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**Status Report on the Development of the Historical Technical Basis
Document for the Requirements of the International Transport Safety
Regulations**

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Abstract

At PATRAM 2013, papers were presented outlining the efforts underway at the International Atomic Energy Agency (IAEA) to develop a comprehensive and detailed technical basis document (TecBasDoc) to support the current and future revisions of the IAEA Transport Safety Regulations. The motivation for the development of the TecBasDoc is that, with the passage of time, the scientific and technical heritage of several decades of development in transport safety regulation has begun to fade; i.e. the “corporate memory” is being lost. It was therefore recognized that there was a need to capture and preserve valuable knowledge for future reference in reviewing and – as needed – revising the IAEA Transport Safety Regulations, and in assisting in the application of those Regulations worldwide. Indeed, such knowledge could prove invaluable to the international transport safety community as the “Regulations for the Safe Transport of Radioactive Material” undergo review and revision in the future.

It was recognized that the past and current regular review and – as needed – revision of the Regulations has been driven by problems, challenges, and the demand for improvements; as well as by the need to take into account experiences in transport, newly identified issues, new technologies, best practices, the demand for sustainable transport, and harmonization. Furthermore, every requirement in the regulations has been developed based on deliberations amongst international experts and discussions of an appropriate technical basis. One goal of the IAEA’s TecBasDoc effort is to provide easier access to the existing technical bases for the Regulations while concurrently facilitating a more comprehensive understanding and appropriate application of the Regulations. The TecBasDoc effort is viewed as an effort to transfer knowledge between generations that can contribute, in future decades, to the further development of, and innovations in, transport safety, while also streamlining the regulatory review and revision process and avoiding needlessly revisiting

the same issues and discussions.

Significant progress has been made on the TecBasDoc since the report delivered at PATRAM 2013. The draft TecBasDoc is still not completed. In fact, it is viewed as a living and maturing document and will continue to be so for the ensuing future. This paper provides an overview of international-level efforts that began in 2010, and outline of the current status of that effort.

Introduction

As was reported at PATRAM 2013 [1], capturing the technical bases for the current transport safety regulations and preserving that information for future generations of transport regulators as well as the larger transport community was then seen, and continues to be seen as a priority for the IAEA. Since the Regulations for the Safe Transport of Radioactive Material were first issued by the IAEA in 1961, there have been fourteen revisions, amended editions, or supplements of the Regulations issued. The latest edition was issued in 2012 as Specific Safety Requirement No. 6 (SSR-6) [2].

The history of the revisions and their supporting explanatory and advisory documents was summarized by Bajwa, et. al. [1] Figure 1 (copied from that paper) depicts graphically the overall history of the development of these documents which has occurred in three phases (a) 1957 to 1961, (b) 1964 to just prior to 1985, and (c) 1985 to 2012 [1]. That figure indicated that the expectation at that time was the first full draft of the TecBasDoc would be issued in 2013. It is noteworthy that, since that time, a new version of the advisory material supporting the application of the Regulations has been issued [3].

These revisions of the Regulations have been developed taking into account the world-wide experiences, new issues, new technologies, best practices, lessons-learned from their application, the demand for sustainable transport, and the need for harmonization with other international bodies and between IAEA Member States. Problems, challenges, the demand for improvements, and the need to provide biennial inputs to international dangerous goods model transport regulations, continue to motivate the transport community to review and, as needed, revise the Regulations.

To support the continued review and periodic revision of the Regulations, an effort was initiated in 2010 at the IAEA with a view to capturing and documenting, to the extent possible, the technical bases for the Regulations. This international-level effort, which continues, is focused on the development of a comprehensive and detailed technical basis document (TecBasDoc) [1].

The TecBasDoc is viewed as supporting the current and future revisions of the Regulations by providing:

- (a) a narrative history of the development of the regulations,
- (b) the technical bases for the decisions that were made regarding the requirements in the regulations, (where the technical bases could be clearly discerned) and
- (c) the appropriate historical references that support those decisions.

The intent of the IAEA is to (a) provide the TecBasDoc electronically on the internet, (b) to re-issue it periodically by continuing to add to it and update it as resources are available and as changes are made in the Regulations, while (c) concurrently making the references cited in TecBasDoc – to the extent possible – available electronically. This will allow this valuable resource to be readily available on the internet to the transport safety community, providing the necessary explanations of the “whys” behind the current regulations.

