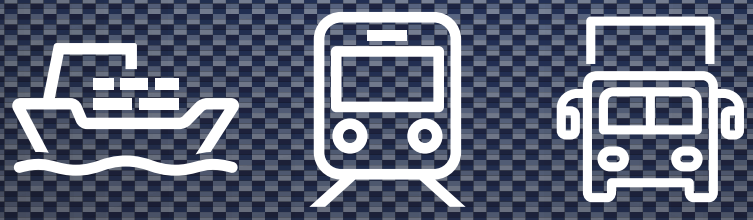
European Commission

Guide for decision-making

Multimodal



Risk management framework for inland transport of dangerous goods

Mobility and transport

The present document is a non-legally binding guidance of the European Union Agency for Railways.
It is without prejudice to the decision-making processes foreseen by the applicable EU legislation.
Furthermore, a binding interpretation of EU law is the sole competence of the Court of Justice of the European Union.

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Risk management framework for inland transport of dangerous goods

Guide for decision-making

(version applicable to the voluntary implementation scheme during the test phase period 2018-2020)

Version 1.0/2018

Practical information for users

This guide is intended to assist with risk management for the transport of dangerous goods. This document is recommended for use on its own or in combination with the risk estimation guide. In either case the user needs to take into account the framework guide and the glossary in combination with the guide on decision-making.

Use of this guide is voluntary and it is applicable to any category of user. Please remember that its use remains the full responsibility of the user. However, users are encouraged to implement this EU harmonised method, which aims to improve:

- the quality of risk control decisions relating to the inland transport of dangerous goods,
- the level of transparency, and
- the recognition of stakeholders' decisions.

The approach was developed by experts with knowledge and practical experience of the management of risks posed by the inland transport of dangerous goods by rail, road and inland waterways.

As such the approach contained in this guide is applicable to the three inland modes of transport, individually or in combination.

During the three year development process the experts have considered many different situations that they have faced in their professional careers and have agreed on this harmonised decision-making (DM) approach. It is applicable to a wide range of users for a wide range of risk situations, for example:

- Companies may use it for making decisions on risk control measures within their safety management systems[1]. Appropriate approval needs to be obtained from any relevant authority to ensure legally binding provisions and / or duties of care are complied with.
- Professional associations may use this guide for members who are required to demonstrate the efficiency of their risk control measures.
- Local, regional, national, European and international authorities may use this guide for making decisions that are recognised by their stakeholders, whilst complying with their own legal obligations.
- International organisations, European Union institutions, bodies and agencies as well as TDG regulators may use this guide as an aid to investigating relevant amendments to the harmonised Transport of Dangerous Goods legislation and/or for modal-specific requirements.

1 In the context of EU railways the user of the risk management framework also needs to take into account, notably, the requirements of *Commission implementing regulation (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment and repealing Regulation (EC) No 352/2009* and *Commission Delegated Regulation establishing common safety methods on safety management system requirements pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulations (EU) No 1158/2010 and (EU) No 1169/2010.*

Users are invited to provide feedback – including lessons learnt[2] – to the Expert Users and Development Group established under the current framework.

The transport of dangerous goods is governed by a number of regulations at levels from international to national and regional. These regulations continue to evolve due, not least, to scientific and techical developments. Companies and the private sector need to follow these developments and requirements by incorporating the evolving regulations into their operations and decision-making processes for the transport of dangerous goods. Indeed, organisations should have primary systems in place that act as a baseline for their risk management programmes. These systems should guarantee compliance with their existing policies and standards in addition to complying with relevant codes and regulations.

At present, this guide does not set explicit acceptance criteria[3] for assessing the control of risks but establishes a level playing field for good decision-making applicable to all Inland Transport of Dangerous Goods. In particular it sets quality objectives and defines decision-making principles.

2 *Please report any feedback using the contact template available on the dedicated webpage* https://www.era.europa.eu/activities/transport-dangerous-goods/inland-tdg_en

3 *In the context of EU railways the user of the risk management framework needs to take into account the requirements concerning the achievement of Common Safety Targets and the risk acceptance criteria established by Commission implementing regulation (EU) 2015/1136 of 13 July 2015 amending Implementing Regulation (EU) No 402/2013 on the common safety method for risk evaluation and assessment.*

Acknowledgements

This guide was developed under the TDG Roadmap project (phase I) organised by the European Union Agency for Railways with the contributions of experts involved in the management of risks posed by the rail, road and inland waterways transport of dangerous goods.

The DG Mobility and Transport of the European Commission and the European Union Agency for Railways warmly thank all the participating experts and organisations for their fruitful contributions in setting up the Inland TDG risk management framework.

Note: a list of contributing experts and organisations is given in the framework guide.

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1. Introduction

1.1. Aims and Purpose

This guide aims to:

- fully cover the risk evaluation and decision parts of a risk management process,
- facilitate the preparation of risk-based decisions by decision makers, based on harmonised decision-making principles and indicators,
- improve the quality of risk assessment decisions and for them to be made in a harmonised way which, if queried, can be backed-up with a chain of evidence.

Its content covers topics generally detailed in decision-making literature, whilst proposing a specific process to solve issues identified in the annex of the Roadmap Document on risk management in the context of inland transport of dangerous goods. It also aims to be consistent with the decision-making process proposals in the DNV Study 'Harmonized risk acceptance criteria for transport of dangerous goods' commissioned by the European Commission, in 2014.

Specifically, it provides a process that takes account of the recurring issues encountered in TDG decision-making whilst leaving responsibility for the final decision with the decision–maker. Put simply: this guide will not make the decision for the decision maker but aims to assist them in analysing the important steps that need to be taken.

It also aims to enhance the transparency and reliability of decision-making in the field of TDG by setting out clear guidelines for recording the steps involved and for communicating with interested parties throughout the decision-making.

1.2. Structure

- Section 1: Overall aims of the guide and its structure.
- Section 2: The basic framework of the risk management approach which focuses on risk management strategies, actors, relevant categorisation for risk management situations, and risk management measures. It concludes with consideration of appropriate quality objectives to be met by users applying this guide.
- Section 3: An overview of the decision-making process in terms of steps involved followed by details of the decision-making principles to be assessed for selecting potential risk control measures. The decision-making principles include:
  - o not reducing the existing safety level of the system,
  - o continuous improvement,
  - o utility for society,
  - o fair treatment of individuals and groups of individuals and
  - o avoidance of uncontrolled transfer of risk.

- Section 4: Guidance on the use of decision-making indicators to determine the extent in which decision-making principles (DMPs) are fulfilled for the risk control measures considered.
- Section 5: Indications for the user to record each step of the DM process in relation to specific decision-making cases.
- Section 6: Approach for justification and communication of decisions following the application of the DM process.
- Section 7: References.
- Section 8: Definitions and Abbreviations: please refer to the framework Glossary.

2. Risk management approaches

This section provides an outline of the core dimensions of risk management for the transport of dangerous goods. In particular, it specifies the scope of this guide and identifies how the risk management activity within its scope can be organised to ensure its quality. It focuses specifically on these issues:

- **Risk management strategies** covering the broad choices for a potential user for dealing with identified risks (Section 2.1)
- **Risk management actors** setting out the different categories of user (Section 2.2)
- **Classification** of **risk management situations** and **classes of risk management measure** detailing 1) the possible risk management situations covered, and 2) the measures available (Section 2.3)
- **Risk management** from the perspective of **accident prevention** and **mitigation** aimed at reducing the frequency and / or consequences of dangerous goods events (Section 2.4)
- **Quality of risk management** defining requirements to be fulfilled by any risk management activity within the guide's scope in order to support mutual recognition of decisions by third parties (Section 2.5)

2.1. Risk management strategies

2.1.1. Starting point

Users should consider their risk management strategies (RMS) in relation to the framework:

- A possible starting point: Determine which risk region is likely to be involved (Broadly Accepted; Tolerable; Unacceptable) for the specific RM situation. If it is clear at this point that insufficient information is available about risks, further information gathering and analyses will be necessary.
- Once the likely RM way forward has been identified the initial choice of RMS should be set out. The chosen RMS should match the risk region involved. As the RM progresses there could well be changes to the chosen RMS (e.g. where the first choice was risk reduction (RMS3) but further analysis concludes that any risk reduction is unfeasible).

