

January 1990

Field Note N°: Trucking-15

Previous Reference Sheet N°: None

JAN 22 1990

LIBRARY  
BIBLIOTHEQUE

## "JUDGE" KNUCKLEBOOM LOADER SCALE

### BACKGROUND

With the advent of tougher legislation and stricter enforcement of the maximum legal gross and axle loads allowed on public roads, it is becoming increasingly important for log haulers to find systems that will weigh their loads at the loading site. One such method is the loader-mounted Judge Knuckleboom Loader Scale (KBLS) manufactured by Allegany Technology Inc. of Cumberland, Maryland and distributed in Canada by Timberjack Inc. Recently, FERIC saw a "Judge" in operation for Abitibi-Price in Thunder-Bay, Ontario and attended a demonstration of the scale given by Timberjack in Ste-Foy, Quebec.

### DESCRIPTION

The KBLS Judge is specifically designed for Prentice loader models 180 to 625. It is also available in a retrofit package for any Prentice loader with a 2 1/16" pin on the grapple knuckle. This same retrofit package can also be installed on other makes of loaders, but the grapple and stick boom may have to be modified to accept the Judge knuckle cell.

The Judge has two main components, the knuckle cell and the MEGA 8 computer. The knuckle cell (Figure 1), which does the actual weighing, is a strain gauge load cell that is mounted by pins between the stick boom and the grapple, replacing the usual grapple knuckle. The

MEGA 8 computer (Figure 2) can be mounted anywhere in the cab within easy reach of the loader operator. Usually, it is mounted on the roof of the cab with a slide-mount bracket for easy installation or removal. The MEGA 8 can be accessed through a keyboard by which data such as the payload of the truck can be entered or commands executed. As well, a remote toggle switch, usually mounted on a boom control lever, is used for entering grapple weights during the loading cycle.

### INSTALLATION COST AND TIME

The model that was observed in operation at Abitibi-Price was installed on a Case 8250 loader by the local Timberjack dealer at a total cost of \$12 285, of which \$9 470 was the cost of the unit plus the regular installation cost for a Prentice loader. The remaining cost was for the machining and welding needed to adapt the loader to the unit (\$2 332) and for calibration by the service representative (\$483). The total time of installation was 16 hours. The major modification was redesigning the nose piece on the boom to accept the knuckle cell.

### OPERATION

The actual operation of the unit is quite simple and, according to both the manufacturer and Abitibi-Price, does not significantly affect loading time. Weighing of

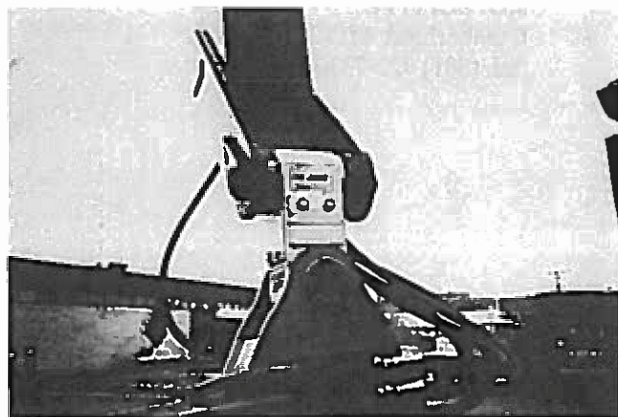


Figure 1. The knuckleboom load cell.

