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CENTRE CANADIEN DE RECHERCHES POLICIERES

TM-20-93 ***Electronic Measuring Device***

By Sergeant G. Genereux

TECHNICAL MEMORANDUM

Submitted by
Royal Canadian Mounted Police
Grande Prairie Forensic Identification Section

March 1993

NOTE: Further information
about this report can be
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SUMMARY

The Royal Canadian Mounted Police Forensic Identification Section in Grande Prairie, Alberta conducted an evaluation of two different electronic measuring devices during the latter part of 1992.

Two instruments, the Dimension Master Plus and the Sonin 250, were purchased from Butler Survey Supplies in Edmonton. They were used indoors, and in all types of weather conditions out of doors.

The Dimension Master Plus, although very accurate, was found to be impractical for typical police work. The Sonin 250, on the other hand, proved to be more effective for police applications.

RÉSUMÉ

La Section de l'identité judiciaire de la Gendarmerie royale du Canada de Grande Prairie (Alberta) a évalué deux appareils de mesure électroniques dans les six derniers mois de 1992.

On a acheté les deux appareils, le Dimension Master Plus et le Sonin 250, de l'entreprise Butler Survey Supplies d'Edmonton. On les a utilisés à l'intérieur et à l'extérieur dans diverses conditions météorologiques.

Le Dimension Master Plus est très précis mais ne convient pas au travail policier. Le Sonin 250 est plus approprié à cet égard.

ELECTRONIC MEASURING DEVICE (POCKET TYPE)

1. A field evaluation of this type of equipment began in June 1992. This evaluation continued until December 31, 1992 in order to test the instruments during outdoor winter conditions.
2. Two different instruments were purchased at Butler Survey Supplies in Edmonton. Product code # 3015.3302, Dimension Master Plus sonic measuring device was purchased for \$187.95, and product code # 3015.250, Sonin 250 was purchased for \$199.95.
3. The Dimension Master Plus is a combination tapeless measuring instrument/full dimensional calculator manufactured by Calculated Industries Inc. of Yorba Linda, California. This unit uses 3 Polaroid ultrasonic sensors and sends out an inaudible narrow ultrasonic beam of sound that bounces off the target surface and returns to the unit as an echo. It then determines how long it took for the echo to return and converts this information into linear distance. Temperature variations are taken into account automatically by this unit since it contains a temperature sensor. To assist in pointing the narrow ultrasonic beam, a pointer lamp can be pointed to indicate where the beam will be hitting.
4. This unit, although very exact and compact, delivered complete with a belt carrying case, does not lend itself well for the applications required for police work. No difficulty was encountered when measuring dimensions of interior rooms, however, locating furniture within a room proved to be a more difficult chore. It cannot distinguish a small contoured or narrow surface, and therefore, it could not be relied upon to give a reading that could be trusted for this type of task. The unit was also used during an accident investigation course, but here also, reliable measurements could not be obtained.
5. The Sonin 250 is a two part unit, and therefore, is more effectively used when two persons are available, similar to one person at each end of a tape. This unit lends itself very well to measurements using the offset method which is widely used in both indoor and outdoor scenes. A baseline is set down in the usual manner, and then the investigator used the measuring/reading component of the instrument, and the helper places the target component as directed by the investigator. Both components have clips at the back permitting attachment to a belt or in the case of the accident scenes, the measuring/reading component can be attached to a clipboard.

6. This unit was used indoors on a few occasions and performed very well, however, tapes are just as easily used indoors within relatively the same time frame and good accuracy. The unit was passed on to the Highway Patrol/City Traffic Unit of this detachment, and tested during the accident investigation course. It was found to be very accurate. It was then used extensively and continues to be used at accident scenes where it is proving to be a very facilitating device for this type of work. The greatest benefit gained through the use of the Sonin 250, other than the obvious time saving, is the added safety afforded members by giving them the ability to remain visible by standing upright, and being more cognisant of their surroundings.

7. Attached is the report submitted by Constable Steve Kinahan of the Grande Prairie Highway Patrol Unit. It will give further detail on the Sonin 250 electronic measuring device.

J.R.G. Genereux, Sergeant
NCO in charge Grande Prairie
Forensic Identification

ELECTRONIC MEASURING INSTRUMENT

1. Grande Prairie Highway Patrol Unit has been using the Sonin 250 electronic measuring device since July 1992.

2. The Sonin 250 has been used at numerous collision locations in the Grande Prairie Highway Patrol area, and in varying weather conditions. The following is a short evaluation on the instrument.