In this guide the term 'risk management strategy' concerns the broad principal choices available for dealing with risks to the transport of dangerous goods. The general approach should be to deal with the identified risks for which this guide is relevant. Four principal RMS have been identified: (1) acceptance, (2) transfer, (3) reduction and (4) elimination.

The user needs to determine the appropriate RMS for the risks that have been identified. However, this choice does not determine a specific type of risk management measure. For an overview of possible types of risk management measure refer to Section 2.3.

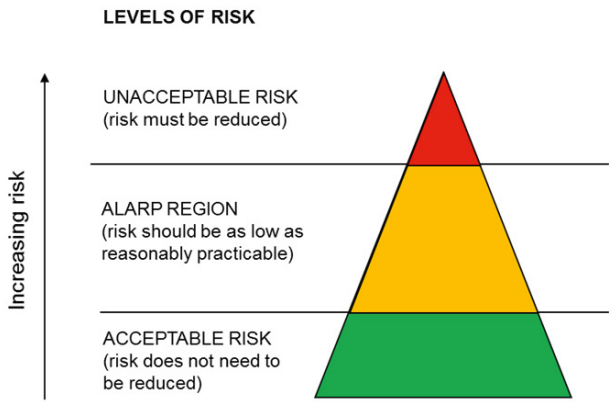
Table 1 presents the four principal RMS from the lowest level of action (accept the risk with no further action) to the highest level of action against the risk (eliminate the risk).

Table 1. Classification of risk management strategies

Acronym	Class	Complementary information
A	Acceptance	Retain Do not change the risk
T	Transfer	Transfer by contract Transfer by insurance Physical transfer Risk sharing
R	Reduction	Reduce the frequency of causes (prevention) Reduce the frequency with which consequences occur Reduce consequences (mitigation)
E	Elimination	Completely avoid the risk

The choice of risk management strategy is influenced by the type and level of TDG risks involved. The higher the identified risk the more likely it is that the chosen RMS will deal with it through transfer, reduction or complete elimination. Figure 1 below offers a conceptual framework[1] for the connection between three risk level regions and RMS:

Figure 1. Acceptability of risks (Excerpt from DNV 2014 study)



Source: DNV (2014) 'Harmonised Risk Acceptance Criteria for Transport of Dangerous Goods'

Risks in the Acceptable Region require no action and 'Acceptance' as a RMS is appropriate. For all other cases a RMS involving some form of action is necessary, i.e. transfer, reduction, elimination. This is self-evident for risks in the Unacceptable Region. Risks in the Tolerable Region may only be acceptable / tolerable if the available risk reduction strategies are impracticable or if the costs are disproportionate to the improvements obtained.

1 This Guide does not provide harmonised multimodal risk acceptance criteria. However, for railways, the binding harmonised design targets for technical systems established by the Commission Implementing Regulation (EU) 2015/1136 shall be complied with, when applicable. In other cases, it is for the user to determine what is applicable in terms of risk acceptance. The user may also wish to consider in more detail the model at section 0.10 in the DNV Report "Harmonised Risk Acceptance Criteria for Transport of Dangerous Goods" (P. 7).

2.1.2. Further details about risk management strategies

2.1.2.1. Acceptance

This strategy envisages the risk under consideration being unchanged. Several reasons for choosing this strategy include:

- Risks may be undesirable but cannot be avoided, reduced or transferred in any economic or practically feasible way.
- Some risks remain after the successful reduction of risks to a certain level (residual risks). These are characterised as insignificant if further reductions are costly or impracticable.

This is the lowest level of action in managing risks that requires no further information to be provided.

2.1.2.2. Transfer

This strategy involves transferring the risk in the following ways:

- By contract: The parties involved in a movement of dangerous goods establish beforehand the rights and liabilities in case of accident, damage or loss of goods.
- By insurance: The transfer of risk involves the purchase of insurance and/or re-insurance. (In recent times more risks have been commercially insured.)
- Physical transfer: The physical transfer of a given risk can take many forms, including changing the transport mode or activity, the route of transport, or timing.
- Risk sharing: This involves cooperation arrangements where the risk costs are distributed among several interested parties.

In addition to liability, in most cases the transfer of risk is connected to the financial dimension of accidents (costs and responsibilities) in the form of insurance / contracts which would not necessarily involve the physical transfer of human, environmental or property risks.

Possible reasons why this strategy may be appropriate include:

- Acceptance is considered insufficient given the risks involved, necessitating a transfer of risk costs / responsibilities or physical transfer of the risks.
- Reduction is considered impractical or too costly (the risk level is ALARP) and transferring the risk would be sufficient to alleviate the concerns linked to the particular situation.

2.1.2.3. Reduction

This strategy involves risk reduction but not complete elimination. Essentially, risk reduction can be achieved by taking preventative and / or mitigating measures:

- Prevention: Risk control measures that reduce the *probability of occurrences* involving transport of dangerous goods.
- Mitigation: Risk control measures that reduce the *severity of outcome* of occurrences involving transport of dangerous goods or subsequent events.

Reduction becomes relevant where the risk is in the unacceptable or tolerable regions.

For risks in the unacceptable region risk reduction measures need to be identified and implemented to deal satisfactorily with the risk management situation.

For risks in the tolerable region the economic, technical, operational and legal feasibility of risk reduction for the specific risk management situation need to be considered.

The feasibility assessment could involve prevention, mitigation or a combination of these approaches. Two outcomes are possible:

- Risk reduction is feasible. It should be implemented,
- Risk reduction is not feasible. The strategy becomes Acceptance or Transfer.

Generally the preference is for risk reduction framed within a prevention-based approach. However a mitigation approach may be required as well if risk reduction through prevention alone is unfeasible.

Further consideration of risk management for accident prevention and mitigation is included in Section 2.4.

2.1.2.4. Elimination

This strategy involves elimination or risk avoidance at the source. It can involve several elements, including the elimination of:

- Chemical-related activities (e.g. banning production and transport of chemicals),
- Transport / distribution hazards and their effects,
- Causes of and contributing factors to accidents / incidents involving the release of dangerous goods and the subsequent consequences.

Elimination relates to situations where the risks being considered are in the unacceptable region and where there is no scope for risk reduction.

2.2. Risk management actors

This section enables the user to determine the category of actor involved and provides a preliminary indication of relevant risk management measures that are available to address the particular situation being considered.

Those involved in risk management processes may represent international organisations, public administrations and agencies as well as industry/business:

- Public administration / agencies:
  - o National government and its entities, regional government, local government, intergovernmental organisations, emergency services, inspectors.

- Business sector:
  - Industry, logistical service providers, shippers, carriers, consignors, consignees, fillers, unloader, safety and security professionals, insurers.

Whilst public administrations (mainly European, governmental and regulatory bodies) impose regulations and rules, the business sector (manufacturers / transporters of dangerous goods) is required to observe them and make decisions accordingly.

This set of interconnected actors interact with the entire complex risk management system with roles ranging from a high-level forward-looking perspective to control of specific risks and occurrences. As such, with risk management being provided by different individuals, organisation is required so that management of emergencies (again performed by different individuals dealing with particular occurrences) is facilitated.

Overall, this guide is geared to a wide spectrum of actors with decision-making responsibilities in respect of risk management planning that goes beyond day-to-day operations. Therefore, relevant generic guidance for all actors[2] is provided (rather than actor-specific advice).