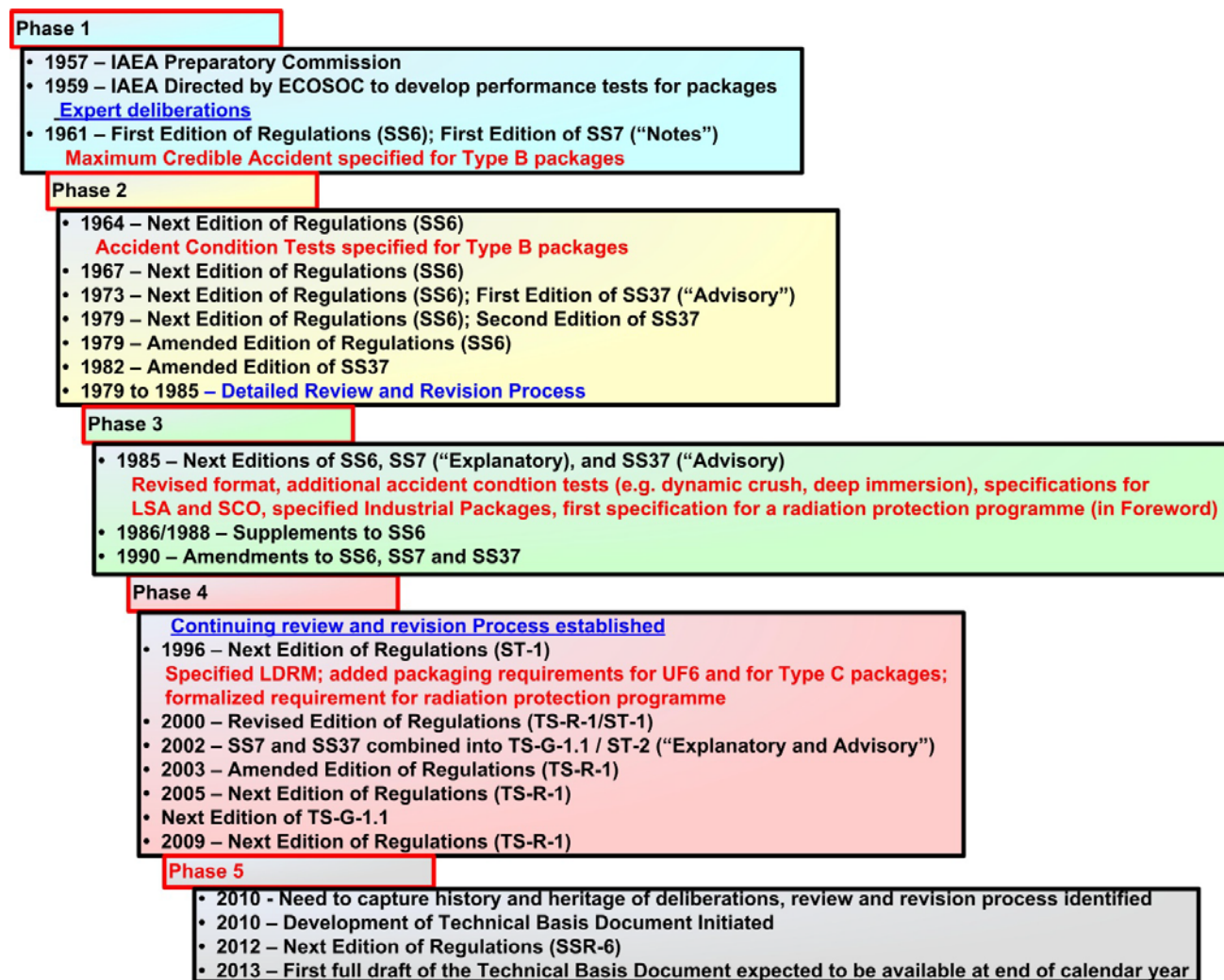


Figure. 1. Graphical depiction of the process of developing the IAEA Transport Regulations and supporting documents (Bajwa, et. al. [1]).

This paper elaborates on the background behind the development of the TecBasDoc, provides an update on its status, and discusses plans for the future.

Background on the Development of the Technical Basis Document

The effort to develop the TecBasDoc began with a technical meeting convened in October 2010 in Paris, France. This initial, “kick-off” meeting was followed by a second technical meeting

convened in March 2011 in Vienna, Austria. The two meetings focused on identifying the underlying technical bases for the essential safety requirements for transport. Some historical documents had been collected and correlations between those documents and the essential safety requirements had been traced in more detail to clarify the technical bases of the transport safety requirements.

A partial working draft of what was envisioned to eventually become the TecBasDoc was prepared by a consultant services (CS) meeting in March 2012. The working draft was further developed and provided to a working group for consideration and advice at the IAEA's Transport Safety Standards Committee (TRANSSC) meeting in October 2012 (TRANSSC 25). This TRANSSC working group provided guidance on the future development of the TecBasDoc.

A further CS meeting was then held in December 2012 with the mandate to incorporate the TRANSSC working group recommendations and further edit and refine the current draft of the TecBasDoc. Also, an expanded effort to collect relevant historic reference material continued during the CS; the IAEA archives were searched, documents pertaining to transport safety were reviewed, and copies of relevant documents were obtained. These documents were scanned and added to an electronic database of references for the TecBasDoc. Proceedings from relevant technical conferences and journals were then reviewed and relevant papers catalogued for future incorporation as references for the TecBasDoc. All of these documents are under further consideration for strengthening the detailed technical bases for various regulatory requirements, including how and why they have changed with time.

