used in performance. Masks, costumes should not impair vision or ability to breathe. Hypo-allergenic make-up should be used.

□ **Seating**
The Manitoba Fire Code (MFC) includes requirements to ensure safety to life is not compromised during live performances. Exits in theatres with fixed seating must never be blocked. Non-fixed seating must meet the fire code requirements. See the guideline and Plan for Non-Fixed Seating in the **Appendix** for more information.

□ **Rigging Systems, Performer Flying and Use of Lifts during Performance**
School theatres are not equipped with riggings systems. Therefore “flying” of scenic units or performers is not permitted. NO temporary rigging systems are permitted. The use of lifts (Scissor lifts, Genie lifts) as part of a performance is not permitted. See the guideline for details.

□ **Rakes, Ramps and Balconies**
A rake is an acting area that is not level. Rakes and ramps may present tripping or stumbling hazards. Loose objects may roll on rakes. Balconies must be constructed to provide a stable platform with guardrails in place. See the guideline for details.

□ **Open Flames and Pyrotechnics**
Open flames are not permitted. Pyrotechnic special effects are not permitted. See the guideline for information.

□ **Fog Machines**
Fog machines create special effects but can also trigger smoke detectors quickly ending your performance. See the guideline for information regarding the use of fog or smoke machines.

□ **Stunts, Weapons and Combat**
Serious injuries can occur when performing stunts, using LARP (Live Action Role Playing) weapons, and if combat is simulated. Only qualified choreographers are permitted to train performers in these disciplines. See the guideline for details.

□ **Emergency Exits and Hallways**
Emergency exits in theaters with fixed seating and in gymnasiums with non-fixed seating must never be blocked. Hallways must never be blocked with tables and chairs. See guideline for details.

□ **Emergency Procedures**
An emergency plan must be developed and reviewed with all participants. See guideline for details.

I have reviewed the above *Live Performance Safety Guideline Summary* and understand my obligations**.**

Performance title _____

Performance Location:_____Date of Performance:_____

Producers' Name:_____Signature: _____

Principals' Name:_____Signature: _____

Date signed_____

Responsibilities

The School Principal

The school Principal is responsible for all activities taking place within the school including live performances. The school principal ensures responsibilities are assigned to others if required including: producer, director, prop manager, students, contractors, and others. The principal must ensure, as far as is reasonably practicable, the safety, health, and welfare of all staff, students and persons attending performances. All Manitoba Workplace Safety and Health legislation must be followed. The Principal must ensure the Producer signs off on the *Live Performance Safety Guideline Summary* prior to planning any production. Any accident or serious incident must be immediately reported to the Principal who will document it according to school division protocols and notify the school division's safety officer.

The Producer (or director or designate)

Collaborates with a team of students and staff, coordinating research, stagecraft, costume design, props, lighting design, acting, set design, stage combat, and sound design for the production. It is his/her responsibility to ensure that everyone involved in the production reads , understands and follows the appropriate section of the guidelines. At the beginning of any live performance, the producer must ensure the audience is informed of emergency evacuation procedures and the location of evacuation routes.

The Prop Manager and/or Set Designer

Supervises the building of sets and making and/or buying of the props needed for a performance. He/she must ensure safety practices are followed by everyone involved in set design and construction and deconstruction. He/she should ensure a plan has been developed for the storage and/or disposal of sets and props. The Prop Manager and/or Set Designer must ensure the safe use of hand tools and power tools by everyone he/she supervises.

Performers

Must ensure they read, understand, and follow the appropriate section of the guidelines as directed by their direct supervisor.

Contractors

Contractors hired by the school must agree to the terms and conditions for Contractors working in the school division and must complete the PTSD safety orientation prior to working on school property. Contact facilities and maintenance for details.

Working at Heights

Falls account for many injuries and fatalities in the Province of Manitoba. People working at heights must be provided with appropriate training and equipment to perform their tasks safely.

The Scissor Lift or Hydraulic Lift:

May be required where work cannot be safely performed using a ladder. In order to access the use of these lifts in a school, the schools MUST follow school division protocols. Only trained and authorized users may operate the Lifts. No students, teachers or contractors are permitted to use the lifts. The use of lifts as part of a performance is not permitted.

Scaffolding:

Must be erected and dismantled trained, skilled and experienced workers. The scaffolding must be inspected and approved prior to use by a trained and experienced supervisor. See the **Appendix** for more information.

Ladders:

Must only be used by custodial, trades staff and contractors trained in Ladder Safety.

Set Construction, Storage and Disposal

The prop manager working under the authority of the principal shall ensure safe work procedures are provided, explained and followed by everyone involved in set construction. People using hand tools or power tools must wear the appropriate personal protective equipment including safety glasses and be trained on how to operate and use the equipment safely.

Safe work procedures for power tools and hand tools commonly used during set construction are provided in the **Appendix** of this document including the following:

- Power drill
- Hammer, screwdriver, wrenches, hand saws

The prop manager must also develop a plan for the storage of sets and props and disposal and/or recycling of materials. Schools typically do not have extra storage space and so it is critical to have a plan in place. Correct safety protocols must be followed for storing sets and props. These include but are not limited to:

- Appropriate smoke or heat detectors must be located in the storage area;
- Flammable materials must be stored in containers and stacked properly and safely;
- Storage of sets and props must be done in a manner to allow easy and unobstructed access to the fire/emergency exits;
- Storage of simulated weapons, other than when in use for rehearsals and performances, should be done in a locked cabinet;
- Hazardous materials used in set construction must be removed from the building.

The prop manager (or designate) oversees or arranges the set-up of choral risers, and portable staging. Often the set-up of these items are assigned to (or are supervised by) the school caretaker. Safety back rails for choral are required when students are standing on the risers for performances. Side rails are also required when risers are used on portable stages or are placed within six feet of the stage edge for built in stages.

Serious injuries may occur due to a collapse if choral risers or staging is not set up properly. It is essential to ensure a qualified person supervises the set-up of portable staging. A safe work procedure for portable stage set-up is provided in the appendix of this document. Portable stages & risers are not stackable and are required by the manufacturer to be set up on **ONE** level only.

Visual Art Display panels used for art exhibitions must be set-up with appropriate manpower and adult supervision. It is recommended that no fewer than two (2) people, one of which must be an adult, undertake the assembly of these panels.

If your school has purchased their own stages and risers and needs to purchase side / back rail guards please contact the manufacturer to inquire about the guardrails. If you have purchased risers from Wenger Corporation, side rails are approximately $410 / pair. Contact: Wenger Corporation @ #1-800- 268-0148 or www.wengercorp.com

Moving Scenery (during performances)

During productions movement of sets and props must be done under suitable lighting conditions. While near darkness may be desirable, enough light must be provided on stage to ensure safe movement of people and sets. Movement of large set pieces and set flats must be done under adult supervision and with sufficient help to be managed in a safe way. Movement of scenery should be rehearsed prior to the performance. During the rehearsal the producer (or designate) should address any safety concerns noted at that time.

Electrical Work, Sound systems, and Lighting

Electrical Work:

Qualified electricians ONLY are permitted to perform electrical work (wiring etc). All personnel involved with the use of electrical equipment shall be competent in the job they are required to perform. Lighting and other electrical fixtures shall be de-energized and locked out before being opened for repairs or maintenance. Each receptacle should identify the circuit that powers it. The location of the circuit breaker shall be known by the competent worker who must be present during the performance. Each connector in a multiple-circuit cable should identify the circuit to which it is connected. Portable switch boards and dimmers must be CSA /UL certified and must be:

- accessible for emergency power shutdown;
- located so they will not obstruct any exit
- protected from damage from objects or persons that are near or must pass near them
- be properly connected to an approved fused or breaker supply panel
- be connected with a cable of sufficient size and amperage to carry the full rating of the supply fuse or breaker; and
- must never connected to bypass the fusing of the supply panel.
- Electrical equipment should be protected from exposure to excessive moisture, gases, vapours, fumes, liquids, heat, cold, or other agents which could have a deteriorating effect on the electrical insulating qualities of the equipment.

- All electrical cables and connecting components
    - must be provided by an approved manufacturer
    - be approved for the purpose
    - have polarity identified
    - must be grounded
    - must be properly assembled

Electrical cables shall be in good repair and adequately secured so as not to put strain on the connector or cause undue wear or damage to the cable or insulation of the cable. Electrical cables should be protected from wear and damage such as crushing, abrasion, and shearing. If electrical cables or the insulating casing are found to be damaged they are to be replaced or not used. Electrical cables should not be fastened or suspended in such a way that the insulating cover could be damaged. Cables should not be spliced.