In this guide the following five categories of actor are used when characterising the risk management situation:

- Companies / other parties in the logistic chain,
- Local / regional authorities,
- States / national authorities / national committees,
- Supranational authorities / international transport agencies,
- Regulatory committees for international transport.

Each type of actor is able to use a range of risk management measures to deal with particular situations (Section 2.3 provides details on the classification of risk management situations and measures). In this way it is possible to map risk management measures against the different actors.

2.3. Classification of risk management situations and measures

2.3.1. Classification of situations

Table 2 provides the relevant dimensions to be considered for any specific risk management situation, to assist in defining the decision-making case category and possible measures (options) to deal with the risks.

2 Actors may be individuals, groups of individuals or persons acting on behalf of others.

Table 2: Risk Management Situation: Descriptors and Examples

DESCRIPTOR	EXAMPLES
Geographical scope of RM situation	**Local, one route, several routes / regional network, whole network for a given mode / all modes**
Risk owner / risk manager / relevant decision maker	**Companies; Local / regional authorities; National authorities, National committees; Intergovernmental Organisations, Transport Agencies; Regulatory committees for international transport**
Other descriptors	
Triggers of the risk management situation	Safety related concerns / Non-safety related issues
Type of (potential) risks	Human (i.e. staff, contractors, persons living in neighbourhood / area), environmental, asset / other vulnerabilities
Transport mode(s) involved	Rail / road / inland waterways /multimodal
Load/cargo aspects, type of substances involved	Class / volume of dangerous goods
Activities involved	Loading, transporting, unloading - transfer between modes
Operations involved	Operations with substances and containments, Handing / loading / stowing / transboarding operations, Transport operations, Logistic operations
Time dependencies	Workday, weekend, daytime, night-time, seasonal
Location	Urban centres, agglomeration, urban regions, rural areas

Only some of the 'other' descriptors will be relevant and so the user needs to select those applicable to the given decision-making case.

These descriptors characterise risk management (RM) situations at a high level. A system of classification has been developed from these descriptors that can be applied by the user of this guide as a tool to identify the key characteristics of the risk management situation to be addressed. This information will also enable further definition of the scope (nature, size and complexity) of the issue.

The case described below focuses on a small set of key characteristics to create a manageable and useful classification. There is a hierarchy in the list of characteristics: some belong to a higher level and would be included in the classification, whereas others feed into a detailed characterisation of the risk management situation and the definition of the scope of the problem (e.g. time-based or load-related aspects). Two characteristics underpin the classification of risk management due to their high-level nature and global relevance:

- Geographical scope of the risk management situation
  - o local,
  - o one route,
  - o several routes / regional network,
  - o whole network for a given mode or for all modes.
- Risk owner / risk manager / decision maker involved:
  - o companies,
  - o local / regional authorities,
  - o National authorities, National committees,
  - o Intergovernmental organisations,
  - o Transport Agencies,
  - o Regulatory committees for international transport.

The proposed sub-categories are defined generically to ensure a high level of applicability for the users of the guide.

The two dimensions chosen for the categorisation of risk management situations provide a user-friendly means of presentation, using a matrix format: Table 3 below shows the sub-categories for geographical scope in **columns** and sub-categories for type of risk owner in **rows**. Each matrix cell represents a specific type of risk management situation for geographical scope and risk owner. For example, the **local** geographical scope combined with a **company as risk owner** is represented by the first cell (top left). Most cells in this example relate to possible types of risk management activity / study.

Table 3. Risk management typology following the geographical scope and primary risk owner

	Typical geographical scope			
Typical risk owner	Local (vicinity of yards, multimodal platforms)	One route (absolute / comparative assessment, including potential comparison of different modes)	Several routes / regional network	Whole network for a given mode or for all modes (calculation of baseline risk)
Companies	Risk assessment, potentially in relation to land use planning obligations	Choosing the most efficient route / mode, logistical planning, while keeping the risk within acceptable limits. Reputational risk management.	Same objectives as for a single given route, potentially also including local assessments.	Same objectives as for a single given route, potentially also including local assessments. For example shippers / global carriers controlling their reputational risks or having to comply with acceptable limits.
Local authorities	Addressing Environmental Code requirements			
States or National authorities, National committees	Addressing Environmental Code requirements	Cases under Chapter 1.9 of RID, or justification of legal enforcement of a risk control measure	Addressing supervision of network safety performance/planning (e.g. CSM on supervision for railways, BasisNet type of approaches) or justification of legal enforcement of a risk control measure, e.g. including application of art 1.4 of 2008/68/EC	Addressing supervision of safety performance by a multimodal authority at national level (e.g. CSM on supervision, BasisNet type of approaches), or justification of legal enforcement of a risk control measure
Supranational authorities, Transport Agencies	Addressing assessment of legal compliance monitoring or advice/ recommendation.	Addressing assessment of legal compliance monitoring or advice/ recommendation	Addressing assessment of legal compliance monitoring or advice/ recommendation	Addressing assessment of legal compliance monitoring or advice/ recommendation
Regulatory committees for international transport			Justification of a legal requirement affecting international transport	Justification of a legal requirement affecting multimodal international transport

2.3.2. Categorisation of measures

Various risk management measures address risks from the TDG. The risk management measures should be placed within a RMS (see Section 2.1 - Three strategies involve taking action: elimination, reduction and transfer). Three aspects can be used to categorise the risk management measures: Purpose of introduction, Legal aspects and Nature of the RM measure.

- Purpose of introduction: Where the chosen risk management strategy involves risk reduction this aspect describes whether the risk management measure is preventive or mitigating. (See Section 2.1 for an overview of this distinction, and Section 2.4 for the perspective of accident prevention and mitigation.).
- Legal aspects: This category concerns the distinction between:
  - Regulatory / mandatory measures, and
  - Non-regulatory / voluntary measures.
- Nature of risk management measure: This aspect covers several categories: technological, operational, managerial, knowledge / information, methodological, financial, legal, others.

Table 4 (below) provides an overview of this categorisation, focusing on reference to legal aspects and the nature of these measures. Examples are provided for each type of risk management measure. The distinction between Regulatory / mandatory and Non-regulatory / voluntary measures cross-cut the different types involved.

Table 4. Risk management measures

Category measures	
Regulatory / mandatory measures	Non-regulatory / voluntary measures
Technological (hardware, software, information technology and communication solutions)	
Operational (packing, storage, stowage, loading / discharging, transport, documentation)	
Managerial (governance and cooperation among the stakeholders involved in TDG)	
Knowledge/information (risk communication programmes, information tools, dissemination / sharing of risk-related data, dissemination / sharing of risk assessment results, public hearings)	
Methodological (risk assessment and management methods, techniques and tools, accident data and databases, reporting systems, accident investigation systems)	
Financial (market-based economic incentive tools, trade restrictions or permit systems, quotas on imports / exports, subsidies)	
Legal (Permissions, certifications, prohibitions)	
Others	

There is often no single fully effective solution (option) so a package of measures may be required in order to address sufficiently the risks concerned.

2.4. Risk management: accident prevention and mitigation

When considering any specific risk management situation, it needs to be determined whether risk reduction is feasible through prevention and / or mitigation. It is also necessary to consider the scope for continuous improvement.

Section 2.1 identifies four risk management strategies: Acceptance, Transfer, Reduction and Elimination. The "Reduction" strategy can be viewed as the most complex, as the analytical requirements are higher than for the other three. As noted in Section 2.1 risk reduction can involve two fundamental approaches:

- Prevention: reducing the *probability* of *occurrences* involving loss of containment of dangerous goods.
- Mitigation: reducing the *severity* of the *consequences* of loss of containment of dangerous goods.

Various preventive and mitigation measures are available when a reduction strategy is used to manage the risks of TDG. The distinction between prevention and mitigation measures can be illustrated by the bow-tie approach which links causes to primary events (see the details in the Guide for risk estimation). Any preventive risk management measure addresses the causes of primary DG events, whereas mitigation measures seek to address the consequences of primary DG events.

