Education and Training System in Croatia (Case Study)

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Historical overview

- **1990-1996:**

- War for independence: training and education in radiation protection was not a topic of primary concern.

- **Up to 1998:**

- Radiation protection infrastructure is „ under construction"
- Educations from Ex. Yugoslavia radiation protection system were accepted
- Recognized educational institutions:

  - Institute Ruđer Bošković (Croatia)
  - Institute for Nuclear Sciences Vinča Belgrade (Serbia)

- **1999:**

- **Act on Ionizing Radiation Protection** - frame for radiation protection infrastructure and education
- Croatian Institute for Radiation Protection (CIRP) was established (specialized expert body under Ministry of Health)
- Training and education for exposed workers and RPO is required by Act, organized and provided by CIRP

Historical overview

- 2003:

Amendments on Act on Ionizing Radiation Protection

- Croatian Institute for Radiation Protection becomes State Office for Radiation Protection (SORP) as regulatory body
- Education is still organized and provided by SORP

- 2010:

Act on Radiological and Nuclear Safety: Article 47

- The conditions, deadlines and manner of acquiring professional training and the refreshment of knowledge on the application of radiological safety measures are prescribed in an ordinance issued by the director of Office
- SORP becomes State Office for Radiological and Nuclear Safety.

Historical overview

- 2011:

Ordinance on the training required for handling ionizing radiation sources and the implementation of measures for protection against ionizing radiation.

- Requirements to be meet by the institution organizing and providing additional training, RPO training and refresher training:

1. Institution shall be an institution providing higher education whose standard curriculum contains the subject of protection against ionizing radiation.

2. The institution in question may organize and provide training in the fields of medicine, dental medicine and veterinary medicine only if it provides higher education in the fields of biomedicine and health care.

National training program

- National training program is prescribed by expert commission appointed by director of the SORNS, based on Ordinance.
- Training program: additional training and refreshment of knowledge with period of 5 years.
- Separate training programs for:
  - Exposed workers
  - RPO
  - Non-exposed workers handling ionizing radiation sources
- 4 Recognized educational institutions:
  - University of Applied Health Studies, Zagreb
  - Faculty of Medicine Osijek
  - Faculty of Medicine Rijeka
  - University of Split - University department of Health Studies

National training program

- More than 20 lecturers experienced in radiation protection and education.

- Written examination specialized for training program, questions defined by expert commission.

National training program: Exposed workers

- Basic program: 10 hours
  - Ionizing radiation physics (3 hours)
  - Biological effects of ionizing radiation (2 hours)
  - Principles of radiation protection (1 hour)
  - Effects of ionizing radiation exposure and health surveillance of exposed workers (2 hours)
  - Legislation (2 hours)

National training program: Exposed workers

- Specialist program: 6 hours - for specific practices and specific types of ionizing radiation sources:

1. X-ray units used in medicine
2. Sealed sources used in medicine
3. Unsealed sources used in nuclear medicine
4. X-ray units used in stomatology
5. Non-destructive testing appliances emitting ionizing radiation
6. Well logging devices
7. X-ray units for spectrometry and diffractometry
8. X-ray units and devices containing sealed radiation sources used for security screening
9. Transport of radioactive material
10. Level indicators and similar devices containing sealed radioactive sources
11. Radiation sources used in scientific and research laboratories
12. X-ray units used in veterine

National training program: RPO

- Training program: 24 hours (4 days)
  - Ionizing radiation physics
  - Biological effects of ionizing radiation
  - Principles of radiation protection
  - Health surveillance of exposed workers
  - Legislation (in extended range)
  - RPO responsibilities
  - Discussion

National training program: Non-exposed workers handling radiation sources

- Basic program: 8 hours
  - Ionizing radiation physics
  - Biological effects of ionizing radiation
  - Principles of radiation protection
  - Health surveillance of exposed workers
  - legislation

National training program: Non-exposed workers handling radiation sources

- Specialist program: 4 hours
- Depending on specific end-user practice, specialist training program for exposed workers is applied.
- Specialist training program is reduced in elements concerning exposed workers only.

Additional education and refresher training

- All end-users are mandatory to refresh their knowledge from radiation protection after 5 year period. Refreshment training is organized according to additional training program in reduced content.

  - Ionizing radiation physics (1 hour)
  - Biological effects of ionizing radiation (1 hour)
  - Principles of radiation protection (1 hour)
  - Health surveillance of exposed workers (1 hour)
  - Legislation (1 hour)
  - Specialist program (3 hours)

National training system

- Advantages

- Courses may be organized on end-user request and on end-user location when practicable.

- Training is adopted to end-user type of practice including specific exposure situations and protective measures.

- Good and bad practices can be discussed with end-users.

- For small number of trained participants from different practices, groups can be merged for basic program and split for specialist program. (Training courses can be organized more often and expenses are decreased.)

National training system

- Disadvantages

- Different educational institutions with the same training program provide different lectures depending on lecturer.
- Very different level of the formal education of the participants is not recognized in training material content.
- There are no practical exercise elements.
- There is no assessment of education effectiveness and trainers competence.

Improvements for the future to be considered

- Harmonized training materials and presentations on national level (development in progress).
- Development of different training modules for participant groups with different formal education level.
- Implementation of simple practical exercises demonstrating basic radiation protection methods.
- Implementation of education effectiveness and trainers quality assessment.