Event Rigging Hazard Guide

Contents

Disclaimer

In legislative terms, the requirements of the *Work Health and Safety Act 2011* (the WHS Act) and Work Health and Safety Regulations (the WHS Regulations) are mandatory. In contrast, a guide is designed to assist obligation holders to comply with the requirements of an act or regulation. The information contained in the LPA guides is not mandatory, has no legal status and may not apply in all work situations.

Obligation holders still have a duty to assess the risks in each work situation and take all reasonable steps to eliminate or minimise the risks that are specific to each work activity.

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1. Overview

This guide provides information to assist in managing risks associated with **rigging** work undertaken in live entertainment and events. Information in this guide is based on the *Work Health and Safety Act 2011* (WHS Act) and Work Health and Safety Regulations 2011 (WHS Regulations), which are operational in all states except Victoria and WA, where adoption of the legislation is not yet enacted (as at Jan 2018).

It is recommended that this information is referenced during the planning and delivery of events to assist in identifying hazards, assessing risks and determining appropriate control measures to eliminate and or minimise these risks, so far as reasonably practicable.

This guide does not replace the need to develop risk management strategies, undertake research or seek specialist advice.

Each worker and person conducting a business or undertaking (PCBU) has a responsibility to understand their obligations under Work Health and Safety legislation. Codes of Practice and Australian and international standards provide approved guidance on how to meet work health and safety obligations.

As rigging work can only be undertaken by appropriately licensed personnel who are competent to identify and control risks associated with rigging, this guide does not provide detailed advice on suggested control measures.

When undertaking rigging, additional risks associated with working at height must also be identified and managed. See Working at Height Hazard Guide.

The Safety Guidelines for Live Entertainment and Events Part 1 provides general information on duties, obligations and risk management.

1.1. Definitions

1.1.1 Rigging

Rigging is defined by Part 1 WHS regulations.

Rigging work *means:*
(a) the use of mechanical load shifting equipment and associated gear to move, place or secure a load using plant, equipment or members of a structure to ensure the stability of those members; or
(b) The setting up or dismantling of cranes or hoists.

In terms of the WHS regulations, rigging work typically meets the requirements for high risk work, construction work and high risk construction work –

- **High risk work** as it is within the scope of a high risk work licence for dogging and rigging work.
- **Construction** work as it includes the assembly of prefabricated elements to form a structure, or the disassembly of prefabricated elements forming part of a structure. Assembly of rigging is adding a new element of structure to the existing structure.
- **High risk construction work** because:
    - there is a risk of a person falling more than two metres, or
    - The work is carried out in an area in a workplace in which there is movement of powered mobile plant.

Chapter 6 of the Model WHS regulations define certain requirements related to rigging as high risk construction work including the use of Safe Work Method Statements (SWMS), security of the workplace, and general construction induction training.

1.1.2 Basic rigging

- ***Basic rigging***

Definition:	Dogging work plus Hanging (placing) a single hoist Installing a suspension point to a structure Installing a counterweight flying line or winch (temporary or permanent)
Examples	Single chain block, motor, wire/batten, truss arch or truss upright that is lifted by a mechanical device Installing life lines. Design, planning and consultation for basic rigging tasks Supervision of basic rigging activities
Competence	Basic rigging certificate plus relevant experience in applying rigging skills in a live entertainment or event context

- ***Intermediate rigging***

Definition	Dogging and basic rigging work plus: Installing multiple hoist systems with multiple power sources that can be controlled individually or collectively Planning and coordinating of multi hoist lifts, irrespective of scale (number of points)
Examples	Installing lighting truss supported by two or more chain blocks, hoists or winches

	Installing speaker or AV system supported by two or more chain blocks, hoists or winches
	Installing multiple bar load equalisation or power assisting hoist or winches to theatre flying systems
	Supervision, design or planning work that requires intermediate and below competence in rigging
Competence	Intermediate rigging certificate plus relevant experience in applying rigging skills in a live entertainment or event context

- ***Advanced rigging***

Definition	Dogging, basic and intermediate rigging work plus:
	Suspension of persons
	Temporary guide structures
	Span lines
Examples	Flying performers
	Rigging circus or aerial acts

1.1.3 Classes of rigging

- ***Dogging***

Definition	Dogging work plus:
	Hanging (placing) a single hoist
	Installing a suspension point to a structure
	Installing a counterweight flying line or winch (temporary or permanent)
Examples	Single chain block, motor, wire/batten, truss arch or truss upright that is lifted by a mechanical device
	Installing life lines
	Design, planning and consultation for basic rigging tasks
	Supervision of basic rigging activities
Competence	Basic rigging certificate plus relevant experience in applying rigging skills in a live entertainment or event context