Sound systems:

Acceptable sound levels have recently been the subject of re-assessment in Canada and CCOHS (Canadian Centre for Occupational Health and Safety) recommends lowering the present limits. The CCOHS agrees with OSHA (Occupational Safety and Health Administration in the U.S.) that the present regulations for noise exposure limits and hearing protection are not adequate for workers in live performance, and is recommending that the provincial governments develop a new regulation to address this concern. It makes good sense to ensure young performers are aware of damage caused by noise and so producers and technicians should ensure sound levels are acceptable.

During events such as graduation dances the sound level should not exceed the recommended exposure limits listed in the **Appendix**. Free sound level meter apps may be downloaded to I-phones or I-pads and used to determine the approximate sound exposure. Speakers and monitors should have minimal floor contact since low frequencies tend to travel through solid surfaces rather than through air. Reducing the surface contact of speakers and monitors will increase the low end frequencies received by audience and performers, so the overall sound level need not be as high.

Audio Wiring:

Placement of microphones should allow for adequate room for instrument performance and should not impede the traffic patterns in the pit.

The placement of cables should follow the same recommendations as those for electrical wiring, and should be done only by competent persons.

Lighting:

A plan showing seating, risers and stand placement should be given to the person responsible for the pit set-up in sufficient time to allow the pit to be wired safely with enough circuits for all the stands and other electrical requirements before the first rehearsal.

Adequate power should be provided for all stand lighting and any other electrical requirements. If changes to the plan are required, sufficient notice should be given to the person responsible for the set-up.

All cables in the pit should be of adequate length and be taped down after the set-up is complete. No cable should be stretched to reach the plug-in box.

Re-plugging should be done only by a competent person. All cables should be positioned so as not to impede the normal traffic patterns.

Rigging of all lights (regardless of height) must be done with the use of a safety cable. This is a wire cable with clips that provides additional security. The safety cable should be attached in a secure way to a non-movable fixture such as lighting bar or metal ceiling supports.

Lights are to be mounted in such a way as to ensure that the hot lights do not come in contact with flammable materials such as wood, cloth or paper. Spot lights placed on raised platforms must be secured (tethered) to prevent the equipment from falling off the platform.

All electrical and sound cords should be taped down securely backstage to prevent anyone tripping. Duct tape or gaffer's tape is suitable for this task. Do not staple or nail extension cords.
Lighting must not be set up on multiple stacked stages or tables. Students **MUST NOT** be asked to climb stacked tables/stages/etc. to operate lighting. Lighting must be set up on the floor, hung from the ceiling or use lighting trees, etc.

Sound and lighting equipment cables must be secured to the floor and covered with mats / cable covers/or taped down to prevent tripping hazards.

Ensure lighting trees or speakers that are located near pathways or exits have their feet tucked away or covered to prevent a tripping hazard.

Hand Props, Costumes and Make-Up

Hand Prop: Any article that is carried or handled, not worn, by the performer.

Costume: Any article, including footwear, masks, wigs and headgear, that is worn, not carried or handled, by the performer.

Make-Up: cosmetics such as lipstick or powder applied to the face, used to enhance or alter the appearance. Hypo-allergenic make-up should be used in all productions. Never use paints, dyes, or other non-cosmetic substances. Purchase only ingredient labeled cosmetics and discard old products. Be aware of possible allergies and allergic reactions.

Performers must be given adequate instruction and rehearsal time to become accustomed to all props and costumes as they will be used in performance. Masks, costumes should not impair vision or ability to breathe.

Props should be checked for rough edges, chips, loose material or other potential hazards before being given to the performers.

The person(s) responsible for costumes should be informed as soon as possible about special movement required of a performer so that these movements may be anticipated in the construction and fit of the costume.

All aspects of costumes should be fitted to avoid injury or unnecessary discomfort. Costumes, including masks, wigs and headgear should;

- provide a field of vision adequate for safe movement on and off stage
- not obstruct the performer's breathing or hearing;
- be fitted and balanced to prevent headaches, neck or back strain;.

Costumes worn next to the skin should be cleaned frequently. Other costume elements, including wigs, masks and headgear, should be cleaned as necessary.

Seating

The Manitoba Fire Code (MFC) includes requirements to ensure safety to life is not compromised during live performances.

Occupant load signs are issued by the City of Winnipeg and are required to be posted near the entrance of assembly areas such as gyms, lunch rooms, theaters, etc. The Occupant load limit for the gym or theatre must not be exceeded. Your school may or may not have the City of Winnipeg occupancy load posted at this time. This is something the division is working towards completing. In the interim, approximate values have been calculated for each school. Please see the occupancy load spread sheet posted on the safety website under concert and stage setup.

Non-fixed seating must meet the fire code requirements. Rows of chairs should contain no more than 16 seats. When the occupant load exceeds 200 people the seats must be fastened together using the supplied connectors, from Facilities & Operations, in units of no fewer than 8 seats. See the Plan for Non – Fixed Seating in the **Append**ix of this document.

Seating plans should be developed in accordance with the above requirements. See the appendix for sample seating plans.

Reserved areas should be made in the front row for parents/grandparents/students that are in wheelchairs. Wheelchairs must no block aisles or exits.

Remove all gym benches from the area to prevent parents/students from blocking access/ egress pathways.

Rigging Systems, Performer Flying and Use of Lifts during Performance

A rigging system is used to lift and move heavy loads using a system of ropes, chains, and mechanical devices. It is a backstage tool for closing curtains and moving scenery, allowing dramatic set changes and other spectacular effects. Rigging systems also provide safe access to overhead lighting and equipment with the use of catwalks, eliminating the need for staff or students to climb ladders for maintenance. Motorized rigging is a theatrical rigging system using powered winches and other devices to move equipment rather than muscle power.

Only a trained person is permitted to operate rigging. Rigging systems must be inspected by a competent person at least once a year. The inspection must include all parts and functions of the rigging system.

School theatres are not equipped with riggings systems (except for curtains). Therefore “flying” of scenic units or performers is not permitted. No temporary rigging systems are permitted.

Rakes, Ramps and Balconies:

A rake is an acting area that is not level. A ramp connects two platforms. Rakes and ramps may present tripping or stumbling hazards. Loose objects may roll on rakes. There should be adequate rehearsal on the rake so that all concerned become accustomed to the conditions. In determining “adequate” rehearsal, consultation prior to and during rehearsals, with performers and others working on the rake, is of utmost importance. Lack of rehearsal time combined with an unfamiliar surface can lead to unsafe occurrences. Balconies must be constructed to provide a stable platform with guardrails in place.
Guardrails must be 42.8 inches above the platform with vertical guards every 4” along the length of the top rail.

Open flames and Pyrotechnics:

Open flames are not permitted **in school performances.** Pyrotechnic special effects are not permitted in school performances. Theatrical pyrotechnics are governed under the Federal Department of Energy, Mines and Resources Explosives Division Class 7.2.5. Any person who assumes the responsibility for pyrotechnics must have a clear understanding and working knowledge of the guidelines of the NFPA Code 1126 and of the Department of Energy, Mines and Resources Explosives Division. Permission must be granted by the school division prior to use of pyrotechnics on divisional property.

Fog Machines:

Fog machines create special effects but can also set off the fire alarm resulting in the evacuation of the building and the attendance of the fire department.

When using a fog machine it may be necessary to bypass a zone protected by a smoke detector. Facilities must be contacted if this becomes necessary and will be assessed on a case by case basis.

Water based fog machines are the most commonly available types for both consumer use and commercial applications. The fog fluid in the fluid tank is forced through a heat exchanger by a high pressure pump. The heat exchanger maintains a high temperature at which the fluid vaporizes in a process commonly known as "flashing". As the fluid is "flashed" it rapidly expands, and that expansion forces the vapour through the nozzle of the machine. When the vapour mixes with cooler air outside the fog machine, it instantly forms an opaque aerosol we see as fog.

Water based fog fluids are typically made from glycol and water. It is important to understand that fog machines and there fluids are designed as systems. Specific fluid formulas require a specific temperature range for optimum conversion to an aerosol during the "flashing" process. Fog machine manufacturers design their machines to be compatible with their fluids.

