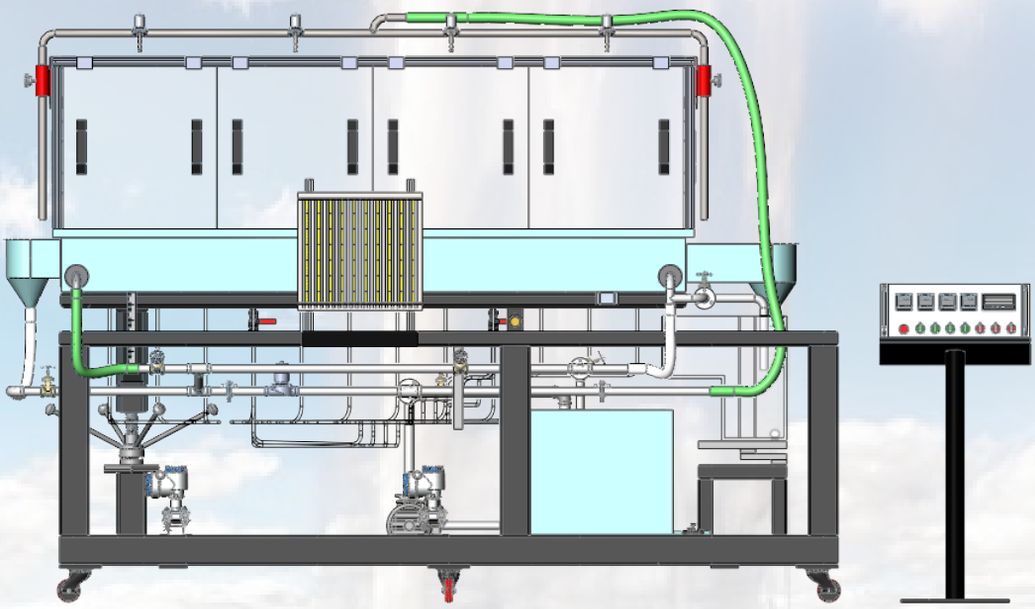
KCFM-401
Advanced Hydrology System

Engineering Growth Connection

K.C. ENGINEERS LIMITED

AN ISO 9001:2015 CERTIFIED COMPANY



Introduction & Exclusive Features

K. C. ENGINEERS LIMITED has been designing and supplying Computer Controlled Advanced Hydrological Investigation Apparatus with wide range of experimentations on the fundamentals of Hydrology which focus on important concepts such as seepage, flow of water in soil and use of ground water resources. It is unique in its capability, as its features are suitable for studying and demonstrating various physical processes found in hydrology and fluvial geomorphology, including: rainfall hydrographs for catchment areas of varying permeability, the formation of rivers and their features, effects of sediment transport, scour and erosion, the abstraction of ground water by drains both with and without surface recharge from rainfall etc. Realistic results can be obtained from this well designed, small scale, floor standing apparatus, which can be conveniently located and requires no special services.

Setup Description

This apparatus demonstrates some of the major physical processes found in hydrology. The unit comprises a tank with sand, made of stainless steel. Nozzles are fitted in square pattern on the top of the tank that can be switched in groups of two nozzles each. Water is fed to these nozzles with the help of a centrifugal pump connected to a storage tank. Time of precipitation through nozzles will be adjustable with a timer. A valve arrangement is there to change the water flow through nozzles or direct to the tank. It is provided with groundwater wells and pillars, flow and sediment measurement systems.

The present set-up has a facility to interface the system with computer which enables to log the experimental data using computer. The educational software and data-logging package has been developed for unit. The software environment base is of Lab View of NATIONAL INSTRUMENTS, USA. This software is compatible to interfacing unit designed by K. C. Engineers. This software package provides a comprehensive educational software environment within which the investigations can be performed. This software is capable to tabulate the sample readings according to the requirement of experiment under study and results obtained can be compared. The real time data acquisition can be done by interfacing the set-up with computer using software. Software allows the user to have control on data logging, printing the stored data, preparing spread sheets in Excel etc.