In principle, any actor could consider the measures available for prevention and / or mitigation to determine the feasibility of risk reduction. An organisation could approach risk reduction by dealing with a particular risk situation or as part of a continuous improvement approach to lower risks over time.

2.5. Quality of risk management

Nine quality objectives provide indications of how to undertake risk management using harmonised provisions. Further guidance in Section 5 below provides the information necessary for the user to determine whether these quality objectives are achieved.

Quality objectives ensure that each application of the guide to specific risk management situations at least meets the same minimum requirements. This will facilitate harmonisation of approaches in this area by contributing towards the recognition of decisions by third parties.

These generic risk management quality objectives provide relevant and achievable requirements when using this decision-making guide. A summary is given below, followed by detailed guidance:

- Consider compliance with legal requirements as a minimum standard (RMO1)
- Manage risks in accordance with best practice (RMO2)
- Inform and involve all concerned parties about the risk situation as required (RMO3)
- Reduce the risk level if economically practicable and proportionate to the issue to be solved (RMO4)
- Identify whether the primary risk owner can address the risk situation alone (RMO5)
- Avoid solutions involving uncontrolled transfer of risk (RMO6)
- Ensure risks are monitored regularly at all levels (RMO7)

- Evaluate whether the solutions that have been implemented deal sufficiently with the risk situation identified (RMO8)
- Separation of risk management duties (RMO9)

Achieving these nine risk management objectives will establish a reliable basis for a robust target situation.

2.5.1. Consider compliance with legal requirements as a minimum standard (RMO1)

The transport of dangerous goods is regulated by UN-Conventions and international (pan-European) law. These rules form the standard requirements for transport. However, in addition to international law, national authorities can issue stricter provisions to enhance transport safety. Nevertheless, these provisions must comply with the principles of trade facilitation as defined in the relevant treaties.

To meet risk management quality objectives the principal steps for the user are to:

- identify the legislation that is relevant to the risk management situation, and
- check that the proposed solution and methodology for adopting it comply with applicable legal requirements.

2.5.2. Manage risks in accordance with best practice (RMO2)

Key characteristics of best-practice risk management would include:

- Use of a consistent, controlled and proportionate approach
- Management of uncertainties related to the analysis and the estimation of risks in order to ensure robust decision-making
- Thorough application of the SMART-principle[3] for defining objectives when optimising the risks involved
- Facilitate decision-making, planning and prioritisation through a comprehensive and structured understanding of the decision-making case
- Contribute to efficient use of resources
- Regular consideration of any relevant scientific and technical developments

2.5.3. Information about the risk situation and involvement of concerned parties (RMO3)

RMO3 is included as a quality objective to ensure that communication with and involvement of relevant parties is addressed consistently. Communication and engagement with concerned parties should not be seen as a distinct stage in the management of risk, but should run through the entire process.

3 The SMART-principle refers to objective-setting in the context of project management that must be: Specific, Measurable, Achievable, Realistic and Time-framed.

This is important as parties have their own perceptions of the risk situation which sometime needs to be confronted to other perceptions and facts to reach common understanding.

These parties should be identified, recorded and integrated into the decision-making process.

Subsequently, the appropriate level of engagement should be determined to correspond to the scope and complexity of the risk management situation.

Section 6 of this guide deals with the communication of decisions.

2.5.4. Reduce the risk level if it is economically practicable and proportionate to the problem to be solved (RMO4)

This quality objective ensures that risk management will be geared towards the optimisation of the residual risks for the situation concerned. The risks should be reduced if:

- it is feasible from economic, technical, operational and legal perspectives, and
- it is proportionate to the problem to be solved.

The fulfilment of this objective builds on the user's chosen risk management strategy (see Section 2.1). Four distinct strategies are available to the user (Acceptance, Transfer, Reduction and Elimination). Risk reduction should be considered in all cases unless the risks concerned are broadly acceptable, such that the cost of reduction would be disproportionate to the problem. In all other cases a form of elimination, reduction or transfer of risks should be considered, taking into account whether the risk(s) belongs to the Unacceptable or Tolerable Region.

A key element for the user is to examine the costs and benefits linked to the possible risk reduction measures to determine the economic feasibility. Several techniques can be used including cost-benefit analysis (where effects are quantified and monetised) or multicriteria analysis (where effects are considered qualitatively). Also, consideration of the feasibility of risk reduction from other perspectives is needed (notably from technical, operational and legal perspectives).

2.5.5. Identify if the risk situation can be addressed appropriately by the primary risk owner alone (RMO5)

A risk situation can normally be resolved in various ways by involving actors at various levels and using risk management measures from different geographical scales. The principle here is that the users of this guide should manage the risk, so the first step involves assessment of risk control measures. These link to the primary owner of the risks concerned, in accordance with the correctly defined geographic scale. This approach should assist in ensuring the proposed solutions are proportionate to the risk management situation, and that they match the identified geographical aspects. Further analysis of the risk management situation may conclude that it is not possible to address it satisfactorily, e.g. if many organisations at the same level share ownership of the risks. In particular, in such cases it may then be necessary

to involve another actor from a higher or lower level, taking into account the geographical scope.

2.5.6. Avoid solutions involving uncontrolled risk transfer[4] (RMO6).

In some cases the risk in an area may be diminished by relocating an activity to another geographical area or time period. Decision makers must realise that application of solutions in one area could lead to an unacceptable change of risk elsewhere. Analysis of this aspect should be an integrated part of the decision-making process to avoid uncontrolled transfer of risk.

The achievement of this quality objective will avoid unexpectedly transferring a risk to another party in an uncontrolled manner and / or increasing the overall risk level.

The avoidance of uncontrolled risk transfer is included as one of the five decision-making principles for use when evaluating options for possible ways to address the risk management situation (see Section 3 of this guide).

2.5.7. Ensure that risks are regularly monitored at all levels (RMO7)

A single calculation of a specific risk at a certain moment is of limited value. The monitoring of risks on a regular basis avoids decisions being made on the basis of a restricted (weak) data set. Regular monitoring at the start of the decision-making process underpins a well-performed risk analysis, and supports the evaluation of solutions that have been implemented (see RMO8).

2.5.8. Evaluate whether the implemented solutions sufficiently address the identified risk situation (RMO8)

RMO8 emphasises that risk management not only considers the pre-implementation stage of the proposed solution but also involves the post-implementation stage with a focus on whether the solutions have sufficiently addressed the identified risk situation. If an evaluation concludes that the solutions are not sufficient then the risk management decision needs to be reviewed to determine appropriate amendments to the original solution. It is good practice for the pre-implementation stage to set out a plan for evaluating whether the solution, once implemented, has the intended effect. It is therefore important to define the criteria to be used to decide whether a solution/decision is effective. It is also important to define a time frame for performing the evaluation, and to designate a responsible party for this task. The planning and implementation stage should make provision for proper resourcing of the post-implementation evaluation phase.

4 Uncontrolled transfer of risk means that risk control measures have unexpected consequences on the risk situation to be managed and the measures lead to a new situation where the risk is unexpectedly transferred to another party in an uncontrolled manner and/or is increased instead of being reduced.

2.5.9. Separation of risk management duties (RMO9)

A precondition for robust and unbiased management of risks is that risk estimation tasks are separated from decision-making tasks. If not, the lack of separation could give rise to questions about how the risks were estimated for each option, about how these were then used in the decision-making, and about the interfaces between them. Meeting this quality objective is important if risk management decisions are to be recognised.

