

UNIVERSITI TEKNOLOGI MARA

**POSITIONAL ACCURACY
IMPROVEMENT OF CADASTRAL
RECORD VIA ANGULAR-BASED
ADJUSTMENT**

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Thesis submitted in fulfillment
of the requirements for the degree of
Science Surveying and Geomatic (AP220)

Faculty of Architecture, Planning and Surveying

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Malaysia's land records management landscape has been drastically changed with the e-cadastral implementation. The least-square estimation (LSE) that can preserve positional accuracy has taken over the role of Bowditch in systematically distributing the random errors in cadastral measurement. However, the use of bearing that is affected by the propagation of errors in cadastral network adjustment has significantly affected the quality of LSE solutions. Thus, to scrutinize this issue, this study aims to quantify the ability of direct measurement (i.e. angle) to constrain the augmentation of errors that suffered from indirect data (i.e. bearing). The first experiment was designed to measure the ability of LSE in preserving the accuracy of cadastral record. To achieve the research aims, later experiment has performed two (2) sets of LSE adjustments using both data: i. Bearing; and ii. Angle. Three (3) sets of traverse networks were utilized to rigorously evaluate the findings: i. Small; ii. Large; and iii. Combination of small and large. With the RMSE of 0.013m, it is proven that LSE manage to preserve the positional accuracy of land record compared to Bowditch solution, 0.024m. While later experiment demonstrated that direct measurement has significantly improve the quality of cadastral data up to 30%. In contrast, large traverse yield opposite result and further analysis has found that limitation of bearing adjustment that might contribute to adjustment uncertainties. This study reveals that the angular adjustment is able to reduce propagation in cadastral network rather than bearing adjustment which eventually increases the positional accuracy in cadastral database.

Keywords: Error Propagation, Bowditch, Least Square Adjustment, Angular-Based Adjustment, Positional Accuracy Improvement

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