

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Dangerous Goods

Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods

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Accidents and risk management

Report after the 3rd workshop on risk management in the context of rail, road and inland waterways Transport of Dangerous Goods, 17-19 February 2015

General information

The third workshop of the roadmap on risk management in the context of inland transport of dangerous goods took place on the 17-19 February 2015, in Valenciennes. The European Railway Agency chaired the workshop on the two first days and invited Mr Pfauvadel, Chairman of the Joint Meeting, to co-chair the discussions on chapter 1.8.5 of ADR/RID/ADN during the last day.

Experts in the field of transport of dangerous goods and transport operations, representatives of national administrations (from 13 countries) and the private sector, as well as of international organizations attended the workshop.

In total around 40 participants, discussed the following items:

- existing databases on transport events and reporting of accidents,
- potential use of telematics applications (data collection / statistics),
- desirable content of databases and reporting regime for risk evaluations,
- contribution to ADR/RID/ADN Chapter 1.8.5.

In total, fourteen (14) presentations and twenty-six (26) documents (contributions) have been submitted to the workshop and made available to the participants through the new extranet workspace which was welcomed by the participants. The presentations and the majority of the documents shared by the participants were used to discuss the different topics.

ERA prepared also presentations in order to introduce each item with the relevant conclusions of the previous workshops and a summary analysis of the documents available for discussion. These presentations should not be considered as proposal/position from the ERA but as an effort to identify important principles – for discussion – to be considered by the group.

The main objective of the 3rd workshop was to discuss important principles which should be followed to guide further detailed work.

Some participants considered that the discussions held until now should be continued with detailed working documents taking into account the important concepts and principles which have been discussed.

Main results

The main results after the discussion concern key principles to be taken into account for entering in a detailed work phase. The transition from discussions on principles towards the development of detailed working document is now expected by many participants.

This expectation shows that the workshop's discussions have resulted into better awareness of the state of play and could be used to agree, at the level of principles, on key aspects of the upcoming detailed work.

In annex I, the Joint Meeting representatives may find a table of presentations and documents discussed at the 1st, 2nd and 3rd workshops. These documents are all available on the ERA extranet workspace dedicated to the Roadmap on TDG risk management. Interested representatives may have access to these documents as extranet users, as soon as they will be registered.

In annex II of the present document, the Joint Meeting representatives may find a tripartite proposal from AEGPL, UIC and France which was discussed with the workshop participants during the third day of the workshop and which summarizes some of the important principles to be considered in future work developments.

For the benefit of the Roadmap continuation and for the organization of future detailed work it is suggested that the Joint Meeting representatives share their views on the results reported below and in the annexes.

Concerning the development of reporting regimes and associated databases:

In the process of development of better harmonised and collaborative reporting regimes, the following categories of parameters need to be considered for facilitating the practice of risk evaluations:

- **Events** (what is the category and sub category of concerned event, for example traffic operation accident or spontaneous TDG release...)
- General information on the **circumstances of the event(s)** (description of the circumstances, date, time, location, weather...)
 - Concerned Operation
 - Concerned Persons/Companies
 - Concerned Objects/Systems (for example in case of collision with other objects)
- Detailed **factual information** on the events
 - In general
 - Concerned Vehicle
 - Concerned Infrastructure (Road/Track/Waterway)
 - Concerned Signaling / Traffic control system
 - Concerned Communication
 - Specific to TDG
 - Concerned Goods
 - Concerned Containment (Packing, tank...)
 - Concerned outcome Scenario (spill, explosion, toxic cloud...)

- Quantity of dangerous goods transported and released
- Detailed information on the **causes of the events**
 - Direct Causes
 - Indirect causes
 - Root causes
 - Combined causes / Common mode causes
- Detailed information on the **resulting impacts of the events**
 - Victims (fatalities / injuries ...)
 - Qualitative impacts on the transport sub-systems and on its operation
 - Qualitative impacts on environment
 - Other impacts (for example reputation...)
 - Monetized impacts

It is recognised that none of the harmonized reporting regimes cover all the above categories of parameters. When the above categories are covered the taxonomy is not harmonized and the level of detail content may significantly differ. This situation is a barrier to the use of risk-based approach and a barrier to the mutual recognition of risk evaluations.

Only few harmonized reporting regimes include parameters relating to the causes of events. This is also a barrier to risk evaluations at national and international levels. At company levels, internal reporting regimes generally contain information on causes; however they do not follow harmonized definitions (company specific).

In order to be efficient, the next work steps should prioritise the development of a harmonised taxonomy for the most commonly used categories of parameters, at least for the description of events, circumstances, direct causes and impacts.