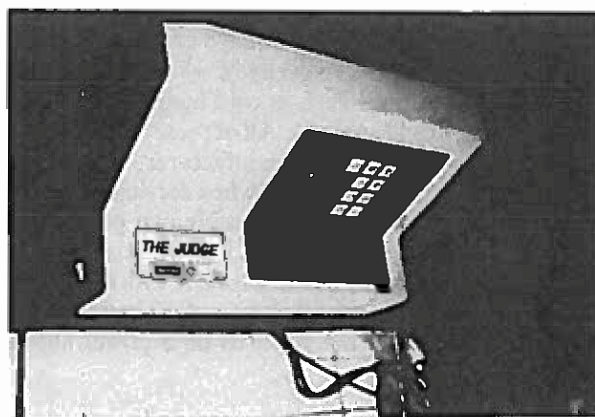


Figure 2. The MEGA 8 computer.

the grapple loads can be done "on the fly" but a smooth and constant swing of the grapple is needed and some practice is required even by experienced loader operators to acquire the proper technique. The basic requirements are that the scale system be turned on at least two hours prior to use to warm up the circuits, that the loader be on relatively flat ground, and that any factors which may affect the weight reading, such as wind intensity, are not excessive.

Before loading a trailer, the empty grapple weight is zeroed and the total desired payload is entered into the MEGA 8. From that point on, each grapple load weight is deducted from the total entered and the remaining balance is displayed to the operator. Excessive payloads are displayed as negative numbers. Grapple load weights are entered into the system by pressing the toggle switch during a steady swing of the grapple from the wood pile to the trailer. The MEGA 8 beeps when the toggle switch is pressed and beeps twice when it receives a steady signal from the load cell, usually within two seconds. Finally, it beeps twice again after the grapple load has been released and the system is ready to receive another weight.

## EVALUATION

Prentice/Omark Industries ran the Judge through extensive factory testing, consisting of more than three million loading cycles, to ensure that the calibration does not drift and that the scale is accurate. This accuracy was borne out at the Timberjack demonstration in Ste-Foy, Quebec. After rectifying an installation problem on the first day of the demonstration, the scale recorded weights within -0.3% and +0.7% of those measured on a nearby tractor-trailer weigh scale.

Field testing of the Judge has been ongoing at Abitibi-Price in Thunder Bay for several months. This was one of the first retrofit installations on a non-Prentice loader. They have reported acceptable scale accuracy when the unit is functional but have experienced a few start-up problems, the majority of which were caused by climatic conditions such as cold temperatures, high humidity and bright sunlight. All of these were resolved with assistance from the manufacturer. They also found that one must be careful when servicing or greasing the grapple since the cell cable can be pinched when laying the grapple down. Finally, Abitibi-Price have been having some problems of late with the display screen of the MEGA 8 blacking out. They have not resolved this yet but believe it to be a power supply problem.

Overall, Abitibi-Price are very satisfied with the unit. They have found that the accuracy is quite adequate (better than 1%) when the scale is operable, and that

once the operator familiarized himself with the unit, no significant time was lost in the loading operation. Abitibi-Price say that if the long-term reliability of the unit can be established, they would seriously consider purchasing other units.

## CONCLUSIONS

Considering the manufacturer's claim plus the results of Abitibi-Price's trial and the Timberjack demo, there is little doubt as to the accuracy of the unit when properly installed and operated. There still remain some questions, however, about its long-term reliability in forest operating conditions. If adequate reliability can be established, loader-mounted scales, like the Judge, may prove to be a cost effective way to meet gross vehicle weight restrictions and, perhaps, axle group weight restrictions.

## INFORMATION

The information contained in this report is based on limited field observation and is only published to disseminate information to FERIC member companies. It is not intended as an endorsement or approval by FERIC of any product or service to the exclusion of others that may be suitable.

More information may be obtained from your local Timberjack representative or from:

Mike Chadwick, Mechanical Superintendent  
Abitibi-Price Inc., Lakehead Operations  
P.O. Box 2510  
Thunder Bay, Ontario  
P7B 5E9  
Tel. (807) 683-6235

Paul Stern  
Allegany Technology Inc.  
P.O. Box 1744  
Cumberland, MD 21502 USA  
Tel. (301) 722-7330

Jan Michaelsen, B.Sc.F.  
Secondary Transportation, Eastern Division

Wayne A. Williams, Eng., M.Sc.FE  
Secondary Transportation, Eastern Division