(a) Accuracy

This is a two piece unit using a receiver/transmitter, and came calibrated from the factory. It was checked with some known distances and was found to be extremely precise and in no need of calibration. Under good summer conditions, the range was in excess of the stated 250 feet. Under distances of 1 meter however, the instrument was not accurate, and conventional methods had to be employed.

Measurements taken by this unit have been converted from field notes to plan drawings which were in turn used for court purposes on two occasions. A recent check was done to check the calibration of the measuring instrument and it was found not to need any further calibration adjustments.

(b) Weather conditions/reliability

During the time of usage, the unit has been used through the entire spectrum of weather conditions.

HOT, DRY CONDITIONS: excellent results, exceeded specifications.

RAIN: no problems encountered, however, the range dripped slightly during very heavy rain storms.

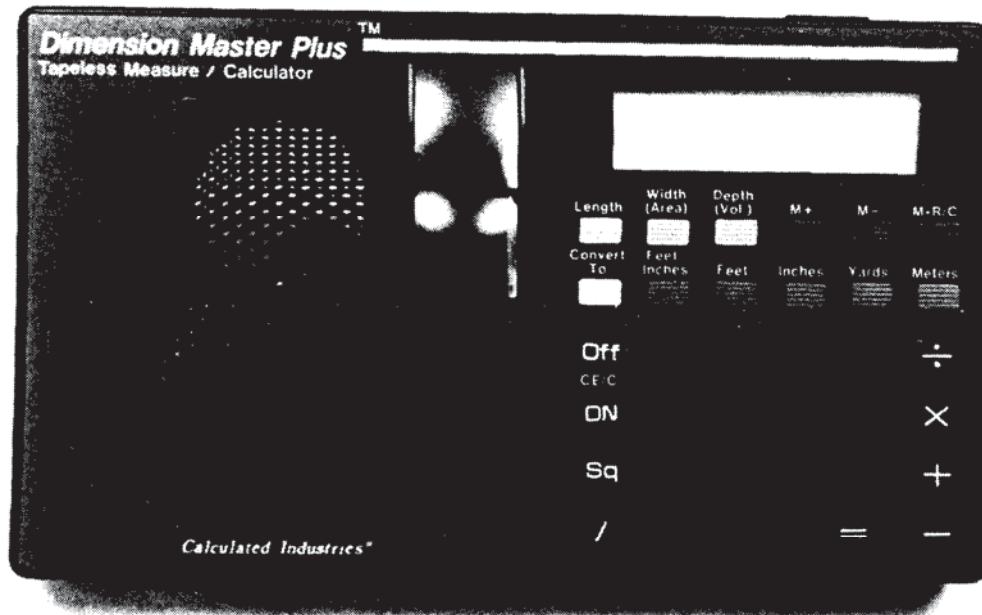
TEMPERATURE TO -1 OC: worked well for 15-20 minutes exposed.

TEMPERATURE TO -20C: worked for 1-4 minutes exposed.

TEMPERATURE BELOW -20C: very poor performance if exposed to these temperatures. The extreme cold affected the LED readout and the battery performance. However, this was expected.

3. Summary - after using this measuring device, I found it to be an excellent tool in assisting with motor vehicle collision investigations. One important final note concerning this device is that it helps to create a much safer working condition for the motor vehicle accident investigator.

Steve Kinahan, Constable
Grande Prairie Highway Patrol



Photograph 1 - Dimension Master Plus Tapeless Measure/Calculator

Dimension Master Plus

**Ultrasonic Tapeless Measure for Accurate Measurements to 60 Feet
-Plus a Complete Dimensional Calculator**

- Accuracy 10 99.5% Over Entire 60-Foot Range
- Measures in Feet/Inch/Fraction or Metric
- Automatically Figures Area and Volume
- One Button Conversions To and From:
 - Decimal Feet
 - Feet Inch/Fraction
 - Inches
 - Yards
 - Meters

Including in Square and Cubic

- Built-in Dimensional Calculator
- Built-in Aim-Assist™ Light
- Four AAA DURACELL® Batteries Included

