PRODUCING INSTRUCTIONAL VIDEO FOR THE TIMBER INDUSTRY

by

Mark Beaulieu

submitted to

Department of Forest Engineering
College of Forestry
Oregon State University

as partial fulfillment for the degree of

Master of Forestry

ABSTRACT

This paper was written to serve as an introduction to instructional video production for timber industry officials. Discussed herein is the applicability of video to the timber industry and the development steps required to produce a scripted, edited instructional video. The focus of the paper is on content development and the role of the timber industry official as producer. The technical aspects of video equipment and their methods of usage are not discussed except as necessary to improve understanding of the video production process. Additionally, The development of a specific video project conducted by the Forest Engineering Department at Oregon State University, "Tackling Productivity in Mechanized Logging Operations", is discussed.

TABLE OF CONTENTS

INTRODUCTION
What is Video? 1
The Application of Video to the Timber Industry . . 2
Instructional Video as Discussed in this Paper . . . 3

PREPRODUCTION: PLANNING THE VIDEO PROGRAM
Overview of Preproduction Steps 6
Identifying Objectives 7
Identifying the Audience 9
Outlining the Content 10
Determining a Presentation Style 11
Creating Program Continuity and Pacing 12
Incorporating Reviews of the Message 13
Writing the Script 14
Tips on Video Scripting 15
Scripting Variety 16
Scripting for the Timber Industry 17
Budget and Operational Considerations 19

PRODUCTION: SHOOTING THE VIDEO
Studio Shooting and Location Shooting 22
Shot Selection 24
Shooting for Editing 25
Audio 28
Graphics 30

POSTPRODUCTION: EDITING AND EVALUATING THE PROGRAM
Overview of Video Editing 33
Time Coding, Dubbing and Logging Tapes 34
The Editing Script 37
Editing a Rough Draft 37
Evaluation 40
The Final Program Draft 43

THE DEVELOPMENT OF A TIMBER INDUSTRY VIDEO:
Tackling Productivity in Mechanized Logging Operations

Preproduction 45
Production 48
Postproduction 50
Retrospective 54

LITERATURE CITED 56

APPENDICES

Appendix I: Excerpt from a Video Script i
Appendix II: Example of a Video Storyboard Script . ii
Appendix III: Critical Path Schedule for Video Activities iii
Appendix IV: Example of a Numeric Code Used on a Video Log Spreadsheet iv
Appendix V: Excerpt of Video Log Information (Unsorted) v
Appendix VI: Video Log Information Extracted by Subject vi
Appendix VII: Excerpt from an Edited Script . . . vii
Appendix VIII: Excerpt from an Edit Decision List. viii
Appendix IX: Example of a Video Evaluation Questionnaire ix
Appendix X: Example Tally of Questionnaire Responses x

INTRODUCTION

What is Video?

Video is an electronic process used to transmit visual images. A video signal is a fluctuating voltage produced by scanning the image of a scene within a video camera by an electron beam (Millerson, 1987). This image can be transmitted either directly to a television screen or recorded as a series of electronic impulses on videotape.

Videotape has several advantages over conventional film. Video equipment can operate in natural or artificial indoor light without extra lighting. It can record audio with the visual image simultaneously. Videotape requires no processing time as it is "developed" instantaneously (Hanson, 1987). The entire video process can require as few as one or two people. Video can also utilize more personnel and studio assistance for more complex projects.

The versatility and portability of video has led to its rapid growth and widespread application. Demand for this technology has stimulated advances in equipment design and has lowered the cost of video units. Using video for employee instruction is now well within the means of most industries.

Video is ideal as a training tool because the medium is inherently persuasive. An audience watching a video does not perceive things as they are, nor do they see a scene as they would if they were there in person. Instead their

attention is directed to a selective choice made by the camera (Millerson, 1987). Their concentration is focused to a particular point of view, which is the intention of the instructor.

The Application of Video to the Timber Industry

Changes within the timber industry support the development of better training methods for new workers. Some of these changes include:

1) Advancement of logging technology. Increasing sophistication of harvest machinery and methods requires more skilled workers.
2) Changes in the labor force. Greater skills and incentive based pay has led to more stable crews, concerned with productivity.
3) Increasing regulations. Workers must find productive methods that respond to environmental sensitivity and do not conflict with constraints.
4) Concerns for safety. Better training is cost effective in terms of lower insurance rates as well as increased efficiency.

Currently there is a lack of training apparatus on par with the level of operational sophistication within the industry. Hands-on instruction is not enough to educate workers involved with highly integrated mechanized logging systems. The costs of owning and operating modern equipment

are too great to allow for experience alone to slowly convey sound logging principles to new workers.

Video has tremendous potential to provide sophisticated training to timber workers. Video can illustrate proper work techniques, reveal unproductive habits and improve decision making. Some possible areas of application include tree felling practices, cable logging operations, unit layout strategies, machine scheduling, crew interaction and safety.

The portability of video allows for the recording of timber harvest events in remote locations, difficult terrain and poor conditions. Its unobtrusive presence will not interfere with normal operations.

The versatility of video allows for specific content to match the needs and resources of the user. Simple, non-edited recordings can provide straightforward illustration of events. Video can be enhanced through scripting, editing, narration, computer graphics and special effects for more formal instructional programming. Video can become sophisticated enough to prompt the viewer for decisions and respond accordingly. Video systems can even be designed to emulate operating equipment to teach dexterity and judgement as with modern airplane flight simulation.

Instructional Video as Discussed in this Paper

This paper focuses on the development of a scripted and edited instructional video applicable to the timber

industry. It is written as a primer or a starting point for industry executives or teachers considering the use of video. The video development process is outlined and related to specific characteristics of the timber industry where appropriate. The emphasis is on content development (scripting, editing, evaluating, etc.) rather than the technical aspects of video production (camera lenses, lighting, etc.). Technical considerations are discussed only to the extent necessary to clarify production processes as vocational training is necessary for a full understanding of the video medium.

A scripted and edited video program is characterized by three developmental stages - preproduction, production and postproduction. Preproduction is primarily comprised of identifying audiences, developing program objectives, outlining content and script writing. Production includes all the camera work, audio recording and graphics creation. Postproduction includes assessing taped video scenes, editing them according to the script, evaluation of preliminary drafts and assembly of the final product.

As previously suggested, video programming of this sophistication requires the technical expertise and vocational skills of a video professional. The professional's role is to advise on program feasibility and logistics, and to manage the recording and editing equipment.

The role of the timber industry official will be to develop the script and ensure its correct portrayal. The industry and video professionals must work together as producer and consultant through every stage of program development. The former assumes responsibility for the message while the latter assumes responsibility for the medium. This ensures the audience will view coherently constructed scenes and also will interpret scenes to correctly receive intended messages.

PREPRODUCTION: PLANNING THE VIDEO PROGRAM

Overview of Preproduction Steps

The following steps are the preproduction steps of a video program (Kaplan, 1983). They will be discussed in more detail in the following sections.

1) Identify program objectives
2) Identify the intended audience
3) Outline the program content
4) Determine the presentation style
5) Create program continuity and pacing
6) Incorporate reviews of the message
7) Write the program script

This planning process is crucial to the development of a sound instructional video. It is also the stage of development most directly controlled by the timber industry professional.

The range of possibilities related to video images and interpretations require this very thorough step by step planning. Cost is another important factor. Production and postproduction require the greatest investment. Redefining the program content during or after the camera shooting will result in large cost overruns.

Identifying Objectives

Determining your objectives is the first step in creating a video program. Generally, the objective of any instruction is to seek a learning outcome among trainees in behavioral terms. Behavioral objectives of learning have been defined in a Taxonomy of Educational Objectives by Bloom and Krathwoho (Gillette, 1984). The Taxonomy classifies behavioral effect into three categories. These are: 1) the psychomotor domain or objectives involving dexterity and motor skills, 2) the cognitive domain or intellectual objectives and 3) the affective domain or objectives related to emotion and feeling (Gillette, 1984).

All of these objectives categories are appropriate in the timber industry. Traditional, hands-on training has been most successful in the psychomotor domain. Direct one on one instruction is well suited for relating manual processes. Such psychomotor skills, however, can also be relayed through video. Simple, unedited videos of direct sequences of actions are particularly useful as a means of illustration or clarification. An example would be a video of someone rigging a spar tree or loading logs onto a truck.

Instructional video is most effective in the cognitive domain as a means to teach work strategies and decision making skills. For example, editing video taped scenes of separate logging system components within an operation is ideal for portraying their interactions. Video has the

unique ability to dissolve time and space barriers between activities to illustrate cause and effect. Such complex interaction may define the overall productivity of a logging operation, but it is often unnoticed by workers whose main day-to-day concern is their own area of work. A short video sequence can directly show how certain decisions may affect subsequent activities even when the real world process occurs over several days or weeks.

The power of video to motivate and arouse interest (the affective objective domain) should not be overlooked by industry. A presentation should not only deliver a message; it should also inspire the audience to put it to use. A dry presentation will not be remembered, no matter how valuable its message is. When appropriate, videos should incorporate music, humor, creativity, etc. to relax the audience, increase their receptivity and help them feel better about their work.

Chosen objectives should be clearly defined before proceeding with other program planning. It is important to limit objectives for any one program to a few related ideas. An overloaded audience will have poor recall of any of the message. Audio visual experts have stated that the optimum length for an effective presentation is generally 8 to 12 minutes (Bateson, 1980). Within this length of time, a successful program will leave the audience with 3 or 4 tangible ideas.

Identifying the Audience

Apart from the program objectives, no single aspect of program planning should govern the eventual product as much as an understanding of the intended audience. An audience of logging crew members may require a different program than an audience of managers or an audience of students. Each audience will have a different background, perspective and terminology for any particular subject.

How the program is watched is also important. It may be viewed in a group or singly. It may be watched once or replayed. It might be stopped at certain points for viewer response. The setting of the presentation may range from relaxed and casual to formal and intensive. All these aspects of presentation will guide script design.

It is also important to understand the audience's prior knowledge of the subject. It is crucial for the producer to avoid a common problem of over familiarity with the subject (Millerson, 1987). The producer is very familiar with the scene being filmed and the teaching point being delivered. The audience, however, will be viewing the program and its message for the first time. Every scene must visually and narratively reveal enough of the subject to allow the audience to fully interpret it.

