



**The Malaysian Water  
Association**

# **MWA COLLOQUIUM 2012**

**GIS and Network Modeling in Water  
Supply Distribution System**

Sponsored by:  
**Ranhill Water Services**

# O bjective

This event is targeting on establishing guidelines and promoting GIS & Hydraulic Modeling in Malaysia as one of useful tools in water industries.

Title of Event: **GIS and Network Modelling Colloquium 2012**

Date: **Tuesday, 12<sup>th</sup> June 2012**

Venue: **Tun Hussein Onn Hall, Putra World Trade Centre**



## **Presenter: Ir. Hj. Khalid Nasir**

### **Company: Syarikat Air Melaka Berhad**

Title Presentation: Modelling and Planning Tools – ‘The Melaka Experience’

#### ■ Synopsis

Melaka is a famous historical city and developed state attracts many investors who set up industries and contribute to its rapid economic growth. A comprehensive and strategic planning in water management and distribution is essential to ensure the continuity of supply and demand.

SAMB has developed its Network Modelling since 2009 and until to-date there are 9 All Mains Model and 1 Strategic Model completed and calibrated. And these models are continuously updated based on current scenarios.

## **Presenter: Ir. Hj. Fuad Bakri**

### **Company: SAJ Holdings Sdn Bhd (SAJH)**

Title Presentation: Introduction and Experience on GIS and network modeling projects (Johor experience).

#### ■ Synopsis

Johor state had seriously embarked on GIS development for water supply since year 2000 when SAJSB (a state owned company) was privatized to SAJ Holdings. It is part of the restructuring programme under Ranhill Utilities (2000-2009) to bring SAJ Holdings to be at par with world class water utility company.

MS ISO procedures couple with management monitoring tools like KPI, human resources development skills and effective business plan had benefited most of the company programme outlaid.

GIS evolved from tacit knowledge to schematics technical drawings, then AutoCAD plan to a reliable geospatial database system server. The mapping and database of water asset in GIS has led to many customized application for ease of reporting. The advance GIS engine helps us to explore integration or enterprising to other existing system within the organisation and perform quick analysis for operational needs.

GIS is a better platform for Hydraulic Model development and validation project platform. Data exported to the model had benefitted strategic distribution mains simulation for planned maintenance/operation, and supply for new development areas.

It has served SAJH as tool for system control mechanism for Control Center/SAJiC to monitor water quality violations, NRW locations for designated DMA. With geo-tagged customer meter billing installation code to GIS, detail consumptions pattern can be monitored through a single screen.

GIS helps reduce time process in operations, asset identifications and contribute work efficiency. GIS has contributed to smooth SAJH migration process to Federal Government (in 2009) under SPAN regulatory regime and Pengurusan Aset Air Berhad as then new assets owner.

## **Presenter: Mohd Zool Hilmie Mohd Nasir**

### **Company: Innovyze (M) Sdn Bhd**

Title Presentation: Network Modelling Using Infoworks WS (Water Supply)

#### ■ Synopsis

The key objective for all water supply and distribution organisations is to promote efficient and sustainable water supply of high quality water according to specified standard. This should be provided at an acceptable pressure and with minimal leakage losses. This challenge is affected by weather conditions, stringent regulatory environments, security concerns and an increasingly aware consumer audience.

InfoWorks WS gives an accurate view of the performance of your network and assists with meeting your operational targets. An accurate all mains water supply model can identify infrastructure weaknesses, water quality incidents and other operational needs. The model can also be used to simulate emergency conditions and investigate solutions.

