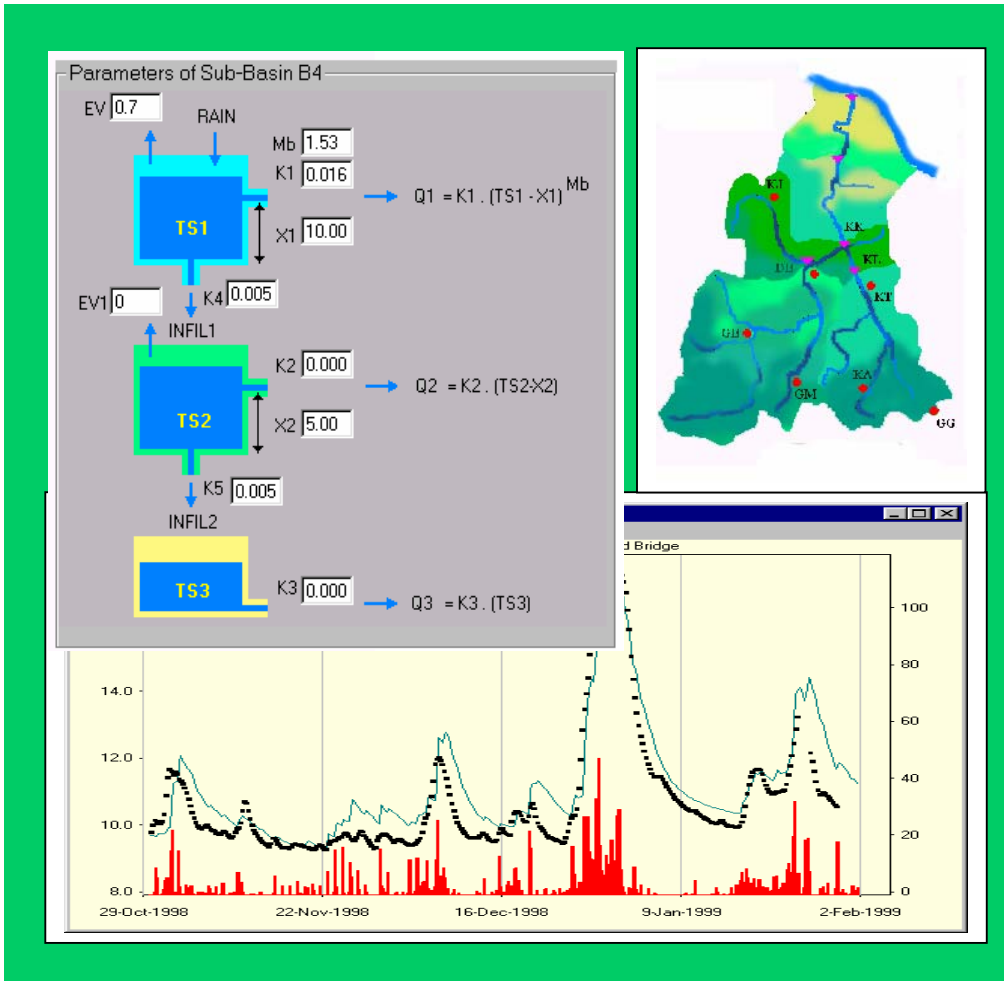
REGIONAL CORPORATION PROJECT IMPLEMENTATION PLAN (RCPIP), WORKING GROUP OF HYDROLOGY, TYPHOON COMMITTEE

4TH ON THE JOB TRAINING

Configuring an Operational Flood Forecasting System based on the Tank Model



Kuala Lumpur, Malaysia
12 July – 6 August 2010

Department of Irrigation and Drainage (DID)
Ministry of Natural Resources, Malaysia

A. *Course Background and Overall Goal*

Flood forecasting is a non-structural measure to mitigate flood loss. By giving advance flood warnings, flood forecasting provides the following benefits:

- early evacuation of property and people so as to mitigate flood loss
- allow authorities to take contingency measures releasing water from dam, activate pumping, diversion of flows etc. to mitigate flood impact.
- Allow authorities to activate emergency response plan to face flooding

In Malaysia, flood forecasting has been successfully implemented in the Kelantan and Pahang River Basins and it is intended that the service be extended to other river basins.