One final note on audience is the realization that all viewers are very sophisticated as watchers of televised media. Every day the audience sees highly technical and expensive Hollywood-style productions on their televisions.

The subconscious effect of this programming has been to create production editors and critics out of all of us. Viewers will become unknowingly distracted by production details and lose the message if the program is poorly constructed. It is important when planning scenes to ensure they are complete, continuous and within the limits of the equipment and budget employed.

Outlining the Content

An outline of the topics to be covered develops objectives into a workable form. The outline does not necessarily need to reflect the order by which the topics will be presented. It is more important to distinguish headings and subheadings and determine their relative importance and need for emphasis.

One technique for developing an outline for complex subjects is to write each possible heading and subheading on separate note cards. On a desk top these cards can be organized to reflect a hierarchal structure. Similar to a flowchart, this method creates a graphic and conceptual view of an abstract subject. Headings and subheadings can be rearranged and supplemented until the objectives are best fulfilled. Topics not directly related to the objectives become easier to identify and eliminate.

The outline should be kept simple and not detailed beyond one or two levels of subheadings. The "skeleton" of

the video program should define its structure but also allow for flexibility in content presentation.

Determining a Presentation Style

Style refers to the manner of presentation. Possible styles for instruction include lecture, demonstration, documentary, interview, panel discussion, voice over narration or dramatic presentation (Gayeski, 1983). Evaluation of the audience will be the primary driving force in selection of a presentation style or combination of styles. A panel discussion may be suitable for a classroom training session, but it is not likely to convey ideas to a tired logging crew on Friday afternoon. For each subject it is important to analyze which style will both convey the message and hold the audience's interest.

Feasibility follows audience evaluation in planning style. While the latter defines the chosen style, the former determines to what degree the style can be implemented. Research into the logistic aspects of video production is required at this stage. Some items needing research include equipment and facility availability, access to shooting locations, budget restrictions, required production time, administrative needs and organization (Millerson, 1987). The need for assistance in the form of subjects, talent and technicians must also be determined.

Other aspects of style are audio and visual materials

used to illustrate and emphasize program content (Kaplan, 1983). Music, sound effects, titles, charts, models, computer graphics, etc. clarify ideas, provide content variation or relief and create a more lasting impression. The feasibility and level of sophistication available for these tools should be researched and assessed.

Creating Program Continuity and Pacing

Before the script writing begins, the program outline should be examined in terms of presentation. The sequence of headings and subheadings and their relative alloted time must be planned. Equally important will be the transitions between scenes, which "glue" or bind the various aspects of the message together.

The outlining method mentioned above also lends itself to organizing the program sequence. Headings and subheadings can be rearranged until they seem most effective. The sequence should be logical in terms of skill development and causal relationships (Kaplan, 1983). Points should be presented one at a time in their entirety to avoid confusion. Switching back and forth between topics should be avoided. Topics and subtopics should be interspersed and appropriately emphasized so that the main points are easy to identify and remember.

Pacing can be defined as the rate of delivery of information in the program, or the "rhythm" of the video. A good instructional video will have a cadence. The audience

is introduced to a subject, provided with supportive visual and audio information and then given time to assimilate the new knowledge. This process will repeat throughout the video.

Pacing is a result of the relationship between the audio and visual portions of the program. Neither component should overwhelm the presentation. Moments of silence allow the audience to assimilate information and serve as transitions between topics (Millerson, 1987). When properly utilized, narration breaks are exclamation points to the completion of actions or processes. Likewise, visual material should be simple when emphasizing spoken information. The use of graphics is very effective for reinforcing the audio message.

It is important to realize that video is not like written material. The audience cannot "reread" a passage that is difficult to understand. Video allows for faster assimilation of information than other media, but the audience still needs time to observe a subject and then ponder its significance for themselves (Millerson,1987). The producer should be aware of his or her overfamiliarity with regard to pacing and ensure the audience has enough time to observe and assimilate each scene.

Incorporating Reviews of the Message

Main points of the message should be emphasized through review. This is particularly important for complicated

subjects or processes with many components (Kaplan,1983). The audience cannot be expected to remember every particular aspect of a subject from one viewing. The important points should be summarized and repeated to reinforce them. For maximum retention, the main points should be few and simply stated. Details should not be repeated. Details should be used only to provide the background and reasoning of the message for a complete picture.

Reviews can be incorporated wherever they seem appropriate in the program. Besides improving memory retention, reviews finalize a topic and prepare the audience for another subject. Too much review, however, makes the pace of the video too slow and the audience impatient.

Writing the Script

A lot of time and effort has been spent up to this point before any actual script writing has begun. The value of this planning now becomes evident. Video allows for so much variation in imagery, style and level of sophistication that it is important to have content and structure well defined before scripting. The planning process as described thus far guides the author to the selection of a coherent, feasible program. The process itself will initiate many scripting ideas and make it easier to assess their continuity and effectiveness. It is always easier to rewrite an outline, style or topic sequence than it is to rewrite a new script without a well defined structure.

Video script writing has a unique format because of its visual element. Video and audio portions must be written simultaneously to be complementary. The format places a description of the visual part of each scene on the right half of each page of written script (see Appendix I). Each corresponding audio portion is written to the left. This format allows the writer to manage each portion for its respective continuity and to manage both portions together for cohesiveness.

More complex or critical segments of the program often require a better visual representation than a written description. Some scenes need a pictorial development. Drawing rough sketches of the intended scene adjacent to related text is called storyboarding (see Appendix II). It is particularly useful in developing effective beginnings, endings, graphics sequences and as a tool to maintain visual continuity. A storyboard can also serve as a prototype for pre-production planning.

Tips on Video Scripting

A scripted video needs a clear beginning and ending to appear complete to the audience. The beginning is perhaps the most critical portion of the whole presentation. The first 90 seconds of the program must command the attention of the audience and create interest in the message (Bateson, 1980). Although the intention of the program is instruction, it should not have to be swallowed like bad

medicine. A creative and entertaining beginning will put the audience at ease and make them more receptive.

Likewise the ending needs special attention. The ending should be an active scene which summarizes the presentation and convinces the audience that the message benefits their own personal objectives. A video should end enthusiastically and not wind down to a painfully slow death (Bateson, 1983).

Another important point to consider is the script is written to be heard and not read. Though the language is directed toward the audience, a conversational style will help them feel participatory. Formal language sounds unnatural, if not distracting in a video. Sentences should be short and to the point (Bateson, 1983). Long sentences become incomprehensible because the audience must concentrate on the visual information also. The producer must also remember to always use the active voice rather than the passive voice. The script must be strong enough to call the audience to action. Other keys to conversational style include avoiding technical jargon, speaking as a friend rather than an expert, and even using contractions or slang when appropriate (Bateson, 1983).

Scripting Variety

An effective instructional video usually provides variety in communication tools. Inclusion of interviews, acted scenes, graphics, music, special effects and subject

metaphors add interest to the program. They illustrate and emphasize important points in the message. Finally, these tools improve the pace of the program and serve as transitions.

Graphics are especially useful for clarifying complex topics and reinforcing the audio portion of a program. Graphics can be created as cards on poster-board materials, photographic slides, or computer software. The latter is becoming more feasible and affordable for industrial use. The software allows the computer to interface with a standard video signal. Computer graphic drawings or text can then be added to the program or combined with recorded scenes. Whatever the means of creation, it is important to keep graphics simple and uncluttered. This will allow the audience to concentrate on the audio.

Scripting for the Timber Industry

Scripting for the timber industry has some special considerations. If the video involves scenes of actual operations, the script writer must realize there will be little control over activities. Certainly most crews would not mind simple changes in their routine for the sake of a scene, however, their primary objective is to be productive. The director cannot significantly stall operations to stage a scripted scene. Likewise, the writer will have no control over ground and weather conditions. Therefore the script writer must write almost entirely within the framework of

what can actually be expected to happen during the normal course of operations.

Any exception to this rule lies in the power of video to create illusions. There is a viewers' rule, which states that audiences can be relied on to assume shots belong in the scenes in which they appear (Gayeski, 1983). Careful editing allows the script writer to create a continuous sequence from shots which may have actually happened at different times or places. For example, a cut from a shot of a non-operating machine to a mechanic carrying tools will imply that the machine is broken down. In truth the machine may be stopped for a lunch break but the audience will assume the connection. The script writer should consider how to build sequences which cannot be counted upon to actually occur.

Another important consideration when shooting actual harvest operations is that the workers are not professional actors. Though they might not object to performing before the camera, they are likely to appear selfconscious and unnatural. Even professional actors require several takes to get it right though they spend a lifetime developing their craft. Script writers must work within the acting limitations of their subjects. If they cannot catch workers performing desired actions unaware of the camera, they should limit acting direction to short, simple activities without difficult speaking parts.

There may be a desire to include personal comment from crew members, etc. This often lends authenticity to the program and provides some relief to the narrative. This can be difficult if the speaker cannot naturally provide insightful commentary. As with the camera, most people will feel selfconscious speaking into a microphone. It will likely be more authentic to have an actor do a voice-over of the comments than to have comments nervously stated by the actual subject. The audience has no need to see the subject speak the words directly. A close-up or medium shot of the subject with a believable voice dubbed over it creates the illusion that the subject is speaking those words.

Finally, because of these uncontrollable elements of location shooting, the script must allow for revisions. There will also be limits encountered due to equipment and finances. Generally, the underlying premise is to keep things simple. Keeping the script simple does not mean the message will be trite. Rather it means the main sequences which will shape the program are scenes the writer knows will be caught on video unobtrusively as common occurrences. The remainder of the program will rely on the writer's creativity. The creative elements are more flexible and easier to revise to suit the needs of the program.

Budget and Operational Considerations

Concurrent to the development of a script is the process of budgeting and planning the production and

postproduction of the video. It is important to document and maintain a file on all the various research discussed earlier. Once the first draft of the script has been prepared, the producer and video consultant should have a handle on the manpower and technical needs of the program and the time required for subsequent activities.

It is helpful to outline the remainder of the project in the format of critical path management. Each production and postproduction activity should be listed along with the estimated time and resource requirements. The dependence of activities upon other activities or the ability to conduct activities simultaneously should also be noted. There are several inexpensive microcomputer software packages that will perform this analysis (see Appendix III).