1.1.4 Work NOT deemed as rigging

Definition	Attaching or suspending items – these tasks involve attaching items to a pre-existing/proprietary system using a standard method. This work is often referred to as theatrical rigging, such as ‘rigging a light’, or ‘rigging sound/AV’. It is not

	rigging as defined by WHS regulations.
Examples	Hanging technical elements (lighting, sound, AV equipment) from a hook clamp
	Attaching cloths, drapes, banners
	Attaching scenery with a dedicated attachment point
	Attaching styling/design elements
	Attaching or running cables
Competence	Follow task instruction
Controls	Site supervision
	Following venue guidelines, including allowable weights for items
	Following proprietary system manuals
	SWMS

2. Key Considerations – Event Rigging

The following questions must be considered during event design, planning and delivery. Use them to identify hazards and plan how risks will be managed.	**Yes**	**No**	**Comments/Action**
2.1 Design and planning			
Will other PCBUs and workers will be involved or affected by this activity?	☐	☐	
Have arrangements been made to consult with and cooperate and coordinate activities with other PCBUs before and during the undertaking of this activity?	☐	☐	
Has the scope of work been defined – duration, equipment required, scheduling, location?	☐	☐	
Are there site-specific safety requirements or procedures that must be considered?	☐	☐	
Are there elements to be suspended?	☐	☐	
Has it been determined how the weight will be distributed?	☐	☐	
Does the venue have the appropriate rigging infrastructure?	☐	☐	
Have the capacities of the venue rigging infrastructure been determined?	☐	☐	
Is venue approval required to install rigging?	☐	☐	
Will mobile plant be required?	☐	☐	

Is the rigging equipment fit for purpose and compliant with legislation?	☐	☐	
Are the weights of all suspended elements known, including all rigging components, brackets etc.?	☐	☐	
Have all environmental conditions that may affect the rigging structure been taken into consideration?	☐	☐	
Will engineering certificates be required?	☐	☐	
Have all PPE requirements been determined?	☐	☐	
Is it clear who will conduct the risk assessment?	☐	☐	

2.2. Event delivery			
Do workers have the appropriate licences?	☐	☐	
Will workers be exposed to the risk of falls?	☐	☐	
Will movements of rigging be part of the performance?	☐	☐	
Have the procedures and authority for calling stop and go/no go been established?	☐	☐	
Have rigging communication protocols been established?	☐	☐	
Are adequate rigging inspections scheduled, including by whom and when?	☐	☐	
Is the activity co-ordinated with other PCBUs?	☐	☐	
Can the rigging work be scheduled to minimise exposure to other worker/services?	☐	☐	
Have the identities of all individuals who will be in the work area when rigging is being conducted been determined?	☐	☐	
Has it been determined how exclusion zones will be established and maintained?	☐	☐	
Are arrangements in place to ensure the rigging structure cannot be accessed by the general public/audience?	☐	☐	

3. General Guide – Event Rigging

3.1. Responsibilities

The WHS regulations require that people undertaking high risk work hold the license appropriate for that class of high risk work. Specific licenses apply for dogging and rigging work; relevant experience in applying rigging skills in a live entertainment or event context is also required.

PCBUs have a duty to ensure people hold the required license and individuals are required to provide evidence of the class of license held and relevant contextual experience.

3.1.1 Training and competence

Competence to undertake various classes of high risk work is regulated through a national licensing system. Rigging work in live entertainment and events requires persons to hold one of the following classes of license in addition to the general construction induction training card (White Card):

- Dogging
- Basic rigging
- Intermediate rigging
- Advanced rigging

Personnel must also be competent to undertake work at height. Completion of the unit RIIWHS204D Work Safely at Heights or equivalent is the recommend standard.

More information on the specific competencies and licensing arrangement can be obtained from the state/territory safety regulator or from Safe Work Australia.
Details are included in the *Certification Standard for Users and Operators of Industrial Equipment* [NOHSC: 1006 (2001)] and the *National Standard for Licensing Persons Performing High Risk Work.*

The following are examples of tasks that are related to rigging but **not deemed as rigging** within this guide. They require a level of competence but not a high risk work licence.
Examples are:

- Operation of flying systems

  An operator of a flying/hoisting system (counterweight or powered) must:
  - have received specific training in the use of the particular flying/hoisting system
  - be competent to operate the equipment
  - have undertaken a venue-specific induction

  before operating the flying/hoisting system.

