



Australian Government

Department of Education, Employment and Workplace Relations

CUSSOU301A Provide sound reinforcement

Revision Number: 2

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Modification History

Release	Comments
Release 2	Created to fix formatting errors only. Released with CUS09 Music Training Package version 1.2

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to operate sound reinforcement systems for live performances. The emphasis is on front-of-house speaker systems.

Application of the Unit

Sound reinforcement is about making live or prerecorded sounds louder and distributing the sound mix through a loudspeaker system to an audience. This work is undertaken by sound technicians who could be providing sound reinforcement for a range of productions in the live entertainment, events and broadcasting industries.

Sound reinforcement systems can be as simple as a single microphone and PA system in a room to the very complex system required for live outdoor concerts with audiences in the tens of thousands. The latter situation requires a team of audio engineers and technicians.

The work often involves long or irregular hours. The ability to work cooperatively as part of a production team is essential.

Skills associated with setting up and testing audio equipment in venues are covered in:

- CUSSOU303A Set up and disassemble audio equipment.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable

Employability Skills Information

Not applicable

Elements and Performance Criteria Pre-Content

<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.</i>
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for sound reinforcement operations	<ul style="list-style-type: none">1.1 In consultation with relevant personnel confirm front-of-house sound reinforcement requirements, referring to production documentation as required1.2 Check that equipment has been correctly installed and tested1.3 Prepare for playback of prerecorded material as required1.4 Ensure that equipment anticipates the need for standby facilities1.5 Adjust the sound system to take account of venue acoustics and do final sound check
2. Monitor sound reinforcement operations	<ul style="list-style-type: none">2.1 Ensure that sound quality and balance meet artistic and technical requirements2.2 Monitor sound levels to ensure they do not exceed safe noise levels2.3 Promptly identify and rectify malfunctions with minimum disruption to sound quality2.4 Communicate appropriately with relevant personnel throughout the production
3. Complete work operations	<ul style="list-style-type: none">3.1 Complete required documentation in line with enterprise procedures3.2 Assist with the disassembly of audio equipment as required3.3 Seek feedback from relevant personnel on own work performance and note areas for improvement

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication, literacy and teamwork skills sufficient to:
 - interpret and clarify written and verbal instructions
 - make verbal fault reports to appropriate personnel
 - interpret block diagrams of equipment and system set-ups
 - read and interpret sound documentation
 - read manufacturing specifications and installation manuals
 - work effectively in a team environment
- critical-listening and aural-discrimination skills when operating sound reinforcement systems in a range of venues
- initiative and enterprise skills in the context of dealing effectively with equipment malfunction in a live performance environment
- technical skills sufficient to:
 - operate sound reinforcement systems
 - test sound equipment in line with industry standards
- planning skills sufficient to:
 - prioritise work tasks
 - meet deadlines
 - seek expert assistance when problems arise
- problem-solving skills sufficient to identify typical faults that may occur in sound reinforcement systems

Required knowledge

- basic audio principles and practices, including:
 - range of microphones and contexts in which they are used
 - microphone characteristics, e.g. frequency response, sensitivity and polar patterns
 - effect of microphone placement on quality of sound
 - characteristics of sound in a range of environments
 - signal-to-noise ratio, signal phase and audio level/headroom control
 - audible defects in analogue and digital technologies
 - features of mixers, amplifiers, speakers and effects racks
- basic principles of acoustics, including:
 - frequency
 - pitch
 - amplitude
 - loudness

- velocity
- wavelength
- delay
- sound absorption
- timbre
- sound envelope
- basic understanding of psychoacoustic principles, including:
 - spatial hearing
 - direct sound
 - early sound
 - reverberant sound
 - room design
- techniques for aligning and testing audio equipment, including:
 - understanding electrical power (voltage, distribution, phasing, load and circuit breaking)
 - knowledge of a range of sound equipment and associated operating principles (level, impedance, phase and frequency)
 - testing and tagging electrical fittings in accordance with safety regulations
- issues and challenges that typically arise in the context of providing sound reinforcement
- OHS requirements, including:
 - licensing requirements for persons performing high risk work
 - safe manual-handling techniques
 - working safely with electricity and hazardous substances
 - principles of safe listening, such as safeguards against hearing loss

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of the ability to:</p> <ul style="list-style-type: none"> • provide a live sound mix for performances on at least three occasions that demonstrates an understanding of room acoustics and the principles of sound reinforcement • test equipment in line with production requirements • work cooperatively in a team environment • apply OHS procedures, particularly in relation to safe noise levels.
Context of and specific resources for assessment	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> • access to a range of industry-current equipment as listed in the range statement • access to venues in which to install audio equipment • use of culturally appropriate processes, and techniques appropriate to the language and literacy capacity of learners and the work being performed.
Method of assessment	<p>The following assessment methods are appropriate for this unit:</p> <ul style="list-style-type: none"> • case studies and questioning to assess candidate's understanding of OHS requirements • observation and/or video recordings of the candidate testing and operating sound reinforcement systems • written or oral questioning to test knowledge as listed in the required knowledge section of this unit.
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> • CUESOU04C Mix live audio • CUESOU11B Set up and operate stage monitor systems • CUSOHS301A Follow occupational health and safety procedures • CUSSOU303A Set up and disassemble audio equipment.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<i>Relevant personnel</i> may include:	<ul style="list-style-type: none"> • artists, musicians and performers • sound engineers and technicians • broadcasters • clients • directors • producers • program managers • venue managers • stage managers • sound designers • video and sound recorders.
<i>Productions</i> may include:	<ul style="list-style-type: none"> • live music or theatre performance • commercial • print advertisement • corporate video • feature film and/or video • filmed event and/or performance • interactive media product • internet production • electronic game production • radio broadcast • television program.
<i>Documentation</i> may include:	<ul style="list-style-type: none"> • house plans • sound plans • line diagrams • installation schedules • artistic requirements • scripts • musical scores • dubbing sheets • technical/equipment manuals • enterprise operating procedures and standards • stage plans • sound plots

	<ul style="list-style-type: none"> • design, director's and sound specifications • production and venue requirements • production schedules • OHS requirements and instructions • manufacturer specifications • performers' requirements • fault report sheets.
Checking may involve ensuring that:	<ul style="list-style-type: none"> • amplification equipment has been connected in the correct order • loudspeakers are positioned to: <ul style="list-style-type: none"> • produce optimum quality • avoid feedback and other extraneous noise • cables are: <ul style="list-style-type: none"> • routed and secured safely • visually unobtrusive • leads and associated electricals are patched into the correct input and output sockets • adequate resources are available in the event of equipment breakdown.
Equipment may include:	<ul style="list-style-type: none"> • multi-range speaker systems • amplifiers • playback equipment • cables • headphones • microphones and accessories • mixing consoles and desks • monitors and speakers • signal processors and plug-ins • effects rack • turntables.
Preparation for playback of prerecorded material may involve:	<ul style="list-style-type: none"> • ensuring that playback machines are correctly referenced and synchronisation protocols are compatible • ensuring that technical and artistic requirements are met • checking sound levels with relevant personnel • ensuring that loudspeakers are close enough to relevant personnel to avoid coloration and time delay.

Unit Sector(s)

Media and entertainment production - audio/sound