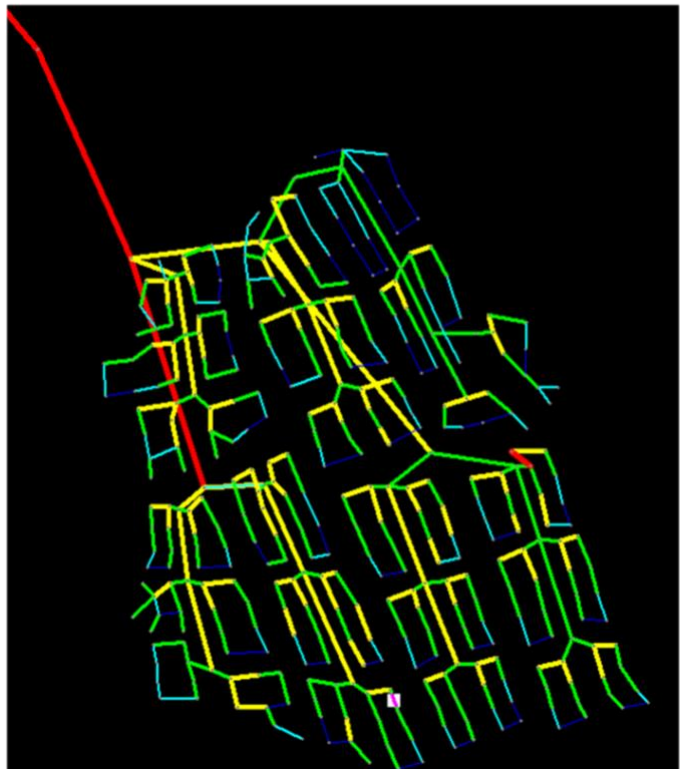


Training
on
PIPE DISTRIBUTION NETWORK
29 July to 2 August 2024
Islamabad
Marriot Hotel Islamabad



Organized by
ASIAN DEVELOPMENT BANK

INTRODUCTION

The irrigation system in Pakistan faces several challenges, including: (i) water scarcity with unpredictable snowmelt and monsoon rains affecting water availability, (ii) deterioration of infrastructure with aging irrigation structures and insufficient funding for maintenance, (iii) climate change altering precipitation patterns and water supply, (iv) inefficient water distribution and use, (v) lack of modernization with old irrigation practices and technology. These issues contribute to problems like waterlogging, soil salinization, and reliance on poor-quality groundwater.

Low Water Use Efficiency (WUE), high evaporation and seepage losses, and land acquisition are some of the problems associated with traditional irrigation technologies that use an open canal distribution network. Utilizing a Piped Distribution Network (PDN) for conveyance of irrigation water and micro irrigation techniques to apply irrigation water at the field level, coupled with modern management systems, will maximize water usage efficiency, expand irrigation coverage, support flexible cropping and increased crop yields and increased farmers income.

Understanding this, many countries are adopting PDN systems to supply and distribute irrigation water to farmers. However, there is huge gap in the capacities of most irrigation engineers and other stakeholders when it comes to the design of PDN.

This training program will cover many facets of PDN design using EPANET software. Expert resource person(s) will give presentations on the benefits of buried pipe systems and their adoption in Pakistan and elsewhere, pipe types and dimensions, pipe layout options, fixing pipe design discharges, pressure and flow control systems, civil works, pumps, O&M including power and energy requirement, and so on. Multiple design exercises will be taken up, and handouts will be provided to the participants.

TRAINING PROGRAM LOCATION AND ARRANGEMENTS

The program will be held in person at the Marriot Hotel Islamabad.

Participants are required to:

- Bring (laptop) computers to the training course on which to complete the design exercises.
- Excel, google-earth, and EPANET 2.2 should be downloaded on the laptops prior to the training program. For EPANET 2.2 download from <https://www.epa.gov/water-research/epanet>

RESOURCE PERSON

The main resource person from the ADB consultant team is Alan Kendall Clark - Irrigation Modernization Specialist, Northwest Hydraulic Consultants (NHC) Ltd., Canada.

TARGET GROUP

Graduate Engineers in the ranks of engineers working in provincial irrigation departments, provincial agriculture departments, WAPDA, selected research institutes, academia, engineering consultants and manufacturers and other stakeholders of water resources sector.