3. Decision-making approach

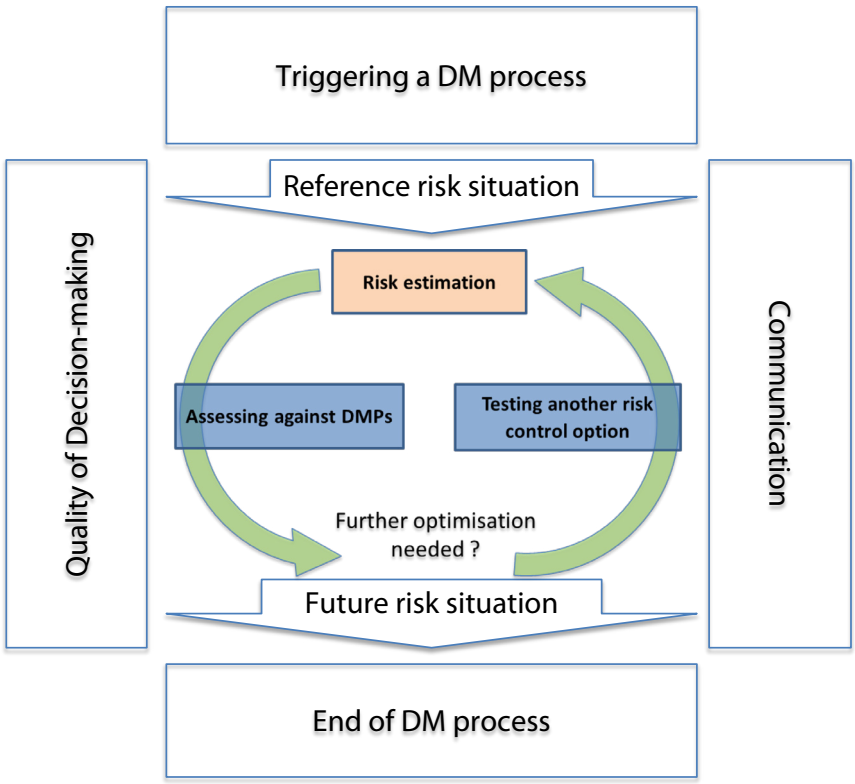
The overarching Decision-Making (DM) approach of this guide has two key components:

- Decision-Making (DM) process setting out the main steps schematically, for a user to go through in order to identify the optimal response to any DM case covered by this guide (Section 3.1)
- Decision-Making Principles (DMPs) to be assessed against, in order to determine how the risk situation with the proposed risk control measures in place compares to the risk situation without the risk control measures in place (reference risk situation) (Section 3.2)

3.1. DM Process

This process draws on state-of-the-art structured approaches to DM. It is specified at a high level to enable it to be used for a broad range of DM cases in terms of geographical scale, actor typology and mode of transport. Moreover, this process is structured to encourage ***proportionality*** where the complexity of the DM process can be customised to the case being considered. The DM process is set out in Figure 2.

Figure 2: Harmonised decision-making process



Overall, the DM process involves the following key steps (each of these are described in detail below):

Step 1. **Start point of the DM process:** triggering the DM process

Step 2. Description of the DM case: reference risk situation (without additional risk control measures)

Step 3. Identifying the optimal future situation: this step in the DM process involves a series of sub-steps that should be repeated until an optimal future situation (potentially with additional risk control measures) has been identified

Step 4. **End point of the DM process:** Validation / end of process

In addition, the DM process also includes two components that are present throughout any DM case:

- **quality of decision-making**: this refers to the nine risk management quality objectives described in detail in Section 2.5;
- **communication**: this concerns information exchange with interested parties.

3.1.1. Triggering a DM process

The DM process is triggered when a risk situation is considered to be potentially sub-optimal in terms of risk level and/or meeting Decision-Making Principles. Examples of triggers are given below:

- need for a better risk control identified by a safety management system,
- outputs of a risk estimation,
- existing risks perceived to be too high,
- new business opportunities,
- transport developments,
- spatial developments,
- accidents or incidents,
- questions or complaints from external parties,
- other

When the user identifies one or more triggers the next step is to **describe the DM case** (see below)**.**

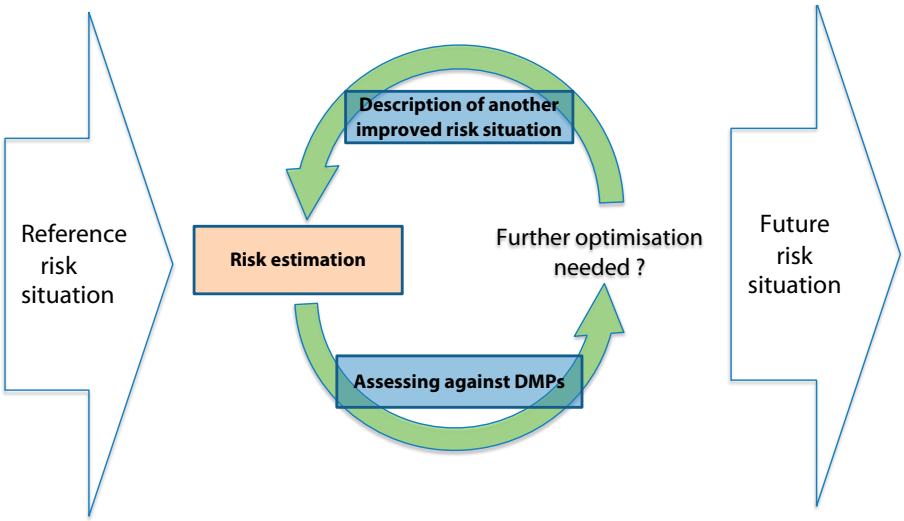
3.1.2. Identifying the optimal future situation

The DM process is a cyclical process. It can be repeated until the decision maker is satisfied that an optimal solution has been reached.

From the description of the reference situation the decision maker may either:

- state that there is no need to act on the risk situation and clearly explain the reasons why the situation is considered as optimal, or
- further optimise risk control measures by identifying other possible risk control options leading to the description of another target risk situation.

Figure 3: Risk optimisation loop



It is necessary to ensure that the design of the future risk situation is consistent within this step and at the stage of the identification of potential risk control measures, notably in terms of the feasibility of emergency preparedness and rescue planning.

3.1.3. Description of the DM reference situation

The description of the DM case needs to set out a reference risk situation (parameters to be included are outlined in Section 5.2). This reference situation is the one against which the decision maker will estimate the effect of potential measures. At the end of the DM process the risk indicators for the reference situation are compared with the indicators relating to the options and the target situation.

When the reference risk situation is clearly described, the decision maker may decide either that the control of the assessed risk situation should be further improved or that the risk situation is under control.

In both cases the decision maker should record clear reasons for acting or taking no action.

When action is deemed necessary the decision maker should indicate the desired level of achievement against the decision-making principles and the improvement in risk level achieved by the optimal future risk situation.

3.1.4. Risk estimation step

Refer to the Guide for risk estimations, in particular to Sections 2.1, 2.2 and 3, to get an overview of risk estimation tasks in relation to a decision-making case, and detailed descriptions of risk situations.

From the point of view of the decision maker, the objective of the risk estimation step is to provide risk estimation indicators of the risk situations that have been described as broad '**options**' by the decision maker.

At the end of the risk estimation step the decision maker receives one detailed information package for each option studied by the risk analyst (see Section 3.3 of the Guide for risk estimations).

3.1.5. Assessing the Decision-Making Principles (DMPs)

The statement that the optimal future situation has been reached is assessed for compliance with the decision-making principles.

The decision-making principles are defined in Section 3.2 below and the way in which compliance with them should be assessed with the help of risk estimation is described in Section 4.

3.1.6. Validation of the optimised risk-based future situation

The validation of the optimal future situation is based on the best positive assessment against the decision-making principles as described in Section 4.

This validation integrates the best possible risk estimations, justification and transparency in terms of owners and parties affected by the risks.

This validation shall not take into account any consideration other than factual and accurate assessment of the risks (e.g unjustified perceptions or aversion to the risks are not part of the validation). These additional considerations may be assessed by the decision maker during the end step of the DM process, as may any other exogeneous criteria.

