



Department of Public Works and Highways
Flood Control and Sabo Engineering Center



FCSEC Newsletter

Volume 1, 2007



AMIDST WATER-RELATED DISASTERS

Super typhoons, mudflows, landslide, devastation, damages, deaths... these and other gloomy stories pervade last year's water-related disasters. Occurring in many parts of the country notwithstanding international help and domestic effort, the government and the people realize there is much needed work towards disaster mitigation. It is acknowledged that structural measures are not enough, given the increasing magnitude of disasters and considering the high cost of infrastructures. Non-structural measures and other mitigation strategies are urgently needed.

This maiden issue of the Flood Control and Sabo Engineering Center (FCSEC) newsletter introduces the center and shows its humble contribution to disaster mitigation, focusing on capability building of the country's main infrastructure agency, the Department of Public Works and Highways. This newsletter hopes to provide linkages and information among DPWH offices and other agencies in disaster mitigation.

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The DPWH Hydraulic Laboratory (Grant Aid from the Government of Japan)

By: Jerry A. Fano

The hydraulic laboratory, a grant aid from the Government of Japan was inaugurated on July 17, 2003. It is intended to help upgrade, revise and verify the formulated technical standards and guidelines, to verify and recommend flood control and sabo structures through modeling, to develop skills of local counterparts and to demonstrate the hydraulic phenomena primarily to the DPWH engineers.

The Hydraulic Laboratory is managed and operated by the DPWH PMO - Flood Control and Sabo Engineering Center (FCSEC). The laboratory aims to support the enhancement activities of the center by providing adequate researches and studies on determining technologies and appropriate flood control and sabo structures. The laboratory works also play an integral part on the training activities of FCSEC. The project implementing offices, regional offices, district offices, as well as consultants and other entities are envisioned to benefit from the operation of the laboratory.

Building Features

The building covers a 2-storied reinforced concrete laboratory having a floor area of 2,224 m². The spacious venue houses state-of-the-art hydraulic equipment and apparatus that can be utilized to perform sundry of experiments, to wit:

1. Wide Flume

Length : 40m
Width : 3m
Depth : 70cm
Slope : 0 ~ 1 / 50



For experiments on the hydraulic phenomena affected by cross sectional flow and for experiments of actual river planning.

2. Two-Dimensional Flume

Length : 20m
Width : 0.5m
Depth : 60cm
Slope : 0 ~ 1 / 50



For basic experiments on sediment transportation and two-dimensional flow.

3. Debris Flow Flume

Length : 20m
Width : 0.5m
Depth : 60cm
Slope : 0 ~ 1 / 50

For basic experiments on behavior of sediment transportation at sabo section and for slope stabilization works for steep slope rivers.



4. Lahar / Alluvial Fan Flume

Length : 20m
Width : 1.0m
Depth : 60cm
Slope : 0 ~ 50 lahar
Slope : 0 ~ 1/50 Alluvial

For basic experiments on behavior of sediment transportation of lahar at alluvial fan section of the river.



5. Artificial Rainfall Apparatus



For experiment on slope erosion, landslide and rainfall intensity. With adjustable / changeable nozzle for rainfall intensity variation.

6. Demonstration Models



For presentation to visitors of the facility.

It is envisioned that the utilization of the hydraulic laboratory and related facilities will contribute towards the strengthening of the overall flood management function of the DPWH, through the development of efficient and sustainable flood control and sabo engineering structures which will mitigate water induced and sediment related disasters.

FCSEC Library

By: Adolfo M. Rey

After several years of collecting development studies, reports, books, master plans, and other reference materials on flood control and sabo works, the library of FCSEC is now open to provide materials and information to offices both public and private.

The following are some of the available reference materials in the FCSEC library:

- ✓ River Jurisdiction Maps and political boundaries for every District Offices of the Department Public Works and Highways
- ✓ Master Plan of major river basins in the country, i.e., Agno River Basin, Lower Cotabato River Basin, Pasig-Laguna Bay River Basin, etc.
- ✓ Feasibility Studies of different major and principal river basins in the country' i.e.,

Cagayan River, Mangahan Floodway, Sacobia-Bamban/Abacan River, Parañaque Spillway and Pasig River Cut-Off, etc.

- ✓ Other development studies i.e., Disaster Prevention and Reconstruction in Camiguin, Flood Control Project Implementation System in Principal Rivers, etc.
- ✓ Computer Books and technical journals and other related references.
- ✓ Books on Water, sediment and related subjects

This FCSEC library also provides the materials and services to support the academic research and programs of other DPWH offices, other government offices, LGUs, academe and other activities.

From page 5: Project ENCA Highlights

FCSEC started conducting field investigations on damaged structures in 2001. Investigation results were prepared for the damaged or ineffective structures, such as, revetment, dike, spur dike, ground sill/weir and bridge. Such information are presently being maintained and continuously updated by FCSEC in its database (MS Access format). Through the initiative of FCSEC and the Bureau of Maintenance, Inventory Forms of Flood Control/Drainage Structures and River Jurisdiction Maps were duly filled-up and submitted by the District Engineering Offices (140/160 DEOs).



Trial Use of River Jurisdiction Maps and Inventory Forms with maintenance engineers at the Cavite DEO



Experiment on Scouring at Bridge Piers



DPWH Undersecretary Manuel M. Bonoan and Japanese Ambassador Kojiro Tanaka during the ribbon-cutting ceremony

Under research and development, FCSEC and other participating DPWH offices began to have a better understanding on the river phenomena with the inauguration of the JICA donated Hydraulic Laboratory Building on July 17, 2003. Initially, FCSEC staff were lectured on HLB Equipment Familiarization/Calibration, HLB Demonstration and Basic Experiments. Later on, more complex cases were undertaken with the supervision of JICA short-term experts, such as:

- a. **Pasig-Potrero River**
 - Experiment on Fine Sediment Movement and
 - Experiment on Suspended Load Transport
- b. **Badoc River**
 - Experiment on Effective Arrangement of Spur Dike
- c. **Other**
 - Experiment on Permeable Type Spur Dike

Project for Enhancement of Capabilities in Flood Control and Sabo Engineering (Project ENCA) Highlights

By: Michael T. Alpasan

The first JICA Project Type Technical Cooperation (PTTC) in DPWH, the Project for Enhancement of Capabilities in Flood Control and Sabo Engineering of the DPWH (Project ENCA, Phase I) was implemented in January 10, 2000 to June 30, 2005 by the PMO-Flood Control and Sabo Engineering Center. The technical manuals and guidelines formulated by FCSEC and officially disseminated to the DPWH Main Offices and Regional/District Engineering Offices are shown in Table 1. In addition, various reference materials such as technical books and study reports were collected and maintained at the FCSEC Library.

