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Dr.Quek's Tips on MSMA
Application of
Hydrological Procedures
Presented By: Ir. Dr. Quek Keng Hong

WELOME TO

"10 Common Mistakes by Engineers in Applying MSMA"

Video 3- Application of Hydrological Procedures

Presented by: Ir. Dr. Quek Keng Hong



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Topics Covered in Dr. Quek's Video on "10 Common Mistakes by Engineers in Applying MSMA" Series:

1. Choice of Design Storm- Where to get up-to-date design storm data?
2. Choice of Peak Discharge- What limitations of various computation methods?
3. Hydrological Procedures- Which can still be applied for rural catchments?
4. Rational Method- What limitation to catchment size?
5. Time-Area Method- How to apply Time-Area Method correctly?

Topics Covered in Dr. Quek's Video on "10 Common Mistakes by Engineers in Applying MSMA" Series (Continued):

6. Runoff Routing Method- Which free software can be used and what data required?

7. Detention- Detention Basin or On-Site Detention (OSD)?

8. On-Site Detention (OSD)- How to optimize the required SSR (Site Storage Requirement)?

9. Detention Basin- How to optimize the required detention storage?

10. Erosion and Sediment Control Plan (ESCP)- How to apply ESCP Correctly?

- **Are there any alternatives to MSMA for computing peak discharges?**

  Two alternatives:

  1. Flood frequency analysis

  2. Hydrological Procedures (JPS)

- **1. Flood frequency analysis**

  Based on historical streamflow data

  Plotted on graph using Weibull Plotting Position

  Advantages: gives accurate assessment of rural condition flow

- **2. Hydrological Procedures**

  Published by JPS

  Empirical approach for estimate of peak discharge.

  Applicability depends on catchment size, rural conditions

  Examples: HP5, HP11 and HP4

- **Applicability of Hydrological Procedures**

METHODS	HP	YEAR	AREA (KM^2)	CATCHMENT TYPE	BASIS OF METHOD
Rational Method	5	1989	0.3-100	Rural	Rainfall-Based
Design Hydrograph Method	11	1980	<518	Rural	Rainfall-Based
Regional Flood Frequency	4	1987	>20	Rural	Runoff-Based

- **Hydrological Procedures (HP5, 11 & 4)**

  HP5, 11 & 4 may be used to estimate peak discharges for rural catchment i.e., Pre Development scenario.

  Differences in the range of applicability in terms of catchment area

  Recommended: Compute and compare the estimates

- **Advantages of Hydrological Procedure HP 11**

HP5 applicable > 0.3 km2
HP4 applicable > 20 km2
HP11 applicable to <518 km2

Gives good estimates of rural peak discharges + hydrographs

Recommended for Pre-Development Scenario e.g., design of detention basins.

Recommended for calibration of Rainfall-Runoff Model like HEC-HMS

- **References for Hydrological Procedures (HP5, 11 & 4)**

Drainage and Irrigation Department (1989) Rational Method of Flood Estimation for Rural Catchments in Peninsular Malaysia (Revised and Updated). Hydrological Procedure No. 5. Ministry of Agriculture, Malaysia.

Drainage and Irrigation Department (1980) Design Flood Hydrograph Estimation for Rural Catchments in Peninsular Malaysia. Hydrological Procedure No. 11. Ministry of Agriculture, Malaysia.

Drainage and Irrigation Department (1987) Magnitude and Frequency of Floods in Peninsular Malaysia. Hydrological Procedure No. 4. Ministry of Agriculture, Malaysia.

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Benefits of Attending MSMA Workshops:

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