Technical Assistance
HYDROLOGY PROJECT

DHV CONSULTANTS & DELFT HYDRAULICS with HALCROW, TAHAL, CES, ORG & JPS

VOLUME 3
HYDRO-METEOROLOGY

FIELD MANUAL – PART II

STANDARD RAINGAUGE STATION (SRG) OPERATION AND MAINTENANCE

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GENERAL

The Field Manual for Hydro-meteorology, comprises the procedures to be carried out to ensure proper execution of rainfall and climatological network design, operation and maintenance. The operational procedures are tuned to the task descriptions prepared for each Hydrological Information System (HIS) function. The task description for each HIS-function is presented in Volume 1, Field Manual, Hydrological Information System.

It is essential, that the procedures, described in the Manual, are closely followed to create uniformity in the field operations, which is the first step to arrive at comparable hydro-meteorological data of high quality. Further, reference is made to the other volumes of the manual where hydrometry, sediment transport measurements and water quality sampling and analysis is described. It is stressed that hydro-meteorology cannot be seen in isolation; in the HIS integration of networks and of activities is a must.

This Volume of the Field Manual consists of 5 parts:

- Part I deals with the steps to be taken for network design and optimisation. The procedures refer to network design/review based on measures of effectiveness for estimating areal values of rainfall and potential evapotranspiration, and interpolation. Furthermore, site selection procedures are included.
- Part II comprises operation and routine maintenance of rainfall stations with SRG (non-recording rain gauge).
- Part III comprises operation and routine maintenance of rainfall stations with ARG or TBR (recording rain gauge) and SRG (non-recording rain gauge).
- Part IV comprises operation and routine maintenance of full climatic station (FCS).
- Part V covers the field inspections and audits as well as maintenance and calibration.

In the Parts II to IV for each of the stations the day to day activities are spelled out, with reference to a HIS-function. The procedures as listed out in this manual are in concurrence with the procedures adopted by IMD to operate its network, who in turn follow closely the WMO-recommended procedures.

Part II of the manual on observations practice is primarily designed for staff (Job Category M –1) working at rainfall stations equipped with an SRG. It provides guidance on recommended practices namely: what to do, how to do and when to do. It is the responsibility of the observer to make regular and careful observations punctually at the prescribed hours of observations and make entries immediately in the prescribed forms and the Register.

1 RAINFALL MEASUREMENT BY STANDARD RAING GAUGE

1.1 STANDARD RAINGAUGE (SRG)

The amount of rainfall at a station in a specified period is measured as the depth to which it would cover a flat surface. The measurement of this is made by a standard rain gauge, which in India is made of Fibre Glass Reinforced Polyester (FRP) and shown in Fig. 1.1.

