

International Nuclear Information System (INIS): Malaysia's Contribution for Nuclear Knowledge Preservation

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ABSTRACT

International Atomic Energy Agency (IAEA) is an organization under the United Nations (UN), which serves to disseminate accurate information about the nuclear matters. In accordance with its role, an International Nuclear Information System (INIS) was established in 1970 to provide opportunities for member countries under the auspices of the IAEA to share information, expertise and knowledge, particularly in the nuclear field. Malaysia became a member since 1978, and the first country's input was posted in 1980. INIS activities are supervised by liaison officers (LO) to monitor and oversee matters relating to INIS management. INIS has developed 49 subject matters (subject heading) and LO needs to prepare, review and compile the records before sending to INIS database at IAEA headquarters in Vienna, Austria. Material received will be processed before distributing to all IAEA member states through INIS website or CD to countries that subscribe to it. This paper focused on how Malaysia contributes to development of INIS and to promote Malaysian about the existence of this database that not only focused on nuclear science but also related technologies.

Keywords: International Nuclear Information System, knowledge base, knowledge management, knowledge preservation, Malaysia

I INTRODUCTION

The problem of storage and information retrieval become crucial since 1940s. This problem become more critical as scientific information emerged whirlwinds during that period and many fields in science must be filled and this make information retrieval become worst. A researcher from a country will not aware what researches being done by others except through meeting, conference or exhibition. Furthermore, information exchange at that time was done manually. In 1960s, this problem was overcome

with the creation of information technology system known as MEDLARS-Medical Literature Analysis and Retrieval System (Samsuridin, 1984).

The establishment of International Atomic Energy Agency (IAEA) in Vienna, Austria is to ensure use of nuclear energy peacefully. Besides that, IAEA also has given a mandate by member states to foster the exchange of scientific and technical information on peaceful uses of nuclear technology, with that a system was developed namely International Nuclear Information System (INIS) fully operational in 1970. This system is operated by IAEA in collaboration with member states and selected international organizations such as The International Commission on Radiological Protection (ICRP), International Organization for Standardization (ISO) and Food and Agriculture Organization (FAO).

The main purpose of INIS's establishment is to provide a comprehensive nuclear information announcement and abstracting services for literature pertaining to the peaceful uses of nuclear science and its technologies. Besides that, INIS promotes exchange scientific knowledge between the member states. INIS subject matters cover most of scientific knowledge from nuclear science and engineering, application of nuclear energy, renewable energy, non-renewable energy, energy from economical views, agriculture, material science, life science, knowledge management, astrophysics, mathematical and computer modeling that related to nuclear and many more. Figure 1 shows the percentage of subject covered by INIS from 1980 until 2008.

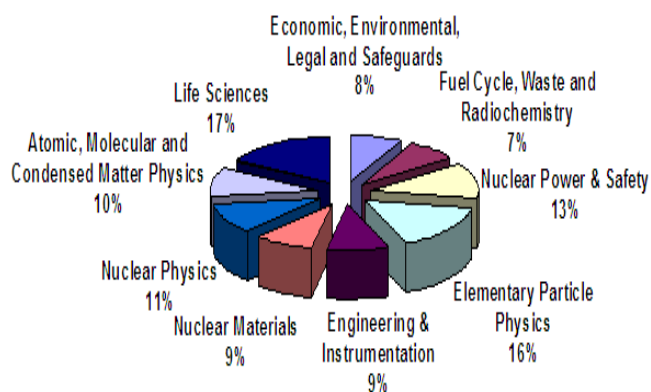


Figure 1. Percentage of subjects covered by INIS Collection from 1970-2008 (Nuclear News, 2008)

In Malaysia, Malaysian Nuclear Agency (Nuclear Malaysia) was appointed as National INIS Liaison Center due to its role as nuclear research and development organization. Nuclear Malaysia also fits the position as national nuclear knowledge center in this country and responsible in collecting, indexing and promoting INIS activities since 1980. This study focused on how Malaysia contributes to development of INIS Collection since 1980. In addition, this paper is written to promote INIS to the public, especially to researchers and students who do research in related field.

II INIS IMPLEMENTATION METHODOLOGY

INIS was established through contribution and cooperation between INIS member states. Implementation of INIS involved 3 stages. The first stage is acquisition and collection of all related publication in Malaysia. All publication will reviewed first according to their suitability on INIS subject scopes. The collection involved journals, reports, conference paper, books, chapter in the books, thesis and legislation documents, published in Malaysia.

