ELECTRONIC DISTANCE MEASURING (EDM) INSTRUMENTS

Introduction

EDM are now the prime measuring device for land surveyors and others. EDM is also used routinely for measuring field event performances and checking the heights of the bar in the high jump and pole vault events at major track and field competitions.

EDM is used for most measurements recorded in the IAAF Certification System Report of Measurement. This report has to be accompanied by an instrument calibration certificate.

The purpose of this paper is to outline an acceptable method of calibrating an EDM instrument.

Calibration Frequency

At least every 12 months to a national or state standard primary standard of measurement.

Calibration Accuracy

The minimum standard of uncertainty of EDM calibration should be 5mm + 30ppm at a 99% confidence level.

EDM Instrument Errors

An EDM instrument has three inherent systematic errors. These are additive constant, scale factor and cyclic error. The first two errors can be calculated using formulae given and the cyclic error is derived independently of the calibration results [(1)].

Calibration

An EDM is calibrated against a testline of between four and eight points of known distance apart and height established as part of the National Measurement Standard to required standards of accuracy.

After correcting for errors calculated as given in the reference [(1)] the measured distances are compared with the known distances and a standard deviation calculated for the instrument.

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References

(1): New South Wales Surveyor-General's Regulations for Surveyors
www.lpi.nsw.gov.au/publications/sgdir5w.pdf
(2): "Electronic Distance Measuring" (1990, J M Rueger, Springer-Verlag Berlin