



**PRODUCTION SERVICES SAFETY
THEATRICAL ELEMENTS REGISTER**



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This document is provided for instruction on Special Effects and Theatrical elements sanctioned by Sydney Opera House.

DEFINITIONS

For the purposes of this document, the terms are used according to these definitions:

AS – Australian Standard

Fog and smoke – are both used to describe atmospheric effects in theatre. Smoke is comprised of solid particles suspended in the air and is more often than not the effect of incomplete combustion. Fog comprises liquid droplets suspended in the air and is not the product of combustion.

HAZE – Fine smoke causing lack of transparency or reduced visibility. Used to define light beams and sources.

MDF – Medium Density Fibreboard

MSDS (Material Safety Data Sheet) – a document prepared by the manufacturer or importer of a hazardous substance. It prescribes the properties and uses of a particular hazardous substance and provides information on the substance's identity, chemical and physical properties, health hazard information, precautions for use and safe handling information.

PPE – Personal Protective Equipment

PSS – Production Services Safety

Risk Assessment - means the process of evaluating the probability and consequences of injury or illness arising from exposure to an identified hazard and for the purposes of this document includes Hazard Identification and Risk Control initiatives.

SFX – Special effects

SOH – Sydney Opera House



RESPONSIBILITIES

The NSW OH&S Act 2000 and the NSW OH&S Regulation 2001 places responsibility on everyone involved in the presentation of a production or event to ensure compliance with the legislation and that standards are maintained. This responsibility is shared by the producing company and its employees, venues and their employees, contractors and labour hire agencies.

The following legislation and Australian Standards are referenced in this document:

- Occupational Health & Safety Act 2000 (NSW)
- Occupational Health & Safety Regulation 2001 (NSW)
- AS/NZS ISO 31000:2009 Risk management - Principles and guidelines
- Code of Practice – Risk Assessment (2001) (NSW)

RISK ASSESSMENT

All productions and events to be staged within the Sydney Opera House precinct must have a risk assessment and appropriate management plans. This process and document must include all aspects of what takes place during bump in and out, rehearsals and performances. Appropriate control measures must be identified and implemented. This plan must be delivered to your Production Manager in a minimum of two weeks prior to commencement of your bump in.

Sydney Opera House OHSMS provides the following definition – “*Risk (in safety management), represents the potential likelihood and consequence of a hazard resulting in an injury*”.

The Australian Standard for risk management AS/NZS 31000-2009 defines risk as the effect of uncertainty on the objectives. In other words, risk is the combined “effect” of the likelihood that a hazard will cause injury and the potential severity or consequences of the injury.

To manage the uncertainty of risk, Sydney Opera House has adopted a risk management framework based on the assessment of risks in the workplace environment and the activities we do. For any sequences involving stunts, fights, aerial, acrobatic work, pyrotechnics, special effects or any work identified in the risk assessment as requiring specialist supervision, an appropriately qualified and experienced Supervisor shall be engaged to



supervise the bump in of such sequences and supervise their ongoing operation.

Notification is required when the following risks are identified:

- Animals
- Dangerous goods/hazardous substances
- Explosives
- Firearms
- High noise areas
- Multiple venue locations within SOH
- Pyrotechnics
- Significant amounts of electrical equipment
- Significant manual handling
- Temporary Structures
- Working at height (>2m)
- Working with major plant and equipment – (forklifts, elevated work platforms, etc)

If assistance is required in compilation of your risk assessment and management plan please contact PSS – Anthony Russell on 9250 7357 or James Ternen on 9250 7367.

Sets

Sets cannot impede on fire exits, viewing exit signs or in any way create an obstacle to the smooth free flow of movement around a venue. In some venues it is not permitted to make a passageway, crossover point or aisle any narrower than it already is.

All sets should be built with materials that conform to Australian Standards Specification C1.10 of the BCA and AS/NZS 1530 Part 3 relating to fire retardation. Fire retardant is a chemical that slows the spread of fire. A quality and professionally applied fire retardant can help fire fighters as it can dramatically slow the spread of fire.

