FUTURE FORESTS RESEARCH

HARVESTING TECHNICAL NOTE

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USING VIDEOS FOR TRAINING – BREAKING OUT

Summary

Vocational training material is usually presented in written form and can be difficult for people to understand and learn from. Most of the concepts are visual and dynamic and are best portrayed in multimedia (video and sound). This project aimed to study best practice in the breaking out phase of cable harvesting, and investigate the potential of video to offer improvements in task training. Short duration videos ("video clips") of 18 "breaker outs" were collected from different breaking out operations, and presented an opportunity to create a new video resource to fit with current training programmes in breaking out for cable harvesting.

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INTRODUCTION

Short videos with audio, also known as "video clips" or "multimedia", are frequently used by organisations, as visual presentations or on their websites, to help explain or promote their services. Video clips are also used for educational purposes and maintenance guides (Tiernan & Grudin 2000, Brinkman *et al.*, 2001). The use of video clips for the visualisation of financial information and video conferencing has also been noted (Records & Olinsky, 1998, Panteli & Dawson, 2001). The video-sharing website "YouTube" holds numerous video clips of training material, uploaded by individuals and organisations offering their material via the site.

Improved Understanding

The greater the number of ways we receive information, the less uncertainty and ambiguity there is about that information. Video is appealing, and it is thought that the success of television advertising owes much to this (Christie & Collyer, 2008). Video seems intuitively to offer immediacy and a singular ability to focus attention on its subject (Meisel, 1998). There are advantages in including a visual component in communication, supporting the principle that combining words and pictures can be more effective in facilitating learning than using only words (Mayer, 2001).

A multimedia system has been designed to train quantity surveyors to prepare cost estimates for building projects. Feedback was that the system benefited users by being able to provide visual images (e.g., of different types of wall), along with additional explanations in the form of voice and video clips (Shen *et al*., 2001).

Studies have also demonstrated that video helps in the understanding of material. In a study of 11- to 23-year-olds, the subjects could remember more from news stories seen in the original video form than if they were presented in print only (Furnham *et al.*, 2002). A multimedia presentation was found to be more effective in promoting learning than the same presentation with all the multimedia elements removed except for the text and speech (Faraday & Sutcliffe, 1997).

One study measured the effectiveness of video (and audio) over audio only in presenting the results of industrial research and development. It was found that viewing video (with audio) rather than audio only resulted in more interest in the material, and the users felt more confident that they could answer questions about the material. It was concluded that it is valuable to test video clips on prospective users rather than rely on assumptions about how the clip will be received, based on experience and judgement, which may not be good enough (Christie & Collyer, 2008).

Video for Training

Video can also be useful for training purposes. Video-based training modules have been developed to help prepare learners for various skills prior to having to apply those skills in an actual work environment. For example, video

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has been used in an operating theatre to help train medical staff (Guerlain *et al.,* 2004).

Video learning materials are becoming a significant resource for online teaching. A recent edition of *Science* magazine described a system using video to enhance online teaching of environmental science by the Harvard-Smithsonian Centre for Astrophysics. They found video was good at showing students the "messiness" of real-life work. All too often instruction assumes that students build knowledge sequentially, in a linear, hierarchical manner that mirrors the design of traditional textbooks and lectures. In real life, however, we tend to advance our understanding through a process that is much more haphazard and random. Videos that show real people grappling with real problems put a human face to work and make it more understandable (Schneps *et al*., 2010).

Videos give students an opportunity to "tag along on virtual visits" to the field or the research laboratory, to expose them to a level of "messy" peripheral detail that is essential for learning. Videos define a broad, visual context that serves as alternative to the linear structure defined by textbooks, to help learners make sense of ideas they may only partially understand (Driver *et al.,* 1985).

The forest industry training organisation, FITEC, currently has video training material available on subjects including chainsaw maintenance, crew safety culture and safe tree felling procedures. Video footage is also used during assessor workshops as an assessor training tool.

