

Harmonisation for Cost-Effective Transport

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Introduction

The transport of radioactive materials is becoming increasingly international and with it, the added importance of maintaining consistency and predictability in the interpretation and application of international regulations to ensure safety through compliance and also, to facilitate efficient operations. Regulations do not have a beneficial impact on safety until they are properly implemented at the operating level. Inconsistencies can have an undue impact on the day to day job of the transporter. Differences in interpretation and implementation can jeopardise safety and lead to confusion, duplication of effort, delays in obtaining approvals and inefficiencies in both industrial transport organisations and national authorities.

As we well know, no sector of transport is regulated more stringently than the nuclear transport industry. The nuclear transport industry is subject to a long-standing, comprehensive, inter-connected regime of international, modal and national regulations and standards. The International Atomic Energy Agency (IAEA) transport safety regulations, the so-called TS-R-1, are at the heart of that international regulatory regime. These then are incorporated in the United Nations (UN) dangerous goods model regulations, the regulations and standards of the International Maritime Organization (IMO) for marine transport, the International Civil Aviation Organization (ICAO) for air transport, the ADR, RID and ADN for road, rail and inland waterways in Europe, and the regulatory regimes of the IAEA Member States themselves. The IAEA transport safety regulations are reviewed every two years and amended or revised as appropriate to ensure they are up-to-date.

This is a complex and protracted process. Harmonisation issues are encountered at every stage; some are of more consequence than others and they vary from region to

region. Although, much work has been done to harmonise the regulations, there is still much to do.

Some Harmonisation Issues

Lack of harmonisation of implementation dates

A combination of multiple transport modes are used for most nuclear consignments, such as road to rail, rail to sea port or airport, and each of the mode specific regulations needs to be consulted. This becomes more complicated during the various transitional periods the modes allow. For example, although new regulations were introduced in January 2007 the exact arrangement for mandatory application varies as indicated below.

Regulation	In Force	Mandatory
Un Model	1.1.2007	Non-mandatory
ADR	1.1.2007	1.7.2007
RID	1.1.2007	1.7.2007
IMDG	1.1.2007	1.1.2008
ICAO	1.1.2007	1.1.2007
IAEA	1.1.2005	There will be no change in 2007

The IAEA regulations are fed into the Modal regulations through the UN dangerous goods Model Regulations (the so-called Orange Book). When changes to the IAEA Transport Regulations are adopted they are sent to the UN Committee of Experts for incorporation into the Orange Book. These changes will not be adopted until the December the following odd year. They then are sent to the Modal bodies for incorporation into the various modal regulations e.g. IMDG Code, ICAO Technical Instructions. This means there can be a four year delay between the IAEA changing TS-R-1 and the Modal regulations reflecting these changes.

The transitional period and time taken to incorporate the IAEA changes can cause confusion for industry. By way of example, if a small sample of radioactive material is being transported during a transitional period the consignor must try to decide which of the two public-ations apply. Also when a package is sent for transport via a parcel carrier the consignor does not know which mode will be used and therefore the package must comply with all modal regulations.

The problem is made even worse when there is no official translation of the various regulations into the users' language.

Rationalisation of implementation of regulations

In some countries different regulatory bodies deal specifically with the various modes of transport; i.e. road, rail, sea and air. This can lead to complexities such as different document structures and wording, as well as different adoption dates for the various modes. The regulatory body may also involve several different authorities and in such cases it is important to have clearly defined responsibilities to prevent errors and to avoid unnecessary duplication or conflicting requirements being placed on the operator. One notable example of where a lack of harmonisation could have caused a denial of shipment relates to uranium hexafluoride (UF₆) shipped from New Orleans to the Port of Rotterdam. The transport system routinely used for such transports requires the use of lash barges to load/unload from a 'Mother' ship at the ports of departure and arrival. Although these transports are in full compliance with the IMDG code, the Port of Rotterdam noticed that the transfer of the lash barges from the 'Mother' ship to the berth used an inland waterway system and therefore should comply with the ADN Regulations requiring radioactive materials to be transported in double skinned barges. This caused several problems for the transporter and the shipping company, to the extent that the shipping company was considering withdrawing its service for Class 7 cargoes. A compromise solution was eventually agreed by the port authority but the issue of disharmony between the regulations remains.

Criticality safety analyses

National authorities carry out independent reviews of the criticality safety of packages containing fissile materials but the underlying assumptions which are used in the calculations can differ and the outcome is that the requirements for implementation of the regulations are not uniform. A single design may require preparation of multiple criticality analyses to obtain base approval and foreign validations; e.g. packages for the transport of nuclear fuel elements. When several competent authorities are involved, the resolution of these issues to validate a package design can be time consuming and resource rich.

Re-validation of approved packages

At present, there often are considerable time intervals between the renewal of a package certificate in one country and the relevant re-validation in a foreign country, during which time transports can not take place.

Sequencing of tests

The IAEA Regulations stipulate that package tests to demonstrate the ability of high-duty packages to withstand accident conditions of transport should include three different drop tests, in a sequence such that on their completion, the specimen package shall have suffered damage as will lead to the maximum damage in the following thermal test. What if one jurisdiction has a different view from another on the most damaging sequence of tests for a particular package design? This could have significant implications for the applicant in terms of costs and delays.

