

 Report from French incidents**Industrial radiography : collection of incidents involving unauthorised persons in the controlled area****Description of incidents**

There have been several incidents reported in which non-radiography personnel have been found in the controlled area while radiography was being (or was about to be) undertaken. These typically fall into the following categories:

1. A controlled area being demarcated without first evacuating other persons in the area.
2. Incomplete demarcation of the controlled area allowing persons to enter unknowingly.
3. A controlled area being demarcated and then being entered by unauthorised persons.

Some examples of each of these are given below:

1. Controlled area being demarcated without evacuating persons.

- When leaving a cabin installed in a machine hall, two people realized that they were inside a zone marked for carrying out radiographic checks, while gamma radiography was underway. Each person received a dose of 0.04 mSv. However, it was estimated that they could have received up to 0.5 mSv based on the duration of the gamma radiography.
- Two people working within the exclusion zone for gamma radiography were only made aware of their situation due to an audio announcement that gamma radiography was about to start. They evacuated their location immediately, only a few minutes before the exposure of the source. In this case, it was fortunate that the source had not been exposed, and no dose was received.

2. Incomplete demarcation of the controlled area

- Gamma radiography was to be undertaken in an engine room and the perimeter was demarcated to prohibit access. However, access was still possible via an external staircase serving each floor: only the access to the ground-floor via this staircase had been demarcated. Consequently, it was possible to access the controlled area without crossing any barriers or warning signs.
- During site radiography, the demarcation plan was not followed by the radiographer, and no barriers/signs were placed on two ladders which permitted access to a room adjacent to where gamma radiography was undertaken.

In both the above cases, the faults were discovered before any persons had entered the controlled area. Had this not been the case, it is estimated that doses of a few mSv could have been received.

3. Unauthorised persons crossing the controlled area barriers.

- When undertaking gamma radiography in an engine room, an employee of the client was responsible for checking the demarcation and evacuation of the controlled area. At approximately 9:30 p.m., he noted that barriers and a rotating beacon were in place, although the radiography was scheduled to start at 10:00 pm. He therefore crossed the barriers to continue his inspection, believing that the radiography had not yet begun. In fact, the radiographer was preparing to expose the source. Fortunately, he saw the individual and told him to leave the area before any dose was received. If this had not been the case, the dose received would have been several mSv.

Lessons to be learned from these incidents

There are several lessons associated with these incidents, and these are summarised below.

- Site radiography requires close collaboration between the radiography company and the site owners.
- To help ensure the absence of people in the controlled area, it is necessary to coordinate and plan on-site activities, including radiography. All relevant workers should be made aware of on-site activities that may affect their own work.
- The larger the controlled area, the more difficult it is to properly demarcate and control. Therefore, the exclusion zone should be as small as reasonably practicable.
- The demarcation of an area must be planned in advance, with reference to the site/building plans. Special care is required where access is possible from different levels. Thus, proper plans, of sufficient detail, should be a pre-requisite when planning the work.
- It is important to undertake a risk assessment for radiography, and to define and implement local working instructions, eg scheduling of radiography (during and outside working hours), inspection of isolated or obstructed premises to ensure that nobody is there, and sufficient radiography staff to ensure control of the area.
- Barriers and warning signs must be clearly visible, and should be emphasised with warning lights where appropriate (eg at normal routes of access).
- A check on the demarcation of the entire area should be made prior to the first radiograph. Thereafter, barriers should be patrolled to confirm they remain effective.
- Prior to gamma radiography, especially in large controlled areas, it is recommended that announcements are made (ie using a PA system) to notify people that radiography will be taking place shortly.
- Non radiography personnel must be instructed not to cross any barriers or signs, and observe all warning signals, even if they have reason to believe that the radiography is not in progress.