If equipment or studio time is available only during certain time frames, then it becomes crucial to ensure that preliminary activities are completed on schedule. Any foreseeable problems or delays should be assessed and backup plans should be developed. Even if time criticality is not a major concern for the project, there is tremendous benefit to having a complete picture of the video process for keeping track of project status.

Budgeting should be determined for the program during planning stages and the script should be revised as necessary to meet capital constraints. Some factors to consider for budgeting include (Gayeski, 1983):

1) program format - how much scripting, shooting, and

travel the program requires,

2) technical quality - what equipment needs to be purchased or rented,
3) the amount of outside services required in terms of planning, scripting and editing,
4) program length,
5) shooting ratio - the amount of tape shot compared to that used and the amount of editing,
6) talent - the program may require paid actors and narrators,
7) sets and graphics,
8) duplication - number and type of final copies,
9) preparation and research for program content,
10) evaluation effort, and
11) source of funding and profit requirements.

Every expenditure should be accounted for to monitor program investment. In addition, 10 to 15% of a projected program cost can be expected in overruns and unforeseeable costs (Gayeski, 1983).

It is impossible to estimate in this paper the cost of producing an instructional video due to the wide variety of program styles and levels of sophistication. A ballpark figure given by Gayeski in 1983 is $1000 per minute of program length through final editing.

PRODUCTION: SHOOTING THE VIDEO

At this point in program development, a workable script has been developed and arrangements have been made for shooting the necessary scenes. The video professional assumes a larger role during production. The professional will have a better understanding of the shot types and angles best suited for each sequence. The producer should have a basic knowledge of this information to visualize the program and offer suggestions. There will likely be the need to revise details of the script as the shoot progresses so it is important to understand the structure of shot sequences.

Studio Shooting and Location Shooting

Mention should be made of studio shooting even though timber operations and related video are primarily outdoor activities. Studio shooting may be applicable to certain timber activities, and it does have its advantages and disadvantages.

Studio shooting is appropriate when the background is not important. It is usually easier and can be less expensive (Gayeski, 1983). A studio offers control over lighting and acoustics. A greater variety of shot types and angles can be achieved as well as using several cameras to shoot an activity. There are more personnel available for assistance in the studio. Finally, turn-around time (time

from shooting to completed sequence) is faster with studio shooting because audio, special effects, edits, etc. can all be accomplished at the time of the shooting (Gayeski, 1983).

Location shooting is usually done with one camera. A two person crew is all that is required. The video professional operates the camera, and it is suggested that the producer help him with equipment and offer suggestions for shot selection.

A one camera operation limits shot selection to a particular position for each scene shot. However, because timber harvest involves repetitive cycles of machine and worker activity, it is possible to set up the camera for different perspectives of the "same" scene. Scenes from different cycles can be edited together to appear as the same sequence. Location shooting will therefore require greater postproduction effort in editing.

Whenever possible, a one or two day test shooting should be arranged for location scenes. The test shoot should include a variety of location activities and shot types. Reviewing this material will provide a visual perspective of the subject and help to fine tune the script. The test shoot should be used to determine the feasibility of critical sequences.

Shot Selection

Gayeski describes these general principles about shot selection (Gayeski, 1983):

- Close-ups grab attention and signify that something is important.
- Long shots give a wide perspective and remove a viewer from direct involvement.
- A zoom zeroes attention on a particular subject.
- A pan or truck across a scene gives the viewer the perspective of an array of related items, and a sense of movement through a place.
- A long angle looking up at a person makes the person appear strong, powerful, authoritarian.
- A high angle looking down on a person makes the person seem to be weaker or more fragile.
- Rapid editing of shots denotes life, vigor and the perception that the viewer should look for an underlying theme.
- Slow dissolves and camera movements denote tranquility and emphasize the mood of each subject.

Each of these shots are effective in instructional video. Close-ups create personal involvement with the subject as in voice-over commentary or provide detailed attention. Zooms provide transitions in or out of a particular subject from a general context. Pans set the location of a harvest operation and set spatial

relationships of various machines. Angle shots help to emphasize scale. Rapid editing restores the active impression of large scale machine operations which have a tendency to appear much slower and less significant when viewed on a small screen. Finally, slow camera movements slow the pace of the program for easier transitions among subjects. The important concern is to pick shots that not only illustrate the subject but persuade the audience to interpret the message as the author intended (Millerson, 1987).

Shooting for Editing

Beyond the concern for shot selection, there is also the need to consider construction of shot sequences, or shooting for editing. Shots are categorized not only in relation to type but also according to their role in a shot sequence.

Winston and Keydel describe the roles of shots in a typical sequence (Winston and Keydel, 1986). An establishing shot sets the scene or location of a sequence. A master shot establishes the relationship between the subjects in a shot and their environment. It serves as an establishing shot, however it goes a step further because it sets the action as well as the scene. To avoid confusing the audience, one or both of these types of shots must be revealed before any closer detailed shots are shown. Inserts are closer examinations of active details included

in the master shot. Cutaways are components of the master shot. They are not essential to the main activity of the sequence.

The action in an insert must be synchronized with the action of the master shot for continuity in a sequence. There are three relationships between these types of shots with respect to time that must be avoided (Millerson, 1987). The first is missing time. The insert action must be initiated in the master shot without any gaps in time. The second is duplicated time. The same actions should not be repeated in adjacent shots. Third is over-extended time. A little more subtle, this rule states that an action initiated in the master-shot must proceed naturally in the insert. The action cannot linger at an intermediate step.

The cutaway shot has a different role. It serves as an "escape clause" from the normal rules of editing and provides a way to sequence shots that do not quite match. For example, the master-shot might show the foreman watching a timber operation. The insert focuses on the activity of the machinery. A cutaway then shows a medium shot of the foreman's watchful stare before the machinery is rejoined at a slightly later time. In this example, the cutaway avoided a missing time error, perhaps due to a lack of a complete sequence of machine shots.

Although these considerations may seem more of a concern of editing than shooting, the emphasis is that planning for editing is an integral part of shooting.

Fortunately, the type of action related to the timber industry is more forgiving than dramatic acting. For example, cutting from a master shot of a skidder moving through timber to a close-up insert of the skidder cab is not as critical as matching the movements of an actor through different shots. However, the same rules do apply with respect to continuity.

The rules of editing stress the need to shoot several takes of the same type of activity. These takes should include a variety of angles and shot types. It is also important to catch the incidental pieces of activities. These may become the saving grace of key sequences in the program. A rough estimate for the amount of tape actually used compared to the amount shot is about 5 to 10 percent (Millerson, 1987).

One final rule of editing directly related to shooting is the 180 degree rule (Winston and Keydel, 1986). This guideline creates an imaginary line parallel to the direction of and through the center of action. The camera perspective should never cross this line within any given shot sequence. This keeps the viewer's perspective within a 180 degree arc of the subject. This is best illustrated by the coverage of a football game. The camera is always on the same side of the field and never crosses an imaginary line between the goalposts. If this were to happen the audience would be disoriented with respect to the direction

of action. This rule applies to movement of machinery or crew activity as well.

Audio

Audio is an essential part of the video program. As previously mentioned, audio has a larger role than simply conveying verbal information. Audio also serves to enhance the visual portion of the program and improve continuity and pace. Successful audio will have two components. The first is the technical aspect of the sound, i.e. choosing the proper equipment and technique for sound quality and clarity. The second is the artistic aspect, or the selection and combination of sounds to create the right impression of the message.

The technical aspect is largely the domain of the video professional. The skills involved in microphone selection and placement, etc. are professional skills much as lighting arrangement and camera skills. The producer should be aware in a general sense, however, of the sources of sound available for use.

Sound can be either pre-recorded, studio recorded or recorded live with the visual portion of the program. Sound effects and music fall into the first category. Narration and voice-over are studio recorded. Background sound and acted scenes are recorded live. Of these sound sources, live sound is obviously most critical because it must have good quality with every shot. Pre-recorded sound is a

matter of choice, and studio sound can have as many takes as is necessary to get it right.

Fortunately for instructional video as related to the timber industry, live sound is primarily background noise of the scene environment and not as critical as is in acted scenes. The sound of equipment, while important in creating atmosphere, is generally toned down to allow emphasis on narration. If the live sound matching a visual scene is of poor quality, the background sound of a similar scene can be overdubbed. The audience will be largely unaware because their main concentration is on the narration.

For this reason, it is helpful to make a separate audio tape recording of common background noises while on location (Millerson, 1987). This tape could also be used if the sound between edited shots is noticeably discontinuous. Specific sounds such as yarder whistles or truck brakes are also valuable to record. Similar to the role of cutaways in visual sequences, specific sound effects can provide audio transitions and enhance program variety.

Narration is commonly recorded in a studio on a separate audio tape to be mixed later with the video. Speaking narratively is an acting skill and is best done by someone well experienced to have a natural, conversational feel. The producer should, however, review his script by reciting it into a tape recorder. As it is played back, the producer should check its comprehension, style and pace. Background sound, music and visual scenes should be imagined

behind the narration so the producer can best advise the narrator.

Putting narration together with background sound, music and special effects becomes an artistic choice. While narration carries the message, other sounds can be equally important. Music can be especially useful for introductions or transitions. Music entertains the audience and loosens them up to be receptive to the message. However, it can be distracting during more serious instruction. Background sound pulls the audience into the scene and makes them more alert to the activity. Special effects are cues to specific actions of interest.

A final consideration of audio and narration in particular is the way it is mixed with the visual portion. It is somewhat a matter of choice whether the sound is mixed to match the visual or the visual is mixed to match the sound. Although both are acceptable, generally for an instructional, narrative video it is best to edit the visual portion to match the narrative within any given sequence or train of thought. However, where there are natural breaks in the narrative between sentences or ideas, silent pauses can be shortened or lengthened to allow for completion of visual activity and smooth transition.

Graphics

Graphics are an important tool in video to show titles and credits, emphasize parts of the message, convey abstract

ideas and provide variety in a program. They can appear as overlays on taped scenes or as the entire visual part of the scene.

Graphics can be created as drawn posters or photographic slides, but most modern graphics are now created on computers (Gayeski, 1983). Dedicated video graphic workstations have considerable power to transform video images as often seen in television graphics. However, these workstations are expensive and often beyond the scope of instructional video.