If a machine is calibrated at too low a temperature for a given fluid, the result can be "wet" fog that can leave a residue. If the temperature is too high, the fluid can "burn" or decompose the fluid, thus changing its chemical composition. This "burning" can create harmful by-products. Well-designed fog machines have removable fluid tanks for the convenience of the user. If you use a lot of fog you will get a very thin film of fog fluid residue on everything in the room, including people. It is possible that the small water-based particles could set some types of smoke detectors off.

- Always review and follow the manufacturers' instruction guide.
- Ensure a MSDS is available for the fog liquid. Review the information on the MSDS.
- Make sure you plug your fog machine into an outlet that can handle the wattage of the machine.
- Never overload the circuit breaker with too many items plugged in. Never run an extension cord thru water. Do not leave the fog machine unattended.
- A lot of heat is generated from the fog machine. Make sure nothing flammable is near the unit.
- Only use the fog liquid recommended in the owner's manual. Remember, that liquid is designed specifically for certain types of fog machines. Using a different liquid could result in damage to the fog machine.
- Use the least amount of fog to obtain the desired effect. You do not want a fog filled room in which you cannot see your way around or make it difficult to breathe.
- Do not let the fog fluid run out. Some machines have a built in automatic shut-off when there is no fog fluid left. However, yours may not. Running a fog machine with no fog fluid in it can easily burn out the motor. The fog fluid serves a dual role in the pump. Not only is it used to create fog but; it serves as a coolant/lubricant for the pump and motor.
- People with asthma may be affected by fog. Most fog fluids are made of glycol. Studies have shown this mixture is not hazardous to humans. However, some people have complained of respiratory problems and throat irritation when exposed to prolonged exposure or theatrical fog. Therefore, it is advisable to notify patrons about the intended use of a fog machine.
- Fog may cause floor surface to be slippery.

Weapons, Stunts & Combat

Serious injuries can occur when performing stunts, using LARP (Live Action Role Playing) weapons, and when combat is being simulated.

LARP weapons formerly consisted of "Boffer" weapons, which were little more than PVC pipes and foam often taped up. Now, LARP weapons are made with carbon-fiber cores swathed in foam, coated with latex and meticulously painted. Some weapons have an enormous array of features. Others use an almost indestructible foam rubber with no latex coating. These LARP swords and LARP weapons are capable of amazing amounts of detail and are generally a little heavier than the traditional foam swords, providing more realism.

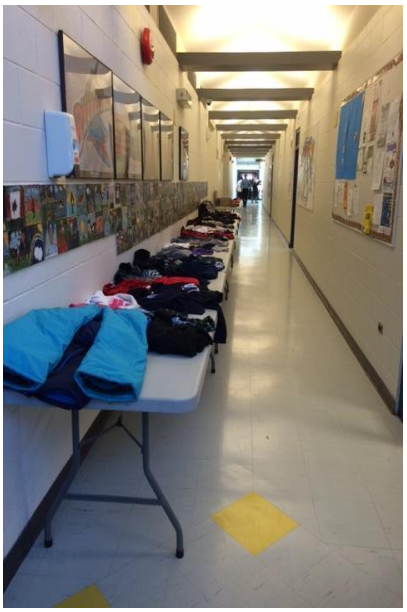
Stage combat is an artistic presentation of violence in a theatrical environment. It is violence based on the principles of reality, masked by specific techniques that make the actions safe for the performers, in which the audience perceives the violent act as reality. Theatrical weapons must never be used outside of the theatre setting. Law enforcement officers cannot determine whether a theatrical weapon being used in a school hallway or outside is real and will react accordingly if threatened.

A fight director is responsible for all aspects of violence within a theatrical event. This can be something as simple as a fall onstage to something as complicated as gang fights in "West Side Story." The fight director works directly under the producer/director and is responsible for keeping that director's vision intact.

Emergency Exits and Hallways

Exits in theatres and gyms must never be blocked. Aisles must be kept clear. Extra seats must not be placed in theatres already having fixed seating . Means of egress (aisles, exit routes, and exit doors) must never be obstructed.

Hallways in a school must never be blocked with tables or chairs. During an event there is double if not triple the normal amount of people in the school and in the event of an emergency hallways blocked with tables and chairs become an extreme hazard that may mean the difference between a safe escape or having hundreds of people hurt or killed. If there is a need to put out lost and found items or sell treats during an event please use a classroom or library, not the hallway.



Emergency Procedures

At the start of any Live Performance, it is the Producers responsibility to announce locations of fire exit routes and procedures.

Parents should be instructed In case of emergency evacuation they should not approach the stage to get their children. Children will be evacuated by the staff in charge.

Ensure the announcement is made when performing at a different venue (i.e. Winter Concert in another venue such as high school or Church)

An emergency plan must be developed and reviewed with all participants. The plan must include procedures for dealing with:

- Fire Evacuation
- Lockout (shelter in place) or Lockdown
- Medical emergency
- First Aid requirements and defibrillator locations

APPENDIX

- Safe work procedure for hand tools
- Safe work procedure for setting up portable staging
- Safe work procedure for setting up risers
- WFPS Plan for Non- Fixed Seating
- Example of Gym seating plans
- Safe work procedure for scaffolding erection
- Sound level chart

Safe Work Procedure – Hand Tools

Event Name: _____

Prop manager or designate: _____

Hazards Present:	**Personal protective equipment (PPE) required:**
Various hazards depending the tool being used. Hazards may include: eye injury, cuts, stab, crushing, and equipment damage.	CSA approved safety glasses

Additional Training Requirements or notes

Always wear safety glasses when using hand tools .

Guidance documents/standards/legislative requirements:

School Division Policy / Practice:

- ✓ GBGBA Employee Violent Incident Reporting
- ✓ Accident Reporting Administrative Practices
- ✓ GBGBB Harassment

Hammer:

1. Wear safety glasses or face shield
2. Watch the area you are hitting. Keep opposite hand at a safe distance from area to be struck. Use vise or other holding device as necessary. Do not raise the hammer excessively and strike using massive blows. Strike a hammer blow squarely with the striking face parallel to the surface being struck. Avoid glancing blows and over and under strikes.
3. Visually inspect hammer before each use. Do not use a hammer with a loose or damaged handle or head.
4. Hold the hammer with your wrist straight and hand tightly wrapped around the handle.
5. Look behind and above before swinging a hammer. Do not strike with side of the hammer.
6. Select and use a hammer according to its intended use.

Hand File:

1. Never use a hand file without the handle. Tap the file downwards on the bench to make sure the handle is secure.
2. Select and use a hand file according to its intended use.
   Hold hand file firmly in one hand, steadying the other end with the tips of the fingers of the other hand. Use steady even pressure. Do not file with short quick strokes. If face of file becomes clogged, clean it using a brush. Wear recommended gloves.
3. Wear safety glasses or a face shield.

Wrench:

1. Pull on wrench and do not push. Face an adjustable wrench forward and turn wrench so pressure is against the permanent jaw.
2. Select and use a wrench according to its intended use.
3. Grip wrench so that it does not endanger oneself in case of slippage. Use correct jaw and ensure wrench is adjusted properly and secure to nut/bolt. Wear recommended gloves.
4. Do not increase the leverage by adding sleeved additions to increase wrench length or strike a wrench with a hammer to gain more force. Do not use wrench on moving machinery. Do not insert a shim in a wrench for better fit.
5. Visually inspect wrench before each use. Do not use worn adjustable wrenches.

Screwdriver:

1. Keep screwdriver handle clean. Do not hold work-piece in one hand while using the screwdriver in the other. Do not lean or push on a screwdriver with any more force than necessary to keep contact with screw. Keep the shank directly over the screw being driven.
2. Do not use a screwdriver with rounded edges or tips, split or broken handle.
3. Do not use a screwdriver for prying, punching, chiseling, scoring or scraping.
4. Select and use a screwdriver according to its intended use

Hand Saw:

1. Wear safety glasses or face shield
2. Start cut carefully and slowly to prevent blade from jumping. Pull upward until blade bites. Start with partial cut, then set saw at proper angle. Apply pressure on the down stroke only. Use entire length of blade in each cutting stroke. Hold work-piece being cut firmly in place. Use a co-worker, a supporting bench or vise to secure and/or support work-piece if required.
3. Visually inspect saw and blade before each use. Never use saws with bent, buckled, twisted or cracked blades.
4. Select and use a saw and blade according to its intended use. Ensure saw blade is secure and installed with the teeth pointing forward. Keep saws sharp, clean and oiled.
5. Keep hand/fingers at a safe distance from cutting line Wear safety footwear. Use a support bench or get assistance from a co-worker to catch cut off stock
6. Use machine oil on blade if necessary
7. Wear hearing protection

Pliers:

1. Cut at right angles. Never rock from side to side or bend wire back and forth against the cutting edges of pliers. Pull on pliers, do not push.
2. Select and use pliers according to their intended use
3. Do not use pliers on nuts/bolts. Do not hammer on pliers to cut wire or bolts.