Aisle lights cannot be switched off under any circumstances.

Animals



Animals required for performances or events are permitted on site. The following issues need to be effectively covered in the Risk Assessment:

- Engagement of suitably qualified and experienced animal wranglers and, where necessary, veterinarians.
- What the animals are required to do in the course of the performance.
- Any potential contact of the animals with audience or general public.
- Animal contact and possible disease transmission.
- Well-being of the animals.
- Appropriate facilities to house, feed and transport the animals in hygienic conditions without affecting the hygiene of nearby areas.
- Disposal of animal waste off site.
- Emergency plans developed in consultation with animal handlers.

Firearms, Replicas and Weapons

Only those holding a Theatrical Armourer's Dealers Licence (Firearms Amendment Act 2008) and Commissioners Permit issued by the NSW Police service shall be responsible for provision, supervision of use, storage and security of firearms and weapons.

Firearms, replicas and weapons must only be used in accordance with NSW legislation and regulations.

NB: It is an offence to bring any firearm, replica or weapon into the SOH precinct unless it is under the above conditions.

Live ammunition must never be used.

All swords, knives and blades must be blunt.

Appropriate warnings must be provided to cast and crew in relation to the use of blank fire ammunition prior to the cue for firing. The use of blank fire ammunition must not exceed 85 dB(A) over an 8 hour period or peak at more than 140 dB(C) as stated in the NSW OH&S Regulation 2001.

In the Opera Theatre the risk assessment shall have regard to the possibility of a weapon/firearm falling into the orchestra pit and, as appropriate, the area of perceived risk shall be protected by a net or by other means.



An SFX form must be completed and sent to PSS for approval prior to use on site. Approved gun cabinets can be provided by SOH where required.

Flutter Canons

Flutter canons can be used at SOH. They must be supplied by a reputable supplier and operated by a competent person.

Hazardous Substances (Including their use in Pyrotechnics and Special Effects)

Hazardous substances are regulated materials that have been singled out for special attention by Chapter 6 of the NSW OH&S Regulation 2001. They can affect your health in the short-term with injuries such as a burn from corrosive acid, or your long-term health from such illnesses as cancer after years of exposure.

Hazardous substances are regulated because their use may present a higher risk of harm than other substances. They include, but are not restricted to, pyrotechnics, flammable liquids, acids, gases and solvents.

Please note the following points with regard to using hazardous substances at SOH:

- The risk assessment must separately address each hazardous substance indicating that it is being used in accordance with requirements set out in Material Data Safety Sheet (MSDS).
- The producing company is responsible for supplying a register of hazardous substances (including chemicals) to SOH and is responsible for providing the MSDSs to all those using such substances.
- All MSDSs provided must comply with National Occupational Health and Safety Commission Guidelines.
- Products should only be purchased from a reliable supplier who can provide the information referred to above.
- Products where MSDSs are not available **must not be used**.
- SOH can reserve the right to refuse the use of any particular hazardous substance in its venues or precinct.

Anyone working with any hazardous substance must consult the MSDS prior to use, taking special note of:



- Required safe work practices.
- First aid and emergency procedures.
- PPE recommended for use.
- Safe storage, transportation and disposal procedures.

Where hazardous substances are being mixed with other substances, hazardous or otherwise, they must only be mixed in accordance with MSDS and having regard to the compatibility of the individual substances.

NB: Special brews or concoctions must not be accepted or used on the basis that the ingredients are a “trade secret”, even if assurances are given that they are not toxic.

MDF

Medium Density Fiberboard may be used at SOH. In line with industry practice and SOH policy MDF **must not be cut on site**.

MDF contains urea-formaldehyde which may cause eye and lung irritation when cut or sanded.

MDF is best cut in a workplace controlled environment with dust extraction facilities outside SOH.

Naked Flame

Naked flames, e.g. candles, LPG, flame gel and the like will be approved providing it can be demonstrated that it is crucial to the artistic requirement of the performance.