On a lesser level of sophistication, add-in cards and related software allow more common microcomputers ("PC"s) to accept a video signal and to transfer graphics to video tape. The software can also "open a window" of one taped scene onto another. The general rule which limits this software is that the graphic image must be a still shot. Likewise, either the "window" scene or the background scene must be a still shot. Movement in a graphic can only be simulated by a succession of still shots with progressive changes in them.

This level of graphic sophistication is well suited for instructional video. A word or phrase, which summarizes the theme of the scene, can be used as an overlay for emphasis. Graphic images or icons can also help convey abstract topics and provide symbols to improve memory retention. Note, that as video software technology is improves, it will soon offer

producers of instructional video a much wider range of options.

The best rule for using graphics is to keep them simple. Elaborate graphics are very expensive and an overly detailed graphic only confuses the audience. Images should be uncluttered with a few bright, contrasting colors. The use of icons or representative symbols imprint ideas more clearly than complex pictures. Simple graphics allow the audience to concentrate on the narrative.

POSTPRODUCTION: EDITING AND EVALUATING THE PROGRAM

Overview of Video Editing

Once all the raw video and audio tapes have been made it is time to assemble the program. Usually, a rough draft will be edited for evaluation before a final product is made. As noted earlier, the preproduction phase was primarily the work of the producer while the production phase required the intensive skills of the video professional. For the postproduction phase, it is vital for both parties to work together to best edit video scenes so they are both coherent in the technical sense and effective in conveying the message.

Editing specific shot sequences from a large inventory of raw footage can be a very tedious process. Fortunately, there is a systematic approach to editing that organizes and expedites the process.

Editing is better understood with a little knowledge of video tape and editing equipment. Video tape is segmented into different tracks, one track for the video signal, two tracks for audio signals and one control track.

The control track is invisible to the editor. It is a recording of control pulses, one for each video frame which occur at 30 per second. These pulses keep the tape running at proper speed so the video and audio signals are read correctly. Proper editing requires the control pulses to maintain proper spacing through cuts (Gayeski, 1983). This

makes mechanical, cut and splice editing (film editing) virtually impossible.

Video editing is an electronic process of copying scenes from the original tapes to a master edited tape. Two video tape recorders and screen monitors are needed, one for playback and one for recording. These VTR's are interfaced by an editing controller which allows the raw tape and the master edited tape to match tracking speeds and cut points. The controller also functions to add effects like fading and time coding - an electronic audio signal which references or "addresses" each video frame (Gayeski, 1983). A time code reader tells the editor the tape location of each scene. Finally, an audio mixer allows recorded sound to be added to the edited master tape. This equipment is the basis for an editing operation. There may be additional equipment for more sophisticated functions.

Time Coding, Dubbing and Logging Tapes

Time coding of the original tapes (master tapes) is the first step in the editing process. One of the audio tracks is used for time coding. The other audio track carries the soundtrack of the program. Time code is given in hours, minutes, seconds, and frames. It assigns a unique reference to every frame on a given tape, allowing the editor to find any specific shot on that tape. It is helpful to start each different master tape with a separate hour number so each

shot for the entire inventory of raw footage has a unique time code.

Once all master tapes have been time coded, a copy or dub should be made of each of them. The dubbed tapes will be the working copies for creating the rough draft of the program. They will also have the same time code as the masters. This saves the masters from possible damage, which may inadvertently occur during editing. When the final draft has been approved, the best quality video program can be made directly from the masters.

The time coded dubs are now ready to be logged. The log is a record of every shot on the tapes. For every change in camera perspective on each tape, a new log entry should be written. Log entries should include the following:

1) starting, ending time codes and length of the shot
2) subject
3) shot type (close, medium, long, pan left, pan right, zoom in, zoom out, vertical pan, etc.)
4) lighting conditions, if variable
5) comments

Shots unsuitable for use because of poor lighting, excessive camera motion, etc., should be identified. Additionally, anything pertinent to the particular subject that serves to identify the scene should be included. For example, if the subject was logging equipment, it would be helpful to know whether the camera shot the left, right,

front, or back of the machine (to meet the 180 degree rule of editing). Generally, the more information included in the log, the easier it will be to find a needed shot during editing.

A microcomputer spreadsheet is a good tool for logging video tape. Numerical codes can be used to identify different shot types, lighting conditions, subjects or any other criteria that separates shots from one another. This allows for sorting and extracting a list of shots sharing some particular attribute in common. For example, if the desired scene is an approaching log truck, a sort or extraction could be made to find all front views of a moving truck in sunlight at medium range. This greatly reduces the amount of time spent looking through tapes for particular shots or even looking through a log of maybe 5 hours of taped scenes (see Appendices IV, V, and VI).

Also in relation to time coding, dubbing and logging video tape: although it may seem as though these are technical tasks, they are best done by the producer. Operation of the editing equipment for these jobs is fairly simple and can be learned in a couple hours of instruction. The advantage for the producer comes from reviewing all the video tapes in a detailed manner. This is valuable in gaining an understanding of all available scenes to work with and for matching the most effective shots to the script during editing.

One method to allow the producer the ability to log video tape more conveniently is known as "window dubs". Window dubs are one-half inch video dubs with the time code visible within a "window" on the videotape. These can be made at most video production facilities and they have the advantage of allowing the producer to log and evaluate the tapes on any VHS machine in the home or office.

The Editing Script

After the log is completed, the dubs should be reviewed to match shots with the script. The time code for selected shots should be written on a copy of the script. This becomes the editing script (see Appendix VII). In addition, any selected audio sources and graphics should be included.

Creating an editing script requires only a playback machine. Therefore, it is much less expensive to plan editing at this stage than to wait until the actual editing process begins. An editing script allows greater attention to be paid to shot selection and alternative shots. Actual editing time will then be reduced and better organized.

Editing a Rough Draft

With dubs, audio tapes, graphics and an editing script prepared, the first draft of the program can be created. Editing modes of the equipment describes above can be classified as either assemble editing or insert editing (Gayeski, 1983). Assemble editing joins segments of tape,

each containing audio, video and control tracks. The segments must be laid down consecutively onto the edited master. The insert mode allows audio or video segments to be inserted anywhere on an existing recording. This requires a prerequisite recording of "anything" (i.e. color bars, black) to establish a control track with which to synchronize subsequent audio and visual inserts. Insert editing is far more flexible and amenable to change than assemble editing.

Editing a narrated instructional video is nearly always done in the insert mode. Typically, the narration is laid down on an audio track for any given sequence and then the corresponding video shots are inserted. Breaks in narration are inserted over video when it becomes necessary to complete actions in a sequence. In this manner video and audio inserts are "leap-frogged" to create balance and smooth continuity in the whole program.

A written record of shot selection is required during editing to allow subsequent reconstruction of the program from the master tapes after the draft is reviewed, revised and approved. Known as an "Edit Decision List", EDL, it typically indicates the time in, time out, length, transition and description of each scene to be written as they exist in sequence on the program draft. Time related data needs to be recorded to the exact video frame for correct reconstruction (see Appendix VIII).

Both audio tracks are typically used in the program. One is for the narration and music, etc., while the other is for background sound of the video subject. This typically leaves no available audio track for time code on the program draft to use for correlating with selected shots. This emphasizes the need for an accurate and thorough record of selected shots. The only exception is found in video equipment which has a third "address track" dedicated specifically to time code.

Some editing techniques (the 180 degree rule, sequence construction, etc.) have already been mentioned because they are an integral part of the shot planning process. In addition, Millerson identifies the following guidelines (Millerson, 1987):

- Do not cut between shots which are very similar (e.g. (frontal close-ups of two different people).
- Avoid cutting between two extremely different sized perspectives of the same subject.
- Avoid jump shots through different angles of the same subject.
- Maintain relative direction of movement between two subjects.
- Avoid cutting between static and fast-moving pictures.
- A subject should not exit a shot and then be found again already in the next shot.
- Avoid intercutting shots where the subject jumps from

one side of the screen to another.

The key to good editing is to make the mechanics of editing invisible to the audience. The audience should be able to interpret the effects of the edits, but their attention should not be distracted by editing technique.

Evaluation

The products of the edit session are the rough draft of the program and an EDL documenting construction of that draft. At this stage of development, the video needs to be evaluated by objective audiences not connected with its production.

The producer may have an opinion on the effectiveness of the video, but more likely will be overfamiliar with its construction and unable to watch the video without concentrating on technical details. An outside audience, particularly one for which the program is intended, will have a fresh view of the program content.

The importance of rough draft evaluation cannot be overlooked. Minor changes to clarify certain sequences or to eliminate excess shots will greatly improve the program. Certainly, this is the last time any major changes can be made in content. Video producers for the timber industry will likely be unable to reshoot sequences at this stage because the subject work crews will have moved to different settings. This further emphasizes the need to shoot multiple takes of scenes and to catch many cutaway details

during production. The producer must usually rely on the original shot inventory to correct ineffective scenes.

Evaluating a video project can be difficult. In rare instances it may be possible to directly measure performance changes of the audience, however, the complexity of timber industry work makes it difficult to isolate specific causes of change in work activity. Consequently, a video producer must use more indirect methods. Generally, evaluation of the program draft will consist of a combination of interviews, questionnaires, and direct observation of audience reaction. A pre-test and post-test format can often be used to assess retention of the key points in the program or changes in attitude.

The scope of the questionnaire or interview should cover the elements of content, creativity and production quality. Obviously, it is most important to convey the program message. Answers to questions of content should reveal if the message was technically correct, appropriate for the target audience and retained in their minds. Content questions should determine whether the objectives have been met.

Creativity is the next area of concern. The program should stimulate audience attention throughout its length. Questions on creative elements should be directed toward the video's beginning and ending, pace, styling, narration, graphics and any other visual or audio effects in the

program. These tools should enhance the message and not distract the audience.

Finally, the questionnaires or interviews should address the technical aspects of the video production. These include lighting, visual and audio clarity, editing points, camera steadiness, etc. An audience overlooks and forgives some technical imperfections provided their senses are not constantly disturbed by shaking camera motions, bad editing or poor sound.

Whenever possible, questions should be direct. If answers are too ambiguous they will be difficult to compare and tally for an entire audience. Questions which ask the audience to express whether they agree or disagree with a statement (on a scale of 1 to 5, for example), lend themselves to tallying to determine statistical averages or quantitative "grades" for various aspects of the video (see Appendices IX and X). In addition, comments should be solicited for more specific opinions for items of concern.

