

## Indirect Impact of Infrastructure Development Programs on Security in Transport of Radioactive Material in Indonesia

Indonesia is catching up with infrastructure development in recent years. Based on the World Economic Forum 2013 data, Indonesia's infrastructure is ranked 64 out of 148 countries in the world. Meanwhile, Indonesia's ranking in ASEAN is ranked 5th after Vietnam. The main purpose of this development is to improve the economy and business in Indonesia. However some aspects should be considered as they might contribute in direct impact to the development, one of which is security in transport of radioactive material.

The transport of radioactive material is usually an interim phase between production, use, storage, and disposal of the material. The modes of transport should be taken into account when designing the transport security system. The total time that radioactive material is in transport, the number of intermodal transfers and the waiting times associated with the intermodal transfer are kept to the minimum necessary.

From 2014 to 2018, Indonesia has built along 3,432 kilometers roads and 947 kilometers of toll roads. The toll roads of concern are the Trans Sumatra toll road and the Trans Java toll road. Bakauheni-Palembang toll road in Sumatra is expected to have a significant impact on security in transport of radioactive material. The toll road is divided into 2 sections, Bakauheni-Terbanggi Besar (140km) which has been operating since March 2019 and Terbanggi Besar-Palembang (220km) which is estimated to be fully operational by the end of 2019. This toll road becomes important for security in transport of radioactive material because South Sumatra is one of the largest oil producers in Indonesia, so that industrial radiography activities are also quite high. Companies providing industrial radiography services from Java island usually use land transportation after crossing the Sunda Strait that passes through Lampung to reach the location of the oil industry in South Sumatra. Before the construction of the toll road, the road across Sumatra had a high crime rate of theft with violence, especially in Lampung. With the existence of the Trans Sumatra toll road, travel time can be reduced and toll road security is also maintained. Therefore it can reduce the threat of security in transport of radioactive material, especially for industrial radiography in South Sumatra and Lampung.

The Trans Java Toll Road also has an important impact on the security in transport of radioactive material. The toll road has connected Jakarta and Surabaya, the 2 largest cities in Indonesia, with a the length of 760 km. The travel time for Jakarta-Surabaya will be significantly reduced, from 20 hours passing the national road, to less than 15 hours passing the toll road. Therefore the travel time of transportation of radioactive material in the Java Island can be reduced, which also reduces the threat of security in transport of radioactive material. Indonesia also develops infrastructure for information and communication connectivity. The Palapa Ring, which involves an undersea fiber-optic cable network that stretches across 13,000 kilometers as well as an onshore network of nearly 22,000 kilometers, will provide fast broadband Internet to Indonesian people in both the urban and rural areas across the country. Once completed, all Indonesian districts (Kabupaten) are connected through fiber-optic communication.

The development of connectivity infrastructure is dedicated to facilitating the mobility of people working and doing business, increasing the distribution of goods and services, and increasing people's productivity and competitiveness in the international market. But this infrastructure can also support the security in transport of radioactive material. For packages of radioactive material with contents meeting or exceeding the radioactivity threshold for the enhanced security level tracking measure should be applied. Tracking methods or devices may be used to monitor the movement of conveyances containing radioactive material. A simple tracking system will be able to track when a shipment has departed, whether the mode of transport has changed and if the material has been placed in interim storage or the consignment has been received. This information about status changes should be readily available to the appropriate parties. The tracking system, in conjunction with a communications system and response procedures, will allow the operator and the competent authority to react in a timely manner to a malicious act, including theft of radioactive material. In addition to the above benefits, there are also challenges for the security in transport of radioactive material due to the increased infrastructure development. From 2014 to 2018, 19 new ports have been built and existing ports revitalized. The government also plans to make seven ports in Indonesia an international hub to compete with Singapore. The need for Radiation Portal Monitor (RPM) is increased to ensure the security in transport of radioactive material. At present, there are only 6 units of RPM installed in Indonesia in 6 locations, Tanjung Priok, Batam, Bitung, Makassar, Belawan and Semarang ports.

**State**

Indonesia

**Gender**

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