Table 1. FCSEC Technical Manuals and Guidelines

Title	Authorized Thru:
1. Technical Standards and Guidelines in Planning and Design	Department Circular No. 4, s.2002
2. Typical Design Drawings on Flood Control	Department Circular No. 2, s.2003
3. Manual on Flood Control Planning	Department Circular No. 5, s.2003
4. Manual on Design of Flood Control and Drainage Structures	Department Circular No. 5, s.2005
5. Manual on Construction Supervision of Flood Control Projects	Department Order No. 28, s.2005
6. Manual on Maintenance of Flood Control and Drainage Structures	DPWH Secretary Memorandum dated April 20, 2005



FCSEC Technical Manuals and Guidelines officially disseminated to DPWH Offices

Tables 2 to 4 show the DPWH offices covered by the three (3) training courses formulated by FCSEC under the Project and implemented in coordination with the Human Resources Training and Materials Development Division-AMMS and the concerned DPWH Regional Office.



Training on Planning and Design of Flood Control Structures (Lecture) in AMMS for DPWH Region V engineers held on August 14 -18, 2005.

Table 2. Regions Covered by the Training on Planning and Design of Flood Control Structures

Region	Lecture	Site Practicum	OJT (Completion)	No. of Offices
I	June 24-28, 2002	July 08-12, 2002	2003	11
III	September 09-13, 2002	September 23-27, 2002	2004	17
IV-A	July 21-25, 2003	August 04-07, 2003	2005	14
II & CAR	August 16-20, 2004	September 07-09, 2004	2006	23

Table 3. Regions Covered by the Training on Construction Supervision of Flood Control Projects

Region	Schedule	No. of Offices
III	January 17-19, 2005	11
IV-A	March 14-16, 2005	16

Table 4. Regions Covered by the Training on Maintenance of Flood Control and Drainage Structures

Region	Schedule	No. of Offices
I	September 01-03, 2004	7
III	January 19-21, 2005	6
IV-A	March 16-18, 2005	17

Prior to the end of Phase I, an Assessment of Trainings under the Project was conducted on May 12, 2005 and participated by former training participants, their immediate supervisors and resource speakers of the three (3) training courses. The meeting resulted in an improvement plan for the succeeding trainings.



Assessment of Trainings held at Pearl Hotel, Manila on May 12, 2005.

Project for Strengthening the Flood Management Function of DPWH, Project ENCA, Phase II

By: Grecile Christopher R. Damo

To sustain the gains of the Project ENCA, Phase I, the Government of the Philippines and the Government of Japan agreed for the Phase II of the Project. The Project for Strengthening the Flood Management Function of the Department of Public Works and Highways (Phase II of Project ENCA) started in June 2005 and will end on June 2010.

The super goal of the project is that water-induced disasters are mitigated through improved effectiveness of flood control and sabo structures and other measures implemented by DPWH for sustainable development. This will be realized if the overall goal is met which is the construction and implementation of more effective and appropriately designed flood control structures/facilities in accordance with the technical standards, guidelines and manuals.

Under the project, there are five (5) outputs namely: (a) implementation of pilot projects; (b) research and development; (c) training; (d) information management; and (e) creation of the internal support mechanism. These outputs, in principle, will strengthen the flood management function of DPWH.

a. Implementation of Pilot Projects

FCSEC developed several manuals and Technical Standards and Guidelines as reference for the DPWH Engineers in flood control planning and design, construction and maintenance under the Project ENCA (2000-2005). In order to check the applicability and effectivity of the said manuals, pilot project will be implemented using these developed manuals.

After field investigation and evaluation, the selected pilot projects for implementation are: (a) Kinanliman River (1st Quezon, Region IV-A) flood control works – 2007, (b) Digmala River (2nd Nueva Ecija, Region III) flood control works – 2008, (c) Sta. Fe River (Nueva Vizcaya Sub, Region III) sabo works – 2009,. Preparation of survey plans and detailed engineering for Kinanliman River is now on going.

b. Research and Development

The Government of Japan constructed and donated the hydraulic laboratory in 2003, and the FCSEC staff has been performing several experiments since. These experiments are needed to update the developed technical standards and guidelines and manuals of the DPWH in flood control and sabo and support the development of appropriate countermeasures.

Several experiments have been conducted in the laboratory, namely:



Presentation of on-going experiments to FCSEC visitors

- Effective arrangement of spur dikes as countermeasure against bank erosion (Badoc River)
- Effective arrangement of spur dikes as countermeasure against bank erosion in Agos River.
- Several experiments modeling on Kinanliman river, Agos river, Mt. Mayon sediment and on vanes are initiated and are expected to be completed in this year's first quarter.

c. Training

There are three (3) training courses in flood control being conducted by FCSEC, they are: (a) Planning and Design; (b) Construction; and (c) Maintenance. For planning and design there are three (3) components – the 5 days lecture, site practicum and planning and design stage, for construction and maintenance there are two (2) components the 2 ½ day lecture and half day site practicum. The center is currently working on the development of curriculum for the Sabo training and the accreditation of flood control/river engineers.



Lecture on Planning and Design of Flood Control Structures held at AMMS

Just soon after the commencement of the project SFMF, engineers from regions V and VI have participated in the training courses for flood control. The training courses are expected to be completed for all the regions by the end of the project.

d. Information Management System

Information management system is established for more effective flood management function of DPWH.

FCSEC maintains a database on profile of damaged flood control structures. It is also completing the database for the inventory of flood control structures in the country. River jurisdiction maps and other base maps are also available and are very useful in planning activities. The center is working on improving the library materials and the establishment of more databases.

e. Internal Mechanism

DPWH creates the internal mechanism to sustain the development of technology and organization in the field of flood control and sabo engineering. The Project Management Office – Flood Control and Sabo Engineering Center spearheads the implementation of the project.

