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ANALYSIS AND CALIBRATION OF A WATER DISTRIBUTION SYSTEMS
(A CASE STUDY OF PORT DICKSON)

BY

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ABSTRACT

Calibration of network models is an integral part of water distribution system analysis. Calibration, establishes the credibility of the model that is used as a benchmark case for studies and as a predictor. Calibration may be done manually or through the aid of computer programs. Sources of error or inaccuracies include improper network definition or demand distribution, or both. A thorough knowledge of operation and performance of the system is gained through the process of calibration. This may be more important than the degree of accuracy of calibration, since modeling is often more concerned with changes than with absolute values.

1.0 INTRODUCTION

Mathematical models of water distribution networks are formulated and used for predicting the behavior of the networks under different conditions and in planning their expansions. Before a network model is used, it must be ensured that the model would predict, with resonable accuracy, the behavior of the network. Such a process is termed "calibration" of the model.

Shamir and Howard (1977) state that "calibration consists of determining the physical and operational characteristics of an existing system and determining the data that when input to the computer model will yield realistic results." Cesario and Davis (1984) define calibration as "the process of fine-tuning a model until it simulates field conditions for a specified time horizon (such as maximum-hour conditions) to an established degree of accuracy." Walski (1983b) precisely defines calibration as "a two step process consisting of: (1) Comparison of pressures and flows predicted... with observed pressures and flows for known operating conditions, i.e., pump operation, tank levels, pressure reducing valve (PRV) settings; and (2) adjustment of the inputdata for the model to improve agreement between observed and predicted values."

Reasonable agreement of the model is usually judged in terms of the differences in the observed and predicted pressures or heads at the test nodes (e.g., Cesario and Davis 1984; Eggener and Polkowski 1976; Rahal et al. 1980; Walski