



Polish lessons

CERN is renowned for its creative work. It is top-level science with important discoveries. However, less desirable effects also occur. For instance, when the protons fly off track due to magnet malfunctioning, or when the protons are stopped once the experiments have been completed. As a consequence the surrounding equipment becomes activated. In brief, CERN creates radioactive material.



A dosimeter.

When is radioactive matter dangerous? That decision is taken by the Radiation Protection Group, which has approximately one hundred employees. These CERN employees carry out measurements, register highly active locations, provide access to measuring setups, and monitor the radiation exposure of all staff members. For exposure measurements, each researcher is required to wear a dosimeter. Such meters are special devices suitable for the registration of beta and gamma radiation (using a MOSFET) and neutrons (via a PADC plate). At the same time, they are used as a badge for access to sections of CERN, such as LHCb, ISOLDE and SPS. Without a dosimeter, you cannot gain any access. But how does one acquire such an exclusive device?

Well, you need to complete a training course on radiation protection (including dosimetry, biological effects, risk factors and legislation). The French company Sofranext prepares training courses for this. They offer similar courses for the nuclear industry and have an extensive client portfolio in this field. However, the trainers from this company arrange their courses in French only. Unfortunately, this does not meet the needs of the international community at CERN. Other experts are asked to give related courses in English. Therefore, I regularly provide lectures on how to work with ionising radiation in a responsible way.

PhD students, IT experts, cryogenics specialists, Russians and Chinese, they all come to the Swiss training centre for a radiation training. And some of the participants pose a challenge. Recently I had a group of welders from Poland. They would be set to work that same week to improve the cooling water pipes at CMS. My Polish wasn't up for the challenge. So, how does one accomplish such a task?

CERN appoints people like Izabella for such jobs. She is a sworn interpreter and helps me to explain to the participants what they have to learn. That goes smoothly, because she understands what I want. Soon I understand what *tak*, *tak* and *nie* mean (*yes*, *yes* and *no* respectively), recognise words such as *dystans* and *ryzyko* (*distance* and *risk*) and succeed in conveying facts about radiation with a sense of humour in Polish as well. Now, this might seem a relaxed scenario. However, there is something at stake. The men know that at the end of the day, there is a test. And for those who fail, there will be no dosimeter. For them there will be no work.

The team boss sits on the front row and wonders how I will manage to get his men at the level that CERN requires. It is impossible to do that with the standard approach of atom – nucleus – alpha – beta – gamma – becquerel - sievert... A different tactic is required. I need to come up with something else, as these men are not physicists and neither will they ever be. I adapt my teaching method. The participants know something about radiation, such as ^{210}Po (named after their own country), and when I compare the risks of radiation to those of smoking, they nod meaningfully.

I make a link to their work by referring to industrial radiography. The quality of their welding is checked by a radiographer. Highly radioactive sources are used to make photos to check whether the components are properly connected. An older participant remarks that the measuring equipment of radiographers always rattles when they are taking photos.

This is a nice opportunity to use the available measuring equipment. The men detect background radiation, trace sources, register contaminations and know how to use shielding materials. They also want to measure outside the classroom “as there will be definitely less radiation out there”. There is good interaction and serious interest. Izabella has to work hard. At some times she gives me a lost look, especially when she has to translate terminology such as *source holders of depleted uranium* and *maximum dose rate of 10 $\mu\text{Sv/h}$ at the border*, from English to Polish and vice versa.

Towards the end of the day, as the test approaches, the students become nervous. Outdoors a considerable number of cigarettes is smoked. A Polish version of the test is not available, so Izabella has to translate very carefully. The test is digital. The questions are projected on a screen and the candidates select their choice by using a voting box. At the end of the test, one final click displays the result of the entire class. The outcome? Everybody passed, without a single word of English being used.