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1-Fluid friction apparatus:

This apparatus is designed to allow detailed study of head losses which occur when an incompressible fluid flows through pipes, bends, valves and flow metering devices.



2-Orifice weir testing:

- a) To investigate the relation between the head over the crest of rectangular and V-notch with the volume flow rate (discharge) through the weir.
- b) Hence the measurement of the coefficient of discharge (c_d) for a specific weir.



3-Flow visualization open channel:

Open channel flow is an important task of fluid mechanics for civil engineers. It describes the flow in rivers, man-made channels and =partially full pipes, as well as the behavior of hydraulics structures suchas weirs, spilway and sluices

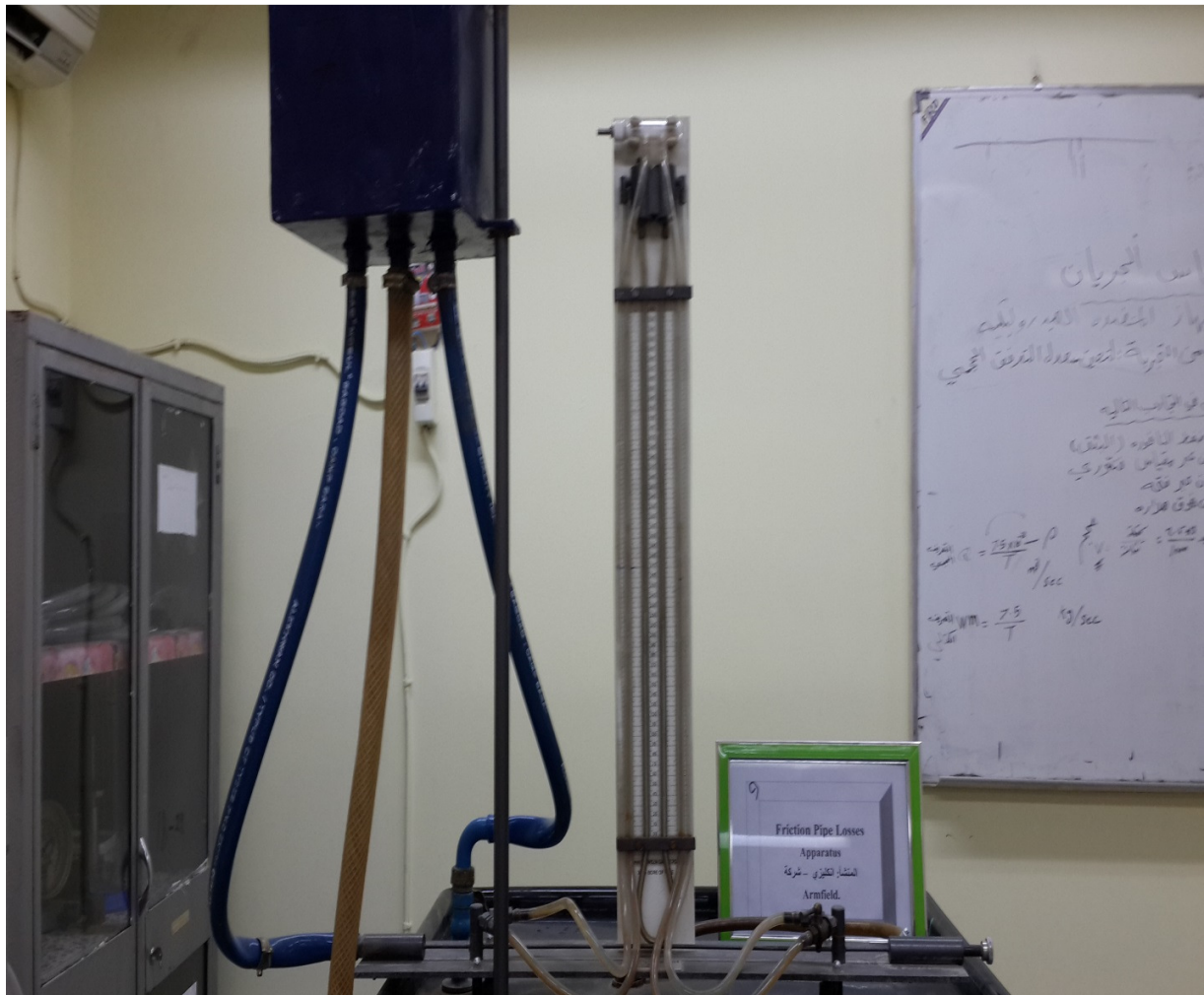


4-Hydraulics bench: To measure the volume flow rate (discharge).



5-Friction pipe losses:

To investigate the variation of friction head along a circular pipe with average flow velocity in the pipe.



6-Orifice meter:

Measure the extent of the reduction in flow, contraction of the stream and energy loss, as the water discharges into the atmosphere from a sharp edged orifice in the base of a tank.



7-Venturi meter

- a) Direct measurement of the static pressure profile along venture tube
- b) Comparison of these results with theoretical predictions.