3.1.7. Ending the DM process

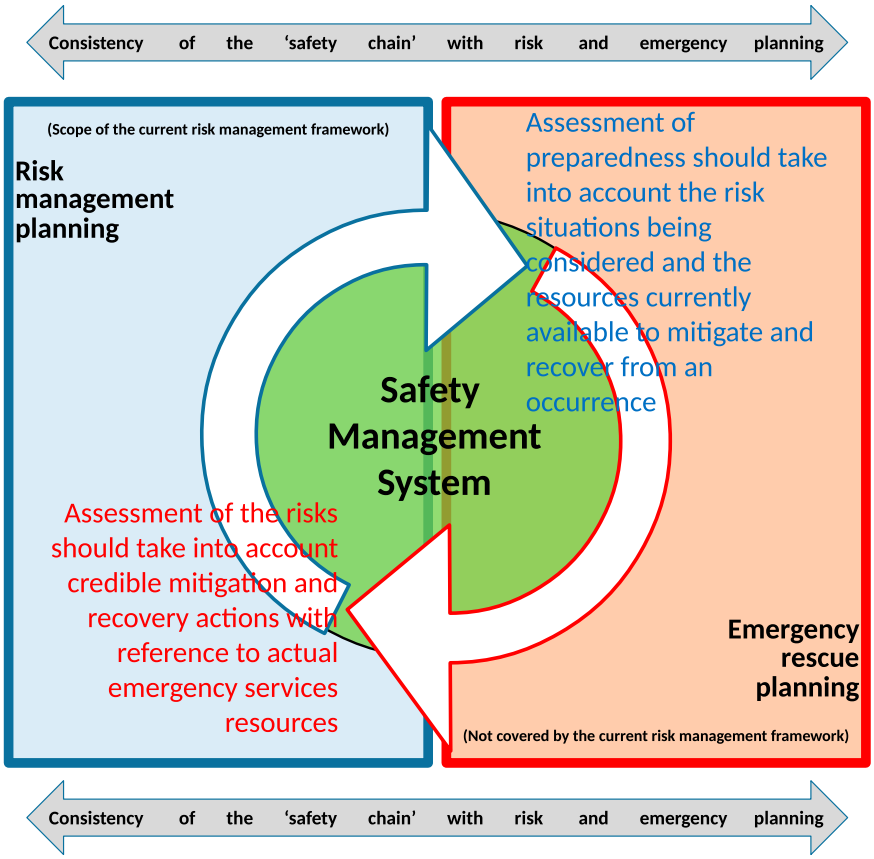
The DM process concludes when an optimal future situation has been assessed positively using the decision-making indicators, and is considered feasible.

An optimal situation is considered to be achieved when all the decision-making principles have been followed and when the estimated risk level of the future situation has been reduced in comparison to the reference situation.

Feasibility should be assessed as soon as possible after the options for action have been defined. The assessment should receive positive feedback from the interested parties and include a consistent safety chain as highlighted in figure 2 below.

As described in the figure below, risk management planning and emergency rescue planning have mutual influence. They shall be consistent, in order to ensure that the proposed future control of risks is credible and manageable through the actual implementation of safety management systems.

Figure 4: Risk management optimisation and emergency rescue planning



For example, the proposed risk control measures should not take into account potential mitigating actions that cannot currently be performed by the emergency services in the event of the occurrence of the DG scenarios that have been assessed.

This step of the decision-making process ends when a set of options (potential risk control situations) and a future situation (optimal risk control situation) are defined.

The validation also includes the achievement of quality and communication objectives and the possible closure of the whole risk optimisation process.

When it is only possible to partly achieve the above, the decision maker should prepare to communicate the pros and cons of the proposed future situation and actions. Otherwise, it may be necessary to perform another iteration of the optimisation loop to assess other options with the help of interested parties (see Section 3.2 below).

3.2. Harmonised Decision-Making Principles

The harmonised decision-making principles (DMPs) to be assessed for each optimisation loop are:

- existing system safety is not reduced,
- continuous improvement,
- utility for society,
- fair treatment of individuals and groups of individuals, and
- avoidance of uncontrolled risk transfer

These five DMPs are described in further detail below.

3.2.1. Existing system safety is not reduced

Any change made to technical, human and operational systems shall not introduce new uncontrolled safety risks which may lead to a reduction of the safety of the system being assessed.

It means that any change to a system must be safely integrated.

Important note:

For railways, "Commission implementing regulation (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment" ensures that levels of safety are maintained or improved. It is implemented in combination with the harmonised design targets for technical systems established by "Commission implementing regulation (EU) 2015/1136 of 13 July 2015 amending implementing Regulation (EU) No 402/2013 on the common safety method for risk evaluation and assessment".

3.2.2. Continuous improvement

In the context of this framework of guides the continuous improvement principle reflects the continuing requirement, over time, to reduce the risks posed by the Transport of Dangerous Goods as far as is reasonably practicable.

The principle of continuous improvement finds its limit when the reduction of the risks for a small group of individuals / interests would compromise the operation of the transport system and, in turn, the benefits it provides for the majority of the society. This aspect is covered by the principle of 'fair treatment of individuals and groups of individuals'.

The limit of practicability for continuous improvement also needs to be considered. This is based on the consideration that lowering the risk is only practicable up to a certain limit in order to allow the operation of the transport system for the benefit of society. Within this framework the limit is assessed against the 'societal utility' principle.

3.2.3. Utility for society

'Utility' is an economic term referring to the total satisfaction or happiness received through consuming goods or services. However, utility cannot be measured or observed directly; the solution is to make judgements based on individuals' choices (either through revealed or stated preference studies). Equally, society is also a complex concept, raising questions about who is included etc. In the context of this decision-making guide the term refers to the net benefits derived from risk control measures / options by the entities (including individuals) constituting 'society' within the geographical scope of the risk management situation.

This TDG-related definition requires consideration to be given to the utility for the society of accepting a certain level of risk arising from the transport of dangerous goods. From this perspective various options for fulfilling society's need for the transport of dangerous goods should be compared to the level of risk posed by such operations (societal disadvantage/ costs).

3.2.4. Fair treatment of individuals and groups of individuals

This principle applies to the acceptability of variations in the level of risk exposure for different groups of individuals.

In practice it is impossible to ensure that any individual is exposed to the same risk level as other individuals or groups of individuals; nonetheless it is considered that risks should not be unduly concentrated on or transferred onto particular individuals or communities.

This principle applies to any category of individual exposed to the risks generated by the transport of dangerous goods: persons living, working, travelling or spending their free time near the transport infrastructure, and persons directly involved in the transport operations.

3.2.5. Avoidance of uncontrolled risk transfer

Uncontrolled risk transfer can be defined as the situation where risk control measures have unexpected consequences on the risk situation to be managed. In turn the measures lead to a new situation where the risk is unexpectedly transferred to another party in an uncontrolled manner and/or is increased instead of being reduced.

The decision-making process described in this document should be used to avoid such situations.

4. Using risk indicators to assess DMPs

The overall DM process described in the previous section may use risk estimation as described in the Guide for risk estimation.

When used, the risk indicators obtained by applying the guide for risk estimation will allow better assessment of the potential influence of proposed risk control measures on the risk level of the assessed options and future risk situation.

The following sections suggest the possible ways to use risk indicators to assess whether the decision-making principles have been followed.

Both qualitative and quantitative approaches for the assessment of all DMPs are proposed. Where a quantitative assessment is possible the user is also expected to assess the DMPs using the relevant qualitative approaches.

This assessment is always made on the basis that:

- the reference situation is correctly described, taking into account its actual performance level, and
- the future situation will be effectively implemented and its implementation is controlled by a safety management system.