Knife ("exacto" type):

1. Wear safety glasses or face shield. Cover knife with rag when snapping off blunt end of blade for new edge. Never twist or gouge with knife blade.
2. Ensure opposite hand/fingers are a safe distance from the path of cut. Do not use excessive pressure while cutting. Visually inspect knife blade before each use.
3. Snap off blunt end or change knife blade as soon as it becomes inefficient.
4. Wrap up and dispose of used knife blades in designated containers
5. Select and use knife blade according to its intended use.
6. Ensure knife blade is secure and installed properly.
7. Always retract, cover or remove knife blade when knife is not being used.

NOTE: These procedures include a practical demonstration of the tools by an experienced staff member. The prop manager or designate must be confident that the operator understands the procedure.	**Users' name:** _____ **Signature:** _____ **Date of review:** _____

	Event Name:_____ Prop manager or designate: _____	SAFE WORK PROCEDURE Trouper Stage – Set Up Page 1 of 3

LOCATION	WRITTEN BY:	APPROVED BY:	DATE CREATED	LAST REVISION
All schools	Lorie Carriere Donna Hancox Michael Baril	Gord Howe	Dec. 3, 2014	New

HAZARDS PRESENT	PERSONAL PROTECTION EQUIPMENT (PPE)	ADDITIONAL REQUIREMENTS
✓ Pinch points ✓ Falling equipment ✓ Collapse of stages	✓ Protective footwear ✓ Protective gloves	✓ Orientation on setup and tear down of stage equipment.

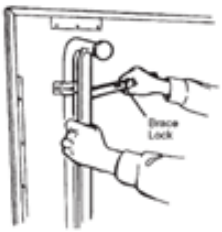
SAFE WORK PROCEDURE

PRE-JOB SAFETY:

1. All platform units must be locked together using unit to unit clamps.
2. Platforms are designed for level surfaced only and contain no provision for adjusting leg height.
3. Do not set up multilevel stages using trouper units unless adequate special clamping is provided to secure the levels together.
4. Stage set up requires two people to avoid injury.
5. Inspect the system as you are setting up and check for any bent, broken or loose parts. If any defective parts are found, do not use the section. Set it aside and notify facilities & operations department.

PROCEDURE FOR STAGE ASSEMBLY:

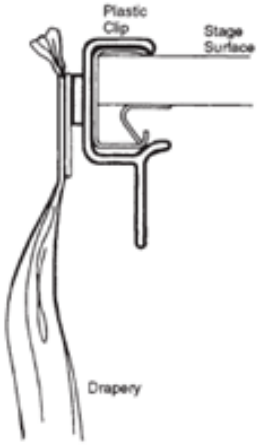
1. Stages will be delivered by cartage and left in the gym for setup by the school caretakers
2. Using a two-wheeler or other device, move the stage deck to the desired location.
3. Open all legs on the platform unit. Straighten the hinged brace on each leg. If necessary push in on the brace lock until it engages.
4. Using two people rotate the platform unit off the cart and set it upright on its legs.
5. Repeat steps 2-4 for the remaining platform units.
6. Position the first two platforms units at their desired stage location, rear center of the stage.



7. Attach the platforms together in at least two places using the unit-to-unit clamps beneath the platform surface.
8. Ensure all units are locked together at the points indicated. **NOTE:** Platforms are not safe and may collapse if the unit to unit clamps are not used as specified.

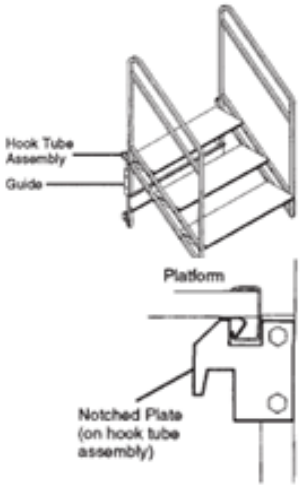
INSTALLING DRAPERY ENCLOSURES:

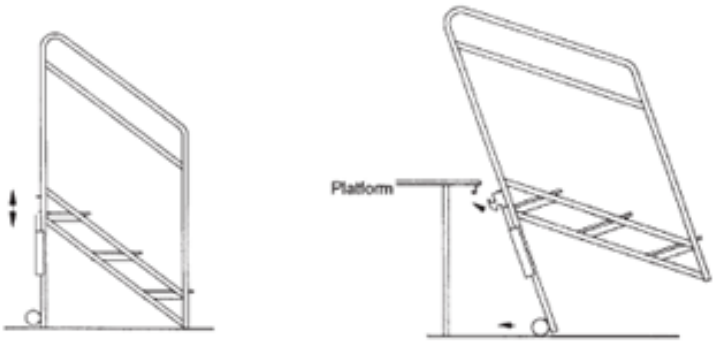
1. Drapery enclosures must be attached prior to stairways being installed.
2. Install clips along the stage perimeter wherever drapery is desired (about 12" apart).
3. Beginning at a corner of the stage, press the drapery onto the clips.
4. Continue attaching the drapery to the clips until the section is completely installed.
5. Repeat the above procedure with the remaining drapery sections.



INSTALLING THE STAIRWAY(S):

1. The hook tube assemblies that slip into guides on each side of the stairway frame have a notched plate. The notched plates must be on the outside of the tubes, extending away from the stairway frame.
2. Adjust the hooks to the proper height for the stage.
3. Tip the stairway into place
4. Check that the notch in the hook tube is secured to the stage framework, and that the stairway feet are flat on the floor.
5. Tuck the top edge of the drapery enclosure under the lip of the stage at the stairway locations.





DISASSEMBLY OF STAGE EQUIPMENT:

1. Remove the stairway by tilting it back to disengage the notched plate from the stage assembly.
2. Remove the drapery enclosure by pulling it away from the clips.
3. Remove all of the drapery clips.
4. Disengage the stage unit to unit clamps beneath the platform surface.
5. Separate the platform units.
6. Using two people rotated the platform onto its side.
7. Disengage the brace lock on each leg and slide the hinged brace until the leg collapses and folds back to the platform.

   NOTE: PLASTIC BRACE LOCKS WILL BE DAMAGED IF NOT DISENGAGED WHILE FOLDING THE LEGS!!! THIS RENDERS THE STAGES UNSAFE FOR THE NEXT ASSEMBLY! PLEASE INSTRUCT ALL THOSE ASSISTING IN ASSEMBLING AND DISASSEMBLING STAGES OF THE IMPORTANCE OF DISENGAGING THESE PLASTIC BRACE LOCKS BY PUSHING THEM BACK AGAINST THE SPRINGS FAR ENOUGH TO RELEASE THEM PRIOR TO FOLDING THE LEGS.
8. Stack the stages in a secure location for cartage pickup.
9. Any loose hardware on the floor (bolts, nuts, screws, washers, other fasteners or parts, etc.) are to be either reattached to the stages or collected and sent back with the stages. **DO NOT** throw them away.

REGULATORY REQUIREMENTS

- WS&H Act W210, Section 4, 5, 7, 7.1
- Mb. Workplace Safety & Health Regulations 217/2010,
  - Part 2, General Duties, Section: 2.1, 2.1.1
  - Part 6, Personal Protective Equipment
  - Part 9, Working Alone
  - Part 30, Temporary Structures
- Wenger, Trouper and Stagehand Platform System Instruction Manual

	Event Name: _____ Prop manager / designate: _____	SAFE WORK PROCEDURE Signature Choral Riser - Assembly Page 1 of 4

LOCATION	WRITTEN BY:	APPROVED BY:	DATE CREATED	LAST REVISION
All schools	Lorie Carriere Donna Hancox Michael Baril	Gord Howe	Dec. 5, 2014	New

HAZARDS PRESENT	PERSONAL PROTECTION EQUIPMENT (PPE)	ADDITIONAL REQUIREMENTS
✓ Pinch points ✓ Falling equipment ✓ Falls from risers ✓ Collapse of risers	✓ Protective footwear ✓ Protective gloves	✓ Orientation on setup and tear down of stage equipment.