#### Example Applications:

- Assessment of supply to individual customer level
- Investigation of supply deficiencies
- Demand management
- Design and implementation of drought management plans
- Planning of capital investment programs
- Critical link analysis
- Scenario planning & fire flow analysis
- Simulation of pollution incidents
- Assessing source blending requirements
- Water quality and chlorination assessment
- Sedimentation analysis and mains flushing
- Optimization of pumping systems
- Optimization of system storage

## **Presenter: Marcus Chang**

### **Company: Astasoft Sdn Bhd**

Title Presentation: Modelling Techniques for Detecting Leakage Hotspots

#### ■ Synopsis

Leakage represents a major portion of water loss or non-revenue water (NRW) in water distribution networks around the world. Over the last decade leakage and leak detection has been the focus of a significant amount of research – a number of techniques have been developed, but few are cost-effective for rapidly pin-pointing leakage hotspots. An award-winning optimization technology has been developed for achieving cost-effective leakage detection by leveraging the well-established hydraulic model. With an improved hydraulic model leakage can be effectively simulated as pressure dependent demand – the greater the pressure, the greater the leakage.

## **Presenter: Ms Emily How**

### **Company: Esri Malaysia Sdn Bhd**

Title Presentation: ArcGIS for Water Utility

#### ■ Synopsis

Today's water utility is realizing the benefits of geographic information system (GIS) technology for water network engineering, construction, and operations purposes. The typical requirements of water utility reflect business needs to:

- Update GIS databases with as-built data
- Produce standard and custom map products
- Integrate computer-aided design (CAD) drawings into the GIS environment
- Integrate with other enterprise systems, such as work management systems (WMSs), document management systems (DMSs), infrastructure management systems (IMSs), materials management systems (MMSs), and customer information systems (CISs)
- Analyze installed network for capacity planning and capital improvement projects
- Provide hydraulic modelling applications with the latest and accurate water network asset information
- Manage operations activities, such as leaks, repairs, and inspections

The presentation aims to provide an overview of ArcGIS Water Data Model and ArcGIS Water Utility Templates supports these typical business needs by providing an implementation that focuses on operations, maintenance and information dissemination portions of the facility life cycle.

Petronas is one of the biggest customers and SAMB has specific agreements with them in delivering and supplying water for the operations. Model has been used to simulate the future demand in the water supply system.

**Presenter: Muhamad Haniff Ismail**  
**Company: Halcrow Jurutera Perunding Sdn**  
**Bhd**

Title Presentation: Experience on Modelling Projects for Malaysia and UK Water Company

■ **Synopsis**

Experiences gained from Malaysia and UK modelling works provides broad perspective of water distribution modelling and its advantages. The experiences will be shared in term of challenges that been encountered, introduction of new tools, model utilisation and preliminary view of the status of local network modelling compared to UK.

# Workshop 1

**Facilitator: En Mohd Zin Othman**

**Title: Framework Towards the Guideline Establishment for  
GIS and Network Modeling in Malaysia**

## Issues and Challenges

1. **Data** – unreliable and outdated information of water supply network.
2. **People** – lack of expertise and knowledge transfer among staff, tacit knowledge among senior staff is “personally stored” and not properly channeled to new staff and other members in the water utility organisation.
3. **Infrastructure** – insufficient access to infrastructure, relevant tools and significance to facilitate water utility companies’ asset information management.
4. **Procedure** – Lack of standard procedures to commence asset information management for water utility companies.

## Current Status

1. **Unreliable data** – incomplete and inaccurate GIS data still exist within water utility companies in Malaysia.
2. **Tacit Knowledge** – only senior staff and perhaps those already retired ones have in-depth knowledge of the water supply network; new staff who just joined the company are left with the information from available drawings and schematics for them to verify.
3. **Incomplete infrastructure** – limited understanding on the significance of establishing completed GIS and network modeling system makes it difficult for water utility companies to fully utilize its full potential.
4. **Lack of standard procedure** – There is still a need for nationwide methodology for assessment of GIS and network modeling in Malaysia and a call for the right people to obtain accurate data and manage the system.

## Gaps

1. Lack of expertise and knowledgeable people.
2. Limited number of GIS and network modeling practitioners.
3. Lack of awareness to the significance in establishing accurate GIS and network models.