4.1. Indicators for assessing whether system safety has been reduced

The indicator used for this principle will be mainly based on information received from the risk analyst. Particular consideration needs be given to the correct and detailed description of the risk situations being assessed and, notably, to the changes between the two situations being considered that can affect safety.

When a quantitative assessment is used, consideration needs be given to:

- the correct and detailed description of the values allocated to the parameters of the risk estimation model, and
- the traceability of the changes made to these parameters between the reference and the future situations.

(Qualitative) Criteria for a positive assessment of this principle	When compared to the reference situation the future situation does not introduce new safety risks to the system. The safety risks posed by the future situation are lower than the safety risks posed by the reference situation.
(Quantitative) Criteria for a positive assessment of this principle	The Expected Value of the future situation is lower than the Expected Value of the reference situation.

4.2. Indicators for the assessment of Continuous safety improvement

The continuous improvement principle is based on the consideration that overall risks should not increase (see principle that system safety should not be reduced), and should reduce over time.

However, there are underpinning issues that need consideration when following this principle. For example, is this principle applied at local, regional, national, or international level? Should the scope be limited to only one transport mode? Or should improvement be considered globally for the whole transport system, including the possibility of shifting between modes? There are also time-related aspects to consider in relation to this principle, i.e. what is the relevant time horizon over which risk changes should be measured and the results used to assess whether risks are reducing?

Depending on the categories of improvement that initiate the risk management optimisation exercise the following indicators can be used:

- Reduction of individual risks
- Reduction of risks for a specific group of individuals:
  - collective risk: a given category of persons, or
  - localised risk: persons living in a given geographical area.
- Reduction of maximum grouped fatality risk (in general or at a specific location)

From the point of view of these indicators the best possible assessment is the one showing a simultaneous reduction of the three indicators listed above while also respecting the 'utility for society' principle.

(Qualitative) Criteria for a positive assessment of this principle	There is qualitative justification of the risk reduction for the future situation compared to the reference situation. It is recognised by interested parties. It can be considered for one, several or all categories of indicator.
(Quantitative) Criteria for a positive assessment of this principle	The risk indicators (Individual risk IR and Expected value of societal risk EV) show a lower value for the future situation than for the reference situation. For individual risk: IR (future situation) < IR (reference situation), For collective risk: EV (future situation) < EV (reference situation), For localised risk: comparison of the shapes of F/S curves between the future and reference situations, and EV (future situation) < EV (reference situation) For maximum grouped fatalities: F/N curve of the future situation is below the F/N curve of the reference situation for high values of N, and – independently of the value of N – F is lower than the lowest frequency threshold.

4.3. Indicators for the assessment of Utility for society

The comparison of advantages and disadvantages for society arising from the transport of dangerous goods under various risk situations generally requires the analysis of several considerations:

- Scope of the transport situation that benefits society and the related quantification of disadvantages and costs. The benefits mainly relate to the geographical scope of transport operations and the volume of transport needed to satisfy societal needs. The disadvantages to be evaluated mainly arise from the transport risks to the persons potentially affected.
- The cost of implementing further risk reduction measures compared to the benefits – reduction in safety risk – achieved by the implementation of the measures (see previous bullet point). In this respect it is important to have reasonable proportionality between the costs and the benefits.
- The definitions of the 'benefits' and of the 'society' affected, particularly where the risks are largely borne by one community (or even country) while the benefits accrue to a different community (or country).

(Qualitative) Criteria for a positive assessment of this principle	The transport system in its future situation gives rise to risks from its operation that are considered acceptable in the context of the benefits that the operation of the system brings to society.
(Quantitative) Criteria for a positive assessment of this principle	Using an estimate for the Expected Value (Societal risk) the Safety-Economy test gives a positive outcome. This means that the risk situation is located in Area-I, Area-II, Area-III or Area-IV. The areas are listed in order of risk performance, Area-I being the best. Assessments whose outcomes are located in AreaV do not conform to the principle of not reducing system safety. Details on the Safety Economy Test may be found here.

4.4. Indicators for the assessment of Fair treatment between individuals and groups of individuals

To promote fair treatment of all individuals and specific groups, decisions should be based on an overview of the transport-related risks, where possible reaching a consensus over the treatment of risks with the different interested groups.

The first stage of complying with this principle is the identification of the specific groups of individuals who are being considered. The second stage is the comparison of exposure to risks for all of these groups.

Compliance with this principle requires the range between the lowest and highest levels of exposure to risk across all groups to be minimised.

The application of this principle is generally limited by the 'societal utility' principle which may require the exposure of a small group of individuals to a higher level of risk for the benefit of society.

(Qualitative) Criteria for a positive assessment of this principle	The range between the minimum and the maximum risk levels for the groups of individuals considered should decrease between the reference situation and the future situation.
(Quantitative) Criteria for a positive assessment of this principle	The range between the minimum and the maximum risk levels for the groups of individuals considered should decrease between the reference situation and the future situation. It is based on the comparison of the average individual risk (IR) for each group of individuals considered. To be successful the future situation should also be assessed positively against the other decision-making principles, in particular (but not only) the principle of avoidance of uncontrolled risk transfer.

4.5. Indicators for the assessment of the avoidance of uncontrolled risk transfer

The evaluation of this principle is based on a comprehensive analysis of changes between the risk situations being assessed.

This should take into account geographical scope as well as the different actors who may potentially be affected over various time horizons. If unintended / unplanned changes in risk are identified for any of the options the user of this guide should reconsider such options with the aim of meeting the principle of 'avoidance of uncontrolled risk transfer'.

From this analysis the changes to parties affected by the risks should be clearly listed.

This principle recognises the possibility that different groups of individuals are affected by the two situations being considered. However risk transfer must be evaluated in terms of risk variation in order to:

1) avoid global increase of risk between the two situations, and

2) inform newly affected parties of the expected variation in risk arising from the future situation and what the related risk control measures will be.

(Qualitative) Criteria for a positive assessment of this principle	The change of risk owners and parties affected by the risks between the reference situation and the future situation is clearly identified, accepted and controlled. The risk owners of the reference situation and of the future situation agree on the way of transferring the risk as well as its control. In addition the 'continuous improvement' principle is also assessed positively.
(Quantitative) Criteria for a positive assessment of this principle	A quantitative estimate is made of the risk transfer. The risk level (EV) of the future situation is lower than the reference situation. The other principles are also assessed positively.

5. Recording implementation of a DM process

Guidance to the user on recording the application of the DM process to any DM case is set out for each step:

- triggering the DM process (Section 5.1)
- description of the DM reference situation (Section 5.2)
- risk estimation step (Section 5.3)
- assessing against the DMPs (Section 5.4)
- validation of the optimised risk-based future situation (Section 5.5)
- ending the DM-process (Section 5.6)
- quality of decision-making (Section 5.7)
- communication activity (Section 5.8)

Recording the application of the DM process will improve the transparency of risk management for Transport of Dangerous Goods. In addition, this guidance makes it easier for the user to connect the application of the DM process (Sections 3 and 4) with the subsequent tasks of justification and communication of decisions (Section 6).

5.1. Recording the triggering of the DM process

A record of the triggering of the DM process should cover the following elements:

	Trigger category (see indicative list in Section 3.1)	**Description**	**Assessment**	**Information source**
Trigger #1				
Trigger #2				
…				
Recommended follow-up	Outline whether the considered risk situation should be further improved or is under control			

5.2. Recording the description of the DM reference situation

The following table should be used for recording this part of the DM process:

Element of description of reference risk situation	Details
Geographical scope of RM situation	
Risk owner / risk manager / concerned decision maker(s)	
Types of potential risk / vulnerability exposed to TDG events	
Transport modes involved	
Load/cargo aspects, types of substance involved	
Transport infrastructures	
Operations involved	
Traffic involved	
Time dependencies	
Location	

When the Guide for risk estimation is used the above table should summarise the detailed descriptions required by the implementation of the guide and / or used as instructions by the user of the Guide for risk estimation.