There are instances when indirect questioning may help to elicit a person's true feelings. Gillette identifies three types of indirect questioning used to get responses if it is believed direct questions may put an audience on the defensive. These are 1) phrasing a question in the third person, 2) combining answers to a series of more direct questions that reveal some additional feeling, and 3) giving respondents incomplete sentences to finish (Gillette, 1984).

The producer should consider the type of audience and the presentation setting when devising the evaluation. The appropriate degree of formality, difficulty and detail should be planned for the evaluation. The audience should be comfortable during the presentation because it is important for the producer to watch their response. During the presentation, the producer should watch the audience and not the video. Obvious responses like laughter and more subtle cues like wandering eyes will provide information about program effectiveness which may not be expressed verbally.

The Final Program Draft

After evaluation and any necessary reconstruction of the video, the final product can be assembled. This is the task of the video professional. The final product is made from the original master tapes and the EDL made during previous edits. In addition, any necessary corrections to the audio are made. After a master copy of the final program is assembled, copies are made for in-house viewing and distribution.

Once all the work involved in creating a video is complete and the final copy is ready for distribution, it may still be difficult to tell whether it is a success, especially in terms of cost effectiveness. For this purpose, video is often compared with other forms of instruction, usually instructor-led training sessions.

Typically, a single training session costs less than a video program. However, a video program can be shown many times and distributed to several groups very cheaply once initial costs are paid. Video also has a tremendous advantage in terms of convenience and informality over organized training sessions. Even when formal training seminars are desired, video can be readily incorporated to provide insight and relieve lecture tedium.

Ultimately, the cost effectiveness of video within the timber industry would be measured in terms of higher productivity and safer operations. For such a costly and dangerous industry, any form of worker training which results in less delays and accidents will quickly pay for itself many times over.

THE DEVELOPMENT OF A TIMBER INDUSTRY VIDEO:

Tackling Productivity in Mechanized Logging Operations

The principles and procedures described in this paper were employed to create the video "Tackling Productivity in Mechanized Logging Operations" at Oregon State University. The video was produced through the collaboration of the author (as a graduate student) and two faculty advisors and managers of the project, Dr. Eldon Olsen and Mr. John Garland of the OSU Forest Engineering Department. Technical control, graphics and program advisement was provided by Jeff Hino, a staff member of the College of Forestry's Media Center. This video is made available by the Forest Media Center at Oregon State University. This section of the paper will briefly discuss the development of this video. Examples of documentation as produced during the program are shown in the appendix.

Preproduction

The driving force to create the video was not to produce a video dealing specifically with mechanized logging operations. Rather, the initial goal was to introduce video itself as a training tool for the timber industry. In that regard, the video was an experiment to test the feasibility and effectiveness of the medium in relation to worker instruction in the industry.

Previously, the theme of industry related video had been limited almost exclusively to product demonstrations. There were examples of minimally edited video available as simple illustrations of direct events, e.g. felling technique or truck loading. However, there were no videos designed to instruct logging crews on logging system strategies.

The eventual subject of this video, productivity in mechanized logging operations, arose from the perceived need to expand worker instruction from hands on training of manual skills to more abstract "thinking" concepts. This was reinforced by recent changes in the industry, particularly growing technological sophistication of operations and incentive based pay scales. These changes have created the need for workers with more self determination and decision making skills. The second factor leading to this topic was the availability and willingness of a mechanized operation to serve as the subject of the video.

With the subject broadly defined, the next step was selecting objectives. These were identified as both cognitive - understanding the dependence of productivity on machine and worker interactions and affective - developing a sense of teamwork among crew members.

Having chosen logging crews as the primary audience, the important steps in audience identification became analyzing their possible attitudes toward instruction and

the desired formality and setting of program viewing. The video project team believed the crews would not be comfortable with a video presentation in a classroom setting, so the team decided to create a program that could be viewed informally and to use some entertainment in the video to relax viewers and stimulate interest.

Content was outlined as described earlier in this paper. Possible topics were written on separate slips of adhesive note paper. These were arranged and examined on a desk top until a few related ideas were identified as crucial for the objectives. Next, the style of voice-over narration was chosen because it had the least amount of outside talent requirements and was most direct in conveying ideas.

With objectives stated, the audience identified, content outlined and style chosen, ideas for continuity and pacing started to come together. The interaction of logging system components could be illustrated by individual examination of each machine's operation. This would include the effects of each machine's activity on subsequent components. The main principles that either guided productivity or detracted from it could be presented together and "keyed" to enhance their retention in memory. For this reason, the "Five B's" of mechanized logging productivity were developed. A work situation could be used to illustrate these principles in action. Enhancement of

teamwork could be accomplished by showing communication, assistance and cross training among crew members.

These ideas were the main themes for the script. Additionally, the end of the program would review the "Five B's" and stress once again the importance of teamwork. A football metaphor was adopted for the program, to create an effective beginning and ending, to add entertainment and to stress teamwork. This would also serve to thread elements of the program together. Placing a football scoreboard and other graphics over logging scenes would help to reinforce the connection and provide a little entertainment.

The thought process described above condenses the actual development of the first script draft to the basic steps. Although roughly sequential in development, much of the process was concurrent or sporadic, often "two steps forward and one step back" until a workable program resolved itself. This first draft was by no means finalized. Almost every part of the script would undergo revision during subsequent production and postproduction, but a strong framework for the project had been constructed.

Production

A two day test shoot was arranged with the subject logging operation. Although a couple of tapes were made, the main goal of this shoot was to observe the operation and to visualize themes from the script to determine if they would be feasible. At the time of the test shoot, the

program themes had been identified but the script itself in terms of actual sequences and dialogue was perhaps only halfway thought out.

Following the test shoot and examination of the related tapes, a more complete script revision was made. Narration and rough visual images were drawn together for each sequence.

The shooting of the bulk of on location tapes occurred one month after the test shoot over a period of one week. One camera was used for all the shooting. The crew was composed of the camera man and one or two assistants at any given time to help with the equipment and share ideas on shots. Roughly thirteen tapes ranging from 15 to 20 minutes in length were shot at the main location and two similar tapes were shot at other logging operations in the vicinity. These were often reviewed in the evening to assess their quality and potential.

The majority of scenes were shot directly as they occurred during actual work operations. The camerawork stressed multiple takes of machines performing the same actions with a variety of shot types and angles. Some scenes would show the entire machine, just the active part of the machine (e.g. shear blades, skidder grapples, etc.), or perhaps the operator's actions within the cab. At times the cameraman boarded the equipment and rode along for a different perspective. As discovered during the eventual editing process, there were never too many perspectives and

facets of the operation to be caught on camera. Even shots taken somewhat randomly which at the time had no direct correlation to the script would become important.

Talent requirements of the crew were kept to a minimum. Although they were agreeable to performing requested actions, direction usually involved simple actions only, such as walking into camera view, carrying on unrecorded conversations, pointing to machine controls, etc. Naturally, there was some obvious self-consciousness when asked to perform more complex actions.

Audio portions of the script were studio recorded with an experienced narrator (Hino). Faculty members assisted in providing voice overs of crew member "comments". This relieved us from relying on the crew members to speak. Speaking naturally into a microphone is a real talent, often not appreciated until a person attempts it and then listens to the playback of his or her own voice. Several takes are often required for an inexperienced person to produce even a paragraph of good narration.

Postproduction

Following production, the tapes were time coded, dubbed and logged. In addition, necessary tapes from outside the shooting were obtained (football scenes and different examples of equipment). These were also time coded, dubbed and logged. A spreadsheet was used to log the dubbed tapes.

This spreadsheet included numeric codes to help differentiate scenes according to the following categories: type of machine as subject of the scene, the perspective of the machine, type of camera focus, and lighting quality. In addition, time code information was recorded and each scene had a brief comment discussing any of its aspects which may have been important for the script.

The spreadsheet allowed for sorting and extracting all scenes by subject. Additionally, all scenes of a particular subject could then be grouped for like perspectives, camera focus, and lighting. This greatly reduced the time required to sift through the entire log of tapes to find desired scenes.

At this point, a final script revision was made. The tape log identified all sequences which could be readily constructed or would be infeasible. The script was fine tuned to match the available video and narrative resources. The script was also reviewed once again by all managing and technical members of the video project team for final approval before editing the first draft.

The logged scenes were then matched to the script by preparation of an editing script. Definite scenes were identified on a script copy according to their time code and tape location. For other sequences, possible alternative scenes were noted.

Scenes and narration for this program were edited sequentially from the beginning to the end of the program.

Typically, several minutes of narration were recorded onto the edited master to be followed by recording of matching video scenes. Often, pauses were inserted to allow the visual action to be completed and then following narration was re-recorded. In this manner, the recording of narration and video was a step-by-step process as outlined previously in this paper.

Graphics for the program were developed simultaneously with the editing process. The reason for this was the need to have a clearly identified tape sequence for which to lay the graphic over. For all of the graphic scenes that included taped footage, it was necessary to develop a graphic that would not interfere or block the central action of the scene.

Purely graphic sequences were also developed during editing although they had been thought out previously. Ideally, such graphics would have been made during the production phase, so that they could have been easily inserted into the program. However, the timing schedule for shooting production forced their delay. This was also allowable on this project because the forestry college owned the graphic and editing equipment. This permitted the editing portion of the program to proceed at a more relaxed pace than would have been economically feasible if editing time had to be rented from a private studio.

Even during the editing process, there was a need for minor script revisions. Often, there arose a conflict

between script content and technical quality. For example, the best shot for content may have had poor lighting or the best shots for a sequence could not be edited smoothly. This shows the need for the producer and the video professional to be equally involved in the editing process. Only by working together during editing can effective compromises be obtained in difficult script sequences that will insure the content message is delivered as well as a technically correct editing approach.

The first draft was completed along with an accurate record of its construction according to video tape time codes. By now, the people most directly involved in its creation had viewed each sequence so many times that it was difficult for them to have an undistracted opinion of its effectiveness and quality.

Extensive review of this first program draft was conducted. The first outside group to view the program was comprised of members of the OSU Forest Engineering faculty. They were given a three-part questionnaire to fill out after the viewing. The most heavily weighted part of the questionnaire pertained to questions of program content, message delivery and effectiveness. In other words, how well were the program objectives met. Of secondary importance were the creative aspects of the script. These include how well the program held attention and how well the graphics, visual metaphors and other instructional tools helped to enliven the program and carry the message.

