

THE INFORMATION SYSTEM ON OCCUPATIONAL EXPOSURE IN MEDICINE, INDUSTRY AND RESEARCH: INDUSTRIAL RADIOGRAPHY

2022 Annual Report

INTERNATIONAL ATOMIC ENERGY AGENCY
Vienna, 2023



FOREWORD

The International Atomic Energy Agency is the world's central intergovernmental forum for scientific and technical co-operation in the nuclear field. It works for the safe, secure, and peaceful uses of nuclear science and technology, contributing to international peace and security and the United Nations' Sustainable Development Goals.

ISEMIR is the acronym for the Information System on Occupational Exposure in Medicine, Industry and Research. Optimization of protection is one of the three general principles of radiation protection. ISEMIR-IR is a tool for radiation protection optimization for non-destructive testing (NDT) companies, conducting industrial radiography (IR). ISEMIR-IR is developed as a web-based tool for regular data collection and analysis of occupational doses for individuals in IR, and for the use of this information to improve occupational radiation protection. It assists IR facilities in benchmarking their arrangements in radiation protection and safety, and hence it promotes the implementation and optimization of occupational radiation protection.

In 2022, in response to the IAEA General Conference Resolution GC(66)/RES/6, requesting the Secretariat to promote ISEMIR with the aim to strengthen the safety of workers in industrial radiography and interventional cardiology, the IAEA has launched the 3rd ISEMIR-IR global survey (which followed the 1st in 2010 and the 2nd in 2020), This aimed to improve the ISEMIR-IR system and to meet the needs of users, such as NDT service providers. The survey consisted of two questionnaires, one for the regulatory body and one for the NDT service providers, which were sent to all the Member States. The regulatory bodies of Member States were requested to complete the respective questionnaire and to disseminate it to the NDT service providers in their country, as well as to encourage its completion. The results of this global survey are presented in this annual report.

The current report contains the overall review of the ISEMIR-IR system, the actual status of the database collections and gives a summary of activities for the year 2022. The report also provides some conclusions and recommendations for the future development of the system.

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1 INTRODUCTION

The ISEMIR project was initiated by the IAEA in January 2009 to focus on very specific topical areas where occupational radiation protection needs to address non-trivial occupational exposures and may face unresolved issues and gaps.

In the design phase, the IAEA was assisted by an Advisory Group (AG) with representatives of international organizations as well as from the five main world regions . The AG identified two specific areas in radiation use, where non-trivial occupational exposures occur, interventional cardiology and industrial radiography.

For each of these two specific topical areas, a working group was set up with experts covering the area in a comprehensive way, with respect to professions, type of radiation usages, geographical regions, and other factors. The Working Group on Industrial Radiography (WGIR) was formed.

The main task of the WGIR was to draw an overview of the situation concerning occupational exposures and radiation protection of staff in IR worldwide. The WGIR was comprised of professionals with experience of working for NDT companies, client companies, NDT societies, technical service organizations, including education, training, and inspection, as well as for regulatory bodies. The WGIR and the AG agreed that the effort for WGIR should be focussed on keeping both the dose due to normal exposure and the risk of accidents as low as reasonably achievable (ALARA).

As a part of its actions, the WGIR performed a worldwide survey of occupational radiation protection in IR over a period of about one year, from mid-2010 to mid-2011. Responses were received from 432 industrial radiographers, 95 NDT companies, and 59 regulatory bodies. The data collected demonstrated:

- a clear need for worldwide improved optimization of occupational radiation protection in IR
- an ability to compare doses for specific occupational roles and conditions, to assess the impact of radiation protection actions, and to follow dose trends.

The results of the survey, including its comprehensive analysis, have been included in the TECDOC: The Information System on Occupational Exposure in Medicine, Industry and Research (ISEMIR): Industrial Radiography (IAEA-TECDOC-1747) [2].

The AG and the WGIR in its original set-up ceased to exist. ISEMIR-IR continued with the support of an Expert Working Group (EWG). The EWG met every year in consultancy meetings that were organized by the IAEA.

In 2020, the EWG performed the 2nd Global Survey. Responses were received from 284 NDT companies from 42 countries, and 46 regulatory bodies. The report of this survey was published on the ISEMIR-IR website: [ISEMIR-IR: Industrial Radiography | IAEA](#).

In order to increase the number of active users in the ISEMIR-IR system, as well as enhance users' experience exchange, IAEA launched the 3rd global survey in the October 2022. The survey consisted

of two questionnaires, one for the regulatory body with 9 main questions and one for the NDT service providers with 19 main questions in 10 languages (Chinese, Czech, English, French, German, Japanese, Korean, Portuguese, Russian and Spanish). The questionnaires were reviewed by the EWG. The final versions of the questionnaires were addressed with a letter to the appointed national contact persons (NCPs) for ISEMIR IR at the member states, regulatory bodies and NDT companies from the previous survey as well as to the companies registered in ISEMIR-IR. All were requested to complete the questionnaires and assist with its dissemination. Based on the conclusions discussed at the Consultancy Meeting, the EWG felt that distributing questionnaires online would be more convenient. Therefore, with the efforts of the EWG, this global survey provided online questionnaires in ten languages for the first time. Collection of completed questionnaires was planned to end before 31 December 2022, but the deadline for submission was finally extended to 31 March 2023. The data received was analysed and is reported in a separate document [4]. In chapter 4 of this annual report, we summarize the main results.

