

Proceedings of The Institute of Acoustics

THE PRESENTATION OF TAPE RECORDED EVIDENCE

D. J. Dean

Home Office Tape Laboratory, Scientific Research and Development
Branch

Introduction

Since July 1979, as part of its research programme, the Home Office Tape Laboratory has offered to police forces an experimental operational audio tape service. This has been concerned with establishing the requirements of the service, with intelligibility enhancement, examination and authentication of recordings, handling and documentation. The service also includes the provision of replay equipment for use in courts and for producing written transcripts. The main users of the service have been the police and courts.

Every investigation handled by the laboratory has been considered as potential evidence for a court of law. Not only were technical solutions sought, but a comprehensive service established to provide advice and assistance at all stages through to the completion of court cases. It has ranged from the simple copying of recordings to conforming to the requirements of the courts and the legal constraints of tape recorded evidence.

Documentation and Handling

Formal documentation is always required by the courts to establish continuity of antecedence, the provenance of copies and the nature of laboratory involvement. It is also essential in keeping track of a heavy workload. Security of storage and extent of access may also be open to detailed enquiry. Few fields of activity are liable to such close public examination by parties who, in court, have a vested interest in finding fault. Any sign of carelessness would undermine the credibility of the laboratory. Formal procedures for handling, documentation and identification are ostentatiously adhered to.

Direct and enhanced tape copies

Original tape recordings are rarely if ever played in court. They are vulnerable to inadvertent damage, particularly if played many times on machines of poor quality. The original recording may also be in any one of a score or more of formats, from micro cassettes to large open reels of tape with perhaps twenty channels, each format requiring a different machine for replay. Copying should be carried out as soon as possible and the original tape sealed and secured. This reduces the opportunity for interference if subsequent allegations of unauthorised tampering arise.

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Court copies are normally made on open reels and working copies usually on compact cassettes. Working copies are required for a number of purposes, but chiefly for consultation and the production of written transcripts.

Copies may be either direct or enhanced. In direct copying, no attempt is made to improve upon the quality of the original recording, whereas enhanced copying seeks to improve intelligibility or ease of listening. Enhancement is frequently desirable and occasionally essential. Typical cases calling for enhancement have arisen from:-

- (a) Recorded telephone calls where the distant voice is almost inaudible whilst the near voice shouts.
- (b) Interfering tones or loud mains hum degrading the recording.
- (c) Recorder speed variation due to a malfunction.
- (d) Reverberation due to acoustic properties of a room.
- (e) Noise caused by the movement of clothing against a microphone or arising from background music or conversation.

Tape 'cleaning' or enhancement requires analysis of the problem and the application of some form of filtering or compression. Extensive use has been made of analogue equipment, but digital computer techniques offer far greater scope and versatility, particularly in the field of analysis and the application of time varying parameters such as in adaptive filtering.

The Laboratory is currently assessing a number of computer programs for operational use. Occasionally a spectacular increase in intelligibility is achieved, but more often than not a small but significant improvement is made. This can be particularly important in the case of marginally intelligible recordings which form the bulk of the laboratory investigations. These present a problem when used for assessing and quantifying any improvement made by the processing, the nature of which may be better understood when considering written transcripts.

Tape authentication and examination

It is the author's opinion that the best guarantee of authenticity is a well documented and credible provenance and antecedence.

Professional editing of recorded radio programmes and music recordings is commonplace. A commercial music cassette may have as many as 200 edits and it could well be argued that some edits produced on domestic equipment might stand up to fairly close scrutiny without detection. Counsel for a defendant is not obliged to give advanced warning of his case, thus the court requires to know whether a whole recording is authentic, not whether an edit exists at a specific point which only emerges as the area of interest during the trial. Whilst almost unlimited time may be spent on a recorded passage of one second duration, it is clearly impossible to expend the same effort on a recording which is perhaps one or two hours long.

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However, for those attempting to interfere with a recording in a sinister manner the pitfalls are numerous. It may be one thing to edit out a single provocative remark, but quite another to fabricate conversations and events from a quantity of recorded material, even with expertise, opportunity and equipment. Thus, authentication is not confined to looking for edits.

