

COMPUTER MONITORING OF TRUCK PERFORMANCE

This paper is presented on behalf of Pan Pacific Forest Industries (N.Z.) Limited (Pan Pac) by the Log Transport Superintendent (Mr Neil Weber).

COMPANY OPERATION OUTLINE:

Pan Pac is an integrated Pulpmill/Sawmill located at Whirinaki on the North Island's East Coast, 16 kilometres North of the city of Napier.

The mill currently uses approximately 500,000 tonnes of logs per annum.

The Log Transport Department of Pan Pac transports this volume to the mill as well as providing log transport services to other forestry companies, forest owners and other mills. The total volume per annum transported is currently around 750,000 tonnes.

Pan Pac operates eleven of its own logging trucks as well as contracting log transport owner operators. In late 1992 three new logging trucks were purchased and fitted with on-board computers (vehicle and driver performance monitoring machines).

ON-BOARD COMPUTERS - (O.B.C.'s)

O.B.C.'s are basically the adaption to the trucking industry of the aviation industries flight information recorder (black box). There are several brands currently available to the transport industry. Pan Pac uses the Stemco unit which is available in New Zealand from Advanced Transport Systems in Auckland. While they may be fitted to any make or model of truck or engine they are particularly suitable to fitting to electronic engined trucks. Pan Pac's three new units run the Cummins "Celect" electronic engines and connection involves simply wiring into the engines E.C.M. (Electronic Control

Module).

The O.B.C.'s automatically monitor and record a huge amount of information and can produce a large amount of reports as required by the user.

The information is recorded onto a cassette similar to an audio cassette which is carried within the unit in the cab of the truck. The unit can store information when the cassette is not in the unit. Downloading is done by removing the cassette, with the truck switched off, and putting the cassette into a reader that is connected to a P.C. Downloading takes 15-30 seconds after which the cassette is then "clear" and is put back into the truck.

Appendix I is an example of one of the many reports (Basic Trip Summary) showing some of the information recorded:

WHY FIT AN ON-BOARD COMPUTER?

O.B.C.'s are particularly suitable for fleet owners (and owner operators where another driver is used). They give the fleet manager information on the current performance and operation of the units far in excess of the normal historical data (ie., fuel figures, tyre life etc) usually used by fleet managers who do not use O.B.C.'s. From this information, assessments can be made and standards may be set.

The potential for improvements and savings as a result of the O.B.C.'s is then relative, in the first instance, to the quality of the drivers and secondly how the information generated is then used. This type of information (in such detail and availability) is not possible without an O.B.C.

BENEFITS AND POTENTIAL FROM O.B.C. INFORMATION

It is possible that all an O.B.C. may show you is that you have employed top quality operators to drive your units

and that they are achieving the most efficient economical operation possible of the units. If this is the case then the information from the O.B.C. can be used as the standard to set for any future drivers employed.

If this is not the case, and almost certainly in a fleet operation it will not be, then definite operational improvements and savings are possible.

Operators who run set runs all the time have the best opportunity to do direct comparisons of different drivers and set goals and standards. In logging where trips differ so much and change regularly this is not so easy. However one area that can be constant, regardless of terrain, is the time spent in different rev ranges (excluding engine brake use). This is the area that Pan Pac monitors the most as it is critical to the most economical use of electronic engines.

Appendix II is a report that quickly indicates R.P.M. ranges (engine speed histogram).

By using the information from an O.B.C. transport managers may introduce incentive based payment or bonus schemes. Schemes could be based on achievements by operators on such items as:

- ◇ percentage of revs in a predetermined R.P.M. range
- ◇ percentage of travel under brakes
- ◇ percentage of idling time

Pan Pac has found O.B.C.'s useful in providing more information on the operation of its units than has been historically available. Some beneficial information has been obtained on fuel figures and braking time from the different roads and forest that are used to provide the mill with logs. The effect of two way loading on costs has been easily obtained through the O.B.C.'s. Extreme detail on the previous one kilometre of travel is also available in

the event of an accident.

Futuristic uses may include:

- ◇ The substitution of the drivers logbook with the O.B.C.
- ◇ Negotiation of lower insurance premiums as a result of the unit having an O.B.C.
- ◇ The combining of an O.B.C. with G.P.S. or radio telephone for downloading information.
- ◇ The rating of log haulage trips for cartage payment purposes from the O.B.C.'s information.

SUMMARY:

There is no doubt that O.B.C.'s are suitable to many transport operations in New Zealand. The question transport managers should ask before deciding whether to fit O.B.C.'s is, "Is the information required and will it be used?" If the answer to both questions is "Yes", then evaluate what is required from the O.B.C. and be sure to purchase the type that suits the operation and provides the information needed.