2 STATUS OF THE SYSTEM

2.1 USER REGISTRATION

In 2022, 5 new companies registered with ISEMIR-IR platform, and the number of users has reached 46 (FIG. 1).

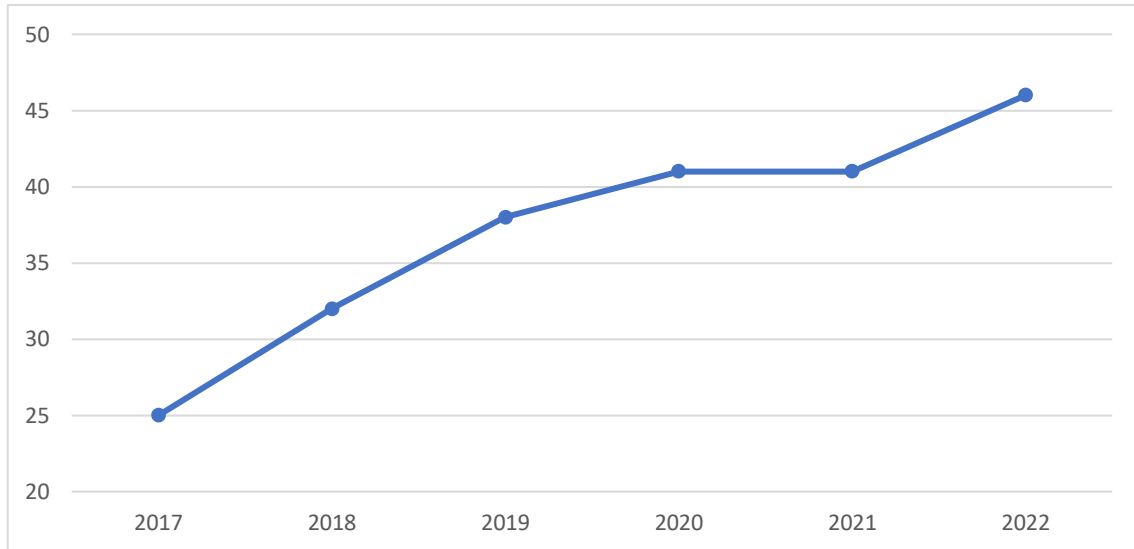


Fig. 1. Annual registration rate

The registered users come from 29 countries located in in Asia-Pacific, Europe, North America, South America, and Africa.

2.2 DATA STATISTICS

From the 46 companies registered in the database, there are 26 datasets recorded. Because some information in the database was duplicated and invalid, after screening and elimination, the total amount of data reduced compared with last year. Reminder letters for these submissions are addressed to the corresponding companies annually.

3 ACTIVITIES CONDUCTED IN 2022

3.1 CONSULTANCY MEETING

The Consultancy Meeting of the ISEMIR-IR was held 16-18 May 2022 at the IAEA Headquarters, Vienna, Austria, with the aim to improve the ISEMIR-IR system and the number of users. A global survey on ISEMIR-IR was proposed and two questionnaires for regulatory body and NDT service providers were produced during this meeting. Before final distribution, the questionnaires were confirmed and endorsed by all members of the EWG. This meeting discussed and approved the proposal to use online questionnaires for the first time.

3.2 ACTION LIST

One of the main outputs from the first Consultancy meeting in 2019 was the development of the action list to discuss the mechanism for the ISEMIR-IR operation. In addition, key actions important for proper functioning and approaches to promote the database to the Member States, NDT companies and NDT operators in particular, were agreed upon.

The action list plays a significant guiding role in the EWG`s work: Every subsequent consultancy meeting the action list will be reviewed and updated with completed and new actions.

3.3 REGISTRATION TEST

In the 2nd survey, some companies reported that they had difficulties in registering on the system. To better understand the issues that new users may come across during the registration process, the EWG found several volunteers from different countries and backgrounds to complete the registration process without any guidance and record the time spent and problems encountered in each step. Some improvements were suggested and implemented.

3.4 ISEMIR-IR SYSTEM

E-mail reminders were sent to all registered users in April 2022, to request for their annual submissions of data for 2021. As we also received a huge amount of data from the 2nd Global Survey, the uploading thereof is still ongoing.

3.5 ISEMIR-IR ADMINISTRATION MANUAL

To clarify the responsibilities of administrators of NDT companies in ISEMIR-IR, the process and timeline of global surveys, and the details that need to be noted in key processes, the EWG drafted an administration manual for this group of key users.