Most of existing databases have not been developed for the need of risk evaluation practices, therefore the future developments should be justified by the needs relating to risk evaluation practices and should consider the appropriate level of information to be covered within each above categories of parameters.

In order to avoid duplication of reporting regimes, and ensure the compatibility among several reporting regimes (and consequently limit the costs for the industry) the improvement of existing reporting regimes, in addition to the ADR/RID/ADN reporting regime, need to take care of the existence of already well-developed harmonised frameworks, in particular:

- US DoT reporting of dangerous goods events (multimodal)
- DG MOVE – Care/Cadas reporting regime (fatal road accidents reporting)
- EU – ERAIL reporting regime (railway accidents investigations)
- EU – CSIs reporting regime (railway safety performance indicators)

The *Glossary on Transport Statistics* agreed between IFT/UNECE/EUROSTAT needs also to be taken into account when developing a TDG-related harmonized taxonomy. These documents are also made available in the ERA Roadmap extranet workspace.

In order to limit the burden of potential developments for the concerned industry, the developments of existing reporting regimes shall also take into account existing internal

occurrence reporting frameworks within operating companies and infrastructure managers. Future development of reporting frameworks should be limited to what is strictly necessary for facilitating risk evaluations practices, including the needs for improving mutual recognition of risk evaluation results, the transparency and availability of data.

The above principles should be respected when developing the detailed description of future reporting regimes and content of related databases. The Joint Meeting representatives are invited to share their views on these principles.

Description of risk evaluation practices and production of necessary statistics/consensus:

The previous workshops and the discussion held also during the 3rd workshop suggest that three directions may be used to facilitate the practice of risk evaluations:

1. the production of **statistical inputs** which must be produced from the information collected on events, circumstance and causes, which shall be made available to the risk assessor community,
2. the production of **traffic statistics** which must be produced from the information collected on transport operations and which shall be made available to the risk assessor community. These statistics should be both available at local, national and network level for allowing different risk evaluation purposes,
3. to avoid the productions of statistics that are very challenging to establish today a certain number of **consensus inputs and method** for risk evaluations should be agreed within the dangerous goods and risk assessor community and recognized by the authorities as acceptable practice.

Concerning **statistical inputs**, and after having analysed risk evaluations practices, it is identified that the following parameters (not exhaustive) are generally necessary to estimate risks:

- Frequency of occurrence of events (number/year)
- Frequency of occurrence of causes contributing to the occurrence of a given event
- Frequency of the involvement of the dangerous substance for each type of event
- Kinetic of dangerous goods involvement
- Correlations between influencing factors on above frequencies
- Correlation damage/leakage, speed of impact/breach size...

For establishing risk evaluations and comparison with other transport situations it is necessary to normalise the results with the intensity of the considered operations, in general the quantity of goods transported is used as normalising parameter (risk per transported quantity).

Information about the general traffic performance provided by EU/national statistical offices is necessary to derive scaling data so that frequency rates for the occurrence of **primary** (central) events can be established (number of years operated, (train/vehicle-) km travelled, quantity of goods transported, quantity per shipment, etc.).

Concerning traffic statistics:

The use of telematics applications assorted with an anonymous, but mandatory reporting of a sufficient amount of traffic information is a credible solution at medium term (< 10 years). Such developments are considered as feasible for EU railways, based on further developments of the TAF TSI.

In road transport, a participant showed that a similar approach would be feasible but is still at the level of research project development or demonstrators. There is no similar legal framework than the TAF TSI for developing the collection of road traffic information which seems to be a limitation for progress in this field.

Concerning **consensus inputs and method**:

From the 1st and 2nd workshops' discussions it was identified that it is a quite common risk evaluation practice to estimate the potential effects of TDG scenarios for typical toxic clouds, heat release and explosions.

This approach of 'test scenarios' is used by many risk assessors however with some differences in the detailed definition of the scenarios to be tested and on the method used to derive the impacts of these scenarios on vulnerabilities.

In principle, the definition of a mutually recognized 'test scenarios' for the most commonly considered hazards would help the mutual recognition of risk evaluations, avoiding long debate on minor differences between source terms used by different risk assessors and on the related uncertainties.

In addition to 'test scenarios', other 'consensus parameters/methods' may be defined for facilitating the mutual recognition of risk evaluations, for examples:

- Correlation between the size of the hazardous source and its probability of occurrence (Frequency/Leak size correlation),
- Consensus method for calculating the size of the areas concerned by the hazardous phenomenon resulting from hazardous scenarios,
- Common way to estimate impacts of the hazards on vulnerabilities within the impacted area (human, material, environmental),
- Effect of influencing factors on the size of the hazardous areas/ on the scenarios themselves (for example, the influence of sheltering...)

