



Australian Government

Department of Education, Employment and Workplace Relations

CUSSOU401A Record sound

Revision Number: 2

CUSSOU401A Record sound

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 record sound, including the supervision of sound-recording operations.

Application of the Unit

Supervising sound technicians apply the skills and knowledge described in this unit. They could be working in a variety of creative arts industry sectors, including live performances, music recording studios, online environments, radio outside broadcasts, and film and sound archives.

Typically they are responsible for ensuring that required equipment is available and in working order, troubleshooting recording problems, recording sound, and supervising assistants engaged for recording sessions. They are expected to work closely with other production team members, e.g. producers, directors, broadcast engineers and lighting crew. This work is undertaken with limited or no supervision or guidance.

Skills associated with recording sound for screen productions are covered in:

- CUSSOU406A Record sound on location.

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 recording	1.1 Clarify recording requirements with reference to production documentation and in consultation with relevant personnel 1.2 Prepare a team work plan as required and brief personnel accordingly 1.3 Check that sound equipment and accessories are in working order for recording sessions 1.4 Ensure that sound equipment and accessories are set up, connected and aligned according to safety, technical and production requirements 1.5 Ensure that the selection of sound equipment and accessories meets required standards 1.6 Ensure that recording devices have sufficient capacity for expected duration of recordings 1.7 Anticipate problems that may arise during the recording process and plan accordingly 1.8 Ensure adequate supply of consumables is available for duration of sound recordings
2. Place microphones and test record line-up	2.1 Select, power and position microphones and microphone accessories according to safety, technical and production requirements 2.2 Apply principles of microphone operation when placing and moving microphones 2.3 Ensure placement of microphones and microphone accessories is safe, unobtrusive and avoids extraneous and unwanted noise 2.4 Conduct a sound check to ensure quality of recording will meet required standards 2.5 Test signal flow of connected sound equipment and accessories
3. Make sound recordings	3.1 Ensure run-up time is sufficient to allow stable sound recording 3.2 Apply appropriate signal processing for optimal sound quality and make test recordings to ensure no audible defects are present 3.3 Continuously monitor sound recording for quality, audible defects and extraneous background sound 3.4 Critically listen to recording and provide feedback on appropriate recording techniques to record line-up 3.5 Ensure recorded sound supports and enhances

ELEMENT	PERFORMANCE CRITERIA
	production requirements 3.6 Complete recording sessions in line with production timelines
4. Finalise sound-recording operations	4.1 Ensure that recordings are saved in the appropriate format and logged/filed in line with organisational procedures 4.2 Make safety copies or backups as required 4.2 Prepare accurate production set-up reports 4.3 Ensure that sound equipment and accessories are de-rigged, checked and cleaned appropriately 4.4 Ensure that work environments are cleaned after use and restored to their pre-recording condition 4.5 Provide feedback to other team members as required 4.6 Evaluate own performance against technical and creative criteria and note areas for improvement

Required Skills and Knowledge

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

Required skills

- research skills sufficient to locate and use relevant sources of information
- literacy skills sufficient to:
 - prepare production set-up reports
 - read and interpret recording documentation
- numeracy skills sufficient to calculate duration and capacity of recording media at various speed/sample rates
- communication skills sufficient to:
 - liaise with sound-production and recording personnel, including in a supervisory capacity
 - provide feedback to recording personnel on appropriate recording techniques
 - clearly explain and offer suitable alternatives to record line-up when recording difficulties cannot be resolved within operational constraints
- initiative and enterprise skills in the context of critically analysing sound recordings
- learning skills sufficient to maintain currency of knowledge of recording equipment upgrades
- planning and organisational skills sufficient to prioritise work tasks and meet deadlines
- problem-solving skills sufficient to promptly and effectively rectify sound defects, system failures and mechanical breakdowns
- technology skills sufficient to work with a variety of sound-recording equipment

Required knowledge

- principles of psychophysics, such as:
 - frequency
 - pitch
 - amplitude
 - loudness
 - velocity
 - wavelength
 - acoustical phase
 - timbre
 - sound envelope
- principles of psychoacoustics, such as:
 - spatial hearing
 - direct sound
 - early sound

- reverberant sound
- studio and control room design
- ergonomics
- operational knowledge of sound-recording equipment
- principles and techniques of sound recording, including:
 - audible defects in analogue and digital technologies
 - compatibility of different digital standards
 - identification/logging requirements
 - operational principles of microphones, including microphone placement
 - operational/technical limitations of recording media
 - recording formats and technical standards
 - signal-to-noise ratio, signal phase and audio level/headroom control
 - logarithmic units and the use of different metering systems
 - timecode levels and standards in analogue and digital applications
 - principles of synchronisation and referencesystems
- issues and challenges that typically arise in the context of recording sound
- OHS principles of safe listening, including 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	Evidence of the ability to: - make sound recordings that meet production requirements and demonstrate a thorough understanding of: - prerecording checks - microphone positioning - testing record line-ups - OHS principles in relation to safe sound levels - use a range of industry-current sound equipment and accessories - work collaboratively with team members.
Context of and specific resources for assessment	Assessment must ensure: - access to a range of work environments and productions where sound is recorded - access to industry-current sound equipment and accessories, including recording devices, microphones, signal processors and consumables - use of culturally appropriate processes, and techniques appropriate to the language and literacy capacity of learners and the work being performed.
Method of assessment	The following assessment methods are appropriate for this unit: - case studies to assess candidate's ability to apply OHS principles of safe listening to day-to-day work activities - evaluation of a range of live, acoustic and/or sequenced recordings made by candidate - observation of candidate making sound recordings - written or oral questioning to test knowledge of principles of psychophysics and psychoacoustics.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: CUSSOU405A Mix recorded music