This project aimed to study best practice in the breaking out phase of cable harvesting and investigate the potential of video of breaking out operations to offer improvements in task training.

METHODS

The video clips collected in this study differed from conventional video material in that the video was collected from helmet-mounted cameras (Parker, 2010). In conventional video training, the subject of the video is a person who appears as an actor in the scene, demonstrating how to do a task or how to react to a particular situation as if it were happening to them. Helmet camera video differs in that the view captured is in the first person (the view of the "actor"). The viewer of the video now becomes a participant in the situation and sees the world as the camera operator does (Omodei & McLennan, 1994).

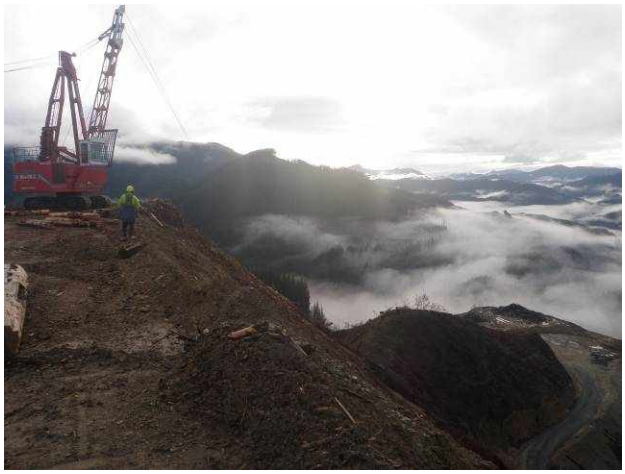

Figure 1: Swing yarder operating in steep country.

In steep country harvesting operations (Figure 1), tasks such as breaking out, where tree stems are hooked to moving cables, cannot be filmed satisfactorily by a conventional hand-held video camera. The camera operator would get in the way or not be able to get close enough to capture the action safely. Head-mounted or helmet-mounted video cameras solved this problem.

Each harvesting crew was visited for a morning or afternoon work session, the reasons for the study were explained, and informed consent was obtained.

Two breaker outs at each crew were fitted with small video cameras (HQR II or PV-500 devices) worn either in front of the left ear or attached to their helmets (Figure 2).

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The video recorder was carried in the breaker out's backpack and video was collected. A microphone was attached to the shoulder strap of the backpack and recorded audio.

Figure 2: Breaker outs wearing video cameras

At the end of the work period, usually two to three hours, the video equipment was retrieved and the video files were saved to a computer. The video files were then scanned to find relevant clips which could be used for training purposes.

A total of 18 breaker outs were visited in the study, and approximately 40 hours of video were collected.

Specific parts of the breaking out task were the focus of the study:

- Approach to the butt rigging – did the breaker outs wait until the rigging stopped moving?
- Hooking up – how did the breaker outs hook up wire rope strops or chains?
- Retreat distance from the drag.

RESULTS

The wearable cameras provided good quality video of the breaking out operation. Video was viewed to gain an impression of the breaking out techniques used. A detailed task analysis of the video data will be reported in a later publication.

Approach to Rigging

The approach style of breaker outs to the cable rigging could be recorded from their wearable cameras (Figure 3).

Figure 3: Breaker out's view of the butt rigging as captured by the wearable camera.

The Best Practice Guidelines for Cable Logging (Cable Logging BPG) recommends that breaker outs walk in to the strops (FITEC, 2005). Approaching too close before the rigging had stopped moving could be seen from the video on some occasions. Similarly, good approach technique – waiting for the rigging to stop moving dangerously – could be viewed in the video. The video also showed that breaker outs occasionally ran or walked very quickly to attach strops or chains.

Hooking up

In this study breaker outs used three different types of strops: chains, wire rope with manual chokers, and wire rope with electronic chokers. Video of each type was recorded. Figure 4 shows the breaker out using chain strops.

