Needs Of DMAs For Forecast And Warnings Of Hydrometeorological Hazards

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<th>Planning and Preparedness</th>
<th>Operation Activities</th>
<th>Post Disaster Management</th>
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**NADMA Malaysia - Core Functions**
NADMA Malaysia: Urban Flash Floods

Mitigation activities
- Local authorities to ensure all drains are good conditions
- Construction activities do not block drainage system

Preparedness of relevant authorities
- Fire and Rescue Department; Civil Defence; Police; PWD; DID

Warnings to the public
- Local residents
- Road users
<table>
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<th>NADMA Malaysia: Landslides</th>
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<td><strong>Mitigation activities</strong></td>
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<td>• Continuous surveillance by relevant authorities and parties</td>
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<td><strong>Preparedness of relevant authorities</strong></td>
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<td>• Local authorities</td>
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<td>• Highway authorities</td>
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Landslides

Floods

Earthquakes

Heavy rains

Landslides
NADMA Malaysia: Requirements for forecast

**Lead times**
- Depends on the monitoring activities by relevant authorities and parties

**Location of disaster**
- Prior identification of flood and landslide prone areas

**Accuracy of forecast**
- Difficult to achieve

**Impacts of forecast**
- Reduce losses both economic and lives
- Reduce hardships face by the communities
Need for closer collaboration of forecasting agencies

Flash floods
- Met Malaysia
- DID

Landslides (federal roads)
- Met Malaysia
- PWD
Kuala Lumpur Flood Mitigation Project: Reducing flash floods
KLFM PROJECT: SMART TUNNEL

- 'Flood By-Pass' Tunnel
- Motorway Tunnel
- Attenuation Pond
- Holding Pond

Komponen SMART

KLANG GATES DAM

Length = 9.7km
Tunnel Diameter = 11.8m
Total Storage Capacity = 3 million cu.m

Holding Basin
0.6 million cu. m
1.0 million cu. m
1.4 million cu. m

Sg. Kerayong
Sg. Ampang
Sg. Gombak
Sg. Klang

TUNNEL
FLOOD PRONE AREAS
The geological conditions are a challenge for excavating a 13m diameter bored tunnel. From the existing geological information it was known that the main bedrock would be limestone. This limestone is typically made up of 90 to 100% calcite that has been metamorphosed into marble. The limestone was known to be affected by solutions and has a range of typical karstic features.
Operation System

**Flow (cumec)**

- **< 70**
  - Mode I: No Storm
  - Klang River
  - Berembang Holding Pond
  - Traffic Tunnel
  - Lower Drain
  - Traffic Evacuation
  - Mode 1

- **70-150**
  - Mode II: Moderate Storm
  - Traffic Tunnel
  - Lower Drain
  - Traffic Evacuation
  - Mode II

- **> 150**
  - Mode III: Major Storm
  - Traffic Tunnel
  - Lower Drain
  - Traffic Evacuation
  - Mode III

- **> 150 prolong**
  - Mode IV: Prolonged Major Storm
  - Traffic Tunnel
  - Lower Drain
  - Traffic Evacuation
  - Mode IV

**Total Storage Capacity**

- Holding Pond: 800,000 m³
- Northern Section: 750,000 m³
- Motorway Tunnel: 750,000 m³
- Southern Section: 1,400,000 m³
- Attenuation Pond: 3,000,000 m³
- Total: 3,800,000 m³
Flood Detection System (FDS)

An integration of:
- SCADA Information Management and SMART Interface/Operation System
- Flood Forecast Modeling System
- Communication System

Main functions
- Monitoring Catchment Condition
- Forecast Mode 2, 3 & 4 storms
- Monitoring the status of all components (e.g., gates, pumps, cctv, warning stations etc)
- Ensure the control of gates automation working all the time

Types of communications
- Fiber optic, Radio GSM, Wi-Fi (4.8GHz), normal telephone lines

SMART Control Room
Early Storm Detection by MMD Ground Radar

Radar Loop from Doppler radar for cappi
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