ECONOMIC COMMISSION FOR EUROPE

Evaluation Title:	Evaluation of the global and regional impact of UNECE regulations and United Nations Recommendations on the transport of Dangerous Goods (2005 – 2014)		
Period of Review:	2005-2014		
Date of Evaluation Report:	2 January 2016		
Approved by:	**Director, Programme Management Unit** Ms. Zamira Eshmambetova	Date	Signature
Cleared by:	**Director of Division** Ms. Eva Molnar	12.7.2016.	
Prepared by:	Manager of the evaluation Mr. Olivier Kervella	12.7.2016	

Note 1: *The secretariat thanks the consultant for this evaluation report. The secretariat recognizes that the effectiveness of the evaluation has been limited by the relatively short time afforded to the consultant for analysis of numerous and lengthy background information and of responses to a survey that were received very late. As a consequence the management response contains sometimes corrections or additional data to the information provided by the consultant.*

Note 2: *The secretariat shares the conclusions and recommendations contained in paragraphs 164 (1–7) of the report. The secretariat considers nevertheless that some of the findings contained in the report are not completely accurate and need be rectified. (See comments below and annexed documents)*

For the secondary conclusions contained in paragraph 165 (1–2), the secretariat does not object but considers that these are programmatic issues that should be raised by interested delegations when discussing work programmes rather than through this evaluation report.

Note 3: *A complete analysis of the questionnaires results as well as UNECE secretariat comments is presented in annex 1 to this document. The draft update of the "Review of the implementation of OSCE commitments in the economic and environmental dimension" mentioned in management response to finding 2 is reproduced in annex 2. The report of the Secretary-General to the Economic and Social Council on the Work of the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals is reproduced in annex 3.*

Conclusion/Recommendation 1:

From the evidence of the questionnaire, and from the evidence provided by earlier UN studies and studies from other bodies that the UN Model Regulations on the Safe Transport of Dangerous Goods and the international modal transport Conventions are widely known throughout the globe and do form the basis of most transport legislation in this field. (124)

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Management Response:

The UNECE secretariat does share the views of the consultant that the United Nations Recommendations on the Transport of Dangerous Goods and related international legal instruments are widely known through the globe in relation to air and maritime transport, but it is not convinced by this conclusion in relation to inland transport in countries outside the UNECE region. In paragraphs 2 and 5 of the report, the consultant himself expresses some disappointment at the "relatively poor response to questionnaires".

In fact, responses were received from 30 different governments, sometimes from different departments of these governments, six intergovernmental organizations (IMO, ICAO, IAEA, WHO, UPU and OTIF, i.e. all those organizations which are closely involved in the process of regulating international transport of dangerous goods), and from 24 NGOs representing the dangerous goods industry (explosives, chemicals, gases, etc.), the road, rail and inland waterways transport sectors, packaging and tank manufacturers, and other sectors concerned, and therefore this is not "poor response".

For governments, it is true that most responses come from EU and North America countries, but responses from countries of other regions such as Australia and Brazil (participating in the work of the ECOSOC Committee) or Costa Rica, Peru, Thailand (not participating in the work but which were contacted in relation to on-going technical assistance activities) were also received.

In addition, it should be borne in mind that the questionnaire (to governments) was intended for inland transport administrations and not to maritime or air transport administrations since information on implementation for these modes is monitored by IMO and ICAO.

As a consequence the conclusion in paragraph 8 that "Although the total response to the questionnaire was low it could be explained by the general level of satisfaction with the performance of the UNECE and the long established use of its provisions" does not seem obvious to the secretariat. For the secretariat:

- The level of response was not low for UNECE countries or other countries participating in the work;
- The lack of response from certain UNECE countries or other countries participating in the work seems related to problems of communication/coordination at national level;
- The lack of response from African countries which were contacted but which do not participate in the work seems to be related to the absence of suitable national legislation regulating inland transport of dangerous goods and ignorance of the existing UN mechanisms in this respect, or to lack of coordination between road traffic safety regulators and inland transport of dangerous goods competent authorities if such authorities exist.

The answers to the questionnaire contain interesting information and sometimes questions. The secretariat has carried out the survey analysis and has prepared a consolidated version of this feedback with suggested conclusions and answers to questions (see annex 1).

Follow up actions and responsibilities:

The conclusion does not call for follow-up action. However, it would be useful to monitor more precisely the status of implementation of the Recommendations on the Transport of Dangerous Goods worldwide, but no resources are available for this.

Conclusion/Recommendation 2:

The provisions are widely applied through international, regional and national legislation. There remains further scope to ensure even wider application and, importantly, regular updates of legislation to apply the latest versions of the UN instruments. (124, 128)

Management Response:

The UNECE secretariat does share the views of the consultant that the United Nations Recommendations on the Transport of Dangerous Goods and related international legal instruments are widely applied, and particularly through international IMO and ICAO legislation applicable to maritime and air transport.

The main important legal instruments applying to road, rail and inland waterways remain those which have been developed by the UNECE, notably ADR (road) and ADN (inland waterways) or by other organizations (OTIF and OSJD) in cooperation with UNECE for rail transport (RID and SMGS). Particular mention has to be made of ADR since, contrary to RID, SMGS and ADN which have a restricted regional scope, ADR is open to all member States of the United Nations and its 48 current Contracting Parties include not only UNECE countries of the EuroAsian continent, but also non-UNECE countries from North Africa. ASEAN countries refer to the provisions of ADR for regulating transit on their territories. Regional agreements in South-America include not only provisions derived from the UN Recommendations on the Transport of Dangerous Goods but also significant parts of ADR. In 2011, the Council of Arab Ministers of Transport called upon all member States of the Arab league to accede to ADR. It should also be underlined that, after the consultant's report was drafted, and in the context of the United Nations Decade of action for Road Safety (2011-2020) and of the 2030 Agenda for Sustainable Development, the United Nations General Assembly encouraged all member States to accede to United Nations legal instruments dealing with road safety including, specifically, ADR (GA resolution 70/260 of 15 April 2016), which reflects the global interest for this specific UNECE legal instruments.

It should also be underlined that the commitment of IMO, ICAO and UNECE to take account, at the request of ECOSOC, of the United Nations Recommendations on the Transport of Dangerous Goods guarantees not only the global and multimodal harmonization of all main international legal instruments applicable to transport of dangerous goods by different modes, but also the regular and synchronized updating of these instruments.

Regarding national legislation, the UNECE secretariat has not detailed information on the status of application of the United Nations Recommendations on the Transport of Dangerous Goods in countries from Africa, Asia and Latin America. Nevertheless, in workshops and events on the subject of transport of dangerous goods where the secretariat has participated, several countries from these regions have expressed the need for support for the development and implementation of national regulations for the inland transport of dangerous goods.

Follow up actions and responsibilities:

The current UNECE activities related to international and regional legislation should be actively pursued and, if possible, strengthened.

The implementation of the United Nations Recommendations on the Transport of Dangerous Goods through national legislation and regular updating of such national legislation remains the responsibility of member States.

The current resources of the secretariat are not sufficient to deploy an awareness and capacity building exercise on the national implementation of the Recommendations on the Transport of Dangerous Goods, although the secretariat believes that this would be of great benefit for countries outside the UNECE region (see also Conclusion/Recommendation No. 5).

Conclusion/Recommendation 3:

It has been demonstrated that UNECE can respond rapidly and effectively by working together with UN

experts/contracting parties when faced with major new challenges. This is evidenced by the adoption and subsequent dissemination of new security provisions following the 9/11 attacks, the response to major accidents such as Bhopal in 1986 and Valu-Jet in 1996 and rapidly developing new technologies such as lithium batteries. (Table 6)

Management Response:

The UNECE secretariat agrees with the conclusion/recommendation.

Follow up actions and responsibilities:

The conclusion does not call for follow-up action.

Conclusion/Recommendation 4:

Considerable effort has been made both by the Secretariat and participating bodies to promote better cooperation and understanding between the SCETDG and SCEGHS. The establishment by the Main Committee in 2014 of an experimental standing joint working group is a significant step forward to ensuring the transport is seen as an integral part of the SCEGHS.(61)

Management Response:

The UNECE secretariat agrees with the conclusion/recommendation.

Follow up actions and responsibilities:

In order to avoid duplication of work and enhance cooperation between the TDG and GHS sub-committees, it is worth noting that both sub-committees addressed this issue in December 2014 and agreed to sharing meeting time (starting on July 2015) to discuss issues of common concern. Both subcommittees remain flexible and willing to adapt the programme of meetings.

Conclusion/Recommendation 5:

The UNECE Secretariat, together with the other relevant UN Secretariats, provides a universally well respected and highly professional performance in servicing the instruments for which they have the remit to support. However, there is little available facility to do much more than service meetings and prepare regulatory text revisions for publication. Outreach to governments and NGOs is on an ad-hoc and unstructured basis dependent on the availability and willingness of individuals within the Secretariat. This is despite the written intent to provide such support in a number of UN seminars and reports. This should be reviewed in particular the resource and budgetary issues need to reflect a world that relies on the UN Recommendations (97-107, 142-143)

Management Response:

Paragraphs 140 to 143 of the report seem to address a number of different issues: monitoring; capacity-building; technical assistance/training. The secretariat agrees that such activities would be very beneficial to better implementation of the UN Recommendations on the Transport of Dangerous Goods and related UNECE legal instruments, but considers that the development of such activities would require the definition of a well-organized and consistent framework, and that the pre-requisite should be:

- Official requests for assistance or monitoring from demanding countries, through official channels; and related evaluation of extra-budgetary resources needed;
- Identification of donors and realistic evaluation of committed funds that could

feed a trust fund;

- Adoption of a proper mandate/terms of reference for such activities, at UNECE level for possible UNECE beneficiaries, and at ECOSOC or General Assembly level for countries outside the UNECE which are in fact those which are most in need of assistance.

The secretariat underlines that the activities of IMO, ICAO and IAEA referred to in paragraph 140 are organized within well defined terms of reference adopted by the governing bodies of these organizations in relation to the broad implementation of their respective legal instruments or standards and taking account of budget considerations but also of diplomatic considerations notably in relation to monitoring.

The secretariat does not think that appropriate capacity-building activities can be envisaged if the proposal for their development is solely based on hypothetical derivation of sales publications revenues.

In paragraph 140.2, the consultant states "it is possible that retired experts might be prepared to help the Sustainable Transport Division promote the use of dangerous goods regulations a suitable message from the secretariat to the heads of delegations may produce a list of people who would be prepared to help provided expenses were reimbursed" (sic). This is an idea that could be explored if extrabudgetary funds could be raised for technical cooperation activities, and subject to the observance of relevant UN Rules and Regulations.

In paragraph 142, the consultant refers to IMO practice of using revenues generated by sales of publications for funding technical cooperation activities.

It is true that part of the revenues generated by the sales of IMO publications is used to fund technical cooperation activities, but there is no link between a title (i.e. a publication concerning dangerous goods) and the nature of the technical cooperation activities. How the technical cooperation fund is used is decided by the IMO Technical Cooperation Committee. Similarly the use of revenue generated by the United Nations publications is subject to a specific United Nations policy, which is different from the IMO policy, and author departments such as the UNECE do not have their say in this process.

Follow up actions and responsibilities:

According to the answers to the questionnaire:

- No UNECE country expressed a need for support. The three countries expressing this need are non-UNECE developing countries. The secretariat has participated in several workshops and events on the subject of transport of dangerous goods and several countries from Africa, Asia and Latin America have expressed the need for support for the development and implementation of national regulations for the inland transport of dangerous goods. Unfortunately, these countries did not reply to the questionnaire.
- No government has indicated willingness for contribution to a trust fund, but 5 NGOs have done so.

When the secretariat receive official requests for support, the possibility of establishing a trust fund will be explored.

Conclusion/Recommendation 6:

Without a formal technical support programme it is difficult to envisage how the UNECE can impact greatly on the wider adoption and application of its various instruments. Whilst recognising the difficult budgetary issues that this raises (97- 107). Such a programme could offer training to government officials.(140-143)

Management Response:

Same as for Conclusion/Recommendation 5.

Follow up actions and responsibilities:

Conclusion/Recommendation 7:

The sustainable development of the world needs the transport of dangerous goods and whilst there is a universally and well respected secretariat they simply do not have the resource to help promote the rules they administer. More assistance is needed from ECOSOC or the General Assembly (140 -143).

Management Response:

See management response to Conclusion/Recommendation 5. For staff resources, see also comments on finding 16 (paragraphs 100, 105, 106, 107)

Follow up actions and responsibilities:

Conclusion/Recommendation 8:

The provisions are widely applied through international, regional and national legislation. There remains further scope to ensure even wider application and, importantly, regular updates of legislation to apply the latest versions of the UN instruments. (124, 128)

Management Response:

Application of the UN provisions at a domestic/regional level

A more detailed analysis may be found in the Secretary-General report E/2015/66 in paragraphs 7 to 16.

Paragraph 79:

Reference should also be made to the call of the Council of Arab Ministers of Transport (24th ordinary session, 26 October 2011) on all Member States of the Arab League to accede to ADR.

See also response to Conclusion/Recommendation 5.

Follow up actions and responsibilities:

Secondary conclusion/Recommendation 1:

Some attention needs to be given to goods in the mail whether for international or domestic post. It is sensible that UPU and ICAO take a lead on this as a good starting point for such items are the passenger allowances in the ICAO TIs. The SCETDG should be kept informed because most mail will travel not only in vehicles but also railways and ships. Once a scheme has been identified it should be included as appropriate in the Model Regulations and the various modal documents (151)

Management Response:

Consumer issues

(Paragraph 77) The various kinds of dangerous goods that are authorized in international transport by UPU are extremely limited. It is the understanding of the UNECE secretariat that when such international transport is authorized by UPU, it has to be in conformity with the international regulations applicable to the mode(s) of transport concerned.

Regarding the whole finding, it must be underlined that the main cooperating international organizations are missing: these are the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO) and the Intergovernmental Organization for International Carriage by Rail (OTIF). Their role is better acknowledged under finding 20.

As mentioned in paragraph 148, there are already quite a number of possible exemptions for dangerous goods packaged in small quantities, and besides this, quite a number of exemptions that are intended to deal with some situations involving non-professional carriers in a pragmatic way. Paragraphs 147 to 152 seem to be addressing the problem of delivery of dangerous goods that are ordered by individuals from internet sites. According to the UPU regulations, only very few dangerous goods may be carried internationally by postal services. For domestic postal services, it is up to each country to decide what may be offered for shipment by post. Nevertheless, it is the understanding of the secretariat that when dangerous goods are authorized for shipment by post, all relevant regulations applicable to the mode(s) of transport concerned must be complied with. Therefore, the secretariat believes that this is more a problem of enforcement than a problem of regulation.

Follow up actions and responsibilities:

Draw the attention of the ECOSOC Sub-Committee of Experts on the TDG to this recommendation.

Secondary conclusion/Recommendation 2:

Guiding principles documents (153) for the modal regulations should be produced to ensure stakeholders understand the reasons for variations and additions in modal requirements (151)

Management Response:

Guiding principles

The secretariat agrees with this finding, but the actions proposed represent quite a lot of additional work and paragraphs 153 and 154 do not suggest how this additional work would be done. Voluntary contributions from governments would be of course welcome, but the current UNECE staff resources available are not sufficient for carrying out this additional work.

Follow up actions and responsibilities:

Draw the attention of the ECOSOC Sub-Committee of Experts on the TDG to this recommendation.

Additional management responses and comments on individual findings

Executive Summary of the consultant's report

Paragraph 1: The purpose of the evaluation was to assess the significance of international cooperation in the field of transport of dangerous goods and the global and regional impact of United Nations agreements and recommendations on the transport of dangerous goods as described in section I of the Evaluation Requirements (Annex C to the report) as stated in the last sentence of this paragraph. This could include the evaluation of the role of the UNECE secretariat in relation to services provided to the ECOSOC Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals and to the UNECE Inland Transport Committee subsidiary bodies dealing with transport of dangerous goods (Working Party on the Transport of Dangerous Goods (WP.15), ADN Safety Committee and ADN Administrative Committee, RID/ADR/ADN Joint Meeting, and in relation to the administration of two United Nations treaties, ADR and ADN.

This is more adequately reflected in paragraph 1 of the report.

Paragraph 4: The questionnaire was not addressed to all member States of the United Nations. It was sent only to permanent missions of all UNECE member States, to all delegations participating in the work of the above-mentioned bodies, and to representatives of African countries who had participated in workshops organized jointly by the UNECE and the UN Economic Commission for Africa in Addis Ababa in 2014 and 2015 in relation to improvement of road traffic safety in Africa. See also paragraph 5 of the report.

Paragraph 15: The proper reference is ECOSOC resolution 2015/7- The reference "E/2015/66" is the symbol of the report of the Secretary-General of the United Nations to the Economic and Social Council on the work of the Committee of experts on the transport of dangerous goods and on the Globally Harmonized System of Classification and Labelling of Chemicals during the biennium 2013-2014 which contains relevant information concerning the implementation of the United Nations Recommendations on the Transport of Dangerous Goods (paragraphs 7-16) and of the GHS (paragraphs 17-32) (see annex 3).

Finding 1: There is no global consistent data relating to the transport of dangerous goods

Management Response:

Lack of global consistent data

Paragraphs 16-26:

As indicated by the consultant, statistics on the transport of dangerous goods are not collected globally and it is very difficult to have a global overview of the exact economic importance of such transport. As also indicated, customs tariffs are not based on the transport of dangerous goods classification criteria, and therefore customs statistics cannot be used for this purpose. In addition they would be relevant only in the context of international traffic.

Nevertheless some countries such as the United States of America, or regional entities such as the European Union, have developed methodologies – that are sometimes put into question – to estimate the effective importance of transport of dangerous goods. These statistics give at least an idea of the reality of the situation bearing in mind that any transport of dangerous goods operation may lead to catastrophic or very serious accidents if not effected in proper safety condition. Of course, the statistics may vary considerably from one country to the other, depending on whether the country is "producer" of dangerous goods, or just "consumer", or both, and depending on the transport conditions. The review mentioned in paragraph 18 is in fact a review that had been done by the UNECE Transport Division in 2008 for the OSCE, and the

2012 version referred to in paragraph 18 and footnotes 1, 2 and 6 is a version that had been voluntary updated by the secretariat in 2012 but that had not been published either as an OSCE document or an UNECE document. Copy of this update is attached herewith. (See annex 2).

This update did not take account the US Commodity Flow Survey 2012 which had not yet been published at that time. Tables 3a and 3b reproduced in the consultant's report are extracted from the US Commodity Flow Survey 2012, but it would have perhaps been interesting, to illustrate the importance of dangerous goods in transport, to reproduce also table 4 of this survey that provides statistical data on "Hazardous versus Non-Hazardous Material Shipment Characteristics by Mode of Transport for the United States in 2012".

This table 4 shows the percentage of goods carried as hazardous in the United States in 2012.

- For carriage by truck: 23.4% (tons) or 10.2% (ton-miles)
  by rail: 6.8% (tons) or 7% (ton-miles)
  by inland waterways: 53.3% or 28.5% (ton-miles)
  by sea: 61.7% (tons) or 83% (ton-miles)
  by air (including truck + air). 5.4% (tons) or 4.7% (ton-miles)

This gives an idea of the proportion of goods which are subject to transport of dangerous goods regulations. However it is more difficult to assess the proportion of vehicle movements which are subject to transport of dangerous goods regulations. The presence of one single drum containing dangerous goods in the load of a single truck implies that the movement of the truck is subject to transport of dangerous goods regulations even if the rest of the cargo is non-dangerous.

However, it is true that availability of up-to-late data at global level is an issue.

Finding 2: Safety for the public and transport workers

Management Response:

Safety for the public and transport workers (paragraphs 27-33)

Reporting of serious accidents or incidents that happen during loading, filling, carriage or unloading of dangerous goods is mandatory not only under ADR (road transport), but also under RID (rail) and ADN (inland waterways). However, the obligation concerns only the loader, filler, carrier or consignor as appropriate, and the report has to be submitted to the competent authority of the country where this happened. There is no obligation for the competent authority to report such accidents to the UNECE secretariat nor to other Contracting Parties. This is up to the discretion of the competent authorities ("when deemed necessary"), and reporting to the intergovernmental bodies serviced by the UNECE secretariat is usually done only when lessons learnt from the accident show that there is a gap in the regulations that should be addressed, and not when they show that the regulations were not complied with. Furthermore, in some cases, competent authorities are not authorized by their domestic legislation to release information on accidents as long as the accident is under investigation or is being addressed by a Court of justice. Table 7 shows a list of accidents reports notified to the secretariat in accordance with section 1.8.5 of ADR. Accidents concerning rail transport are notified to the OTIF secretariat when necessary and also leads to safety discussions (e.g. tank-wagons derailment and explosion that happened in Viareggio, Italy, in 2009 which prompted hot discussions on the relevance of requiring the mandatory installation of derailment detection systems, which are still ongoing). For carriage by inland waterways, accidents are reported to the UNECE/CCNR ADN Safety Committee, e.g. the capsizing of the Waldhof on the Rhine in 2011. This led to new requirements for the stability of chemical tankers and training of crew. Similarly, fires on board barges carrying coal in bulk recently led to new requirements for such carriage.

Therefore the secretariat does not share the view of the consultant that the fact that not all accidents/incidents are reported to UNECE intergovernmental bodies make such reporting requirements of questionable value.

For the remark in paragraph 32 regarding the development of an accident database, eight Contracting Parties have contributed to the pilot exercise by providing all accident/incident reports submitted to competent authorities. This pilot exercise has shown that systematic

collection of accident/incident data was possible. Nevertheless several options remain open concerning the way the data could be submitted and how – and by whom – it could be accessed, on the understanding, anyway, that it would remain anonymous and would not identify entities involved in such accidents. The main interest of this database is that it should provide a comprehensive picture of the transport of dangerous goods accidental situation in the region for the three inland modes of transport; it would allow the identification of some problems that may seem insignificant when occurring only once in a country but may have to be looked at seriously if they are occurring several times or recurrently at a larger regional scale; it would provide regulatory authorities with a sound tool for risk management decision-making based on risk analysis. Further developments will depend on the outcome of activities led by the European Railway Agency (ERA) in cooperation with the RID/ADR/ADN Joint Meeting for developing guidance on risk management in inland transport of dangerous goods. These activities may also lead to a review of the information currently required to be included in the mandatory reporting forms.

It is envisaged that the database and related reporting system will be hosted by the UN ECE secretariat, at least in relation to road and inland waterway transport.

It should be noted that for maritime transport, the International Maritime Organization has also developed similar procedures for reporting incidents/accidents at sea and port areas involving dangerous goods in relation to its own conventions (SOLAS and MARPOL) which require ship masters to report such events to the nearest coastal state, as well as procedures for its member states to report such events to IMO.

Finding 5: Emergency response

Management Response:

The information in paragraph 42 is not entirely correct. The "Emergency Response Guidebook" has been developed jointly by the USA, Canada, Mexico and Argentina and it is intended for use by emergency responders. It has been translated in many languages and is effectively used by emergency services in many countries of the world, including in European countries. In ADR, RID and ADN countries similar tools have been developed, such as national emergency response databases mentioned in paragraph 43, and by the chemical and gas industries (notably the "ERICARDS" developed by the European Chemical Industry Council (CEFIC) specifically for emergency teams that have to respond to inland transport accidents).

The emergency procedures developed by IMO and ICAO are intended for the crew of sea-going vessels and aircraft, who cannot expect any immediate help from emergency responders when a dangerous goods accident happens in the middle of the ocean or in the air. Similar instructions – concerning the crew- have been developed for inclusion in ADR, RID and ADN (sections 5.4.3) and are specific to the mode of transport concerned for the driver of a train; driver of a road vehicle; crew of inland navigation vessels. They are intended for first action by the crew if this can be taken safely, but mainly for protection of the crew pending arrival of the emergency responders.

The IMO procedures have been developed in the specific context of emergency at sea, and the secretariat does not think that they should be used in the context of transport by inland waterway since the navigation conditions (such as manoeuvrability of the vessel), the environment, the possibility for crew to escape and the possibility for intervention of external emergency services are completely different.

Finding 6: Training

Management Response:

Paragraph 45:

The information is not correct. The requirement for driver training was decided first by the

UNECE Working Party on the Transport of Dangerous Goods in the early 1980s and became applicable to international transport through ADR on 1 January 1983 for tank-vehicles and transport units carrying tanks.

This requirement was later extended to drivers of other vehicles carrying dangerous goods in the late 1980s and became applicable on 1 January 1992 for explosives and 1 January 1996 for other dangerous goods.

The EEC directive mentioned by the consultant, which in fact is directive 89/684/EEC, was issued in December 1989 for application of the same training requirements to drivers of vehicles in domestic traffic in countries of the European Economic Communities, for application as from 1 July 1992 for tank-vehicles and explosives and 1 January 1995 (with derogation for Portugal until 1/1/1996) for other dangerous goods.

Paragraph 47:

This is correct, but for the reasons mentioned in the comments related to paragraph 45, the second sentence starting with "like the driver training …" should start with "Unlike the driver training …".

The reference to ADR Chapter 1.4 is not correct, the proper reference is section 1.8.3.

The reference to Table 10 is not correct, it should be Table 9, which contains information collected by the UNECE secretariat from Contracting parties to ADR and not exclusively from EU countries.

Paragraph 48:

The basic requirements are to be found in Chapter 1.3, of the UN Recommendations. Under RID, ADR and ADN, they are also applicable to entities that are not subject to the training requirements of section 1.8.3 of RID/ADR/ADN or Chapter 8.2 of ADR/ADN. UNECE, as IMO and ICAO, has developed specific requirements for training of drivers of vehicles/crew of inland navigation vessels besides the general requirements applicable to all entities involved in the transport of dangerous goods chain.

Paragraphs 49–55:

These paragraphs are not related to training, but to "Security provisions" and should have been preceded by a related sub-title.

Finding 8: Decade of Action for Road Safety.

Management Response:

Paragraph 65:

There is no requirement to report accidents to the secretariat. This is left to the appreciation of the competent authorities. However, it would be an important progress, in the perspective of improved risk analysis and safety, if an international centre of database were established at UNECE (See also comments on Finding 2) This, however, depends on the political will of Contracting Parties to legal instruments and on the allocation of relevant additional resources.

Finding 10: Intergovernmental cooperation.

Management Response:

Paragraph 71:

The ECOSOC resolution mentioned underlines also the need for IAEA to take proper account of the United Nations Recommendations on the Transport of Dangerous Goods.

Paragraph 73:

WHO is also cooperating closely in relation to classification of pesticides.

Finding 12: The UN provisions working in the world

Management Response:

The meeting reports published by the UNECE secretariat are subject to the relevant General Assembly decisions regarding the limitation of documentation, and are subject to page – and even word – limits – Only decisions are supposed to be recorded since argumentation may be found in related pre-session meeting documentation. As underlined by the consultant, systematic representation of the UNECE secretariat at relevant meeting of IMO and ICAO would improve communication on the implementation side, but this representation is impeded not only by the UNECE secretariat scarce travel budget, but also by limited staff resources which cannot be released for attendance at external meetings.

Finding 15: Meeting cycle

Management Response:

Paragraph 96:

This does not seem to the secretariat to be an appropriate answer.

Figure 13 shows clearly that both for governments and NGOs, the vast majority view is that the current 2-year cycle of revisions is the correct interval.

Finding 16: Close liaisons between secretariats aids the efficient operation of the regulatory environment

Management Response:

Paragraph 99:

Perhaps it should be mentioned also that the UNECE secretariat is in permanent liaison/discussion with the CCNR and OTIF secretariats.

Paragraph 100:

The third entry should read:

"2 P3, One P3 is responsible for ATP and ADN, (WP.11, WP.15/AC.2) and publications, the other is responsible for ADR (WP.15) and assist in relation to the RID/ADR/ADN Joint Meeting and the UN SCETDG and is responsible for related publications (ADR, UN Recommendations on the TDG).

The fourth indent: 1 P2 assists the Head of Section and one P3 in relation to WP.15, ADR, the UNSCETDG and the UN Recommendations on the TDG.

In the list of publications, the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) should be added (Best seller of the UN).

Paragraph 105:

Ideally, and as explained above in relation to paragraphs 86 and 99, it would be useful that the UNECE secretariat participate in all relevant ICAO, IMO and OTIF sessions. However, this is currently impossible due to travel budget constraints but also to staff availability constraints. Nevertheless, the IMO, ICAO and OTIF secretariats participate in the UNSCETDG sessions and play their secretariat reporting role, and there is, in

addition, very good intersecretariat cooperation/communication. So the problem is not as acute as it may appear. This being said, the UNECE secretariat agrees that better representation at meetings of other organizations would enhance the visibility and credibility of the ITC WP.15 and the UNSCETDG.

Paragraph 106:

There are many informal groups established to facilitate and support the work of ECOSOC and UNECE bodies. The activities of these groups are not accounted for in the UNECE programme budget, and as a consequence no staff resources can be allocated to such activities.

Paragraph 107:

The Dangerous Goods and Special Cargoes Section believes that the first step would be to provide more appropriate staff resources to the section, i.e. one additional P4 post and upgrading the current P2 post to the P3 level, but these posts would have to be funded from the regular budget. This would facilitate attendance at external meetings and would release the whole section from the burden of constantly having to recruit and train staff assigned to the current P2 post which is subject to mandatory short-term mobility and this assessment is supported by the director of the Sustainable Transport Division. The question of funding some activities such as travel and technical assistance by revenues generated by the sales of dangerous goods publications has been raised several times in the past but without any success, since transferring funds from one budget line to the other in the United Nations seems to be particularly complicated (see also management response to conclusion/recommendation 5).

Finding 17: Interpretation at meetings

Management Response:

Paragraphs 108 and 109:

The comments on interpretation were mainly raised in relation to sessions of the ECOSOC SCETDG, were the working languages are English and French only for documentation, but interpretation is provided in Chinese, English, French, Russian and Spanish. As a consequence, interpreters are provided with the documentation under discussion in English and French only and lack reference material in the other languages despite the fact that the subjects under discussion are usually highly technical. A solution could be to provide the documentation in all languages, but this would have serious budget implications for the UNOG language services since it would multiply by 4 the current costs of translation.

The quality of interpretation is better for sessions of UNECE ITC bodies (WP.15, RID/ADR/ADN Joint Meeting, ADN Safety Committee) where the documentation is provided in all interpretation languages (i.e. English, French and Russian for WP.15 and additionally German for the RID/ADR/ADN Joint Meeting and the ADN Safety Committee where the translation into German is done by the cooperating organizations (CCNR and OTIF).

It should also be underlined that delegates tend to speak very fast, which does not facilitate the task of interpreters and they should be reminded that they should talk much slower if they wish to be well understood by all participants.

Finding 18: Attendance at meetings

Management Response:

Paragraph 115:

For governmental attendance a distinction should be made, between ECOSOC meetings and

UNECE meetings.

a) ECOSOC meetings: the SCETDG has a restricted membership decided by ECOSOC. However most countries which are full members are represented by strong governmental delegations. Unfortunately a few full members were not represented in the past few years for reasons which are unclear but which may be as follows:

   – Experts not available due to limited staff in the administration and limited travel budget: e.g. (Czech Republic, Portugal);

   – Limited travel budget, problems of internal communication, lack of political interest from hierarchy; e.g. (Mexico, Iran, Morocco, India);

   In accordance with the terms of reference of the Sub-Committee, experts have to be made available at each country own expense and the United Nations cannot subsidize participation.

b) UNECE ITC bodies (WP.15, RID/ADR/ADN Joint Meeting, ADN Safety Committee)

All Contracting parties which have major interest in international transport of dangerous goods participate.

Participation in the RID/ADR/ADN Joint Meeting is less important probably because the subjects discussed are usually highly technical. For WP.15 and the ADN Safety Committee, the non-attendance or poor attendance of certain Contracting parties to ADR or ADN is, in the view of the secretariat, linked to:

Tiny transport of dangerous goods departments and very limited economic interest in international transport of dangerous goods by road (e.g. Iceland, Cyprus, Malta, Liechtenstein, Andorra, Morocco, Tunisia)

Limited travel resources and lack of political support for road safety activities, in particular in countries in transition such as Belarus, Kazakhstan, Ukraine, Tajikistan, Azerbaijan, Republic of Moldova, Albania, and Former Yugoslav Republic of Macedonia, which denotes also probably some kind of problems of effective implementation.

Finding 25: Customs tariffs

Management Response:

The secretariat does not understand very well what is meant by paragraphs 145 and 146. In accordance with relevant IMO Recommendations, most port authorities require advance (24 H) notification of dangerous goods on board before the ship may call in the port, and this notification is normally based on the information contained in dangerous goods transport documents. Some customs authorities may also require advance information in relation to customs tariffs, but the secretariat does not see the problem since the customs tariff code has also to be included in the customs documentation. If this question had to be studied by the SCETDG, it would have to be raised by a government or NGO concerned and better explained. The UN transport of dangerous goods codes are mainly intended for transport safety and emergency response, while the customs codes are mainly intended to specify the applicable customs tariff, and the criteria are different. Should this issue be raised at UN SCETDG level, the secretariat has good relationship with the secretariat of the World Customs Organization in charge of chemicals and cooperation should not be a problem once the problems, if any, have been clearly identified.

Finding 29: Costs of attending, electronic attendance at meetings, WP15 should follow Joint Meetings in Geneva JM and WP 15

Management Response:

The secretariat is well aware of problems related to the funding of participation in meetings. The secretariat, in the past few years, has made a number of suggestions relating to the length of

meetings and to their periodicity, which were not adopted by the bodies concerned for well justified reasons.

Regarding suggestion N° 1 (Participation through electronic ways, e.g. conference calls), the secretariat notes that such conference calls work relatively well for informal meetings with few participants and only one communication language. Meetings organized by the Transport Division count from 100 to 200 participants with 3, 4 or 5 working languages. Most delegations consider that meetings in Geneva, in person, offer them the possibility to create close working relationship with delegates of other countries, not only during the meeting time, but also during coffee breaks, lunchtime and evenings, and conference calls do not provide this human relation opportunity. But in any case, the UNOG interpretation services claim that the current IT Technology in UNOG is not sufficient to allow them to provide satisfactory services through conference calls.

Regarding suggestion N° 2, the secretariat does not think that organizing sessions of the RID Committee of Experts or of WP.15 back to back with sessions of the Joint Meeting would be a good idea in relation to work efficiency for the following reasons:

– The UNECE and OTIF secretariats need some time to prepare the texts that have to be considered by WP.15 and the RID Safety Committee; this cannot be done over the week-end in four languages;

– The delegates participating in the Joint Meeting and in WP.15 or the RID Safety Committee are not always the same; those who participate in all meetings cannot always afford to be away from the office for such a long time;

– Discussions regarding the organization of OTIF meetings are not within the remit of the UN secretariat and related comments are not relevant in the context of this evaluation;

For WP.15 meetings, this would mean that the UNECE secretariat would have to service continuously meetings for 2 weeks in even years and 3 weeks in odd years, in September which is the busiest meeting period, and this is not acceptable for the secretariat.

Annex 1

Questionnaire results

(Analysis by the UNECE secretariat)

Questions 1 to 5 were dedicated to identify the name, contact information, country and functions of the persons responding. Corresponding data from all 3 questionnaires is kept confidential.