- Adjusting lights on a truss or lighting bar/suspension

- Hanging technical elements (lighting, sound, AV) from a theatrical hook style clamp
- Attaching cloths, drapes, banners
- Attaching scenery with a dedicated attachment point
- Attaching styling/design elements
- Attaching or running cables

3.2. Consultation, Co-operation and Co-ordination

The WHS Act makes consultation with workers a legal requirement. Consultation, cooperation and coordination between PCBUs is a requirement where they share a duty for the safety of a worker or for work to be done.

All PCBUs have a duty to consult, co-operate and co-ordinate with all other PCBUs and workers involved the activity. They should use the information in this guide to consult with workers including event staff to determine the rigging hazards and risks associated with an event and how to best eliminate or minimise these risks using the hierarchy of controls.

Consultation should start as early as possible, before decisions are made, and continue through the duration of the event.

Consider the other parties who will need to be involved in the consultation process in the planning stages of the event and determine what information needs to be shared and discussed. In particular, consultation must include gathering information from designers, which will inform the approach to rigging.

During an event, PCBUs are required to consult, co-operate and co-ordinate with other PCBUs such as the venue or site management, unions, production companies, designers, event organisers or promoters, security, subject matter experts such as licensed riggers, engineers, safety officers, local authorities or governments, performers, suppliers of plant or equipment etc.

If employees are represented by health and safety representatives, the consultation must involve those representatives.

Areas to address during consultation may include induction, schedules, floor plans, set, lighting and sound designs, site-specific requirements, venue structure and weight loads, risk assessments, SWMS, hazards and control measures, legislative requirements, licences, plant movement, traffic management, exclusion zones, key contacts, emergency procedures, permits to work etc.

Opportunities for consultation include toolbox talks, event briefings, site inspections, stakeholder meetings, post event reviews, working groups or forums.

3.2.1 Co-operating with the scheduling and control of rigging activities

Rigging is high risk work and there must be clear allocation and communication of responsibilities for all people working on site.

The person with authority for rigging such as the rigging company, rigging supervisor or head rigger will be responsible for the planning, scheduling and control of rigging operations. In particular, the person responsible for rigging will determine exclusion zones while rigging is being undertaken and will ensure sufficient mechanisms are in place to maintain the exclusion zones during work.

Authority to issue safety instructions and call 'stop' must be clearly established. This must be communicated to all people on site and they must understand and be able to follow these safety protocols.

3.3. Design and planning

In the early stages of design and planning for an event, the following criteria should be addressed when planning rigging work:

- Consultation with relevant PCBUs and workers
- Selection of the rigging plant and equipment required to complete the task
- Scheduling and allocation of resources to minimise impact on others
- Consultation with contractors
- Work permits, engineering certificates or safety plans requirements
- Development of risk assessments and SWMS including controls agreed to during consultation
- Access to site and logistics
- Maintenance programs
- Legislative requirements such as a rescue plan
- Emergency procedures
- Communication methods

3.3.1 Indicative rigging planning considerations

- Obtain technical specifications from the promoter/technical director/production manager/project manager/organiser about the production rigging requirements including:
    - lighting design
    - sound design
    - set design
    - set builders
    - production design
    - suppliers of equipment
    - temporary structure designer
- Obtain technical specifications for the venue.
- Take into account the loads applied to the system by the weight of fittings, equipment and other items. This must take into account the capacity of all elements including trusses, hoists and points of attachment.
- The rigging plan must meet the requirements specified by the venue including meeting SWMS's procedures, weight statements, and any work permits.
- Any new risks that result from the placement of rigged items must also be managed. For example, the choice of rigging points should ensure that the installation of false ceiling does not obstruct fire safety systems.
- Access requirements for inspection and maintenance must also be considered to ensure new height safety hazards are eliminated or minimised.
- Assess the work to be undertaken and determining high risk work license requirements.
- Any other considerations that may arise from event specific requirements.