Stages 2 involved reviewing by panel expert within National Liaison Center, in this case, Malaysian Nuclear Agency. Following that, these records will be compiled using WinFibre, software for verification developed by INIS Center for this particular purpose. All the classification according to INIS: Guide to bibliographic description (Revision 8, Amendment 3). Then, these records will send to INIS Center through e-mail or file transfer protocol (Ftp). Upon receiving, INIS Center will

verify the records and approves them to enable for online retrieval. Last stage, INIS Center will produces selective topics which address inputting issues such as nuclear accident and incident, research reactor conference, radiochemistry, isotope hydrology, nuclear medical application, nuclear reactor application and development of nuclear power. This information will be put in specific bibliography and distributed to member states through CD. In Malaysia, INIS Liaison Officer will put this information on internal system. It is responsibility of local LO to make this publication available to user in Malaysia through My INIS Malaysia (<http://myinismalaysia.wordpress.com>).

Alternatively, user can search through INIS Collection Search (<http://www.iaea.org/INIS/>) for the article. This search is free. Figure 2 shows the summary of the INIS management meanwhile figure 3 shows the flow of publication from Malaysian INIS center to INIS Secretariat in Vienna.

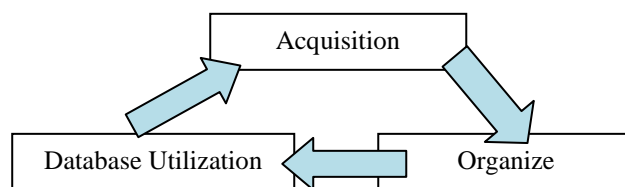


Figure 2. Summary of INIS management

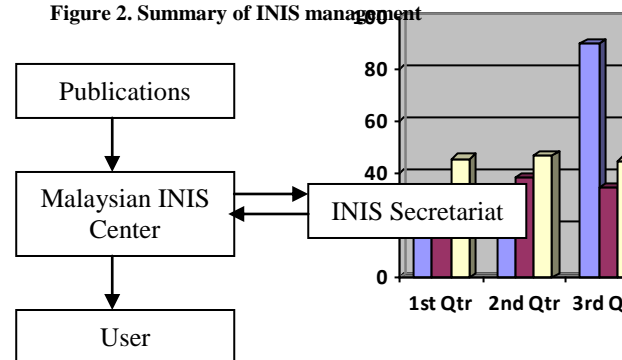


Figure 3. Records flow for publication from Malaysian INIS Center to user

III RESULT AND DISCUSSION

A. Current status of INIS records

By the end of 2011, INIS provides almost 3.2 million bibliographic references and 439314 full-texts document available online (INIS Activity Report, 2011). A total of 877585 records are inputted from all over the world during the period of 2000-2008 (Prakasan et al, 2011). Figure 4 shows that number of input submit to INIS Collection since 2002 until 2011. Through

Countries	No. of records (1970-2011)
World	
United Kingdom	314956
Netherlands	348281
United States	989029
Asia	
India	51721
China	73497
South of Korea	44491
Japan	187518
Southeast Asia	
Malaysia	3998
Indonesia	3083
Philippines	1037

observations, three countries, United States of America, United Kingdom and Netherland are the biggest contributor input to INIS Collection. The most publication in collection until 2011 was article from journal (57 %), research reports (26 %), and followed by books (16 %) and patents (1 %).

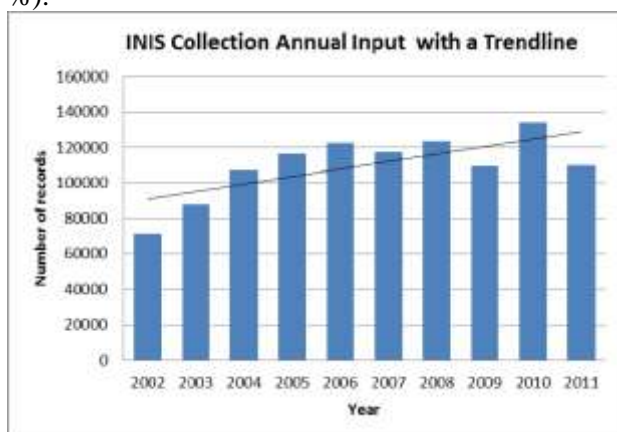


Figure 4. Number of input to INIS Collection from 2002-2011

B. Malaysia input to INIS

Since Malaysia is not a nuclear country, but it also active in doing research in this particular field. 3875 records were sent to INIS and 739 were in full-text documents in 1980 until 2011. Figure 5 shows the number of input sent to INIS Collection by year from 2000 until 2011 (WinsPirs, 2011).

