A COMPREHENSIVE WATER SAMPLER

G.T. Ridall
Waikato Valley Authority, Hamilton

The following notes apply to a comprehensive water sampler developed at the Hydraulics Research Station, Wallingford, England, and lent to the Waikato Valley Authority for its investigations into the Waikato River delta.

DESCRIPTION AND FUNCTION OF COMPONENTS

The instrument (Fig.1)* is designed to take water samples containing their correct proportion of suspended solid particles from a sampling point at a chosen depth below the water surface. The depth of the sampling point, and the current velocity there, can also be measured by the instrument. A small pump draws a continuous stream of water and associated solids from the chosen sampling point, the rate of flow being adjusted so that the speed of entry of the water into the submerged intake is equal to the current speed past it. In this way the intake tube causes very little disturbance to the flow and a truly representative sample is obtained.

A pneumatic device gives a direct indication of the depth of immersion of the sampler head; irrespective of streaming due to current action which makes lead-line type observations both difficult to take and unreliable. It has a depth range of 3 to 100ft, reading to $\pm$ 5%, or 1ft, whichever is the lesser. At the maximum depth it requires a supply of compressed air at about 45lbs per sq.inch, which is supplied by a car tyre pump.

The intake head also has a standard Watts current meter (Figs. 1 & 2) mounted on it, the meter being arranged to give a direct indication of current speed without using a stop-watch and rating chart. Current velocity is indicated to $\pm$ 0.2ft per sec.

The pump, electric batteries, depth measuring equipment, current meter display unit and various spares are housed in a console-like case (Fig.3), to which the hose and electric lead connections are made. Its weight is about 150lbs without batteries.

The current consumption of the pump motor is about 4 amps at 24 volts D.C. giving roughly twelve hours running from a pair of 52 amp-hour 12 volt batteries in series.

* Figures are shown on pages 20-21.

SOME FIELD COMMENTS

To date the sampler has been used largely for tidal studies at the mouth of the Waikato River and its water sampling function has been confined to the collection of saline samples. This is not a critical use of the apparatus since the equating of the speed of entry into the intake with the current velocity is unnecessary for saline sampling. The other functions of depth and velocity measurements worked remarkably well.

In the very limited use of the apparatus for suspended load sampling it was noticed that the regulation of the valve controlling the delivery of the sample was rather coarse, so that it was difficult to achieve an output velocity precisely parallel to the current velocity.

POSTSCRIPT: THE CURRENT METER

An interesting feature of the Watts current meter used with the sampler is the shrouded live terminal (Fig.2) which makes it more easily protected from the water than with the older type model (see also Fig.4).

The following suggestion might be useful to anyone undertaking work in salt water: for prolonged immersion of a meter, particularly at depths greater than 10ft, and when the water is saline, fill the box with light oil. This requires, of course, that the contact box be fitted with the necessary washer to prevent leakage of the oil.

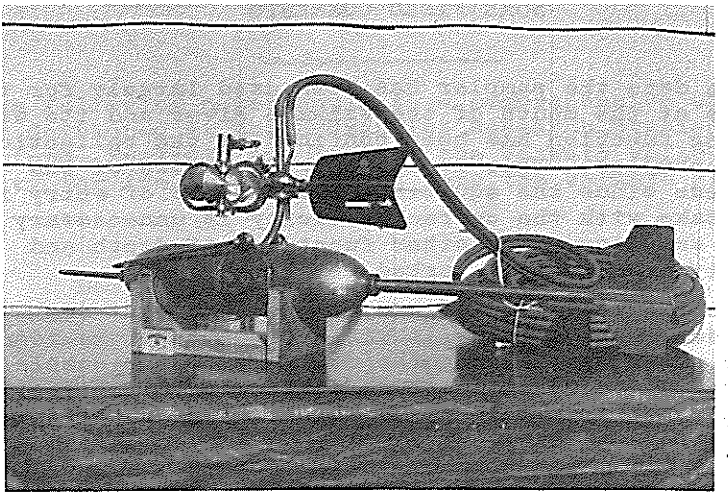

Fig. 1 - Water sampler. One hose conveys the water sample, the other is part of the depth gauge.