5.3. Recording the optimisation loops

A record of the risk estimation step should be kept as follows:

	Overview of mandate to risk analyst	Overview of risk estimations provided on the basis of the mandate
1st loop		
2nd loop		
…		
Final loop		

When the Guide for risk estimation is used the above table should summarise the main characteristics of / changes to the information packages described in Section 3.3 of the Guide for risk estimation.

5.4. Recording assessment against the DMPs

For each optimisation loop the following table should record the assessment results of each option against the DMPs.

	DMP1 – not reducing existing system safety	**DMP2 – continuous improvement**	**DMP3 – utility for society**	**DMP4 – fair treatment**	**DMP5 – avoidance of uncontrolled risk transfer**
1st loop					
Option 0 (reference situation)					
Option 1					
Option 2					
2nd loop					
Option 3					
Option 4					
Last loop					
…					
Option n					

Note: Option 0 corresponds to the Reference risk situation; the number of options tested within each loop is defined by the user of the guide.

5.5. Recording validation of the optimised risk-based future situation

A record of the validation step of the application of the DM process should be provided through the following table.

	Validation of optimised risk-based future situation	
DMP assessment	**Preferred option**	**Supplementary comments (incl. robustness)**
DMP1: Best positive assessment?	Number of the option	Assessment comment
DMP2: Best positive assessment?		
DMP3: Best positive assessment?		
DMP4: Best positive assessment?		
DMP5: Best positive assessment?		

Proposed best option as risk-based future situation	
Summmary of assessment of DMPs	
Robustness of assessment of DMPs	

Transparency	
Transparency in terms of risk owners	
Transparency in terms of parties affected by the risk situation	

5.6. Recording the end of the DM process

Recording the end of the application of the DM process should capture the following elements:

Description of DM case		
	Reference risk situation	**Future risk situation**
Overall description of risk situations		
Strategies for risk management	n.a.	A, T, R, E
Geographical scope		
Description of intended actions (including category of measures)		
Actors Implementing actors Decision makers		
Summary of the comparative assessments		
DMP1 assessment – Not reducing existing system safety		
DMP2 assessment – Continuous improvement		
DMP3 – Utility for society		
DMP4 – Fair treatment of individuals and groups of individuals		
DMP5 – Avoidance of uncontrolled risk transfer		
Feasibility assessment		
	Reference risk situation	**Future risk situation**
Implementation considerations		
Feedback from interested parties		
Consistency of safety chain		
Exogenous decision criteria (not risk-based), if applicable		
Consideration given to exogenous criteria?		
Adjustment to future situation required?		

5.7. Recording the quality of decision-making

A record of the quality of the decision-making with respect to the nine quality objectives (from Section 2.5) should be established as follows:

Quality objectives	Measures used for achievement	Assessment of achievement
RMO1. Consider compliance with legal requirements as a minimum standard		
RMO2. Manage risks in accordance with best practice (including the management of uncertainties)		
RMO3. Inform and involve all concerned parties about the risk situation as required		
RMO4. Reduce the risk level if economically practicable and proportionate to the issue to be solved		
RMO5. Identify whether the risk situation can be addressed appropriately by the primary risk owner alone		
RMO6. Avoid solutions involving uncontrolled risk transfer		
RMO7. Ensure risks at all levels are monitored on a regular basis		
RMO8. Evaluate whether the solutions implemented deal sufficiently with the risk situation that has been identified		
RMO9. Separation of risk management duties		
Overall assessment of quality of decision-making:		

5.8. Recording communication activity

A record of the communication activities undertaken during the application of the DM process should contain the following elements:

Category of concerned party	Identified	Informed	Consulted	Follow-up provided
Concerned party type 1				
Concerned party type 2				
Overall assessment of the communication activity:				

6. Justification and communication of decisions

This section describes good practice in respect of the justification and communication of decisions taken on the basis of the application of the DM process, including:

- Ex-ante justification of decisions
- Ex-post justification of decisions
- Transparency
- Shared information
- Recognition of decisions by third parties

These aspects are not a direct part of the application of the DM process but relate to the process in terms of:

1) how the DM process outputs are used to justify decisions / recommendations;
2) how the DM process outputs should be communicated, giving consideration to transparency, sharing information with relevant stakeholders, and mutual recognition of decisions by third parties.

The information to be used for these tasks will be based to a large extent on the different sets of records described in Section 5 of this guide.

6.1. Ex-ante justification

Ex-ante justification involves setting out the reasons for the chosen options / actions including the preferred options to reach the optimal future risk situation. The justification should be made before any measures are implemented.

As such the ex-ante justification should set out:

- Reference risk situation (without action)
- Selected future risk situation
- Preferred option and actions corresponding to the future risk situation
- (level of) Achievement of DMP principles
- Feasibility
- Fulfillment of any exogenous criteria
- Achievement of DM quality objectives
- Achievement of effective of communication

At this point plans for monitoring and evaluation arrangements could also be set out. Where the preferred option is **No Action** based on the DM process outcome this would still require an ex-ante justification.

6.2. Ex-post justification

Ex-post justification should determine whether the implemented solution (preferred option) to the RM situation has performed as was expected in the DM process. The ex-post justification would therefore be based on information collected as part of any monitoring activities. As such the ex-post justification should contain:

- Available information on the future risk situation, based on actual values
- Comparison of the **actual** future risk situation and **expected** future risk situation
- Assessment of whether the actual future risk situation is properly reflected by the DM indicators that have been used

On the basis of the ex-post analysis it may be necessary to start a new application of the DM process to amend the original solution, in order to ensure that the risk levels concerned are optimised. It would also be relevant to consider the use of ex-post justification in cases where the preferred option was No Action.

6.3. Transparency

It is important, from a credibility viewpoint, that key decisions are recorded to enable monitoring and identification of risk priorities. In addition to justifying RM measures in terms of risk reduction and cost, consideration of the benefits accruing from a given practice will demonstrate how a specific decision was made. In the event that the decision is subsequently challenged or reviewed this approach ensures transparency, avoids doubt on what was decided, and provides an evidence trail. In particular it allows the rationale behind the decision to be explained to interested parties.

Overall, two main points are important in order for users of this guide to ensure appropriate transparency:

- Clear, concise and coherent documentation of decisions, including how they were reached and the reasoning behind them. This may be supported through appropriate communication with interested parties about the decision, as well as providing access to relevant documentation. (See also the quality objective at Section 2.5: **Inform and involve all concerned parties about the risk situation as required**)
- Introduction of stakeholder feedback in respect of communication to enable continuous improvement of transparency and stakeholder communication

6.4. Sharing information

Sharing of information (linked to risk management situations and decisions) is partly covered by Section 6.3. However, this section focuses on communication and stakeholder relations management. As part of the principle for sharing information there are important linkages to risk communication. In particular, for TDG there should be consideration of:

- Principles for disseminating / sharing risk-related issues, best practice and experiences,
- Principles for disseminating / sharing relevant risk-related data and information,
- Principles for disseminating / sharing decisions by risk owners linked to particular risk management situations.

6.5. Recognition of decisions by third parties

The main objectives of the TDG RM framework are 1) to allow the use of a harmonised risk estimation method which will 2) allow recognition of risk-based decision-making between parties who will implement the guides.

Recognition of decisions by third parties can be supported by:

- Good practice for transparency of the decision, in particular recording / documenting the decision and the basis on which it was taken,
- Appropriate arrangements for communicating with third parties.

7. References

The list of references for the whole risk management framework is available in the framework guide, in the framework glossary and additionally here.

8. Definitions and abbreviations

Lists of definitions and abbreviations for the whole risk management framework can be found in the framework glossary.

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- Framework guide
- **Guide for decision-making**
- Guide for risk estimation
- Framework glossary

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