Tape authentication involves a long examination with a view to corroborating statements as to the manner in which the recording was made. Thus a recording is no less authentic for having been recorded intermittently, at varying speed, edited, stretched or otherwise abused, provided that all this is declared. Such a declaration may of course affect the credibility of the tape.

To carry out an authentication the Laboratory requires the production of the original recording and of the equipment and accessories with which it was made. A written transcript is required together with information as to the manner and circumstances in which the recording was carried out. Any claims being made in relation to the tape must be established. The characteristics and peculiarities of the recording are then confirmed as being consistent with the purported facts.

Authentication cannot guarantee freedom from unauthorised interference, but may provide a considerable measure of confidence. The work requires an average of 20 working days per recording usually spread over a period of six weeks.

The Laboratory always provides written reports in respect of tape examination or authentication. These aim to provide the court with:-

- (a) A state of the art summary which guides the reader in giving the appropriate weight to the conclusions.
- (b) A summary of the work done.
- (c) A conclusion or opinion concerning the examination.

The report can be used as the basis for informed cross-examination and ensures that both Prosecution and Defence are adequately briefed. There is even a good chance that the investigating scientist will not have to attend court at all. The report in fact fulfils the role of the expert witness.

The expert witness

An expert witness differs from an ordinary witness in that the latter is confined to statements of fact whereas the expert may be asked to assist the court with his expertise by expressing an opinion.

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The role of the expert in the witness box is to present his evidence in an unbiased manner. It is for counsel to support one side or the other. In the witness box the expert may be under some stress and it is advisable to anticipate probable questions. The first is normally to establish the witness' name and qualifications. It is helpful to provide counsel with this information in advance and should include an indication of the number of years experience in the relevant field. Most of the questions generally deal with some specific point of the investigation, but may well be heralded by: "Mr. Smith, I understand that you have conducted a laboratory investigation. What were your findings?" There can be no excuse for not having prepared a short clear answer. It can rarely be helpful to enter a witness box overburdened with charts and diagrams. The witness is the expert and the court does not seek a lightning course in acoustics.

The expert should never overlook the value of being able to say "That is outside the area of my expertise", or "That was outside the scope of my investigation", or even "That is a matter on which my judgement is no better than that of the court".

Written transcripts

The purpose of written transcripts is to simplify the communication of information contained in the recording. They are used in deliberation and consultation by interested parties or used, in conjunction with the recording, to make it easier to follow the conversation and events. In connection with any court case, someone will always need a transcript. However, the use of a transcript during the actual trial is not mandatory.

On the contrary, "a transcript may be permitted to assist the court", with emphasis on the word 'may'. In practice transcripts are at least helpful, if not essential, and are normally permitted in court. Their approval depends upon individual circumstances. Where Defence and Prosecution do not initially agree upon the contents, they may be asked to submit an agreed version. If this fails, a transcript may be submitted with one or other of the parties having marked those passages in dispute. The jury may be asked to hear a recording several times before being permitted to follow the transcript, but in almost all cases they are instructed that it is what they conclude from the tape, not from the transcript, that matters. Generally, once the court is satisfied with the transcript and the tape has been heard, the tape may be set on one side and cross-examination continued on the basis of the transcript.

The importance of written transcripts can be observed where a jury has to follow a recording of poor intelligibility. It may last for an hour or more with perhaps less than a minute being of real importance to the case. It is difficult to imagine anything more soporific. The transcriber has the advantage of being highly motivated, having considerable time, and of being able to replay sections of the recording at will. He may frequently

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be chosen for his understanding of the accent or dialect, or his familiarity with the subject of the recording. This can be very important. A measure of confidence can be gained from initial observations that, whilst a transcriber can be mistaken as to the contents of a passage, it is very difficult to convincingly insinuate a meaningful alternative with sinister intent. That is, to deliberately falsify a transcript.

Errors in a transcript make recorded dialogue difficult to follow. The more unintelligible the recording, the better the transcript needs to be. Where a passage represented by the legend 'unintelligible' is of some length, an indication of the duration of the passage is required. The least helpful transcript received by the Laboratory, from the point of view of following the recording, was a single continuous page of A4 size, where timing indicated that it should have been 25 pages long.

