APPLYING ARR 2016 TO STORMWATER DRAINAGE DESIGN

Dr. Geoffrey O'Loughlin[1]
[1]*Anstad Pty Ltd, Penshurst, Australia*

Overview

The methods and advice presented in Australian Rainfall and Runoff 2016 are not yet complete, and there has been a slow uptake of these by the stormwater industry, with many organisations continuing to apply methods from the previous version of this publication.

While Book 9 - Runoff in Urban Areas in ARR 2016 provides overall advice and sets new directions such as an emphasis on volumetric controls, it does not provide detailed information on design applications.

The authors have been involved in the application of ARR 2016 methods in the DRAINS program, and in providing advice on the new methods to users. This paper presents the results of assessments of the methods and provides advice on their implementation. It covers issues such as:

- application of the new intensity-frequency-duration (I-F-D) rainfall data and ensembles of rainfall bursts;
- implications of changed design rainfall intensities and climate change adjustments;
- presentation and interpretation of results in drainage systems;
- analyses of detention basins;
- implementation of the initial loss – continuing loss (IL-CL) hydrological model from ARR 2016, and comparisons of its results with those from existing models - the rational method, extended rational method and ILSAX.

An overall assessment of the scope and effectiveness ARR 2016 procedures is presented. Areas where information or advice is lacking are pinpointed, options for designers are specified, and provisional advice is provided by the authors.

Objectives

The objective of the paper is to provide information and guidance in an important area where direction is lacking.

Method

The new material in ARR 2016 has been examined, and responses by industry have been noted. Results obtained using rainfall ensembles have been assessed, and alternative hydrological models have been compared in runs of the DRAINS model. Implications for drainage authorities and designers have been assessed.

Results

Voluminous results from analysis of rainfall ensembles are processed by software and presented to users in summary form. Results from various hydrological models, including the ARR 2016 IL-CL model, are compared. Effects of applying climate change adjustments are assessed.

Conclusions

Guidance on the use of material from ARR 2016 is lacking, and methods are not fully implemented. There appears to be an impasse that is impeding further progress, and the response from industry has been generally uncertain and apathetic.

It is possible to implement the major parts of the ARR urban drainage methods and software developers have responded to this challenge, although this involves considerable complexity.

The authors recommend adoption of 2016 IFD data and climate change adjustments in all models, and adoption of the IL-CL model when this is fully specified. Data on full storm patterns should be provided to designers, as well as the available burst information. ARR 2016 has not covered all aspect of urban drainage modelling and further research and development is needed. The data used in developing the ARR 2016 methods should be made freely available.

Other Matters

The intended category is Modelling and design, within Technology and Practice