Results

Competent authorities from the following 30 countries replied to the questionnaire:

Costa Rica, Thailand, Peru, Belgium, Brazil, Turkey, Germany, Bulgaria, Lithuania, Denmark, Spain, Norway, United States of America, France, Switzerland, Slovakia, Portugal, Romania, Belgium; Luxembourg, Latvia, Norway, Netherlands, United Kingdom, Sweden, Canada, Finland, Australia, Austria and Malta.

The responses were not geographically representative. While in some countries the questionnaire was answered by several competent authorities, no answers were received from African countries.

A total of 24 NGOs replied to the questionnaire:

Dangerous Goods Advisory Council, Verein der Kohlenimporteure e.V., IPPIC - International Paint and Printing Ink Council, IFDI, European Skippers Organisation (ESO), SAAMI, CIPA, IATA, CLEPA, Compressed Gas Association (CGA), Recommended ADN Classification Societies, Cefic, OICA, Union Internationale des chemins de fer (UIC), Eucobat aisbl, International Road Transport Union (IRU), Institute of Makers of Explosives, International Dangerous Goods and Containers Association (IDGCA), Lloyd's Register, RECHARGE, European Industrial Gases Association, International tank Container Organisation, Australian Explosives Industry Safety Group and IFFO.

6 IGOs replied to the questionnaire:

International Maritime Organization (IMO), World Health Organization (WHO), IAEA, Intergovernmental Organisation for International Carriage by Rail, ICAO and Universal Postal Union.

Q.6: (Governments' questionnaire) Status of the answers (please tick as appropriate)

answered question	**36**
skipped question	**1**

Results

36.1% respondents indicated that they have filled the questionnaire after consultation with other relevant governmental entities and therefore the answers represent the coordinated views of their governments.

50% of the respondents filled the questionnaire only for matters falling within their area of responsibility.

Finally, **13.9%** of the respondents filled the questionnaire in their personal capacity (i.e the answers provided do not necessarily represent their governments view)

Q.7: Does your country regulate domestic transport of dangerous goods?

Answer Options	Yes	No	Response Count
by road	33	0	33
by rail	30	2	32
by inland waterways	20	12	32
		answered question	**36**
		skipped question	**1**

Q.8: Does your country require compliance with the requirements of the following international legal instruments for DOMESTIC transport of dangerous goods?

Answer Options	Yes	No	Response Count
ADR	25	8	33
RID	23	10	33
ADN	15	18	33
SMGS	2	23	25
		answered question	**36**
		skipped question	**1**

Q.9: If Yes, then

Answer Options	Partly	Significantly	Fully	Response Count
ADR	1	2	22	25
RID	0	0	22	22
ADN	0	0	14	14
SMGS	1	0	1	2

Which edition?

Answer Options	2015	2013	2011	Response Count
ADR	22	0	1	23
RID	19	1	0	20
ADN	12	1	0	13
SMGS	2	0	0	2
				Question Totals
			answered question	**28**
			skipped question	**9**

Q.10 : Does your country ENVISAGE requiring compliance with the requirements of the following international legal instruments for DOMESTIC transport of dangerous goods in the future?

Answer Options	No	Yes	Response Count
ADR	5	17	22
RID	6	14	20
ADN	12	10	22
SMGS	11	6	17
		answered question	**27**
		skipped question	**10**

Q.11: If the requirements applicable to domestic inland transport of dangerous goods in your country are not those of ADR, RID, ADN or SMGS, are they nevertheless based on the UN Recommendations on the Transport of Dangerous Goods, Model Regulations?

Answer Options	Response Percent	Response Count
No	18.2%	2
Yes, partly	9.1%	1
Yes, significantly	36.4%	4
Yes, fully	36.4%	4
	answered question	**11**
	skipped question	**26**

Results

It is important to notice that 81.9% of the requirements applicable to domestic inland transport of dangerous goods that are not those of ADR, RID, ADN or SMGS, contain provisions partly, significantly or fully based on those of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations.

Q.12: if Yes, on what edition of the UN Recommendations are they based?

Answer Options	Response Percent	Response Count
18th revised edition	70.0%	7
17th revised edition	10.0%	1
16th revised edition	0.0%	0
15th revised edition	0.0%	0
14th revised edition	10.0%	1
13th revised edition	0.0%	0
12th revised edition	10.0%	1
Previous edition (please specify)		2
	answered question	**10**
	skipped question	**27**

Results

Countries that are not Contracting Parties to ADR, RID, ADN or SMGS, mentioned that they apply provisions mostly based on the 18th revised edition of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations (Orange Book) i.e. the same edition on which the current (2015) versions of ADR, RID, ADN and SMGS are based.

Q.13: Are packages, freight containers and portable tanks containing dangerous goods, which are in conformity with the IMDG code or ICAO TI, accepted for transport by road, rail and inland waterways, prior to or following maritime or air transport, even when they are not in full conformity with your domestic transport regulations?

Answer Options	Response Percent	Response Count
Yes	84.8%	28
No	15.2%	5
answered question		**33**
skipped question		**4**

Analysis/ comments by the secretariat

This question may have been misunderstood. The 5 negative answers come from respondents from 4 countries which apply ADR (4), RID (4) and ADN (2), including the provisions of 1.1.4.2 (allowing such divergences), to domestic transport.

Q.14: If your national regulations are available online, please provide the relevant links. Otherwise, please quote the relevant piece(s) of legislation

Answer Options	Response Count
	31
answered question	**31**
skipped question	**6**

A list of the links provided can be found below:

N°	Response Text	Country
1	http://www.pgrweb.go.cr/scij/Busqueda/Normativa/Normas/nrm_texto_completo.aspx?param1=NRTC&nValor1=1&nValor2=30431&nValor3=32130&param2=1&strTipM=TC&lResultado=10&strSim=simp	Costa Rica
2	http://www.apn.gob.pe/web/apn/mercancias-peligrosas	Peru
3	Ley 28256, Ley que regula el transporte terrestre de materiales y/o residuos peligrosos, Decreto Supremo No. 021-2008-MTC, Reglamento Nacional del Transporte Terrestre de Materiales y/o residuos peligrosos	Peru (land transport)
4	I cannot give the exact link, but they can be found in out official jounal http://www.ejustice.just.fgov.be/cgi/welcome.pl	Belgium
5	The main regulation on inland and rail transport is available at http://www.antt.gov.br/carga/pperigoso/pperigoso.asp Also, there are others pieces of legislation at www.inmetro.gov.br (packagings) and, in the case of radioactive materials, at www.cnen.gov.br. RBAC 175 is the main regulation for air mode transport of dangerous goods http://www2.anac.gov.br/transparencia/pdf/RBAC%20175.pdf	Brazil
7	http://www.dziennikustaw.gov.pl/DU/2011/s/227/1367/1 - this act refers to RID/ADR/ADN, links to regulations on transport of dangerous goods are also provided on the following pages: http://www.mir.gov.pl/strony/zadania/transport/drogi/przewozy-drogowe/przewozy-	Poland

N°	Response Text	Country
	specjalne/towary-niebezpieczne/ or http://www.mir.gov.pl/strony/zadania/transport/kolej/przewoz-towarow-niebezpiecznych/	
8	http://www.bmvi.de/SharedDocs/DE/Artikel/G/Gefahrgut/gefahrgut-recht-vorschriften.html	Germany
9	https://www.e-tar.lt/portal/lt/legalAct/TAR.32E0A3FB18C4/cjNQTryBUx https://www.e-tar.lt/portal/lt/legalAct/TAR.2CD9AB1C25F7/TfnRVlBWnN	Lithuania
10	ADR https://www.lovtidende.dk/pdf.aspx?id=152738 RID http://www.trafikstyrelsen.dk/DA/Jernbane/Farligt-gods/RID/RID-2015.aspx	Denmark
11	http://www.fomento.es/MFOM/LANG_CASTELLANO/ORGANOS_COLEGIADOS/CCTMP/ULTIMA_HORA/	Spain
12	http://www.dsb.no/no/Ansvarsomrader/Farlige-stoffer/Transport/Oppdatert-regelverk-for-transport-av-farlig-gods/	Norway
13	LEY N° 28256 DECRETO SUPREMO N° 021-2009-MTC	Peru
14	http://www.ecfr.gov/cgi-bin/text-idx?gp=&SID=ff497e9fc72cf97687c7662916cc215c&mc=true&tpl=/ecfrbrowse/Title49/49chapterI.tpl	USA
15	http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000020796240&categorieLien=id	France
16	SDR: http://www.astra.admin.ch/themen/schwerverkehr/00246/00408/index.html?lang=fr RSD: https://www.admin.ch/opc/fr/classified-compilation/20121700/index.html	Switzerland
17	Act 56 of 31st, January 2012 on Road Transport as amended ADR is fully valid in SR also for domestic transport and it is implemented in the Act 56/2012 of Coll of SR.	Slovakia
18	ACT 338 of 22 September 2000 on Inland Navigation and on Amendments of some Acts	Slovakia
19	www.imt-ip.pt	Portugal
20	for ADR approved by Low no. 31/1994 - there is a link on UNECE website - http://www.arr.ro/doc_353_Transport-marfuri-periculoase--ADR-_pg_0.htm ADN approved by Law no. 159/2008RID approved by Government Ordinance no. 69/2001	Romania
21	ADR: 28 JUIN 2009. - Arrêté royal relatif au transport des marchandises dangereuses par route ou par chemin de fer, à l'exception des matières explosibles et radioactives ADN: 31 JUILLET 2009. - Arrêté royal relatif au transport des marchandises dangereuses par voie de navigation intérieure explosifs: 23 SEPTEMBRE 1958. - Arrêté royal portant règlement général sur la fabrication, l'emmagasinage, la détention, le débit, le transport et l'emploi des produits explosifs. (link: http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1958092301&table_name=loi) nuclear: Chapter VII of the Royal Decree of 20 July 2001 laying down general rules on the protection of the public, workers and the environment against the dangers of ionizing radiation (GRR-2001). Only available in French or Dutch: - French: http://www.jurion.fanc.fgov.be/jurdb-consult/consultatieLink?wettekstId=11617&appLang=fr&wettekstLang=fr	Belgium

N°	Response Text	Country
22	http://www.mt.public.lu/ministere/index.html	Luxembourg
23	http://likumi.lv/doc.php?id=220516 http://www.vvc.gov.lv/export/sites/default/docs/LRTA/Likumi/Law_On_the_Handling_of_Dangerous_Goods.doc http://likumi.lv/ta/id/116190-bistamo-kravu-parvadajumu-noteikumi http://likumi.lv/ta/id/74478-noteikumi-par-bistamo-kravu-parvadasanu-pa-dzelzcelu	Latvia
24	https://lovdata.no/dokument/SF/forskrift/2009-04-01-384	Norway
25	Wet Vervoer Gevaarlijke Stoffen and its Annexes (Law on Transport of Dangerous Goods and its Annexes).	Netherlands
26	For Great Britain: CDG 2009 as amended by CDG 2011. There are separate regulations for Northern Ireland. See links below: http://www.legislation.gov.uk/uksi/2011/1885/pdfs/uksi_20111885_en.pdf http://www.legislation.gov.uk/uksi/2009/1348/pdfs/uksi_20091348_en.pdf http://www.legislation.gov.uk/nisr/2011/365/pdfs/nisr_20110365_en.pdf	UK
27	RID-S: https://www.msb.se/externdata/rs/66703878-b6b0-4498-a03b-ccfddb5c7bd7.pdf ADR-S: https://www.msb.se/externdata/rs/974f510a-4964-4c5e-b69c-ae96d32116b3.pdf	Sweden
28	http://laws-lois.justice.gc.ca/eng/acts/T-19.01/FullText.html https://www.tc.gc.ca/eng/tdg/clear-tofc-211.htm	Canada
29	National regulations: http://www.trafi.fi/tietopalvelut/vaaralliset_aineet/saadokset_ja_maaraykset	Finland
30	The Australian Code for the Transport of Dangerous Goods by Road and Rail and Australia's national Model Act on the Transport of Dangerous Goods by Road and Rail are available at the following link. http://www.ntc.gov.au/topics/safety/australian-dangerous-goods-code/	Australia
31	http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=9206&l=1	Malta

Comment:

Several respondents mentioned the willingness to provide the secretariat with more information, documents or links. A follow-up should be done.

Q.15. There is a general lack of statistics on a worldwide basis about the transport of dangerous goods by:

- Mode of transport
- Class of dangerous goods
- Dangerous goods packed in limited quantities
- National versus international transport
- Accidents involving dangerous goods during transport

Does your government collect national statistics concerning the transport of dangerous goods by:

i) Road
ii) Rail
iii) Inland waterways
iv) Sea
v) Air

If yes could you supply copies or a web link for the statistics:

This question was asked in the Governments and NGOs questionnaires please see the results below:

Governments results

Answer Options	Yes	No	Response Count
i) Road	**16**	**10**	**26**
ii) Rail	**18**	**7**	**25**
iii) Inland waterway	**9**	**16**	**25**
iv) Sea	**9**	**9**	**18**
v) Air	**9**	**10**	**19**
		answered question	**22**
		skipped question	**5**

NGOs results

Answer Options	Yes	No	Response Count
i) Road	2	20	22
ii) Rail	1	21	22
iii) Inland waterway	1	21	22
iv) Sea	1	21	22
v) Air	1	21	22
		answered question	**22**
		skipped question	**5**

Provided links for statistics on the transport of dangerous goods	
Country	**link**
USA	http://www.census.gov/econ/cfs/2012/ec12tcf-us-hm.pdf
France	http://www.statistiques.developpement-durable.gouv.fr/donnees-ligne/r/flux-marchandises-sitram-i.html
Switzerland	http://www.bav.admin.ch/themen/verkehrspolitik/00709/02277/02609/index.html?lang=fr
Denmark	http://www.danmarksstatistik.dk/da/search.aspx?q=farligt+gods
Romania	We encourage you to request the statistics to National Institute of Statistics - INS www.insse.ro
Belgium	See the information document on transport of radioactive material in Belgium. Only available in French or Dutch: - French: http://www.fanc.fgov.be/GED/00000000/3500/3539.pdf - Dutch: http://www.fanc.fgov.be/GED/00000000/3500/3538.pdf Inland waterways: Information available about classes of dangerous goods (1) oil and gasoline (2) chemical products and (3) explosives Road: information available about number of controls conducted
Lithuania	http://www.stat.gov.lt/en/home

Questionnaire results

Provided links for statistics on the transport of dangerous goods	
Country	**link**
Germany	https://www.destatis.de/DE/Publikationen/Thematisch/TransportVerkehr/Querschnitt/Gefahrguttransporte.html
Norway	https://www.ssb.no/statistikkbanken/SelectVarVal/Define.asp?MainTable=JernbGodsFarlig&KortNavnWeb=jernbane&PLanguage=0&checked=true https://www.ssb.no/statistikkbanken/SelectVarVal/Define.asp?MainTable=KvSafeSeaNet&KortNavnWeb=kv%5Fstatres&PLanguage=0&checked=true
Poland	In rail/road/inland waterways transport data specified in the regulation on yearly report concerning the activities connected with the transport of dangerous goods (http://www.dziennikustaw.gov.pl/DU/2012/966/1) are gathered. Under the Parliamentary Act on transport of dangerous goods these data are gathered by the Office of Rail Transport (Urząd Transportu Kolejowego, Inland Waterways Offices (urzędy żeglugi śródlądowej), Inspectorates of Road Transport (inspektoraty transportu drogowego). As far as Maritime transport is concerned data on transport of dangerous goods are collected by Maritime Offices (urzędy morskie). As far as rail transport is concerned some of these data are presented in an aggregate form in yearly reports on rail transport safety available on the national safety authority http://www.utk.gov.pl/pl/bezpieczenstwo-systemu/monitoring/opracowania-dotyczace-b/3883,Opracowania-dotyczace-bezpieczenstwa.html. As far as other modes of transport are concerned the statistics are not published.
Brazil	This information is not published on internet for air mode, although we can supply you with some statistics. More than 750000 packages of dangerous goods were transported by air since January 1st of 2015 until today (79% of Class 9; 10% of Class 6; 4% of Class 3). There isn't any accident involving dangerous goods transported by air, although there were 60 incidents reported since January 1st of 2014 until today (26% undeclared; 44% regarding documentation; 17% regarding packaging) (Top 3 dangerous goods incidents reported are Class 3, Class 9 and Class 8). For road transportation, you can check at produtosperigososbrasil.com; www.ipr.dnit.gov.br; http://www.mma.gov.br/seguranca-quimica/emergencias-ambientais/plano-nacional-de-prevencao-preparacao-e-resposta-rapida-a-emergencias-ambientais-com-produtos-quimicos-perigosos
Sweden	http://www.trafa.se/en/Statistics/ The available statistics are of a more general character. Concerning the air mode, we do not know what statistics that is available.
Australia	In September 2015, the Australian Bureau of Statistics will release a publication entitled "Road Freight Movements" (catalogue number 9223.0), which is expected to include, among other things, total tonnes of dangerous goods carried, total dangerous goods tonne-kilometres, and total kilometres travelled. The publication will be made available on the website of the Australian Bureau of Statistics. http://www.abs.gov.au/
Norway	http://www.dsb.no/Global/Farlige%20stoffer/Dokumenter/1293-2013-elektronisk%20(2).pdf
Spain	http://www.fomento.gob.es/MFOM/LANG_CASTELLANO/DIRECCIONES_GENERALES/TRANSPORTE_TERRESTRE/MMPP/Estadisticas/ For air, not available for the public.
Peru	http://www.apn.gob.pe/web/apn/reportes-estadisticos-sobre-mercancias-peligrosas
Thailand	There is only a one-time estimation of the data compiled by a German Expert, Mr. Manfred Zachzial on the Transport Information Database (TID) under the Thai-German Dangerous Goods Project during the year 1997-2003.

Comment:

Several respondents mentioned the willingness to provide the secretariat with more information, documents or links. A follow-up should be done.

Statistics are also collected at EU level, refer to http://ec.europa.eu/eurostat/statistics-explained/index.php/Road_freight_transport_by_type_of_goods

Q.16 : Is your country party to a convention/agreement governing international transport of dangerous goods by road, rail or inland waterways, OTHER than ADR, RID, ADN, SMGS?

Answer Options	Response Percent	Response Count
No	80.0%	28
Yes	20.0%	7
If Yes, please specify (Name and depositary)		8
answered question		**35**
skipped question		**2**

If Yes, please specify (Name and depositary)

Country	
Costa Rica	El país firmó solamente el Convenio de Basilea
Thailand	Protocol 9 of the ASEAN Agreement on the transport of dangerous goods across the borders based on UN RTDG and ADR
Peru	Convenio SOLAS y Convenio MARPOL. El libro naranja, MTC, MINSA-DIGESA
Brazil	The Agreement on the Rail and Road Transportation of Dangerous Goods on Mercosur
United Kingdom	English-French Intergovernmental Commission (IGC): Eurotunnel Safety Arrangements - Volume F
Canada	Unclear, the agreements are North American Specific. For example, for rail in North America, this is done through agreements with the Association of American Railways.
Finland	Bilateral agreement with Russia (Rail, dangerous goods)

Q. 17. Are the provisions of this agreement/convention consistent with those of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations?

Answer Options	Response Percent	Response Count
Yes	90.0%	9
No	10.0%	1
answered question		**10**
skipped question		**27**

Comment:

It is noteworthy that 90% of the reported agreements/conventions that are not ADR, RID, ADN, SMGS, contain provisions consistent with those of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations.

Q.18. If Yes, which edition? (18th to 12th). Previous edition (please specify)

Answer Options	Response Percent	Response Count
18th revised edition	50.0%	4
17th revised edition	12.5%	1
16th revised edition	0.0%	0
15th revised edition	25.0%	2
14th revised edition	0.0%	0
13th revised edition	0.0%	0
12th revised edition	12.5%	1
Previous edition (please specify)		2
	answered question	**8**
	skipped question	**29**

Comment:

One agreement (MERCOSUR) is still based on the 7th revised edition, which implies that a serious update should be highly recommended.

Q.28 Are you aware that the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations are updated at two-year intervals?

Answer Options	Response Percent	Response Count
Yes	100.0%	35
No	0.0%	0
	answered question	**35**
	skipped question	**2**

Q.29 Do you think the two-year cycle of revisions is the correct interval?

Governments results

Answer Options	Response Percent	Response Count
Yes	80.0%	28
No	11.4%	4
I do not know	8.6%	3
	answered question	**35**
	skipped question	**2**

NGOs results

Answer Options	Response Percent	Response Count
Yes	70.8%	17
No	29.2%	7
	answered question	**24**
	skipped question	**3**

IGOs results

Answer Options	Response Percent	Response Count
Yes	66.7%	4
No	33.3%	2
Do not know	0.0%	0
	answered question	**6**
	skipped question	**0**

If No, then is it:

Governments results

Answer Options	Select one answer	Response Count
Too long	0	0
Too short	4	4
	answered question	**4**
	skipped question	**33**

NGOs results

Answer Options	Select one answer	Response Count
Too long	1	1
Too short	6	6
About right	2	2
	answered question	**9**
	skipped question	**18**

IGOs results

Answer Options	Select one answer	Response Count
Too long	0	0
Too short	2	2
	answered question	**2**
	skipped question	**4**

Governments results

80% of the respondents consider that the two-year cycle of revisions is the correct interval.

Among the 11.4% of those who replied "no" to this question, 100% considered the 2-year cycle too short.

8.6% did not know

NGOs results

70.8% of the respondents consider that the two-year cycle of revisions is the correct interval.

Among the 29.2% of those who replied "no" to this question, 19.47% considered the 2-year cycle too long, 6.49% consider it to be about right and 3.24% consider it to be too long.

IGOs results

66.7% of the respondents consider that the two-year cycle of revisions is the correct interval, while 33.3% of the respondents consider it to be too short

The overall conclusion is that the vast majority of respondents/stakeholders is satisfied with the current 2-year periodicity of amendments.

Q.31. The United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations are dealt with by the Committee of Experts on the Transport of Dangerous Goods (TDG) and on the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and its Sub-Committee on TDG. This leads to standard methods of classification, packaging, marking and labelling. They are then transferred to the individual modal bodies for adoption.

Do you consider the system works well? If your answer is No, please explain briefly your concerns

Governments results

Answer Options	Response Percent	Response Count
Yes	88.6%	31
No	2.9%	1
I do not know	8.6%	3
If your answer is No, please explain briefly your concerns		1
answered question		**35**
skipped question		**2**

NGOs results

Answer Options	Response Percent	Response Count
Yes	78.3%	18
No	21.7%	5
answered question		**23**
skipped question		**4**

IGOs results

Answer Options	Response Percent	Response Count
Yes	100.0%	6
No	0.0%	0
If your answer is No, please explain briefly your concerns		0
answered question		**6**
skipped question		**0**

If your answer is No, please explain briefly your concerns

Governments' results

The governments' results reflect a general satisfaction with the way the United Nation system works (88.6%). Only one of the respondents raised an issue with intermodal differences in classification of dangerous goods indicating that ADN has some substance identification numbers different from ADR, but the secretariat is not aware of such differences except perhaps for carriage of liquids in bulk in tank vessels where specific ADN numbers have been assigned to substances not regulated under ADR.

NGOs results

78.3% of the respondents consider that the current system works well (i.e. standardisation of classification, packaging, marking and labelling at Committee level followed by transfer to the relevant provisions to the individual modal bodies for adoption).

21.7 % of the respondents consider that the system does not work well. This percentage includes the contribution of one respondent who answered "no" to the question although he/she specified in the comments that in his/her view the system works well as far as the modal bodies are concerned since they participate in a cooperative and constructive manner to the work of the Committee, transposing its recommendations into the legal instruments under their responsibility as soon as possible and providing feedback when necessary. On the contrary he/she felt that Governments are not so cooperative and efficient in implementing provisions for land transport.

The concerns expressed by those who considered that the system does not work well are as follows:

- Too much divergences remaining in modal provisions as well as in the way competent authority implement them (e.g. conscious deviation or time lag in transposing the Model Regulations)
- Dis-harmonization generated by non-respect of the procedure, i.e.: issues of global concern discussed first at regional level and once a decision has been taken regionally, brought to the attention of the Sub-Committee where the outcome of the discussions might be different.
- Too lengthy discussions on some issues.
- Duplication of discussions on the same issues in TDG and GHS sub-committees, which slows down significantly the decision-making process.
- Lack of efficiency of governments as regards the implementation of provisions for land transport.

Analysis/comments by the secretariat

As regards the question of avoiding duplication of work and enhancing cooperation between the TDG and GHS sub-committees, it is worth noting that both sub-committees addressed this issue in December 2014 and agreed to sharing meeting time (starting on July 2015) to discuss issues of common concern.

Opinions/guidance on how to address the remaining concerns:

- remaining divergences in modal provisions are often justified by safety concerns specific to one mode of transport. Past discussions on elaborating an international multimodal convention showed that governments had still diverging opinions on the need for such a convention;
- non-respect of the procedure It is true that some governments tend to raise some issues first at modal level (IMO, ICAO, or UNECE Joint Meeting) and this leads to problems. This practice should be avoided and modal authorities should exert proper discipline to ensure that issues that concern all modes be raised first at the level of the ECOSOC Sub-Committee of Experts on TDG;
- lack of efficiency of governments as regards the implementation of provisions for land transport This is a problem that occurs in countries that have not developed proper administrative mechanisms of follow-up to revisions of the UN Recommendations.

Q.32. Do you consider that the international regulations are up to date and relevant to the modern uses of and distribution of dangerous goods?

Governments results **Answer Options**	**Response Percent**	**Response Count**
Yes	91.4%	32
No	2.9%	1
I do not know	5.7%	2
If your answer is No, please provide examples of deficiencies		2
answered question		**35**
skipped question		**2**

NGOs results **Answer Options**	**Response Percent**	**Response Count**
Yes	68.2%	15
No	31.8%	7
answered question		**22**
skipped question		**5**

IGOs results **Answer Options**	**Response Percent**	**Response Count**
Yes	80.0%	4
No	20.0%	1
If you answer no please provide examples of deficiencies		1
answered question		**5**
skipped question		**1**

If your answer is No, please provide examples of deficiencies:

Governments' results

91.4% of the respondents consider that the regulations are up to date and relevant to the modern uses of and distribution of dangerous goods, while 2.9% answered "no" to that question.

Examples of general deficiencies given by those who answered "no" to the question are:

- In certain areas it may be considered to develop performance based provisions rather than very detailed provisions.
- Regarding technical development there is always a delay in adapting suitable provisions. This is of course frustrating for industry, but it is difficult to solve this problem with the current system.

NGOs results

68.2% of the respondents consider that the regulations are up to date and relevant to the modern uses of and distribution of dangerous goods, while 31.8% answered "no" to that question.

Examples of general deficiencies given by those who answered "no" to the question are:

- Packing instructions not keeping pace with packing technology

- Lack of enforcement capacity by some competent authorities to ensure the packagings are made in daily production the same as the units tested in the design qualification tests.

Examples of more nature or modal specific deficiencies given by those who answered "no" to the question are:

- Lack of non-testing criteria to assign packing groups to mixtures in Class 8
- Lack of provisions addressing combustibility
- Lack of full recognition of new developments (such as document digitisation) by all contracting parties to ADR??.
- Lack of recommendations for a harmonized explosives security marking
- Outdated provisions for the transport of fishmeal

IGOs results

80 % of the respondents (4) consider that the regulations are up to date and relevant to the modern uses of and distribution of dangerous goods, while 20% (1) answered "no" to that question.

Comments of general deficiencies given by the respondent who answered "no" to the question indicated a need for better alignment with current consumer trends in online ordering, in particular the need for exemptions of minimal quantities of dangerous goods.

Q.33. The UNECE Transport Division in Geneva provides secretariat services to ECE TDG bodies namely WP15 for ADR, the RID/ADR/ADN Joint Meeting and WP15/AC.2 for ADN. In addition, they provide secretariat services to the ECOSOC TDG and GHS committee and its sub-committees. Do you consider the secretariat functions/works well?

Governments results

Answer Options	Response Percent	Response Count
Yes	82.9%	29
No	5.7%	2
I do not know	11.4%	4
If not, could you please identify weaknesses and supply details		4
answered question		**35**
skipped question		**2**

NGOs results

Answer Options	Response Percent	Response Count
Yes	100.0%	22
No	0.0%	0
answered question		**22**
skipped question		**5**

If not, could you please identify weaknesses and supply details

Governments results

82.9% of the respondents consider that the secretariat works well.

5.7% of the respondents consider that the secretariat does not work well.

11.4% of the respondents did not know.

Examples of general deficiencies given by those who answered "no" to the question are:

- Even the answer is yes, we consider a need to supplement the number of persons and the funds for transport of dangerous goods Section.
- Generally works well. Better documentation of discussions, resolutions, and evolution of files would be appreciated. Decisions are documented, but the rationale and discussions are lacking especially when changes or major points are raised in plenary.
- Several countries, mostly from Latin America claimed that they do not know of the work done by the UNECE secretariat.

NGOs results

100% of the respondents consider that the secretariat works well.

Additional feedback provided in relation to that question indicates the following:

- The service provided by the secretariat is outstanding
- The secretariat has a deep knowledge on the implementation of the Model Regulations through their involvement in UNECE modal bodies
- Weakness: lack of funding for outreach, particularly as regards countries which are not able to participate in the meetings

Comments from the secretariat

For the contents of reports, the secretariat has to comply with strict rules concerning the limitation of documentation, according to which only decisions should be recorded especially when the arguments, or the rationale of decisions can be derived from supporting documentation. A maximum of six pages of CRPs (2000 words) may be submitted for translation per day (maximum of 10500 words for the final narrative part of the report).

The few statements reflecting little knowledge of the work done by the secretariat came mainly from respondents of countries that do not participate in the work.

Q.34. Are the various publications from the UNECE Transport Division produced in a timely manner? I.e. are they available in good time for use by the regulators and industry?

Governments results

Answer Options	Response Percent	Response Count
Yes	85.7%	30
No	2.9%	1
I do not know	11.4%	4
	answered question	**35**
	skipped question	**2**

NGOs results

Answer Options	Response Percent	Response Count
Yes	100.0%	23
No	0.0%	0
	answered question	**23**
	skipped question	**4**

Q.35. Are the United Nations regulatory and capacity building exercises effective in spreading knowledge concerning dangerous goods transport?

Governments results

Answer Options	Response Percent	Response Count
Yes	62.9%	22
No	5.7%	2
I do not know	31.4%	11
	answered question	**35**
	skipped question	**2**

NGOs results

Answer Options	Response Percent	Response Count
Yes	75.0%	15
No	25.0%	5
	answered question	**20**
	skipped question	**7**

IGOs results

Answer Options	Response Percent	Response Count
Yes	60.0%	3
No	40.0%	2
If No, please explain		3
	answered question	***5***
	skipped question	***1***

Q.36. Could more be done for example:

- **Providing written guidance on how the regulations work (note there is already a Road map for accession and implementation of ADR)?**
- **Providing training courses for government official and agencies on application of the various legal Instruments**
- **Other (please specify)**

Governments results

Answer Options	Yes	No	Response Count
Providing written guidance on how the regulations work (note there is already a Road map for accession and implementation of ADR)?	18	5	23
Providing training courses for government official and agencies on application of the various legal instruments	23	3	26
Other (please specify)			7
		answered question	**27**
		skipped question	**10**

Governments results

62.9% of the respondents consider that the United Nations regulatory and capacity building exercises are effective in spreading knowledge concerning dangerous goods transport.

Analysis/comments by the secretariat

There is support to deploy additional resources to develop the following activities:

- Effective link between countries and the UNECE Transport Division.
- Providing study visits to the European countries that already applied the agreements to enable the developing countries to learn and see the actual practices from the best examples. The rules should be more promoted in developing countries.
- Providing guidelines concerning application of certain regulations based on positions agreed at the UNECE bodies meetings. In other words e.g. agreed understanding of regulations raising doubts which have been discussed under the point “Interpretation of RID/ADR/ADN” could be gathered in one place.
- It would be useful if the different language versions of the UN Model Regulations could be done earlier.
- Clear instructions on how to acquire relevant publications in existing languages versions.

NGOs results

Answer Options	Yes	No	Response Count
Providing written guidance on how the regulations work (note there is already a guide on a Road map to accession to ADR and implementation)?	12	5	17
Providing training courses for government official and agencies on application of the various legal instruments	13	6	19
		answered question	**20**
		skipped question	**7**

NGOs results

75% of the respondents consider that the United Nations regulatory and capacity building exercises are effective in spreading knowledge concerning dangerous goods transport.

On the question “could more be done [by the United Nations] to spreading knowledge concerning dangerous goods transport”, there was similar support from the respondents to the 2 options provided as an example, i.e: development of written guidance on how the regulations work, and development of courses for government official and agencies on application of the various legal instruments.

Analysis/comments by the secretariat

Notwithstanding the fact that a majority of respondents seem satisfied with the effectiveness of the United Nations regulatory and capacity building exercises as regards spreading knowledge concerning dangerous goods transport, there is support to developing additional resources. The problems faced by the secretariat:

- Absence of clear mandate (institutional (ECE/ECOSOC)) to perform such activities, notably outside the ECE region;
- Lack of resources within the section for additional activities/developing guidance, training materials, publications, leaflets, etc.;
- Lack of time and travel budget for secretariat participation in workshops/seminars.

The secretariat could envisage possible available options (e.g.: e-publications for the website; revisiting information published; developing guidance…, or other suggestions) in the light of resources available.

IGOs results

Answer Options	Yes	No	Response Count
Providing written guidance on how the regulations work (Note: Some material is already available on the UNECE website, such as Guiding Principles related to the UN Recommendations on TDG, GHS Guidance, GHS Presentations, Road Map for accession and implementation of ADR, Catalogue of questions related to ADN training)	4	2	6
Providing training courses for government official and agencies on application of the various legal instruments	5	1	6
Other (please specify)			2
		answered question	**6**
		skipped question	**0**

IGOs results

60% of the respondents (3) consider that the United Nations regulatory and capacity building exercises are effective in spreading knowledge concerning dangerous goods transport.

For one respondent it wasn't clear what was meant by "capacity building exercises" in the question while another indicated that he/she would have preferred to answer this question with "do not know" (same or different respondent?)

The need for additional capacity building activities in developing Member States was raised by one respondent, in order to develop a "safety culture" and to offset the effects of continuous changes in personal in Member States government departments.

On the question "could more be done [by the United Nations] to spreading knowledge concerning dangerous goods transport", there was similar support from the respondents to the 2 options provided as an example, i.e: development of written guidance on how the regulations work, and development of courses for government official and agencies on application of the various legal instruments.

Additional suggestions for improvement included:

- Providing translation of UN model Regulations as well as ADR/RID/ADN in all UN official languages to promote their implementation in non-EU countries and facilitate the use of correct translation and terminology used in other legal instruments prepared by other IGOs.
- Development of on-line training for regulatory bodies, with modules focusing on behavioural and safety culture development and explanations on how the different regulatory bodies function.

The commenter indicated that this is being developed in the IAEA for the transport of Class 7 using the IAEA SSR-6 transport requirements. This work would benefit from multi-agency funding which would then include reference to the Model Regulations and perhaps modal regulations.

Analysis/comments by the secretariat

The UN Model Regulations and the Manual of Tests and Criteria are already published in all UN official languages.

ADR and ADN are agreements administered by UNECE bodies and as such, issued in the three official languages of UNECE (i.e. English, French and Russian).