The effort in flood forecasting began in the early seventies following the widespread severe flooding which affected many areas in the country in 1971. The Department of Irrigation and Drainage was subsequently entrusted by the government to provide flood warning and forecasting services to flood prone areas in the country. This led to gradual installation of hydrological data acquisition systems involving telemetry and SCADA as a prerequisite to real-time monitoring of floods, flood warning and flood forecasting.

Several flood forecasting models such as the Sacramento Model, the Tank Model, the Linear Perturbation Model had been configured and put into operational use and among these the Tank Model stood out as an easy to use and effective model for flood forecasting.

The Tank model in its original form was developed by Professor Sugawara of Japan. What attracted DID to use the model was its simplicity of concept, simplicity in computation while achieving forecasting accuracy comparable with more sophisticated models.

There were efforts made to further enhance the Tank Model by way of changing the runoff equation of the outlets and adding an error correction module to adjust the simulated flood hydrograph so as to achieve better forecasting accuracy.

The Typhoon Committee at its Thirty-Third Session in 2000 decided to revive the Regional Cooperative Programme Implementation Plan (RCPIP). The RCPIP working group on hydrology proposed 9 projects to be carried out within a period of 3 to 60 months. Malaysia has decided to conduct an international on-the-job training course on flood forecasting in January 2008, in cooperation with the Typhoon Committee Secretariat (TCS). The proposal was endorsed by the Typhoon Committee during the thirty-ninth Session of the Committee in Manila from 4 to 9 December 2006.

B. *Course Description*

1. Title (No.):

Configuring an Operational Flood Forecasting System based on the Tank Model

2. Objectives:

The proposed on-the job training programme is to enable participants to:

- gain knowledge, appreciation and experience on use of the Tank Model for flood forecasting
- configure a flood forecasting model based on the Tank Model for a selected catchment in the participant's country
- calibrate the Tank Model and preparing the model for operational use in the participant's respective organisation
- develop an error correction module for the Tank Model to enhance forecast accuracy
- develop expertise in writing simple macros (MSExcel) to automate model computations – a skill which can be used to customize the model and further enhance the model in the future

3. Course Output:

To achieve the above mentioned objectives, participants are expected to produce the following outputs by the end of this course:

- Understanding the concept of the Tank Model in simulating flood runoff.
- Configure and calibrate a Tank Model for a river basin in the participant's country
- Develop expertise in simple programming techniques which is useful for future continual enhancement of the model which is to be expected

4. Place and Duration:

Kuala Lumpur, Malaysia, July 16 – August 6, 2010.

5. Total Number of Participants and Candidate Countries:

(1) Number of Participants;

Each country is expected to nominate one engineer who is engaged in flood forecasting or disaster management. For the proposed 4th OJT, the number 3 persons will be selected as agreed by TC.

The date of previous OJT and the countries of the participant as followed:
1st OJT – 21 January -28 February 2008 – Vietnam and Philipines
2nd OJT - 1- 31 January 2008 – China, Loas and Vietnam
3rd OJT – 21 July- 23 August 2009 – China, Thailand and Loas

(2) Candidate Countries;

Cambodia, Democratic People's Republic of Korea (DPRK), Japan, Lao People's Democratic Republic (Lao PDR), Malaysia, Philippines, Republic of Korea, Singapore, Thailand, Viet Nam.

6. Eligible/Target Organization:

Organization involved in flood monitoring, warning and forecasting at the national or local level in the public sector such as government/provincial ministries or municipalities

7. Language to be used in this Course:

English

8. Course Program:

This program consists of the following five (5) phases.

(8.1) Preparatory Phase; (7 April 2010)

Preparatory Questionnaire. All applicants are requested to fill and submit the 'Preparatory Questionnaire' (refer ANNEX I). Participants can download digital copy of form at this link – http://h2o.water.gov.my/train/train.html.