...

It is recommended to try defining such consensus approach to the risk evaluation in order to improve mutual recognition of existing practices.

Finally it was also a common view (2nd workshop) that qualitative approach should also be allowed for risk evaluations, however qualitative and quantitative approaches should lead to the same conclusions when applied to given risk situation. Therefore the process of comparison and equivalence between qualitative and quantitative approach should be further discussed.

From the definition of harmonized risk evaluations practices it will be possible to better identify the necessary parameters and it will contribute to the definition of the necessary content of future reporting regimes.

Concerning the evolution of the legal frameworks concerning risk evaluations and data reporting regimes

The contributions provided by some of the participants to the 3rd workshop and ERA's experience of EU railways reporting regimes it is clear that different reporting regimes exist and have different purposes and different reporting timescales, as follows:

- internal company reporting regimes (immediate to yearly):
 - manage communications in emergency situations,

- gather data on a 24/7 base for controlling daily operations inherent to the company,
- collect data that must be reported to authorities (National or Supranational) according to agreed definitions, thresholds and frequency
- national regimes (monthly to yearly):
 - analyze data collected from the company in order to supervise companies performance,
 - learn lessons from severe accidents,
 - identify needs for amending national or international legal provisions,
 - use collected data in the process of authorization/certification.
- international regimes:
 - learn lessons from severe accidents,
 - establish statistics on the overall performance of an industry sector / a policy.
 - identify needs for amending international legal provisions and provide data for cost-benefit / impact analyses

It will be necessary to take care of these aspects when proposing improvements of the existing reporting regimes.

Future developments – method of working:

Considering the above ERA will initiate the development of detailed working documents, with the contribution of all interested parties:

- Guidance on the development of databases and related reporting regimes for facilitating the evaluation of risks related to the inland transport of dangerous goods,
- Guidance on risk evaluation practice in the field of inland transport of dangerous goods.

The two documents are interlinked and will be developed in parallel.

The ‘database’ document will use the ‘risk evaluation’ document in order to target database developments that are necessary for risk evaluations.

The ‘risk evaluation’ document will use the ‘database’ document in order to explain how could be used (future) databases for calculating risks in a way which is recognized by the TDG experts and risk assessor communities.

As foreseen in the Roadmap, the ERA extranet workspace will allow all interested parties to contribute to the drafting of the documents, to provide comments and to requests amendments, as well as to prepare for document review discussions during the next workshops. First draft documents could be discussed during the 5th workshop, in October 2015.

Proposal

ERA is inviting the Joint Meeting representatives to discuss and share their views on the above results and on the foreseen follow-up work as well as on the proposal of principles (annex II) made by AEGPL, UIC and France.

These views will help ERA to organize follow-up work, within the roadmap framework, and in collaboration with all interested parties.

Annex I

Lists of presentations and documents considered by the 1st, 2nd and 3rd Workshops of the Roadmap

1st Workshop

(list presentations available on ERA website)

- DNV GL - Challenges and results on development of a quantified risk assessment methodology for marshalling DG
- DNV GL - Current Practices in EU on application of Risk Acceptance Criteria toTDG
- DNV GL - Feasibility of Harmonised Risk Acceptance Criteria for Transport of Dangerous Goods
- Dutch Ministry of Infrastructure and the Environment- Lessons from similar initiatives
- Dutch National Institute for Public Health and the Environment - Basics of risk assessment methods
- ERA - Common Safety Method on risk assessment
- ERA - Occurrence reporting relying on accident fault trees
- ERA - Quality assurance in the framework of a risk-based approach regulation.
- Flemish Gov-New Flemish Approach for Risk Analysis System TDG
- IUR - Reconciliation of local and global Safety levels objectives
- FR -MEDDE_DGPR_MTMD-Study on accident probability in marshalling yards
- Spanish Ministry of Public Works and Transport - Traffic restrictions
- Swiss Federal Department of Environment, Transport- Raiwlay Safety Measures and land use planning
- ERA - WS Background document

2nd Workshop

(list of presentations also available on ERA website)

- CEFIC - guidance on risk assessment
- DG Move-CARE database
- DNV Leak frequency data for DG vehicles
- EASA - Occurrence Reporting in Aviation
- ERA - Coordinated risk-based reporting
- ERA - Occurrence reporting in railways
- ERA EU Occurrence reporting in different transport modes