3.4. Event Delivery

In the delivery stages of an event (set up, rehearsal, presentation/performance and breakdown/bump out) the following requirements should be addressed:

- Ongoing consultation with relevant PCBUs and workers
- Site specific inductions
- Equipment inspections and/or maintenance
- Implementation and monitoring of controls identified in risk assessments or SWMS
- Enforcing compliance to legislative requirements
- Review, consultation and adjustment control measures as required on site
- Incident reporting and management

- Sign-off and handover procedures

Rigging during event set up and event de-rig should adhere to the following steps:

- Conduct tool box talks with crew and production representatives
- Establish works area and exclusion zones
- Establish access methods
- Mark out rigging points
- Hang hoists
- Layout trussing system
- Lift truss to work height
- Allow other suppliers or technical departments to install their equipment
- Check that what was installed complies with agreed rigging documentation
- Clear work zone for truss to move to trim height

Rigging during presentation/performance mode should adhere to the following steps, which may be repeated for each presentation/performance event:

- Agree timings with production
- Establish the communication protocols, including verifying who calls 'stop'
- Agree process with other technical areas (lighting, sound, AV) for rigging test
- Test/rehearse rigging in full work light without any other technical elements
- Progressively introduce technical layers of performance one by one – e.g. lighting, then sound, then performers
- Establish responsibility for deciding who does what in the performance/event space

3.5. Review

After an event, review the following elements in consultation with other stakeholders:

- Incident reports and outcomes including near-misses
- Effectiveness of the control measures
- Scheduling
- Areas for improvement
- Incidents of non-compliance
- Any new hazards or risks identified

3.6. Documentation and records

The following documents and records should be created, maintained and kept readily accessible when undertaking rigging:

- Rigging plan
- Point load document
- Periodic inspection certificates
- Rigging test tags (where used)
- Risk assessments and SWMS
- Training records, certificates of competency and licences
- Induction records
- Toolbox talk topics and attendance
- Evidence of consultation
- Incident reports, including near-misses
- Plant design specifications and maintenance records
- Engineering certification, work permits and sign-off records

Any of the above documents could be requested to be sighted by other PCBUs for verification or clarification and should be available at all times.

Some WHS documents and records need to be retained for a specific period of time – see relevant WHS legislation for details.

Copies of High Risk Work licenses must be kept for a minimum of one year.

4. Suggested Control Measures

4.1. General event rigging

Rigging work will often take place amongst a range of other activities during set up/breakdown or bump-in/bump-out and performance/presentation of live entertainment and events. To manage associated risks it is essential to clearly distinguish rigging work from other related activities and ensure relevant controls are in place.

4.2. The stages of rigging

As legislation defines rigging as high risk work, specific control measures need to be implemented for the process of 'rigging'. To enable the reasonably practicable implementation of these control measures in the environment of live performance and events, the process is best described by stages.

Stage 1: Top rigging – to be considered 'rigging' and therefore a high risk activity. Commences from when the elevated work platform is in a lowered static position ready to begin the task of attaching a new element to the structure. This would include, but not be limited to, connecting top points and positioning chain motors. Top rigging ceases when all attaching tasks at height are completed and the elevated work platform is returned to the lowered static position.

Stage 2: Ground work – not deemed to be 'rigging' or a high risk activity. This stage includes all work conducted at or below two metres with workers positioned at the ground level. During this stage there is no risk of falling from height and minimal risk of harm from falling objects. Ground work would include, but not be limited to, the assembling of truss, attaching banners, lights and audio visual equipment to the truss or structure to be lifted.

Stage 3: Movement – to be considered 'rigging' and therefore a high risk activity (other than the operation of a flying or hoisting system – see definitions 1.1.1 in this document), commences from when the structure is moved to when it is stationary again. This would be for the purposes of loading and attaching lights and audio-visual equipment.

4.3. Control measures to be implemented

For the stages listed above that are considered 'rigging', the following control measures must be implemented and enforced by the person or company responsible for undertaking rigging. These are mandatory legal requirements and any persons undertaking rigging work or working on in the vicinity of rigging activity must be aware of these safety requirements and adhere to them.

- **Construction induction card and HRW license –** all persons involved in the activity of rigging are to hold a general construction induction training card. As a minimum this would include the licensed rigger, dogger and the spotter. Persons undertaking dogging and rigging work must hold the appropriate class of high risk license.

- **Safe work method statement –** as the rigging process has been defined as a high risk activity, a task specific SWMS must be provided on site and reviewed prior to work commencing and signed off by all workers involved in the activity of rigging.

- **Head protection and safety boots –** riggers, spotters and other workers within the exclusion zone must wear appropriate head protection and safety boots during the stages identified as rigging.