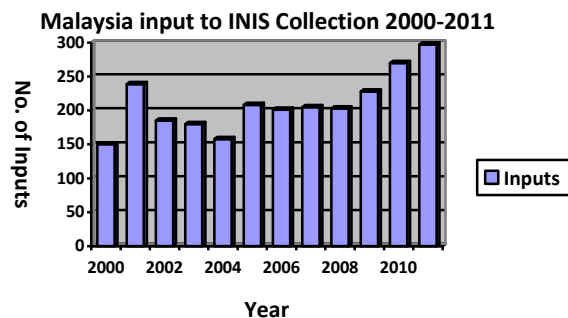


Figure 5. Malaysia inputs to INIS Collection from 2000-2011

Table 1. Number of records sent to INIS by countries

From Table 1, we found that Malaysia is still in good track in producing publications that fulfill INIS scopes compare to other countries in this region like Indonesia and Philippines. Main factor that contributes to this data is Malaysia is not a nuclear country but still doing research in this field compare to other nuclear countries such as United States, Netherlands, United Kingdom, India, Japan, China and South of Korea. Besides that, active research on nuclear technologies and related fields also contribute to the producing on more publications by these countries.

Year	Time lag (Months)							Max.	Av	
	< 1	1-2	3	5-6	7	9	11-12			
2011	1		-4	98	-8	43	32	124	54	21
2010	5	81		46	62		1	75	30	9
2009	7	100	9			26	11	75	54	12
2008			81	29	42			51	32	10
2007	48			66	83			8	54	18

C. Inputting time-lag

Analyzing the time-lag was very important as the user's need of up to date and current records. Table 1 shows time-lag for Malaysia records from 2007 until 2011. Time lag of records measured by input date minus with publication date, so delay date can be obtained and this delay date are recorded in months view (INIS Activity Report, 2011). From the observation, 2011 is a year that shows high average time-lag (21) compare to another year in the table. This is because many of publications in 2010 were recorded in 2011 due to problems faced by the Malaysian INIS Center in getting the material from the publisher.

Table 2. Time lag for Malaysia records from 2007-2011

D. Contributing of Malaysian Journal

Journal is the most preferred publication by the researchers in writing their literature review. The main reason for this is that data published in journals are more updated and reliable from the other publications besides books. Likewise, this scenario also applied to INIS in which journal articles are the most input publications by the countries. Despite of inputting articles in journal, no full paper are shared in order to avoid copyright act. Sometimes for a country does not have funding for INIS programmed, one can request permission to do bibliographic input from the publisher, inadvertently, helping the journal publisher promoting their journal to the world. In Malaysia, current journals that contribute more in INIS are Sains Malaysiana, Malaysian Journal of Analytical Science, Journal of Science Nuclear, Journal of Nuclear Science and Related Technologies because of their contents fulfill the INIS scopes.

E. Types of publication

INIS Collection is unique because it has Conventional Literature and Non-Conventional Literature (NCL). Conventional Literature is literature that commercially available in the market such as books and journals. Meanwhile thesis, reports, conference papers and general articles are categories in Non-Conventional Literature or "grey literature", because this literature is not obtainable from commercial outlets and is no longer easily available from other sources (Nuclear News, 2008). Although the NCL is regarded as the most important and valuable part of INIS Collection, only 23 % of the total annual input includes a link to a full-text, with just 12.4% of full-texts physically residing in the INIS Collection (INIS Activity Report, 2011). In Malaysia, conference papers are the most publication recorded in INIS. Unfortunately, only a small number of full-text is available. All the data about Malaysia's publication sent to INIS are shown in Table 2;

Table 3. Types Malaysia's Publication sent to INIS Collection from 1980-2011

Types of Publication	No. of Records
Book and citation in book	188
Conference	2604
Article in Journal	790
Legislative Publication	2
Miscellaneous	2357
Report	243

IV CHALLENGES AND FUTURE WORK

There are many ways to sustain INIS Collection. It is important for this collection should be utilized by all researchers in the country which will increase the demand. There is need for acquiring information effectively through collaboration with universities and research center. This collaboration will enable Nuclear Malaysia direct access to publication at those institutions especially collection of thesis and research paper. There is also need to address the problem of time-lag in updating the record. That collaboration will also hope to resolve the problem.

