Australian Government

Department of Education, Employment and Workplace Relations

CUSSOU304A Restore audio tracks

Revision Number: 2

INDUSTRY
SKILLS
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CUSSOU304A Restore audio tracks

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 perform restoration work on recorded audio and soundtracks.

Application of the Unit

Sound technicians in the film, television, radio and audio post-production and archival industries apply the skills and knowledge described in this unit. They are responsible for restoring audio tracks to as close to the original recording as possible, taking into account the final application and client requirements. They are usually working with analogue recordings, but the restoration process can also be applied to early digital formats, such as digital audiotapes and compact discs.
This work is undertaken with some supervision and guidance.

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

Elements describe the essential outcomes of a unit of competency.	*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.*

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Clarify scope of restoration project	1.1 In consultation with **relevant personnel** confirm restoration **requirements**
	1.2 Ensure that **documentation** relevant to the project is available
	1.3 Where **source materials** are not supplied, liaise with relevant personnel to locate the most original, best quality recording to be restored
	1.4 Evaluate all recordings to be restored for auditioning purposes and technical selection as required
2. Prepare source material for digital transfer	2.1 If required, physically **repair and clean** source material in preparation for playback, taking great care not to damage the source material
	2.2 Select the most appropriate playback machine, taking into account the fragility of source material and the ability of the playback machine to provide the most authentic playback
	2.3 Set up playback paths and recording settings to ensure a flat, transparent, and where possible uncompressed file
	2.4 Set audio levels in line with technical parameters
3. Make digital recording of source material	3.1 Record source material to defined quality standards
	3.2 Monitor the recording, and document or mark sections that display recorded **artefacts** or damage
	3.3 As required, **record from more than one source**
4. Apply restoration techniques to audio tracks	4.1 Select the most appropriate restoration **equipment and tools** for the job
	4.2 Commence restoration by applying **manual restoration techniques** to the most audible artefacts first, then moving onto less noticeable faults
	4.3 Following manual restoration, apply **automated restoration processes** as required
	4.4 Seek feedback on work in progress from relevant personnel and make adjustments
5. Make a copy of restored audio tracks	5.1 Apply **appropriate processes** to play-out and take into account the end use when creating required delivery **format**
	5.2 Deliver master in the required format to relevant personnel in line with project requirements
	5.3 Complete required documentation in line with enterprise procedures

Required Skills and Knowledge

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

Required skills

- communication, teamwork and literacy skills sufficient to:
  - interpret and clarify written and verbal instructions
  - complete workplace documentation
  - read and interpret technical manuals
  - respond positively to constructive feedback on own performance
- critical-listening and aural-discrimination skills in the context of restoring audio tracks
- technical skills sufficient to:
  - use specialised equipment to perform audio restoration work
  - operate other studio equipment for playback and recording
- planning and self-management 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 audio-production environments

Required knowledge

- acoustic principles related to noise and distortion on audio tracks
- aesthetics of sound production
- operation of current and obsolete audiovisual equipment
- appropriate handling and storage of fragile and archival material
- preservation methods for preparation of source materials
- restoration principles, tools and technique to apply to different artefacts
- techniques and principles for removing or masking audio artefacts, including:
  - features and operating characteristics of restoration tools
  - compatibility with mono, stereo or multi-channel systems
  - use of timecode equipment
  - format encoders and decoders
- principles of media archiving
- issues and challenges that arise in the context of working with soundtracks
- 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: • distinguish between the original sound and unwanted artefacts • use appropriate equipment to restore soundtracks to as close to the original recording within guidelines and available resources • apply correct post-production processes prescribed for the designated outcome when making a copy of the restored soundtrack • meet production deadlines.
Context of and specific resources for assessment	Assessment must ensure: • access to a range of current and obsolete industry 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	The following assessment methods are appropriate for this unit: • case studies, and written or oral questioning to assess candidate's understanding of white noise and the process of de-noising soundtracks • recordings of original soundtracks and authenticated de-noised versions done by the candidate.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • CUFIND301A Work effectively in the screen and media industries • CUFSOU301A Prepare audio assets • CUSSOU305A Analyse soundtracks.

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.

Relevant personnel may include:	• client • production designer • post-production manager • production manager • preservation supervisor • supervisor • head of department • director of photography • artist • director • producer • technical director • other technical staff • other specialist staff • designer • animation production personnel • sound recordist • sound editor • sound-editing personnel.
Requirements may include:	• artistic • technical, e.g. final format for master • budget • production schedules • organisational policies and procedures • resources • OHS requirements • audience • confidentiality • content • contractual arrangements • copyright • duration • intellectual property • purpose

	• style.
Documentation may include:	• pre-mix scripts • mixing sheets • track sheets • de-noising documents • cue sheets • edit decision lists (EDL) • dubbing sheets • queries • notes • manuals • databases • fault reports.

Source materials may include:	• film and television soundtracks, including:
	   • music
	   • dialogue
	   • sound effects
	• oral histories
	• location recordings
	• optical soundtracks
	• analogue audio recordings in different formats, such as:
	   • tape, e.g. open reel and cassette
	   • wire recording
	   • cylinder
	   • vinyl disc
	   • lacquer disc
	   • film mag
	• digital recordings in different formats, such as:
	   • digital audiotape
	   • CD.

Repairing and cleaning source material may involve:	• replacing dry or sticky film splices • attaching leader to film • removing adhesive left behind by sticky splices • repairing broken or damaged perforations on film • sonic cleaning film • manually cleaning film • baking magnetic oxide tape • using hot-pen on audiotape

	• scraping to remove oxide or other matter from oxide tape • manually cleaning oxide tape • removing mould by vacuum or alcohol swab • re-housing tapes if cassette damaged • cleaning discs • cleaning vinyl discs • cleaning and repairing cylinders • affixing lacquer fragments that are loose or separated from backing disc to lacquer discs • correcting warp in vinyl discs • detangling wire recordings • joining broken wire recordings.
Artefacts may include:	• white noise • hiss • clicks • pops • crackle • sibilance • hum.
Recording from more than one source may be required if:	• sections are missing from the original version • sections are heavily damaged • corresponding sections are available from another source and can be edited during the restoration process.
Equipment and tools may include:	• noise reduction systems • mono, stereo or multi-channel systems • timecode equipment • format encoders and decoders • audio editing systems • sound mixing desks • multi-track equipment • software packages • hard drives • analogue and digital playback equipment • restoration tools.
Manual restoration techniques may include:	• editing out artefacts • editing in missing sections from another source • waveform restoration.
Automated restoration processes	• high and low pass filters • de-noise

may include:	• de-click • de-scratch • de-crackle • de-hiss • repair filter • pitch correction • noise reduction.
Appropriate processes may include:	• expander • limiter • compressor • compander • playback curve.

Formats may include:	• digital file:
	    • AIF (AIFF)
	    • WAV
	    • broadcast WAV format (BWF)
	    • WMA
	    • OGG
	    • advanced audio coding (AAC)
	    • Real Audio
	    • QuickTime
	    • MP3
	• digital storage:
	    • CD
	    • DVD
	    • USB
	    • hard drive
	    • linear tape-open (LTO)
	• analogue:
	    • film.

Unit Sector(s)

Media and entertainment production - audio/sound