The Joint Coordinating Committee (JCC) and the Technical Working Group (TWG) created under the Project ensure that the development of technology and policies in flood control and sabo engineering are institutionalized. The project brochure and two technical reports about the experiments were disseminated this year for information and reference. FCSEC provides technical assistance to various DPWH offices, academe, other agencies and at times, Local Government Units (LGUs).



2nd JCC Meeting held on December 20, 2006 at the Operations Room, Office of the Secretary

Conference/Seminar Report

DPWH Engineers Attended International Conference on Integrated Sediment-Related Disaster Management

August 3-5, 2005, Yogyakarta, Indonesia

By: Jesse C. Felizardo

Privileged to attend the International Conference on Integrated Sediment-Related Disaster Management held on August 3-5, 2005 at Gadjah Madja University, Yogyakarta, Indonesia. were Mr. Irwin Antonio of 1st Leyte District Engineering Office, Mr. Wataru Sakurai, JICA Sabo Expert and this writer of PMO-FCSEC. The theme focused on the, "Sediment-Related Disaster in the 21st Century, Challenge for Improving Awareness and Willingness for Better Living." The conference was attended by approximately 500 delegates from Indonesia, Japan, Nepal, Canada and the Philippines.

In the topic sessions, the Capacity Building of Government Engineers through Hydraulic Laboratory Experiment was presented by this writer. Mr. Irwin Antonio spoke on Community Commitment for Sustained Efficiency of Infrastructures, Ormoc City and Mr. Sakurai delivered Community Based Non-Structural Disaster Prevention Measures for the Province of Camiguin, Philippines. Some topic sessions highlighted the inclusion of increasing public awareness of the community as a countermeasure for disaster management through formal and non-formal education. Speakers from Japan, Indonesia and Nepal stressed the importance of information, education and communication in disaster prevention. Initiatives in the different levels of their education include specialized course in sediment disaster from elementary to masteral level, workshops for the different schools, training of trainers, and discussions with the local communities. Also, the visit to Mt. Merapi, one of the most active volcanoes in the world, oriented the participants on the Indonesian method of planning and design of sediment control works. The proposed low cost multi purpose sabo dam introduced soil cement as one of the construction materials, which impressed some participants.

During free time, we were treated to a cultural drama dance show, the Ramayana ballet, at the open theater of Prambanan. It is believed to be the best in the world surpassing the original Hindu dance. The conference promoted network among experts which provide forum for the exchanges of ideas, technology and cooperation not only during but also after the conference.



Irwin Antonio, Wataru Sakurai and Jesse C. Felizardo at the Conference in Indonesia

Regional Refresher Seminar on Integrated River Basin Management and the Environment-Exploring Capacity Building and Institutional Development Needs

October 24-30, 2005, Beijing, China

By: Dolores M. Hipolito

The UNESCO-IHE Institute for Water Education Delft, the Netherlands in Collaboration with the Administrative Center for China's Agenda 21 and Peking University, Beijing, People's Republic of China successfully organized and conducted the Regional Refresher Seminar on Integrated River Basin Management-Exploring Capacity Building and Institutional Development Needs on October 25-30, 2005 at Xijiao Hotel in the City of Beijing.

The seminar was attended by 19 alumni of UNESCO-IHE from 8 countries and 15 participants from China. The program included a series of lectures, case studies, group work and technical site visits.

As an alumnus of the institute, having obtained my Master of Science degree on Water and Environmental Resources Management in 1999, I was invited to the regional refresher seminar along with other alumni from Asia and the Middle East, and was awarded fellowship by the UNESCO-IHE covering the travel cost and other expenses.

The seminar is relevant to DPWH's role in flood management and water resource development, considering that integrated river basin management (IRBM) approach is now acknowledged to be the best approach in integrating water and land activities in the basin for sustainable development.

The participants comprised of water managers, water service providers, hydrologists, environmentalists and other stakeholders in water resources.

I, along with participants from Indonesia, Nepal, Bangladesh and China presented IRBM issues and challenges in our respective countries. The fruitful exchange of experiences and sharing of information was quite interesting and gave us more understanding of the challenges in water management. The IRBM issues and challenges I presented are on: governance, water regulation, public disclosure and participation, water pricing and water rights, effective regulations, vulnerability to disasters and others i.e., lack of database research and development, etc.

The organizers were kind enough to include some cultural activities in our program. We enjoyed the social evenings at traditional Chinese restaurants, a cultural show at the famous Lao Tse Teahouse where visiting heads of state and other dignitaries are entertained. A visit to China will not be complete without the experiences of climbing the Great Wall and walking at the vast Tiannamen Square.

Flood For Thought ...

There are 18 major river basins in the country with drainage areas of more than 1,400 km². The longest river is Cagayan River in Region II with a length of 505 kms and drainage area of 27,280 km².



Participants from Asian countries (Philippines, Indonesia, India, Nepal, Vietnam, Bangladesh, Lao PDR, China, etc.) with the lecturers/resource speakers from UNESCO-IHE and Peking University. The Philippine alumni participants included this writer from DPWH, Engr. Rodney Peralta from LWUA and Ms. Maribeth Fruto from DENR Region V.

ASIAN WATER CYCLE SYMPOSIUM

November 2-4, 2005
Tokyo, Japan
By: Resito V. David

Water-related disasters such as floods and droughts are major challenges that need to be overcome in order to ensure sustainable human development and alleviate poverty. Devastating water-related disasters have increasing trends in the Asian Region, and their damage impact is becoming more and more pronounced in the socio-economic spheres.

Disaster Coordinating Council (NDCC) / Office of the Civil Defense (OCD) database from 1990 to 2004. A template based on the country report of the author was drafted to be commonly used by participating countries i.e., China, Japan, Thailand and other Southeast Asian countries.



The author, through the sponsorship of the Japan and Science and Technology Agency attended the Asian Water Cycle Symposium in the University of Tokyo, Tokyo, Japan from 2-4 November 2005. The symposium addressed the issues on how water resources management has become one of the key issues of the century and that flood and droughts have become completely uncontrollable resulting to large socio-economic losses.

Through water and sediment symposia - like the Asian Water Cycle Symposium - ideas and experiences are shared, water-related issues and risks are recognized and addressed in coordinated manner.