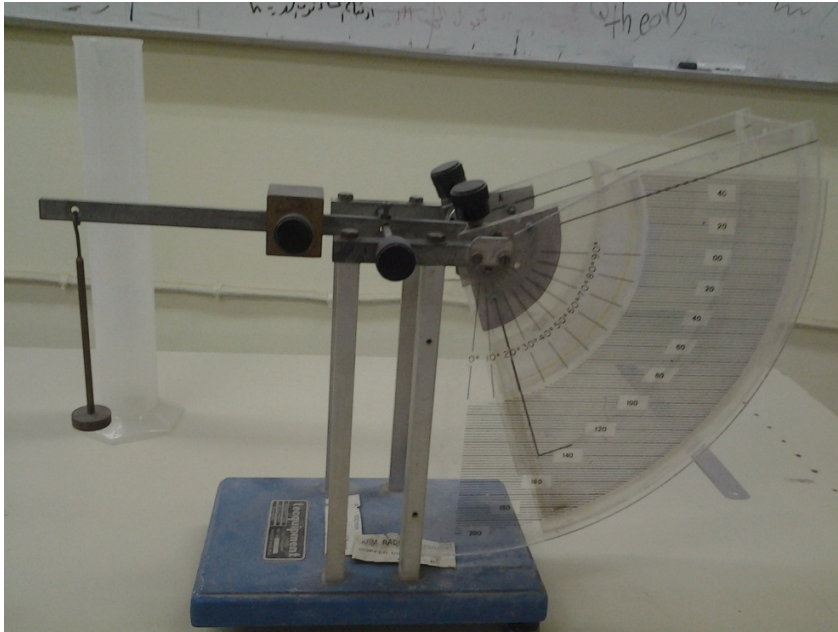
c) Measurement of the coefficient of discharge “ c_d ” for the meter at various flow rates.



8- Center of pressure

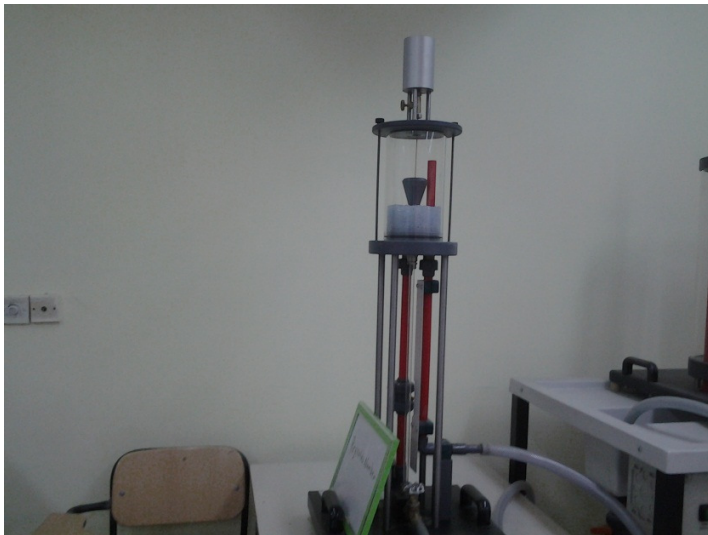
Measurement of the center of pressure of general case of plane area at various angles and depths of immersion.

All results can be compared with theoretical predictions



9-Renolds apparatus

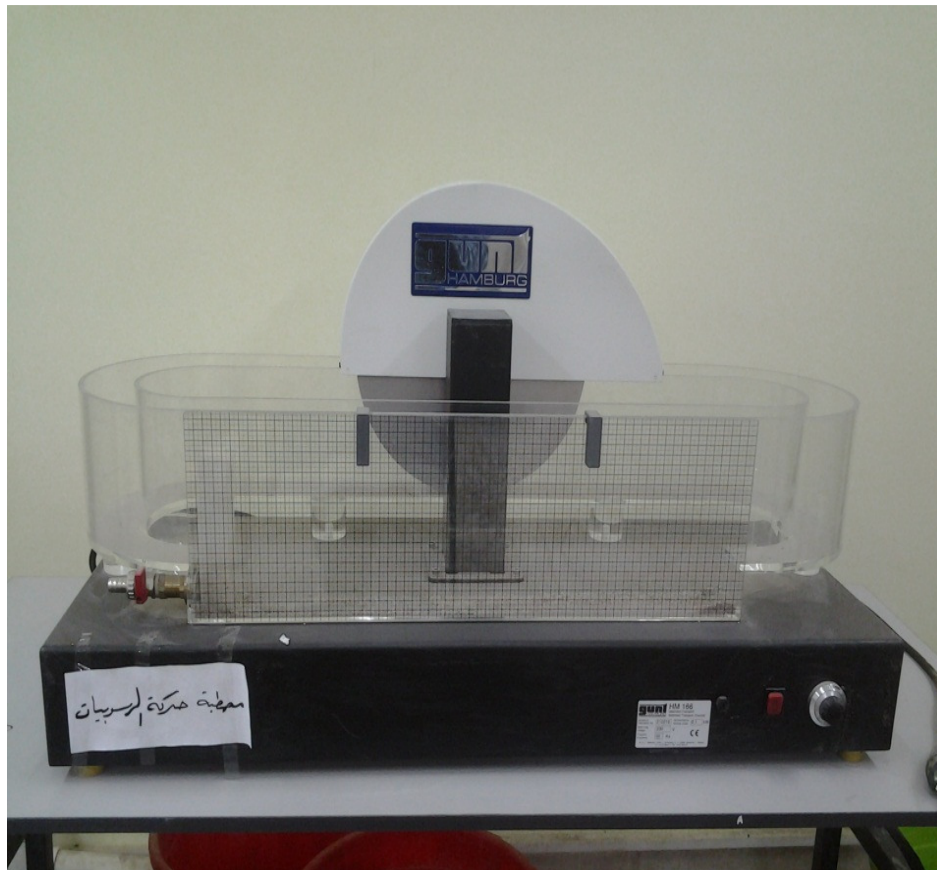
To compute renolds number (Re)for laminar, turbulent, transition flow



10- Sedimentation transport channel:

Starting conditions for bed-load transport

- *how flow velocity affects bed-loadtransport
- *ripple and due formation on the river bed
- * fluvial obstacle mark of bridge piers (scour formation and siltation)



11-fluid properties:

It provides an introduction to the fundamental properties of Newtonian liquids that affect their behavior in practical application. Administration of the behavior of non-Newtonian liquids is included in the project work exercise.