	• CUSSOU406A Record sound on location • CUSSOU407A Coordinate location sound recording.
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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>Productions</i> may include:	• music recording • interactive media product, such as: • CD • DVD • podcast • internet production, e.g. website audio • radio broadcast • voice-over.
<i>Documentation</i> may include:	• production schedules • set-up reports • cue sheets • track sheets • dubbing charts • equipment instructions • OHS requirements • organisational standards • performers' requirements • sound and audio reports • technical manuals.
<i>Relevant personnel</i> may include:	• artists, musicians and performers • audio and sound engineers • audio and sound technicians/mixers • broadcasters • technical producers • broadcast technicians and engineers • directors • producers • conductors • program managers • curators • post-production managers • supervisors • sound designers.

Sound equipment and accessories may include:	• amplifiers • analogue to digital converters • cables • compact disc (CD) and digital versatile disc (DVD) players and burners • computer technology and associated software • digital and analogue recording devices: • hard disk recorder, e.g. digital audio workstation (DAW) • digital audiotape recorder, e.g. S-DAT and R-DAT • digital videotape recorder (DVTR) • mini disc recorder (MD) • modular digital multi-track recorder (MDM) • open-reel analogue audiotape recorder • digital audio players, such as: • iPod • MP3 • headphones • microphones and accessories • mixing consoles and desks • monitors and speakers • signal processors and plug-ins.
Production requirements may include:	• attributions • audience • budget • confidentiality • content • contractual arrangements • copyright • deadlines • direct quotes • duration • intellectual property • interviews • location • purpose • schedule • style.
Consumables may include:	• audiotape, e.g. digital and open-reel analogue

	• compact discs, e.g. CD-R and CD-RW • cue sheets and track sheets • digital versatile discs, e.g. DVD-/+R and DVD-/+RW • masking tape, marker pens and labels • mini discs (MDs) • memory cards, e.g. flash memory cards.
Microphones may include:	• boundary (PZM) • capacitor/condenser, such as: • electret • lavalier • mini microphone • transistor • tube • contact • digital • directional, such as: • single entry port • multiple entry port • multi/poly-directional • dual-element • dynamic, such as: • moving coil • ribbon • headset • low and/or high impedance • microphone systems, such as: • adaptive array • binaural • high definition • parabolic • surround sound • wireless • cordless • FM • radio transmitter • noise cancelling • shotgun.
Microphone accessories may include:	• boom poles, including: • aluminium

	• carbon fibre • fisher • hand-held • perambulator • remote panner • tripod • cables, including: • balanced • unbalanced • clips • connectors, including: • female • male • XLR • housing • pop filters • shock mounts • stands, including: • desk • floor • gooseneck • windscreens.
<i>Principles of microphone operation</i> may include:	• balanced and unbalanced audio transmission • diaphragm diameter and frequency response • diaphragm mass and transient response • differential input and single-ended input • directional characteristics, including: • omnidirectional (non-directional) • unidirectional, e.g. sub-cardioid, wide angle cardioid, cardioid, super-cardioid, hyper-cardioid and ultra-cardioid • bi-directional • ground loops and ground lift • magnetic induction • matching high/low impedance (passive/active DI interface) • phase cancellation and acoustic comb filtering • pickup pattern (polar response pattern) • polarity • sound response, such as: • frequency response

	• hum • maximum sound pressure level • overload limit • proximity effect • self-noise • sensitivity • signal-to-noise ratio • transduction • variable capacitance.
Signal processing may include:	• amplitude (dynamic) signal processing: • compressors, e.g. broadband, split-band, de-esser • limiters • expanders • noise gates • pitch shifters • noise processing, such as: • Dolby • dbx • DSP • spectrum signal processing: • equalisers, e.g. fixed frequency, graphic, parametric and paragraphic • filters, e.g. high/low pass, band pass and notch • psychoacoustic processors • time signal processing: • reverberation, e.g. digital, plate and acoustic chamber • delay, e.g. doubling, chorus, slap back and prereverb • flanging, e.g. positive and negative • phasing • morphing.
Appropriate recording techniques may include:	• articulation and voicing • breathing • microphone use • pitch • playing, singing and performing style • timing • tone

	• tuning • volume.
<i>Production set-up report</i> may include:	• console settings • effects settings • microphone choices • patch bay wiring • processor settings • track sheets.
<i>Work environment</i> may include:	• dubbing theatre • outside broadcast • recording studio • sound stage.

Unit Sector(s)

Media and entertainment production - audio/sound