SAFE WORK PROCEDURE

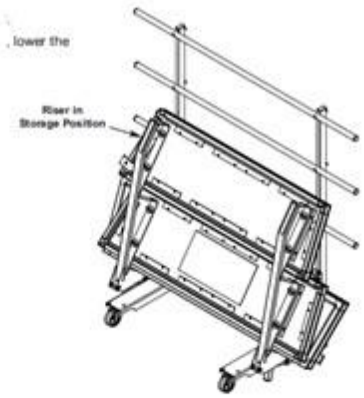
PRE-JOB SAFETY:

1. When ordering risers ensure that you indicate on the cartage request whether side rails are required and depending on your riser setup whether or not you need 2, 4 or 6 side rails. Side rails are required if you will be placing the risers:
    - On a portable stage
    - Within 6 feet of a stage edge if the stage is built in.
    - Risers are not required if they are place onto the gym floor.
    - All risers come with back rails. All back rails must to be installed prior to use.
2. Assembly instructions for arc configuration and straight configuration are different and require different assembly instructions.
3. Risers are designed for level surfaced only and contain no provision for adjusting leg height.
4. Back rail assembly must remain attached to the risers at all times. Removal can cause riser instability and could result in injury. Risers are NOT to be used as stairs to the stage.
5. Risers can be assembled by one person, but two people will make the job easier.
6. With the riser in the open position, check the fasteners for tightness. There should be 6 locking nuts on the chassis, 4 screws on the back rail upright tubes, 6 locking nuts on the back rail horizontal tubes and 12 plastic wing nuts (four under each step).
7. Inspect the system as you are setting up and check for any bent, broken or loose parts. If any defective parts are found, do not use the section. Set it aside and notify facilities & operations department.
8. Risers are to be used indoors only.

Note: if your school purchased their own risers they must also have back rails and side rails for use.

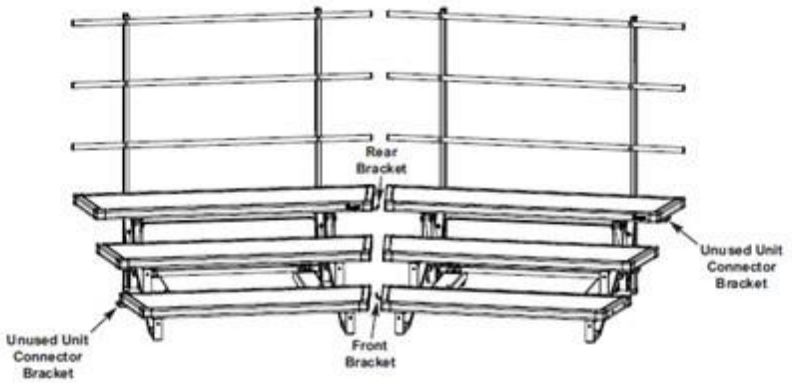
PROCEDURE FOR RISER ASSEMBLY:

1. Risers will be delivered by cartage and left in the gym for setup by the school caretakers
2. Risers have four wheels on the bottom of each section. Move each riser to the desired location.
3. If placing risers onto the stage:
   - roll the riser to the stage edge,
   - install the guardrail by placing the posts into the holders on the back of the risers and clicking them into place.
   - lean the back guard rail up against the stage edge;
   - lift the bottom portion of the riser (using your arms and legs and not your back)
   - leverage the riser up and over the side.
   - Push the riser back and onto the stage.
   - Lift up the riser and wheel it to the desired location



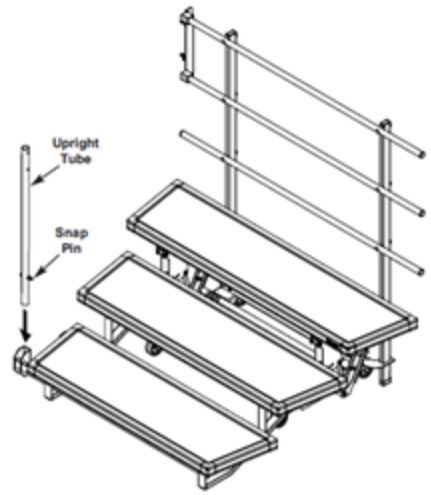
4. To place the riser into the set up position, pull down and lower the first step to the ground.
5. Unfold the second riser and connect it to the first riser:
   - Set the rear step onto the rear bracket of the first riser.
   - Lift the front step of the first riser over the front bracket of the 2nd riser.
   - If necessary, shift the positioning of the connected risers to fit tightly together.

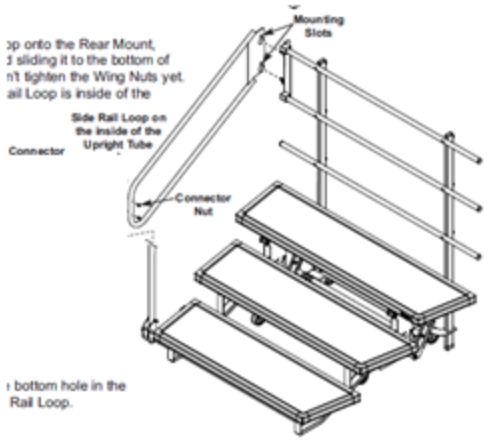
   Note: adjoining risers c separate during use unless they are connected using the attached unit connector brackets. Unused unit connector brackets can cause injury.
6. Repeat steps 5 for the remaining risers.



INSTALLING SIDE GUARDRAILS:

1. All risers placed on portable stages are required to have side guardrails installed. All risers placed on built in stages that are located within 6 feet of the stage edge are also required to have side guardrails installed.
2. Insert the snap pin into the hole in the upright tube. Close the wire retainer over the pin to keep it in place.
3. Place the end of the upright tube with the snap pin into the front mount.
4. Place the side rail loop onto the rear mount, over the wing nuts and slide it into the bottom of the mounting slots. Don't tighten the wing nuts yet. Ensure the side rail loop is inside of the upright tube.
5. Thread one threaded rod into a connector nut. Slide both through the top hole in the upright tube and the side rail loop and secure at the other side with an additional connector nut. Use two 5mm hex key wrenches to tighten them securely.
6. Repeat step 5 on the bottom hole in the upright tube and side rail loop.
7. Thread the knob into the hole of the front mount. Tighten securely against the upright tube to stabilize it.
8. Tighten the wing nuts on the rear mount against the plate on the side rail loop





DISASSEMBLY OF STAGE EQUIPMENT:

1. Remove the side rail by loosening the knob on the front mount and both wing nuts on the rear mount. Lift and rotate the side rail off the riser.
2. Lift up on the first step of the riser and fold it up to the back rail.
3. Roll the riser to the stage edge. From the floor leverage the riser over the edge and lower to the floor. Use proper lifting techniques.
4. Roll the risers to a secure location for cartage pickup.
5. Any loose hardware on the floor (bolts, nuts, screws, washers, other fasteners or parts, etc.) are to be either reattached to the risers or collected and sent back with the risers. **DO NOT** throw them away.

REGULATORY REQUIREMENTS

- WS&H Act W210, Section 4, 5, 7, 7.1
- Mb. Workplace Safety & Health Regulations 217/2010,
  - Part 2, General Duties, Section: 2.1, 2.1.1
  - Part 6, Personal Protective Equipment
  - Part 9, Working Alone
  - Part 30, Temporary Structures
- Signature Choral Riser – Three Step Model Instruction Manual
- Signature Side Rail – Instruction Manual

Fire Paramedic Service • Service d'incendie et de soins médicaux d'urgence
Fire Prevention Branch• Direction de la Prévention des incendies

PART 5 – GUIDE TO THE MANITOBA FIRE CODE REQUIREMENTS FOR NON-FIXED SEATING

Non-fixed seating applies to seats that are not permanently attached in one position. Generally non-fixed seats are used in areas that are utilized in many different ways. An example would be the gymnasium in a school, or the hall in a community club.

This guide is to assist property/business owners so they are in compliance with the Manitoba Fire Code requirements for non-fixed seating.

Typically, non-fixed seating will either be arranged in rows (indoors or outdoors), or at tables.

A. Non-fixed seating arranged in rows shall meet the following (see illustration):

1) The seats shall be arranged in rows.

2) The distance between the rows shall be 400 mm (16 inches), and be measured from a plumb line from the back of one seat to the most forward projection of the seat directly behind it.

3) Aisles shall be located so there are no more than 7 seats between any seat and the nearest aisle. Thus, there can only be 16 seats in a row between aisles.