TENTATIVE TRAINING SCHEDULE

(Final schedule will be provided at the start of the training)

Day	Time	Training/ Event	Remarks
Day 1 Monday, 29 July	09:00	Registration	
	09:30 to 10:00	<u>Inaugural Session</u> Opening Address & Self-introductions by participants	
	10:00 to 10:45	Presentation 1: Pipeline design and EPANET <ul style="list-style-type: none"> - Pipe Flow Friction Losses - Pipe Flow Velocity Limits - Losses Due to Bends, Transitions, Fittings and Valves 	Presentation by Consultants Handout 1: Guideline for use of pipeline design program – EPANET
	10:45	Tea break	
	11:15 to 13:00	Kick off Design Exercise #1 (Selected Case Study #1) using EPANET 2.2	Pipeline layouts and designs for a pressure pipe scheme to be prepared by participants.
	13:00	Lunch break	
	14:00 to 16:00	Design Exercise #1 – cont. Tea break	
	16:30 to 17:00	Design Exercise #1 – cont.	
Day 2 Tuesday, 30 July	09:00 to - 09:15 to 09:45	Introduction to Day 2 Design Exercise #1 - Results and Q&A Session	
	09:45 to 10:45	Presentation 2: Experience around the World and Classification of Pipe Systems.	Presentation by Consultants Handout 2: Development of modern irrigation systems in India and likely role of pipe systems
	10:45	Tea break	
	11:15 to 11:45	Presentation 3: Types and Choice of pipes and pipe dimensions (focus on HDPE and uPVC pipes)	Presentation by Consultants Handout 3: Types of pipes to be used in Irrigation Systems
	11:45 to 12:15	Presentation 4: Fixing pipe design discharges (crop consumptive use, efficiencies, flexibility factors)	Presentation by Consultants Handout 4 Pipe design discharges
	12:15 to 13:00	Presentation 5: Level of Service, Irrigator Flows and Layout Preparation	Presentation by Consultants Handout 5: Level of Service, Irrigator Flows and Pressures, and Layout Preparation
	13:00	Lunch break	
	13:00 to 15:00	Design Exercise #2 (Case Study #2)	Pipeline layouts and designed for a gravity scheme to be prepared by participants.
	15:00	Tea break	
	15:30 to 17:00	Design Exercise #2 (cont.)	

Day	Time	Training/ Event	Remarks
Day 3 Wed., 31 July	09:00	Introduction to Day 3	-
	09:15 to 11:00	Design Exercise #2 (cont.)	Pipeline designs to be completed, including cost for pipes, presented and discussed
	11:00	Tea break	
	11:30 to 13:00	Presentation 6: Fittings/ devices for flow control, flow measurement, and protection (Remote operation/ monitoring).	Handout 6: Guideline of types of devices and control structures needed
	13:00	Lunch Break	
	14:00 to 15:30	Design Exercise #3 (Case Study #3)	Pipeline layouts and designs for a pumped pressure scheme to be prepared by participants, and presented
	15:30	Tea Break	
	16:00 to 17:00	Design Exercise #3 (cont.)	
Day 4 Thursday, 1 August	09:00	Introduction to Day 4	
	09:15 to 11:00	Design Exercise #3 (cont.)	Pipeline designs to be completed, including cost for pipes, presented, and discussed
	11:00	Tea break	
	11:30 to 13:00	Design Exercise #4 (Exercise: calculate pumping cost and total life costs for HLC System)	Participants complete the design exercise, present and discuss. Handout 7: Power and energy requirements.
	13:00	Lunch Break	
	14:00 to 15:00	Presentation 7: Pumps, Pipework, and Civil Works Civil works: intake and/ or pumping arrangement (trash, sediment issues, pumps, and pipework), air valves, trenches, hubs, etc.	Handout 8: Pumps and Pipework for Pressure Systems, and Turnouts for Gravity Systems
	15:00	Tea break	
Day 5 Friday, 2 August	09:00	Introduction to Day 5	
	09:10 to 11:00	Design Exercise #5 (Case Study #4), cont.	
	11:00	Tea break	
	11:30 to 13:00	Design Exercise #5 (Case Study #4), cont.	
	13:00	Lunch Break	
	14:00 to 15:00	Design Exercise #5 (Case Study #4), cont.	Presentation of layouts and designs by participants

Day	Time	Training/ Event	Remarks
	15:00 to 15:30	Presentation 8: Scheme O&M	Including institutional aspects and implementation arrangements
	15:30 to 16:30	Presentation 9: Summary of Workshop and relevance to irrigation modernization	
	16:30 to 17:00	Closing of Workshop Certificates Presented to Participants	