In order to promote INIS database to the user, more actions are needed. Participating in local conference, exhibition and seminar is a way forward to ensure the awareness of this collection can receive by target groups. A plan is underway to make a visit to all local universities and research center specially promoting the services. We hope the plan will get full supported by those institutions.

V CONCLUSION

INIS Search Collection is free and can be access by interested parties seeking for knowledge either for research purpose or self-development. Nuclear Malaysia is the responsible agency for the management and promotion of INIS in Malaysia. Malaysia also contributes into nuclear knowledge preservation through INIS as one of terms in developing nuclear power programmed for the future agenda.

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REFERENCES

- Marinkovic, N.M. (2003). Research Reactor records in the INIS Database-A bibliometric study. In: *7th International Topical Meeting on Research Reactor Fuel Management (RRFM)*. 9-12 March 2003. France. 239-247.
- INIS to start next year. (1969). *IAEA Bulletin*, 11(2): 14-15. Retrieved from <http://www.iaea.org/Publications/Magazines/Bulletin/Bull112/11205001415.pdf>

- First result of INIS. (1970). *IAEA Bulletin*, 12(3): 5-6. Retrieved from <http://www.iaea.org/Publications/Magazines/Bulletin/Bull123/12305300506.pdf>
- Rashkova, N., Georgieva, A. (2004). Role of the National INIS Centre in the knowledge preservation programme. In: *Proceeding of International Workshop education and Knowledge preservation in nuclear sciences in the Balkan Countries*. 21-26 June 2004. Bulgaria. 1-4.
- Judy, J.R., Todeschini, Claudio. (1979). INIS and ASRIS-Their use and potential in developing countries. *IAEA Bulletin*. 21(2): 41-54.
- Kumar, A.,Prakasan, E.R., Kadam, Sandeep, Bhaskar, N. (2011). Evaluation of Indian input to the INIS database. *International Journal of Nuclear Knowledge Management*, 5(3): 238-248
- Hafizal Yusof, Habibah Adnan, Samsurdin Ahamad, (2011). International Nuclear Information System (INIS): Researchers platform for knowledge sharing. In: *Nuclear Technical Convention (NTC) 2011*. 13-15 Sept. 2011.
- Todeschini, Claudio, (2010). *The INIS, the first 40 years (1970-2010)*. Vienna, Austria; IAEA.
- Azizah Jaafar, (1997). INIS dan kejayaannya sebagai sistem maklumat nuklear berkomputer antarabangsa terunggul. *Buletin Nuklear Malaysia*, 30: 16-23.
- Samsurdin Ahamad, (1984). INIS in Malaysia. *Warta Nuklear*. Unit Tenaga Nuklear.
- Dobrica, Savic, (2009). INIS and international cooperation in nuclear information. *Nuclear Information and Nuclear Knowledge Newsletter*, 7: 2
- Sellappan, P., (2006). *Database Management*. Selangor; Venton Publishing (M) Sdn. Bhd.
- INIS backups nuclear literature archive. (2008). *Nuclear News*. 33(4): 64-65. Retrieved from <http://www.iaea.org/INIS/Products-services/Articles/index.html>
- INIS progress and Activity report 2011. (2012). Retrieved from <http://www.iaea.org/INIS/INIS-about-us/activities/index.html>
- INIS production statistics 2008. (2007). Retrieved from <http://www.iaea.org/INIS/Members-area/Members-INIS-production-statistic>
- INIS production statistics 2007. (2006). Retrieved from http://www.iaea.org/INIS/Members-area/Members-only/Statistics/Annual_production/index.html
- INIS production statistics 2009. (2008). Retrieved from http://www.iaea.org/INIS/Members-area/Members-only/Statistics/Annual_production/index.html
- INIS production statistics 2011. (2010). Retrieved from http://www.iaea.org/INIS/Members-area/Members-only/Statistics/Annual_production/index.html
- INIS production statistics 2010. (2009). Retrieved from http://www.iaea.org/INIS/Members-area/Members-only/Statistics/Annual_production/index.htm
- Levine, Emil. (2009). Nuclear Power INIS on internet. *Nuclear News*. 33(4): 31-34. Retrieved from <http://www.iaea.org/INIS/Products-services/Articles/index.html>
- INIS database now available free of charge. *Nuclear News*. 51(7):56-57. Retrieved from
- <http://www.iaea.org/INIS/Products-services/Articles/index.html>