4) Aisles that serve rows where there are 60 seats or fewer must be at least 750 mm (30 inches) wide.

5) Aisles that serve rows where there are more than 60 seats must be the greater of 1100 mm (44 inches) wide, or the number of seats the aisle serves X 6.1 mm/person. For example, if the aisle serves 100 seats: 100 X 6.1 = 610 mm. The greater of 610 mm or 1100 mm is 1100 mm. Thus, the minimum width the aisle serving 100 seats can be is 1100 mm (44 inches).

6) Dead end aisles must not be longer than 6 M (20 ft.).

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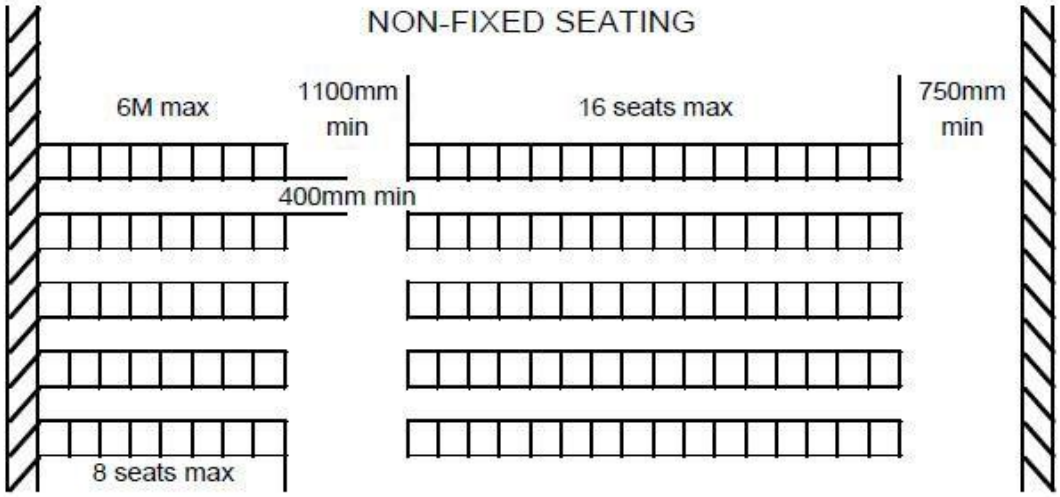
7) Every required egress doorway shall be served by an aisle that has a clear width not less than 1100mm (44inches), has access to at least one additional egress doorway; and at every point on the aisle, provides a choice of 2 opposite directions by which to reach an egress doorway. **NO EXITS CAN BE BLOCKED**.

8) When your assembly contains more than 200 seats, the seats in a row shall be fastened together in units no fewer than 8 seats. If the row has 7 or fewer seats, then all the seats in the row shall be fastened together.

9) When arranging non-fixed seats in outdoor assembly areas, aisles can be located so there are no more than 15 seats to the nearest aisle (a maximum of 32 seats/row). Aisles shall be the greater of 1200 mm (48 inches), or the number of seats served by the aisle X 1.8 mm.



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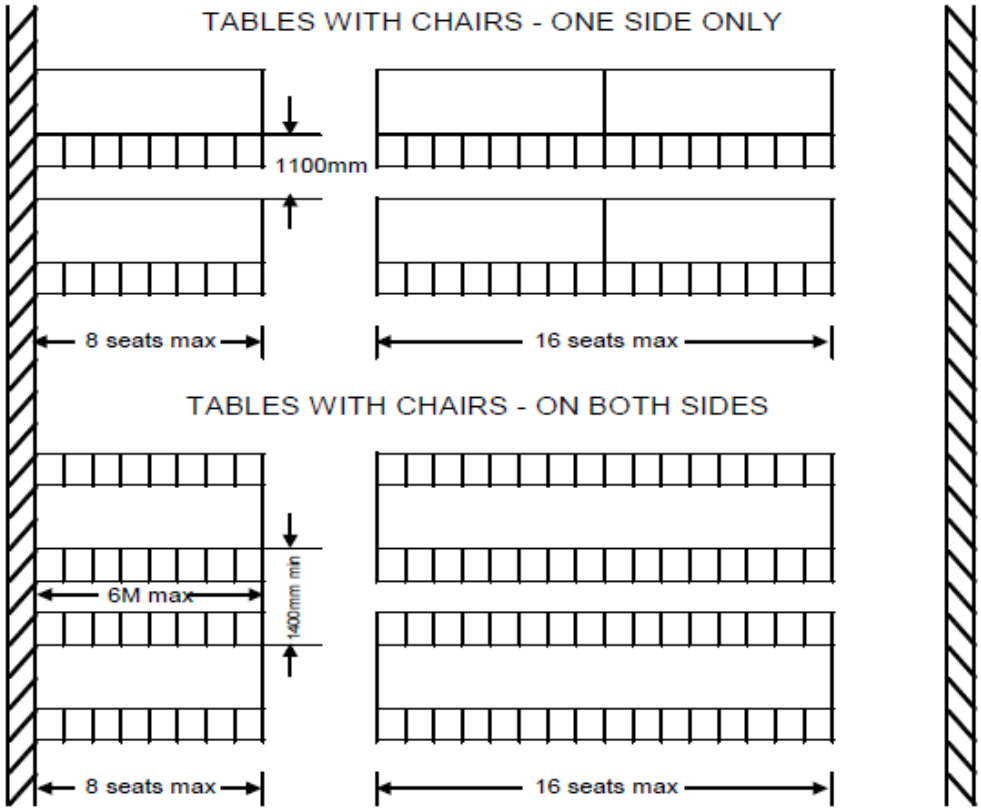
B: Non-fixed seating that is arranged with tables shall meet the following (see illustration below):

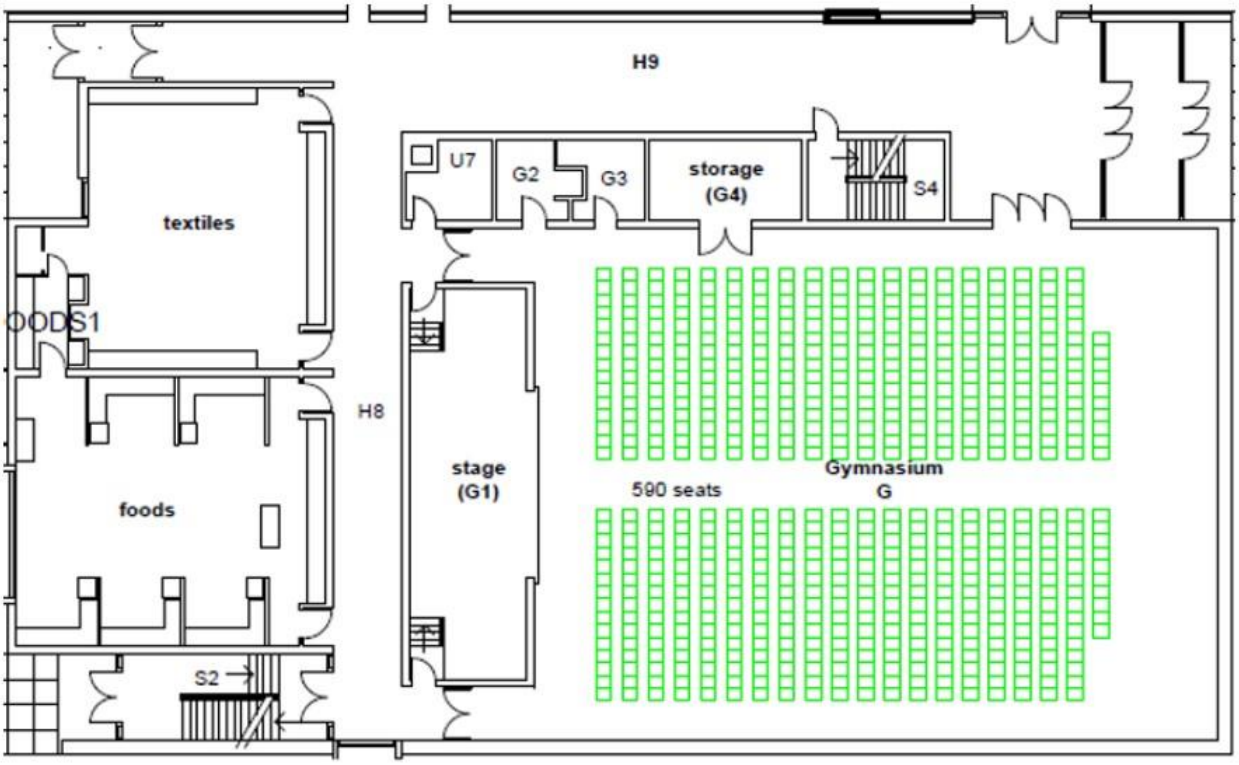
1) If the tables being used will be set up with chairs on both sides, the distance from the edge of one table to the edge of the next shall not be less than 1400 mm (56 inches).