The symposium was attended by 133 participants from different Asian countries. The reports and discussion presented vary from water-related issues such as floods, droughts, landslides, water supply inaccessibility, river and water environment and the effects of climate change.

To address the issues, coordinated scientific approaches and combination of global earth observation system with physical, chemical, biological and socio-economic information in the local scale are recommended.

The author presented a country report entitled "Water-Related Disaster Threats in the Philippines" which included a table of Annual Flood Damages based on the National

Participants From the Asian Water Cycle Symposium posed for souvenir group picture. Dir. David is 2nd from right in the seated front row (encircled).

As a developing country, the Philippines is a recipient of Overseas Development Assistance (ODA) including grant-aid projects when water-related disasters occur. It would be an advantage if the country can provide credible and dependable flood damage data annually to facilitate appropriate mitigating measures with technical and financial assistance from donor countries. Through the DPWH, data management system of water-induced and sediment related disasters should be coordinated with other government agencies to harmonize methodologies on arriving at credible figures.

Flood For Thought ...

The tragic flash flood in Ormoc City on November 05, 1991 killed almost 8,000 persons. The Anilao and Malbasag Rivers are the rivers flowing towards Ormoc City.

INTERNATIONAL WORKSHOP ON FLOOD RISK MANAGEMENT

January 23-27, 2006

Tsukuba, Japan

By: Resito V. David

In April 2005, the Government of Japan proposal to set-up the International Centre for Water Hazard and Risk Management (ICHARM) at the 33rd General Conference of UNESCO was accepted. Now established, the ICHARM functions as the core of research, training and information networking activities on water related hazards and risk management at national and international levels.

Last January 23-27, 2006 ICHARM invited the Project Director of FCSEC to present the topic *"Philippine Case Study: Technical Cooperation Project for the Enhancement of Capabilities in Flood Control and Sabo Engineering"* in the International Workshop on Flood Risk Management in its facility in Public Works Research Institute, Ministry of Land Infrastructure and Transport, Tsukuba, Japan.

The workshop had the following five (5) topic sessions:

- (a) Hazard Risk Assessment and Monitoring
- Vulnerability of societies to hazards is normally

- Reducing human and property vulnerability / risk while reaping the benefits of flood is good governance.
- (d) Capacity Building and Technical Info-Sharing
- Flood-risk mapping training program is offered to flood-prone member Asian countries at the center.
- (e) Technical Assistance
- Development of case studies for Integrated Flood Management
 - ICHARM to get services of social and behavioural scientists to improve decision making

The participants had outlined the following recommendations accrued from attending the Workshop to benefit the DPWH organization

- (a) Data exchange important to river management
- (b) FCSEC as global affiliate to ICHARM
- (c) Enforcement of laws/policies leading to risk reduction from floods
- (d) Adopt Integrated Flood Management Approach
- (e) Promote and heighten interest in river and sabo (erosion and sediment control) engineering.



overshadowed by more pressing development issues. Vulnerability is difficult to conceptualize. Reduction of people's exposure to risk is a political issue.

- Assignment of ICHARM affiliates globally
- (b) Early Warning, Forecasting and Real Time Observations
- Implement global flood risk information service framework
 - Lead time and data credibility crucial to effective evacuation system
- (c) Governance and Integrated Flood Management

Participants from the International Workshop on Flood Risk Management posed for souvenir group picture. Dir. David is 1st from right in second row.

Flood For Thought ...

The World Meteorological Organization (WMO) Guide to Hydrometeorological Practices recommends at least one rainfall station for every 600-900 km² for flat regions and at least one station for 100-200 km² for mountainous regions.

4TH WORLD WATER FORUM

March 16-23, 2006, Mexico City

Dir. Maria Catalina E. Cabral
PM Dolores M. Hipolito
Mr. Jerry A. Fano

OIC-Director
Project Manager II
Engineer III

Planning Service
PMO-FCSEC
PMO-FCSEC

Several DPWH staff shone in the triennial event 4th World Water Forum which convened in Mexico City on 16-22 March 2006. The Forum – the largest international event on freshwater - seeks to enable multi-stakeholder participation and dialogue to influence water policy-making at a global level, in pursuit of sustainable development. The 4th Forum's main theme, "Local actions for a global challenge," was addressed through five framework themes:

- a. Water for Growth and Development
- b. Implementing Integrated Water Resources Management (IWRM)
- c. Water Supply and Sanitation for All
- d. Water Management for Food and the Environment
- e. Risk Management

Over 200 thematic sessions were held, and almost 10,000 participants attended, representing governments, UN agencies, intergovernmental organizations, non-governmental organizations (NGOs), academia, business and industry, indigenous groups, youth and the media. The Philippines DPWH group comprised of Dr. Maria Catalina E. Cabral, OIC-Director of Planning Service, PM Dolores M. Hipolito and Engr. Jerry A. Fano, Project Manager II and Engineer III respectively, of the PMO-FCSEC. The participants were invited to the Forum under the sponsorship of the Japan Water Forum, Japan International Cooperation Agency (JICA) and the World Meteorological Organization (WMO) to present the following local actions:



PM Hipolito grouped in a panel under topic session "Tsunami, Landslide and other Natural Disasters"

- a) *"Application of Flood Vulnerability Index in the Philippines"*
Topic Session : FT 5.19 : Collaborative Approach Among International Agencies for Effective Flood Management – International Flood Initiative
Dir. Ma. Catalina Cabral, Planning Service
- b) *"Basic Study for Non-Structural Disaster Prevention Measure, Camiguin Island"*
Topic Session : FT 5.04 Partnership Building at Community Level
PM Dolores M. Hipolito, Project Manager II, FCSEC
- c) *"Countermeasures for Debris Flow and Flashflood, Quezon, Philippines"*
Topic Session : FT 5.20 : Flashfloods
Engr. Jerry A. Fano, Engineer III, FCSEC

The group was then requested by topic convenors - International Flood Network (IFNet) and Japan Water Forum (JWF) – through Mr. Yoshio Tokunaga, JICA Chief Advisor for the Project for Strengthening the Flood Management Function of the DPWH, who accompanied and acted as coordinator to the group, for presentations in their sessions.