A risk assessment for the performance shall take into account costumes, props and sets and ensure appropriate controls are implemented to eliminate the risk of fire.

During lighting plots, rehearsals and performances where naked flame exists, there must be at least one suitably trained person in attendance in the stage area at all times for the purpose of operating, whenever necessary, any proscenium safety curtain, drencher system, smoke exhaust system or fire



extinguisher. Also, the smoke detection system in the venue must be appropriately isolated during use of the naked flame.

LPG must be hard piped by a licensed gas fitter, and LPG gas bottles must not be stored inside the SOH. There is a cage designed to hold 6 x 9 kg bottles only located on the vehicle concourse.

An SFX form must be completed and sent to PSS for approval prior to use on site.

NB:

- Smoking and naked flames will only be approved for the stage and not in auditoriums.
- No effect will be approved where it places any member of the audience in danger, or performers and/or crew at an unacceptable level of danger.

Pyrotechnics

Pyrotechnics may be approved for use by holders of a NSW explosives licence endorsed for Theatrical and Indoor Fireworks.

Pyrotechnics use needs to be covered extensively in the production risk assessment. A risk assessment for the performance shall take into account proximate costumes, props and sets and ensure appropriate controls such as the use of inherently flame retardant construction are implemented to eliminate the risk of fire.

A safe work method statement must be produced for the use of pyrotechnics, including the storage, handling, operation and disposal.

An SFX form must be completed and sent to PSS for approval prior to use on site.

You must at all times comply with the conditions of the *Explosives Act 2003* and the *Explosives Regulation 2005*.

Smoking



Smoking cigarettes, cigars or pipes by performers will be approved providing it can be demonstrated that it is crucial to the artistic requirement of the performance.

A risk assessment for the performance shall take into account costumes, props and sets and ensure appropriate controls are implemented to eliminate the risk of fire. Suitable means of extinguishing cigarettes/cigars must be provided (e.g. ashtrays and sandboxes) and positioned in a manner accessible to the performer.

Signage will need to be supplied in foyers indicating that the performance contains smoking.

An SFX form must be completed and sent to PSS for approval prior to use on site.

Snow Machines

Snow machines, both paper and chemical, are permitted at SOH. Chemical snow machines which create a slip hazard are not permitted. Snow machines which are currently approved for use at SOH are:

- Snowboy – chemical
- White light – paper

Other snow machines will be considered on application.

An SFX form must be completed and sent to PSS for approval prior to use on site.

NB: All chemical units are to be used with the manufacturer's specified fluids only. No substitutions will be permitted.

Vehicles of any kind on stage

Vehicles are permitted on stage provided the vehicles use, spillage containment and emissions are covered effectively in the Risk Assessment. Petrol tanks should be as empty as possible.

Water on Stage



Water is permitted on stage provided its storage, spillage containment, use and removal are covered in the Risk Assessment.

LIGHTING

Lighting and associated mediums have the potential to adversely affect the health and safety of those in the workplace. Following is information regarding lighting special effects at SOH.

Strobe Lighting

Strobe lighting has been known to induce epileptic seizures. Epileptics who are flicker-sensitive are likely to experience a full seizure if triggered. Flicker rates of 4 flashes per second or less are recommended.

Signage will need to be supplied in Foyers indicating that the performance contains strobe lighting.

Ultra Violet Light (UV Light)

UV light is part of the light spectrum with wavelengths between 100 and 400nm. Exposure to UV light affects the eyes and the skin. These effects can be magnified if people are taking certain drugs such as tetracyclines, sulphonamides or oral contraceptives.

UV lights should be eliminated or substituted wherever possible. Where the use of UV lights is unavoidable the following should be considered to control adverse affects:

- A reasonable distance should be maintained from the source.
- Ensure sources are well maintained to prevent leakage.
- Enclose or shield the source wherever possible.
- Ensure replacement of component parts on sources will not increase potential UV.
- Eliminate reflection where possible.