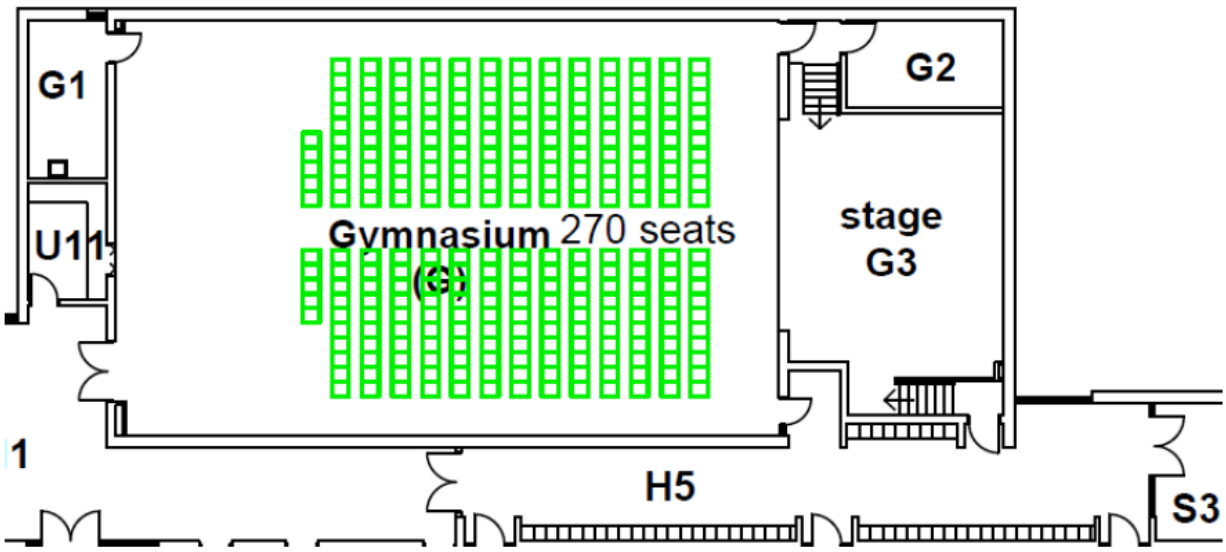
2) If the tables being used will be set up with chairs on one side only, the distance from the edge of one table to the edge of the next shall not be less than 1000 mm (40 inches).

3) There can be no more than 16 seats in a row, or no more than 7 seats to the nearest aisle as was applied to assembly seating in rows.



Seating plan examples.
Never exceed the Occupancy Load.





LOCATION	WRITTEN BY:	APPROVED BY:	DATE CREATED	LAST REVISION
All Schools	L. Carriere Lorne Turner	Leon Prevost Brent Vandenbosch	June 12, 2013	New

HAZARDS PRESENT	PERSONAL PROTECTION EQUIPMENT (PPE)	ADDITIONAL REQUIREMENTS
✓ Pinch points ✓ Falling equipment ✓ Toe & foot crush hazards ✓ Falls ✓ Rope abrasions ✓ Muscle strain	✓ Safety Glasses ✓ Grade 1 Safety footwear ✓ Hard hats ✓ Harness ✓ Retractable 6ft. lanyard ✓ scaffolding anchor. ✓ Gloves ✓ Rope	✓ Equipment orientation ✓ Scaffolding Erection training ✓ Fall Protection Training

SAFE WORK PROCEDURE

INSPECTION:

1. Don personal protective equipment – safety glasses, footwear, hard hat and gloves.
2. Gather all equipment in the area where it will be used.
3. Inspect all equipment to ensure that it is in good repair and suitable for the intended use. See checklist at the back of the SWP.
4. Ensure all pieces are present before assembling the scaffolding. The following pieces are required to erect 3 levels of scaffolding:
   a) 4 wheels with locking levers
   b) 6 scaffolding end fames
   c) 6 cross braces
   d) 6 pieces of decking
   e) 4 guard rail posts
   f) 4 long guard rails
   g) 4 short guard rails
   h) 16 locking pins

SCAFFOLDING ASSEMBLY:

1. If you will be using the scaffolding indoors: lay down the two bottom end frames in the area where the scaffolding will be used. Insert one wheel into each leg of the end frames (4). Pin the wheel in place by sliding the locking pins through the hole in the wheel and scaffolding leg. Lock the pins in place by bending the end of the pin down. Ensure the ground surface you will be using the scaffolding on can support the loads from the scaffold, workers and materials on it.

   If using the scaffolding outdoors – Insert screw jacks into the bottom of the scaffolding end frame legs and pin in place. Insert the wheels onto the bottom of the screw jacks. Note: if you are using the scaffolding outside you **MUST** use screw jacks (used for levelling the scaffolding).

2. Lock the wheels on one end frame of scaffolding and stand it up. Lift up the attached locking pins on the scaffolding and insert one leg of the "X-bracing". Lower the pin to lock the bracing in place. Repeat with the other leg of the "X-bracing". Allow the frame to lean slightly forward and rest on the ground while you install the 2nd set of "X-bracing".


X-bracing locking pin – open


Closed


X-bracing attached to the first end frame

3. Lock the wheels on the second scaffolding end frame and stand it up. Connect the 2nd end frame to the "X-bracing" on the first end frame. Ensure all X-bracing pins are locked and in place.

   Note: Install the cross bracing so that the ends of the bolts face outward. (prevents clothing from getting caught in the bolts)

4. Install the decking on top of the two end frames. Lifting the decking up and over the two end frames and hook the decking onto the top rail of the end frames. Install the remaining two deck pieces. Close the deck locking pins across the top rail of the scaffolding. The deck locking pins secure the deck to the end bracing.

   Remember the working deck must **always** be fully decked. Staff are not allowed to work from a partially decked section.

   Install the horizontal-diagonal brace. Secure each end of the brace to the end frames using a double tube clamp.


Scaffolding fully decked


Deck locking pins closed


Horizontal diagonal bracing

5. Inspect the safety harness and lanyard. Have one worker don their safety harness and attach the lanyard to the D-ring on the back. Ensure that that lanyard snap hooks are securly attached to the scaffolding snap hooks.


Front


Back


Retractable lanyard with scaffolding anchor

6. Have one worker climb the ladder on the scaffolding to the top of the decking. Attach the scaffolding snap hook to the corner where the top beam of the end frame meets the upright. **NEVER** connect your lanyard to the guardrail or X-bracing.

   The second person is considered the helper. Have the 2nd person hand the two end frames up to the worker. Insert the 2nd level end frames over the top of the base end frames and pin in place.

7. Connect the 2nd level "X-Bracing" and pin in place. Install the 2nd level decking and pin in place.

Ensure 2nd and 3rd level end frames have the ladders all running on the same side

End frame pin – push the pin through the holes and lock the pin in place by pushing the end down.

8. Repeat steps 6 and 7 to assemble the 3rd level. Use a rope system to pull the scaffolding pieces up to the working level. Remember each working level must be fully decked.

9. Install the horizontal diagonal brace just below the decking. Connect the brace using double locking clamps.

10. Disconnect your lanyard and climb to the 3rd level. Reconnect your lanyard. Install the four guard rail posts onto each leg of the end frames and pin in place. Ensure the posts are orientated the correct ways so that all the guardrails can be inserted onto the pins

11. Install the mid-rail and top-rails (four of each) and pin in place. Ensure all pins are locked and guardrails are installed on all open sides. Note: the guardrails have some give in them and will move if leaned on.

3rd level with guardrails

Guardrail pins

Guardrail pins

12. Install toeboards as required. The gap between the bottom of the toeboard and the top of the platforms must not be more than 13mm (1/2 inch).

13. If more than three sections of scaffolding are required outriggers must be installed (note: outriggers must be rented so pre-planning is required) and an external staircase (with rest platforms) must be added (rented).