Finally, the audience was questioned on the production or technical elements of the program including visual and audio clarity, lighting, transitions and program length.

Questions were phrased in the form of a statement and a rating in terms of agreement with the statement on a scale of 1 to 5. This allowed for "scores" to be compiled from many questionnaires. Additionally, space for comments was given and the project was discussed.

Subsequent reviews were conducted with the subject crew of the program, other mechanized logging crews and industry officials. From these reviews, some minor changes in the program developed and a final draft was planned, created and prepared for distribution.

Retrospective

Using hindsight, it is always possible to improve upon the planning and execution of a project. The single, most valuable improvement to this project would have been better script preparation before the actual video production or shooting phase. The script at the time of the shooting was still very general. The main sequences had been developed and visualized, but specific scenes were not predetermined.

As novices, the producers assumed the video camera would capture their ideas and perspectives and the program would fall into place as they visualized it. In truth, the camera captures whatever it is pointed at. There is no

guarantee that pointing the camera at a subject will reveal the message one wishes to be conveyed about that subject. Camera scenes of moving vehicles do not necessarily portray observers' impressions and no two scenes of moving vehicles seem to reveal the same message even if "identical".

The lesson emphasized is to enter production with a fully developed script including as many predetermined "shot lists" for sequences as possible. Video allows for immediate viewing of scenes at the end of the shooting day and this opportunity should be used to ensure the scenes will carry the message of the script and will allow for cohesive editing. Typically with the live action footage of timber operations, there will be no second chance to reshoot a scene after the initial production phase..

The OSU project benefitted from a large inventory of tape footage and in-house editing equipment. This allowed enough time during the editing process to fully develop desired sequences from existing "random" shot perspectives. In many cases, minor script revisions were necessary to match available footage. The private industry producer, renting editing time and equipment cannot afford the luxury of scripting while editing. They are therefore cautioned to be sure they have their script and related shot selections determined as fully as possible before the cameras are turned on.

Literature Cited

Bateson, Michael A. 1980. Audio Visual Scripting. Audio Visual Product News. September/October, 1980. pp. 25-30.

Gayeski, Diane M. 1983. Corporate and Instructional Video: Design and Production. Prentice-Hall, Inc. Englewood Cliffs, New Jersey. 291 p.

Gillette, Fred. 1984. Evaluating Video Programs Through Viewer Interviews. Educational and Industrial Television. May, 1984. pp. 88-96. June, 1984. pp. 61-64.

Hanson, Jarice. 1987. Understanding Video: Applications, Impact, and Theory. Sage Publications. Newbury Park. 135 p.

Kaplan, Don. 1983. Producing Instructional Video. Design for Arts in Education. March/April, 1983. pp. 40-42.

Millerson, Gerald. 1987. Video Production Handbook. Focal Press. London, England. 216 p.

Winston, Brian and Keydel, Julia. 1986. Working With Video: A Comprehensive Guide to the World of Video Production. Mobius International, Ltd. London, England. 256 p.

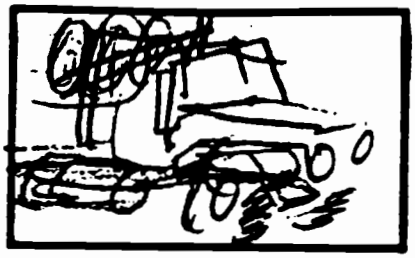
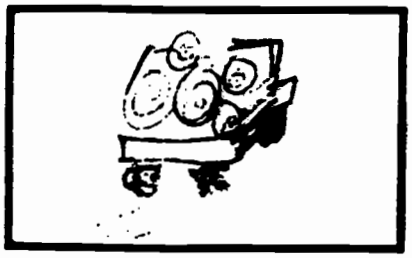
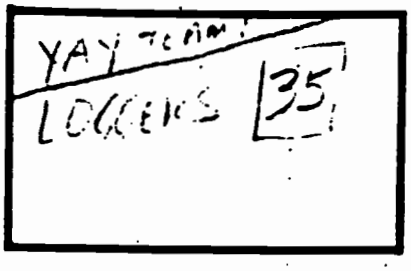
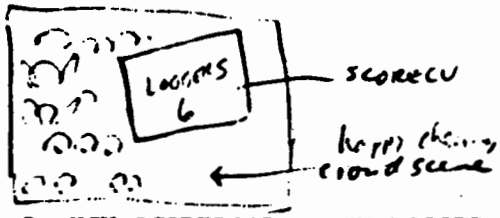
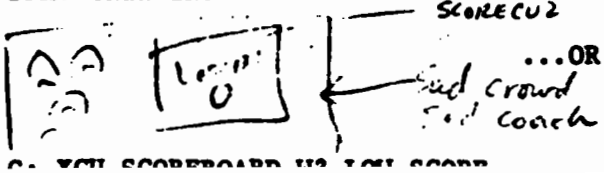
Also contributing to this paper was consultation provided by Jeff Hino, Oregon State University Forestry Media Center, during the production of the video Tackling Productivity in Mechanized Logging, during 1987 and 1988.

Appendix I: Excerpt from a Video Script

PRODUCTIVITY VIDEOTAPE
SCRIPT 4 12/15/87

SCENE AUDIO	VIDEO
1. You know a good football team when you see one.	Football touchdown footage
2. Just look at the scoreboard and you can tell how well they're doing.	TELEPHOTO: Scoreboard
3. Chances are, if they've got good players, good coaching, and have it together as a team, they can really rack up the points.	Football footage highlighting players and coaches
4. But how do you know a good mechanized logging operation when you see one?	LONGSHOT: Establishes mechanized logging activity skidder, delimber, etc.
5. Well, you just might take a look at the scoreboard...	Superimpose graphic of scoreboard in forest
6. Think of TD's as "truckloads delivered" and you'll see what we mean.	CLOSE-UP: Scoreboard in forest
7. The number of truckloads delivered to the mills each day tells how your team is doing. Have you been keeping score lately?	LONGSHOT: Loaded log truck crosses screen; GRAHIC SUPER: Score increases
8. Every machine operator from the feller/buncher ...	LONGSHOT: Feller-buncher in operation CLOSE-UP: Feller-buncher operator in cab
9. ... to the truck driver ... makes important play-by-play decisions which affect the number of truckloads delivered	MEDIUM SHOT: Truck driver in cab pulling away, camera follows
10. ... for better ... (crowd cheering) ... or worse ... (crowd booing)	Cheering crowd, with scoreboard graphic MEDIUM SHOT: Disappointed fans
11. It's a sad fact that on many operations the equipment is actively logging less than three quarters of every shift	Freeze shot of workers doing repairs, superimpose "TIME-OUT" graphic
12. Why? Because crews battle time bandits ... delays and mistakes which keep them punting instead of producing.	Football sequence of botched play
13. The objective of this program is to help you defeat the time bandits, that is, reduce delays and score more "TD's" ... through better communication...	Scoreboard Graphic: "BEAT THE BANDITS" Scoreboard:"COMMUNICATION", insert of crew talking
14. ... cross training ...	Scoreboard:"CROSS TRAINING", insert of crew member demonstrating something to another
15. ... and teamwork.	Scoreboard:"TEAMWORK", insert of crew members assisting each other

Appendix II: Example of a Video Storyboard Script

VISUAL	AUDIO
	the F/B...
V: F/B IN OPERATION	
	...TO THE TRUCK DRIVER...
V: TRUCK INTERIOR	...MAKES IMPORTANT PLAY BY PLAY DECISIONS...
	...PLAY DECISIONS WHICH AFFECT
V: LOG TRUCK MOVING ACROSS	
	...THE NUMBER OF TRUCKLOADS DELIVERED...
V: LOADED TRUCK HEADING AWAY FROM CAMERA	
	 ...FOR BETTER...
G: XCU SCOREBOARD WITH LOGGER SCORE AND CHEER	
SFX: CHEERING	
	 ...OR WORSE.
G: XCU SCOREBOARD W/ LOG SCORE	

Appendix III: Critical Path Schedule for Video Activities

FORESTRY MEDIA CENTER — PRODUCTIVITY VIDEO PROJECT — NOV 87 - DEC 88

REPORT

:11/NOV/87

	1987		1988											
PERIOD COMMENCING DATE	11	18	8	14	18	2	6	9	22	5	3	7	5	
MONTH	NOV	DEC	FEB	MAR		MAY	JUN	JUL	AUG		OCT	NOV	DEC	Estimated / Who
PERIOD COMMENCING TIME UNIT	8	26	50	65	75	85	100	120	140		170	195	215	Hours /
EDIT SCRIPT	===.	.	.											40 Inside & Outside
LOCATE FOOTBALL FOOTAGE	=...	.	.											8 J & M
VIDEOTAPE SCOREBOARD	=...	.	.											4 J & M
LOCATE MUSIC/SFX	=...	.	..											8 J & M
DEVELOP GRAPHICS		==.	.	..										30 J & M
RECORD NARRATION - ROUGH VERSION		=.	.	...										8 J
MIX AUDIO ROUGH		=.	.	...										8 J
GRAPHICS APPROVAL		=.	.	..										2 Eldon
ROUGH EDIT DECISION LIST		=|	=|	....										8 J & M
EDIT ROUGH CUT VIDEO		=|	=|	....										40 J & M
INTERNAL REVIEW			|	=....										3 Eldon, et al.(*)
DEVELOP FORMATIVE REVIEW INSTRUMENT			|	==...	..									40 M
REVISE ROUGH CUT VIDEO (INTERNAL RE			|	==.	.									16 J & M
FORMATIVE EVALUATION BY FEI				C										2 M & Eldon
FORMATIVE REVIEW BY INLAND CONFEREN					C									3 M & Eldon
INTERPRETATION OF REVIEW DATA					=|	...	....	.....	.....					16 J & M & Eldon
FINAL SCRIPT REVISION (OUTSIDE REVI					=|	=..	....	.....	.....					8 J & M & Eldon
GRAPHICS REVISIONS					|	=..	....	.....	.....	..	.....	.....	..	8 J & M
FINAL EDIT DECISION LIST					|	=..	....	.....	.....	..	.....	.....	...	6 J & M
RECORD FINAL NARRATION					|	=..	....	.....	.....	..	.....	.....	..	4 J
FINAL AUDIO MIX						=.	....	.....	.....	..	.....	.....	..	8 J
RESHOOTING SCENES							=.	.....	.....	.				24 J & M & ?
DUBBING/TIMECODING								.....	.....	..	.....	.....	.....	6 M
EDIT 3/4 FINAL REVIEW COPY							=.	.....	.....	..	.....	.....	...	24 J & M
FINAL REVIEW								=...	.....	..	.....	.....	...	3 Eldon, et al.(*)
ONE-INCH EDITING								==..	.....	..	.....	.....	.....	24 J& M
DUPLICATION OF MASTER								==.	.....	..	.....	.....	.....	2 J
SKYLINE SYMPOSIUM SCREENING													C	1 M & Eldon

Chart Key:- CCC :Critical Activities === :Non Critical Activities NNN :Activity with neg float ... :Float

350 approx. total manhrs.

