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DETERMINATION OF CAPABILITIES OF ELECTRONIC EQUIPMENT FOR USE IN PHOTOGRAMMETRY

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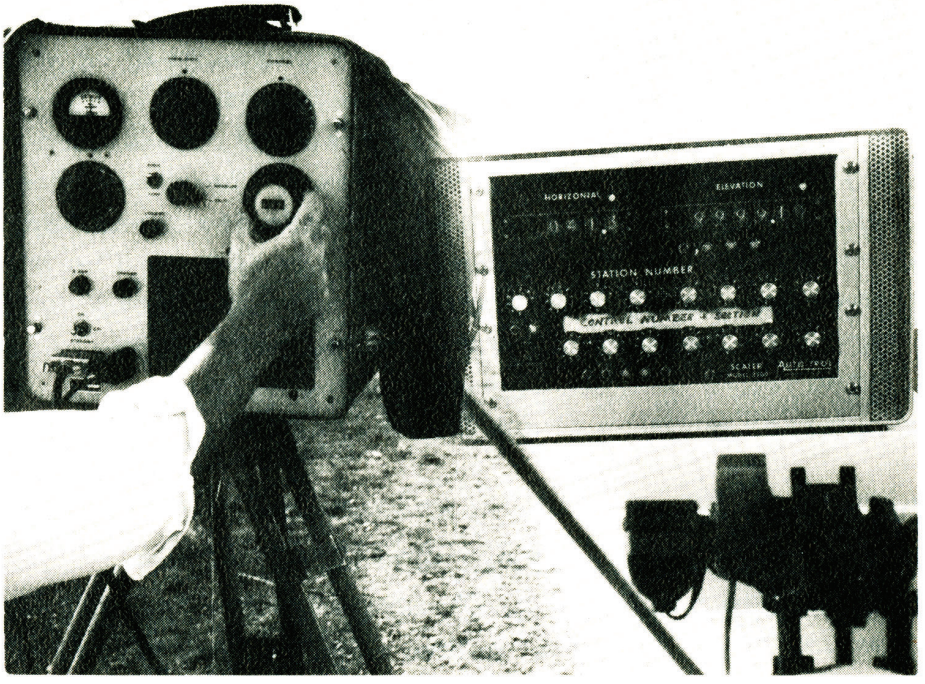

Cooperative Research Study of the
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TEXAS HIGHWAY DEPARTMENT
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DETERMINATION OF CAPABILITIES OF ELECTRONIC EQUIPMENT FOR USE IN PHOTOGRAMMETRY

by

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INTRODUCTION

The capabilities of the Electrotape Model DM-20 and the Auto-trol Scaler Model 3900 are reported. The aims of this study are to state the methods used, problems encountered, accuracies and limitations involved in the manipulation of each device under varying conditions and to provide a reference guide of recommended procedures. Both of the devices were used and evaluated by the Texas Highway Department on actual projects.

ELECTROTAPE

The Electrotape Model DM-20 is an electronic-distance measuring device. A pair of these units was used to establish second-order control for mapping, bridge location, and as a check on baselines chained by field personnel. Trilateration was also accomplished using the Electrotape. Measurements made by the Electrotape were compared to a precisely chained baseline in order to test the accuracy of the device. The baseline used is approximately one mile in length and was chained four times using an Invar chain and first-order methods. Approximately 1000 miles of control was established during this project, and the average position closure was 1/23,000.

AUTO-TROL

The Auto-trol Scaler Model 3900 is an electronic analogue-to-digital converting scaler. It can be used with all types of photogrammetric equipment using the tracing table principle and the information obtained is in a form suitable for use with electronic computers. During this study the Auto-trol was used to establish cross-sections from aerial photography through the use of a Kelsh stereo-plotter. These cross-sections were used to determine earthwork quantities, to establish hydraulic gradients for streams, and to establish hydraulic data for large bridge structure designs.

CONCLUSIONS

The following conclusions were drawn about the two instruments tested in this research study.

Electrotape

1. The Electrotape was found to be faster than normal field methods of measuring distances, if the distances measured were longer than 1500 feet.
2. The Electrotape has proven to be more accurate than normal field methods of chaining.
3. The Electrotape has few limitations. The limitations that have been observed are noted in the body of the report.
4. The use of the Electrotape has been shown to save as much as $1,000 over conventional methods on a single project.
5. At no time has it been necessary to rerun the established control because of failure of the Electrotape to function properly.

Auto-trol

1. The Auto-trol is as accurate as normal methods of cross-sectioning.
2. The Auto-trol is faster than normal field methods of cross-sectioning.
3. The Auto-trol has few limitations. The limitations that have been observed are noted in the body of the report.
4. On an average project the Auto-trol will save between $500 and $600 per linear mile of cross-sections over normal field methods.
5. The down time of the Auto-trol has been found to be less than 2% of operating time.