Two (2) additional presentations were developed through the coordination of FCSEC staff, Engr. Jesse Felizardo who provided the materials via email correspondences and from the available file materials fortunately carried by the participants, these were titled:

- a) *"Philippines, Leyte Island, 2006 Landslide Disaster"*
Topic Session : FT 5.14 : Tsunami, Landslide and other Natural Disasters
PM Dolores M. Hipolito, Project Manager II, FCSEC
- b) *"Strategies in Disaster Mitigation"*
Topic Session : FT 5.06 : Sharing Experiences for Water Related Disaster Risk Management
Dir. Ma. Catalina Cabral, Planning Service

Philippine participants to the Forum included notable officials from various National Government Agencies (NGAs) and Non-Governmental Organizations (NGOs). Shown at the photos below with the DPWH participants are DENR Sec. Angelo Reyes and wife, Government Corporate Counsel Atty. Agnes VST Devanadera, LLDA Gen. Manager Casimiro Ynares III and wife, NWRB Exec. Dir. Ramon Alikpala, MWSS Deputy Administrator Macra Cruz and MWCI President Tony Aquino.



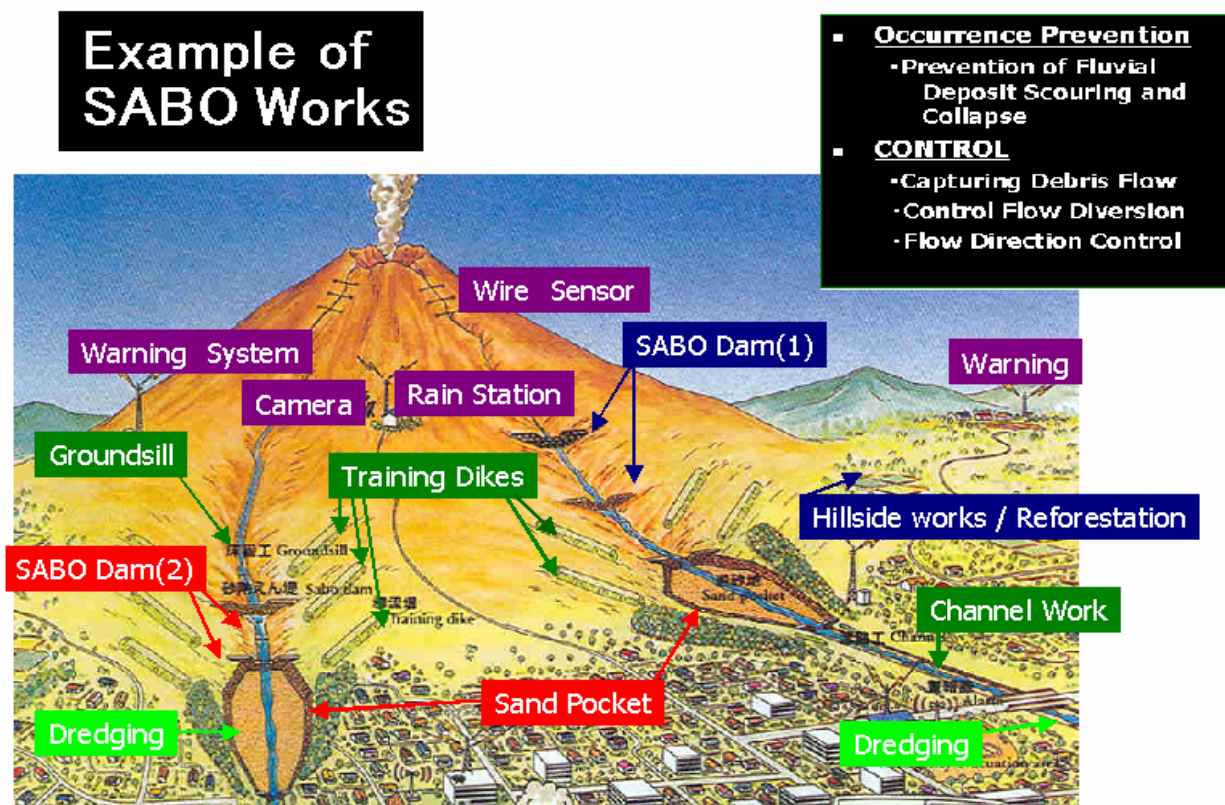
Participants from various NGAs were welcomed in a sumptuous dinner hosted by the Philippine Ambassador in Mexico City.



Filipino Participants Take time to pose for posterity during lunch break

The participants' experience and exposure in the Forum advanced their understanding of water related disasters through the gathered information and knowledge. The river basin-wide approach in water resource management is being acknowledged as the integral approach towards sustainable use of fresh water. Similarly an Integrated Flood Management approach is now recognized as a comprehensive approach towards flood mitigation.

From page 17... BITS OF KNOWLEDGE ON SABO



Introducing...

Personalities in the Sector

Yoshio Tokunaga,

Chief Advisor of the Technical Cooperation Project

By: Michael T. Alpasan

Mr. **YOSHIO TOKUNAGA**, 42, is the incumbent Chief Advisor of the JICA Technical Cooperation Project (TCP) for Strengthening the Flood Management Function of DPWH. As Chief Advisor, he is tasked with providing recommendation and advice to the Project Director on matters pertaining to the management and implementation of the TCP. Prior to his dispatch to the Philippines, he was working as Deputy Director of the Water Resources Planning Division of the Ministry of Land, Infrastructure and Transportation (MLIT) in Japan (2003-2005). At that time, he was spearheading the information drive on water to other countries and intergovernmental organizations. At present, he is a member of the *Japan Water Forum.



A graduate from Hokkaido University in Sapporo City, he started his career in 1990, working at the River Division of the Sizuoka Prefectural Government in Japan. His main job at that time was the formulation of a Basic River Environmental Plan. After working for the local government for 2 years, he ventured into policy-making relative to seacoast conservation and others as chief engineer in the Ministry of Construction (1992-1995).

As Chief of Engineering Division of Yamba Dam Work Office (1996-1997), he spearheaded the information campaign on the importance of flood mitigation structures to the residents. During the campaign, he realized the difficulty in making the residents understand and cooperate due to their attachment to their lands and properties.

He served as Second Secretary in the Embassy of Japan in Indonesia (1997-2000), promoting Overseas Development Assistance (ODA). During his tour of duty in Indonesia, he also coordinated JICA surveys/development studies and JBIC loan projects on flood control and other infrastructures. Such experience according to him better equipped him in the implementation of the TCP.