Basic Trip Summary

PAN PAC. MAIN ROAD.WHIRINAKI NAPIER	Driver: Vehicle: Route:	Report Date: Mar 28 94 Report Time: 3:19 PM Trip Dates: Mar 20 94 - Mar 28 94
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Time Totals	HH:MM	Pct
Total Trip Time	188:29	100.0
Time in Motion	53:01	28.1
Total Leg Time	53:53	28.6
Non Driving Time	134:36	71.4
Engine On Time	60:45	32.2
Engine On Time	60:45	100.0
Total Idle Time	7:44	12.7
Stop Idle Time	5:16	8.7
Overrevving Time	0:07	0.2
Driving Idle Time	2:28	4.1
Lugging Time	1:25	2.3
Off Road Ovrv Time	0:00	0.0
Time in Motion	53:01	100.0
Speeding Time	0:17	0.5

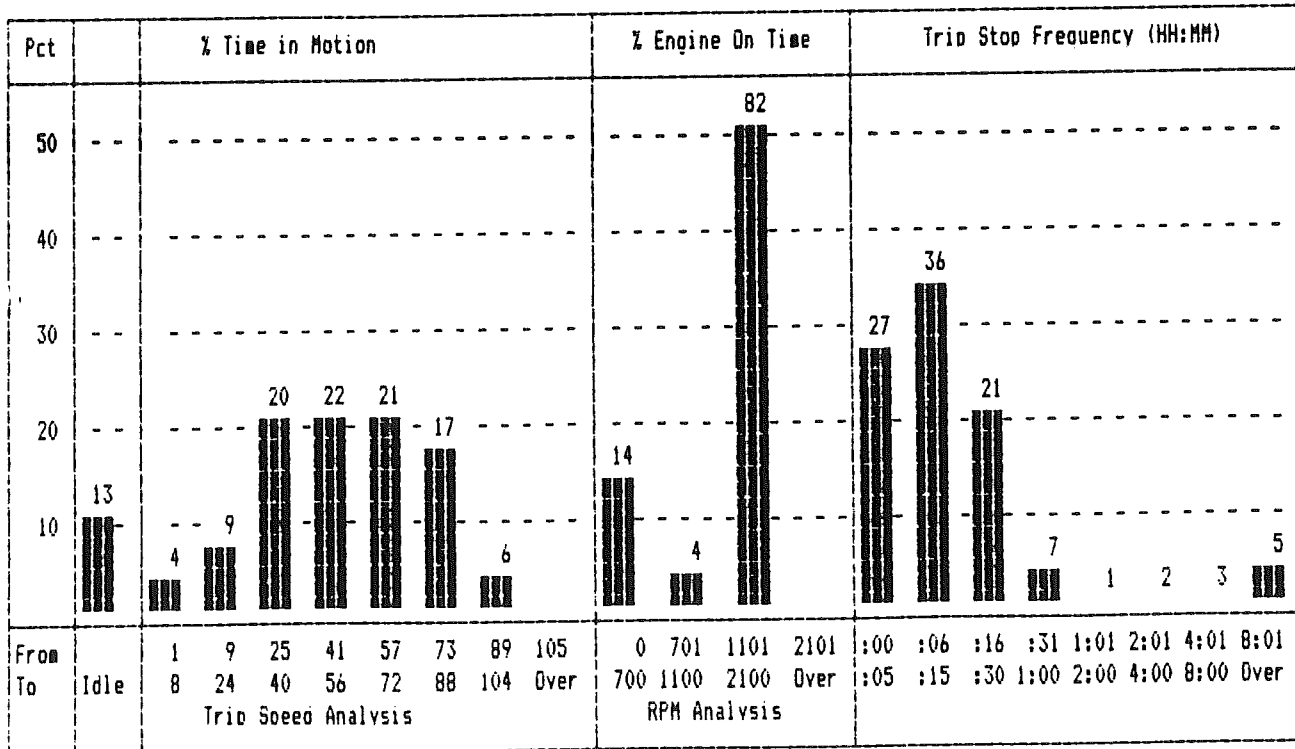
Event	Count	Duration
Engine on	165	59:21
Inout B	0	0:00
Foot brake	2300	4:04
Eng brake	3544	6:56
Inout E	0	0:00
Inout F	0	0:00
Brakes	2583	18:49
Off Road	0	0:00
Hard Brakes	4	0:04

Trip Statistics	Value
End Odometer	151773.6
Start Odometer	149026.0
Trip Distance (Km)	2747.6
High RPM	2208
High Speed	102
Average Speed (KPH)	51.0
Fuel Purchased (LIT)	0.00

Driver	Grade	Criteria
605	91	STANDARD

FuelCoach Statistics	Liters
Total Fuel Consumed	1862.80
Off Road Fuel Consumed	0.00
Stop Idle Fuel Consumed	15.56
Actual L/100Km	67.80
Fuel Consumption Rate	30.66/hr

Fleet Speed Limit: 95 (KPH)



Comments:

N.Z. Logging Industry,
 Research Assn. Inc.
 P.O. Box 147,
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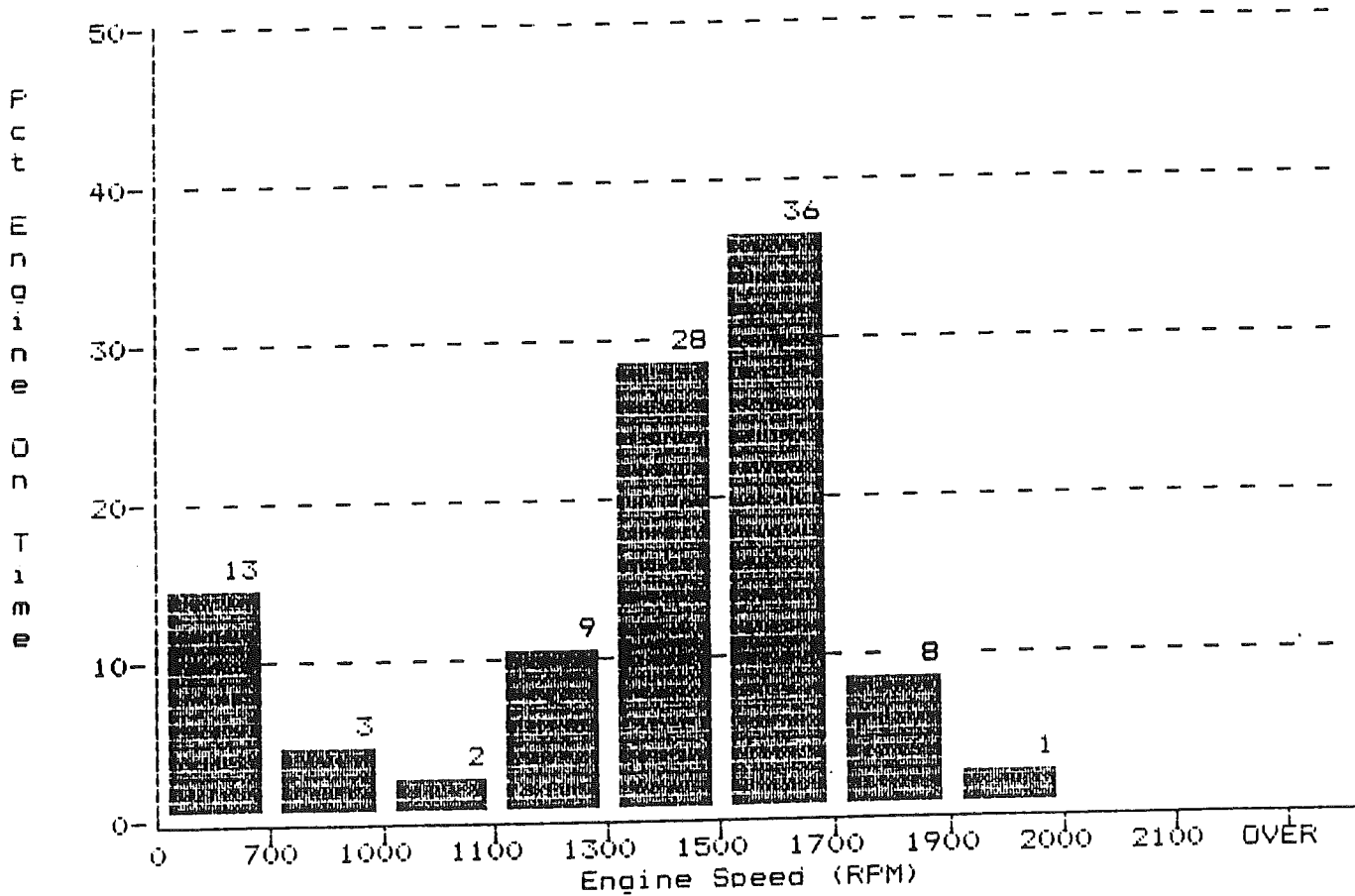
Trip : 940328015401

MM # 14614

Engine Speed Histogram

PAN PAC. MAIN ROAD, WHIRINAKI NAPIER	Driver:	Report Date: Mar 10 94
	Vehicle:	Route:
		Report Time: 9:44 AM
		Trip Dates: Mar 09 94 - Mar 10 94

Engine Rev Limit: 2100



Speed (RPM)	Pct	Time (HH:MM)	Speed (RPM)	Pct	Time (HH:MM)
0-700	13.20	0:26	1501-1700	36.04	1:11
701-1000	2.54	0:05	1701-1900	8.12	0:16
1001-1100	2.03	0:04	1901-2000	0.51	0:01
1101-1300	9.14	0:18	2001-2100	0.00	0:00
1301-1500	28.43	0:56	2101-OVER	0.00	0:00

	HH:MM	Pct		HH:MM	Pct	Driver Grade	
Total Trip Time	16:42	100.00	Total Idle Time	0:22	11.17	Grade: 96	Criteria: STANDARD
Time in Motion	2:55	17.47	Stop Idle Time	0:15	7.61		
Total Leg Time	2:52	17.17	Driving Idle Time	0:07	3.55		
Non Driving Time	13:50	82.83	Overrevving Time	0:00	0.00		
Engine On Time	3:17	19.66	Speeding Time	0:10	5.71		