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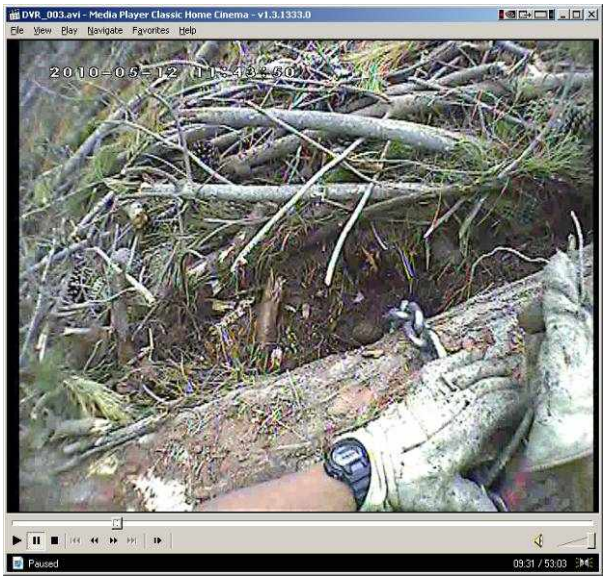

Figure 4: Breaker out hooking on with a chain strop.

Hooking on techniques under a range of conditions could be seen clearly in the video. If the stem was lying flat on the ground, digging under the log was often required. Occasionally a stick would be used to hold the choker closed

Hooking on practices generally followed those recommended in the Cable Logging BPG. Hook on position was the only activity that differed from that suggested in the Cable Logging BPG, which states "…strops must be attached approximately 1 m (1½ times the butt diameter) from the end of the stem". In this study strops were commonly attached further than 1 m from the end of the stem.

Retreat from Drag

Best practice requires that prior to signalling cable extraction, breaker outs are to retreat uphill and preferably behind the drag. While they are doing this they must take care in walking to minimise the chance of dislodging rocks that may fall on co-workers.

From the video (Figure 5) it was difficult to judge the actual distance that breaker outs retreated from the drag. However they did try to keep the stems in view as they were being broken out, which resulted in breaker outs standing apparently close to the moving drag.

Figure 5. View of drag after retreating.

Limitations of the Study

This is the first time a study of cable breaking out using wearable cameras has been attempted. Camera placement was commonly problematic. Some video was unusable because the helmet- or head-mounted video camera was dislodged and did not capture the activities of the breaker outs. For example, some breaker outs' hands could not be seen so hooking on was not recorded.

Water droplets and pine gum on the camera lens also degraded some images, making them unusable. Two cameras on each person, one on the helmet and one on the shoulder, as used in an earlier study of tree felling (Parker, 2010) would have provided a greater field of view. Video images have no depth of field so it was difficult to estimate the distance that breaker outs retreated.

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RECOMMENDATIONS

- Training material must be easy to follow and hold the trainee's attention. Video has been proven to do this, and video can be used to reinforce knowledge of critical aspects of the job. For example, video of breaking out could be used to show trainee breaker outs that some tasks will take time and there is no short cut, such as waiting to one side until the rigging is lowered or stops swinging before grabbing the strops.

- The video must be of short duration. Video clips of 1.5 to 4 minutes duration have been reported as the ideal length for training pharmacy students (Flowers *et al.,* 2010).

- Choosing appropriate video clips can give context to the training information by showing what happens before and after each task. For example, it shows best practice – the correct and safe way to approach, hook on logs and retreat from the drag before it is broken out. It also shows the amount of digging required and how long it takes to get a strop around a difficult log, rather than the task being isolated from the rest of the operation.

- An online training process is currently being trialled by FITEC which includes the use of video to support the learning process. FITEC is committed to investigating the use of different learning media including video, and how these can best support the learning experience of FITEC trainees, who are often learning on-job in remote locations.

- The video resource from this study is available to FITEC to complement the material in the FITEC Best Practice Guidelines and other training guides available to breaker outs. The video clips need to be trialled with trainees to ensure the material is presented in the most effective way.

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