Security requirements

Security is the responsibility of each State, but lack of harmony between States can and does have an adverse effect on international transports, especially for land transports. One State, for example, may only allow their own nationals as drivers, it may have differing criteria for the appointment of security guards. Another State may require tracking devices in lorries. Differing requirements can cause delays and confusion at border crossings. For example, some States have installed radiation portals at border crossings. In Canada, this has caused a rail company to withdraw its service for the cross-border carriage of radioactive materials due to concerns over delays of other cargo. The IAEA will shortly publish a guidance document on transport security to assist States in developing security requirements.

All these problems can lead shipping companies, airlines and road and rail companies to consider whether it is worth their time and effort to transport radioactive materials.

Some Proposals for Improvement

Industrial transport organisations

There is a necessary synergy between the regulator and the regulated – the regulator whose job it is to make and to enforce the rules, and those whose job it is to transport within the rules. And so, the regulator and the transporter can be more effective in achieving their purposes when they co-operate.

It is industry that experiences the harmonisation problems on a daily basis, more than the national competent authorities; it is industry that operates within and between different jurisdictions. And it is industry which must cope with the varying application and interpretation of regulations worldwide.

So, it is for industry to share experiences and information where it can, in the interest of developing consolidated industry positions. Industry knows what the problems are; it follows that industry should have some ideas on how to improve the situation. Can industry develop guidelines to ensure more structured, systematic and consistent approaches to satisfy the requirements of safety cases? Certainly, if industry does have some ideas, it stands a better chance to change things when it works together, shares information and strives to find common ground.

To take a practical example, companies within WNTI are working to develop industry views on whether some form of generic industry guide on assessing criticality safety is possible. This is a good example where the various companies potentially can assist each other by sharing experiences, and drawing appropriate lessons to improve the situation. It should be possible to conduct this exploration while respecting company prerogatives to provide the specific justifications appropriate to their situation and also, to be sensitive to commercial interests.

To take another example, there has been discussion within industry for a number of years regarding standards for shipping uranium concentrates from producers (mine/mill operations) to uranium conversion facilities. Although the standard way of transporting ore concentrates is in drums (nominally 200-210 litre size), the specific packing and securing methods for sea transport vary considerably. Once again, the WNTI has established an industry-driven task force to allow industry to explore the concept of standard good industry practices for uranium concentrates packaging and shipping in ISO containers. The task force is developing an industry guidance document which at the first stage attempts to harmonise issues that can easily be achieved by the industry for little cost, such as drum construction, drum lid securing, and drum restraint. Once completed this document may be introduced at the IAEA, IMO, ISO, ANSI or the International Cargo Handlers Association for further distribution. It is hoped that this will go some way to allaying any concerns expressed by shippers.

IAEA

It is generally recognised that the IAEA Regulations are soundly based and have been very successful in ensuring the safety of radioactive material transport. However, implementation could be improved by avoiding ambiguities, improving the style and ease of use of the Regulations, and providing comprehensive guidance documents to coincide with their publication. The current process of revising the regulations on a 2-year cycle raises implementation problems in practice. WNTI has played a prominent role in the IAEA in recent years in encouraging a refined regulation review process less inclined to prompt changes to the regulations every two years and thereby encourage stability. WNTI has proposed criteria for assessing experience with the existing regulatory regime based on safety/cost benefit principles to determine what, if any, issues require addressal through the review process.

Modal organisations

The various modal organisations base their requirements on the UN Orange Book, a process that permits modal organisations not only to decide the extent to which transition periods should be allowed when the Regulations are changed, but also amending the Orange Book to mode-specific requirements. This topic would be appropriate for further consideration by the modal organisations collectively.

National authorities

This is where most of the harmonisation issues arise and some of the main issues which need to be addressed include expiry dates on certificates that are not always consistent and can vary from country to country, varying interpretations of the IAEA Regulations, and independent reviews carried out by the various national competent authorities using their own particular assessment methods requiring much time and effort and thereby causing delays.

Conclusion

Regulations only have a beneficial impact on safety when they are fully and properly implemented at the operating level. Harmonisation issues which impede efficient and timely implementation can occur at each stage of the complex and protracted implementation process, with the potential to cause delays or even denials of shipments.

There is a widespread recognition today that maintaining transport options requires open and sustained dialogue between the regulator and the regulated. This is improving. It also requires close collaboration among all parties in the industry – this too is increasing. Industry must take the opportunities afforded it to inform the regulators and others of the context in which industry performs its essential services, and to be engaged in the regulation review and implementation processes. Practical, efficient and safe transport regulations should take full account of their impact on those who do the transporting. But industry does itself no favours if it is seen as complaining; it should offer support, encouragement to the other stakeholders, and work together to propose solutions where improvements are called for.

It is important, therefore, that all the stakeholders in the international transport of nuclear materials – industrial organisations, the IAEA, the modal organisations and the national competent authorities – should seek to develop further a holistic strategy to ensure that regulations are implemented in a consistent, efficient and predictable fashion.

To facilitate this uniformity, industry, through WNTI, encourages enhanced dialogue with key stakeholders, both individually and collectively. This in turn can enhance safety while at the same time reducing delays, duplication of effort and inefficiencies for all concerned.



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Conference paper

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