FUTURE FORESTS RESEARCH

HARVESTING TECHNICAL NOTE

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A Piece Counter for Monitoring Production

Summary

Some hauler operators use a paper-based shift level recording system to record delays and their daily production by counting butt stems or logs and top pieces. In addition, some electronic dataloggers require input generated from another device in order to count these values. A push-button counter or Production Display Unit (PDU) was developed by Scion to provide butt log and top count data input either for a datalogger, or for paper-based shift level recording. The PDU is based on a low cost LCD (Liquid Crystal Display) and programmable chipset. The PDU could also be used to display other information such as elapsed time, cycle time and eventually, haul distance. A MultiDAT datalogger, a digital control system, and a cable counter currently in use in New Zealand, are described.

Authors

Tony Evanson and Andy Tuthill, Scion

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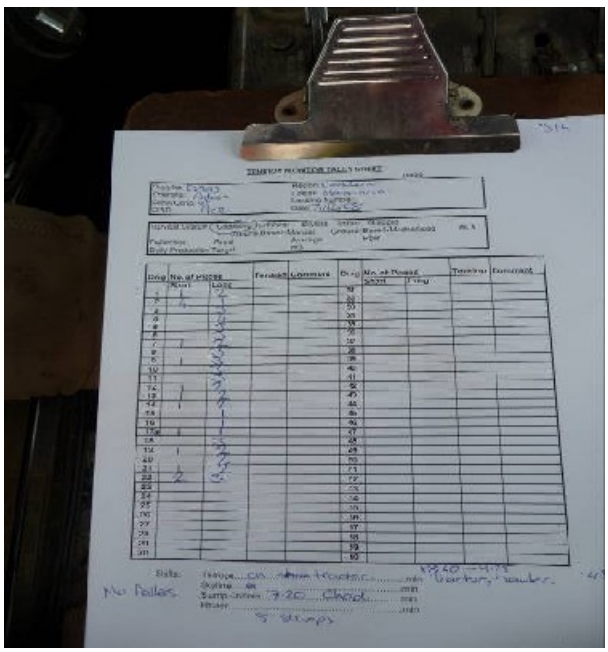

Fig.1 A daily production record sheet

Introduction

Hauler productivity and its measurement has been the focus of research efforts, historically by LIRO, and more recently, by Future Forests Research Ltd. A number of devices or systems are becoming available to supply information that could be used by equipment managers and planners to better manage machines. These range from satellite or radio-linked on-board computers (e.g., Matris, Komtrax), retro-fitted dataloggers (MultiDAT), controller systems (e.g., on Waratah processors) to a simple counter display, the subject of this technical Note.

Some hauler operators record shift level data (daily production and delays) on paper forms (Fig. 1). Number of butts and tops are recorded for each haul. This information is used to make sure that the crew is on track for reaching its daily target (number of butt logs x average piece size from pre-harvest assessment = volume production). Recording butts and tops manually means that the hauler operator will be reaching for the recording pad and pen every production cycle, which may not be feasible.

Some dataloggers, including the MultiDAT (Davis and Kellogg, 2005), require input pulses from another device in order to count variables such as butt logs, top pieces and cycles.

A MultiDat datalogger unit (Fig.2) has been evaluated for use in haulers, and has been found to require a separate input device for the recording of number of hauls, butts and top pieces (Evanson, 2009). A set of push buttons providing the required pulses seemed to be the solution to this problem. However, the addition of an LCD to show the count of pieces was also seen to be useful, so was included in the design.

Future Forests Research Ltd, PO Box 1127, Rotorua. Ph: 07 921 1883 Email: info@ffr.co.nz Web: www.ffr.co.nz

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The electronics in the LCD chip could also enable the recording and display of other information such as haul distance.

Fig.2 A MultiDat Senior datalogger

Method

A display, and piece data entry device (PDU) (Fig. 3) was constructed at Scion to be used as either a front-end device for piece counting by a datalogger, or a stand-alone piece counter to be used in conjunction with shift-level recording.

- Electronics engineers at Scion were consulted about the design and the hardware to be used.
- Functions of the counter are based on shift-level recording requirements.
- The prototype was tested in a tower hauler operation and the operator's comments noted.

Design detail

The PDU (Fig. 3) consisted of a battery-powered LCD and was developed with the following functions:

1. Count and display of number of hauls
2. Count and display of number of butts hauled
3. Count and display of number of top pieces hauled
4. Elapsed time
5. Time since previous haul button depression (cycle) – current value only
6. Output (if required) of haul/butt/piece pulse data to a datalogger or other display.

The PDU can also be programmed to accept data from length-measuring devices.

Using the PDU

The hauler operator pushes 4 buttons in succession, recording hauls, butts and pieces. The PDU has a haul count button, a + and – button, and an enter button.

Fig.3 The prototype PDU.

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Results

- The hauler operator said the counter proved useful and totals were recorded later on paper. The buttons were easy to use and avoided the task of adding individual butt and top entries.
- The hauler operator found that initially the number of butts displayed would not exceed 100 and the display would then re-set. This will be corrected in the prototype by extending the fields to 3 digits.
- If the Enter button was held down, a setup menu would appear, which was unintended. The chipset will be re-programmed to prevent this.
- The operator needed a stopwatch function to record ropeshift delays and used the Haul button and the Cycle display to achieve this. A stopwatch function will be added to the prototype.

Conclusions

There are a number of display systems available for use in haulers. These can provide various types of information, depending on the data captured or the functions being controlled. The Scion PDU provides information on butts and top pieces collected over time. It is foreseen that hauler operators will find the unit easy to use, and the information useful. This would be improved if haul distance can also be monitored and displayed through the unit.

Further development of the PDU will depend on the results of continued field testing and the comments of users.

References

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