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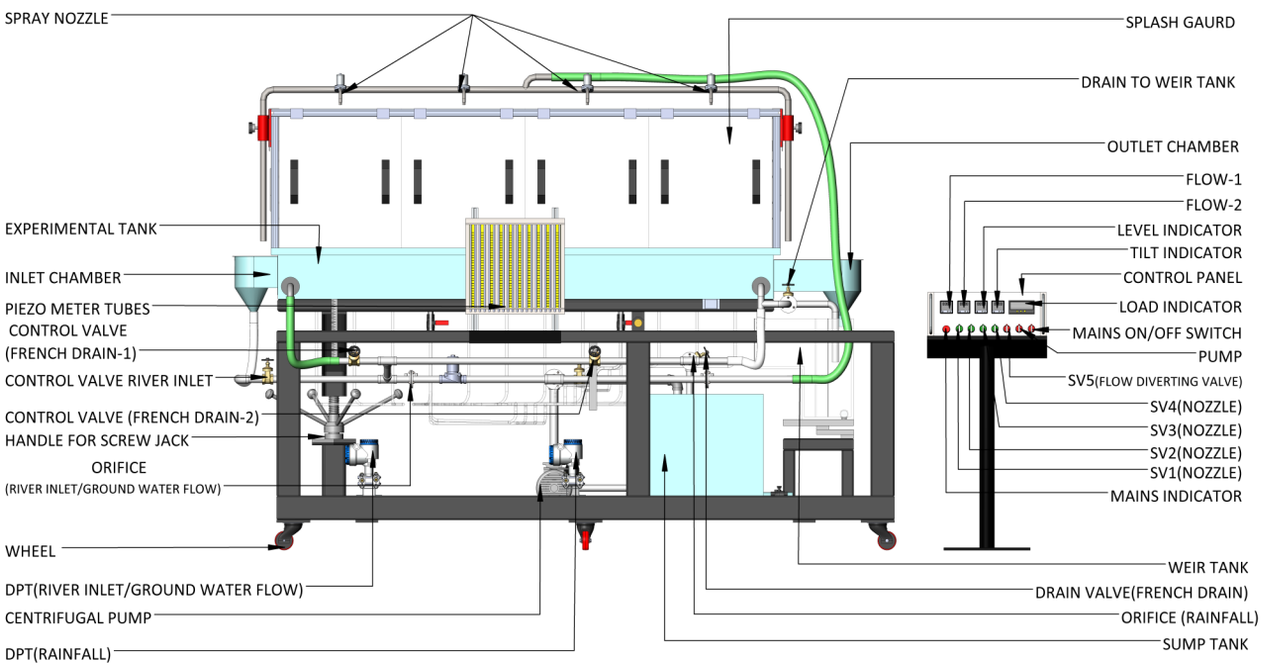

Key features

- Stainless steel sand tank
- Permeable catchment area fed with 'rain' from overhead spray nozzles and/or by groundwater flow from ends of tank.
- Adjustable spray nozzle height
- Piezometer tappings to measure water table profile
- Novel outlet tank design for water flow and sediment flow measurement.
- Stilled inlet tank provides developed river flow conditions, allowing the full length of the tank to be used for river simulations.
- Supply and drain over a large area.
- Includes flow meter to measure flow to the catchment area.
- Self-contained – requires only an electrical supply.
- Sensor System (Load Cell) measures the quantity of sediment collection with respect of timing.
- Dual jacks system provide for adjustable tilt.
- Washed sand single graded Range: 1.0 mm to 2.0 mm
- Single grade of sand for all defined demonstrations, no need to change the sand.
- Control and measurement system for inlet flows.
- Supplied with a comprehensive user guide.

Optional Facilities

- Computer Control System with Educational Software based on LabView of NATIONAL INSTRUMENT, USA, data logging Package and data acquisition card to control various parameters like inclination, pump speed / flow rate involved in the process.
- Computer data logging option for sediment and water outlet flow measurement.
- Enable user to log the real time experiment data and tabulate the experimental readings.
- Flexible configuration allows a wide range of simulations.
- National Instrument Data Acquisition card (250KS/s, kilo samples per second).
- Capable of doing applied research, real industrial, training courses, etc.