14. Dis-assemble the scaffolding exactly the same way as it was erected.

15. Scaffolding must be inspected by the supervisor prior to its first use after erection and every day there after by the user. The supervisor is required to attach an inspection tag to the scaffolding after thieir inspection giving approval for the scaffolding to be used. Supervisor is also required to sign and date the inspection log noting any deficiencies.

16. Users of the scaffolding must inspect, sign and date the inspection tag on a daily basis until the scaffolding has been removed.

17. All tags must be forwarded to the S&H Officer upon completion of the work.

REGULATORY REQUIREMENTS

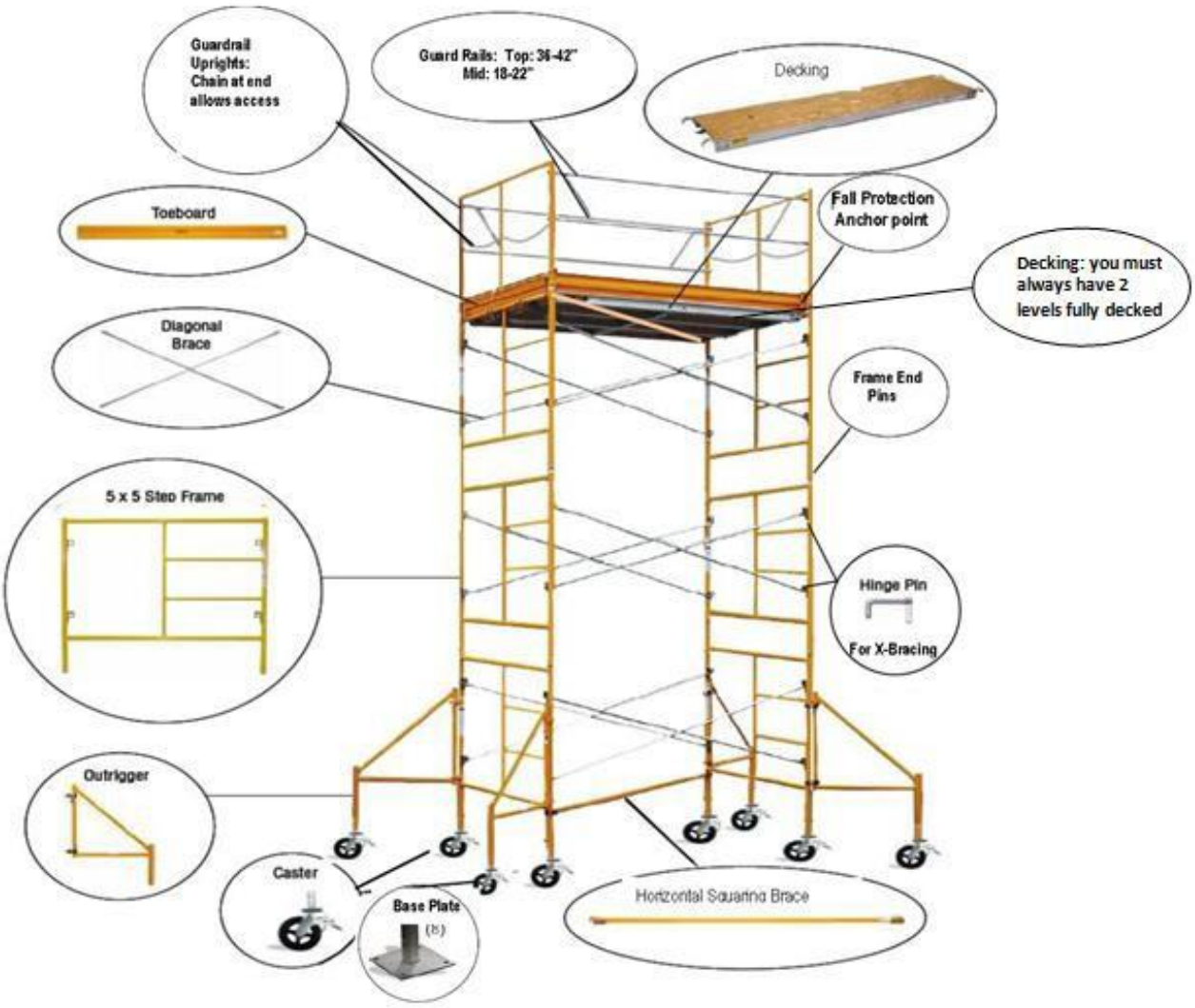
- WS&H Act W210, Section 4, 5, 7, 7.1
- Mb. Regulations 217/2006,
  - Part 14, Sections 14.3 -14.5 Guardrail Systems
  - Part 14, Sections 14.6-14.12 Fall Protection Systems
  - Part 28, Sections 28.1 - 28.13,28.16, 28.20 Scaffolds
- Scaffolding Guideline
- Manufacturer's user instructions

EQUIPMENT INSPECTION CHECKLIST

Prior to use you must inspect the equipment you plan to use to ensure that it is in good repair and suitable for the job planned. Please check the following items:

- ☐ **Casters:** All are same size and from same manufacturer. Wheels rotate well and the swivel below the stem is working. Braking mechanism works properly. Wheel tread has no damage.
- ☐ **Frames:** no cracks in the welded joints. No kinks or dents in the top or bottom bars. Legs plumb and square with the bars. Cross –bracing locking pins in good working order.
- ☐ **Cross-Braces and horizontal diagonal braces** – straight with no bent ends. Double locking clamp connection in good working order. No excessive rust.
- ☐ **Decking** – not misshapen or cracked. Locks are all working. All bolts and screws in place. No burns or broken ends. If upper surface has a non-skid coating, no rot or plywood separation is visible on underside.
- ☐ **Guardrails** – rails and posts are straight with no kinks, dents or rust. No cracks in welds; pins are all in working order and not broken or missing.
- ☐ **Locking Pins** – no rust or dents, broken or missing pieces. If pins are missing or broken, either replace or use #9 wire.
- ☐ **Screw Jacks** – no cracks in welds where screw jack is attached to the top of the caster. No thread damage. Adjusting nut has a tight fit.
- ☐ **Outrigger** – clamp is in good working order. Outrigger frame has no dents, cracks or rust in the weld joints or bars. Screw jack has no cracks in the welds and no thread damage.

Note: Damaged equipment should be tagged and marked as not fit for use. Inform your supervisor so that others do not use it.


Guardrail Uprights: Chain at end allows access
Guard Rails: Top: 36-42" Mid: 18-22"
Decking
Toeboard
Fall Protection Anchor point
Decking: you must always have 2 levels fully decked
Diagonal Brace
Frame End Pins
5 x 5 Step Frame
Hinge Pin
For X-Bracing
Outrigger
Caster
Base Plate
Horizontal Squaring Brace

Safe Sound Level			
Sound Source Examples	**Sound Intensity (Decibels)**	**Recommended Exposure Limits For Repeated Exposures***	**Comments**
Quietest sound heard by person with normal healthy hearing	0	Any duration	None
Quiet empty classroom that meets U.S. acoustical standard†	35–40	Any duration	None
Typical library sound levels	40	Any duration	None
Typical unoccupied classroom	46	Any duration	None
Normal conversational speech	60	Any duration	None
Battery-powered pencil sharpener	71	Any duration	None
Potentially Hazardous Sound Level			
Sound Source Examples	**Sound Intensity (Decibels)**	**Recommended Exposure Limits For Repeated Exposures***	**Comments**
School cafeteria	85	8 hours	Prolonged exposures might cause slight hearing loss. Hearing protection should be used if regularly exposed to this sound level beyond the exposure limit.‡
Band class	90	2 hours	Hearing protection should be used if regularly exposed to this sound level beyond the exposure limit.‡
Wood or metal shop, power tools, snowmobile	100	15 minutes	Hearing protection should be used if exposed to this sound level beyond the exposure limit.‡

Hazardous Sound Level			
Sound Source Examples	**Sound Intensity (Decibels)**	**Recommended Exposure Limits For Repeated Exposures***	**Comments**
Personal stereo system at high volume	105	5 minutes	Hearing protection should be used if exposed to this sound level beyond the exposure limit.‡
Chainsaw, loud rock concert	110	1.5 minutes	Hearing protection should be used if exposed to this sound level beyond the exposure limit.‡
Ambulance siren	120	9 seconds	Hearing protection should be used if exposed to this sound level beyond the exposure limit.‡
Firecrackers, firearms	140-165	Immediate hearing damage possible	Hearing protection should be used whenever exposed to this sound level.‡