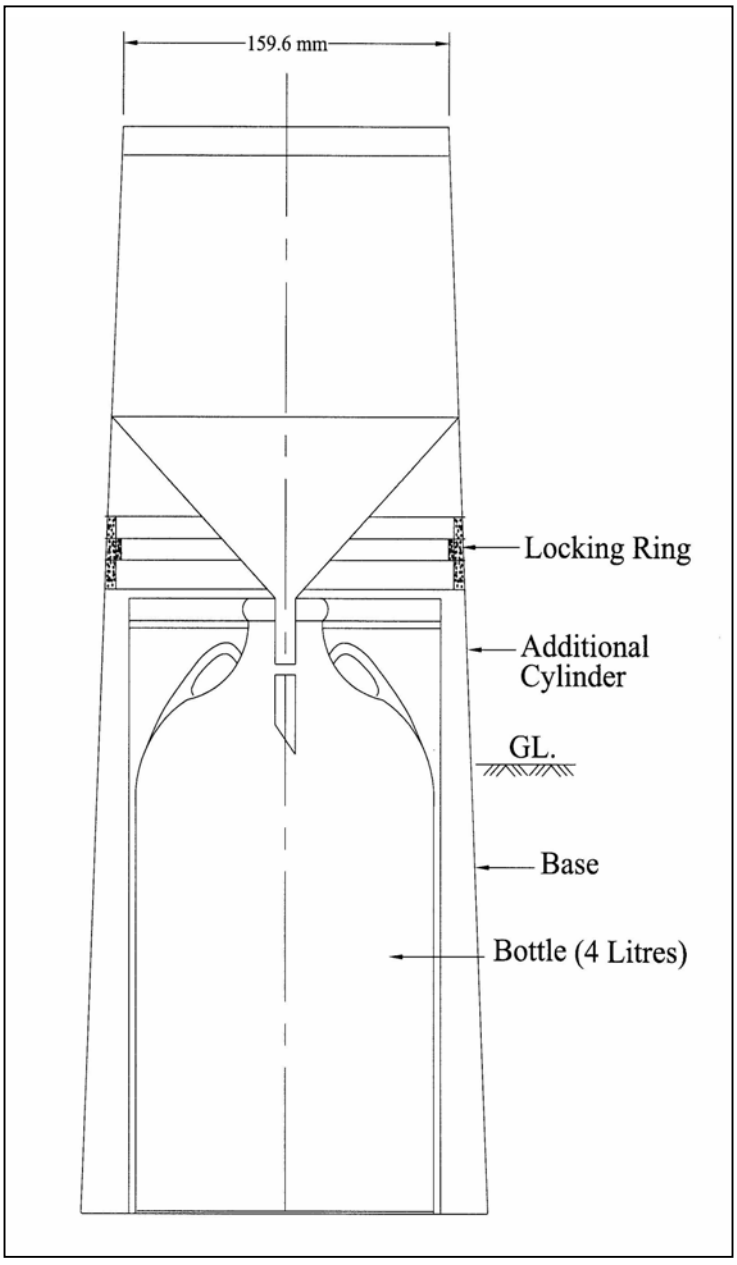

Figure 1.1: Standard rain-gauge

1.2 STANDARD MEASUREMENT PRACTICE SRG

The rain falling into the funnel collects in the bottle kept inside the base, and is measured by a measure glass. The measurement is made daily at 0830 hrs IST in the morning. The following procedure is used:

1. Remove the funnel of the raingauge and take out the polythene bottle.

2. Place the measure glass in an empty basin and slowly pour the rainwater from the receiver (polythene bottle) into the measure glass to avoid spilling. If by chance, any rainwater is spilled into the basin, add it to the rainwater in the measure glass before arriving at the total amount collected.

3. While reading the measure glass, hold it upright or place it on a horizontal surface. Bring the eye to the level of the rainwater in the measure glass and note the graduation (scale) reading of the lower level of the curved surface of water. The reading is recorded in mm to one decimal place.

4. If the rainfall is more than 20 mm (for the 200 cm^2 gauge), the measurement should be taken in two or more instalments depending upon the amount of rainfall.

5. After the first measurement, the rainfall amount is checked by re-measurement, before the rainwater is thrown away.

6. During heavy rain, check the raingauge at hourly intervals to avoid overflow. If necessary, take out the rainwater in a separate bottle, securely corked for measurement at the time of observation.

7. All rainfall observations are made at 0830 hrs IST daily. The amount recorded at 0830 hrs is the rainfall of the preceding 24 hours ending at 0830 hrs of the observation day (Today's date). In other words, the rainfall of the day is the total rainfall collected in the raingauge from 0830 hrs IST of previous day to 0830 hrs IST of the day and is recorded (entered) against today's date. The layout of the field data form is presented in Annexure 1.

8. If there is no rain, enter 0.0 (Note: The column should not be left blank or '-' should not be used for indicating '0' rainfall) and if the rain is below 0.1 mm, enter "t" (trace) in the prescribed form and also in the Register. Daily rainfall data, recorded on the prescribed form is sent to the controlling office daily as per the arrangement fixed for the field station.

1.3 ROUTINE MAINTENANCE SRG

The following routine inspection and maintenance procedures should be used to ensure that the gauge continues to provide accurate records.

1. The collector (funnel) of the raingauge should be inspected for blockage with dirt/dry leaves etc. and cleared if necessary.

2. The collector, receiving bottle and the base should be checked for leakage. If leakage is found, immediate repair / replacement is to be undertaken.

3. While replacing the collector on the base, it should be ensured that the two locking rings are engaged properly.

4. The raingauge and the enclosure should be kept locked for safety.

5. The enclosure should be kept clean. No shrubs or plants are allowed to grow near the instrument as they will affect exposure conditions and the catch.

It is advisable to keep a spare measure glass at the field station. Adhesive solution used in patching up external cracks of the fibre glass material and for attaching any broken piece like the funnel outlet tube should be available at the station to attend to minor defects. However, if the instrument becomes out of order or the measure glass breaks, inform the controlling office immediately for replacements.

Annexure - I

Layout of field data form SRG