Transcription requires headphones and an easily operated machine which, at a touch, stops, rewinds a small controllable amount and commences to replay. Experience shows that the repeated playing of one or two marginally intelligible words rarely helps understanding and that they need to be heard in the context of several adjacent words. It is not uncommon to take 20 or even 30 times normal playing time to produce a handwritten transcript. Thus a one hour tape can take the best part of a week to transcribe.

Mention was made earlier of the use of transcripts to quantify the success of enhancement techniques, but this is in most cases both time consuming and tiring. The difficulty is that it takes a considerable time before a transcriber can be reasonably confident that he or she can make no further improvement in the interpretation. Suppose one considers a short section, perhaps one minute, of a recording which is substantially but uniformly degraded, i.e. not one in which a few words have been masked by a short term noise. As the transcriber listens to the section repeatedly the transcription rate decreases, because the words remaining are those which are more difficult to interpret. At the same time however a gradual learning process tends to offset this effect, possibly as the listener becomes more familiar with the speech quality, local accents, subject matter, and the characteristics of the degradation. Thus an hour's work may be needed before the transcriber is unable to interpret any further words. The transcriber may feel very satisfied with the results, but by this time the transcript may bear little similarity to the true dialogue. The process then has to be repeated with the enhanced recording. Operational tapes vary very considerably in the number of words in a given length of recording and the number of unintelligible words can be estimated only roughly. This suggests that the evaluation of enhancement techniques may be better performed with deliberately degraded recordings of checkable dialogue rather than by the use of operational tapes.

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Replay facilities in court

The acoustics of most court rooms are very far from ideal and, despite the provision of written transcripts, tapes which are largely unintelligible when played through a loudspeaker system lack credibility. The best sound reproduction is obtained by the use of headphones, which are frequently essential and are now used whenever possible. A 'hard-wired' system using normal headphones might well take two days to install. Installation has been simplified and the inconvenience of wires draped around the courtroom reduced by the use of commercially available infra-red headphones. These are of high quality, have no connecting cables and take as little as 30 to 45 minutes to install. Small transmitters working in the infra-red broadcast the signal to all parts of the court where it is received both by the headphones and by a Laboratory-adapted loudspeaker system in the public gallery.

Where a recording has been in a foreign language it has sometimes been the practice to supply only the interpreter and a few key persons in the case with headphones. The remainder have listened via a loudspeaker.

Professional open reel machines are recommended for court replay. It is not unusual for a number of passages to be ruled as inadmissible during the preliminaries of a trial, thus presenting the replay operator with a very difficult task. This can give rise to further problems when the jury retire to consider their verdict since they are supposed to deliberate in private, and they would have to come back into the courtroom for a repeat playback. In one case the operator was sworn in as an officer of the court and was permitted to enter the jury room when required. In a second case, it was ruled that nobody should know which sections of the recording the jury might wish to hear repeated and it was fortunate that the Technical Support Unit had made the admissible parts into an edited version on compact cassette during the course of the trial, thus enabling the jury to use a cassette player in the jury room.

Other Matters

The author is not qualified to comment upon legal considerations or court procedures, but two matters are worthy of mention. It occasionally happens that tapes need to be edited in the Laboratory because certain parts of the recording form no part of the evidence. This can be covered, for example, in the Statement of Witness by the words 'I copied that part of the tape indicated to me as being of interest'. It is also important to listen for admissible evidence of antecedence. E.g. 'You have a down on me because of my criminal record'. It is the practice of the Laboratory to produce additional copies of the tape with the offending remarks masked with a 'bleep' and covered by a Statement of Witness, as this saves difficulties later. In an observed case, the offending remark was contained in a control recording used by a phonetician for voice comparison. In this case the evidence was not accepted, presumably because the jury were entitled to hear the control recording.

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Voice identification or comparison is occasionally required where a suspect denies association with a recording. Speech spectrographs, misnamed 'voiceprints', are not a reliable means of comparison. Courts give some weight to persons knowing the voice well or to the evidence of a phonetician who may make comparisons with a control recording. Occasionally the court may be the only arbiter. These methods have limitations and are generally used only in support of other evidence. The Laboratory is in touch with reputable phoneticians willing to carry out such works.

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