- ADR: http://www.unece.org/trans/danger/publi/adr/adr2015/15contentse.html
- ADN: http://www.unece.org/trans/danger/publi/adn/adn2015/15files_e.html

RID regulations are prepared by OTIF which issues them in the three official languages (English, French and German), see: http://www.otif.org/

However, it is worth noting that the European Union directive 2008/68/EC requires all EU member States to apply the provisions of ADR, ADN and RID which are international treaties applying to international carriage – also to domestic traffic, and as a consequence these provisions are available not only in English, French and Russian, but in all 24 EU languages, including Spanish which is an official UN language widely used outside Europe, and Portuguese also widely used in several non-European countries. The UNECE secretariat provides links to other linguistic versions through its website, see for instance for ADR: http://www.unece.org/trans/danger/publi/adr/adr_linguistic_e.html

As the working languages of the UNECE are only English, French and Russian, the secretariat cannot request the UN language services to provide translations of ADR in other UN languages, unless extrabudgetary resources are provided by interested parties.

As regards development of training, same comments as for NGOs.

The secretariat suggests also that experienced competent authorities could envisage, through the work programme of bodies such as WP.15, to provide guidance on specific issues related to effective implementation and enforcement of regulations, to the benefit of governments that do not possess such experience.

Q.37 Would your government/ organization or its members be prepared to contribute to a trust fund intended for financing UN extra-budgetary training/capacity building activities in countries that need support for implementation?

Governments results

Answer Options	Response Percent	Response Count
Yes	0.0%	0
No	21.9%	7
I do not know	78.1%	25
	answered question	**32**
	skipped question	**5**

NGOs results **Answer Options**	**Response Percent**	**Response Count**
Yes	23.8%	5
No	76.2%	16
	answered question	**21**
	skipped question	**6**

Governments results

21.9% of the respondents are not prepared to contribute to a trust fund for financing UN extra-budgetary training/capacity building activities in countries that need support for implementation and 78.1% do not know.

NGOs results

23.8% of the respondents would be prepared to contribute to a trust fund for financing UN extra-budgetary training/capacity building activities in countries that need support for implementation.

Analysis/comments by the secretariat

The possibility to raise funds from governments and NGOs for developing training/capacity-building activities appears to be limited.

Q.38 Does your country need support for developing and implementing relevant national regulations for the inland transport of dangerous goods based on the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations and related instruments?

Answer Options	**Response Percent**	**Response Count**
Yes	8.6%	3
No	77.1%	27
I do not know	14.3%	5
If yes, please specify		3
	answered question	**35**
	skipped question	**2**

Results

8.6% of the respondents consider that their country needs support for developing and implementing relevant national regulations for the inland transport of dangerous goods.

Examples of areas where help is requested:

- Implementation of the provisions for the inland, sea and air transport of dangerous goods.
- Training and capacity buildings to government officials and guidance on the installation of the infrastructure for the facilitation of the transport of dangerous goods and verification of compliance.
- Harmonization of provisions applicable to the transport of dangerous goods by different modes of transport.

No UNECE country expressed a need for support. The three countries expressing this need are non-UNECE developing countries. The secretariat has participated in several workshops and events on the subject of transport of dangerous goods and several countries from Africa, Asia and Latin America have expressed the need for support for the development and implementation of national regulations for the inland transport of dangerous goods. Unfortunately, these countries did not reply to the questionnaire.

Q.39. If yes, has your country ever sought support for this specific purpose from donor organizations, such as the World Bank, the Asian Development Bank, the African Development Bank, the Islamic Development Bank, the United Nations Development Account, EU Aid, US Aid and other countries' technical cooperation institutions?

Answer Options	Response Percent	Response Count
Yes	0.0%	0
No	54.5%	6
I do not know	45.5%	5
If yes, please specify		0
answered question		**11**
skipped question		**26**

Q.40. The various documents (United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations, ADR, ADN as well as official meeting documentation) are published in more than one language although the majority of proposals are made in English. Do you consider official translations of the documents satisfactory?

Governments results

Answer Options	Response Percent	Response Count
Yes	82.9%	29
No	8.6%	3
I do not know	8.6%	3
If No please provide some examples or general concerns you have		5
answered question		**35**
skipped question		**2**

NGOs results

Answer Options	Response Percent	Response Count
Yes	91.3%	21
No	8.7%	2
answered question		**23**
skipped question		**4**

IGOs results

Answer Options	Response Percent	Response Count
Yes	33.3%	2
No	33.3%	2
I do not know	33.3%	2
If No, please provide some examples or general concerns you have		2
answered question		**6**
skipped question		**0**

If No please provide some examples or general concerns you have

Governments results

82.9% of the respondents considered official translations of the documents satisfactory.

Among those who provided comments, the following issues were raised:

- Translation of documents should be made available earlier. Checking equivalence in technical language takes time and believes that the regulations would increase in value if delegations would have more time available before the session to verify the proposals
- In the end of the meetings, generally some parts of the English version of the report cannot be translated.
- Some errors in the translation force delegations to guess the meaning of the proposals.

NGOs results

91.3% of the respondents considered official translations of the documents satisfactory.

Among those who provided comments, the following issues were raised:

- Translators could be better trained on dangerous goods jargon (e.g., safety vs. security, material vs. substance, article vs. item, mark vs label, label vs placard, etc
- Late availability of translated versions of official documents for the meetings
- Different translations available for the same texts (e.g. UN official translation vs national translations in some countries)

Analysis/comments by the secretariat

The secretariat thinks that the comment on training translators on dangerous goods jargon might be related to interpretation during meetings rather than translation of documents. It is important to understand that UN translators and interpreters are involved in a very wide variety of subject matters and it is not possible for all of them to be specialists of terminology in all these areas. The UNECE Transport Division cooperates closely with the UN language services, but also those of IMO and ICAO, to try to ensure consistency in terminology used. The question of late availability of translations is indeed of concern and the UNOG Division of Conference Management is well aware of it, but they have to face multiple problems:

– limited translation capacity due to budget constraints that does not allow them to respond to the ever-growing demand (at the whole United Nations level);

– Difficulties to recruit translators who are competent in highly specialized areas of work;

– Irregular demands with high peaks at certain periods of the year.

IGO results

Answers were equally divided among those who considered that the translation of UN documents is satisfactory, those who considered it unsatisfactory and those who answered “I do not know”.

Those who provided comments suggested considering publishing the UN Model Regulations on the Transport of Dangerous Goods, as well as reports from meetings and its addenda in all UN official languages.

Analysis/comments by the secretariat

The UN Model Regulations and the reports of the Committee and its addenda are translated in all UN languages, at the request of ECOSOC. The reports of the Sub-Committee are issued only in the working languages (English and French). Translating these reports in all UN official languages would have significant budget implications for the Department for General Assembly and Conference Management that would have to be approved.

Q.42. Are there obstacles to your government's participation?

Answer Options	Response Percent	Response Count
Yes	53.3%	8
No	46.7%	7
If yes, please specify		9
	answered question	**15**
	skipped question	**22**

Results

8 out of 37 (21.6%) of the respondents to the questionnaire stated that there are obstacles to their government's participation. Travel budgets reductions and lack of financial funds were the main reasons cited.

Q.43. If you wish to make additional comments not covered by the questions, the consultant would be happy to receive them

Comments to be noted or that may need further consideration.

- The ADR developing countries, like ASEAN should get some technical supports from the experts from UNECE on how to set up the structure for this region, similar to UNECE WP.15. So, the members from the ASEAN countries can work and consider the level of implementation of ADR, etc.

- Au-delà des activités purement réglementaires, il nous paraîtrait important de développer au niveau du secrétariat des outils permettant d'obtenir des données préalables aux décisions que prennent les différents groupes de travail. Notamment une base de données sur les accidents impliquant des transports de marchandises dangereuses nous semble à cet effet essentielle.
  Dans le cadre du développement des outils de suivi télématique des transports, la CEE-ONU pourrait examiner la possibilité d'héberger certains serveurs. La mise en place de tels outils nécessite bien entendu un compromis au niveau des Parties contractantes.

- For the transport of radioactive material (dangerous goods of class 7), the input and the recommendations for the safe transport of radioactive material are issued by the IAEA (International Atomic Energy Agency) and discussed and prepared by the TRANSSC members (nominated by their Government), see:
  - http://www-ns.iaea.org/tech-areas/radiation-safety/transport.asp?s=3&l=23
  - http://www-ns.iaea.org/committees/transsc/

- In relation to the 2-year cycle of amendments, we suggest that new or amended text will only be included in the amendments to the UN TDG Recommendations, when the issue is finalized. If more discussion on a subject is needed, and more changes in the text is envisaged, the text should be kept as a working document for further discussion in the next biennium. (in the present situation, text just adopted by the modes has already been amended by the UN Subcommittee of Experts on TDG. This leads to a unnecessary burden and costs).

- Late INF papers on new subjects to the committee can be disruptive to preparations, especially for non-English speakers and those having to travel long distances. In such cases, it can mean that the comments of relevant experts have not been obtained in time.

- In view of the costs involved with the current meeting schedule (time, travel and hotels), could consideration be given to linking two of the four WP.15 sessions per biennium to the two Joint Meetings held in Geneva? And if this was found acceptable, perhaps consideration could then be given to following suit for rail and the Joint Meetings held in Bern?

- With the ICT advancements that have been made could consideration be given to enabling a competent authority or NGO which is not able to send a representative in person to instead take part electronically (as is the case with some informal working groups).

NGOs specific questions:

Q.23 Do you consider the services the UN provides to government and industry is widely recognised by companies and organisations involved in dangerous goods transport

Answer Options	Response Percent	Response Count
Yes	72.7%	16
No	27.3%	6
answered question		**22**
skipped question		**5**

Q.28 Are you aware of any conflicts between the UN transport of dangerous goods system and other regulations not the responsibility of the UNECE e.g. customs, general safety regulations from other agencies e.g. EU, OSHA?

Answer Options	Response Percent	Response Count
Yes	34.8%	8
No	65.2%	15
answered question		**23**
skipped question		**4**

Q.29 If so can you give any examples?

Results

65.2% of the respondents were not aware of any conflicts between the UN transport of dangerous goods system and other regulations not the responsibility of the UNECE (e.g. customs, general safety regulations from other agencies e.g. EU, OSHA)

Among those who replied "yes" (34.8%) the following issues were raised:

- Differences in the classification results:
  - goods classified as hazardous for supply and use but not for transport under different regulatory regimes
  - different classification criteria remaining in some countries for different sectors (e.g. USA criteria for flammability used by OSHA, NFPA and DOT)
- Need for further alignment of GHS and TDG provisions (e.g. terminology)
- Need for further coordination between customs and agencies responsible for security and safety in some countries (e.g. as regards advance information related to the transport of cargo)
- Requirements in the EU Transportable Pressure Equipment Directive (TPED) that impede the global movement of UN pressure receptacles ("Pi marking"
- Potential conflict with the EU over security marking of explosives;
- Inconsistencies between national and international rules
- Effect of decisions of the European Food Safety Agency on current provisions applying to the safety of transport of fishmeal.

Analysis/comments by the secretariat

- Differences in classification results being addressed by the GHS SubCommittee (mention development of a harmonized list of chemicals classified according to GHS criteria)

Several issues raised are in fact being currently addressed. The fact that certain national or regional legislations continue to contain deviations from the provisions of the UN Model Regulations, especially legislation applicable to inland transport, remains obviously a problem for the industry as this may affect in particular the last leg of an international multimodal transport operation. Governments should refrain from introducing deviations or should include in their national rules provisions such as those contained in 1.1.4.2 of RID/ADR/ADN to facilitate such international transport operations.

Q.32 Can your organization provide any relevant data of interest to the evaluation of the economic impact of the UN Recommendations on the Transport of Dangerous Goods or ADR or ADN? (e.g. packaging, tank, vehicle, vessels markets)

Comment:

Several respondents mentioned the willingness to provide the secretariat with more information, documents or links. A follow-up should be done.

IGOs specific questions:

Q.6 Overall, do you consider the UN system works well:

Answer Options	Yes	No	Response Count
For your organisation	6	0	6
For the committees you service	6	0	6
For the regulations you produce	6	0	6
If not, please explain			0
		answered question	**6**
		skipped question	**0**

Note: If your organization is not aware of this system, but it would be interested in knowing more about it or in establishing liaison with the relevant United Nations bodies, please provide the name and contact details of the relevant person/department.

- *One organization requested information and expressed interest in establishing a liaison with relevant United Nations bodies. This answer seems to be linked to lack of awareness of new staff in the organization since liaison with the organization in question has been efficiently established for many years.*

Q.11. Do you think the Model Regulations should be further elaborated to address aspects which are not currently addressed, e.g. mode specific aspects? If your answer is Yes, please explain and indicate for which mode(s) of transport

Answer Options	Response Percent	Response Count
Yes	33.3%	2
No	66.7%	4
If your answer is Yes, please explain and indicate for which mode(s) of transport		1
	answered question	**6**
	skipped question	**0**

Results

66.7% of the respondents did not see the need for the Model Regulations to address aspects which are not currently addressed. One respondent (33.3%) however, considered that a "model training curricula" should be included in the Model Regulations to facilitate standardization of training curricula developed by competent authorities.

Q.14 The timing of meetings held in Geneva, particularly those under the auspices of ECOSOC do not necessarily align with dates of your organization meetings. Is this an inconvenience?

Answer Options	Response Percent	Response Count
Yes	33.3%	2
No	66.7%	4
Do you consider that some attempt at closer alignment should be made? If so how?		2
	answered question	**6**
	skipped question	**0**

Do you consider that some attempt at closer alignment should be made? If so how?

Results

66.7 % of the respondents (4) consider that the current timing of meetings is convenient. 2 respondents (33.3%) considered it to be inconvenient, and suggested as measures for a closer alignment: on-line calendar and shorter and/or less frequent meetings

Analysis/comments by the secretariat

The timing of meetings is indeed a problem. The secretariats of UNECE, IAEA, IMO and ICAO do their best to cooperate to avoid overlapping, but they have to take account also of the overall schedule of meetings and availability of rooms and interpretation services within their own organization, which makes the exercise particularly difficult. The IAEA has developed an online calendar of meetings for use by organizations involved in the "Interagency Advisory Group" (IAEA, UNECE, IMO and ICAO) which is useful, but sometimes the information cannot be provided in due time because it is depending on the final decision of the respective conference services of each organization and "tentative" dates are not always reliable.

Regarding reductions, the shortening of the duration of meetings is envisaged whenever possible, but so far only for sessions of WP.15 or of the ADN Safety Committee and in the light of the number of pre-session documents submitted by the deadline. The option of reducing the number of sessions of WP.15 and of the RID/ADR/ADN Joint Meeting has also been proposed by the secretariat to these bodies but it has been rejected.

Q.16 Does the UNECE secretariat provide you with relevant support for facilitating implementation of the UN Recommendations by your organization and cooperation between your organization and UN or UNECE intergovernmental bodies?

Answer Options	Response Percent	Response Count
Yes	100.0%	6
No	0.0%	0
If not, could you please identify weaknesses? Please supply details		1
answered question		**6**
skipped question		**0**

Q.21. If any person wishes to make additional comments they will be gratefully received

- The IAEA has conducted a survey of available accident data for Class 7 and found very few records. The purpose was to provide evidence that the current performance criteria for transport package designs is appropriate as Type B packages are designed to retain their contents under transport accident conditions. What will be needed is a global survey with member States requested to collect data on accidents which is designed not to be too onerous; eg did the accident involve a fire, did the packaged dangerous goods leak, what class of DG was involved, did the consignment meet all regulatory requirements, etc.
- Now that the UN has completed a large body of work on restructuring and developing packing instructions, the issue of lengthening the periodicity should be revisited. I believe a strong argument could be made to have a major revision every four or six years with either a minor revision every two years OR keep the longer cycle but have

a mechanism to allow for an urgent, safety based need to implement such amendments.

Analysis/comments by the secretariat

For the first comment, the development of such an accident database is under discussion in relation to the activities of the Joint Meeting.

For the second comment, this is related to the question of working cycles (Q.29) and the conclusion of the vast majority of stakeholders (governments, IGOs and NGOs) is that the current 2-year periodicity of amendments is satisfactory.

Annex 2

Draft update (2012) of the paper "Review of implementation of OSCE commitments in the economic and environmental dimensions – Transport of Dangerous Goods" originally prepared by the UNECE secretariat in the context of OSCE reporting (16th meeting of the OSCE Economic and Environmental forum, Prague, 19-21 May 2008)

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For more information on UNECE activities in the area of transport of dangerous goods
www.unece.org/trans/danger/danger.htm

Foreword

[to be completed]

Conclusions

[to be completed]

Introduction

1. Dangerous goods are often seen as a very special and mysterious category of goods, to which the public is rarely exposed. The term itself inspires fear, and any accident or even minor incident involving such goods immediately entails reactions from the media and public opinion. In fact, dangerous goods are produced and transported in very large quantities and they cover an extensive range of products which present risks for the population in general, property and the environment. These risks are present at the stage of extraction, production, transport, and use at the workplace and when handled by consumers. Transport is a delicate part of the lifecycle of such goods, since it, or part of it, takes place in areas where people and the environment are particularly exposed.

2. A number of catastrophic accidents in the past have prompted Governments to develop regulations intended to eliminate, or to minimize to the extent possible, such risks. Nevertheless, due to the economic importance of dangerous goods and to the importance of international transport, it has been necessary to discuss these regulations internationally in order to ensure a high level of safety acceptable to all countries and authorities responsible for different modes of transport while making international and multimodal transport possible through the harmonization of transport conditions.

3. Realizing that the Governments of countries most interested in international transport of dangerous goods were separately developing regulations intended to ensure the safe transport of dangerous goods by various modes and recognizing that the incompatibilities between these regulations would sooner or later constitute important technical barriers to trade, the United Nations Economic and Social Council (ECOSOC) decided to create in 1953 a Committee of Experts on the Transport of Dangerous Goods. The mandate of the Committee was to elaborate recommendations addressed to all Governments and international organizations concerned with the safe transport of dangerous goods that would allow the uniform development of national and international regulations governing the various modes of transport.

4. These recommendations are now contained in the "UN Recommendations on the Transport of Dangerous Goods, Model Regulations", also known as the "Orange Book". They contain all necessary provisions concerning the classification and identification of dangerous goods; their packing conditions, including standards for packaging and tank construction; labelling, marking and placarding of packages and transport equipment; and transport documentation. Although they apply to all modes of transport, they nevertheless remain flexible enough to accommodate any special additional requirements that have to be met by specific modes of transport, or at national or regional level.

5. The main international organizations cooperating with the Committee for effective implementation of these recommendations through international legal instruments are: the International Maritime Organization (IMO); the International Civil Aviation Organization (ICAO); and, for inland transport at regional level, the United Nations Economic Commission for Europe (UNECE) and the Intergovernmental Organization for International Transport by Rail (OTIF).

6. These main international instruments are:

(a) The International Maritime Dangerous Goods Code (IMDG Code);

(b) The ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TI);

(c) The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR);

(d) The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN);

(e) Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) (Appendix C of the Convention concerning international carriage by rail (COTIF)).

More detailed information is given in Part VI of this document (see also annex 1).

Dangerous goods

7. In the now well-recognized and implemented transport of dangerous goods regulatory system, dangerous goods are grouped in nine main classes, some of which are broken down into divisions. Some dangerous goods possess hazardous properties belonging to several classes.

8. Table 1 shows the variety of commercial or industrial products which are concerned by transport of dangerous goods regulations.

Table 1: Hazard classes/divisions

Class	Danger	Examples
Class 1	Explosives	- All types of military ammunitions, bombs, etc. - Industrial explosives (dynamite etc.) - Fireworks
Class 2:	Gases compressed, liquefied, or refrigerated	
- Division 2.1	Flammable gases	- Propane, Liquid Petroleum Gases - Cigarette lighters
- Division 2.2	Non-flammable, non-toxic gases	- Air, oxygen, nitrogen, helium
- Division 2.3	Toxic gases	- Ammonia, chlorine
Class 3:	Flammable liquids	- Petroleum products - Paints - Alcoholic beverages
Class 4:		
- Division 4.1	Flammable solids	- Sulphur - Matches
- Division 4.2	Substances liable to spontaneous combustion	- Phosphorus - Fish meal, seed cake
- Division 4.3	Substances, which in contact with water, emit flammable gases	- Metal powders - Sodium
Class 5:		
- Division 5.1	Oxidizing substances	- Ammonium nitrate fertilizers - Hydrogen peroxide - Bleaching agents
- Division 5.2	Organic peroxides	- Dibenzoyl peroxide - Catalysts for polyester resin
Class 6:		
- Division 6.1	Toxic substances	- Sodium cyanide - Pesticides
- Division 6.2	Infectious substances	- Cultures of bacteria viruses etc. - Medical diagnostic specimens - Medical wastes
Class 7:	Radioactive material	- Nuclear fuel - Uranium hexafluoride - Medical radioisotopes
Class 8:	Corrosive substances	- Sulphuric acid, caustic soda - Car batteries
Class 9:	Miscellaneous dangerous substances and articles	- Environmentally hazardous substances - Mobile phone/computer batteries

Source: UNECE secretariat.

9. It is rather difficult to provide figures representing the quantities transported at worldwide level since statistics are not collected on a systematic basis, class by class, in all countries, and methodologies differ. Nevertheless, some statistics have been published by the Government of the United States of America, and the European Commission has also started collecting statistics for inland transport..

United States of America[1]

10. Hazardous materials[2] are essential to the United States and global economy. They include fossil fuels used in cars, trucks, power plants, and heating and cooling homes and offices, as well as petrochemical feedstock. And they are also used for farming and medical applications and in manufacturing, mining, and other industrial processes. Hazardous materials shipments move by truck, train, vessel, and airplane in quantities ranging from several ounces to thousands of tons.

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1 *For the source of information, see acknowledgements on the first page of this document.*

2 *The term "hazardous materials" is used in the United States to designate dangerous goods.*

11. The Economic Census conducted by the US Census Bureau every five years, is the major source of facts about the structure and functioning of the Nation's economy. Transport of hazardous materials is one of the activities covered by the Commodity Flow Survey (CFS) as part of the Economic Census. The CFS was conducted in 1993, 1997, 2002, and most recently in 2007.

12. Hazardous materials shipment data collected in the CFS, allow for the identification of hazardous material flows by mode over the United States transportation network; provide information that is critical for conducting hazardous materials transportation safety risk analyses and security assessments and represent national benchmarks of the type, quantity, and distance of hazardous materials transported by mode in the United States.

13. Data on the flows of hazardous materials in the rail and water modes are collected in other data sets, but are not necessarily publicly available and do not provide a complete nationwide assessment of hazardous materials transportation. CFS hazardous materials data provide national estimates of hazardous materials transportation flows across all modes and combinations of modes.

Evolution of hazardous materials shipments: 1997 - 2002

14. In 1998, the Pipeline and Hazardous Materials Safety Administration (PHMSA) estimated the number of hazardous materials shipments in the United States at more than 800,000 per day with approximately 500,000 daily shipments involving chemical and allied products (SIC 28); about 300,000 involving petroleum products; and at least 10,000 other shipments involving waste hazardous materials, medical wastes and various other hazardous materials. Shipments are defined as equivalent to deliveries, and in most instances may be distinguished from the number of movements, trip segments, or other measures. The estimated number of *movements* associated with these shipments exceeded 1.2 million per day (Table 2).

Table 2: Hazardous materials shipments movements and tons[3] (United States) (1997)

Product group	Daily movements [4]	Daily shipments	Annual tons shipped	Annual tons moved
Chemicals & Allied	500,000	900,000	0.53 billion	0.85 billion
Petroleum products	300,000	300,000	2.60 billion	3.03 billion
Other	10,000	10, 000	0.01 billion	0.02 billion
TOTALS	**> 800,000**	**> 1,200,000**	**>3.1 billion**	**> 3.9 billion**

Source: United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Department wide evaluation of hazardous materials shipments, March 2000.

15. While only about 43% of all hazardous materials *tonnage* was transported by truck, approximately 94% of the individual *shipments* were carried by truck. The air mode, while almost negligible in terms of tonnage, also had a share of individual shipments that greatly exceeded its percentage of tonnage carried: less than 1% of all hazardous materials tonnage but about 5% of all hazardous materials shipments. In contrast, enormous amounts of hazardous materials tonnage were carried by rail, pipeline and water modes, and in some markets they were the only modes that transport hazardous materials products. Yet, the total number of shipments for all three of these bulk commodity modes was less than 1% (Table 3).

[3] *Based on 1993 Bureau of Census Commodity Flow Survey (CFS) shipment distribution data for standard transportation commodity classification (STCC) 28 ; 1995 CMA tonnage figures (SIC 28); 1995 EPA hazardous waste shipment and manifest data; 1996 DOE Energy Information Administration data; 1996 Waterborne Commerce Statistics; and 1997 BTS Air Carrier Traffic Statistics.*

[4] *Movements correspond to the movement of vehicles, rail cars, etc. that carry shipments, and in some cases they are equivalent to shipments.*

Table 3: Hazardous materials shipments, movements and tons (short tons) by mode (United States) (1997)

	Shipments	%	Movements	%	Tons Shipped	%	Tons Moved	%
			CHEMICALS & ALLIED PRODUCTS					
Truck	445,218	90.3%	830,761	89.36%	808,662	55.52%	894,452	37.30%
Rail	3,723	0.8%	11,169	1.20%	335,070	23.00%	1,005,210	41.92%
Pipeline	34	0.0%	34	0.00%	127,500	8.75%	127,500	5.32%
Water	82	0.0%	164	0.02%	181,279	12.45%	362,558	15.12%
Air	43,750	8.9%	87,500	9.41%	4,049	0.28%	8,098	0.34%
SUBTOTAL -- a	492,807	100%	929,628	100%	1,456,560	100%	2,397,818	100%
			PETROLEUM PRODUCTS					
Truck	313,689	99.5%	313,689	99.15%	2,857,470	40.04%	2,857,470	34.39%
Rail	448	0.1%	1,344	0.42%	40,320	0.57%	120,960	1.46%
Pipeline	839	0.3%	839	0.27%	3,146,250	44.09%	3,146,250	37.87%
Water	253	0.1%	506	0.16%	1,091,646	15.30%	2,183,292	26.28%
Air	-	0.0%	-	0.00%	-	0.00%	-	0.00%
SUBTOTAL -- b	315,229	100%	316,378	100%	7,135,686	100%	8,307,972	100%
			OTHER HAZMAT					
Truck -- c	10,000	98.6%	10,000	95.9%	43,048	92.43%	43,048	80.27%
Rail	144	1.4%	432	4.1%	3,526	7.57%	10,578	19.73%
Pipeline	-	0.0%	-	0.0%	-	0.00%	-	0.00%
Water	-	0.0%	-	0.0%	-	0.00%	-	0.00%
Air	-	0.0%	-	0.0%	-	0.00%	-	0.00%
SUBTOTAL	10,144	100%	10,432	100%	46,574	100%	53,626	100%
			TOTAL HAZMAT					
Truck	768,907	93.98%	1,154,450	91.88%	3,709,180	42.94%	3,794,970	35.27%
Rail	4,315	0.53%	12,945	1.03%	378,916	4.39%	1,136,748	10.57%
Pipeline	873	0.11%	873	0.07%	3,273,750	37.90%	3,273,750	30.43%
Water	335	0.04%	670	0.05%	1,272,925	14.73%	2,545,850	23.66%
Air	43,750	5.35%	87,500	6.96%	4,049	0.05%	8,098	0.08%
DAILY TOTALS -- d,e	818,180	100%	1,256,438	100%	8,638,820	100%	10,759,416	100%
ANNUAL TOTALS -- f	298,635,700		458,599,870		3,153,169,300		3,927,186,840	

Key:

" - " is negligible and, in some instances, might actually be zero.

-- a Daily shipment subtotal is rounded to 500,000 in Table 2 and in text.

-- b Daily shipment subtotal is rounded to 300,000 in Table 2 and in text.

-- c This figure is at least 10,000 and could be as high as 80,000 or more daily shipments. Waste hazardous materials, medical waste, various industrial products and other materials comprise this category. Virtually all shipments in the "Other" hazardous materials category are transported by truck.

-- d Daily *shipment* TOTAL rounded to > 800,000 in Table 2 and text.

-- e Daily *movement* TOTAL rounded to > 1,200,000 in Table 2 and text.

-- f Annual tons *shipped* and *moved* are rounded to > 3.1 billion and > 3.9 billion in Table 2 and text.

Source: Hazardous Materials Shipments (prepared by the Office of Hazardous Materials Safety Research and Special Programs Administration, United States Department of Transportation, October 1998).

Table 4: Domestic bulk and packaged shipments and movements by mode of transportation

Mode	Daily shipments	Percent of total	Daily movements	Percent of total	Daily tons moved	Percent of tons moved
Highway	768,907	94	1,154,450	92	3,794,970	50,69
Air	43,750	5	87,500	7	8,098	0,11
Rail	4,315	<1	12,945	1	1,136,748	15,19
Water	335	<1	670	<1	2,545,850	34,01
Total	**817,307**		**1,245,565**		**7,485,666**	

Source: RSPA Hazardous Materials Shipments, October 1998.

Note: Table 4 does not include pipeline data, which account for less than 1 % of total daily shipments and movements although a greater share of tons and ton-miles. Mode-to-mode comparisons of shipments and movements are not appropriate. For example,

the table reports highway shipments and water shipments equally, but a single vessel may contain upwards of 3000 forty-foot truckloads.

16. Statistics showing the evolution between 1997 and 2002 were published in the 2002 Commodity Flow Survey. They show the hazardous material shipment characteristics by mode of transport (Table 5), by hazard class (Table 6) and a comparison between shipments of hazardous material versus non-hazardous material (Table 7).

Table 5: Hazardous material shipment characteristics by mode of transport in the United States (2002 and 1997)

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not add up]

Mode of transpor	Value			Tons			Ton-miles			Average miles per shipment		
	2002 (million $)	1997 (million $)	Percent change	2002 (thousands)	1997 (thousands)	Percent change	2002 (millions)	1997 (millions)	Percent change	2002	1997	Percent change
All modes	**660'181**	**526'679**	**25.3**	**2'191'519**	**1'783'620**	**22.9**	**326'727**	**294'823**	**10.8**	**136**	**110**	**23.7**
Single modes	644'489	510'417	26.3	2'158'533	1'752'056	23.2	311'897	273'865	13.9	105	89	17.1
Truck (1)	419'630	325'166	29.1	1'159'514	959'199	20.9	110'163	82'211	34.0	86	70	23.7
For-hire truck	189'803	144'469	31.4	449'503	369'991	21.5	65'112	49'238	32.2	285	251	13.4
Private truck	226'660	177'144	28.0	702'186	577'003	21.7	44'087	31'948	38.0	38	35	8.0
Rail	31'339	34'937	–10.3	109'369	102'508	6.7	72'087	78'619	–8.3	695	837	–17.0
Water	46'856	33'071	41.7	228'197	167'716	36.1	70'649	63'089	12.0	S	S	S
Air (includes truck and air)	1'643	8'591	–80.9	64	74	–12.5	85	100	–15.4	2'080	1'455	42.9
Pipeline (2)	145'021	108'653	33.5	661'390	522'560	26.6	S	S	S	S	S	S
Multiple modes	9'631	7'203	33.7	18'745	12'266	52.8	12'488	S	S	849	652	30.2
Parcel, U.S.P.S. or courier	4'268	3'184	34.0	245	202	21.2	119	93	27.3	837	697	20.1
Other multiple modes	5'363	4'019	33.4	18'500	12'064	53.4	12'369	S	S	1'371	168	718.4
Other and unknown modes	6'061	9'058	–33.1	14'241	19'298	–26.2	2'342	1'885	24.2	57	33	73.2

Key:

"–" : Represents an estimate equal to zero or less than 1 unit of measure.

"S" : Estimate does not meet publication standards because of high sampling variability or poor response quality.

(1) "Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.

(2) Estimates for pipeline exclude shipments of crude petroleum.

Source: Bureau of Transportation Statistics (USDOT) and U.S. Census Bureau, 2002 Commodity Flow Survey, Hazmat Data, December 2004.

Table 6: Hazardous material shipment characteristics by hazard class in the United States (2002 and 1997)

[Estimates are based on data from the 2002 and 1997 Commodity Flow Surveys. Because of rounding, estimates may not add up]

Hazard class and description	Value			Tons			Ton-miles			Average miles per shipment		
	2002 (million $)	1997 (million $)	Percent change	2002 (thousands)	1997 (thousands)	Percent change	2002 (millions)	1997 (millions)	Percent change	2002	1997	Percent change
Total	660'181	526'679	25.3	2'191'519	1'783'620	22.9	326'727	294'823	10.8	136	110	23.7
Class 1, Explosives	7'901	5'584	41.5	5'000	1'718	191.0	1'568	S	S	651	771	–15.6
Class 2, Gases	73'932	47'288	56.3	213'358	137'138	55.6	37'262	26'002	43.3	95	60	58.7
Class 3, Flammable liquids	490'238	386'994	26.7	1'788'986	1'450'591	23.3	218'574	184'824	18.3	106	69	54.3
Class 4, Flammable solids	6'566	4'238	54.9	11'300	14'832	–23.8	4'391	9'735	–54.9	158	660	–76.0
Class 5, Oxidizers and organic peroxides	5'471	4'485	22.0	12'670	9'239	37.1	4'221	4'471	–5.6	407	193	111.2
Class 6, Toxic (poison)	8'275	10'085	–18.0	8'459	6'366	32.9	4'254	2'824	50.6	626	403	55.2
Class 7, Radioactive materials	5'850	2'722	114.9	57	87	–35.1	44	48	–8.8	S	445	S
Class 8, Corrosive materials	38'324	41'336	–7.3	90'671	98'331	–7.8	36'260	42'918	–15.5	301	205	46.7
Class 9, Miscellaneous dangerous goods	23'625	23'946	–1.3	61'018	65'317	–6.6	20'153	22'727	–11.3	368	323	13.9

Key:

"–": Represents an estimate equal to zero or less than 1 unit of measure.

"S": Estimate does not meet publication standards because of high sampling variability or poor response quality.

Source: Bureau of Transportation Statistics (USDOT) and U.S. Census Bureau, *2002 Commodity Flow Survey*, Hazmat Data, December 2004.

Table 7: Hazardous versus non-hazardous material shipment characteristics by mode of transport in the United States (2002)

[Estimates are based on data from the 2002 Commodity Flow Survey. Because of rounding, estimates may not add up]

Mode of transport	Tons					Ton-miles				
		Hazardous		Non-hazardous			Hazardous		Non-hazardous	
	Total (thousands)	2002 (thousands)	Percent	2002 (thousands)	Percent	Total (millions)	2002 (millions)	Percent	2002 (millions)	Percent
All modes	**11'667'919**	**2'191'519**	**18.8**	**9'476'400**	**81.2**	**3'137'898**	**326'727**	**10.4**	**2'811'171**	**89.6**
Single modes	**11'086'660**	**2'158'533**	**19.5**	**8'928'127**	**80.5**	**2'867'938**	**311'897**	**10.9**	**2'556'041**	**89.1**
Truck (1)	7'842'836	1'159'514	14.8	6'683'322	85.2	1'255'908	110'163	8.8	1'145'745	91.2
For-hire truck	3'657'333	449'503	12.3	3'207'830	87.7	959'610	65'112	6.8	894'498	93.2
Private truck	4'149'658	702'186	16.9	3'447'472	83.1	291'114	44'087	15.1	247'027	84.9
Rail	1'873'884	109'369	5.8	1'764'516	94.2	1'261'612	72'087	5.7	1'189'525	94.3
Water	681'227	228'197	33.5	453'030	66.5	282'659	70'649	25.0	212'011	75.0
Air (includes truck and air)	3'760	64	1.7	3'696	98.3	5'835	85	1.5	5'751	98.5
Pipeline (2)	684'953	661'390	96.6	23'563	3.4	S	S	S	S	S
Multiple modes	**216'686**	**18'745**	**8.7**	**197'941**	**91.3**	**225'715**	**12'488**	**5.5**	**213'228**	**94.5**
Parcel, U.S.P.S. or courier	25'513	245	1.0	25'268	99.0	19'004	119	0.6	18'885	99.4
Other multiple modes	191'173	18'500	9.7	172'673	90.3	206'712	12'369	6.0	194'343	94.0
Other and unknown modes	364'573	14'241	3.9	350'332	96.1	44'245	2'342	5.3	41'903	94.7

Key:

"—" : Represents an estimate equal to zero or less than 1 unit of measure.
"S": Estimate does not meet publication standards because of high sampling variability or poor response quality.