(8.2) Nomination Submission and Notice of Acceptance: 1 Mei 2010

(i) Submission of the Documents for Selection: An interested countries candidate should fill in nominate applicants for the Course and should submit one (1) original Nomination Form and two (2) Preparatory Questionnaire by **7 April 2010** to DID Malaysia.

(ii) Selection: DID reviews the documents for selection, carries out the pre-screening, and send the documents to **TCS** in charge of this course through e-mail by **15 April 2010**. TCS in charge will decide applicants to be accepted among those who fulfill set requirements described in item III.2 below.

(iii) Notice of Acceptance: TCS will inform the applying government of acceptance or non-acceptance of nominees' application no later than **1 Mei 2010 by email and/or letter.**

(8.3) Hydrological data Preparation: 17 March – 7 April 2010

Candidates are advised to prepare the data requirement as specified before acceptance letter by TCS. It is important that all prepared hydrological data for calibrating the Tank Model follow ANNEX II. Participants are required to collect data for developing a Tank Model and submit this data to Hydrology and Water Resources Division, DID, Malaysia by **30 April 2010**. Hydrology data will be checked by DID Malaysia upon received the data from candidates' country. DID Malaysia will inform the candidate's country about the completeness of the data. Digital Copy of the forms can be downloaded at the same link.

(8.4) Program in Malaysia: (12 July – 6 August 2010)

Training	***Type***	***Date***	***Week***	***No. of days***
Flood forecasting using the Tank Model	Lecture	12 July 2010	1	1
MSExcel Macros	Lecture			2
Configuring the Tank Model	OJT			2
Data quality checking and processing	OJT	19 July 2010	2	2
Catchment parameters – calibration of model (1)	OJT			3
Development of Excel macros for automating model computations	OJT	26 July 2010	3	2
Fine tuning model – adjustment of flood simulation to improve forecasts –calibration of model (2)	OJT	28 July 2010		3
Site visit to SMART Tunnel	Site Visit	2 August 2010	4	1
Lecture on telemetry and SCADA, Integrating with SCADA/Telemetry System and preparing the model for real-time flood forecasting, dissemination of flood forecast.	OJT	3 August 2010		2
Other models-enhancements to model – adapting model to changes and additional modules	Lecture	5 August 2010		1
Reports/Discussion	-	6 August 2010		1
			Total No. of Days	**20**

*OJT: On the Job Training

(8.5) Implementation Phase; (7 August 2010 – 8 October 2010)

i) In order to put to use the technologies, knowledge and experience they obtained from this training course, all participants should share the outputs

of this training program within their organization in 60 days after going back to home country and assist their respective flood forecasting service in testing the model in real-time operation with the view of adopting the model for flood forecasting.

ii) All participants should submit the report on the above-mentioned of 60 days activities to the Hydrology and Water Resources Division, DID, Malaysia and Carbon Copy to Chairman Of Working Group of Hydrology by **14 October 2010**. The Report Format will be given during OJT in Malaysia.

iii) The participants are expected to present their flood forecasting model in the next TC working group of hydrology workshop.

C*. Conditions and Procedure for Application*

1. Responsibility of the Participating Countries/Organizations:

(1) Participating countries/organizations are expected to nominate Applicants with relevant experience, is motivated and is committed to address the problem of flood mitigation via flood warning and forecasting.

(2) The organizations are required to facilitate the participants to disseminate what they learned in the course to others in the organization and to assist the participant in testing and implementing the flood forecasting model developed. Due to the short period of training it is expected that there may be certain issues or aspects of flood forecasting not addressed or adequately addressed. However it is the intention that the training will provide sufficient capacity to the participants to modify the model and to add additional requirements as deemed fit.

2. Qualifications of Applicants:

Applicants should:

(1) be nominated by their governments in accordance with the procedures mentioned in the chapter IV

(2) be the technical managers or engineers with at least **five years** experience and currently engaged in flood monitoring, flood warning and forecasting issues in the public sector and **below 45 years old**.