After his stint in Indonesia, he worked for the Dam Engineering Center in Japan, which is one of the institution under the Ministry of Land, Infrastructure and Transportation (MLIT), as planning director (2000-2003) and developed advanced methods for dam construction. In 2003, He was a member of the committee involved in the publication on "Current Activities on Dams in Japan".

During his short stay in the Philippines, he has already observed and cited the vulnerability of the country from water-induced disasters as evidenced by floods in Oriental Mindoro, Quezon and other parts of the country, which claimed numerous lives and caused damages to properties. He suggests that the government, particularly, the Department of Public Works and Highways (DPWH), should make effective use of available data from completed foreign-assisted/local studies and projects in order to prepare a comprehensive plan/approach in mitigating floods and other water-induced disasters.

With regards to the limited budget allocation for flood control, Mr. Tokunaga emphasizes that DPWH strengthen its database relative to inventory of river structures and damages caused by floods in order to justify to the decision-makers the importance of such structures which often damage other infrastructures constructed by the government, such as roads and bridges. He recommends a more strengthened organization or an inter-agency committee which will provide a more coordinated effort in the management of the country's numerous river basins.

Now staying in Makati City with his wife and two children, he is looking forward to the success of the TCP which he believes will greatly contribute to mitigation of water-induced and sediment-related disasters in the country.

* Japan Water Forum: <http://www.waterforum.jp/eng/index.html>

Flood For Thought ...

The Japan Bank for International Cooperation (JBIC) formerly the Overseas Economic Cooperation Agency (OECF) has provided loans for flood control projects, usually on the basis of JICA master plans and feasibility studies. From the beginning of ODA loan operation in 1972, JBIC has committed the first flood control project "Manila and Suburbs Flood Control and Drainage Project" in 1973.

Introducing...

Personalities in the Sector

Resito V. David,

Project Director of PMO-FCSEC

By: Michael T. Alpasan

Mr. RESITO V. DAVID, 51, is the Officer-In-Charge of the PMO-Flood Control and Sabo Engineering Center since its creation in December 1999. He spent majority of his 28 years in government service honing his knowledge and experience in urban drainage, river management, flood control and sediment movement control engineering.



It was in 1977 when he entered into government service as a flood control and drainage Project Inspector in the then Bureau of Public Works. In 1981, he found interest and passion in structural countermeasures on floods when he transferred to the Bureau of Flood Control and Drainage as a Supervising Civil Engineer I. He worked as counterpart to the first DPWH In-house JICA Consultant for Flood Control, Mr. Takashi Inoue, with whom he learned a lot of things including formulation of basic river survey and planning manuals. The interest and passion became more strengthened when he entered the PMO-Major Flood Control Projects in 1983. It was in the PMO where he developed capability in the conceptualization and planning of various flood control projects in major river basins, notably the Pampanga, Agno and Agusan River Basins. He was Resident Engineer for Effective Flood Control Operation System (EFCOS) Project, Phase I (1990-1993).

From 1993-1996, he was Construction Engineer of the Pampanga Delta Development Project (PDDP)-Phase I, Flood Control Component. He became a full-fledged Project Manager in 1996 and served as the Assistant Project Director for Administration in the PMO-Major Flood Control Projects. It was in December 1999 when former Secretary Gregorio R. Vigilar assigned Mr. David then Project Manager II, to manage the newly created PMO-Flood Control and Sabo Engineering Center, implementing office of the JICA-assisted Project for Enhancement of Capabilities in Flood Control and Sabo Engineering of DPWH, Phase I. As the first technical cooperation project in DPWH evolving not on physical outputs rather on human resources development and capacity building for the infrastructure arm of the government, Mr. David adapted slowly but surely to his new role with the able assistance of the JICA Chief Advisors dispatched for the Project, namely, Mr. Hideaki Fujiyama (2000-2003), Mr. Toshiyuki Kano (2003-2005) and at present, Mr. Yoshio Tokunaga (2006-2008). He also gave credit to the short but

fruitful collaborative work of Professor Peter P.M. Castro of the University of the Philippines-Diliman during the initial stage of the project.

In order to widen his perspective in water resources management, he actively participates in related water conferences as member of the Philippine Water Partnership and International Water Resources Association. Recently, he served as the Executive Director in the initial drafting of the National Flood Mitigation Framework Plan, an integrated river basin management approach to flood control initiated by the National Disaster Coordinating Council (NDCC). The responsibility was then turned-over to the Department of Environment and Natural Resources (DENR) following the guidelines of Executive Order 510 creating the River Basin Control Office under the DENR. Relative to the Plan Formulation, Mr. David emphasized the need for addressing the upstream of each river system, particularly the rapid denudation of forests increasing erosion and sediment supply which usually results to disastrous flash floods during heavy/continuous rainfall. He downplays the effect of structural measures in the downstream if the required reforestation and management of headwaters or mountain segments of rivers is not pursued. Overall, he supports the adaptation of an Integrated Water Resources Management (IWRM) approach for the various stakeholders in the water sector. Director David has Master Degrees in Management (MM) and National Security Administration (MNSA). He also is a Career Executive Service Eligible.

Flood For Thought...

The Japan International Cooperation Agency (JICA) is the main institution which has been conducting most of the surveys, investigations and studies for flood control in the Philippines on a grant basis. Starting with the "Study on Pampanga Delta Development Project" in 1975, either master plan or feasibility study of flood control works were conducted by JICA for more than 1/3 of the 18 major river basins nationwide.