Lasers



Lasers used for effect can create a severe hazard to people in a short space of time. Lasers (Light Amplification by Stimulated Emission of Radiation) produce narrow beams of ordered light rays. They are beams of coherent, monochromatic, high-intensity electromagnetic radiation with a frequency near that of visible light.

They have three basic components:

- The active medium, the substance from which the laser light issues.
- The pump system providing the energy to cause the discharge.
- The optical cavity which produces the collimated mono-chromatic, or coherent, beam.

Lasers use wavelengths in the infrared, visible light and ultra violet range. The eyes and skin are particularly susceptible to damage. There are five classes of lasers. Class 1 products only are considered intrinsically safe whilst Class 2 emit visible radiation but are considered safe when you assume a normal blink reflex and do not stare at the beam. Special precautions are required for Class 3A, 3B and Class 4. These classes of laser should not be used for display purposes except under carefully controlled conditions by a competent trained operator. These conditions are outlined in AS2211. No person should be exposed to radiation in excess of maximum permissible limits.

Risk assessment must be undertaken detailing:

- Intended scope of use, display in both plan and elevation, positions of laser sources, mirrors and target areas with relevant distances and dimensions.
- The need to engage a laser safety officer.
- Control measures in the event of power failure or knocking of the laser device that might result in freezing or displacement of the laser beam.
- For outdoor performances, control measures to ensure no interference occurs with the installation and control of reflection for surrounding structures.
- For outdoor performances, lasers must not interfere with air traffic or shipping activities.

Smoke Machines, Foggers, Hazers and Dry Ice



Smoke machines, foggers and hazers are permitted to be used provided their use and emission are covered in the risk assessment. A current Australian MSDS must be provided for the fluid used in such devices.

Products where a current Australian MSDS is not available **must not be used.**

If Dry Ice is required the Hirer must provide adequate storage and handling solutions.

Hazers & foggers that are currently approved for use at SOH are:

1. Unique Hazer
2. Le Maitre G300
3. MDG Hazer
4. Look Solutions Power Tiny

NB: All the above units are to be used with the manufacturer's specified fluids only. No substitutions will be permitted.

Older style Oil based crackers are not permitted to be used at the SOH. Current Mineral Oil based crackers, such as the MDG and DF50, are not permitted to be used in the Concert Hall at SOH as they leave a residue in the venue.

ELECTRICAL EQUIPMENT

All electrical equipment must be inspected and tagged (in accordance with state or territory legislation) and comply with AS3100. Before working on any electrical equipment it must be properly isolated, tagged (in accordance with AS3760) and checked.

Portable electrical tools and appliances must be protected by residual current devices (RCDs) unless the use of RCDs is incompatible with a particular electrical tool or appliance (e.g. dry ice machines), in which case current protection must be provided on the distribution board, and be tested for function by a qualified electrician or competent person in accordance with requirements outlined in AS3190 and AS3760.

Leads and Cables



All leads must:

- Be tested and tagged in accordance with AS3100.
- Not be frayed or have wiring exposed.
- Be protected from the weather.
- Not be twisted, crushed or kinked.
- Not create a tripping hazard.

SOUND LEVELS

Noise or sound energy is created when air is mechanically disturbed leading to small changes in atmospheric pressure which radiate in the form of waves. Repeated exposure or continued exposure to excessively high sound levels can result in irreversible hearing damage. Specialist equipment is required to measure sound levels in the workplace.

Please note the following guidelines from the NSW OH&S Regulation 2001:

- To preserve hearing, sound level exposure must not exceed 85 dB(A) on average per eight hour day and, where possible, should be kept below an average of 85 dB(A) per eight hour day.
- Where shifts longer than eight hours are worked, the exposure level must be appropriately reduced.
- Peak sound pressure levels must not exceed 140 dB(C).
- Nuisance noise such as high pitch, unexpected or distracting noises must be minimised.

Noise measurements are to be made in accordance with AS/NZS 1269.1:1998 *Occupational noise management Part 1: Measurement and assessment of noise emission and exposure*.