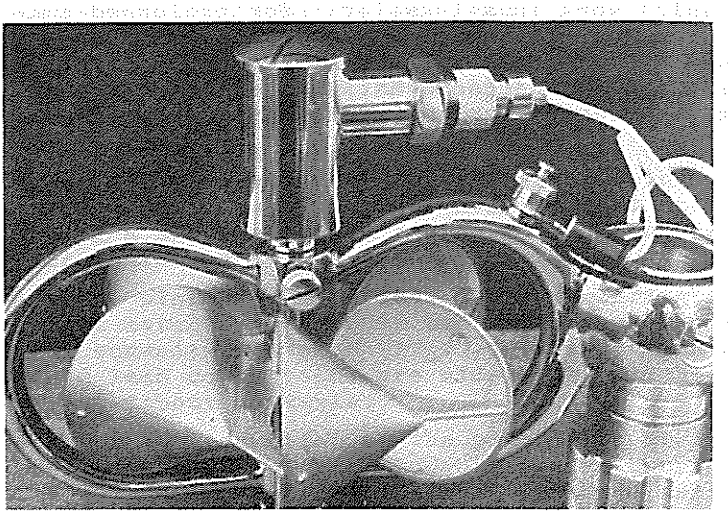

Fig. 2 - Watts current meter with shrouded live terminal.

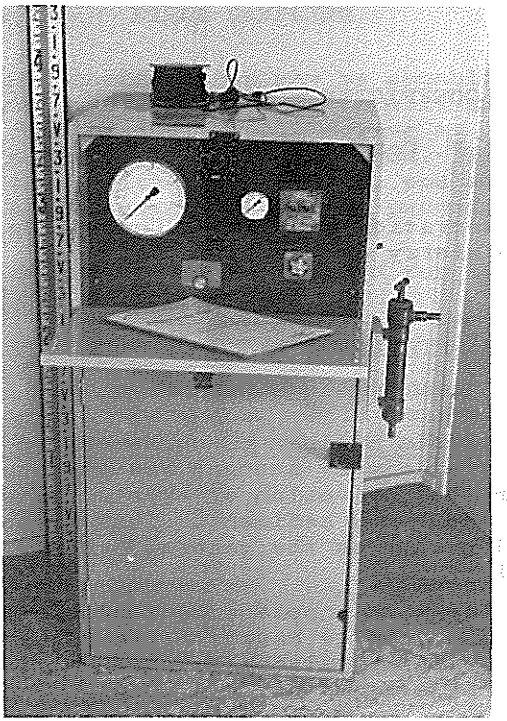

Fig. 3 - Control cabinet for water sampler.

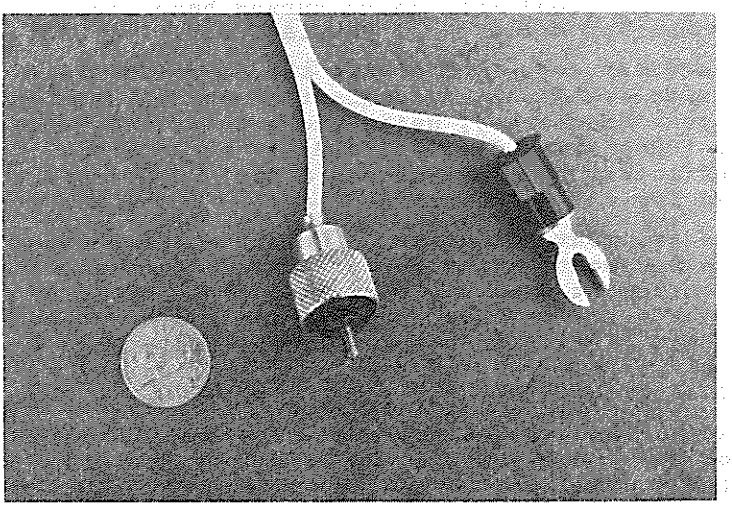

Fig. 4 - Special live terminal connector and standard spade for earth connector.