(1) "Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.
(2) Estimates for pipeline exclude shipments of crude petroleum.

Source: Bureau of Transportation Statistics (USDOT) and U.S. Census Bureau, *2002 Commodity Flow Survey*, Hazmat Data, December 2004.

Evolution of hazardous materials shipments by dangerous goods class and mode (2002 – 2007)

17. According to the data in the 2007 CFS, the estimated 2.2 billion tons of hazardous materials carried by all modes of transportation is about the same as the estimated tonnage from the prior CFS in 2002. However, the value of those shipments more than doubled, from $660 billion to $1,448 billion, driven primarily by the increase in the price of refined petroleum products and other basic commodities.

18. Slightly more than half (54 percent) of hazardous material tonnage (32.2 percent of all hazardous materials ton-miles) is moved via trucks over the Nation's highways. Pipeline is the next most used carrier of hazardous materials, handling 28 percent of the tonnage, while the other modes each accounted for 7 percent or less of total hazardous material tonnage (28.5 percent of all hazardous materials ton-miles to rail, and 11.5 percent to water, with other modes handling the remainder).

19. Trucks transported the largest volume of hazardous materials through the national transportation system, moving 1.2 out of 2.2 billion tons of hazardous materials. These shipments accounted for 104 billion highway ton-miles, out of the total 323 billion ton-miles moved by all modes. CFS data for the highway mode is particularly important because it represents the sole source of national data for hazardous materials transported by truck.

Table 8: Hazardous material shipments by mode in 2007

Mode of transportation	Value (million $)	Tons (thousands)	Ton-miles (millions)	Average miles per shipment
All modes	**1,448,218**	**2,231,133**	**323,457**	**96**
Truck	837,074	1,202,825	103,997	59
For-hire truck	358,792	495,077	63,288	214
Private truck	478,282	707,748	40,709	32
Rail	69,213	129,743	92,169	578
Water	69,186	149,794	37,064	383
Air (includes truck and air)	1,735	S	S	1,095
Pipeline	393,408	628,905	S	S
Multiple modes	71,069	111,022	42,886	834
Parcel, U.S.P.S. or courier	7,675	236	151	836
Other multiple modes	27,739	56,750	17,297	233
Other and unknown modes	6,534	8,489	1,466	58

Key:

S = Estimate does not meet publication standards because of high sampling variability or poor response quality.

Source: Research and Innovative Technology Administration and U.S. Census Bureau, *2007 Commodity Flow Survey, Hazardous Materials*, Table 1a, available at http://www.bts.gov/publications/commodity_flow_survey/.

20. Overall, the truck mode moved 53.9 percent of hazardous materials tonnage in 2007. Private trucking carried 31.7 percent, and for-hire trucking carried 22.2 percent. Hazardous materials shipments transported solely by truck represented 50 percent or more of the tonnage in every hazard class except Class 6 (Toxic materials and infectious substances), which had roughly half of its tonnage transported by rail. (See Table 1 for a list of classes.)

21. The remaining hazardous materials tonnage recorded in the 2007 CFS was transported by pipeline—28.2 percent; water—6.7 percent; rail—5.8 percent; and multiple, other, and unknown modes—5.4 percent (See Table 9).

Table 9: Hazardous material shipment tonnage shares by mode in 2007

Mode of transportation	Percentage of Tons
All modes	**100.0**
Truck	53.9
Pipeline	28.2
Water	6.7
Rail	5.8
Multiple modes	5.0
Other and unknown modes	0.4

NOTES: *The total includes shipments via the air mode. However, an individual estimate for the air mode cannot be published because it does not meet the standard for release due to variability.*

SOURCE: Research and Innovative Technology Administration and U.S. Census Bureau, *2007 Commodity Flow Survey, Hazardous Materials*, Table 1c, available at http://www.bts.gov/publications/commodity_flow_survey/.

22. Flammable liquids (Class 3) represented the bulk of hazardous materials transported. Of the 2.2 billion tons of hazardous materials shipped, 1.8 billion tons were flammable liquids, primarily consisting of refined petroleum products. Shipments of Class 3 materials accounted for 182 billion (56.1 percent) of the total 323 billion hazardous materials ton-miles generated in 2007. Shipments of Class 2 (Gases) comprised 251 million

tons, and their transport amounted to 55 billion ton-miles. Corrosive materials (Class 8) shipments totaled 114 million tons, generating 44 billion ton-miles. Table 8 shows shipments by hazardous material class.

Table 10: Hazardous materials shipment characteristics by hazard class in 2007

Hazard class and description	Value (million $)	Tons (thousands)	Ton-miles (millions)	Average miles per shipment
Total	**1,448,218**	**2,231,133**	**323,457**	**96**
Class 1, Explosives	11,754	3,047	911	738
Class 2, Gases	131,810	250,506	55,260	51
Class 3, Flammable liquids	1,170,455	1,752,814	181,615	91
Class 4, Flammable solids	4,067	20,408	5,547	309
Class 5, Oxidizers and organic peroxides	6,695	14,959	7,024	361
Class 6, Toxic (poison)	21,198	11,270	5,667	467
Class 7, Radioactive materials	20,633	515	37	S
Class 8, Corrosive materials	51,475	114,441	44,395	208
Class 9, Miscellaneous dangerous goods	30,131	63,173	23,002	484

Key:

S = Estimate does not meet publication standards because of high sampling variability or poor response quality.

Source: Research and Innovative Technology Administration and U.S. Census Bureau, *2007 Commodity Flow Survey, Hazardous Materials*, Table 2a, available at http://www.bts.gov/publications/commodity_flow_survey/.

23. Some hazardous materials are additionally designated as "Toxic by Inhalation" (TIH), which includes gases and volatile liquids that are toxic when inhaled and pose additional risk when transported. In 2007, shippers sent 27 million tons of TIH materials that accounted for 10 billion ton-miles.

24. Most hazardous materials are designated in the Code of Federal Regulations (CFR) as requiring shipment in Packing Groups I, II, or III. Packing Group I requires, by regulation, the most rigorous packaging for transport. In 2007, shippers sent 586 million tons of Packing Group I materials, generating 72 billion ton-miles.

Hazardous materials shippers

25. Industry subsectors and groups under the North American Industry Classification System (NAICS) that are major hazardous materials shippers include the Petroleum and Coal Products Manufacturing industry (NAICS 324), which transported 56.0 percent of its hazardous materials tonnage via pipeline and 21.3 percent by truck, and the Petroleum and Petroleum Products Merchant Wholesalers industry (NAICS 4247), which transported 90.5 percent of its hazardous materials tonnage by truck. The Chemical Manufacturing industry (NAICS 325) moved 39.5 percent of its hazardous materials tonnage by truck, 25.3 percent by rail, and 19.7 percent via pipeline (see Table 11).

Table 11: Hazardous materials shipment characteristics for selected NAICS codes in 2007

NAICS Code	NAICS Code Description	Tons			Ton-Miles		
		Total (thousands)	Hazardous (thousands)	Hazardous share (percent)	Total (thousands)	Hazardous (thousands)	Hazardous share (percent)
	Total	**12,543,425**	**2,231,133**	**17.8**	**3,344,658**	**323,457**	**9.7**
324	Petroleum and coal products manufacturing	1,415,099	930,698	65.8	207,148	128,090	61.8
325	Chemical manufacturing	594,262	248,941	41.9	279,917	101,050	36.1
4246	Chemical and allied products merchant wholesalers	119,971	64,533	53.8	31,344	12,813	40.9
4247	Petroleum and petroleum products merchant wholesalers	846,636	803,894	95.0	52,112	39,482	75.8
45431	Fuel dealers	48,438	47,817	98.7	1,784	1,761	98.7
551114	Corporate, subsidiary, and regional managing offices	250,262	72,893	29.1	80,199	17,764	22.1
--	All Other Surveyed Industries	9,268,757	62,357	0.7	2,692,154	22,497	0.8

Note: NAICS codes shown had the highest estimated weight without considering the sampling variability.

Source: Research and Innovative Technology Administration and U.S. Census Bureau, *2007 Commodity Flow Survey, Hazardous Materials*, Table 17; and 2007 Commodity Flow Survey, U.S. Report, table 10, available at http://www.bts.gov/publications/commodity_flow_survey/.

Other hazardous materials shipment characteristics

26. The movement of hazardous materials through the U.S. transportation system represents almost 18 percent of total tonnage for all freight shipments as measured by the CFS. Hazardous materials ton-mileage represents about 10 percent of the CFS national total (see Table 12).

Table 12: Hazardous versus non-hazardous material shipment characteristics by mode of transport (2007)

[Estimates are based on data from the 2007 Commodity Flow Survey. Because of rounding, estimates may not be additive]

Mode of transportation	Tons					Ton-miles[1]				
		Hazardous		Nonhazardous			Hazardous		Nonhazardous	
	Total (thousands)	2007 (thousands)	Percent	2007 (thousands)	Percent	Total (millions)	2007 (millions)	Percent	2007 (millions)	Percent
Total	**12,543,425**	**2,231,133**	**17.8**	**10,312,292**	**82.2**	**3,344,658**	**323,457**	**9.7**	**3,021,201**	**90.3**
Single modes	**11,698,128**	**2,111,622**	**18.1**	**9,586,507**	**81.9**	**2,894,251**	**279,105**	**9.6**	**2,615,146**	**90.4**
Truck[2]	8,778,713	1,202,825	13.7	7,575,888	86.3	1,342,104	103,997	7.7	1,238,107	92.3
For-hire truck	4,075,136	495,077	12.1	3,580,060	87.9	1,055,646	63,288	6.0	992,359	94.0
Private truck	4,703,576	707,748	15.0	3,995,828	85.0	286,457	40,709	14.2	245,748	85.8
Rail	1,861,307	129,743	7.0	1,731,564	93.0	1,344,040	92,169	6.9	1,251,871	93.1
Water	403,639	149,794	37.1	253,845	62.9	157,314	37,064	23.6	120,251	76.4
Air (includes truck and air)	3,611	(S)	(S)	3,256	90.2	4,510	(S)	(S)	4,334	96.1
Pipeline[3]	650,859	628,905	96.6	21,954	3.4	(S)	(S)	(S)	(S)	(S)
Multiple modes	**573,729**	**111,022**	**19.4**	**462,708**	**80.6**	**416,642**	**42,886**	**10.3**	**373,756**	**89.7**
Parcel, U.S. Postal Service or courier	33,900	236	0.7	33,664	99.3	27,961	151	0.5	27,810	99.5
Truck and rail	225,589	11,706	5.2	213,883	94.8	196,772	10,120	5.1	186,652	94.9
Truck and water	145,521	36,588	25.1	108,933	74.9	98,396	12,380	12.6	86,016	87.4
Rail and water	54,878	5,742	10.5	49,136	89.5	47,111	2,937	6.2	44,174	93.8
Other multiple modes	113,841	56,750	49.8	57,092	50.2	46,402	17,297	37.3	29,105	62.7
Other and unknown modes	**271,567**	**8,489**	**3.1**	**263,078**	**96.9**	**33,764**	**1,466**	**4.3**	**32,298**	**95.7**

Key:

(S) Estimate did not meet publication standards.

1 Ton-miles estimates are based on estimated distances traveled along a modeled transportation network. See "Mileage Calculations" section for additional information.

2 "Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.

3 Estimates for pipeline exclude shipments of crude petroleum (SCTG 16).

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at <www.census.gov/cfs>.

Source: Bureau of Transport Statistics (USDOT) and U.S Census Bureau, 2007 Commodity Flow Survey, Hazmat Data, July 2010

27. The majority of hazardous materials transportation originates in a limited number of States. There are 10 States responsible for initiating the transportation of approximately two-thirds of both the tonnage and ton-miles associated with hazardous materials transportation across our Nation. Texas was the State that had the greatest amount of hazardous materials shipments by tonnage as both an origin and destination in the 2007 and 2002 CFS, due in large part to the concentration of the petro-chemical industry located there. Louisiana and California represented the next two States with the greatest amount of hazardous materials shipments by tonnage.

Comparisons with prior surveys

28. The estimated total of 2.23 billion tons of hazardous materials shipments reported in the 2007 CFS is not significantly different from the estimated 2.19 billion tons reported in the 2002 CFS (see Table 13). However, the estimated value of hazardous materials shipped more than doubled from $660 billion in 2002 to $1,448 billion in 2007, principally due to an increase in the price of refined petroleum products and basic commodities classified as hazardous materials.

Table 13: Hazardous material shipment characteristics by hazard class for the United States: 2007 and 2002

[Estimates are based on data from the 2007 and 2002 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

Hazard class and description	Value			Tons			Ton-miles[1]			Average miles per shipment		
	2007 (million dollars)	2002 (million dollars)	Percentage change	2007 (thousands)	2002 (thousands)	Percentage change	2007 (millions)	2002 (millions)	Percentage change	2007	2002	Percentage change
Total	**1,448,218**	**660,181**	**119.4**	**2,231,133**	**2,191,519**	**1.8**	**323,457**	**326,727**	**–1.0**	**96**	**136**	**–29.7**
Class 1, Explosives	11,754	7,901	48.8	3,047	5,000	–39.1	911	1,568	–41.9	738	651	13.4
Class 2, Gases	131,810	73,932	78.3	250,506	213,358	17.4	55,260	37,262	48.3	51	95	–46.6
Class 3, Flammable liquids	1,170,455	490,238	138.8	1,752,814	1,788,986	–2.0	181,615	218,574	–16.9	91	106	–14.3
Class 4, Flammable solids	4,067	6,566	–38.1	20,408	11,300	80.6	5,547	4,391	26.3	309	158	95.4
Class 5, Oxidizers and organic peroxides	6,695	5,471	22.4	14,959	12,670	18.1	7,024	4,221	66.4	361	407	–11.3
Class 6, Toxic materials and infectious substances	21,198	8,275	156.2	11,270	8,459	33.2	5,667	4,254	33.2	467	626	–25.5
Class 7, Radioactive materials	20,633	5,850	252.7	515	57	804.4	37	44	–16.0	(S)	(S)	(S)
Class 8, Corrosive materials	51,475	38,324	34.3	114,441	90,671	26.2	44,395	36,260	22.4	208	301	–30.9
Class 9, Miscellaneous dangerous goods	30,131	23,625	27.5	63,173	61,018	3.5	23,002	20,153	14.1	484	368	31.6

Key:

(S) Estimate did not meet publication standards.

(1) Ton-miles estimates are based on estimated distances traveled along a modeled transportation network. See "Mileage Calculations" section for additional information.

Note: The Introduction and appendixes give information on confidentiality protection, sampling error, nonsampling error, sample design, and definitions. Links to this information on the Internet may be found at <www.census.gov/cfs>.

Source: Bureau of Transport Statistics (USDOT) and U.S Census Bureau, 2007 Commodity Flow Survey, Hazmat Data, July 2010

29. The usage of modes of transportation for shipments of hazardous materials in 2007 was similar to that in 2002. In 2007, 53.9 percent of hazardous materials tonnage was carried by truck, compared to 52.9 percent in 2002. Similarly pipeline, the mode that transported the second-largest volume of hazardous materials in 2007, had a share of 28.2 percent in 2007, compared to a share of 30.2 percent in 2002. Due to methodological changes in mileage calculations, much of the tonnage previously identified as moving solely by the water mode has shifted to multiple mode classifications, in which water is part of the modal combination (see Table 14).

Table 14: Hazardous material shipment characteristics by mode of transport for the United States: 2007 and 2002

[Estimates are based on data from the 2007 and 2002 Commodity Flow Surveys. Because of rounding, estimates may not be additive]

Mode of transportation	Value			Tons			Ton-miles[1]			Average miles per shipment		
	2007 (million dollars)	2002 (million dollars)	Percentage change	2007 (thousands)	2002 (thousands)	Percentage change	2007 (millions)	2002 (millions)	Percentage change	2007	2002	Percentage change
Total	**1,448,218**	**660,181**	**119.4**	**2,231,133**	**2,191,519**	**1.8**	**323,457**	**326,727**	**–1.0**	**96**	**136**	**–29.7**
Single modes	**1,370,615**	**644,489**	**112.7**	**2,111,622**	**2,158,533**	**–2.2**	**279,105**	**311,897**	**–10.5**	**65**	**105**	**–38.1**
Truck[2]	837,074	419,630	99.5	1,202,825	1,159,514	3.7	103,997	110,163	–5.6	59	86	–31.6
For-hire truck	358,792	189,803	89.0	495,077	449,503	10.1	63,288	65,112	–2.8	214	285	–24.9
Private truck	478,282	226,660	111.0	707,748	702,186	0.8	40,709	44,087	–7.7	32	38	–14.8
Rail	69,213	31,339	120.9	129,743	109,369	18.6	92,169	72,087	27.9	578	695	–16.8
Water	69,186	46,856	47.7	149,794	228,197	–34.4	37,064	70,649	–47.5	383	(S)	(X)
Air (includes truck and air)	1,735	1,643	5.6	(S)	64	(S)	(S)	85	(S)	1,095	2,080	–47.3
Pipeline[3]	393,408	145,021	171.3	628,905	661,390	–4.9	(S)	(S)	(S)	(S)	(S)	(S)
Multiple modes[4]	**71,069**	**9,631**	**(X)**	**111,022**	**18,745**	**(X)**	**42,886**	**12,488**	**(X)**	**834**	**849**	**–1.8**
Parcel, U.S. Postal Service or courier	7,675	4,268	79.8	236	245	–3.6	151	119	27.1	836	837	–0.2
Truck and rail	7,052	(X)	(X)	11,706	(X)	(X)	10,120	(X)	(X)	779	(X)	(X)
Truck and water	23,451	(X)	(X)	36,588	(X)	(X)	12,380	(X)	(X)	1,010	(X)	(X)
Rail and water	5,153	(X)	(X)	5,742	(X)	(X)	2,937	(X)	(X)	1,506	(X)	(X)
Other multiple modes[5]	27,739	5,363	(X)	56,750	18,500	(X)	17,297	12,369	(X)	233	1,371	(X)
Other and unknown modes	**6,534**	**6,061**	**7.8**	**8,489**	**14,241**	**–40.4**	**1,466**	**2,342**	**–37.4**	**58**	**57**	**1.2**

Key:

(S) Estimate did not meet publication standards.

(X) Not applicable.

(1) Ton-miles estimates are based on estimated distances traveled along a modeled transportation network. See "mileage calculations" section for additional information.

(2) "Truck" as a single mode includes shipments that were made by only private truck, only for-hire truck, or a combination of private and for-hire truck.

(3) Estimates for pipeline exclude shipments of crude petroleum (SCTG 16).

(4) The mileage calculation methodology was significantly improved in 2007. Therefore, multimode data for 2007 and 2002 are not comparable. For more information, see "mileage calculations".

(5) The 2002 and 2007 "Other multiple modes" categories are not directly comparable due to a definition change. For 2002 "other multiple modes" includes shipments using "Truck and rail", "Truck and water", "Rail and water," and other mode combinations not specifically listed. For 2007, "Truck and rail" "Truck and water", and "Rail and water" are not part of "Other multiple modes".

Note: The introduction and appendices give information on confidentiality protection, sampling error, sample design, and definitions. Links to this information on the internet may be found at www.census.gov/cfs

Source: Bureau of Transport Statistics (USDOT) and U.S Census Bureau, 2007 Commodity Flow Survey, Hazmat Data, July 2010

30. The same States that accounted for the most hazardous material shipments tonnage and ton-miles in 2002 were also the leading States in 2007.

31. Efforts were undertaken with the 2007 CFS to improve the reliability of the estimates for hazardous materials through the targeting and oversampling of hazardous materials shippers. This "oversampling" of hazardous materials shippers, together with a 2007 CFS sample size of 102,369 establishments, resulted in 5.6 percent of the 4.9 million 2007 CFS shipment records being classified as a hazardous materials shipment, compared to 4.9 percent of 2.6 million shipment records from a sample of 51,005 establishments in the 2002 CFS being designated as a hazardous materials shipment.

Forecasts of growth in hazardous materials movements in the United States

32. A forecast by the Chemical Manufacturers Association (CMA) projects that tons of chemicals produced will grow by 2 % annually. Applying the projected annual growth rate of 2 % to the baseline, the PHMSA estimate of 3.2 billion tons of all hazardous materials shipped in 1996, *including both chemicals and petroleum products*, the forecast is 5.1 billion tons of hazardous materials being shipped by the year 2020, i.e. about 59 % higher. A forecast prepared by Data Resources Inc./McGraw Hill estimated growth of roughly 2.5 % per year through 2003. The second forecast also estimated that air and intermodal growth would be 4 times and 3 times faster, respectively, than overall growth in hazardous materials shipments.

33. Data published in the 2002 and 2007 Commodity Flow Survey (CFS) show that there were around 2.2 billion tons of hazardous materials[5] shipments in the United States. In 2008, it was estimated that more than 3 billion tons of hazardous materials would be transported each year with about 1.2 million daily hazardous materials movements through the air, on the railroads, seas, waterways and highways[6].

European Union

34. From 1990 to 2002 the transport of dangerous goods in the EU 15[7] increased from 98.3 billion tonne-kms in the year 1990 to 111.1 billion tonne-km in the year 2002 (+ 13.0 %). The highest increase was by road (+ 27.4 %), followed by inland waterways (+ 11.1 %) and rail (-9.4 %). The market share of road transport in all transport of dangerous goods increased from 51 % in 1990 to 58 % in 2002.

35. Data available in Eurostats from 2003 to 2010 concern mainly road transport (see Table 16). Available data regarding rail and inland waterways transport is limited to year 2006 for rail transport (see Table 17) and to the period 2007-2010 for inland waterways transport, but only for Bulgaria, Hungary, Slovakia and Croatia (see Table 18).

Dangerous goods transport by dangerous goods class and mode

36. From 1990 to 2002 the share of dangerous goods decreased from 9.1 % to 7.8 % meaning that transport of dangerous goods was increasing more slowly than the whole transport market. The growth rate from 1990 to 2002 for the total market was 31 % whilst dangerous goods increased by 13 % only.

37. According to Table 15 'Petroleum Products' were by far the most important dangerous goods class accounting for 54 % of all dangerous goods moved in 2002. The next most important classes were 'Gases' (12 %), 'Flammable liquids' (10 %, belonging to class 3, but no petroleum products) and 'Corrosive substances' (8 %). Nearly 85 % of all dangerous goods were included in these four most important dangerous goods classes. Transport of classes 5.2 'Organic peroxides', 6.2 'Infectious substances' and 7 'Radioactive material' were not reported.

38. For dangerous goods of class 1 (explosives) transport volumes were higher than production in the EU, which amounts to about 0.3 to 0.4 million tonnes per year. This was due to a remarkable level of imports, probably from East Asia, and their consequential effect on distribution.

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5 *The term "hazardous materials" is used in the United States to designate dangerous goods.*

6 *U.S. Department of Transportation. Transportation vision for 2030. January 2008.*

7 *EU15 was the number of member countries in the European Union prior to the accession of ten candidate countries on 1 May 2004. The EU15 comprised the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.*

Table 15: Development of dangerous goods transport in the EU-15 by dangerous goods (1990 – 2002) class and mode (in billion tonne-km)

Dangerous Goods Classes	Total				Road			
	1990	1994	1998	2002	1990	1994	1998	2002
10 Explosives substances and articles	0.5	0.5	0.7	0.8	0.4	0.4	0.5	0.7
20 Gases	10.0	10.8	15.4	13.8	5.3	5.5	8.2	7.7
30 Flammable liquids	16.8	9.9	10.3	10.7	4.5	5.8	5.9	5.9
31 Petroleum Products	50.3	57.6	57.7	60.3	27.2	31.8	31.7	34.3
41 Flammable solids	2.8	2.9	4.2	3.4	1.1	1.4	2.0	1.5
42 Substances liable to spont. combustion	0.9	2.1	2.1	2.9	0.7	1.8	1.6	2.6
43 Substances emitting flammable gases	0.3	0.3	0.5	0.4	0.2	0.2	0.4	0.3
51 Oxidising substances	1.1	1.6	2.0	1.8	0.8	1.1	1.6	1.4
61 Toxic substances	1.0	3.8	4.5	4.0	0.4	1.6	1.9	1.8
80 Corrosive substances	9.2	8.5	9.5	8.9	6.5	5.8	6.2	5.7
90 Miscellaneous dangerous substances	5.3	6.5	5.7	4.1	3.3	2.9	2.7	2.3
00 Total	**98.3**	**104.5**	**112.6**	**111.1**	**50.4**	**58.2**	**62.7**	**64.2**

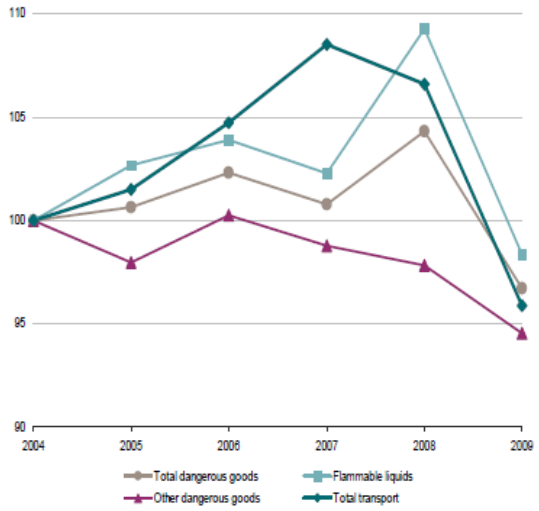
Dangerous Goods Classes	Rail				Inland Waterways			
	1990	1994	1998	2002	1990	1994	1998	2002
10 Explosives substances and articles	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0
20 Gases	3.8	4.1	5.7	4.5	1.0	1.3	1.5	1.5
30 Flammable liquids	11.4	3.3	3.2	3.5	1.0	0.8	1.2	1.4
31 Petroleum Products	9.9	11.2	11.8	12.8	13.2	14.6	14.2	13.2
41 Flammable solids	1.6	1.1	1.7	1.5	0.2	0.4	0.6	0.4
42 Substances liable to spont. combustion	0.1	0.1	0.2	0.1	0.1	0.2	0.3	0.2
43 Substances emitting flammable gases	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
51 Oxidising substances	0.3	0.4	0.3	0.3	0.0	0.1	0.1	0.1
61 Toxic substances	0.5	2.0	2.2	1.9	0.1	0.2	0.3	0.3
80 Corrosive substances	1.8	1.9	2.2	2.0	0.9	0.8	1.1	1.2
90 Miscellaneous dangerous substances	1.4	3.0	2.3	1.1	0.7	0.6	0.7	0.7
00 Total	**30.8**	**27.4**	**29.7**	**27.9**	**17.1**	**18.9**	**20.1**	**19.0**

Source: "Evaluation of EU Policy on the Transport of Dangerous Goods since 1994" published by the European Commission (TREN/E3/43 – 2003).

Road transport

39. Road freight transport of all classes of dangerous goods has declined sharply in 2009 and ended up almost 4% lower than its level in 2004 – similar to the total of road freight transport over the same period. (see Figure 1).

Figure 1: Evolution of EU-27 road transport of dangerous goods, 2004-2009 based on tkm (2004=100)



IE 2009: 2008 data was used; BG, RO 2004 and 2005: 2006 data was used; HU 2004, 2005 and 2006: 2007 data was used

Source: Eurostat

40. Flammable liquids suffered a sharper fall between 2008 and 2009 than other dangerous goods, but its fall has been smaller over the longer term, at 1.5% below its 2004 level. In contrast, the trend for other dangerous goods has been clearly downwards since 2006 and in 2009 it ended up some 6% lower than in 2004.

41. It should be kept in mind, however, that the methodology used for the collection of data on the transport of dangerous goods implies that there are considerable uncertainties attached to those figures, which should be therefore interpreted with care.

Table 16: Development of dangerous goods road transport in the EU-27[8] by class (in million tonne-km) from 2003 to 2010

	2003	2004	2005	2006	2007	2008	2009	2010
Class 1: Explosives	483	403	523	506	386	801	324	478
Class 2: Gases	9,608	10,157	9,385	9,576	10,384	11,006	10,731	10,305
Class 3: Flammable liquids	42,657	44,058	45,294	47,377	47,213	50,435	44,849	45,977
Class 4								
Div.: 4.1 Flammable solids	2,254	2,288	1,002	1,539	1,317	1,758	1,572	1,085
Div.: 4.2 Substances liable to spontaneous combustion	2,254	2,261	2,313	2,591	2,377	1,851	1,634	1,448
Div 4.3. Substance emitting flammable gases (with water)	82	166	56	74	351	89	42	81
Class 5								
Div 5.1: Oxidising substances	2,089	2,356	2,618	2,367	2,143	2,486	2,220	2,902
Div 5.2: Organic peroxides	245	260	251	276	183	49	55	40
Class 6								
Div 6.1: Toxic substances	1,529	1,951	1,748	1,931	2,023	1,337	1,179	1,200
Div 6.2: Infectious substances	350	326	353	363	615	493	723	536
Class 7: Radioactive substances	51	64	45	42	73	110	133	88

[8] *EU 27: The European Union comprises the following 27 countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom.*

	2003	2004	2005	2006	2007	2008	2009	2010
Class 8: Corrosive substances	7,977	7,948	8,462	8,983	8,017	7,831	7,935	8,150
Class 9: Miscellaenous dangerous goods	3,906	3,962	4,633	5,006	5,565	5,584	5,344	5,531
Total Eurostat	74,313	76,971	77,494	81,855	81,814	84,696	77,688	78,694

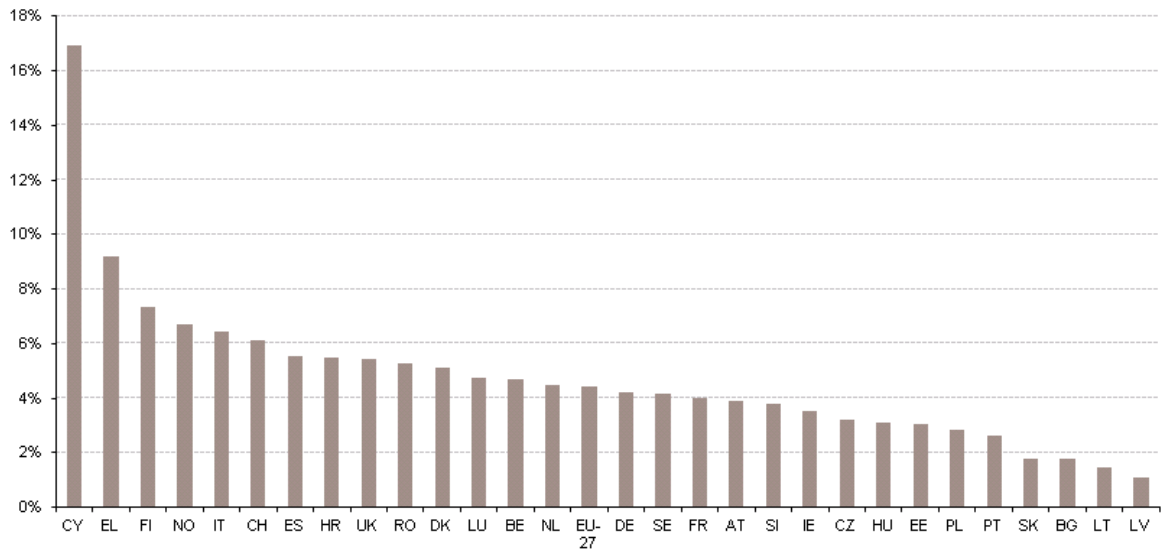
Key: ":" not available

42. Figure 2 shows the share of dangerous goods in the total transport of each country in 2010. For most countries, the share of dangerous goods transport hovered around 4%. All the major economies recorded figures in the 4% to 6% range. Some countries had a substantially greater proportion: Cyprus recorded almost 17%, while Italia and Finland settled in the 6% to 7% range. At the other extreme were Bulgaria, Latvia, Lithuania and Slovakia between 1% and 2%.

43. The transport of dangerous goods in the EU-27 remained stable from 2009 to 2010 with more of 78.6 billion of tonnes-kilometres for the year 2010.

44. Between 2004 and 2010, 10 countries observed a fall in their transport of dangerous goods. Indeed, Belgium and France registered a decrease of more than 15% and the Ireland, Lithuania and Portugal recorded falls of respectively 74%, 75% and 55%. On the other side, countries like Estonia show a very high increase of their transport of dangerous goods.

Figure 2: Share of road transport of dangerous goods in total transport by reporting country[9], 2010 (% in tkm)



Source : Eurostat (http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Road_freight_transport_by_type_of_goods)

45. Figure 3 shows the repartition of the transport of dangerous goods between national and international transport in 2010.

[9] *Country codes :*

(a) EU-27 : Belgium (BE), Bulgaria (BG), the Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), France (FR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), the Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE) and the United Kingdom (UK).

(b) Candidate countries and EFTA countries: Croatia (HR), Liechtenstein (LI), Norway (NO), Switzerland (CH).

Figure 3: Road transport of dangerous goods by type of operation 2010 (% tkm)

Source : Eurostat (http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Road_freight_transport_by_type_of_goods)

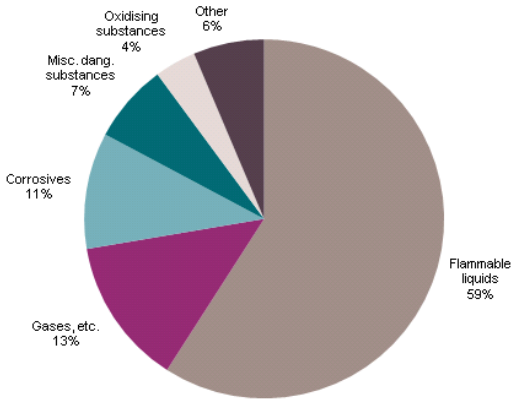
46. For most of the countries, more than half of their transport of dangerous goods is performed on their national territory. Luxembourg has a special pattern: as most of its transport is international transport, 90% of its transport of dangerous goods is performed in international transport.

47. For most countries, the share of dangerous goods carried in international transport is linked to its share of international transport (total of all goods).

48. Exceptions are Estonia, Latvia, Lithuania, Hungary, Poland and Portugal: international transport represents more than half of these countries transport, but most of these countries transport of dangerous goods is performed on their national territory. International markets of these countries concerns mainly transport of non-dangerous goods.