## **Future needs**

1. Establishment of nationwide methodology for GIS and network modeling.
2. Methodology to gather site information and check the accuracy of data.
3. Inculcate GIS usage and network modeling operations as common tools.

## **Proposed recommendations / action plans**

1. Consideration in creation of best practices guidelines for GIS and network modeling operation among the water operators in Malaysia.
2. Development of nationwide methodology.
3. Clarification on procedures for capturing accurate field data or assets information.
4. Awareness sessions to operators on the importance of establishing complete and reliable GIS and network models.

## **Strategies / Way forward**

1. To form “**national steering committee**” that will pave the way to the initial drafting of best practices guidelines for GIS and network modeling operation among the water operators in Malaysia.



## Workshop 2

**Facilitator: En Mansor Abdul Ghani**

**Title: How to Encourage Using GIS/Network Modelling as NRW Tools**

### Issues / Challenge

1. **Human resource** – lack of GIS/network modeling professionals and experts.
2. **Data Accuracy** – absence of data centralization source and asset inventory has not been properly recorded.
3. **People's Attitude** – mind set on the importance of accurate data capturing.
4. **Lack of guidelines** – no guidelines available for using GIS and Network Modeling as NRW tools.
5. **Cost vs. Benefit** – high cost of setting up GIS/network modeling infrastructure supersedes the benefit due to low return of investment.

### Other issues

1. Data accuracy and integrity.
2. Different platform used for GIS and Modeling application.
3. Data updating for maintenance purposes.

### Current Status

1. Limited posts for GIS specialists.
2. Scattered data i.e. located at districts office.
3. Lack of awareness program on GIS and Network Modeling.
4. There is a need to develop the guidelines for GIS/Network Modeling practitioners.
5. High cost on implementing the GIS and Modeling with low benefit to water utility companies.
6. Data collection/transferred to GIS without verification and too many assumptions.
7. Separate work need to be carried out on GIS and Modeling and all data should be synchronized.
8. Data updating is carried out only when is required/requested.

## **Gaps**

1. Awareness on the importance of GIS and Network Modeling.
2. Financial limitation and cost/benefit issues of implementing GIS and Network Modeling projects.
3. Uncertain of the direction.
4. Agreement on the guidelines between water companies.
5. Lack of understanding makes it less important.
6. Requires proper documentation and systematic data collection procedures.
7. Lack of expertise in GIS and Modeling field in Malaysia.
8. Data updating project might also required manpower.

## **Future Needs**

1. More experts in GIS and Network Modeling field.
2. More professional/engineering groups specialized in GIS and Network modeling.
3. Sufficient Budget allocation.
4. Awareness to the importance of GIS/Network Modeling application.
5. Code of practices based on agreed guidelines among water utility companies in Malaysia.
6. Awareness to all water utility companies on the importance of establishing accurate GIS/Network Model.
7. Accurate on-line data capturing system and ensure schedule on site data verification.
8. Ensure that data updating for both applications can be carried out under a single platform.
9. Encourage regular data updating on GIS and Network Model for every state.

## **Recommendation / Action Plans**

1. Provide specific roles/posts in GIS within water operators.
2. Required guidelines/Standard of procedure and target for certain KPI to be achieved.
3. Agreement on the GIS/Network Modeling guidelines from all water companies.
4. Building and capturing accurate data in GIS.
5. More rooms for knowledge sharing/open forum in GIS/Modeling in Malaysia.
6. Develop proper documentation for data capturing system.
7. Decision from authority in identifying the suitable platform for this region.
8. Awareness on the importance of model maintenance where models can be used for operations and planning (scenario modeling).

## **Strategies**

1. Establishment of standard template for PAAB/SPAN reporting requirement.
2. Development of professional team (Learning and Growth of GIS/Network Modeling Practice).

3. Establishment of Malaysian Code of Practices that can be used by GIS/Network Modeling practitioners.