

Experimental Setup for Radiotracer Measurements in Pipes

The experimental setup shown in Fig. 1 developed and produced for radiotracer measurements in pipes is intended for research and teaching in Nuclear Research Center of Algiers. It mainly consists of a 5 m long PVC pipe, with an outside diameter of 32 mm and an inside diameter of 25 mm, placed on a table. The pipe is supplied with water from a tank with a volume of 120 litres by means of a pump

The radiotracer, which is usually Tc-99m, is injected by a syringe and the gamma rays emitted are detected by four collimated NaI (TI) scintillation detectors. The detectors are directly linked to two acquisition chains, two detectors by acquisition chain (Fig. 2).

The laboratory scale experimental setup allows several studies, for instance

- leak detection studies;
- hydrodynamic studies and
- parametric studies of fluids flow;



Fig. 1 Experimental setup for radiotracer measurements in pipes

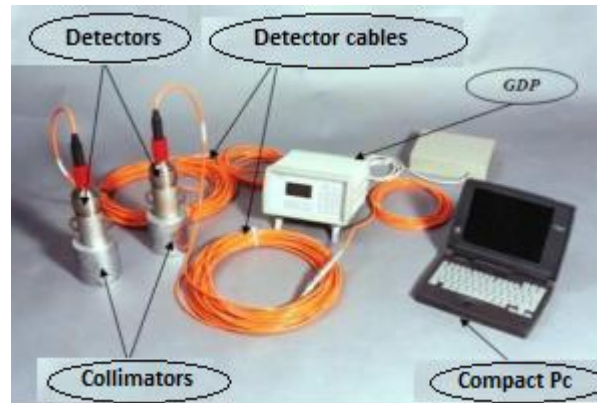


Fig. 2 Acquisition Chain

The study of leak detection, hydrodynamic and parametric studies were carried out under different conditions, in particular to evaluate the effect of flow rate and activity of radiotracer. The leak is located by evaluating the flow along the pipe. Radiotracer technique used for flow rate measurement is pulse transit time which gives velocity directly.

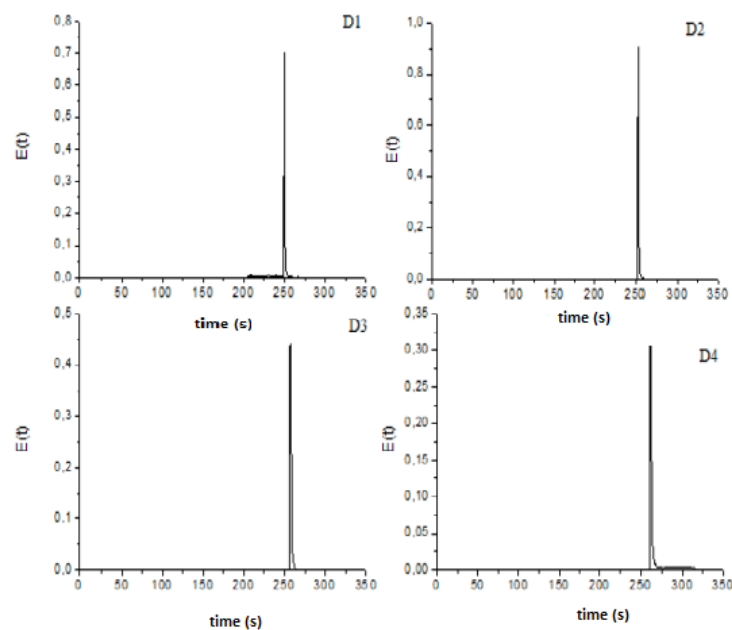


Fig. 3 Example of the RTD curves of four detectors used



An operational radiation protection team supervised the experiments. The members participating in these experiments are Louisa Bounemia, senior researcher in the industrial applications department and Mohamed Belamri, principal researcher carried out the experiments (Fig. 4). An operational radiation protection team supervised the experiments. All five experiments were carried out guaranteeing conditions without risk of external or internal contamination of the environment or of the participating personnel.



Fig. 4 Experimental team