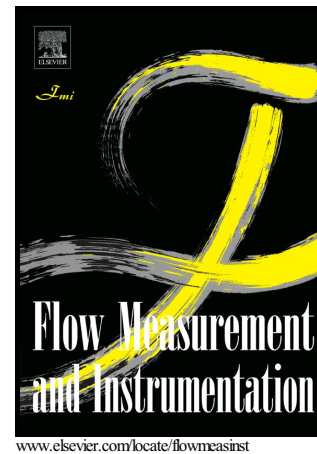


Author's Accepted Manuscript

Parameter Identification for Discharge Formulas of Radial Gates based on Measured Data

Hezhen Zheng, Xiaohui Lei, Yizi Shang, Siyu Cai,
Lingzhong Kong, Hao Wang



PII: S0955-5986(16)30296-5
DOI: <http://dx.doi.org/10.1016/j.flowmeasinst.2017.09.002>
Reference: JFMI1352

To appear in: *Flow Measurement and Instrumentation*

Received date: 14 December 2016
Revised date: 31 July 2017
Accepted date: 10 September 2017

Cite this article as: Hezhen Zheng, Xiaohui Lei, Yizi Shang, Siyu Cai, Lingzhong Kong and Hao Wang, Parameter Identification for Discharge Formulas of Radial Gates based on Measured Data, *Flow Measurement and Instrumentation*, <http://dx.doi.org/10.1016/j.flowmeasinst.2017.09.002>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Parameter Identification for Discharge Formulas of Radial Gates based on Measured Data

Hezhen Zheng¹, Xiaohui Lei^{2*}, Yizi Shang^{2*}, Siyu Cai², Lingzhong Kong¹, Hao Wang^{1, 2}

1. Institute of Municipal Engineering, College of Civil Engineering and Architecture, Zhejiang University, Hangzhou 310058, China
2. State Key Laboratory of Simulation and Regulation of Water Cycle in River Basin, Institute of Water Resources and Hydropower Research, Beijing 100038, China

First Author: Hezhen Zheng: PhD Student, Email: zhenghezhen@zju.edu.cn
866 Yuhangtang Road, Hangzhou, Zhejiang, P. R. China

Corresponding Author: Xiaohui Lei: Professor, Email: lxh@iwhr.com ;

Yizi Shang: Senior Research Engineer, Email: shang.yizi@gmail.com
A-1 Fuxing Road, Haidian District, Beijing 100038, P. R. China

ABSTRACT

Calibrating the coefficients of discharge formulas of gates has great significance for the simulation and control of water flow. By investigating three discharge formulas derived from the energy equation and one discharge formula derived from dimensionless analysis of radial gates, the new parameter identification models for these discharge formulas were established using the least squares method, and the coefficients of discharge formulas were obtained. Followed by that, these discharge formulas of radial gates were applied through a case study. The results showed that the mean relative errors of the four formulas were 18.99%, 34.26%, 24.10% and 21.11%, respectively; while the mean relative errors were reduced to 3.54%, 3.54%, 1.90% and 1.09% by the use of parameter identification technique, respectively, indicating that the accuracy was greatly improved. The results proved that the parameter identification method may have potential application to improve the accuracy of calculating the discharge under the radial gates, and can also be applied to the sluice gates.

Keywords: radial gates; discharge formula; parameter identification; least squares method; field data.

1 Introduction

Gates are widely used as check structures to control water level and flow discharge in the canals by adjusting the gate opening [1,2]. To date, many gates were installed in irrigation canals and water diversion projects [3, 4]. The discharge formula of the gate is the basis to determine the opening, which is of great significance to the accurate simulation of canal flow

Download English Version:

<https://daneshyari.com/en/article/5001764>

Download Persian Version:

<https://daneshyari.com/article/5001764>

[Daneshyari.com](https://daneshyari.com)