49. Figure 4 shows the type of dangerous goods involved in such transport in 2010. The largest specific product group was flammable liquids, taking over a half of the total. Two other groups, gases (compressed, liquefied or dissolved under pressure) and corrosives, accounted for 13% and 11% respectively. This represents very little change compared with previous years when there was a very similar distribution between the product groups.

Figure 4: EU-27 Road transport of dangerous goods by type of dangerous goods, 2010 (% in tkm)



50. The methodology being used in the collection of the data means that there are considerable uncertainties about the figures, both in total and in terms of their allocation by country and type of dangerous good. This implies that not too much weight should be attached to the significance of any one number.

Rail transport

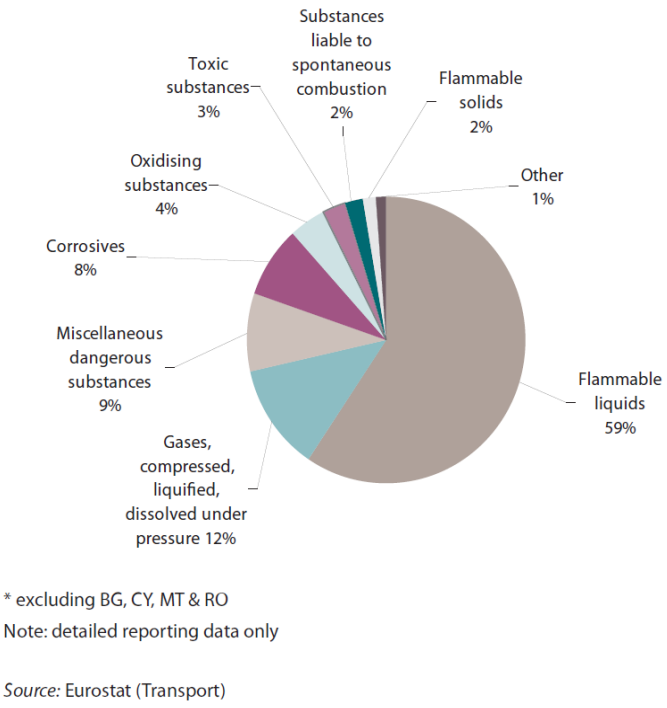
51. The classes of dangerous goods carried by rail are those defined by the International Regulations concerning the Carriage of Dangerous Goods by Rail (RID). Dangerous goods including gases, liquid hydrocarbons and corrosives accounted for an estimated 14.0 % of the total tonne kilometres performed by Rail goods transport in 2006.

Table 17: Dangerous goods rail transport in the EU-27 by class (in million tonne-km) (2006)

	2006
Class 1: Explosives	825
Class 2: Gases	8,255
Class 3: Flammable liquids	38,306
Class 4	
Div 4.1: Flammable solids	989
Div 4.2: Substances liable to spontaneous combustion	1,143
Div 4.3: Substance emitting flammable gases (with water)	638
Class 5	
Div 5.1: Oxidising substances	2,503
Div 5.2: Organic peroxides	36
Class 6	
Div 6.1: Toxic substances	1,755
Div 6.2: Infectious substances	43
Class 7: Radioactive substances	148
Class 8: Corrosive substances	4,997
Class 9: Miscellaneous dangerous goods	5,287
TOTAL	64,925

52. Flammable liquids (59.4 %), which mostly consist of hydrocarbons used for fuel, made up by far the largest share of performance in transport of dangerous goods by Rail. They were followed by Gases, compressed, liquefied, dissolved under pressure (12.0 %) and Miscellaneous dangerous substances (9.0 %) (Figure 5). Flammable liquids and Gases made up nearly identical shares in the EU-27's performance of the transport of dangerous goods by Road, in 2007.

Figure 5: Dangerous goods transported by rail EU-27* (2006) (%tkm)



Source: Traffic and transport quantities and performances. Eurostat Statistical books 2009 Edition.

Inland waterways

53. The Rhine (1320 km) is by far the most important river for Inland waterway goods transport in the EU-27. Flowing through Switzerland, Germany and the Netherlands, it forms a major part of the French-German border and it also links Belgium and Luxembourg through tributaires. The Danube (2850 km) forms the second main axis, linking the EU's Bulgaria, Romania, Hungary, Slovakia, Austria and Germany, but also Croatia, Serbia, Moldova and the Ukraine. Other major rivers, the Elbe and Oder/Odra connect the Czech Republic, Poland and Germany. Rivers' water conditions and operating capacity may be affected by seasonal variations.

54. In 2006, three groups of goods, all of mineral origin, accounted for over half of the weight of goods transported by Inland waterways: Crude and manufactured minerals (27.0 %) and the fuels Petroleum products (16.9 %) and Solid minerals fuels (e.g.: coal) (9.2 %). While Miscellaneous articles accounted for 9.1 % of total, the next four groups of goods, including ores, metals and chemicals, accounted for 20.9 %.

55. Table 18 shows the amount of dangerous goods transported by inland waterways in the period 2007 to 2010.

Table 18: Dangerous goods transport by inland waterways (in million tonne-km) for 2007-2010

	2007	2008	2009	2010
Bulgaria	:	5	11	81
Hungary	322	384	387	462
Slovakia	:	:	23	19
Croatia	:	32	29	29
Total:	322	421	450	591

Key:

":" not available

General observations

56. From the statistics available in the United States and in Europe, it appears that:

(a) Transport of dangerous goods is increasing regularly;

(b) The highest volumes transported are energy products (petroleum products, flammable gases), followed by flammable liquids and gases other than energy products, and by corrosive substances;

(c) Road transport is by far the most used inland transport mode, not only in terms of quantities carried but especially in terms of number of shipments.

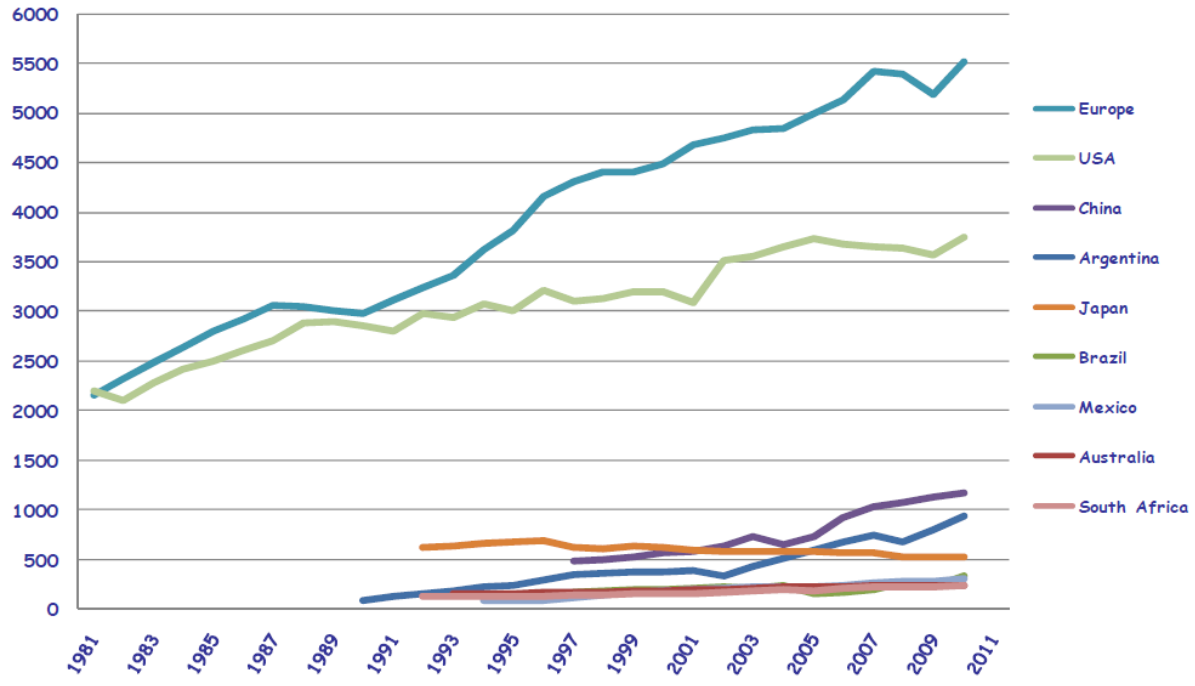
Other remarks

57. The data available for the European Union do not concern air or maritime transport. For the United States, they do not concern imports or exports, which means that they are not representative of maritime traffic which is mostly international. The International Maritime Organization (IMO)[10] estimated in 1989 that more than 50 % of the cargoes transported by sea could be regarded as dangerous, hazardous and/or harmful under the IMO classification criteria, but this estimation probably included not only carriage in packaged form, but also bulk carriage by oil tankers, chemical tankers and gas tankers, and solid bulk cargoes in bulk carriers.

58. For transport in Europe, it is also unclear whether or not the statistics take account of dangerous goods packed in limited quantities. In Europe, no specific mention of these goods is required in the transport document. When the quantity per packaging falls below a certain limit the transport of dangerous goods packed in limited quantities may benefit from certain exemptions from some regulations. Examples are dangerous goods such as perfumes, paints, aerosol dispensers, etc. which are delivered to retail shops or supermarkets for sale to the public. Nevertheless, the quantities carried are also important. Most aerosol dispensers are carried in accordance with these exemptions. Figure 6 shows the quantities of aerosol dispensers produced in the world and therefore carried. Europe still led in aerosol production worldwide with 5 billion units produced. Nearly 12 billion were produced worldwide in 2008.

Figure 6: World production of aerosol dispensers from 1981 to 2010 (in millions of items)

[10] *Focus on IMO, the Safe Transport of Dangerous, Hazardous and Harmful Cargoes by Sea, August 1989.*



Source: Federation of European Aerosols (FEA)

III. DANGEROUS GOODS ACCIDENTS

59. Although in recent years there have been relatively few major accidents involving dangerous goods, dangerous goods have been involved in some of the worst disasters in transport history.

Halifax, 1917

60. By the end of 1917, with the World War I at its height, the 3000 ton freighter *Mont Blanc*, heavily overloaded with more than 2600 tons of explosives, entered Halifax harbour in Canada on her way from the United States to Europe. She collided with another ship, the *Imo*, and caught fire.

61. There were two explosions, as a result of which 1250 people were killed and 15 ships destroyed or damaged.

Texas City, 1947

62. With the end of World War II, demand fell off for ammonium nitrate, a raw material for the production of various explosives. However, the substance is also widely used as an agricultural fertilizer and in the immediate post-war period vast quantities were shipped from the United States to Europe, where it was urgently needed.

63. The freighter *Grandcamp* was one of many ships used for this purpose and in April 1947 was being loaded with ammonium nitrate in the port of Texas City. A fire started in one of the holds and spread. By the time the fire department had been called it was too late: less than an hour later the ship exploded with such force that two light planes flying overhead were destroyed by the blast. The explosion also blew the hatch covers off another ship, the *High Flyer*, which was moored 200 yards away and was also carrying ammonium nitrate. She caught fire and subsequently blew up.

64. A total of 468 people were killed, mostly as a result of the first explosion.

Los Alfaques, 1978

65. In July 1978, a road tanker transporting liquefied propylene sprang a leak as it passed a camp site at Los Alfaques in Spain. It was the peak of the summer tourist season and the camp site was crowded.

66. The leak resulted in some of the liquefied gas escaping and pouring rapidly across the camp site in a huge cloud, which immediately ignited – possibly as a result of coming into contact with flames from one of the many camp stoves in use at the time.

67. The explosion resulted in a fireball some 200 yards in diameter which was so intense that more than 200 people were burnt to death. The devastation spread for 400 yards in all directions.

68. Yet the lorry was carrying only 43 cubic metres of liquefied gas. Some ships carry 125,000 cubic metres or even more.

Mississauga

69. On 10 November 1979, a train of 106 wagons derailed at night in the city of Mississauga (Canada). The first derailed wagon was a tank-wagon loaded with toluene (flammable liquid). It took with it 23 other wagons into the derailment, 19 of which were tank-wagons loaded with dangerous goods. Fire spread through most of the derailed cars; three of which were loaded with propane (flammable gas) and exploded in a fireball causing considerable damage to neighbouring property. One tank-wagon loaded with chlorine (toxic gas) suffered a hole in its shell 2.5 feet in diameter, and because of the fear of the consequence of the escape of this gas, almost 250 000 people from the city were evacuated from their homes and businesses for up to 5 days.

More recent accidents

70. Fortunately, such catastrophic accidents do not happen very often, and the development of regulations based on the UN Recommendations on the Transport of Dangerous Goods has effectively reduced the number of occurrences and minimized their effects. Nevertheless, zero risk does not exist, as shown for example by the **Tauern tunnel fire** in May 1999 in **Austria**, where the crash of a lorry carrying paint into cars in the tunnel entailed the death of 12 persons, injuries to 50 persons, the closure of the tunnel for 3 months and an economic cost of 17 million German marks for the reconstruction and renovation of the tunnel.

71. More recently, in 2009 a freight train with 14 tank wagons carrying LPG derailed as it entered the railway station of Viareggio (Italy). The first tank crashed into a signaling stake and the LPG was released from a crack in the vessel. Consequently, the LPG flashed partially and the remaining liquid fraction spread onto the ballast. The dense-gas cloud originated after the emission moved towards the surrounding quarter that overlooks the station, penetrated in some basements and ground floors, and eventually it was ignited. The following explosion(s) and fires caused 31 fatalities and more than 30 casualties and produced damages to the rail infrastructure and the houses of the surroundings for an estimated cost of 32 million euros.

72. In 2011, the Waldhof (a ship carrying 2,378 tonnes of sulphuric acid 96% from BASF's plant in Ludwigshafen, to Antwerp in Belgium) capsized and sank, with the loss of two lives and 2 persons injured. As a direct consequence of the ship capsizing and lying on its side for an extended period, approximately 900 tonnes of sulphuric acid leaked into the Rhine. An additional 800 tonnes of sulphuric acid were drained into the river under controlled conditions as part of the salvaging operation. The river Rhine near St Goarshausen was closed for a total of 33 days and the resultant blockage created a backlog of more than 400 vessels. The associated lost profits and the damages associated to the accident were estimated to approximately 50-55 million euros.

73. Other accidents have occurred in developing countries where the regulatory system was almost inexistent, e.g. in **Bangkok, Thailand** (25 September 1990, crash of a tank-vehicle carrying LPG, 63 deaths, 90 persons injured) or **Yaounde, Cameroun** (14 February 1998, railway accident involving petroleum products, 220 deaths, 130 persons injured).

74. Accidents also have negative effects on the environment. In 1998, a truck carrying sodium cyanide to a gold mine plunged off a bridge in **Kyrgyzstan**, and around 1800 kg of highly toxic sodium cyanide were spilled into a river upstream of a number of villages. Several hundred people later had to seek medical treatment due to contamination of the water, and the effect on the fauna is likely to have been disastrous.

75. As regards maritime transport, catastrophic pollution of the sea caused by oil spillages from the Torrey-Canyon (1959), Amoco Cadiz (1978), Exxon Valdez (1989), Erika (1999) and Prestige (2002) are very well-known examples of disastrous effects to the environment.

Accident data in the United States

76. In the United States, PHSMA estimates there are roughly 300 million hazardous materials shipments each year totalling approximately 3.2 billion tons and the vast majority of these shipments arrive at their destinations safely.[11] In 1998, there were 15,322 incidents, including 429 serious incidents, 13 deaths and 198 injuries. Although this is a relatively good safety record, given the number of shipments and movements, there remains the potential for catastrophic incidents in the transport of hazardous materials with multiple fatalities, serious injuries, large-scale evacuations, and other costs to society as possible results. For example:

(a) Chemical oxygen generators on a commercial airliner ignited causing the crash of ValuJet Flight 592 into the Florida Everglades in 1996 killing 110 passengers and crew;

(b) Unleaded gasoline spilled during unloading of a cargo tank in Biloxi, Mississippi, in 1998 resulting in 5 hazardous materials fatalities, the evacuation of over 80 people, and the closure of an interstate highway;

(c) Phosphoric acid being transported in intermodal freight containers on a barge were lost over the side or crushed in heavy seas in April 1998. Cleanup costs in the Morgan City, Louisiana, area totalled almost $1 million;

(d) A flatbed tractor-trailer hauling black powder in an intermodal freight container overturned on Interstate-95 in Springfield, Virginia, in June 1999, inconveniencing 250,000 highway users and costing society $25 million due to traffic delays even though there was no release of hazardous materials;

(e) Over 16,250 gallons of chlorine were released when a freight train derailed in Alberton, Montana, in April 1996 resulting in 1 fatality, 787 hospitalizations, 1,000 evacuations, and over $4.5 million in cleanup costs.

Table 19: Serious hazardous material incident history from 1990 through 1998 in the United States

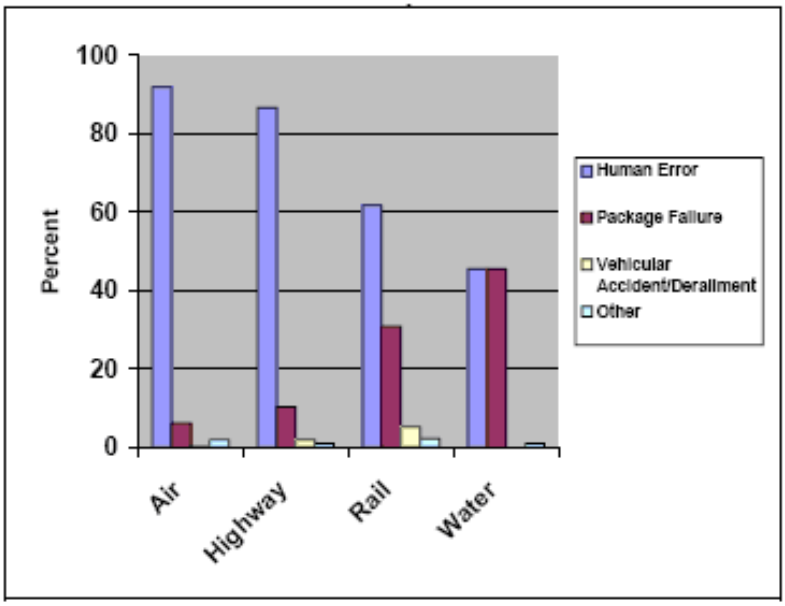
Year	Total reported incidents	Number of serious incidents	Number of fatalities	Number of injuries	Number of persons evacuated	Amount of property damage
1990	8,879	**402**	8	423	12,123	$32,353,276
1991	9,110	**403**	10	439	10,502	$38,350,611
1992	9,310	**375**	15	600	29,186	$35,164,057
1993	12,830	**357**	15	627	18,237	$22,801,551
1994	16,087	**429**	11	577	18,398	$44,185,413
1995	14,743	**409**	7	400	11,444	$30,903,281
1996	13,950	**464**	120[1]	1,175[2]	19,556	$46,849,243
1997	13,994	**417**	12	225	24,587	$33,393,504
1998	15,322	**429**	13	198	9,181	$45,497,550
Total	**114,225**	**3,685**	**211**	**4,664[3]**	**153,214**	**$329,498,486**

Source: RSPA, Biennial Reports on Hazardous Materials Transportation, and RSPA Hazardous Materials Information System incident database as of October 21, 1999.

1. 110 deaths were the result of the ValuJet crash in 1996.
2. A single rail incident in Montana involving chlorine resulted in injuries to 787 people.
3. In summarizing serious incident injuries for the biennial report, RSPA combines hospitalization (serious) injuries with minor injuries.

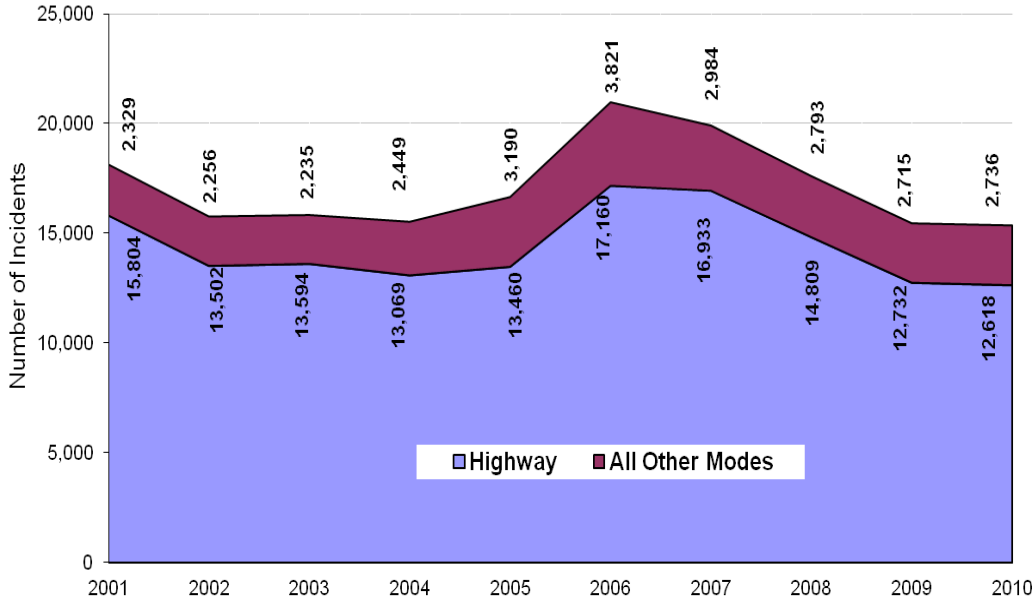
[11] *All data used that provide a measure of the volume of hazardous materials in transportation such as shipments, movements, and tons, represent domestic quantities only.*

Figure 7: Incident cause by mode (1998)



Source: Source: RSPA HMIS incident database as of October 21, 1999.

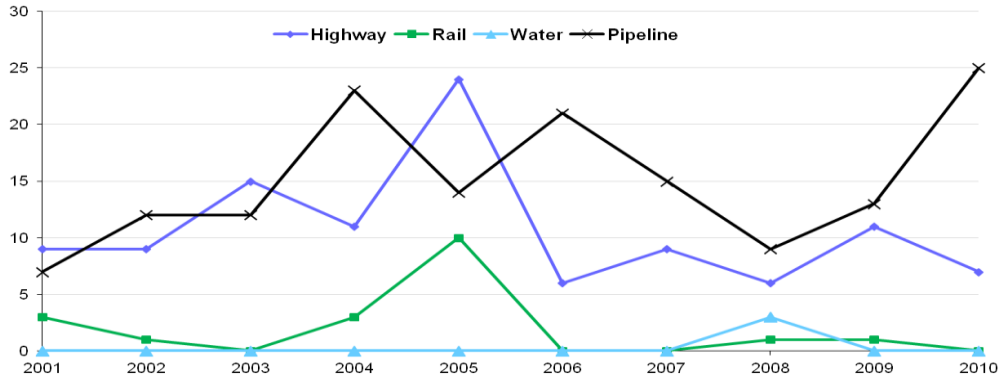
Figure 8: Reported hazardous materials incidents (2001 to 2010)



Note: Hazardous materials moved by water includes packaged goods only, such as drums and containers. Does not include tankers, barges and large vessels which carry hazardous materials in bulk.

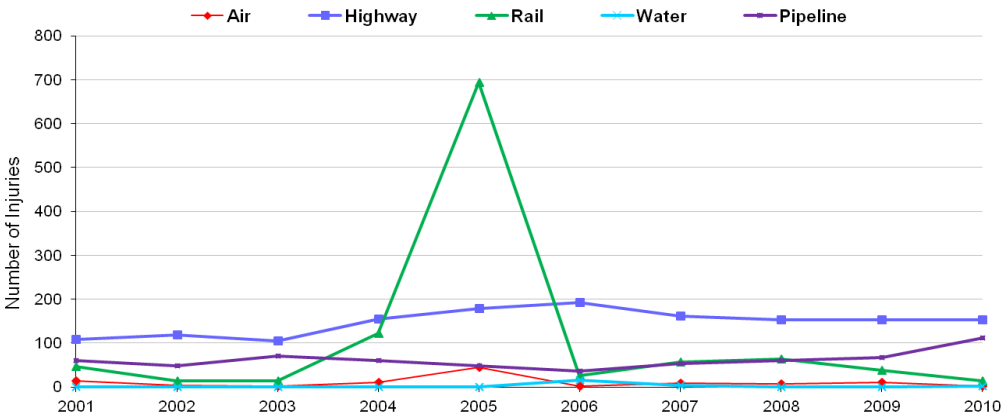
Source: *"Transportation of Hazardous Goods in the United States: Data from the 2007 Commodity Flow Survey." Presentation made by Steven Beningo (International Transportation Specialist. Bureau of Transportation Statistics. U.S. Department of Transportation) to the UNECE WP.6 Geneva, Switzerland in July 2011.*

Figure 9: Reported hazardous fatalities by mode (2001 to 2010)



Source: *"Transportation of Hazardous Goods in the United States: Data from the 2007 Commodity Flow Survey." Presentation made by Steven Beningo (International Transportation Specialist. Bureau of Transportation Statistics. U.S. Department of Transportation) to the UNECE WP.6 Geneva, Switzerland in July 2011.*

Figure 10: Reported hazardous injuries by mode (2001 to 2010)



Note: *Hazardous materials moved by water includes packaged goods only, such as drums and containers. Does not include tankers, barges and large vessels which carry hazardous materials in bulk.*

Source: *"Transportation of Hazardous Goods in the United States: Data from the 2007 Commodity Flow Survey." Presentation made by Steven Beningo (International Transportation Specialist. Bureau of Transportation Statistics. U.S. Department of Transportation) to the UNECE WP.6 Geneva, Switzerland in July 2011.*

77. According to a study conducted by PHMSA[12] the great majority of casualties attributable to incidents associated with the transport of hazardous materials (hazmat) result from a small core number of hazmat commodities being transported. The top ten commodities in Table 20 accounted for 97.44 weighted casualties out of 118.06 overall (from 71 fatalities and 2514 major injuries) over the period 2005-2009 for which data are available, or nearly 83 percent.

[12] *Top Consequence Hazardous Materials by Commodities and Failure Modes (2005-2009). Pipeline and Hazardous Materials Safety Administration, Issue 3. September 2011.*

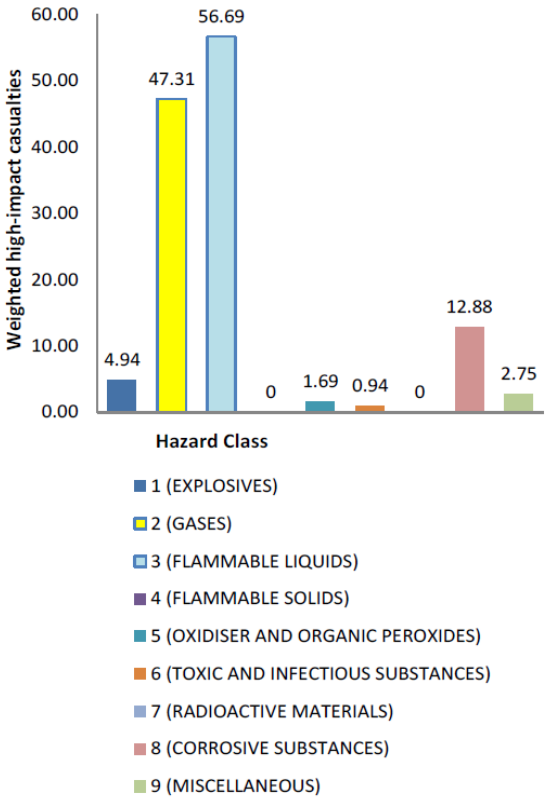
Table 20: Ten commodities ranked by unweighted high-impact casualties

Rank	Commodity name	High-impact casualties (unweighted)	Fatalities	Major injuries	Incidents
1	Chlorine	92	9	83	48
2	Gasoline	49	30	19	1,306
3	Propylene	22	1	21	15
4	Diesel fuel	19	12	7	573
5	Liquefied petroleum gas (LPG)	17	1	16	473
6	Sodium hydroxide solution	10	0	10	2,239
7	Sulfuric acid	9	2	7	1,269
8	Ammonia, anhydrous	8	1	7	317
9	Corrosive liquids, toxic, n.o.s.	8	0	8	511
10	Carbon dioxide, refrigerated liquid	6	3	3	51

Note: High-impact casualties = fatalities + major injuries or hospitalizations

78. Hazmat from Classes 3 (flammable liquids, including gasoline and diesel fuel), 2 (gases, including chlorine), and 8 (corrosives, including sodium hydroxide and sulfuric acid) accounted for the vast majority of the total casualties, as summarized in Figure 11. No incidents involved flammable solids or radioactive materials. Note that as one incident may involve multiple commodities, these figures may include minor duplications.

Figure 11: Weighted high-impact casualties by hazard class (2005-2009)



Source: "Top consequence hazardous Materials by Commodities and Failure Modes (2005-2009)". PHMSA, March 28, 2011.

79. While hazard class serves as a functional summary shorthand for commodities, failure mode is related more closely to mode of transportation: for example, derailments are naturally only a risk for railways. Table 21 further illustrates the impact of mode of transportation when considering fatalities and injuries caused by hazardous materials.

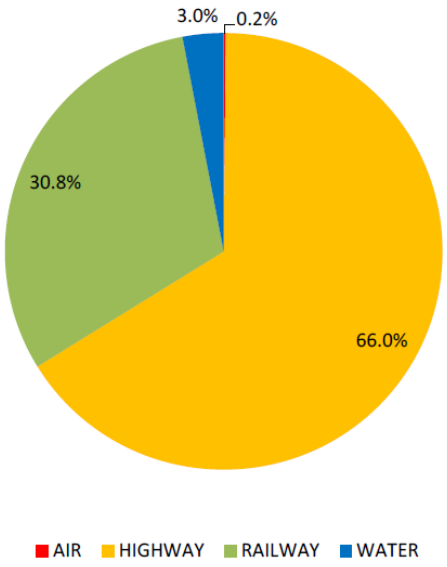
Table 21: Incident consequences by transportation mode (2005-2009)

Mode of transportation	Total number of fatalities	Total number hospitalized	Incident count	Incidents with fatalities or major injuries
Air	0	1	8,254	1
Highway	56	117	75, 094	135
Railway	12	130	3,593	28
Water	3	3	387	2
Total	**71**	**251**	**87,328**	**166**

Source: "Top consequence hazardous Materials by Commodities and Failure Modes (2005-2009)". PHMSA, September 2011.

80. Two thirds of all weighted consequences are attributable to highway incidents (see figure 12) but casualties *per rail accident* were consistently higher than for all modes except water (water incidents tend to be low-frequency high-consequence events from which it is difficult to draw general conclusions). For example, there were 1.3 weighted casualties (fatalities or major injuries) per *casualty-causing* rail incident as opposed to 0.6 for road incidents. Over *all* incidents, the difference was even more pronounced: note in particular that there are roughly the same number of major injuries (and a factor of five in fatalities) between the two modes despite there being 20 times as many incidents recorded on roadways as on railways.

Figure 12: Weighted high-impact casualties by transportation mode as percent of total (2005-2009)



Source: "Top consequence hazardous Materials by Commodities and Failure Modes (2005-2009)". PHMSA, September 2011.

Accident data in Canada

81. According to Transport Canada[13], there are 30 million shipments of dangerous goods each year — more than half by road. In 2009 there were 396 accidents involving the transport of dangerous goods, one per cent less than in 2008. Twelve injuries or death were directly attributable to the dangerous goods themselves. Accidents occurred more than twice as often during loading or unloading as during transport.

[13] *Transportation in Canada. Annual Report 2009. Economic Analysis Directorate Policy Group.* http://www.tc.gc.ca/eng/policy/report-aca-anre2009-index-2292.htm#pdf *(last accessed : January 2012)*

Table 22: Reportable accidents involving dangerous goods by mode and phase of transport (2005-2010)

	In-transit						
Year	*Road*	*Rail*	*Air*	*Marine*	*Subtotal*	*Not in-transit*	*Totals*
2005	129	8	5	0	142	244	386
2006	102	4	7	0	113	272	385
2007	125	9	8	0	142	282	424
2008R	115	6	4	0	125	310	435
2009R	78	5	0	0	83	242	325
2005 – 2009 Average	110	6	5	0	121	270	391
2010P	98	7	1	0	106	236	342

Notes: R = Revised. P = Preliminary (2010 accident data are preliminary based on accidents reported to TDG). TDG = Transportation of Dangerous Goods.
The TDG program does not cover dangerous goods transported in bulk on ships or by pipeline.
Dangerous goods accidents are "Reportable" when the quantity of dangerous goods released exceeds the amount listed in the table contained in Part 8 of the TDG Regulations. TDG accidents can occur while dangerous goods are being transported, while they are handled or during temporary storage pending transport.
"In-Transit" accidents include those that occur during actual transport. "Not-In-Transit" accidents are those that take place at facilities where the goods are prepared for transport (handled prior to loading or unloading), unloaded or stored in the course of transport.

Source: Transport Canada, Dangerous Goods Accident Information System

Table 23: Total number of deaths and injuries at reportable accidents involving dangerous goods (2005-2010)

	Deaths	*Injuries*			
Year		*Major*	*Moderate*	*Minor*	*Totals*
2005	7	18	22	4	44
2006	5	6	30[1]	6	42
2007	6	13	24	10	47
2008	5	13	25	4	42
2009R	1	7	17	4	28
2005 – 2009 Average	5	11	24	6	41
2010P	3	9	18	6	33

Notes: R = Revised. P = Preliminary (2010 accident data are preliminary based on accidents reported to TDG). TDG = Transportation of Dangerous Goods.
The TDG program does not cover dangerous goods transported in bulk on ships or by pipeline.
Total includes deaths and injuries caused by the dangerous goods, as detailed in Table S24.
Dangerous goods accidents are "Reportable" when the quantity of dangerous goods released exceeds the amount listed in the table contained in Part 8 of the TDG Regulations. TDG accidents can occur while dangerous goods are being transported, while they are handled or during temporary storage pending transport.
"In-Transit" accidents include those that occur during actual transport. "Not-In-Transit" accidents are those that take place at facilities where the goods are prepared for transport (handled prior to loading or unloading), unloaded or stored in the course of transport.
Minor injuries refer to those injuries that require first-aid treatment, moderate injuries involve emergency hospital treatment, and major injuries require overnight hospitalization.
1 Fifteen injuries were due to an accident involving the transfer of hydrochloric acid from a rail tank car to a highway tank in Ontario.

Source: Transport Canada, Dangerous Goods Accident Information System

Table 24: Deaths and injuries attributed to dangerous goods at reportable accidents (2005-2010)

	Deaths	*Injuries*			
Year		*Major*	*Moderate*	*Minor*	*Totals*
2005	0	2	2	2	6
2006	1	0	17[1]	0	17
2007	0	2	8	3	13
2008	0	1	8	2	11
2009R	0	1	4	1	6
2005 – 2009 Average	0	1	8	2	11
2010P	1	1	2	2	5

Notes: R = Revised. P = Preliminary (2010 accident data are preliminary based on accidents reported to TDG). TDG = Transportation of Dangerous Goods.
The TDG program does not cover dangerous goods transported in bulk on ships or by pipeline.
Dangerous goods accidents are "Reportable" when the quantity of dangerous goods released exceeds the amount listed in the table contained in Part 8 of the TDG Regulations. TDG accidents can occur while dangerous goods are being transported, while they are handled or during temporary storage pending transport.
"In-Transit" accidents include those that occur during actual transport. "Not-In-Transit" accidents are those that take place at facilities where the goods are prepared for transport (handled prior to loading or loading), unloaded or stored in the course of transport.
Minor injuries refer to those injuries that require first-aid treatment; moderate injuries involve emergency hospital treatment, and major injuries require overnight hospitalization.
1 Fifteen injuries were due to an accident involving the transfer of hydrochloric acid from a rail tank car to a highway tank in Ontario.

