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Design of an Experimental Bench for Gamma Ray Scanning in Algeria

The problems of distillation columns encountered in petroleum refineries require rapid and effective intervention. Gamma ray scanning is a very efficient nuclear technique for on-line diagnostics allowing direct inspection of the internal components of process columns without interrupting the operation of the refinery.

In order to become familiar with this nuclear technique and to understand the problems encountered on an industrial scale better, an experimental device on a laboratory scale (Figure 1) was developed and produced to allow column scanning. It is intended for teaching and research in order to identify problems and allow the digitization of experimental data. The device designed in the mechanical workshop of the Nuclear Research Center of Algiers allows the scanning of columns whose diameter can vary from 10cm to 50cm (Figure 2). The data acquisition chain linked to this system is composed of a NaI (Tl) scintillation gamma detector and a ratemeter (Minekin).

The advantages of this achievement are the possibility

- to use existing calibration sources with moderate activities
- of bidirectional scans (from top to bottom and from bottom to top).

In the realization of the project were involved:

- Bounemia Louisa, senior researcher in the department of industrial applications
- the team of the mechanical workshop and
- the electronic team of the division of specialized technical services (DSTS).

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Figure 1 Gamma ray scanning device

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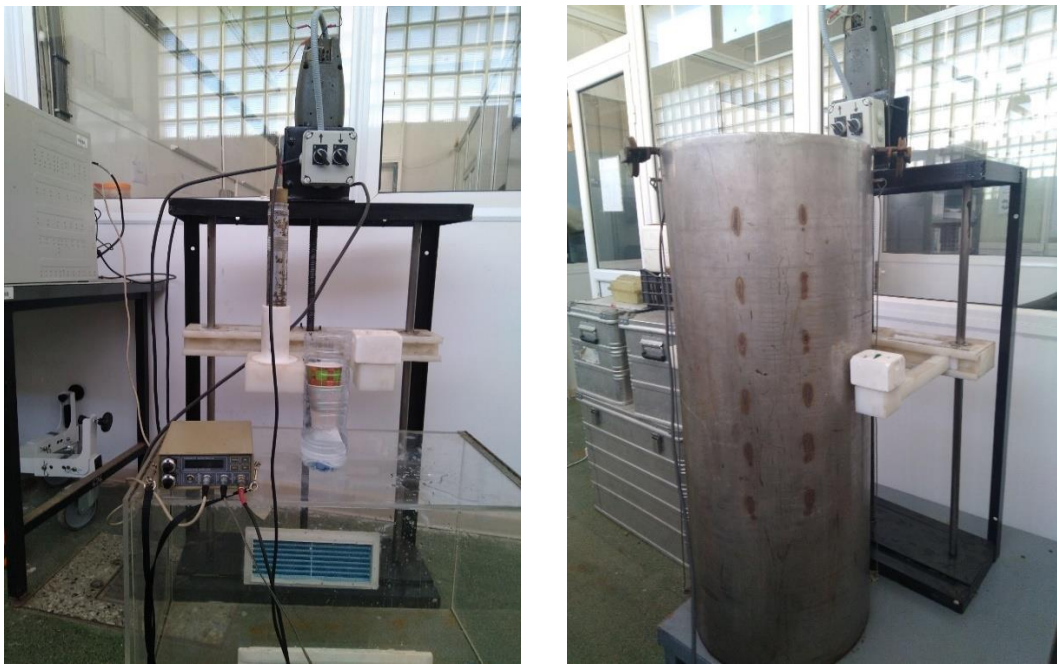

Figure .2: Scan of vessels with different diameters: 10cm (left) and 50cm (right)

Figure 3 shows the interior of the vessel with 50 cm diameter. The two rows of angle plates at the inner side of the vessel are able to support any internals like intact or damaged trays, sieves, perforated plates and so on.

Figure 3: View inside the 50 cm diameter vessel

text and photos: Louisa Bounemia