(3) be university graduates or equivalent

(4) be proficient in spoken and written English

(5) be familiar with MS Excel Spreadsheet software

(6) be in good health both physically and mentally

(7) be non-military personnel

3. Required Documents:

Please refer to item II. 8: Course program.

4. Procedure for Application and Selection:

Please refer to item II. 8: Course program.

5. Rules for Attendance:

Participants are requested to observe the following rules for attending the course:

(1) to observe strictly the course schedule
(2) not to change course subjects or extend the course period
(3) not to bring any members of their family
(4) to return to their home country at the end of the course according to the international travel schedule designated by DID
(5) to refrain from engaging in political activities or any form of employment for profit of gain
(6) to observe the rules and regulations of their place of accommodation and not to change accommodations designated by DID

*Participants who have successfully completed the course will be awarded a certificate by DID

D. *Administrative Arrangements*

1. Travel to Malaysia:

(1) Air Ticket: Round-trip ticket between an international airport designated by TCS.

(2) Travel and health Insurance: Travel and health insurance is insured by TCS.

2. Accommodation:

Accommodation for participants in Malaysia will be arranged by DID Malaysia as follow:

DID Training Centre Hostel,
Human Capital Development Division,
Department of Irrigation and Drainage,
Kompleks JPS Ampang, Jalan Air Bukit Off Km 7,
Jalan Ampang, **68000 Ampang,**
Kuala Lumpur, MALAYSIA.
Tel: 603 - 4256 2657 Fax: 603 – 4251 3064

The participants shall register to the hostel upon arrival. An officer from the hostel in charge will be there.

3. Living Expenses:

Living expenses for the participants while in Malaysia will be provided by DID
(1) Allowances for accommodation, and
(2) Food allowance

At present, Malaysian Law requires the **successful participants** to submit their VISA application (apply for "Professional Visa") as per ANNEX III together with taxation form before they come to Malaysia as per ANNEX IV. These forms shall be attached together for applications. The forms can be downloaded at website: http://h2o.water.gov.my/train/train.html

4. Course Implementing Organization:

Flood Forecasting Unit,
Water Resources Management and Hydrology Division,
Department of Irrigation and Drainage,
Ministry of Natural Resources, Malaysia
Km7, Jalan Ampang
68000 Kuala Lumpur, MALAYSIA
Tel: 603 – 4289 5400
Fax: 603 – 4256 3735

ANNEX:

ANNEX I : Preparatory Questionnaire

ANNEX II : The data for the exercise of developing a flood forecasting scheme

ANNEX III : VISIT PASS APPLICATION FORM (IM. 12-Pin.1/97)): FOREIGN VISITORS – PROFESSIONAL VISIT PASS

ANNEX IV : INLAND REVENUE BOARD OF MALAYSIA (NR/R/PS1)

CHECKLISTS

No	Item	Send by	to	Send by Date
1	Nomination Form: One (1) original and three (3) copies Preparatory Questionnaire (refer to ANNEX I) (Participants are advised to pre prepare the flood forecasting data)	Participants	DID Malaysia	7 April 2010
2	Documents to TCS in charge of this course through e-mail	DID Malaysia	TCS	12 April 2010
3	Notice of Acceptance and Non-acceptance (if possible through e-mail for early notification to asmadi_ahmad@water.gov.my and Cc to zainabhashim@water.gov.my	TCS	Participants	15 April 2010
4	Data developing a flood forecasting scheme (refer to ANNEX II should be submitted to the Hydrology and Water Resources Division, DID, Malaysia	Participants	DID Malaysia	30 April 2010
5	Taxation Declaration and VISA Forms (ANNEX III)	participants	Malaysia Immigration	Before your flight to Malaysia
		Date		
6	OJT in Malaysia	12 July – 6 August 2010		
7	Implementation Phase in Participant's Country	7 August 2010 – 8 October 2010		
8	Report Submission on Item No 7 above	By 14 October 2010		
9	TC Working Group of Hydrology (Paper Presentation)	By each participant in the next TC Workshop		