Source: Transport Canada, Dangerous Goods Accident Information System

82. In 2010[14], there were 342 accidents involving the transportation of dangerous goods, five per cent more than in 2009 (325 accidents in 2009). Five injuries were directly attributable to the dangerous goods themselves. About half of the accidents involved flammable liquids (class 3). During the same year, the Canadian Transport Emergency Centre (CANUTEC), which is operated by Transport Canada to assist emergency response personnel in handling dangerous goods emergencies, provided assistance for 847 emergency situations and handled 28,758 telephone calls.

14 *Transportation in Canada. Annual Report 2010. Economic Analysis Directorate Policy Group. http://www.tc.gc.ca/eng/policy/report-aca-anre2010-index-2700.htm (last accessed : January 2012)*

Table 25: Emergencies by class of dangerous goods* (2010)

Class 1	Explosives	21
Class 2	Compressed gas	169
Class 3	Flammable liquids	193
Class 4	Flammable solids	18
Class 5	Oxidizers and Organic peroxides	57
Class 6	Poisonous and infectious substances	43
Class 7	Radioactives	11
Class 8	Corrosives	268
Class 9	Miscellaneous	13
NR	Non-regulated	202
Mixed load		8
Unknown		24

* includes primary and subsidiary classes, and possibly multiple DGs per emergency

Source: CANUTEC Statistics (http://www.tc.gc.ca/eng/tdg/newsletter-menu-spring2011-1112.htm#canutec)

Accident data EU

Rail accidents

83. Table 26 looks at the number of rail accidents involving dangerous goods and lists the numbers of accidents in which dangerous goods were released (spillage resulting in the contamination of soil, release of harmful gaseous substances, etc.). In general, the number of reported accidents in 2004 and 2005 was very low in most Member States. In six EU Member States, the number of dangerous goods accidents was between 1 and 10 accidents.

84. In only five Member States - Austria, Germany, Sweden, Spain and Lithuania – did their number exceed 10. In 2005 Austria reported 21 accidents involving dangerous goods. Different reporting practices may be one reason for differences between countries in Table 26.

85. For a fair evaluation of the relative safety, the number of registered accidents should be related to the transport performance of dangerous goods (number of tonne-kilometres performed). The United Kingdom (2004), Spain, Lithuania, Germany (2004), France (2004), Estonia and Poland (2005) display values between zero and five accidents per billion tonne-kilometres of dangerous goods forwarded. The risk in Austria, Sweden, the Netherlands and Portugal appeared to be notably higher, between five and ten. Denmark is the only country that exceeded ten accidents per billion tkm of dangerous goods transported, being close to 24 accidents. However the risk in 2005 halved compared to the ratio registered in 2004. Due to a low number of occurrences, these results should however be interpreted with caution.

Table 26: Number of rail accidents with dangerous goods in EU- 25 (2004 and 2005)

	Number of accidents								
	Involving dangerous goods			Releasing dangerous goods			Number of accidents involving dangerous goods per billion tkm of dangerous goods transport		
	2004	2005	2004 and 2005	2004	2005	2004 and 2005	2004	2005	Average 2004 and 2005
Belgium	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0
Denmark	3	2	5	0	0	0	32	17	24
Germany	14	5	19	2	0	2	1	0	1
Estonia	0	4	4	0	0	0	0	1	0
Ireland	0	0	0	0	0	0	0	0	0
Greece	0	0	0	0	0	0	0	0	0
Spain	6	9	15	2	0	2	2	3	3
France	4	5	9	3	2	5	1	:	:
Italy	0	0	0	0	0	0	0	0	0
Cyprus	-	-	-	-	-	-	-	-	-
Latvia	0	0	0	0	0	0	0	0	0
Lithuania	5	7	12	0	0	0	1	2	1
Luxembourg	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	0	0	0	0	0
Malta	-	-	-	-	-	-	-	-	-
Netherlands	2	5	7	0	0	0	4	10	7
Austria	23	21	44	19	20	39	16	15	15
Poland	1	1	2	0	0	0	:	0	:
Portugal	0	1	1	0	0	0	0	13	7
Slovenia	0	:	:	0	:	:	0	:	:
Slovakia	0	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0	0
Sweden	13	3	16	7	0	7	12	3	8
United Kingdom	4	11	15	2	9	11	3	9	6
EU-25 (no SI)	75	74	149	35	31	66	:	:	:
Liechtenstein	0	0	0	0	0	0	-	-	-
Norway	0	2	2	0	2	2	:	5	:

Note: In 2004, no data are available for PL, LI (simplified reporting) and NO for the transport of dangerous goods (in Mio tkm).
In 2005, no data are available for FR and LI (simplified reporting) for the transport of dangerous goods (in Mio tkm). SI data on the number of dangerous goods accidents are missing.

Source: Eurostat/NewCronos

Source: Rail transport accidents in the European Union in 2004-2005. Statistisc in focus. Transport. 34/2007.

Table 27: Number of rail accidents with dangerous goods in EU- 25 (2005 and 2006)

	Number of accidents involving the transport of dangerous goods			of which releasing dangerous goods			Number of accidents involving the transport of dangerous goods per billion tkm of dangerous goods transport		
	2005	2006	2005 and 2006	2005	2006	2005 and 2006	2005	2006	Average 2005 and 2006
Belgium	0	0	0	0	0	0	0	0	0
Bulgaria	:	2	:	:	2	:	:	1	:
Czech Republic	0	0	0	0	0	0	0	0	0
Denmark	2	1	3	0	1	1	17	18	17
Germany	5	3	8	0	1	1	0	0	0
Estonia	4	0	4	0	0	0	1	0	0
Ireland	0	0	0	0	0	0	0	0	0
Greece	0	0	0	0	0	0	0	0	0
Spain	9	14	23	0	0	0	3	8	5
France	5	0	5	2	0	2	:	0	:
Italy	0	0	0	0	0	0	0	0	0
Cyprus	-	-	-	-	-	-	-	-	-
Latvia	0	0	0	0	0	0	0	:	:
Lithuania	7	8	15	0	0	0	2	2	2
Luxembourg	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	1	1	0	0	0
Malta	-	-	-	-	-	-	-	-	-
Netherlands	5	3	8	0	0	0	10	:	:
Austria	21	17	38	20	15	35	15	12	13
Poland	1	0	1	0	0	0	0	0	0
Portugal	1	0	1	0	0	0	13	:	:
Romania	1	0	1	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0
Slovakia	0	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0	0
Sweden	3	1	4	0	1	1	3	1	2
United Kingdom	9	3	12	2	3	5	8	:	:
EU-27	:	62	:	:	24	:	:	:	:
Liechtenstein	0	0	0	0	0	0	0	0	0
Norway	2	1	3	2	1	3	5	14	10
Croatia	1	0	1	1	0	1	2	0	1
Turkey	0	0	0	0	0	0	0	0	0

Source: Eurostat/NewCronos

Source: Rail transport accidents in the European Union in 2005-2006. Eurostat. Data in focus. Transport. 1/2008.

IV. REGULATORY MEASURES TO INCREASE SAFETY AND PROTECTION OF THE ENVIRONMENT

A. General

86. Safety – and protection of the environment – during the transport of dangerous goods may be ensured through:

(a) The use of containment systems of good quality, adapted to the danger presented by the goods to be transported and compatible with them, meeting the construction requirements and the performance tests or other tests contained in the UN Model Regulations on the Transport of Dangerous Goods, as appropriate, in order to withstand stresses, impacts and other wear and tear to which packages may be submitted during normal conditions of transport. Failure of containment systems can lead to leakage or spillages or even explosion of the containment system itself in case of pressure build-up.

The means of transport themselves may also have to meet certain safety requirements depending on the goods carried (e.g. tank-vehicles, holds of ships, maritime or inland navigation tankers);

(b) Good operational practices;

(c) An adequate hazard communication system (labelling, marking, placarding, documentation) which provides appropriate information to:

(i) Transport workers involved in dangerous goods handling;

(ii) Emergency responders who have to take immediate action in case of incidents or accidents;

(d) Training of transport workers and all participants involved in a chain of transport of dangerous goods;

(e) Effective control and enforcement by competent authorities.

B. Containment systems

87. Distinction can be made between:

(a) Packagings for dangerous goods packed in limited quantities;

(b) "Classic" packagings (up to 400 kg/450 litres) such as drums, boxes, etc.

(c) Intermediate bulk packagings (IBCs) and large packagings (up to 3000 kg/3000 l);

(d) Tanks (including tank-containers, tanks of tank wagons and tank-vehicles);

(e) Cargo tanks or bulk holds of sea-going or inland navigation tankers or bulk carriers (not addressed by the UN Model Regulations; covered by specific IMO or UNECE instruments (SOLAS, MARPOL, IBC Code, IGC Code and BC Codes; ADN));

(f) Pipelines (not covered by the UN Model Regulations nor related international legal instruments).

88. Packagings for dangerous goods packed in limited quantities have to meet certain construction standards, but they are not required to be certified.

89. All other packagings, including IBCs, large packagings used for the transport of dangerous goods internationally, have to be manufactured to a design type which has been tested according to the UN Model Regulations and certified ("UN" mark) by the competent authority of the countries of design type approval.

90. The performance tests include e.g. drop tests, stacking tests, leakproofness tests, hydraulic pressure tests, depending on the type of dangerous goods to be carried and the degree of danger (three degrees of danger, Packing Groups I, II and III).

91. The packaging requirements have of course important economic implications as dangerous goods packagings are much more expensive than ordinary packagings. In Europe, the figures in Table 28 give an idea of the yearly market for some types of packagings designed for the carriage of dangerous goods.

Table 28: European market for some specific types of "UN" certified dangerous goods packagings

Plastics drums	Steel drums	Flexible IBCs ("Big bags")	Other IBCs
11 million	45 million	5 million	3.8 million

Source: Estimates provided by representatives of the International Confederation of Plastics Packaging Manufacturers (ICPP) and by the European Association of Steel Drum Manufacturers (SEFA).

92. Gas receptacles and portable tanks used for the international carriage of liquids, gases or granular or powdery solids and bulk packagings for solids also have to meet requirements contained in the UN Model Regulations and be approved accordingly, although in Europe there exist alternative requirements which may be applied for international inland transport only (e.g. ADR/RID gas receptacles and tank-containers).

93. The European Industrial Gases Association (EIGA) reports that its companies fill, store, transport and maintain an inventory of about 40 million cylinders to serve the market, and these cylinders are moved several times a year for refilling. To supply in bulk or in cylinders its 4 million customers at its 4.5 million delivery points, they operate a fleet of 14 000 vehicles covering 500 million km per year.

94. Similarly the European Association of Liquid Petroleum Gases (AEGPL) reports that its companies fill, store, transport and maintain 200 million gas cylinders per year (involving a fleet of 20 000 to 30 000 vehicles for delivery) and operate a fleet of 9700 road tank vehicles for bulk carriage.

95. For carriage of all kind of dangerous goods in tanks, 150 000 railway tank-wagons are operating in the EU, and 3000 new tank-wagons are built in Europe every year, according to a representative of the International Union of Private Wagons (UIP).

C. Operational requirements

96. Since the UN Model Regulations are intended to apply to all modes of transport, the operational requirements contained therein are only those relevant for all modes, mainly concerning the use of packagings, bulk packagings and tanks.

97. The regulations which are based on the UN Model Regulations usually contain additional requirements specific to the mode of transport, e.g.:

(a) For maritime transport: stowage and segregation; restrictions on passenger ships; some restrictions on quantities allowed for certain packagings; provisions in the event of incidents and for fire precautions;

(b) For air transport: stowage and segregation; restrictions on quantities allowed per packaging; passenger aircraft restrictions;

(c) For road and rail transport in Europe: possibilities of using alternative construction tanks (RID/ADR tanks); use of fibre reinforced plastic tanks; use of vacuum operated waste tanks; provisions concerning loading, unloading and handling; requirements for vehicle crew and equipment; restrictions for the passage of vehicles through road tunnels; supervision of vehicles;

(d) For inland navigation (ADN): requirements for loading, carriage, unloading and handling of cargo on board dry cargo vessels or tank vessels; provisions concerning vessel crew and equipment.

D. Hazard communication

98. Hazard communication in the transport of dangerous goods consists in:

(a) Affixing appropriate hazard label(s) on the packages (see annex 2);

(b) Marking the UN (identification) number of the goods on the package, and (except for inland transport in Europe) the “Proper Shipping Name”;

(c) Affixing placards identical to hazard labels but of a bigger format on the cargo transport units (vehicles, wagons, containers, tanks) and displaying, either on these placards or on separate orange plates, the UN identification number;

(d) Providing details of the dangerous goods offered for shipment in the transport document (i.e. UN No., name, hazard class, etc).

99. The labels, marks and placards provide information to transport workers as to the dangerous nature of the consignments, and help them in deciding how to stow such goods in the means of transport and checking compliance with relevant stowage and segregation requirements. They also provide essential information to emergency responders since the UN number itself provides sufficient information for immediate emergency action. Databases and guide books have been published in order to provide emergency responders with appropriate emergency action guidelines, on the basis of the UN number (e.g. North American Emergency Response Guidebook, IMO Emergency Procedures for Ships carrying Dangerous Goods (EmS) and Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG), ICAO Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods).

100. For road transport in Europe (ADR), drivers also have to be provided with instructions in writing informing them of the nature of the danger presented by the cargoes, proper use of personal protection equipment, action to be taken to protect themselves and to inform road users and emergency response services, first aid and how to deal with minor leakages or minor fires if this can be done without personal risk.

101. The information which has to be entered in the transport document by the consignor allows the carrier to take appropriate steps to comply with the transport requirements applicable to the dangerous goods carried. It is also an important tool for advance planning in particular for multimodal transport, for emergency response, and for control by authorities.

E. Training

102. As shown by accident statistics, one of the main causes of accidents in the transport of dangerous goods is human error. The UN Model Regulations and the related legal instruments require that all persons engaged in the transport of dangerous goods receive training in the contents of dangerous goods requirements commensurate with their responsibilities and they lay down specific provisions regarding general awareness/familiarization training, function specific training, safety training, records of training, etc. This training can be provided by the employer and concerns all persons involved in classification, packing, filling, labelling, documentation etc. as well as drivers and transport workers in general.

103. In Europe, additional mandatory and certified training is required for drivers of road vehicles (ADR driver training certificate). This involves mandatory initial training for about three days and examination for all drivers of vehicles carrying certain quantities of dangerous goods; two-day refresher courses and a new examination every five years; additional training is required for drivers of tank vehicles, vehicles carrying explosives and vehicles carrying radioactive material.

104. For inland navigation, experts are required to be on board chemical and gas tankers (under ADN), and these experts also have to undergo training every 5 years and to pass examinations.

105. Finally, in Europe, in all countries applying ADR, RID or ADN, each undertaking, the activities of which include the carriage, or the related packing, loading, filling or unloading of dangerous goods, has to appoint one or more dangerous goods safety advisers (DGSA) for the carriage of dangerous goods, responsible for helping to prevent the risks inherent in such activities with regard to persons, property and the environment. These DGSAs also have to hold a vocational training certificate issued after examination which has to be renewed every five years.

106. Apart from the safety benefits that result from these various training requirements, it is important to note that they also have important economic and social implications. They have of course a cost for the various employers concerned, but they also raise significantly the professional qualifications of the workers trained.

F. Controls

1. *General*

107. The UN Model Regulations do not contain recommendations as regards the control of the compliance by the various participants in a transport chain with the various requirements, since the legal requirements to be applied are contained in international conventions or national legislation.

108. Controls or other enforcement actions are normally carried out under the direct responsibility of national authorities designated for these purposes. The number of controls and the level of penalties in case of infringement may vary considerably from one country to the other, but controls are deemed necessary to ensure compliance. They are also an effective tool in revealing problems connected with the safety of the transport of dangerous goods or with the practicability of regulations, and in improving them.

109. Some guidance may be found in Chapter 1.8 of ADR, RID and ADN on how to carry out control operations without causing major disruption of transport services. ADR, RID and ADN also require their Contracting Parties to agree on mutual administrative support for the implementation of these legal instruments.

110. Problems of compliance occur very often in countries where the requirements applicable to international transport by one mode of transport differ from those applicable nationally to domestic transport by the same mode. This problem no longer exists in EU countries since all domestic regulations have been replaced by ADR and RID for road and rail transport (and soon by ADN for inland waterway transport). This is nevertheless still a problem in many European countries outside the EU, and in particular for the controls in international transport by road since road transport controllers themselves may be confused when checking vehicles involved in international transport if the regulations are not the same as those they are used to when checking vehicles involved in domestic traffic. Harmonization of national and international rules, in particular in the road sector is therefore an important factor not only for better compliance with safety requirements but also for transport facilitation.

2. Controls in the United States

111. According to PHMSA, there are approximately 47,000 firms shipping significant quantities of hazardous materials. This figure, however, does not include small or occasional shippers. The figure of 75,000 represents the total of hazardous materials shippers in the United States. However, this figure may be understated because many "firms" or shippers have multiple business locations.

112. PHMSA also estimates that there are approximately 500,000 potential carriers of hazardous materials in the United States. About 43,000 carriers are dedicated hazardous materials transporters that primarily move petroleum products and corrosives in cargo tank trucks. Yet, every carrier can knowingly, or even unknowingly, carry hazardous materials. Table 29 shows the number of hazardous materials carriers which could potentially carry hazardous materials.

Table 29: Number of potential hazardous materials carriers (United States)

Mode	Number of carriers
Air*	3,500
Highway	497,908
Rail	559
Marine	1,300
Total	**503,267**

***** Includes both domestic and foreign carriers with the potential to carry hazardous materials.

Sources: FAA Air Carrier data; FMCSA National Carrier Census Summary Report; FRA Inspection Database; and U.S. Army Corps of Engineers Waterborne Transportation Lines of the United States, Calendar Year 1997, Volume 1, National Summary.

113. Approximately 444,000 vehicles and vessels are dedicated to hazardous materials transport in the United States, primarily highway tank trucks and railroad tank cars. Potentially, another 7.6 million vehicles, vessels, and aircraft could carry hazardous materials on a periodic basis. When one considers the potential for hazardous materials to be undeclared, either due to economics or lack of knowledge, any vehicle, vessel, or aircraft could carry hazardous materials. The fleet breakdown for hazardous materials by mode in the United States is shown in Table 30.

Table 30: Hazardous materials fleet/vehicles (United States)

Mode	Dedicated HM Fleet/Vehicles	Additional potential HM fleet	Total potential fleet
Truck	195,000	6,436,000	6,631,000
Rail	238,000	1,078,000	1,316,000
Waterborne[1]	11,000	68,000	79,000
Air (commercial aircraft)[2,3]	0	12,000	12,000
Total	**444,000**	**7,594,000**	**8,038,000**

1 Represents both United States and foreign flag vessels including barges.

2 The figures are based on the air fleet of carriers who "will carry" hazardous materials.

3 Aircraft are not typically dedicated to hazardous materials transport.

Source: United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Department wide evaluation of hazardous materials shipments, March 2000.

114. The US administration carried out about 250 000 inspections in 1998 (all modes of transport) (see Table 31), which showed 95 361 violations. 40% of the violations were attributed to shipper functions, 37% to either the shipper or the carrier, and almost 23% to the carrier (see Table 32).

Table 31: Number of inspections by point of intervention (United States, all modes) – 1998

Point of Intervention				
Packaging/Manufacturing	**Shipper**	**Carrier/Forwarder**	**Vehicles/ Railcars**	**Total**
614	5,228	19,299	223,307	248,448

Source: United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Department wide evaluation of hazardous materials shipments, March 2000.

Table 32: Violations detected in 1998 (United States, all modes)

Section	Description	Total
Shipper violations		
	Special provisions	10
	Shipping papers	17,036
	Marking	5,774
	Labelling	2,077
	Emergency response	6,647
	General requirements – shipping and packing	6,418
	Specifications for tank bars	269
Percentage of total violations		**40.1%**
Shipper or carrier violations		
	Program procedures	3,141
	General	2,986
	Placarding	19,972
	Training	3,865
	Specifications for packagings	2,515
	Maintenance of packages	2,851
Percentage of total violations		**37.0%**
Carrier violations		21,800
Percentage of total violations		**22.9%**
Total		**95,361**

Source: United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Department wide evaluation of hazardous materials shipments, March 2000.

3. Road checks in Europe

115. EU Council Directive 95/50/EC on uniform procedures for checks on the transport of dangerous goods by road requires EU Member States to report on its application. The report from the Commission is based on the annual reports received from the Member States. So far, the Commission has published four reports covering years 1997-1998, (first report) [15], 1999-2002 (second report) [16], 2003-2005 (third report) [17] and 2006-2007 (fourth report).

116. The third report showed that the number of infringements per check may vary depending on the country from 0.02 to nearly 2. The data provided included only road checks and not checks on the premises (see Table 15). They did not provide information on the gravity of the violation (see Table 33).

[15] COM(2000) 517 final, 06.09.2000
[16] COM(2005) 430 final, 15.09.2005
[17] COM(2007) 795 final, 13.12.2007

Table 33: Time series (1997 – 2005) of the number of checks on infringements and penalties registered in each EU Member State

COUNTRY		1997	1998	1999	2000	2001	2002	2003	2004	2005	'97-'99	'00-'02	'03-'05
	Checks	5698	6062	6720	7666	5940	6671	5831	5420	5273	18480	20277	16524
	Infring.	3834	6043	11913	10542	6923	8271	13973	14653	n.a	21790	25736	28626
AT	Penalties	2317	3094	5630	7514	3825	2647	2647	5362	3041	11041	13986	11050
	Checks	1163	1624	2544	2414	2762	2594	2919	3417	3835	5331	7770	10171
	Infring.	1331	1548	2243	2450	2582	2338	1167	1445	1536	5122	7370	4148
BE	Penalties	0	0	0	0	0	0	0	1342	1306	0	0	2648
	Checks	0	0	0	0	0	0	0	0	0	0	0	0
	Infring.	0	0	0	0	0	0	0	0	0	0	0	0
CY	Penalties	0	0	0	0	0	0	0	0	0	0	0	0
	Checks	0	0	0	0	0	0	0	11334	17796	0	0	29130
	Infring.	0	0	0	0	0	0	0	1271	1615	0	0	2886
CZ	Penalties	0	0	0	0	0	0	0	1187	855	0	0	2042
	Checks	126533	129758	131161	115786	98005	93247	106653	103975	88915	387452	307038	299543
	Infring.	21849	24020	24351	21467	18279	19929	21556	20617	16418	70220	59675	58591
DE	Penalties	19408	17701	19014	14144	14773	14903	19660	20594	16418	56123	43820	56672
	Checks	275	251	274	242	94	203	311	621	708	800	539	1640
	Infring.	80	70	67	28	47	25	80	197	410	217	100	687
DK	Penalties	66	73	67	28	40	25	32	104	232	206	93	368
	Checks	0	0	0	0	0	0	0	74	67	0	0	141
	Infring.	0	0	0	0	0	0	0	74	67	0	0	141
EE	Penalties	0	0	0	0	0	0	0	74	67	0	0	141
	Checks	0	0	0	0	0	0	96	211	1106	0	0	1413
	Infring.	0	0	0	0	0	0	25	21	81	0	0	127
EL	Penalties	0	0	0	0	0	0	29	44	136	0	0	209
	Checks	23900	28037	32849	38759	40013	34423	36782	30453	32591	84786	113195	99826
	Infring.	3205	2975	4342	5569	6319	5087	5620	4706	3759	10522	16975	14085
ES	Penalties	0	0	0	0	0	0	0	0	3759	0	0	3759
	Checks	1602	1723	1437	1849	1690	1739	2394	2536	2401	4762	5278	7331
	Infring.	573	1109	745	763	637	666	706	1057	924	2427	2066	2687
FI	Penalties	776	1338	623	761	615	496	1202	1259	1002	2737	1872	3463
	Checks	19561	0	0	0	0	0	22951	28122	23341	19561	0	74414
	Infring.	1919	0	0	0	0	0	2325	2770	2303	1919	0	7398
FR	Penalties	0	0	0	0	0	0	485	783	n.a.	0	0	1268
	Checks	0	0	0	0	0	0	0	74546	41609	0	0	116155
	Infring.	0	0	0	0	0	0	0	819	935	0	0	1754
HU	Penalties	0	0	0	0	0	0	0	864	717	0	0	1581
	Checks	0	0	0	0	0	435	356	375	815	0	435	1546
	Infring.	0	0	0	0	0	269	399	429	684	0	269	1512
IE	Penalties	0	0	0	0	0	203	370	395	718	0	203	1483
	Checks	0	1797	2389	2459	2514	2528	2797	3135	3963	4186	7501	9895
	Infring.	0	440	333	347	296	247	760	1036	1353	773	890	3149
IT	Penalties	0	440	333	347	296	247	0	0	0	773	890	0
	Checks	0	0	0	0	0	0	0	189	258	0	0	447
	Infring.	0	0	0	0	0	0	0	74	93	0	0	167
LT	Penalties	0	0	0	0	0	0	0	74	96	0	0	170
	Checks	203	286	203	451	454	228	313	100	190	692	1133	603
	Infring.	52	52	4	44	37	18	122	60	114	108	99	296
LU	Penalties	12	4	0	0	0	0	192	91	183	16	0	466

COUNTRY		1997	1998	1999	2000	2001	2002	2003	2004	2005	'97-'99	'00-'02	'03-'05
	Checks	0	0	0	0	0	0	0	403	417	0	0	820
	Infring.	0	0	0	0	0	0	0	231	79	0	0	310
LV	**Penalties**	0	0	0	0	0	0	0	149	79	0	0	228
	Checks	0	0	0	0	0	0	0	0	36	0	0	36
	Infring.	0	0	0	0	0	0	0	0	34	0	0	34
MT	**Penalties**	0	0	0	0	0	0	0	0	34	0	0	34
	Checks	3521	2266	2416	3145	1429	4510	2362	2138	1949	8203	9084	6449
	Infring.	1586	656	1275	4889	2149	3287	946	1047	898	3517	10325	2891
NL	**Penalties**	1419	481	931	1158	711	1209	946	842	898	2831	3078	2686
	Checks	0	0	0	0	0	0	0	0	13505	0	0	13505
	Infring.	0	0	0	0	0	0	0	0	2323	0	0	2323
PL	**Penalties**	0	0	0	0	0	0	0	0	2210	0	0	2210
	Checks	0	0	0	135	150	78	67	192	171	0	363	430
	Infring.	0	0	0	43	116	60	34	118	116	0	219	268
PT	**Penalties**	0	0	0	0	0	0	0	0	0	0	0	0
	Checks	8125	7839	6669	7263	6283	5995	6333	5109	6375	22633	19541	17817
	Infring.	4509	4041	3096	2929	3447	3087	2275	2138	2138	11646	9463	6551
SE	**Penalties**	2140	2152	1758	1833	1435	1186	1462	1195	1917	6050	4454	4574
	Checks	0	0	0	0	0	0	4178	3228	2179	0	0	9585
	Infring.	0	0	0	0	0	0	736	586	359	0	0	1681
SI	**Penalties**	0	0	0	0	0	0	295	268	277	0	0	840
	Checks	0	0	0	0	0	0	0	0	83	0	0	83
	Infring.	0	0	0	0	0	0	0	0	5	0	0	5
SK	**Penalties**	0	0	0	0	0	0	0	0	0	0	0	0
	Checks	6011	9016	7928	7087	6616	4985	6124	4863	5762	22955	18688	16749
	Infring.	1817	1308	1041	660	972	806	810	745	916	4166	2438	2471
UK	**Penalties**	237	131	93	11	261	234	488	277	496	461	506	1261

: Not EU Member State yet / No Data Provision Required

Source: European Commission.

117. Table 34 (from the fourth report of the Commission) provides an overview of the evolution in time of the roadside checks in each Member State. The first line gives the number of checks. The second line provides the percentage of transport units checked where at least one infringement was found. On the third line there is the percentage of checks where the most severe infringement was of category 1, i.e. the most serious infringement.

118. The data begins in 2006 except for the number of checks where the information from the previous report is included. At the end of the table there are averages for the European Union and the statistics from Norway.

119. It should be noted that due to missing data from the Member States reports:

(a) the total numbers of checks for 2006 and 2007 do not include Estonia;

(b) the percentage of transport units checked where at least one infringement of the provisions was found for 2006 does not include Germany, Estonia or Spain; for 2007 Estonia and Spain are not included;

(c) the percentage of category 1 infringements for 2006 does not include Bulgaria, Germany or Portugal.

120. Information on the percentage of category 1 infringements can be misleading for some Member States. If more than one infringement per check has been reported, the percentage of category 1 infringements tends to be lower than the correct value. For 2006, this was the case for France, the Netherlands, Poland and Portugal; for 2007 for Bulgaria, the Netherlands, Poland and Portugal.

121. Some Member States have fewer infringements than there were transport units found to be not conforming. This is the case for Belgium, Italy, Hungary, Malta and Sweden. This should not influence the percentage in a systematic manner. There are cases where the law enforcement authorities report only where infringements are found, but do not provide any information on the infringements or penalties which ensue.

122. In 2006, the average in the EU was 2.95 checks per million tonne-kilometres; in 2007, it was 3.50. This implies an increase of 18.6%. Bulgaria and Hungary have an exceptionally high frequency of checks. Without the numbers of Bulgaria and Hungary, the EU average would be 2.33 in 2006 and 2.90 in 2007 and the annual increase would be 24.5%.

123. All Member States have carried out road side checks according to Directive 95/50/EC. There has been an improvement in the volume and quality of the data which has been submitted to the Commission. Most Member States are using the correct reporting formats. There continues to be a proportion of vehicles found during these checks that infringe the legislation. The number of infringements per check appears to be stable.

124. The number of checks in the EU increased in the region of 20% from 2006 to 2007, reaching some 285 000 annual checks in 2007. Approximately in one check out of eight an infringement was detected. Some 40% of these infringements were of the most serious type. Consequently, almost 10 000 vehicles were immobilised following their check. This clearly demonstrates that practical enforcement of rules on the transport of dangerous goods at the roadside is useful and helps to improve safety.

Table 34: Evolution of the number of checks, non-conformity and category 1 infringements (2003-2007)

COUNTRY/YEAR		**2003**	**2004**	**2005**	**2006**	**2007**
	No of Checks	5831	5420	5273	7089	7580
AT	% Non-conform				36,49%	36,00%
	% Risk Cat. 1				24,62%	24,55%
	No of Checks	2919	3417	3835	3977	4133
BE	% Non-conform				38,52%	39,90%
	% Risk Cat. 1				47,36%	30,47%
	No of Checks				19206	27996
BG	% Non-conform				2,49%	1,24%
	% Risk Cat. 1				#N/A	23,15%
	No of Checks				75	181
CY	% Non-conform				1,33%	0,55%
	% Risk Cat. 1				100,00%	0,00%
	No of Checks		11334	17796	6694	7691
CZ	% Non-conform				5,83%	5,60%
	% Risk Cat. 1				26,46%	17,87%
	No of Checks	106653	103975	88915	83760	86225
DE	% Non-conform				#N/A	20,18%
	% Risk Cat. 1				#N/A	47,00%
	No of Checks	311	621	708	889	646
DK	% Non-conform				55,46%	52,79%
	% Risk Cat. 1				34,08%	40,76%
	No of Checks		74	67	#N/A	#N/A
EE	% Non-conform				#N/A	#N/A
	% Risk Cat. 1				20,41%	37,50%
	No of Checks	96	211	1106	614	456
EL	% Non-conform				13,36%	16,89%
	% Risk Cat. 1				52,44%	64,94%
	No of Checks	36782	30453	32591	40023	42787
ES	% Non-conform				0,25%	0,19%
	% Risk Cat. 1				67,90%	66,69%
	No of Checks	2394	2536	2401	2530	3025

COUNTRY/YEAR		2003	2004	2005	2006	2007
FI	% Non-conform				36,56%	33,92%
	% Risk Cat. 1				31,35%	18,62%
	No of Checks	22951	28122	23341	5566	6388
FR	% Non-conform				10,28%	22,70%
	% Risk Cat. 1				26,60%	22,07%
	No of Checks		74546	41609	35555	25995
HU	% Non-conform				1,63%	4,30%
	% Risk Cat. 1				23,10%	27,03%
	No of Checks	356	375	815	630	731
IE	% Non-conform				32,54%	44,60%
	% Risk Cat. 1				34,15%	24,54%
	No of Checks	2797	3135	3963	4105	4515
IT	% Non-conform				32,35%	34,55%
	% Risk Cat. 1				72,82%	69,90%
	No of Checks		189	258	311	419
LT	% Non-conform				29,58%	16,95%
	% Risk Cat. 1				23,91%	15,49%
	No of Checks	313	100	190	190	182
LU	% Non-conform				64,21%	68,13%
	% Risk Cat. 1				15,75%	49,19%
	No of Checks		403	417	823	1609
LV	% Non-conform				11,42%	10,19%
	% Risk Cat. 1				25,53%	29,27%
	No of Checks			36	33	75
MT	% Non-conform				51,52%	76,00%
	% Risk Cat. 1				23,53%	34,09%
	No of Checks	2362	2138	1949	2750	7340
NL	% Non-conform				26,65%	14,69%
	% Risk Cat. 1				57,82%	57,16%
	No of Checks			13505	15840	39057
PL	% Non-conform				11,14%	2,96%
	% Risk Cat. 1				27,19%	15,52%
	No of Checks	67	192	171	235	137
PT	% Non-conform				76,17%	73,72%
	% Risk Cat. 1				#N/A	42,50%
	No of Checks				2914	4517
RO	% Non-conform				9,37%	5,58%
	% Risk Cat. 1				69,60%	64,77%
	No of Checks	6333	5109	6375	4182	4219
SE	% Non-conform				29,60%	20,27%
	% Risk Cat. 1				22,08%	24,04%
	No of Checks	4178	3228	2179	1621	1041
SI	% Non-conform				17,89%	19,50%
	% Risk Cat. 1				42,76%	39,41%
	No of Checks			83	247	300
SK	% Non-conform				0,00%	0,67%
	% Risk Cat. 1				#N/A	0,00%
	No of Checks	6124	4863	5762	4851	8221
UK	% Non-conform				13,69%	30,76%
	% Risk Cat. 1				19,13%	30,01%
	No of Checks				244710	285466
EU	% Non-conform				12,11%	14,44%

COUNTRY/YEAR		2003	2004	2005	2006	2007
	% Risk Cat. 1				40,57%	41,06%
	No of Checks				632	417
NO	% Non-conform				34,65%	34,53%
	% Risk Cat. 1				21,27%	15,97%

Source: Report from the Commission to the European Parliament and the Council on the application by the Member States of Council Directive 95/50/EC on uniform procedures for checks on the transport of dangerous goods by road (COM(2010)364 final of 7 July 2010)

V. SECURITY

125. Some requirements traditionally contained in transport of dangerous goods regulations may be deemed as representing themselves a security factor, e.g. high safety level construction requirements for packagings and transport equipment, training of transport workers etc. Some legal instruments contain provisions which serve the purposes of both safety and security. ADR addresses the supervision of vehicles, in particular those carrying explosives but also those carrying highly dangerous substances above certain quantities, including supervision during loading and unloading and on parking sites.