(*) These represent opportunities for internal review which could include the Dept. Head, as part of the FMC review process for distribution publication approval.

Appendix IV: Example of a Numeric Code Used on a Video Log Spreadsheet

VIDEOTAPE LOG OF MECHANIZED LOGGING PRODUCTION PROJECT
(numeric code description)

MACHINE CODES
1 = faller-buncher
2 = skidder
3 = delimber
4 = loader
5 = log truck
6 = self-loader
7 = fuel truck
8 = water truck
9 = multiple pieces
10 = Lee
11 = crew
12 = crew with shirts
13 = mechanic
14 = scenery
15 = other
16 = bulldozer

CAMERA CODES
1 = long-shot
2 = medium-shot
3 = close-shot
4 = pan left
5 = pan right
6 = zoom in
7 = zoom out
8 = verticle pan
9 = other

LIGHT CODES
1 = full sun
2 = partial shade
3 = full shade

ANGLE CODES
1 = vehicle front
2 = vehicle right
3 = vehicle rear
4 = vehicle left
5 = inside cab
6 = other

COMMENT ABBREVIATIONS
FBT = tracked faller-buncher (Lee Smith)
FBR = rubber-tired faller-buncher (Lee Smith)
SK = skidder
LDR = loader
LT = log truck
SL = self-loader
FT = fuel truck

TIME CODE INFORMATION
SCENE ... xx.yy xx = tape number
yy = sequential shot # on tape

START ... mm.ss mm = time code minutes
STOP ... mm.ss ss = time code seconds

Appendix V: Excerpt of Video Log Information (unsorted)

SCENE	START	STOP	LENGTH	TITLE	MACHINE	CAMERA	LIGHT	ANGLE	COMMENT
1.01	1.38	1.54	0.27	delimber	3	1	3	4	SK moves in/drops load bad; bad zoom
1.02	1.54	2.38	0.73	delimber	3	1	3	4	working delimber fills screen
1.03	2.38	3.19	0.68	delimber	3	1	3	4	delimber arm extension movement
1.04	3.27	4.56	1.48	delimber	3	1	3	4	delimber arm processes one load
1.05	4.56	5.15	0.32	delimb&skid	9	1	3	4	SK moves in to DL, drops load, exits
1.06	5.15	5.23	0.13	delimber	3	1	3	4	delimber operation
1.07	5.24	5.36	0.20	delimber	3	2	3	4	DL operator in cab while working
1.08	5.36	5.58	0.37	delimber	3	2	3	4	DL head only, processing
1.09	5.58	6.08	0.17	delimber	3	2	3	4	rear DL grapple processing
1.1	6.08	6.21	0.22	skidder	2	2	3	2	SK operator & cab in motion
1.11	6.22	6.46	0.40	delimb&skid	9	1	2	2	SK moves in,drops; DL arm background
1.12	6.46	6.56	0.17	delimber	3	5	2	4	pan from bunch to DL arm
1.13	6.56	7	0.07	delimber	3	7	2	1	zoom from arm to whole DL
1.14	7.01	7.24	0.38	delimber	3	5	2	4	pan from bunch to DL with head operation
1.15	7.24	7.51	0.45	delimber	3	4	2	4	pan left with DL head; zoom in to slash
1.16	7.52	8.52	1.00	skidder	2	1	2	2	SK moves in,stops,waits,drops,leaves;DL
1.17	8.52	9.06	0.23	delimber	3	2	1	4	DL head process one stem
1.18	9.06	9.2	0.23	delimber	3	2	2	4	DL head process one stem
1.19	9.2	9.47	0.45	delimber	3	2	2	4	DL head process 2 stems together
1.2	9.47	10.11	0.40	delimber	3	2	2	4	DL head process schoolmarm
1.21	10.12	10.19	0.12	delimber	3	7	2	4	zoom out on DL head
1.22	10.19	11.54	1.58	delimber	3	1	2	4	DL operation
1.23	11.54	12.04	0.17	delimber	3	2	2	4	DL head operation
1.24	12.04	12.14	0.17	delimber	3	2	1	4	DL butt operation; clamp and pivot
1.25	12.14	12.29	0.25	delimber	3	3	1	4	DL head, sawing,dropping,moving
1.26	12.29	12.53	0.40	delimb&skid	9	4	2	2	pan from deck to SK drop and DL
1.27	12.54	13.1	0.27	scenery	14	7	2	6	zoom out on full log deck
1.28	13.1	13.26	0.27	delimber	3	4	2	4	pan left from deck to DL
1.29	13.26	13.52	0.43	delimber	3	4	2	4	pan left from deck to DL
1.3	13.52	14.01	0.15	delimb&skid	9	1	2	6	SK drop load; DL in background
1.31	14.01	14.22	0.35	delimber	3	2	2	4	DL operator and cab in operation
1.32	14.22	14.4	0.30	delimber	3	3	2	4	face of DL operator in motion
1.33	14.4	15.14	0.57	skidder	2	1	2	4	SK with load,moves in,waits
1.34	15.14	15.18	0.07	skidder	2	2	2	4	SK operator waiting in cab
1.35	15.18	15.35	0.28	skidder	2	1	2	4	SK moves in,drops,leaves;DL in view
1.36	15.35	16.28	0.88	delimber	3	2	2	1	DL head operation from front
1.37	16.29	16.35	0.10	delimber	3	2	2	1	front view DL operator,cab at work
1.38	16.35	16.55	0.33	skidder	2	1	2	4	SK with load moves in,waits
1.39	16.55	17.16	0.35	skidder	2	2	2	4	SK operator in cab,waiting,coffee
2.01	0.13	1.45	1.53	skidder	2	1	1	4	SK enters,turns,makes 2 bunch 1 load,
2.02	1.45	2.12	0.45	scenery	14	8	1	6	pan from treetops to ground
2.03	2.12	2.3	0.30	scenery	14	4	2	6	pan left on trees at ground level
2.04	2.3	2.44	0.23	fueling	7	2	2	4	fueling maintenance, no hard hat
2.05	3.1	3.41	0.52	planning	15	7	2	6	zoom out, pan left ribbons on haul road
2.05	3.41	4.04	0.38	planning	15	7	2	6	zoom out, pan left ribbons on haul road
2.06	4.04	4.17	0.22	planning	15	6	2	6	zoom in to single haul road ribbon

Appendix VI: Video Log Information Extracted by Subject

FALLER-BUNCHER SCENES

SCENE	START	STOP	LENGTH	TITLE	MACHINE	CAMERA	LIGHT	ANGLE	COMMENT
3.01	0.05	1.01	0.93	fbuncher	1	1	1	4	sideview of FBT at work; some zoom,pan
3.02	1.01	1.14	0.22	fbuncher	1	2	2	4	FBT head movement, approaches camera
3.03	1.14	1.5	0.60	fbuncher	1	1	2	4	FBT moving,clipping; dusty
3.04	2.05	2.21	0.27	fbuncher	1	1	2	2	FBT moves accross camera field
3.05	2.21	2.58	0.62	fbuncher	1	1	2	2	FBT moving,clipping; some pan,zoom
3.06	2.58	3.12	0.23	fbuncher	1	8	2	2	pan follows falling treetop
3.07	3.12	3.27	0.25	fbuncher	1	1	2	2	FBT movement; obscurred by trees
3.08	3.27	3.56	0.48	fbuncher	1	1	2	3	FBT at work
3.09	3.56	4.12	0.27	fbuncher	1	2	2	3	zoom to medium of cab;FBT operation
3.1	4.12	4.45	0.55	fbuncher	1	2	2	2	FBT at work as seen thru trees
3.11	5.28	5.57	0.48	fbuncher	1	2	2	4	still shot of FBT shear on tree
3.12	5.57	6.54	0.95	fbuncher	1	3	2	4	shear clipping,lifting; zoom to FBT drop
3.13	6.54	6.58	0.07	fbuncher	1	3	2	4	sprocket movement on FBT
3.14	6.59	7.06	0.12	fbuncher	1	2	2	4	FBT cab,operator backing up
3.15	7.06	7.18	0.20	fbuncher	1	2	2	1	FBT approaches camera
3.16	7.18	7.47	0.48	fbuncher	1	2	2	2	FBT operator stops,dismounts
3.17	7.47	8.19	0.53	fbuncher	1	2	2	2	FBT operator mounts,drives away
3.18	8.19	8.44	0.42	fbuncher	1	2	2	3	rear view of FBT leaving camera
3.19	8.44	9.17	0.55	fbuncher	1	1	1	2	zoom out to FBT clipping,dropping
3.2	9.17	10.13	0.93	fbuncher	1	1	1	6	FBT w/2 cuts on big tree then drops
3.21	10.13	10.55	0.70	fbuncher	1	1	2	2	FBT clipping,dropping
3.27	11.53	11.59	0.10	fbuncher	1	3	2	2	FBT head carrying tree
3.27	11.59	12.08	0.15	fbuncher	1	7	2	2	zoom from head to FBT carrying tree
3.28	12.08	12.12	0.07	fbuncher	1	1	2	6	tree falling into dust
3.29	12.12	12.42	0.50	fbuncher	1	3	2	1	shears clipping, then FBT back,turn,drop
3.3	12.42	12.5	0.13	fbuncher	1	1	2	2	FBT clipping,dropping
3.31	12.5	13.13	0.38	fbuncher	1	2	2	2	FBT maneuvering
3.32	13.13	14.42	1.48	fbuncher	1	3	2	2	FBT operation w/zooms to head
3.33	14.47	14.51	0.07	fbuncher	1	3	2	5	operator's face
3.34	14.51	15.49	0.97	fbuncher	1	2	2	5	view from FBT cab, clipping and dropping
3.35	15.49	15.58	0.15	fbuncher	1	3	2	5	pan to closeup of FBT oper's face
3.36	15.58	16.4	0.70	fbuncher	1	2	2	5	FBT clips high stump,drops tree
3.37	16.4	18.07	1.45	fbuncher	1	2	2	5	FBT at work with quick pan to operator
3.38	18.07	18.13	0.10	fbuncher	1	6	2	5	zoom in to indexed bunch
3.39	18.16	19.06	0.83	fbuncher	1	3	2	5	FBT control operation with pan to face
3.4	19.06	19.32	0.43	fbuncher	1	2	2	5	views of FBT from cab in motion
7.12	6.02	6.13	0.18	fbuncher	1	2	1	3	FBT passes cam in reverse
7.13	6.13	6.4	0.45	fbuncher	1	1	1	1	FBT fades off cam in reverse
7.18	8.1	8.25	0.25	fbuncher	1	2	1	1	still shot of FBR
10.01	0.1	0.33	0.38	fbuncher	1	1	1	4	FBT at work
10.02	0.33	1.37	1.07	fbuncher	1	1	1	4	FBT at work w/zooms to vehicle
10.03	1.37	1.53	0.27	fbuncher	1	1	1	6	view of falling trees