As this process moved forward, periodic updated reports have been made to the TRANSSC, and further advice was obtained from TRANSSC members relative to the contents and structure of the maturing document and to its future. As a result, certain parts of the draft TecBasDoc were determined to require further attention for accuracy while other parts had already been identified as needing to be researched for new topics to be addressed to provide a more complete picture.

Current Status of the Technical Basis Document

The current draft of the TecBasDoc has been developed with the assistance an input of a large number of experts from all over the world. It currently comprises 175 pages including a number notes identifying areas where further investigation is needed. The document is structured into 12 chapters as shown in Table 1. In addition, the current draft of the TecBasDoc contains four appendixes as shown in Table 2.

These tables list the number of references currently cited in each chapter or appendix. For many of these, the number of references now included is significantly greater than what was reported at PATRAM 2013, a result of efforts since that time.

Table 1. Chapter Structure in Current Draft of TecBasDoc as of August 2016.

CHAPTER	TITLE	NUMBER OF REFERENCES CITED
1	Introduction	5
2	General History	26
3	The Fundamental Safety Principles	8
4	Safety Objectives and Principles for Transport	6
5	General Safety Requirements	24
6	Radiation Protection	12
7	Controls for Transport	26
8	Classification of Materials	29
9	Classification of Packages	5
10	Package Design and Testing	129
11	Nuclear Criticality Safety	(chapter is currently under detailed review & revision)
12	Approval and Statutory Requirements	(not yet developed)

Table 2. Appendix Structure in Current Draft of TecBasDoc as of August 2016.

APPENDIX	TOPIC	NUMBER OF REFERENCES CITED
1	Developing and applying the IAEA Transport Regulations – Implementing an international transport safety regime (7 references)	7
2	The structure of the safety standards	1
3	The technical basis for applying the graded approach	37
4	Follow-on studies into the adequacy of the accident conditions of transport	46

The collecting of historical references has been one of the most challenging aspects of the TecBasDoc effort. While a number of references were readily available in an electronic format, many of the older references exist only in paper and then, often only in the personal collections of individuals who have been working in transport for a significant period of time.

To enhance the collection of historical references, the IAEA archives were tapped to find early documents that might shed some light on some of the decisions made in the early editions of the regulations; however, the archives did not always contain the specific documents that were sought.

The IAEA has reached out to the transport community with requests for copies of the remaining outstanding references, with limited success. Some references appear to not be available (in any format) at this time. Ultimately, whatever historical documents are captured electronically, and are not constrained by copyright issues, the IAEA plans to make them available to the larger transport community, along with the TecBasDoc.

Future plans

While the TecBasDoc has not been fully completed and the references are still being sorted and reviewed, the current draft is viewed as a valuable tool that can be used to support a better understanding of the changes that have occurred to the IAEA Transport Regulations over time, and to also support current and future deliberations on proposed changes.

Discussions within the transport community – including in TRANSSC – and among Agency staff, indicate that the TecBasDoc may never see formal publication, although this will always remain an option. Rather, it is expected that it will be brought forward to more fully represent the past history, and then it will be updated periodically, as needed, to reflect future regulatory considerations and future technical developments.

At this time, there are a number of issues that remain to be addressed in the TecBasDoc. These include:

- Reformatting the reference citations to fit a standard format that has now been specified by the Agency's publication staff.
- Constructing a modified reference data structure to facilitate placing as many as possible of the references cited on the internet for easy access by users of the TecBasDoc.
- Resolving copyright issues with publishers of cited documents to enlarge the number of references that can be made available on the internet.
- Completing a redraft and review by technical experts of Chapter 11.
- Developing initial text for Chapter 12.
- Review of multiple notes that have been made by the authors of the current draft with a view to resolving inconsistencies in the text or clarifying / adding further insights into the document.
- Addressing comments and recommendations that have resulted from reviews by TRANSSC members and Agency staff members.

Conclusions

The effort to produce the TecBasDoc has been well received by TRANSSC and the larger transport community. The current version, although not fully completed, is featured as a resource for

workshops and training courses conducted on transport safety. The document is a very unique collection of historical facts and recollections as well as references that provide support to the current edition of the transport regulations. The TecBasDoc would also be considered as “required reading” for the next generation of transport safety professionals as it captures and transfers knowledge that is currently retained by only a handful of transport safety professionals around the world who are still willing and able to share this knowledge with those who are seeking it.

The IAEA will continue to develop the TecBasDoc and plans to periodically update and expand the document to capture the technical bases for more recent changes to the regulations. This will continue to provide the larger transport community with a valuable resource for years to come.

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