126. After 11 September 2001, many Governments realized that it had become necessary to consider much more closely how to prevent potential terrorist attacks. Transport of dangerous goods was rapidly identified as one of the areas where appropriate international action should be taken urgently. As a result, the UN ECOSOC Sub-Committee of Experts on the Transport of Dangerous Goods issued, already in December 2002, recommendations as regards the security measures or precautions that should be provided through transport of dangerous goods regulations in order to minimize the risk of theft or misuse of dangerous goods that may endanger persons or property.

127. These new security provisions are contained in Chapter 1.4 of the UN Model Regulations. They have been included in the IMDG Code (for maritime transport) and the ICAO TI (for air transport) with the reservations nevertheless that:

(a) For maritime transport, they remain recommendations to Governments, that national competent authorities may apply additional security provisions, and that the relevant security provisions of Chapter XI-2 of the SOLAS 74 Convention and of the International Ship and Port Facility Security (ISPS) Code apply;

(b) For air transport, they supplement (and do not supersede) the provisions of Annex 17 (Security) of the Convention on International Civil Aviation and of the ICAO Security Manual for Safeguarding Civil Aviation against Acts of Unlawful Interference.

128. The provisions of Chapter 1.4 of the UN Model Regulations were introduced for the first time in the 2005 editions of the ADR and RID (Chapter 1.10), for mandatory application to international transport (and in the EU also for domestic transport) by road and rail as from 1 July 2005, with some minor adaptations. They were also included in the 2005 edition of ADN, but they did not become of mandatory application for international carriage by inland waterways until 28 February 2009 (following entry into force of ADN on 29 February 2008), although some Governments had already taken steps to implement them at national level (notably on the Rhine through ADNR) before that date.

129. These security provisions consist of:

(1) General provisions applicable to all dangerous goods: the security of areas used for the temporary storage during carriage of dangerous goods; identification of carriers and their staff; training; registration of valid training certificates;

(2) Provisions applicable to the so-called “high consequence dangerous goods” i.e. those which have the potential for misuse in a terrorist incident and which, as a result, could produce serious consequences such as mass casualties, mass destruction or, particularly for Class 7, mass socio-economic disruption. They require special measures to be applied to prevent theft of the vehicles and cargoes. Arrangements between consignors, carriers and any other

participants in the transport operation have to be made for adopting, implementing and complying with a security plan (see Tables 35 and 36).

Table 35: Table of high consequence dangerous goods (ADR 2011)

Class	Division	Substance or article	Quantity		
			Tank (*l*)[c]	Bulk (kg)[d]	Packages (kg)
1	1.1	Explosives	[a]	[a]	0
	1.2	Explosives	[a]	[a]	0
	1.3	Compatibility group C explosives	[a]	[a]	0
	1.4	Explosives of UN Nos. 0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456 and 0500	[a]	[a]	0
	1.5	Explosives	0	[a]	0
2		Flammable gases (classification codes including only the letter F)	3000	[a]	[b]
		Toxic gases (classification codes including letters T, TF, TC, TO, TFC or TOC) excluding aerosols	0	[a]	0
3		Flammable liquids of packing groups I and II	3000	[a]	[b]
		Desensitized explosives	0	[a]	0
4.1		Desensitized explosives	[a]	[a]	0
4.2		Packing group I substances	3000	[a]	[b]
4.3		Packing group I substances	3000	[a]	[b]
5.1		Oxidizing liquids of packing group I	3000	[a]	[b]
		Perchlorates, ammonium nitrate, ammonium nitrate fertilizers and ammonium nitrate emulsions or suspensions or gels	3000	3000	[b]
6.1		Toxic substances of packing group I	0	[a]	0
6.2		Infectious substances of Category A (UN Nos. 2814 and 2900, except for animal material)	[a]	0	0
7		Radioactive material	3000 A_1 (special form) or 3000 A_2, as applicable, in Type B(U), B(M) or C packages		
8		Corrosive substances of packing group I	3000	[a]	[b]

[a] *Not relevant.*

[b] *The provisions of 1.10.3 of the ADR do not apply, whatever the quantity is.*

[c] *A value indicated in this column is applicable only if carriage in tanks is authorized, in accordance with Chapter 3.2, Table A, column (10) or (12). For substances that are not authorized for carriage in tanks, the instruction in this column is not relevant.*

[d] *A value indicated in this column is applicable only if carriage in bulk is authorized, in accordance with Chapter 3.2, Table A, column (10) or (17). For substances that are not authorized for carriage in bulk, the instruction in this column is not relevant.*

Source: ADR 2011, Annex A, Table 1.10.5.

Table 36: Security plan according to ADR 2011

The security plan shall comprise at least the following elements: (a) specific allocation of responsibilities for security to competent and qualified persons with appropriate authority to carry out their responsibilities; (b) records of dangerous goods or types of dangerous goods concerned; (c) review of current operations and assessment of security risks, including any stops necessary to the transport operation, the keeping of dangerous goods in the vehicle, tank or container before, during and after the journey and the intermediate temporary storage of dangerous goods during the course of intermodal transfer or transhipment between units as appropriate; (d) clear statement of measures that are to be taken to reduce security risks, commensurate with the responsibilities and duties of the participant, including: - training; - security policies (e.g. response to higher threat conditions, new employee/employment verification, etc.); - operating practices (e.g. choice/use of routes where known, access to dangerous goods in intermediate temporary storage (as defined in (c)), proximity to vulnerable infrastructure etc.); - equipment and resources that are to be used to reduce security risks; (e) effective and up to date procedures for reporting and dealing with security threats, breaches of security or security incidents; (f) procedures for the evaluation and testing of security plans and procedures for periodic review and update of the plans; (g) measures to ensure the physical security of transport information contained in the security plan; and (h) measures to ensure that the distribution of information relating to the transport operation contained in the security plan is limited to those who need to have it. Such measures shall not preclude the provision of information required elsewhere in ADR.

Note: *Carriers, consignors and consignees should co-operate with each other and with competent authorities to exchange threat information, apply appropriate security measures and respond to security incidents.*

Source: ADR 2011, Annex A, para.1.10.3.2.2.

130. In 2005, the European Commission conducted a study[18] on the evaluation of the security provisions for the transport of dangerous goods adopted by the land modal regulations (RID/ADR/ADN), their effective implementation and practicability, as well as their consistency and deficiencies. The study showed that:

(a) the current regulations covering security during the transport of dangerous goods have provided the right level of protection to the public taking account of the factor that trade in dangerous goods must continue with the minimum of restrictions as it provides important raw materials for many different sectors of the economies of Europe. It was noted, however, that the three sets of modal regulations have adopted the same provisions (with very minor changes) despite the fact that the individual modes do present different security risks. Vehicles, for instance, are easily stolen and easily moved from one place to another whilst barges and trains are unlikely to be stolen and the most likely scenario is that the contents of the barge or train are stolen. The current provisions do not take into account this distinction and it was recognized that it may be necessary to consider this aspect of modal differences in the future.

(b) Member States were quite evenly divided over their attitudes to the whole subject of security. Many considered it to be of high importance, notably those countries that have been affected by terrorism placed great emphasis on this when compared to many others who did not consider themselves at risk.

(c) There was general support that the provisions of Chapter 1.10 were adequate although there were a significant number of respondents that did indicate that some areas of the text could be improved and clarified. Specific examples of these deficiencies were difficult to identify but

[18] Study on transport of high consequence dangerous goods (HCDG). EU Ref: TREN/07/ST/S07.76239. 13 October 2008, available at : http://ec.europa.eu/transport/security/studies/security_en.htm (last accessed: ....2012)

amongst the issues raised in other parts of the questionnaire it would appear that there could be more assistance with:

(i) better definition of the content of security plans;

(ii) what happens when drivers run out of driving time through road accidents;

(iii) defining responsibility for preparing and implementing security plans and procedures; and

(iv) advice on the application of enforcement.

(d) An analysis of the high consequence dangerous goods list and the responses from stakeholders have identified some further issues as follows:

(i) delay in issuing new revised requirements for radioactive materials Class 7 by the IAEA

(ii) possible inclusion in the list of all Division 1.3 explosives, and Division 2.2 cryogenic gases which are oxidizing (e.g. liquid oxygen);

(iii) volumes of traffic for solid and liquid organic peroxides type B (Class 5.2) and self-reactive substances type B (Class 4.1) to be investigated, since if it is significant and could therefore pose a risk, inclusion may be considered

(iv) treatment of Class 6.2 infectious substances Category A pathogens.

(v) treatment of smaller quantities of security sensitive dangerous goods which are currently exempt under the provisions of section 1.1.3.6 of ADR/RID/ADN.

(e) Other issues raised were enforcement and regular visits to premises which appears to be a deficiency in the system as there is no clear requirement either in RID/ADR/ADN, the Framework Directives or the Uniform Procedures Directive to visit premises. Other difficulties arise when different Government departments are responsible for security and transport and staff trained in safety do not have the expertise and knowledge to apply the security provisions. It is possible that these shortcomings could be addressed by an amendment to the Uniform Procedures Directive[19] to require specific security inspections at the roadside and at premises. An extension to the Uniform Procedures Directive checklist to include security questions may also help.

(f) The SEVESO[20] reporting requirements were considered to be helpful and such a provision for reporting security incidents could be considered.

(g) A clarification of the role, in the context of security, of the Dangerous Goods Safety Adviser would be beneficial.

(h) A serious problem was identified with the lack of secure parking facilities for vehicles carrying high consequence dangerous goods. Although the Commission has made funds available, there was low awareness about this. The Commission and other stakeholders could usefully offer more help and guidance.

(i) There was no support for the registration of companies carrying high consequence dangerous goods although some countries do require registration of drivers and Dangerous Goods Safety advisers. However, it was recognized that a common standard design for the driver training certificate agreed at UN level[21], which would include some security features allowing

[19] *Council Directive 95/50/EC of 6 October 1995 on uniform procedures for checks on the transport of dangerous goods by road.*

[20] *Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances.*

[21] *Note by the UNECE secretariat: The Working Party on the Transport of Dangerous Goods (WP.15) addressed the review of the driver training certificate during the period 2008-2009. The work was completed in 2009 and a model for the*

enforcement staff to carry out quick checks, could offer significant benefits without excessive cost.

(j) Finally, there was very little support for vehicle tracking systems at present.

VI. UN MECHANISMS FOR THE DEVELOPMENT AND HARMONIZATION OF TRANPORT OF DANGEROUS GOODS REGULATIONS

A. Recommendations of global scope: Model Regulations on the Transport of Dangerous Goods ("Orange Book") and Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

1. The United Nations Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

131. The United Nations created in 1953 the UN Committee of Experts on the Transport of Dangerous Goods, as a subsidiary body of the Economic and Social Council belonging to the category of "Expert bodies composed of governmental experts".

132. In 1999, the Economic and Social Council decided to extend the mandate of the Committee in order to provide a mechanism for ensuring a global harmonization of systems of classification and labelling of chemicals and to meet the objectives set out in Chapter 19 of Agenda 21 by the United Nations Conference on Environment and Development (UNCED) (Rio de Janeiro, 3-12 June 1992). Thus, the Committee became the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals.

133. The Committee now has two subsidiary bodies: the Sub-Committee of Experts on the Transport of Dangerous Goods (TDG Sub-Committee) and the Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals. The Committee and the Sub-Committees work on a biennial basis. The two Sub-Committees hold their sessions back-to-back twice a year (June-July and December). The Committee meets once only at the end of the biennium in every even year. All sessions take place in Geneva.

134. The TDG Sub-Committee is now composed of 30 expert countries[22] from all parts of the world. The criteria for full membership are the availability of expertise in the applicant country, the willingness of the country to make available qualified experts at its own expenses, the interest of the country in international transport of dangerous goods and the adequate participation of developing countries. Furthermore, States which are not members of the Sub-Committee may be invited to participate in its deliberations on any matter of particular concern to that State. States thus invited participate as "Observers". They do not have the right to vote but they may submit proposals which may be put to the vote on request of any member of the Sub-Committee.

135. Specialized agencies of the United Nations are entitled to be represented at meetings of the Sub-Committee and to participate through their representatives without the right to vote, and to submit proposals which may be put to the vote at the request of any member of the Sub-Committee.

136. Representatives of intergovernmental organizations accorded permanent observer status by the General Assembly and of other intergovernmental organizations designated on an *ad hoc* or a continuing basis by the Committee may participate, without the right to vote, in the deliberations on questions within the scope of their activities.

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training certificate for drivers of vehicles carrying dangerous goods was introduced in the 2011 edition of the ADR (Chapter 8.2, paragraph 8.2.2.8) applicable as from 1 January 2011.

[22] *Argentina, Australia, Austria, Belgium, Brazil, Canada, China, Czech Republic, Finland, France, Germany, India, Iran, Italy, Japan, Kenya, Mexico, Morocco, Netherlands, Norway, Poland, Portugal, Republic of Korea, Russian Federation, South Africa, Spain, Sweden, Switzerland, United Kingdom and United States of America. (Membership as of January 2012)*

2. UN Recommendations on the Transport of Dangerous Goods

137. The TDG Sub-Committee prepares and up-dates on a biennial basis the Recommendations on the Transport of Dangerous Goods, also known as the "Orange Book", which are addressed not only to Members States of the UN for the development of their national requirements for domestic traffic of dangerous goods, but also to international organizations such as the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO) and regional commissions such as UNECE for regulations and international/regional agreements or conventions governing the international transport of dangerous goods by sea, air, road, rail and inland waterways.

138. The UN Recommendations on the Transport of Dangerous Goods, which were first published in 1956, address the following main areas:

- List of dangerous goods most commonly carried and their identification and classification;
- Consignment procedures: labelling, marking, and transport documents;
- Standards for packagings and Intermediate Bulk Containers, test procedures, and certification;
- Standards for multimodal tank-containers (portable tanks) and bulk containers, test procedures certification and service requirements.

139. These recommendations contain all basic provisions for the safe carriage of dangerous goods, but they have to be completed by additional requirements which may have to be applied at national level or for international transport depending on the mode of transport envisaged.

140. In December 1994, the UN Committee of Experts recognized that reformatting the recommendations contained in the "Orange Book" into the form of "Model Regulations" annexed to a set of basic recommendations would provide certain benefits:

- more direct integration into all modal, national and international regulations and easier updating;
- enhanced harmonization;
- overall resource savings for the Governments of Member States, the United Nations and other international organizations;
- improvement in the "user-friendliness" of the regulations;
- better identification of responsibilities in transport operations; and,
- improvement of compliance with the regulations, in particular in the case of multimodal operations.

141. The Model Regulations on the Transport of Dangerous Goods annexed to the Recommendations are divided into seven parts as follows:

Part 1: General provisions, definitions, training and security

Part 2: Classification

Part 3: Dangerous Goods List, special provisions and exceptions

Part 4: Packing and tank provisions Part 5: Consignment procedures

Part 6: Requirements for the construction and testing of packagings, intermediate bulk containers (IBCs), large packagings, portable multiple-element gas containers (MEGCs) and bulk containers

Part 7: Provisions concerning transport operations

142. The latest version (17th revised edition[23]) was issued in 2011 (see also annex 3). The 18th revised edition will be issued in 2013.

143. For the specific case of radioactive material, the International Atomic Energy Agency (IAEA) issues very detailed requirements concerning all aspects of the safe transport of radioactive material, published as the "IAEA Regulations for the Safe Transport of Radioactive Material". These requirements are also incorporated in the UN Model Regulations.

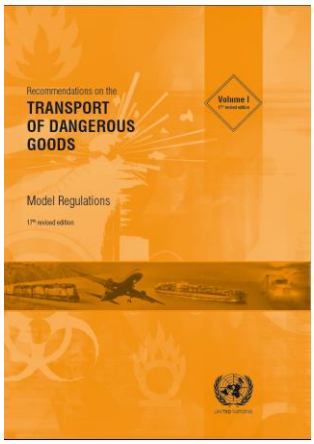
144. It is recommended that all Governments (when developing national regulations), and international organizations (when developing regional or internationally legally binding instruments) follow the same structure and implement the provisions contained in these seven parts, although it is recognized that the Model Regulations may have to be supplemented by specific provisions related to legal aspects or by requirements specific to one mode of transport because such requirements are not addressed in the Model Regulations.

145. The Model Regulations are supplemented by a publication entitled "Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria". This Manual is intended to present the United Nations schemes for the classification of certain types of dangerous goods (in particular dangerous goods presenting a physical hazard, such as explosivity, flammability, self-reactivity, oxidizing properties, etc.) and to give a description of the test methods and procedures considered to be the most useful for providing competent authorities with the necessary information to arrive at a proper classification of substances and articles.

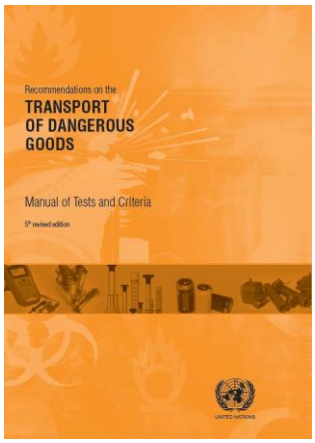
146. A consolidated edition of the Manual of Tests and Criteria is usually published every four years (i.e.: after completion of two biennia of work). Amendments adopted by the Sub-Committee of experts during the first biennium are usually published as a separate booklet. The latest edition of the Manual (5th revised edition[24]) was issued in 2009. Amendment 1 to the 5th revised edition was published in 2011.

Figure 13: Cover pages of the UN Model Regulations and the Manual of Tests and Criteria

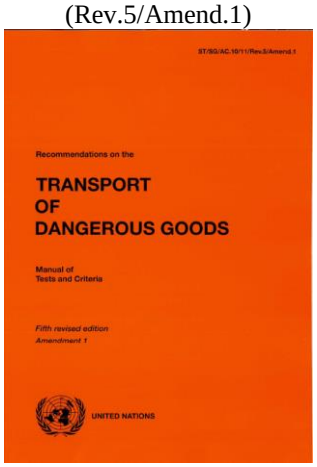
UN Model Regulations (Rev.17)



Manual of Tests and Criteria (Rev.5)



Amendment 1 to the Manual of Tests and Criteria (Rev.5/Amend.1)



[23] http://www.unece.org/trans/danger/publi/unrec/rev17/17files_e.html
[24] http://www.unece.org/trans/danger/publi/manual/rev5/manrev5-files_e.html

3. Globally Harmonized System of Classification and Labelling of Chemicals

147. Transport of dangerous goods is regulated in order to prevent, as far as possible, accidents to persons or property and damage to the environment, the means of transport employed or to other goods. With different regulations in every country and for different modes of transport, international trade of chemicals and dangerous products would have been seriously impeded, if not made impossible and unsafe.

148. With the UN Recommendations harmonized system of classification, listing, packing, marking, labelling, placarding and documentation, carriers, consignors, inspection authorities and emergency services benefit from simplified transport, handling and control, from a reduction in time-consuming formalities to a coherent approach for emergency response.

149. However, this system is implemented only through transport regulations. In practice, dangerous goods are also subject to other kinds of regulations, e.g. work safety regulations, consumer protection regulations, storage regulations. These regulatory systems also contain provisions concerning classification and labelling, and for the time being they are not internationally harmonized.

150. In June 1992, the United Nations Conference on Environment and Development (UNCED) adopted the so-called "Agenda 21" which was a programme of action for the future. It contained a Chapter 19 on the environmentally sound management of toxic chemicals including prevention of illegal international traffic in toxic and dangerous products.

151. This Chapter 19 proposed six programme areas for environmentally sound management of chemicals. Programme Area B concerned harmonization of classification and labelling of chemicals and its objective was that a globally harmonized hazard classification and compatible labelling system, including material safety data sheets and easily understandable symbols should be available, if possible, by the year 2000.

152. In accordance with the recommendations contained in Programme Area B, the UN Sub-Committee of Experts on the Transport of Dangerous Goods, the International Labour Office (ILO), the United Nations Environment Programme (UNEP), the World Health Organization (WHO), the Food and Agriculture Organization (FAO), the Organization for Economic Co-operation and Development (OECD) and regional and national authorities having existing classification and labelling systems formed a coordinating group in order to elaborate a globally harmonized system of classification and labelling of chemicals, and to draft proposals for standardization of hazard communication terminology and symbols in order to enhance risk management of chemicals and facilitate both international trade and translation of information into the end-user's language. The coordinating group allocated tasks to three focal points:

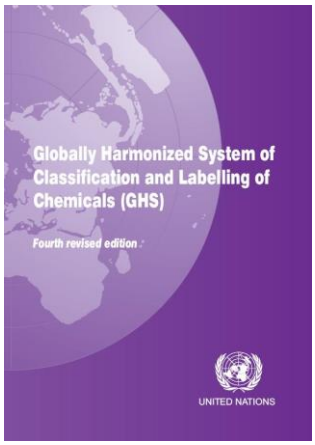
UN/CETDG-ILO	for classification criteria for physical hazards
OECD	for classification criteria for health hazards and hazards to the environment
ILO	for hazard communication

153. The Co-ordinating Group finished its work in 2001 and transmitted the outcome to the newly created GHS Sub-Committee at its December 2001 session. The GHS Sub-Committee continued the work in 2002, and the Committee adopted, in December 2002, the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). Since then, it has been updated every two years. The latest edition of the GHS (4th revised edition[25] was issued in 2011)..

154. The GHS contains recommendations concerning hazard classification and hazard communication (including labelling and safety data sheets) for physical, health and environmental hazards,

[25] http://www.unece.org/trans/danger/publi/ghs/ghs_rev04/04files_e.html

Figure 14: Cover page of the GHS (Rev.4)



155. The World Summit on Sustainable Development (Johannesburg) recommended in 2002 that this new system, covering all kinds of regulations in multiple sectors, be implemented at international level by 2008. However, since the Globally Harmonized System addresses several sectors (transport, consumers, occupational health and safety and the environment), its effective implementation requires significant efforts from Member States to amend many existing legal texts concerning chemical safety in each sector or to enact new legislation and therefore, not all countries have completed the implementation process.

156. In the transport sector, the Model Regulations have already been updated to reflect the relevant provisions of the fourth revised edition of the Globally Harmonized System. All the major international instruments listed in section B below have also been amended accordingly for effective application in 2011, as have all national regulations that are based on those instruments or that are regularly updated on the basis of the Model Regulations.

157. In the other sectors, the situation is more complex, because implementation requires the amendment or revision of a considerable number of different legal texts and guidelines for application.

158. Legal instruments or national standards implementing the Globally Harmonized System (or allowing its application) in one or several sectors are already available in the following countries: Brazil (2009), China (2010), Ecuador (2009), Japan (2006), New Zealand (2001), Mauritius (2004), the Republic of Korea (2006), Serbia (2010), Singapore (2008), Switzerland (2009), Uruguay (2009), Viet Nam (2009) and Zambia, as well as in the 27 countries members of the European Union and the 3 countries members of the European Economic Area (January 2009).

159. Other countries, in particular all those which participate (either as full members or as observers) in the meetings of the Subcommittee of Experts of the Globally Harmonized System of Classification and Labelling of Chemicals such as: Australia, Canada, Chile, Malaysia, the Philippines, the Russian Federation, Thailand or the United States, continue to work on the revision and amendment of their legal texts, standards and guidelines to achieve implementation of the Globally Harmonized System as soon as possible. In particular Australia released in 2009 a draft of its relevant regulations for implementation of the GHS at the workplace, and the publication of the Final Rule implementing the GHS in the United States at the workplace is expected during the first quarter of 2012.

160. Among those which have already implemented the system, the European Union has already updated twice the Regulation implementing the GHS in all its Member States. The second update entered into force on 19 April 2011[26] and was included various scientific-technical changes based on the third revision of the GHS.

[26] Commission Regulation (EU) No 286/2011 of 10 March 2011 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures

B. Implementation of the UN Model Regulations on the Transport of Dangerous Goods through legal modal transport instruments of global scope

1. Maritime transport

161. Transport of dangerous goods by sea is regulated by Chapter VII of the International Convention for the Safety of Life at Sea (SOLAS 74) and Annex III of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). For the purposes of effective implementation of the requirements of these conventions, the International Maritime Organization has published the "International Maritime Dangerous Goods Code" (IMDG Code).

162. The application of the IMDG Code to maritime transport became mandatory through the SOLAS Convention on 1 January 2004 (161 Contracting Parties[27]).

163. The format of the IMDG Code is in line with that of the UN Model Regulations. The seven parts of the UN Model Regulations described above are supplemented with chapters specific to the maritime mode of transport, dealing in particular with stowage and segregation of dangerous goods and cargo transport units on board ships, marine pollution aspects, carriage of road tank vehicles on board ships, special provisions in the event of an incident and fire precautions, transport of dangerous goods in shipborne barges on barge-carrying ships, transport of wastes, etc.

2. Air transport

164. Transport of dangerous goods by air is regulated by Annex 18 to the Convention on International Civil Aviation (Chicago Convention). Annex 18 is amplified by the International Civil Aviation Organization (ICAO)'s "Technical Instructions for the Safe Transport of Dangerous Goods by Air" and the 190 Contracting Parties[28] to the Chicago Convention are required to implement these Technical Instructions or to notify ICAO of those cases where they have adopted provisions different from those contained in the Technical Instructions. The ICAO Technical Instructions have always been developed and kept up to date on the basis of the UN Recommendations on the Transport of Dangerous Goods (and IAEA Regulations in the case of radioactive material).

165. The International Air Transport Association also publishes a manual called "Dangerous Goods Regulations" on the basis of the ICAO Technical Instructions. This manual incorporates additional operational requirements and is intended to provide a harmonized system of procedures for air transport operators to accept and transport dangerous goods safely and efficiently.

C. Implementation through international legal instruments of regional application

1. ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road

166. ADR was developed under the auspices of the UNECE Inland Transport Committee and was concluded in 1957. It entered into force in 1968.

167. The Agreement contains 17 articles, the most important of which is the second, which says in effect that, apart from some excessively dangerous goods, other dangerous goods may be moved internationally in road vehicles provided that the packaging, labelling, vehicle construction, equipment and operation are all in accordance with Annexes A and B to the Agreement, which contain all the detailed provisions (see annex 4). ADR is an Agreement between States, and there is no overall enforcing authority. In practice, highway checks are carried out by Contracting States, and non-compliance may then result in action by national authorities against the driver in accordance with their domestic legislation. ADR itself does not prescribe any penalties.

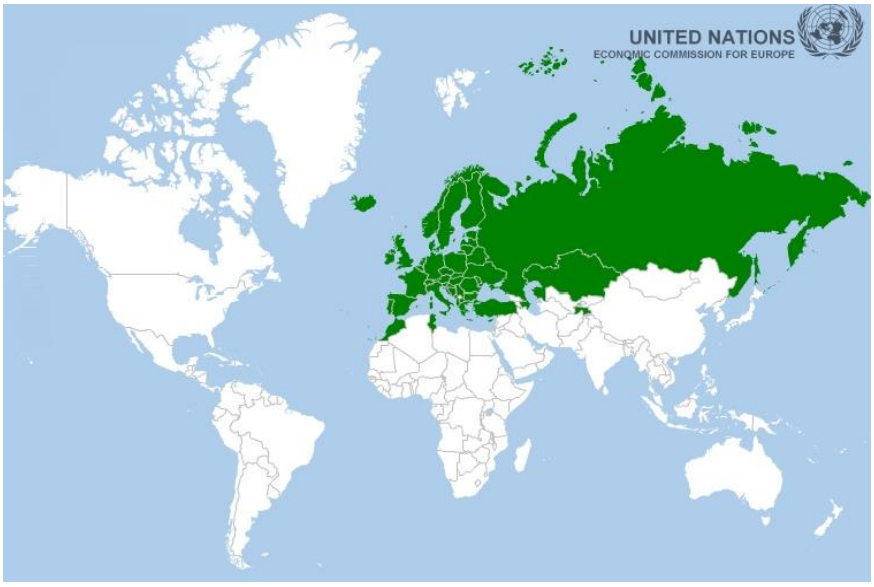
168. ADR is intended primarily to increase the safety of international transport by road, but it is also an important trade facilitation instrument. Except for dangerous goods which are totally prohibited for carriage, and except when carriage is regulated or prohibited for reasons other than safety, the international carriage of dangerous goods by road is authorized by ADR on the territories of Contracting Parties, provided that the conditions laid down in Annexes A and B, that is, the detailed provisions of the Agreement, are complied with.

[27] Status as of January 2012.

[28] Status as of January 2012.

169. There are at present 48 Contracting Parties to ADR (see Figure 15). It should be noted that the requirements of Annexes A and B of ADR have been annexed to European Union Council Directive 94/55/EC (as amended) on the approximation of the laws of Member States with regard to the transport of dangerous goods, and therefore these requirements have become applicable not only to international transport of dangerous goods but also to domestic traffic in the 27 countries of the European Union since 1 January 1997, as well as in Iceland, Norway, Liechtenstein and Switzerland.

Figure 15: Contracting Parties* to the European Agreement on the Carriage of Dangerous Goods by Road (ADR)



* *Contracting Parties as of January 2012: Albania, Andorra, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Montenegro, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Tunisia, Turkey, Ukraine and United Kingdom*

2. RID - Regulations concerning the International Transport of Dangerous Goods by Rail

170. RID is annexed to the Convention for international transport by rail (COTIF), and therefore it is applied by the 47 Contracting Parties[29] to the COTIF, i.e. countries including all western and central European countries, plus certain Middle East and North African countries, as well as the European Union, which accession agreement entered into force on 1 July 2011.

171. The RID Regulations are published by the Central Office for International Rail Transport, which is based in Bern. The RID Regulations are aligned closely with ADR thanks to the work of a Joint Meeting of the UNECE Working Party on the Transport of Dangerous Goods and of the RID Safety Committee, also known as the RID/ADR/ADN Joint Meeting.

172. As for ADR, RID is also made applicable to domestic traffic in the European Union countries through Directive 96/49/EC (as amended).

[29] *Contracting Parties as of January 2012: Albania, Algeria, Armenia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iran, Iraq, Ireland, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, the former Yugoslav Republic of Macedonia, Monaco, Montenegro, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Syria, Tunisia, Turkey, Ukraine, United Kingdom and the European Union. Jordan is an Associate Member.*

3. Convention concerning international goods transport by railway (SMGS)

173. The SMGS is administered by the "Committee of the Organization for Railway Cooperation" (OSZhD), and this Convention applies to 25 countries including the Russian Federation, most countries of the former USSR, a few Central European countries, Mongolia, the Socialist Republic of Vietnam, the People's Republic of China and the Democratic People's Republic of Korea. The railways of countries which are parties to SMGS apply the "Rules of the Transport of Dangerous Goods", known as supplement No.2 to SMGS. These rules are being progressively updated by OSZhD, on the basis of RID, but they have not yet been fully aligned.

4. ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways

174. The ADN provisions were until May 2000 recommendations, not mandatory regulations. These recommendations were addressed to the Governments of European countries with inland waterway networks and to the international river Commissions such as the Central Commission for the Navigation of the Rhine (CCNR) and the Danube Commission. These recommendations have now been upgraded to a formal European Agreement, similar to ADR, which was adopted on 25 May 2000 and signed by 10 countries (France, Germany, Italy, Czech Republic, Croatia, Luxembourg, Netherlands, Republic of Moldova, Slovakia and Bulgaria). It entered into force on 29 February 2008, and counts 17 Contracting Parties (see Figure 16). The annexed Regulations, based on the UN Model Regulations, ADR and RID and supplemented with regulations specific to inland waterway transport, is applicable since 28 February 2009 (see also annex 4).

Figure 16: Contracting Parties* to the European Agreement on the Carriage of Dangerous Goods by Inland Waterways (ADN)

**: Austria, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Luxembourg, Moldova, Netherlands, Poland, Romania, Russian Federation, Serbia, Slovakia, Switzerland, Ukraine*

5. RID/ADR/ADN amendment procedures

175. The intergovernmental bodies responsible for amending RID, ADR and ADN to keep them in line with the UN Recommendations and to update them in the light of technical progress or of specific needs of the European industry or Governments are

- For ADR: the UNECE Inland Transport Committee Working Party on the Transport of Dangerous Goods (WP.15);
- For RID: the OTIF RID Safety Committee;
- For ADN: the UNECE (WP.15)/CCNR Joint Meeting of Experts on the Regulations annexed to ADN, and now the ADN Administrative Committee.

176. The provisions which are common to RID, ADR and ADN are discussed and elaborated first by the so-called “RID/ADR/ADN Joint Meeting”.

177. Since the European Commission and the European Committee for Standardization (CEN) are also very active in the area of approximation of EU member States legislation, the RID/ADR/ADN Joint Meeting has established a special working group for cooperation with CEN. The mandate of the working group is to check the compliance of draft EN standards under development with the requirements of RID/ADR/ADN before their adoption.

178. Once compliance has been verified, a reference to a given EN standard is introduced in RID/ADR/ADN according to which compliance with the EN standard is deemed equivalent to compliance with a corresponding provision of RID/ADR/ADN.

179. In short, regulations concerning inland transport in Europe are discussed first by the UN Sub-Committee of Experts if they concern all modes of transport, then by the RID/ADR/ADN Joint Meeting for adaptation, if needed, to the European context, and finally by the intergovernmental body responsible for a given mode of transport. Once adopted by the relevant intergovernmental body, the amendments are still subject to formal adoption by Contracting Parties to ADR, ADN or RID in accordance with the legal amendment procedure laid down in the agreement or convention.

6. ASEAN countries

180. The Economic and Social Commission for Asia and the Pacific (UNESCAP) published, in 1997, Guidelines for the Establishment of National and Regional Systems for Inland Transportation of Dangerous Goods, recommending the implementation of the Recommendations on the Transport of Dangerous Goods. The Transport Ministers of the Association of Southeast Asian Nations (ASEAN) signed, on 20 September 2002, Protocol No. 9 to the ASEAN Framework Agreement on the Facilitation of Goods in Transit. This Protocol provides for the simplification of procedures and requirements for the transit transport of dangerous goods in ASEAN, using the Recommendations on the Transport of Dangerous Goods and ADR.

7. Mercosur countries

181. The Common Market of the South (Mercosur) countries (Argentina, Brazil, Uruguay, Paraguay and Venezuela) have concluded an Agreement for the facilitation of the inland transport of dangerous goods (Acuerdo sobre Transporte de Mercancías Peligrosas en el Mercosur, 1994). The annexes to this Agreement are based on the seventh revised edition of the Recommendations on the Transport of Dangerous Goods, RID and ADR. Updating of these annexes is under way.

8. Andean countries

182. The Andean Community (Comunidad Andina) (Bolivia, Colombia, Ecuador and Peru) is considering using the provisions of the 13th revised edition of the Model Regulations and/or ADR and RID for regulating the international carriage of dangerous goods by road and rail.

D. Implementation through national legislation applicable to domestic traffic

183. The UN Recommendations on the Transport of Dangerous Goods are relatively well implemented through national legislation, but the degree of implementation may vary from country to country. National legislation for air and sea transport is based on the ICAO Technical Instructions and the IMDG Code, and therefore is perfectly consistent with the UN Recommendations.

184. For regulations applicable to road/rail domestic traffic (which is usually much more important than international traffic), Governments have progressively adapted their own system to the United Nations system and national regulations in most countries of the world are now based on the UN Recommendations on the Transport of Dangerous Goods, even though variations may exist.