- ERA study on Common Occurrence Reporting for EU single railway area
- Flemish - Risk Analysis System for TDG
- FR MEDDE DGPR MTMD - Study on accident probability in marshalling yards
- RFF - Existing databases on transport of dangerous goods accident
- Switzerland-Data Acquisition for Risk Evaluation
- UNECE -Dangerous Goods Events Database
- University of Illinois – Practical risk analysis approach

3rd Workshop

(list of presentations available on ERA's extranet)

- Database of CFL
- Incident report of CFL
- Occurrence Reporting Systems of Swiss Federal Office of Transport
- Workflow of incident reporting to Swiss Federal Office of Transport
- Content of database for risk evaluation by DNV GL
- Electronic reporting system "saferail" and statistics tool of Infrabel
- Use of telematics applications in Belgium for RID transport of Infrabel
- Experience from ChemLog TT project - new projects EDMOND and MONET of OLTIS group
- ERA - Potential use of telematics applications
- ERA - TDG Extranet
- ERA - Roadmap on TDG Risk management - Discussion on Chapter 1 8 5ERA Roadmap on TDG Risk management - Discussion on databases and reporting processes
- ERA - Roadmap on TDG Risk management - Discussion on Risk evaluation
- ERA - Roadmap on TDG Risk management - Discussion on telematics
- ERA - Roadmap on TDG Risk management - Progress review

(List of Contributions other than presentations)

- BE NIB - LISTE DES INFORMATIONS-CHAMPS À RECEVOIR
- BE NIB - Survey Template for participants contributions
- BE SPFMT - Compte-rendu d'un incident
- CEFIC - Capter 3 Guidance for Root Cause Analyses
- CFL - Survey Template for participants' contributions
- CFL - Workflow Database
- CH FOT - Incident_Reporting
- EC - Cadas Glossary

- EC_DNV GL - Harmonised Risk Acceptance Criteria for TDG
- FR - Brainstorming Events
- France - First approach concerning an improved list of information for dangerous goods accidents database
- France - Grille d'analyse des évènements TMD
- France - Signalements à l'origine des évènements TMD
- Infrabel - Arbre des causes 2
- Infrabel - Arbre des causes Saferail
- Infrabel - List in Saferail
- Infrabel - Manuel SafeRail v2
- Infrabel - Survey template for participants' contributions
- Infrabel - Table liste des causes
- ITF_EUROSTAT_UNECE - Illustrated glossary for transport statistics
- NL - Towards a new risk-calculation method for TDG
- UTP - Evènements du TMD ferroviaire FR
- UIC - Safety Database - Report 2013 - Significant Accidents 2012
- US DOT - Guide for preparing hazardous materials incident reporting
- US DOT - Hazardous Materials Incident Report

Annex II

Some Principles for reporting proposed by AEGPL – UIC – FRANCE

(as amended by FR according to comments made by participants during the workshop discussion)

1. In the view of use in an international context as well as in an electronic format, all information contained shall be codified as much as possible. In general, use of drop-down-lists (avoid text, as much as possible, however it shall also be possible to complement through a textual summary). Use definitions from existing Regulation where applicable (eg. RID-ADR Directive 2004/49). The structure of information should facilitate queries.

2. The reporting should be factual and should not structurally prejudge the causes, or express opinions. It should include fields on:

Date and location

Events (what failed, how it failed, where it failed)

Leakage and place (body, openings, valves ...)

General information (description of the circumstances: day-night, weather conditions, etc....)

Concerned Dangerous Goods

Concerned Containment (Packing, tank...)

Concerned Vehicle

Concerned Infrastructure (Road/Track/Way- specific equipment, geometry)

Concerned Signalling

Concerned Communication

Concerned Operation (Loading, traffic & unloading)

Concerned Equipments

Consequences (Human, Assets, Environment, Reputation)

Causes should be reported in a separated field

(the following may be shown :root causes; primary causes; combination of causes)

3. Consider information to be used for :

(a) Risk Assessment Analysis

(b) Statistics

(c) Feedback for: Technical and safety rules improvements, training and education

4. Consider inclusion of all incidents happening to vehicles carrying DG's:

(a) With DG's losses (criteria to be refined)

(b) Without DG's losses (but with potential consequences: criteria still to be defined).

Note: it should be clarified that the purpose is to identify any factor that could compromise the integrity of the DG's containment. Reporting of DG's events should help to understand these mechanisms. Operational failure, in each mode, is not considered "per se", but as potential aggression to the containment.

5. Distinguish DG's specific information from non DG's specific, in order to allow collaborative approach between "general transport" and "TDG specific" data reporting, in particular to serve the purpose of point 4b).

General transport reporting might serve to provide data on traffic performance

6. Ensure same level of detail and same accessibility for all modes of transport.