Appendix VII: Excerpt from an Edited Script

PRODUCTIVITY VIDEOTAPE
SCRIPT 4 12/15/87

SCENE	AUDIO	VIDEO
1.	You know a good football team when you see one.	Football touchdown footage (16:23:15, 16:08:44, 16:09:11)
2.	Just look at the scoreboard and you can tell how well they're doing.	TELEPHOTO: Scoreboard (16:12:02)
3.	Chances are, if they've got good players, good coaching, and have it together as a team, they can really rack up the points.	Football footage highlighting players and coaches (16:21:22, 16:04:51)
4.	But how do you know a good mechanized logging operation when you see one?	LONGSHOT: Establishing mechanized logging activity skidder, delimber, etc. (1:12:29, 5:15:42)
5.	Well, you just might take a look at the scoreboard...	Superimpose graphic of scoreboard in forest
6.	Think of TD's as "truckloads delivered" and you'll see what we mean.	CLOSE-UP: Scoreboard in forest (7:02:16, 7:00:55)
7.	The number of truckloads delivered to the mills each day tells how your team is doing. Have you been keeping score lately?	LONGSHOT: Loaded log truck crosses screen; GRAHIC SUPER: Score increases (8:02:24)
8.	Every machine operator from the feller/buncher ...	LONGSHOT: Feller-buncher in operation (3:07:47) CLOSE-UP: Feller-buncher operator in cab
9.	... to the truck driver ... makes important play-by-play decisions which affect the number of truckloads delivered	MEDIUM SHOT: Truck driver in cab pulling away, camera follows (3:15:49, 11:6:24, 7:00:20)
10.	... for better ... (crowd cheering) ... or worse ... (crowd booing)	Cheering crowd, with scoreboard graphic MEDIUM SHOT: Disappointed fans (16:08:02 or 16:14:20)
11.	It's a sad fact that on many operations the equipment is actively logging less than three quarters of every shift	Freeze shot of workers doing repairs, superimpose "TIME-OUT" graphic (6:08:25)
12.	Why? Because crews battle time bandits ... delays and mistakes which keep them punting instead of producing.	Football sequence of botched play (16:04:11)
13.	The objective of this program is to help you defeat the time bandits, that is, reduce delays and score more "TD's" ... through better communication...	Scoreboard Graphic: "BEAT THE BANDITS" Scoreboard:"COMMUNICATION", insert of crew talking (6:11:01)
14.	... cross training ...	Scoreboard:"CROSS TRAINING", insert of crew member demonstrating something to another (9:08:38)
15.	... and teamwork.	Scoreboard:"TEAMWORK", insert of crew members assisting each other (10:15:11)

Jhnre master 3/14
CH-1 ~5

EDIT DECISION LIST

Page # 1 of 7

Title *Productivity in Mech. Log. Ops.* | Editor *J. Hino* | Contract *Braulien, Olson, et al.* | Notes *DRAFT* | Date *1-26-86*

Reel #	Source In	Source Out	Record In	FX	Dur	V	A	Scene Description
			00:00					LS Pass Play (UP MUSIC) UP CROWD
FBT1	36:34:23		14:28					CU Scoreboard SFX
FBT1	26:32:00		18:08					MS Cheerleaders
								MS Football - hand off
			22:27					MS Coach
FBT1	26:35:23		24:10					Zoom out from huddle/break
FBT1	36:10:17		27:00					MS - TD in progress (QB runs at cam)
T9	9:11:41:17	9:11:48:28	32:07					LS - Logging op w/ Lee ? in FG. Dalumber/shoddor OS
G			39:18					Graphic seq. 1 Blank
G			41:02					G: 2 TD!
G			42:14					G: 3 TRUCKLOAD delivered
T15	15:10:36	15:14:30	49:12					LS - F/B talking
T11	11:07:03:08	11:07:05:08	53:06					XCU - truck driver (cab interior)
T4	4:05:06:10	4:05:10:—	55:06					MLS - Truck passing
FBT2	1:51:24:06	1:51:26:05	59:05					G: overlay - crowd cheers w/ scoreboard "GO TEAM"
FBT2	1:29:40:02	1:29:42:16	1:01:19					G: overlay - Coach w/ scoreboard "Shake it off"
T10	10:15:34:08		1:03:20					CU - Zoom out from cab top w/ repair work
G			1:09:00					G: overlay on freeze frame of above: "Time out" Scoreboard
FBT1	1:16:25:13	1:16:38:08	1:14:26					LS: football play
(G)			(1:16:04)					(G: overlay TIME BANDITS)
FBT1	1:17:15:16		(3:25 duration)					CUTAWAY: MS end of play
	24:—		1:~~29:25~~					
G			1:27:17					G: Scoreboard - blank
G								G: " "beat the bandits"

Appendix VIII: Excerpt from an Edit Decision List (EDL)

Appendix IX: Example of a Video Evaluation Questionnaire

PRODUCTIVITY IN MECHANIZED LOGGING --- EVALUATION QUESTIONNAIRE

	strongly disagree				strongly agree
CONTENT ELEMENTS (50%)					
1. This film accomplishes its stated objectives.	1	2	3	4	5
2. This film can be an effective tool for training equipment operators.	1	2	3	4	5
3. This film is well suited to its intended audience (loggers).	1	2	3	4	5
4. The material is understandable, well organized, and flows well.	1	2	3	4	5
5. The critical components of the film's theme are well emphasized.	1	2	3	4	5
6. The technical aspects of the subject matter are correctly portrayed.	1	2	3	4	5
7. The quantity of information presented is appropriate, not too much or too little.	1	2	3	4	5
8. Overall, I have a favorable impression of this film.	1	2	3	4	5
CREATIVE ELEMENTS (30%)					
1. The medium of film is appropriate for this subject.	1	2	3	4	5
2. The script is interesting and well-paced.	1	2	3	4	5
3. The film shots are well selected and integrated with the script.	1	2	3	4	5
4. The graphics are effectively used and help convey film content.	1	2	3	4	5
5. The football metaphor is appropriately used and attracts viewer interest.	1	2	3	4	5
6. The "5 B's" are an effective tool for emphasizing film content.	1	2	3	4	5

7. Big Bonus Question. List the 5 B's that you can remember.

1. 2. 3. 4. 5.

PRODUCTION ELEMENTS (20%)					
1. Camera focus and lighting are well done.	1	2	3	4	5
2. The film audio was clear and undistorted.	1	2	3	4	5
3. Cuts between film scenes are smooth and not distracting or annoying.	1	2	3	4	5
4. The graphics are clear and easy to understand.	1	2	3	4	5
5. The program length is appropriate and doesn't drag on.	1	2	3	4	5

PLEASE USE BACK OF THIS PAGE TO MAKE SUGGESTIONS OR CONSTRUCTIVE CRITICISMS ON WHAT YOU FEEL ARE KEY AREAS OF THIS PROJECT.

SUMMARY OF EVALUATION QUESTIONNAIRES - PRODUCTIVITY IN MECHANIZED LOGGING - OSU SEMINAR - 6/1/88

	CONTENT ELEMENTS								CREATIVE ELEMENTS							PRODUCTION ELEMENTS				
RESP.	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	1	2	3	4	5
1		5	5	5	5	5	5	5	5	4	4	4	5	5	5	5	3	4	5	5
2	4	4	4	5	5	5	5	5	5	4	4	4	5	5	5	5	4	4	4	4
3	3	3	4	4	4	3	4	4	3	4	4	4	2	4	2	3	4	3	3	4
4	4	4	4	5	4		4	5	4	4	3	4	5	4	5	4	3	4	4	4
5	4	3	4	3			4	4	4	4	4	4	5	4	5	5	3	3	4	3
6	4	4	5	4	5	3	4	4	4	3	4	4	5	4	3	3	3	3	4	3
7	5	5	5	5	5	5	4	5	5	5	5	4	5	5	5	4	4	5	4	4
8	4			5	5	4	4	5	5	4	5	5	5	5	3	5	4	3	4	5
9	4	4	4	3	5	5	4	5	5	4	4	5	5	5	4	3	4	4	4	3
10	5	2	4	5	5	4	4	5	4	5	5	4	5	5	4	4	3	5	5	5
11	4	4	4	4	4	4	4	4	4	3	4	4	3	5	4	5	3	4	4	4
12	4	3	3	4	5	3	3	4	4	3	4	4	4	5	5	3	4	4	5	3
13	4	4	3	4	4	4	4	4	4	4	4	4	4	4	5	4	2.5	4	3	4
14	4															4	3	4	4	4
AVG	4.07	3.75	4.08	4.30	4.66	4.09	4.07	4.53	4.30	3.92	4.15	4.15	4.46	4.61	4.23	4.07	3.39	3.85	4.07	3.92
%	(sum of avgs)/(total possible)							0.83							0.85					0.77

WEIGHTED INDEX 0.83