

# JPS HYDROLOGICAL PROCEDURES: AN UPDATE



*Y.Bhg. Dato' Ir. Hj. Nor Hisham  
bin Mohd. Ghazali*



*Mohamad Hafiz bin Hassan*

**H**ydrological Procedures (HP), published by the Department of Irrigation and Drainage Malaysia (JPS), have been widely used by various government agencies and private sectors in the field of water resources since 1973. The primary aim is to assist engineers and researchers in the development of hydrological monitoring programmes, to conduct hydrological analysis and to select hydrometric instruments which comply with JPS standards. To date, a total of 32 HPs have been published.

The work of a hydrologist has changed substantially with the advent of modern methods and instruments. As more and more hydrological data have been accumulated in recent years, it is time to review these procedures and to incorporate new methods, technologies and "best practices" in hydrometric development, monitoring and hydrological analysis.

In general, HP can be categorised into 3 main applications:

1. Procedures that consist of various hydrological design methods and analysis (i.e. HP1, HP4, HP5, HP11, HP12, HP13, HP16, HP17, HP18, HP20, HP26 and HP27)
2. Procedures that describe various hydrological data collection methods, data management and data quality control (i.e. HP2, HP6, HP7, HP10, HP15, HP19, HP22 and HP28)
3. Procedures related to hydrometric instrument standards (i.e. HP3, HP8, HP9, HP14, HP21, HP23, HP24, HP25, HP32, HP33, HP34 and HP35).

Detail of these procedures are as stated in Table 1 (page 23). HP1 (Estimation of Design Rainstorm in Peninsular Malaysia) and HP26 (Estimation of Design Rainstorm in Sabah and Sarawak) are the most essential procedures for analysis of water related projects in the country. These two procedures of design rainfall derivation have been used in conjunction with other procedures for surface runoff estimation such as HP4 (Magnitude and Frequency Flood), HP5 (Rational Method), HP11 (Snyder Method), HP16 (Urban Hydrology) and HP27 (Clark Unit Hydrograph Method). These procedures can provide reliable and realistic estimates of design surface runoff and flood hydrograph for the purpose of determining structure sizes for proper drainage and other control measures based on design protection level.

The main theory, methodology, design sequence and worked examples of both design rainfall analysis and flood

hydrograph estimation procedures are described in detail in each HP. These simplified procedures are most appropriate and useful for hydrological analysis and design for rural and ungauged catchments.

One of the most crucial elements in hydrological monitoring programme is a good data management system. Hydrological data are undoubtedly complex. It is therefore, essential not to overlook how well hydrological data is managed after acquisition.

Hydrologists are responsible for collecting, analysing, validating, archiving and distributing vast amounts of hydrological data. For this purpose, HP2, HP10, HP15, HP19, and HP22 describe the universally accepted methods and "best practices for the measurement of flow, water quality sampling and suspended sediment sampling in open water courses.

HP6 and HP7 describe data management system such as hydrological station numbering system, hydrological station identifier system and hydrological station registers.

HP28 describes in detail the key procedures, methodology and analysis sequence of hydrological data quality checking, screening and rectification. In addition, worked examples of data quality assessment using actual data are also described in this HP.

On equipment and instrumentations, HP3, HP8, HP9, HP14, HP21, HP23, HP24 and HP25 discuss the standards, accuracy and reliability, sensitivity and precisions, methods for field installation and calibration as well as procedures for periodical maintenance. Detailed requirement of rainfall, water level, stream flow and water quality stations and equipment based on JPS standard, are described in HP32, HP33, HP34 and HP35.

HP4, HP6, HP7, HP11 and HP26 were updated in 2018, using the most recent methodology, latest hydrological data and up-to-date technology. New additions to JPS Hydrological Procedure are HP28, HP32, HP33, HP34 and HP35. Besides the updating of HP1, HP2, HP10, HP19, HP21, HP22 and HP25, the development of HP34 will also be implemented by the end of 2019. Although these Hydrological Procedures are simple and comprehensive, engineers and researchers should observe and understand their suitability, assumptions and limitations within the given scope of application. ■