Project ENCA and DPWH Role in Flood Mitigation

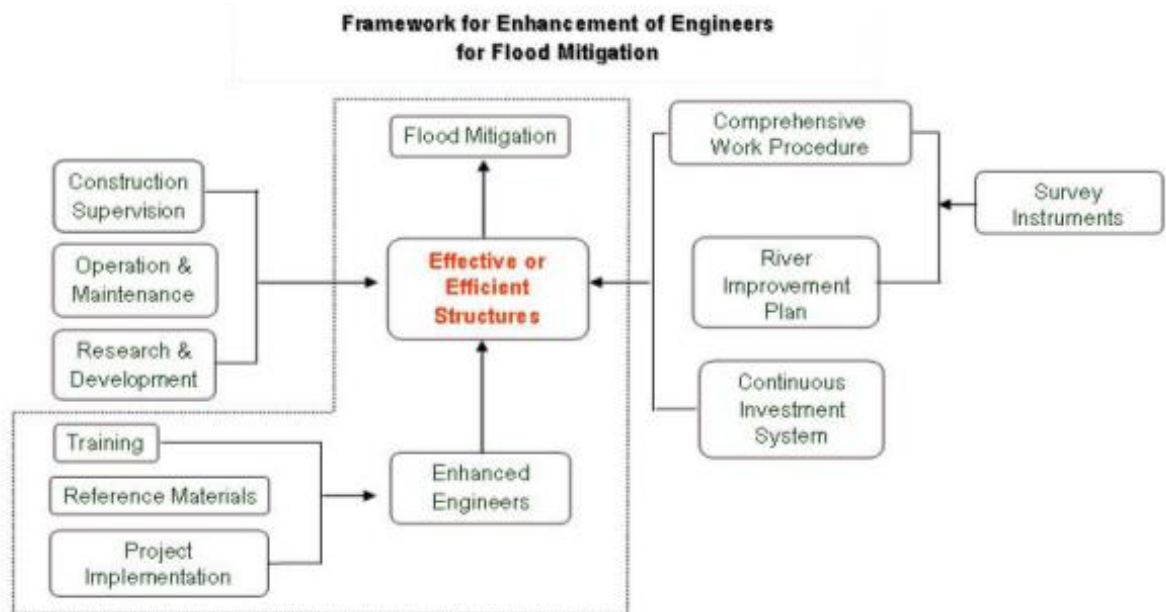
By: Dolores M. Hipolito

The Department of Public Works and Highways, recognizing the need to develop and sustain effective structures for flood mitigation has embarked on capability building programs as a strategy. The recently completed (2000-2005) Japan International Cooperation Agency (JICA)-assisted Project for Enhancement of Capabilities in Flood Control and Sabo Engineering of DPWH (Project ENCA) have produced considerable accomplishments. It did not only provide improvement of knowledge and skills of engineers but also triggered a change in their attitude and approach towards works. Among the early indicators of the improvement in work is the presence of the plans and drawings of new flood control structures constructed in accordance with Project ENCA's recommendations. New structures are constructed adequately (e.g. revetment with end protections, adequate depth of piles, sufficient berm, smooth alignment, etc.). The framework for enhancement was developed after the training needs assessment and problems analysis.

The Project ENCA focused on the improvement of knowledge of DPWH engineers considering that the other proposals require the coordination and approval of the management with adequate funds. The activities undertaken included the conduct of training, formulation and dissemination of Technical Standards and Guidelines for planning and design, formulation and dissemination of manuals.

While the evaluation of the project ENCA indicated considerable accomplishments, both governments acknowledge that there needs much to be done and such accomplishments should be sustained. Hence, FCSEC is now implementing the JICA Technical Cooperation Project for Strengthening the Flood Management Function of DPWH (Project ENCA, Phase II).

The project commenced in June 2005 and will be completed in 2010. It will continue the enhancement of engineers and pursue the strengthening of the DPWH itself towards flood management.



The main proposals for enhancement of capabilities are the: a) improvement of knowledge of DPWH engineers in flood control b) Adoption of comprehensive design works procedure c) formulation of river improvement plans and d) establishment of continuous investment system.

Moreover, FCSEC has been proposed to become a permanent office (Flood Management Center) under the Office of the Secretary in the DPWH Rationalization Plan. As such, it is expected to act as a focal point for DPWH offices, providing technical assistance in flood mitigation and sabo engineering.

Understanding Hydraulic Phenomena through Laboratory Experiment

By: Jesse C. Felizardo

DPWH engineers are now privileged to have a better atmosphere to acquire skills and better understanding in river and sediment hydraulics through laboratory experiment. Visualization through simulation and analysis help the engineers imbibe the hydraulic principles and application in a scaled down model.

Since 2003, the JICA experts trained the DPWH staff on the use of the facilities and modern instruments through basic experiments. Participants came from the FCSEC, Bureau of Design, Planning Service, Bureau of Construction, Bureau of Research and Standards, and PMO-Major Flood Control Projects I and II. In some instances participants from MMDA and PHIVOLCS joined the activities.

In 2004, river modeling in Badoc River using spur dikes as countermeasures against bank erosion was simulated in the laboratory. Said river was one of the site used for the on-the-job training for planning and design of flood control structures for Region I participants.

The spur dikes were arranged and modified according to the flow pattern of the channel to get the best results.

The alignment and width of the target river segment were laid out on the flume and overlaid with sediment samples which more or less will have the same hydraulic effect with the actual river. The bed form of the actual river was reproduced on the flume as a result of the water discharge.

Also, finding the appropriate countermeasures against bank erosion for the Agos River in Infanta, Quezon, where the November 29, 2004 flood disaster occurred, through scaled down modeling

on the flume was probed. The final result of the experiment was viewed by officials of Infanta Municipal Government on March 22, 2006.

These endeavors have engendered new techniques in the planning of countermeasures in situation where river data are inadequate. The satellite photos downloaded from the internet and the GIS software were alternative tools to replicate the prototype river to downscale model.

It is envisioned that not only the DPWH engineers but also the academe and private entities engaged in the research and other related fields will be encouraged to take advantage of the laboratory to further their understanding of the hydraulic principles.



Staff from Different DPWH Offices Involved in the Badoc River Model Experiment

Flood For Thought...

Tropical cyclones are the most destructive weather disturbances because they are accompanied by strong winds aside from large amount of rains. Tropical cyclones are classified according to maximum wind speed near the center as follows:

Tropical depression (TD)	-	winds with speed from 45 to 63 kph
Tropical storm (TS)	-	winds with speed from 63 to 117 kph
Typhoon (T)	-	winds with speed more than 117 kph

BITS OF KNOWLEDGE ON SABO

By: Takeo MITSUNAGA
JICA Sabo Expert, FCSEC

WHAT IS "SABO"?

Our center's name is "Flood Control and SABO Engineering Center". But the word "SABO" is not so familiar with the Filipino people. I will explain about "SABO" in this corner in several batches.