3.6 NATIONAL CONTACT PERSON (NCP)

In September 2019, a request to nominate a National Contact Person (NCP) to assist ISEMIR promotion was addressed to the national liaison officers of the member states. In 2022, another 10 member states joined the NCP program, and currently there are 34 NCPs for ISEMIR-IR nominated by NLOs and regulatory authorities (Table.1).

TABLE 1. COUNTRIES THAT NOMINATED ISEMIR-IR NATIONAL CONTACT PERSONS

Year	Countries	Number of counties
2019	Greece, Latvia, Uruguay, Kingdom of Eswatini, Portugal, Macedonia, Lithuania, Bangladesh, Thailand, Mauritius, Czech Republic, Romania, Turkey, Bulgaria, Malaysia, Cyprus, Armenia, Antigua and Barbuda, Argentina, Kingdom of Saudi Arabia	20
2020	Egypt, Tanzania, China	3
2021	Nigeria	1
2022	Moldova, Tanzania, Slovakia, Morocco, Iceland, Switzerland, Russia, Denmark, Finland, Japan	10

3.7 CONFERENCE PRESENTATION BY THE EXPERT WORKING GROUP

One expert of the EWG gave an update on ISEMIR-IR to the general assembly of the International Committee for Non-Destructive Testing (ICNDT) on 15 June 2022.

The International Conference on Occupation Radiation Protection was held from 5-9 September 2022 in Geneva, Switzerland. Session 5 was on occupational radiation protection in industry, research, and education facilities. One of the experts from the EWG gave a keynote presentation with the title “ISEMIR-IR: A benchmark tool for optimizing radiation protection in industrial radiography”.

Another member of the EWG presented ISEMIR-IR on the regional IRPA congress that was held from 23-27 October 2022 in Chile.

4 ISEMIR-IR SURVEY 2022

During the consultancy meeting from 16-18 May 2022, a global survey on ISEMIR-IR was proposed and two questionnaires respectively for regulatory bodies and NDT service providers were produced during this meeting. Before final distribution, the questionnaires were confirmed and agreed by all members of the EWG. This meeting discussed and agreed the proposal to use online questionnaires for the first time in addition to ones of offline through emails.

The EWG decided to conduct the 3rd Global Survey through a combination of online and offline methods to increase the quality and quantity of data and facilitate data storage and analysis. The questionnaire for the regulatory bodies comprised 9 main questions and was written in English. The questionnaire for NDT service providers comprised 19 main questions and was written in 10 languages (Chinese, Czech, English, French, German, Japanese, Korean, Portuguese, Russian and Spanish).

The global survey was launched by the IAEA on 30 October 2022. The questionnaires were distributed widely primarily using IAEA contacts with regulatory bodies, the NCPs, and the registered users of ISEMIR-IR. The deadline of submitting the questionnaires was 31 December 2022, but it was postponed till 31 March 2023.

Up to the final deadline, 31 March 2023, there are 52 responses from regulatory bodies representing 46 countries (out of 152 countries) and 382 responses from NDT service providers from 42 countries. The regions of regulatory bodies and NDT service providers from which responses were received, are listed in Table 2 and Table 3 separately.

TABLE 2. NUMBER OF QUESTIONNAIRES FROM REGULATORY BODIES

Region	Questionnaires received	Countries
Africa	7	7
Asia-Pacific	16	12
Europe	24	22
Latin America	3	3
North America	2	2
Total	52	46

TABLE 3. NUMBER OF QUESTIONNAIRES FROM NDT SERVICE PROVIDERS

Region	Questionnaires received	Countries
Africa	39	9
Asia-Pacific	135	11
Europe	175	15
Latin America	21	6
North America	12	1
Total	382	42

219 questionnaires from NDT service providers had been fully completed. In the 2nd Global Survey, we only received 108. Some of the entered mandatory information from both Global Surveys was incorrect. E-mail reminders calling for the submission of accurate and legitimate mandatory information were sent to the NDT service providers.

5 CONCLUSIONS

As conclusion, it is necessary to emphasize that ISEMIR-IR is a free online tool, designed with the support of a group of experts. The aim of the tool is to assist NDT companies in optimizing occupational radiation protection and enhance their safety culture. In the meantime, since the information system is relatively new, it is also open for future updates. The IAEA ISEMIR-IR team appreciates comments, suggestions and assistance provided by NDT companies and other users of this tool.

The Agency respects the privacy of NDT companies. Therefore, ISEMIR-IR has been designed as a system with a high level of data security. Only registered users have access to the data. The anonymized statistics for benchmarking purposes is only available for NDT companies, who uploaded at least one data set.

Despite the global slowdown due to the COVID-19 pandemic, the 3rd global survey was still very successful. There were twice as many questionnaires completed as during the last survey and connections were made with more than 100 new NDT companies. The cooperation and contribution of regulatory bodies and NDT service providers, in supporting the IAEA to improve the ISEMIR-IR system and to meet the needs of the users is highly appreciated.

6 REFERENCES

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