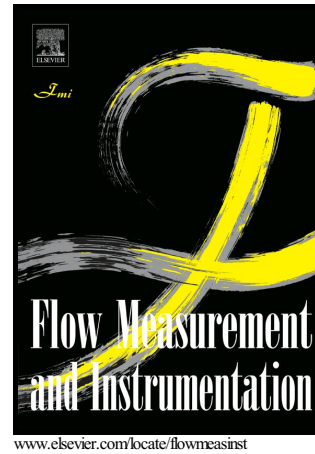


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Measurement of flow rates of water in large diameter pipelines using radiotracer dilution method

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ABSTRACT

The present paper describes measurement of flow rates of cooling water in large diameter pipelines in a thermal power plant using radiotracer dilution method. The objectives of the measurements were to validate the pumping efficiencies of the Vertical Turbine (VT) pumps used for pumping sea water through the pipelines and also calibrate the installed flow meters. Iodine-131 in the form of sodium iodide dissolved in aqueous solution was employed as radiotracer for flow rate measurements. The measurements were carried out at two different pumping units (Unit-1 and Unit-2) with single as well as with simultaneous operation of two different identical pumps. The measured flow rates in Unit-1 and Unit-2 were found to be $15.4 \pm 0.46 \text{ m}^3/\text{s}$ and $14.1 \pm 0.43 \text{ m}^3/\text{s}$, respectively with operation of a single VT pump. Whereas the measured flow rates in Unit-1 and Unit-2 were found to be $27.5 \pm 0.82 \text{ m}^3/\text{s}$ and $24.55 \pm 0.78 \text{ m}^3/\text{s}$ with simultaneous operation of two identical VT pumps. The measured pumping efficiency of each individual pump was found to be quite close to the theoretically predicted pumping efficiency, i.e. $15 \text{ m}^3/\text{s}$. The measured flow rates were also found to be quite different from the flow rates shown by the installed flow meters.

Keywords: Flow rate, large diameter pipeline, Vertical Turbine pump, radiotracer dilution method, Iodine-131, thermal power plant

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