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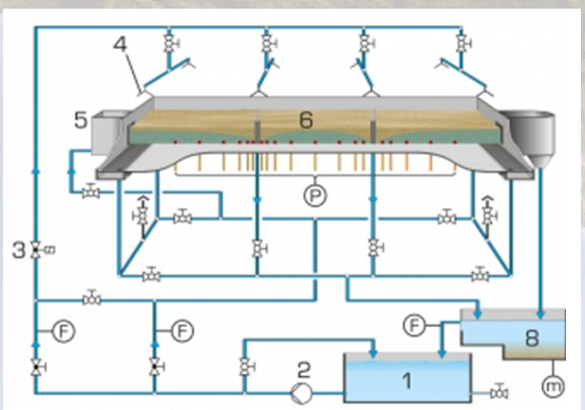
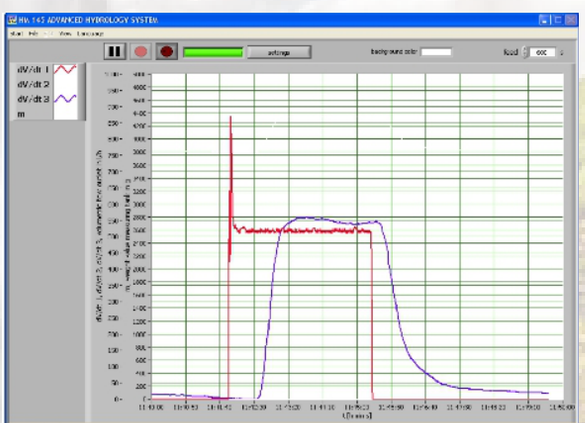
Technical Details of the flume

- Experimental Tank : Material Stainless Steel 304 Grade, Dimensions 2 m x 1 m.Depth 0.2 m. Inclination adjustment Dual linked jacking system, Range up to +5%. Sand filling up to 0.3 m^3.
- Precipitation Nozzles : Material Stainless Steel 304 Grade, 8 Nos. can be switched in groups of 2 nozzles each on an adjustable height gantry.
- Flow rate of precipitating : 1 to 4.5 LPM or better with a square nozzles spray pattern, time of precipitation must be adjustable with a timer.
- Groundwater Wells : Two wells with open seam tubes.
- Pillars : 3 models - round, square and oval.
- Pump : Power consumption 0.55 kW, with a maximum flow rate of 150 LPH or better.
- Storage Tank : Stainless steel 304 Grade with a capacity of 220 Liters or better.
- Outlet Tank : For measurement of both water and sediment flow.
- Water Level Measurement : 15 tubes manometers that can measure up to 300 mm of water column.
- Supply Flow Rate : Range 0 to 1050 LPH.
- Drain Flow Rate : Range 0 to 1000 LPH.
- Sediment Measurement : Range 0 to 5000 grams.
- Data Logging and Software: Data logging software will be provided along with the equipment.
- An ENGLISH instruction manual consisting of experimental procedures, block diagram etc. will be provided along with the Apparatus.
- The whole set-up is well designed and arranged on a rigid structure painted with industrial PU (Polyurethane) Paint.



1 storage tank, 2 pump, 3 solenoid valve with timer, 4 nozzle, 5 chamber, 6 experiment tank, 7 chamber, 8 measuring tank; m mass, F flow rate, P pressure



Software Screenshot: water drain for persistent rain with saturation of the soil: red precipitation, blue drain

Standard Scope of Supply

- Well Designed Experimental Apparatus
- Electromagnetic flow meter
- Instructional Manual
- 3 models (pillars)
- PC with Windows recommended
- CD with KC software + USB cable

Utilities Required

- Electricity supply: Single Phase, 220V AC, 50 Hz, 5-15 Amp combined socket with earth connection. Earth voltage should be less than 5 volts.
- Water Supply: Initial fill
- Floor drainage
- Floor Area Required: 3m x 1.5m.

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