First I will explain about the concept of "SABO". Other topics will be "Types of Sediment-Related Disasters", "The Function of River System SABO Dams", "Types of SABO Dams and so on.

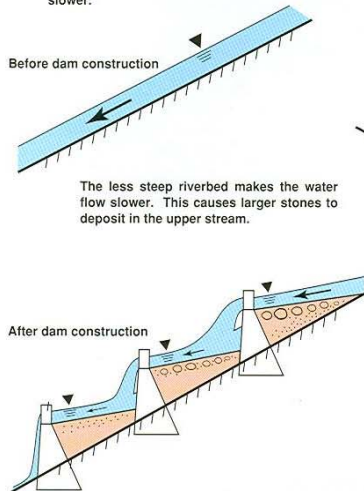
"SABO" is a Japanese word. But Japanese SABO Engineering is used worldwide, and now it is well known worldwide like the word "TSUNAMI". "SABO" is a combination of two words. One is "SA" and the other is "BO". "SA" means sediment and "BO" means prevention. So "SABO" can be translated to "prevention of sediment-related disaster".

According to the geographic and climatic reasons, sediment-related disasters occur in very extensive areas, from headwater area to downstream cities in the Philippines. And those disasters have variety of forms such as debris flow, mud flow, landslide and slope failure. Especially in volcanic areas these disasters are sometimes very powerful and destructive. Floods caused by aggradations are also included as sediment-related disasters.

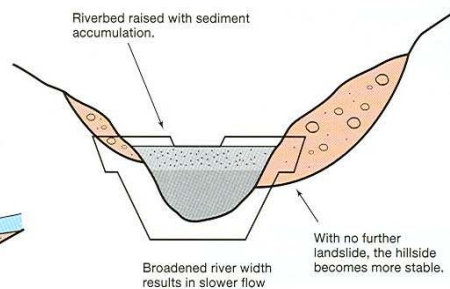
Aggradations are very popular in some Philippine rivers. And to reduce the sediment from devastated area is a fundamental countermeasure for flood control. I think it is necessary to promote SABO works in parallel with other works. There are two types of prevention that are taken. One is structural and another is non-structural measures. Structural measures is constructing facilities and structures such as SABO dam, Channel Works,

The Function of The SABO DAM for Drainage Area

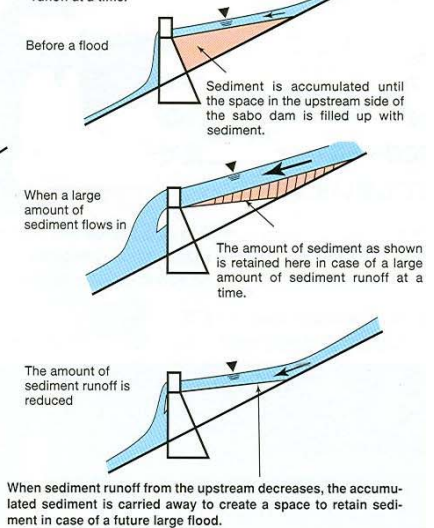
① The accumulation of sediment prevents the erosion of the riverbed and also makes the riverbed slope less steep to make the water flow slower.



② The riverbed raised by the accumulation of sediment prevents hillside landslide and also makes the river width wider resulting in slower water flow.



③ The dam prevents a large amount of sediment runoff at a time.



The purposes of SABO are as follows.

1. Protection of lives and properties against sediment-related disasters.
2. Revitalization of local communities.
3. Conservation of the ecosystem and earth environment.

Groundsill, Sand Pocket, Training Dikes, Spur Dikes, Hillside works etc. Non-structural measure is a way of establishing a system for warning and evacuation, and restricting and controlling new residential land development in area vulnerable to the disasters.

Continuation... page 12

TECHNICAL NEWS/ANNOUNCEMENTS

Technical Report No. 1 Effective Arrangement of Spur Dikes as Countermeasures against Bank Erosion Using Simplified River Model

By: Jesse C. Felizardo

The first FCSEC Technical Report, dealing with the simulation of spur dikes in Badoc River through hydraulic experiment was distributed to different Offices in the DPWH. The experiment featured techniques in the generation of river information through GIS and satellite images and the effectiveness of arranging the spur dikes in a meandering river in consideration of the flow.

The alignment and width of the target river segment were laid out on the flume and overlaid with sediment samples which more or less will have the same hydraulic effect with the actual river. The bedform of the actual river was reproduced on the flume as a result of the water discharge. The provision for length in the technical standards and guidelines for flood control did not give ideal result as experimented. Arranging the spur dikes according to the flow lines of the river, thus necessitating variation in the length of spur dikes and orientation, has controlled the scouring, deposition of the sediment and deflected the flow towards the center of the channel.

Technical Report No.2 Effective Arrangement of Spur Dikes as Countermeasure Against Bank Erosion in Agos River

By: Jesse C. Felizardo

The second Technical Report is now being distributed to different offices in the DPWH. It highlights simulation of spur dikes in Agos River and Landslide in Guinsaugon, St. Bernard, Southern Leyte.

Of same methodology and procedure with the experiment on spur dikes in Badoc River, the experiment on Agos River reinforced the effectiveness of spur dikes against erosion and protecting the bank.

In November 2004, four successive storms hit the towns of Real, Infanta, General Nakar in Quezon and Dinggalan in Aurora Province. River discharge damaged the bridge and breached the 300m right bank retaining wall downstream, which exacerbated the inundation in the town proper. The overwhelming damages require concerted efforts to rehabilitate and to prevent future catastrophe.

The experiment was aimed to determine the appropriate countermeasures in the Agos River, where spur dikes were perceived to be more feasible. The main objective is to examine the effective arrangement of spur dikes and the effect of re-channeling by controlling flow pattern in a meandering river channel using movable bed experiment. The result in the length shows that arranging the spur dikes according to the flow lines of the river, with variations in the length and orientation, controls the scouring and deposition of the sediments and deflects the flow away from the bank.

The second part of the technical report tackles the account and the mechanism of landslide in Guinsaugon, St. Bernard, Southern Leyte which occurred on 17th of February 2006. Two weeks of rainfall and low intensity earthquake triggered the landslide in the geologically weak mountains in Guinsaugon, which buried the community and killed approximately 1,400 persons.