- **Isolation and control of the area of risk –** the area below the activity is to be isolated during each stage identified as rigging to minimise the risk of harm from falling objects. The means of isolation and the size of the exclusion zone is to be determined by the company or authorised person undertaking the rigging, with consideration of the activity being undertaken, and should be identified in their task-specific SWMS. Only workers necessary to the rigging process should remain in the exclusion zone and all workers remaining within this area are required to comply with the controls stated above.

In the planning stages of an event, the move-in/move-out schedules should also take into consideration minimising the number of persons exposed to the rigging activity whenever reasonably practicable.

Source: Adapted from information kindly supplied by the Sydney Convention and Exhibition Centre, 2013.

4.4. Additional factors to be considered in live entertainment and event rigging

An experienced and competent rigger who also has experience in the entertainment and event field and holds the appropriate licenses for the relevant high risk work must be consulted when circumstances/effects involve highly complex rigging situations.

4.4.1 Non 'construction rigging' standard equipment

Rated equipment suitable for use in the entertainment industry must comply with the following three requirements:

1. The minimum breaking load is known and the item is stamped or marked with a serial, part or reference number
2. The appropriate safety factor must be applied
3. The item must be inspected prior to each use

This means that equipment from the climbing and yachting industries or equipment that does not have a marked Working Load Limit (WLL) may be used for entertainment rigging as long all of the above three requirements are met.

4.4.2 Material sizes and capacities

Minimum sizes for wire, ropes, and chains are specified by Australian Standards and rigging license training. However, the smaller wires, ropes, chains etc. may be used where an appropriate risk assessment or method diagram demonstrates that they can be used safely. The diagram must state the working load limit of the cable or fitting and the weight of the load to be supported. Typical examples include suspension of lightweight scenic item, stunts or magic style effects.

4.4.3 Safety factors

Safety factor requirements may vary depending on the circumstances.

WLL = MBL/SF

WLL – working load limit

MBL – minimum breaking load

SF – safety factor

Item	Safety factor
Chain, shackles and other metal fittings	4
Wire rope	5
Natural fibre rope	6
Synthetic ropes or webbing	8
Any item used for suspending a person	10
As a general guideline a safety factor of 10 should be considered for suspending over the general public.	
*** NOTE: a safety factor is only applied ONCE and only to a MBL.	

4.4.4 External entertainment specific factors such as pyrotechnics, low light, atmospheric haze

The consequence of using special effects and the general environment must be considered when selecting items for entertainment rigging. For example, synthetic slings should not be used where pyrotechnics and/or extreme heat may cause a failure, or for a long-term installation where slings may be exposed to chemicals like smoke fluid, or sunlight.
Typical features of the entertainment work environment must be detailed when preparing risk assessments or SWMSs for entertainment rigging. This may include low light, high noise, difficult access, large audiences or members of the public etc.

4.4.5 Alternatives for aerial performers

The WHS legislation in each state allows a variation from standard working at height principles for aerial performers, acrobats, stunt persons etc. ONLY where it is not reasonably practicable to eliminate the risk of a fall. Acceptable circumstances include:

1. The performer is engaged in stunt work
2. The performer is engaged in the performance of acrobatics
3. Working in a theatrical performance
4. Working in a sporting or athletic activity

NOTE this does not apply to the performer while they are rigging, inspecting, or de-rigging their equipment, or any other person assisting them.

The performer should be consulted and incorporated in the planning and development of controls. For more information, please see the Performer Hazard Guide.

Persons conducting a business or undertaking (PCBU) at a workplace must manage the risk of a fall by a person from one level to another that is reasonably likely to cause injury to the person or any other person.

Please refer to the Code of practice – *managing the risk of falls at workplaces* for further information regarding fall prevention and fall-arrest systems.

5. Legislation and Guidance

Workcover NSW, *A Guide to Rigging* 1995.

Safe Work Australia. *National Standard for Licensing Persons Performing High Risk Work. 2006:*
https://www.safeworkaustralia.gov.au/system/files/documents/1702/nationalstandard_licensingpersonsperforminghighriskwork_2006_pdf.pdf

Safe Work Australia. *Certification Standard for Users and Operators of Industrial Equipment* [NOHSC: 1006 (2001)]:

https://www.safeworkaustralia.gov.au/system/files/documents/1702/assessmentguidelinesfornationalohscertificationstandard1994.pdf

Sources:
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https://www.safeworkaustralia.gov.au/system/files/documents/1702/nationalstandard_licensingpersonsperforminghighriskwork_2006_pdf.pdf