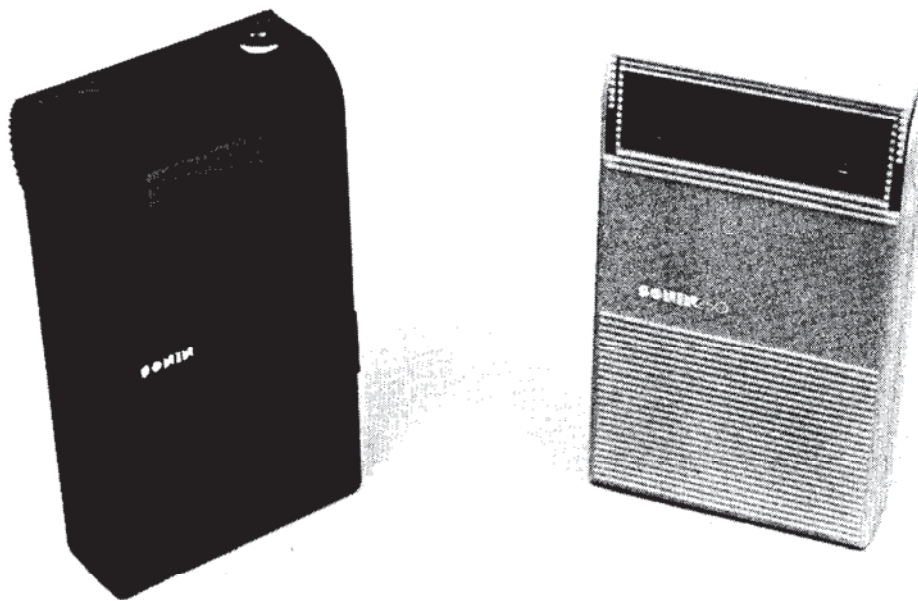
Most Other Laser Beams

Dimension Master's Beam

Using three Polaroid Ultrasonic Sensors instead of just one, the Dimension Master is able to send out an ultra-narrow beam. This allows you to shoot down hallways or in furniture-crowded rooms with ease.

© 1988 Calculated Industries
Assembled in Taiwan, R.O.C.

Photograph 2 - Dimension Master Plus packaging information



Photograph 3 - Sonin 250 measuring device transmitter/receiver



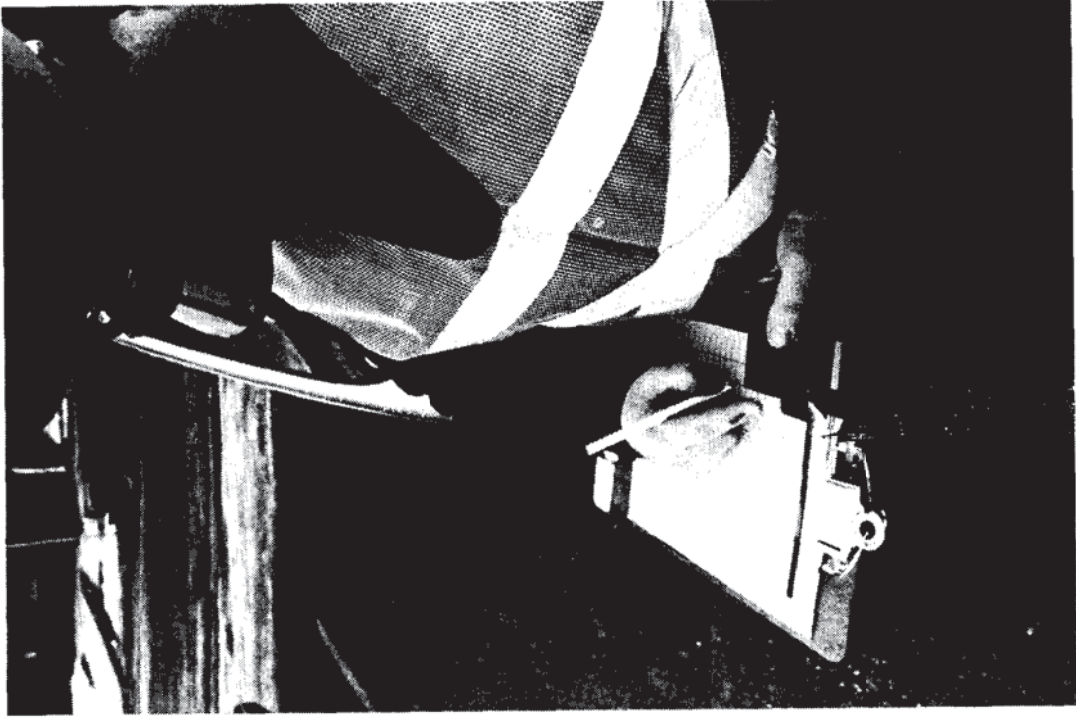
Photograph 4 - Sonin 250 packaging information



Photograph 5 - Sonin 250 transmitter in use



Photograph 6 - Sonin 250 receiver in use



Photograph 8 - Sonin 250 transmitter used on clip board



Photograph 7 - Sonin 250 transmitter/receiver measurement