Report from a UK incident

Industrial radiography enclosure - failure of door interlock

Description of the incident

During an inspection of a radiography compound used for both X-radiography and gamma radiography (iridium-192) it was discovered that the interlock fitted to the main door of the compound was not functioning correctly. Under normal circumstances the interlock would terminate the production of X-rays, or in the case of gamma radiography, sound an alarm, when the door to the compound was opened.

During a previous inspection it had been noted that the door could be opened slightly before the interlock operated, and it was recommended that the interlock be inspected and repaired. The company had not done this, and the interlock had deteriorated further until it was possible enter the compound without the interlock terminating an X-ray exposure or sounding the alarm.

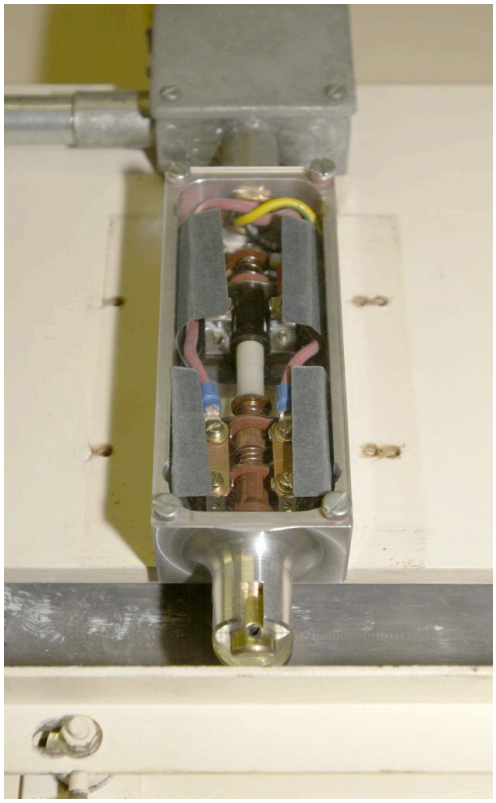
Radiological consequences

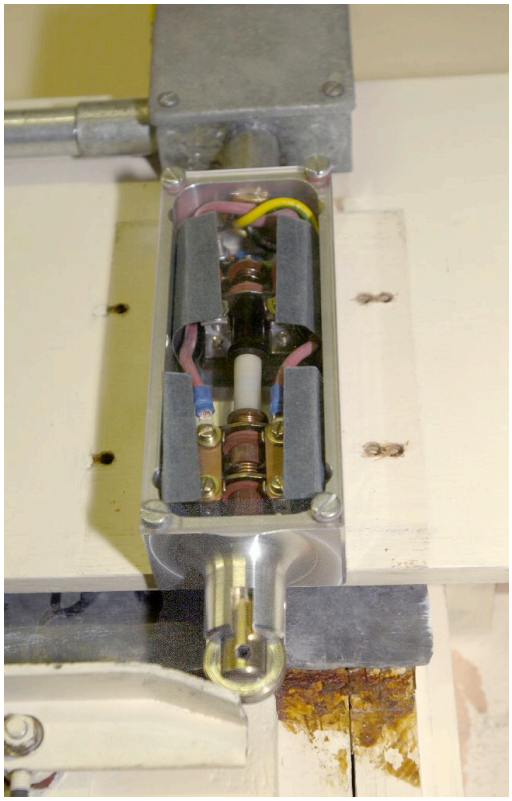
No abnormal doses were recorded on the dosemeters worn by the radiographers using the compound.

Following an investigation, it was concluded that it was extremely unlikely that anyone had entered the compound during a radiography exposure. However, it was noted that the incident provided the potential for a serious radiation accident in which very high doses, and even deterministic radiation injuries (tissue reactions), could have resulted.

Lessons learned

- All interlock systems fitted to the doors of radiography compounds should comply with the appropriate national and international standards for safety-related installations. In practice, the entrance door to a radiography enclosure should be fitted with two separate interlock switches, both of which operate in a fail-to-safety manner (see example in photographs). The two systems should operate in different ways (eg opposite modes), to avoid common-cause failures.
- Routine checks of the correct operation of safety systems should be carried out by the operator and any defects or deficiencies rectified before the installation is used again.





Photographs of two separate safety interlock switches (with covers removed) installed above a sliding entrance door to a radiography enclosure. The switches work in opposite modes, ie as shown in the photographs.