185. In the European Union, Directives 94/55/EC and 96/49/EC required Member States of the European Union to approximate their laws with regard to road and rail transport of dangerous goods (including radioactive material) on the basis of the provisions annexed to these directives which were in fact the same as those annexed to ADR and RID. These two directives have been repealed and replaced in 2008 by one single directive (Directive 2008/68/EC[30]) which entered into force on 20 October 2008. The Directive 2008/68/EC establishes a

[30] *Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods (OJ L 260 of 30.9.2008)*

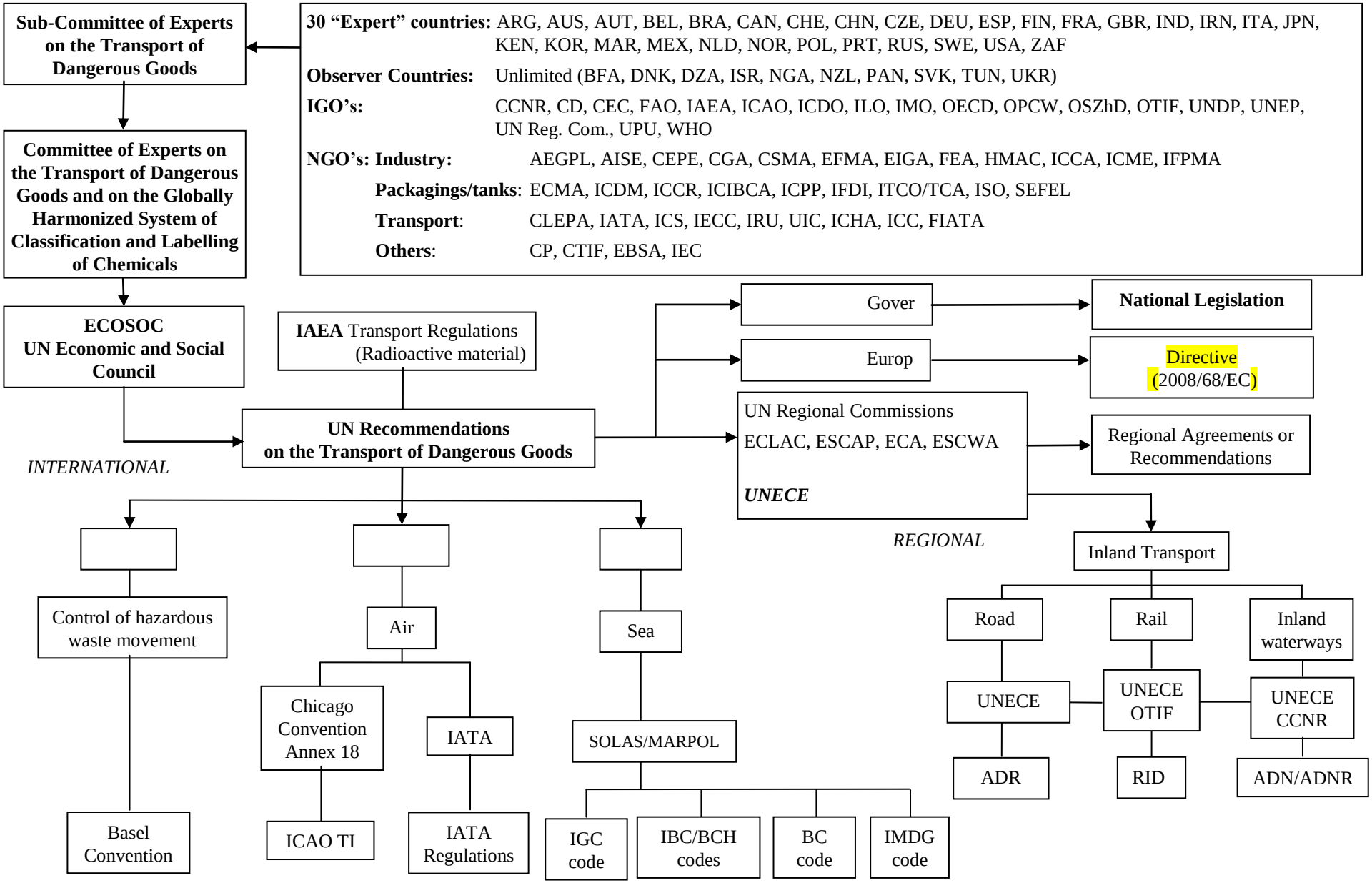
common regime for all aspects of the inland transport of dangerous goods, by road, rail and inland waterways within the European Union to inland transport of dangerous goods (road, rail, inland waterways) and makes the requirements of ADR, RID and ADN applicable to domestic and intracommunautary traffic by reference. For the purposes of national transport operations, Member States may retain provisions in their national law, which differ from those of ADR and RID provided they are consistent with the UN Recommendations on the Transport of Dangerous Goods.

186. For domestic inland transport of dangerous goods in other countries, implementation of the recommendations on the transport of dangerous goods may vary considerably depending on the national procedures for enacting law or updating regulations. For example, the regulations applicable in the United States of America (Title 49 of the Code of Federal Regulations) are normally updated on a yearly basis, and they have been updated to reflect the sixteenth revised edition of the Recommendations on the Transport of Dangerous Goods, with very few exceptions. The Canadian regulations are based on the fourteenth revised edition but consignees are authorized to use the classification and shipping names of the latest edition. The Australian Code for the Transport of Dangerous Goods by Road and Rail is also based on the fourteenth revised edition of the Recommendations. The twelfth revised edition of the Recommendations has been adopted as a national standard in Malaysia and has been implemented through national legislation in Brazil and Thailand.

187. In 1999, the Central African Economic and Monetary Community (Cameroon, the Central African Republic, Chad, the Congo, Equatorial Guinea and the Gabon) adopted regulations concerning the transport of dangerous goods by road that are partly based on old provisions of the European Agreement concerning the International Carriage of Dangerous Goods by Road but that are not fully in line with the Model Regulations.

188. Although international transport of dangerous goods is facilitated by the harmonization of the major international conventions or agreements concerning transport of dangerous goods with the Model Regulations, and their simultaneous updating, the fact that certain national regulations applicable to inland transport are not brought into line simultaneously, or completely, is still causing problems in international trade, in particular in the case of multimodal transport

Annex 1
UN mechanisms for harmonizing transport of dangerous goods regulations
(See following organigram)


Sub-Committee of Experts on the Transport of Dangerous Goods
30 "Expert" countries: ARG, AUS, AUT, BEL, BRA, CAN, CHE, CHN, CZE, DEU, ESP, FIN, FRA, GBR, IND, IRN, ITA, JPN, KEN, KOR, MAR, MEX, NLD, NOR, POL, PRT, RUS, SWE, USA, ZAF
Observer Countries: Unlimited (BFA, DNK, DZA, ISR, NGA, NZL, PAN, SVK, TUN, UKR)
IGO's: CCNR, CD, CEC, FAO, IAEA, ICAO, ICDO, ILO, IMO, OECD, OPCW, OSZhD, OTIF, UNDP, UNEP, UN Reg. Com., UPU, WHO
NGO's: Industry: AEGPL, AISE, CEPE, CGA, CSMA, EFMA, EIGA, FEA, HMAC, ICCA, ICME, IFPMA
Packagings/tanks: ECMA, ICDM, ICCR, ICIBCA, ICPP, IFDI, ITCO/TCA, ISO, SEFEL
Transport: CLEPA, IATA, ICS, IECC, IRU, UIC, ICHA, ICC, FIATA
Others: CP, CTIF, EBSA, IEC
Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals
ECOSOC UN Economic and Social Council
IAEA Transport Regulations (Radioactive material)
UN Recommendations on the Transport of Dangerous Goods
INTERNATIONAL
Gover
National Legislation
Europ
Directive (2008/68/EC)
UN Regional Commissions
ECLAC, ESCAP, ECA, ESCWA
UNECE
Regional Agreements or Recommendations
REGIONAL
Inland Transport
Road
Rail
Inland waterways
UNECE
UNECE OTIF
UNECE CCNR
ADR
RID
ADN/ADNR
Control of hazardous waste movement
Basel Convention
Air
Chicago Convention Annex 18
ICAO TI
IATA
IATA Regulations
Sea
SOLAS/MARPOL
IGC code
IBC/BCH codes
BC code
IMDG code

Instruments

Basel Convention:	Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
Chicago Convention:	Convention on International Civil Aviation
ICAO TI:	ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air
IATA Regulations:	IATA Dangerous Goods Regulations
SOLAS:	International Convention for the Safety of Life at Sea, 1974, as amended
MARPOL:	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978, thereto, as amended
IBC Code:	International Bulk Chemicals Code (International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk)
IGC Code:	International Gas Carrier Code (International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk)
BC Code:	Bulk Cargoes Code (Code of Safe Practice for Solid Bulk Cargoes)
BCH Code:	Bulk Chemicals Code (Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk)
IMDG Code:	International Maritime Dangerous Goods Code
ADR:	European Agreement Concerning the International Carriage of Dangerous Goods by Road
RID:	Regulations Concerning the International Carriage of Dangerous Goods by Rail
ADN:	European Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterways

ADNR: Regulations for the Transport of Dangerous Substances on the Rhine

30 "Expert" Countries:		**Observer Countries (unlimited):**	
ARG:	Argentina	BFA:	Burkina Faso
AUS:	Australia	BGR:	Bulgaria
AUT:	Austria	BHS:	Bahamas
BEL:	Belgium	DNK:	Denmark
BRA:	Brazil	DZA:	Algeria
CAN:	Canada	GR:	Greece
CH:	Switzerland	ISR:	Israel
CHN:	China, People's Republic of,	NGA:	Nigeria
CZE:	Czech Republic	NZL:	New Zealand
DEU:	Germany	PAN:	Panama
ESP:	Spain	SVK:	Slovakia
FIN:	Finland	THA:	Thailand
FRA:	France	TUN:	Tunisia
GBR:	United Kingdom of Great Britain and Northern Ireland	UKR:	Ukraine
IND:	India		
IRN:	Islamic Republic of Iran		
ITA:	Italy		
JPN:	Japan		
KEN:	Kenya		
KOR:	Republic of Korea		
MEX:	Mexico		
MAR:	Morocco		
NLD:	Netherlands		
NOR:	Norway		
POL:	Poland		
PRT:	Portugal		
RUS:	Russian Federation		
SWE:	Sweden		
USA:	United States of America		
ZAF:	South Africa		

Non-Governmental Organizations	
Industry	
AISE:	International Association of the Soap, Detergent and Maintenance Products Industry
AEGPL:	European Liquefied Petroleum Gas Association
AEISG:	Australian Explosives Industry and Safety Group Incorporated
AEROBAL:	International Organization of Aluminium Aerosol Container Manufacturers
AFEMS:	Association of European Manufacturers of Sporting Ammunition
CENCC:	European Conference of Fuel Distributors
CEFIC:	European Chemical Industry Council
CEPE:	European Council of Paint, Printing Ink and Artists' Colours Industry
CGA:	Compressed Gas Association
COLIPA:	European Cosmetic, Toiletry and Perfumery Association
CSPA:	Chemical Specialities Products Association
CROPLIFE INTERNATIONAL	
EBRA:	European Battery Recycling Association
EFMA:	European Fertilizer Manufacturer's Association
EIGA:	European Industrial Gases Association
EPBA:	European Portable Battery Association
EUROBITUME: European Bitumen Association	
FCHEA:	Fuel Cell and Hydrogen Energy Association
FEA:	Federation of European Aerosol Associations
DGAC:	Dangerous Goods Advisory Council
ICC:	International Chamber of Commerce
ICCA:	International Council of Chemical Associations
ICCTA:	International Council of Chemical Trade Associations
ICME:	International Council on Metals and the Environment
ICMM:	International Council on Mining and Metals
IFA:	International Fireworks Association
IFPCM:	Industrial Federation Paints and Coats of Mercosul
IFPMA:	International Federation of Pharmaceutical Manufacturers Associations
IME:	Institute of Makers of Explosives
IPIECA:	International Petroleum Industry Environmental Conservation Association (IPIECA)
IPPIC:	International Paint and Printing Ink Council
PRBA:	Portable Rechargeable Battery Association
RECHARGE:	International Association for the Promotion and Management of Portable Rechargeable Batteries
SAAMI:	Sporting Arms and Ammunition Manufacturers' Institute
SDA:	Soap and Detergent Association (SDA)
Transport	
AHS:	Association of Hazmat Shippers
COSTHA:	Council on Safe Transportation of Hazardous Articles
FIATA:	International Federation of Freight Forwarders Associations
GEA:	Global Express Association
IATA:	International Air Transport Association
ICC:	International Chamber of Commerce
ICHCA:	International Cargo Handling Coordination Association
ICS:	International Chamber of Shipping
IECC:	International Express Carriers Conference
IFSMA:	International Federation of Shipmasters' Associations
IRU:	International Road Transport Union
IVODGA:	International Vessel Operators Dangerous Goods Association, Inc.
ITCO:	International Tank Container Organisation
UIC:	International Union of Railways
IAR:	International Consortium of Rhine Inland Navigation
WNTI:	World Nuclear Transport Institute
Packaging/Tanks	
ECMA:	European Cylinder Makers'Association
EMPAC:	European Metal Packaging
ITCO:	International Tank Container Organization
ICCR:	International Confederation of Container Reconditioners
ICDM:	International Confederation of Drums Manufacturers
ICIBCA:	International Council of Intermediate Bulk Container Associations
ICPP:	International Confederation of Plastics Packaging Manufacturers
IDGCA:	International Dangerous Goods and Containers Association
IFDI:	International Fibre Drum Institute
ISO:	International Organization for Standardization
RCMASA:	Responsible Container Management Association of Southern Africa
SEFEL:	International Secretariat of Manufacturers of Light Metal Packagings
Shipbuilding, classification	
IACS	International Association of Classification Societies
Vehicle Manufacturers	
CLCCR:	Liaison Committee of Coachwork Trailer Builders
CLEPA:	European Association of Automotive Suppliers
OICA:	International Organization of Motor Vehicle Manufacturers

Others	
ABSA:	American Biological Safety Association
CPME:	Standing Committee of European Doctors
CONCAWE:	The Oil Companies European Organization for Environment, Health and Safety
CTIF:	International Technical Committee for the Prevention and Extinction of Fire
EBSA	European BioSafety Association
IEC:	International Electrotechnical Commission
IFALPA:	International Federation of Airline Pilot's Associations
IOHA:	International Occupational Hygiene Association
KFI:	kiloFarad International
OIRC:	Organisation internationale pour la réduction des catastrophes
WFCC:	World Federation for Culture Collections

Annex 2
Dangerous goods labels[31]

<table>
<tr><th colspan="2"></th><th colspan="3">Specimen labels</th></tr>
<tr><td colspan="2">Class 1
Explosive substances and articles</td><td colspan="3"></td></tr>
<tr><td>Divisions</td><td>1.1
1.2
1.3</td><td> 
No.1</td><td colspan="2">Symbol (Exploding bomb): black
Background: orange
Figure “1” in bottom corner
** Place for division - to be left blank if explosive is the subsidiary risk
* Place for compatibility group - to be left blank if explosive is the subsidiary risk</td></tr>
<tr><td rowspan="2">Divisions</td><td rowspan="2">1.4
1.5
1.6</td><td colspan="3"> 
No. 1.4 No.1.5 No.1.6</td></tr>
<tr><td colspan="3">Background: orange;
Figures: black; Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm x 100 mm);
Figure “1” in bottom corner
* Place for compatibility group - to be left blank if explosive is the subsidiary risk</td></tr>
<tr><td colspan="2">Class 2:
Gases</td><td colspan="3"></td></tr>
<tr><td>Division</td><td>2.1
Flammable gases</td><td> 
No.2.1</td><td> 
No.2.1</td><td>Symbol (flame): black or white (except as provided for in 5.2.2.2.1.6 (d)) of the UN Model Regulations
Background: red;
Figure “2” in bottom corner</td></tr>
<tr><td>Division</td><td>2.2
Non-flammable, non-toxic gases</td><td> 
No.2.2</td><td> 
No.2.2</td><td>Symbol (gas cylinder): black or white
Background: green; Figure '2' in bottom corner</td></tr>
<tr><td>Division</td><td>2.3
Toxic gases</td><td> 
No.2.3</td><td colspan="2">Symbol (skull and crossbones): black;
Background: white; Figure '2' in bottom corner</td></tr>
<tr><td colspan="2">Class 3:
Flammable liquids</td><td colspan="3"></td></tr>
<tr><td colspan="2"></td><td> 
No.3</td><td> 
No.3</td><td>Symbol (flame): black or white;
Background: red; Figure '3' in bottom corner</td></tr>
</table>

(Cont'd)

[31] Source : UN Model Regulations on the Transport of Dangerous Goods

		Specimen labels		
Class 4 **Explosive substances and articles**				
Division	4.1 Flammable solids	 No.4.1	Symbol (flame): black Background: white with seven vertical red stripes; Figure “4” in bottom corner	
Division	4.2 Substances liable to spontaneous combustion	 No.4.2	Symbol (flame): black Background: upper half white; lower half red; Figure “4” in bottom corner	
Division	4.3 Substances which in contact with water emit flammable gases	 No.4.3	 No.4.3	Symbol (flame): black or white Background: blue; Figure “4” in bottom corner
Class 5 **Oxidizing substances and organic peroxides**				
Division	5.1 Oxidizing substances	 No.5.1	Symbol (flame): black Background: upper half white; lower half red; Figure “5.1” in bottom corner	
Division	5.2 Organic peroxides	 No.5.2	 No.5.2	Symbol (flame): black or white; Background: upper half red; lower half yellow; Figure “5.2” in bottom corner
Class 6 **Toxic and infectious substances**				
Division	6.1 Toxic substances	 No.6.1	Symbol (skull and crossbones): black Background: white; Figure “6” in bottom corner	
Division	6.2 Infectious substances	 No.6.2	Symbol (three crescents superimposed on a circle): black Background: white; Figure “6” in bottom corner The lower half of the label may bear the inscriptions (in black): INFECTIOUS SUBSTANCE” or “In the case of damage or leakage immediately notify Public Health Authority”;	

(Cont’d)

		Specimen labels	
Class 7 **Radioactive material**			
	Category I – White	 No.7A	Symbol (trefoil): black; Background: white; Text (mandatory): black in lower half of label: "RADIOACTIVE" "CONTENTS……" "ACTIVITY……" One red bar shall follow the word "RADIOACTIVE" Figure "7" in bottom corner
	Category II - Yellow	 No.7B	Symbol (trefoil): black; Background: upper half yellow with white border, lower half white; Text (mandatory): black in lower half of label: "RADIOACTIVE" "CONTENTS……" "ACTIVITY……" In a black outlined box: "TRANSPORT INDEX" Two red vertical bars shall follow the word "RADIOACTIVE" Figure "7" in bottom corner
	Category III- Yellow	 No.7C	Symbol (trefoil): black; Background: upper half yellow with white border, lower half white; Text (mandatory): black in lower half of label: "RADIOACTIVE" "CONTENTS……" "ACTIVITY……" In a black outlined box: "TRANSPORT INDEX" Three red vertical bars shall follow the word "RADIOACTIVE" Figure "7" in bottom corner
	Fissile material	 No.7E	Background: white Text (mandatory): black in upper half of the label: "FISSILE" In a black outlined box in the lower half of the label: "CRITICALITY SAFETY INDEX" Figure "7" in bottom corner
Class 8 **Corrosive substances**			
		 No.8	Symbol (liquids, spilling from two glass vessels and attacking a hand and a metal): black Background: upper half white; lower half black with white border; Figure "8" in bottom corner
Class 9 **Miscellaneous dangerous substances and articles, including environmentally hazardous substances**			
		 No.9	Symbol (seven vertical stripes in upper half): black Background: white; Figure "9" underlined in bottom corner

Annex 3

UN Recommendations on the Transport of Dangerous Goods (Rev.17) – Table of contents

TABLE OF CORRESPONDENCE between paragraph numbers in the IAEA Regulations for the Safe Transport of Radioactive Material (2009 Edition) and the seventeenth revised edition of the Recommendations on the Transport of Dangerous Goods (including the Model Regulations)

Annex 4

ADR and ADN 2011 – Table of contents

(ADN) ***Part 8*** ***REQUIREMENTS FOR VESSEL CREWS, EQUIPMENT, OPERATION AND DOCUMENTATION***

Chapter 8.1 **General requirements concerning transport units and equipment on board**

8.1.1 Transport units
8.1.2 Documents to be carried on the transport unit
8.1.3 Placarding and marking
8.1.4 Fire fighting equipment
8.1.5 Miscellaneous equipment and equipment for personal protection

(ADN) ***Chapter 8.1*** ***General requirements applicable to vessels and equipment***

8.1.1 (Reserved)
8.1.2 Documents
8.1.3 (Reserved)
8.1.4 Fire-extinguishers arrangements
8.1.5 Special equipment
8.1.6 Checking and inspection of equipment
8.1.7 Electrical installations
8.1.8 Certificate of approval
8.1.9 Provisional certificate of approval
8.1.10 (Deleted)
8.1.11 Register of operations during carriage relating to the carriage on UN 1203

Chapter 8.2 **Requirements concerning the training of the vehicle crew**

8.2.1 Scope and general requirements concerning the training of drivers
8.2.2 Special requirements concerning the training of drivers
8.2.3 Training of persons, other than the drivers holding a certificate in accordance with 8.2.1, involved in the carriage of dangerous goods by road

(ADN) ***Chapter 8.2*** ***Requirements concerning training***

8.2.1 General requirements concerning training of experts
8.2.2 Special requirements for the training of experts

Chapter 8.3 **Miscellaneous requirements to be complied with by the vehicle crew**

8.3.1 Passengers
8.3.2 Use of fire-fighting appliances
8.3.3 Prohibition on opening packages
8.3.4 Portable lighting apparatus
8.3.5 Prohibition on smoking
8.3.6 Running the engine during loading or unloading
8.3.7 Use of the parking brakes and wheel chocks
8.3.8 Use of cables

(ADN) ***Chapter 8.3*** ***Miscellaneous requirements to be complied with by the crew of the vessel***

8.3.1 Persons authorized on board
8.3.2 Portable lamps
8.3.3 Admittance on board
8.3.4 Prohibition on smoking, fire and naked light
8.3.5 Danger caused by work on board

Chapter 8.4 **Requirements concerning the supervision of vehicles**

(ADN) ***Chapter 8.4*** ***(reserved)***

Annex 3

Report of the Secretary-General on the Work of the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

United Nations E/2015/66

Economic and Social Council

Distr.: General
20 April 2015

Original: English

2015 session
21 July 2014-22 July 2015
Agenda item 18 (l)
Economic and environmental questions: transport of dangerous goods

Work of the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Report of the Secretary-General

Summary

In accordance with Economic and Social Council resolution 645 G (XXIII), the Secretary-General reports biennially to the Council on the work of the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals, and of its two subcommittees.

The present report concerns the work of the Committee of Experts during the biennium 2013-2014 and the implementation of Economic and Social Council resolution 2013/25.

In accordance with that resolution, the secretariat has published the eighteenth revised edition of the *Recommendations on the Transport of Dangerous Goods: Model Regulations*, amendment 2 to the fifth revised edition of the *Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria* and the fifth revised edition of the *Globally Harmonized System of Classification and Labelling of Chemicals*.

All the main legal instruments and codes governing the international transport of dangerous goods by sea, air, road, rail or inland waterway have been amended accordingly, with effect from 1 January 2015, and many Governments have also transposed the provisions of the Model Regulations into their own legislation for domestic traffic for application from 2015.

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Many Governments and international organizations have revised or taken steps to revise existing national and international legislation in order to implement the Globally Harmonized System as soon as possible.

The Committee adopted amendments to the Model Regulations and the *Manual of Tests and Criteria*, which consist mainly of new or revised provisions that concern the transport of viscous liquids; gases; polymerizing substances; internal combustion engines or machinery powered by flammable liquids or gases; electric vehicles; and lithium batteries and ammonia dispensing systems.

The Committee also adopted amendments to the Globally Harmonized System that include a new hazard class for desensitized explosives and a new hazard category for pyrophoric gases; miscellaneous provisions intended to clarify the criteria for some hazard classes (explosives, specific target organ toxicity following single exposure, aspiration hazard and hazardous to the aquatic environment); additional information to be included in the Safety Data Sheet (section 9); revised and further rationalized precautionary statements; and a new example in annex 7 addressing the labelling of small packagings.

The Committee recommended that the secretariat be requested to collect information on the contact details of competent authorities responsible for national regulations applicable to the transport of dangerous goods by modes of transport other than by air or sea and of national authorities competent for authorizing the allocation of the "UN" approval mark on packagings and tanks that meet the specifications of the *Recommendations on the Transport of Dangerous Goods: Model Regulations*.

The Committee adopted a programme of work for the biennium 2015-2016; sessions for the Subcommittee of Experts on the Transport of Dangerous Goods, for the Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals and for the Committee have been planned for the period 2015-2016, in accordance with Economic and Social Council resolution 1999/65.

The Committee is recommending a draft resolution on its work for adoption by the Economic and Social Council.

Contents

I. Draft resolution for adoption by the Economic and Social Council

1. The Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals recommends to the Economic and Social Council the adoption of the following draft resolution:

Work of the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

The Economic and Social Council,

Recalling its resolutions 1999/65 of 26 October 1999 and 2013/25 of 25 July 2013,

Having considered the report of the Secretary-General on the work of the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals during the biennium 2013-2014,[1]

A
Work of the Committee regarding the transport of dangerous goods

Recognizing the importance of the work of the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals for the harmonization of codes and regulations relating to the transport of dangerous goods,

Bearing in mind the need to maintain safety standards at all times and to facilitate trade, as well as the importance of these issues to the various organizations responsible for modal regulations, while meeting the growing concern for the protection of life, property and the environment through the safe and secure transport of dangerous goods,

Noting the ever-increasing volume of dangerous goods being introduced into worldwide commerce and the rapid expansion of technology and innovation,

Recalling that, while the major international instruments governing the transport of dangerous goods by the various modes of transport and many national regulations are now better harmonized with the Model Regulations annexed to the Committee's recommendations on the transport of dangerous goods, further work on harmonizing these instruments is necessary to enhance safety and to facilitate trade, and recalling also that uneven progress in the updating of national inland transport legislation in some countries of the world continues to present serious challenges to international multimodal transport,

1. *Expresses its appreciation* for the work of the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of

[1] E/2015/66.

Classification and Labelling of Chemicals with respect to matters relating to the transport of dangerous goods, including their security in transport;

2. *Requests* the Secretary-General:

(a) To circulate the new and amended recommendations on the transport of dangerous goods[2] to the Governments of Member States, the specialized agencies, the International Atomic Energy Agency and other international organizations concerned;

(b) To publish the nineteenth revised edition of the *Recommendations on the Transport of Dangerous Goods: Model Regulations*[3] and the sixth revised edition[4] of the *Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria* in all the official languages of the United Nations, in the most cost-effective manner, no later than the end of 2015;

(c) To make those publications available in book and electronic format and on the website of the Economic Commission for Europe,[5] which provides secretariat services to the Committee;

3. *Invites* all Governments, the regional commissions, the specialized agencies, the International Atomic Energy Agency and the other international organizations concerned to transmit to the secretariat of the Committee their views on the work of the Committee, together with any comments that they may wish to make on the recommendations on the transport of dangerous goods;

4. *Invites* all interested Governments, the regional commissions, the specialized agencies and the international organizations concerned to take into account the recommendations of the Committee when developing or updating appropriate codes and regulations;

5. *Requests* the Committee to study, in consultation with the International Maritime Organization, the International Civil Aviation Organization, the regional commissions and the intergovernmental organizations concerned, the possibilities of improving the implementation of the Model Regulations on the transport of dangerous goods in all countries for the purposes of ensuring a high level of safety and eliminating technical barriers to international trade, including through the further harmonization of international agreements or conventions governing the international transport of dangerous goods;

6. *Invites* all Governments, as well as the regional commissions and organizations concerned, the International Maritime Organization and the International Civil Aviation Organization to provide feedback to the Committee regarding differences between the provisions of national, regional or international legal instruments and those of the Model Regulations, in order to enable the Committee to develop cooperative guidelines for enhancing consistency between these requirements and reducing unnecessary impediments; to identify existing substantive and international, regional and national differences, with the aim of reducing those differences in modal treatment to the greatest extent practical and ensuring that where differences are necessary they do not pose impediments to the

[2] See ST/SG/AC.10/42/Add.1 and 2.
[3] ST/SG/AC.10/1/Rev.19.
[4] ST/SG/AC.10/11/Rev.6.
[5] www.unece.org/trans/danger/danger.html.

safe and efficient transport of dangerous goods; and to undertake an editorial review of the Model Regulations and various modal instruments with the aim of improving clarity, user friendliness and ease of translation;

B

Mutual administrative support for monitoring compliance of UN-marked containment systems with the *Recommendations on the Transport of Dangerous Goods: Model Regulations*

Noting with satisfaction that, owing to the effective implementation of the *Recommendations on the Transport of Dangerous Goods: Model Regulations* through national, regional and international legally binding instruments, as described in paragraph 8 of the report of the Secretary-General, dangerous goods that are moved internationally have to be contained in packagings, containers and tanks bearing a "UN" mark certifying that they correspond to a design type that has been successfully tested under the control of the competent authority of the State authorizing the allocation of the mark,

Noting with concern that irregularities in, or forgery of, certification of "UN" packagings have been observed in international transport, leading to the use of packagings that do not meet the required performance level and increasing the risk of dramatic accidents that would affect the public, workers, means of transport, properties and the environment,

Recalling the basic principle laid down by the Committee that "The competent authority should ensure compliance with these Regulations. Means to discharge this responsibility include the establishment and execution of a programme for monitoring the design, manufacture, testing, inspection and maintenance of packaging, the classification of dangerous goods and the preparation, documentation, handling and stowage of packages by consignors and carriers, to provide evidence that the provisions of the Model Regulations are being met in practice",

Recognizing that mutual administrative assistance between the competent authorities of countries concerned would facilitate investigations and improve compliance assurance, but is currently prevented owing to lack of information on the contact details of competent authorities at the worldwide level,

1. *Requests* the Secretary-General:

(a) To seek information from all States Members of the United Nations, and other States if appropriate, on the contact details of:

(i) The competent authorities responsible for national regulations applicable to the transport of dangerous goods by modes of transport other than by air or by sea;

(ii) The competent authorities (and their country identification codes) allowing, in the name of the State, the allocation of the "UN" mark on packagings, pressure receptacles, bulk containers and portable tanks;

(b) To develop and maintain up to date the lists of contact details;

(c) To make this information available on the website of the secretariat of the Economic Commission for Europe,[5] which provides secretariat services to the Committee;

2. *Invites* all Member States to provide the requested information;

C
Work of the Committee regarding the Globally Harmonized System of Classification and Labelling of Chemicals

Bearing in mind that in paragraph 23 (c) of the Plan of Implementation of the World Summit on Sustainable Development (Johannesburg Plan of Implementation),[6] countries were encouraged to implement the Globally Harmonized System of Classification and Labelling of Chemicals as soon as possible with a view to having the system fully operational by 2008,

Bearing in mind also that the General Assembly, in its resolution 57/253 of 20 December 2002, endorsed the Johannesburg Plan of Implementation and requested the Economic and Social Council to implement the provisions of the Plan relevant to its mandate and, in particular, to promote the implementation of Agenda 21[7] by strengthening system-wide coordination,

Noting with satisfaction:

(a) That the Economic Commission for Europe and all United Nations programmes and specialized agencies concerned with chemical safety in the field of transport or of the environment, in particular the United Nations Environment Programme, the International Maritime Organization and the International Civil Aviation Organization, have already taken appropriate steps to amend or update their legal instruments in order to give effect to the Globally Harmonized System of Classification and Labelling of Chemicals or are considering amending them as soon as possible;

(b) That the International Labour Organization, the Food and Agriculture Organization of the United Nations and the World Health Organization are also taking appropriate steps to adapt their existing chemical safety recommendations, codes and guidelines to the Globally Harmonized System, in particular in the areas of occupational health and safety, pesticide management and the prevention and treatment of poisoning;

(c) That national legislation or standards implementing the Globally Harmonized System (or allowing its application) in one or several sectors other than transport have already been issued in Australia (2011), Brazil (2009), China (2010), Ecuador (2009), Japan (2006), Mauritius (2004), Mexico (2011), New Zealand (2001), the Republic of Korea (2006), the Russian Federation (2010), Serbia (2010), Singapore (2008), South Africa (2009), Switzerland (2009), Thailand (2012), the United States of America (2012), Uruguay (2009), Viet Nam (2009) and Zambia

[6] *Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August-4 September 2002* (United Nations publication, Sales No. E.03.II.A.1 and corrigendum), chap. I, resolution 2, annex.

[7] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

(2013), as well as in the 28 countries members of the European Union and the 3 countries members of the European Economic Area (2008);[8]

(d) That work on the development or revision of national legislation, standards or guidelines applicable to chemicals in the implementation of the Globally Harmonized System continues in other countries, while in some others activities related to the development of sectoral implementation plans or national implementation strategies are being conducted or are expected to be initiated soon;[8]

(e) That a number of United Nations programmes and specialized agencies and regional organizations, in particular the United Nations Institute for Training and Research, the International Labour Organization, the World Health Organization, the Economic Commission for Europe, the Asia-Pacific Economic Cooperation, the Organization for Economic Cooperation and Development, Governments, the European Union and non-governmental organizations representing the chemical industry, have organized or contributed to multiple workshops, seminars and other capacity-building activities at the international, regional, subregional and national levels, in order to raise administration, health sector and industry awareness and to prepare for or support the implementation of the Globally Harmonized System;

Aware that effective implementation will require further cooperation between the Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals and the international bodies concerned, continued efforts by the Governments of Member States, cooperation with the industry and other stakeholders, and significant support for capacity-building activities in countries with economies in transition and developing countries,

Recalling the particular significance of the United Nations Institute for Training and Research, the International Labour Organization and the Organization for Economic Cooperation and Development Global Partnership for Capacity-building to Implement the Globally Harmonized System of Classification and Labelling of Chemicals for building capacities at all levels,

1. *Commends* the Secretary-General on the publication of the fifth revised edition of the *Globally Harmonized System of Classification and Labelling of Chemicals*[9] in the six official languages of the United Nations, in book form and on CD-ROM, and its availability, together with related informational material, on the website of the Economic Commission for Europe[5] which provides secretariat services to the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals;

2. *Expresses its deep appreciation* to the Committee, the Economic Commission for Europe, United Nations programmes, specialized agencies and other organizations concerned for their fruitful cooperation and their commitment to the implementation of the Globally Harmonized System;

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[8] Information on implementation of the Globally Harmonized System by country and through international legal instruments, recommendations, codes and guidelines is available from www.unece.org/trans/danger/publi/ghs/implementation_e.html.

[9] United Nations publication, Sales No. 13.II.E.1.

3. *Requests* the Secretary-General:

(a) To circulate the amendments[10] to the fifth revised edition[9] of the *Globally Harmonized System of Classification and Labelling of Chemicals* to the Governments of Member States, the specialized agencies and other international organizations concerned;

(b) To publish the sixth revised edition[11] of the *Globally Harmonized System of Classification and Labelling of Chemicals* in all the official languages of the United Nations in the most cost-effective manner, no later than the end of 2015, and to make it available in book and electronic format and on the website of the Economic Commission for Europe;[5]

(c) To continue to make information on the implementation of the Globally Harmonized System available on the website of the Economic Commission for Europe;[8]

4. *Invites* Governments that have not yet done so to take the necessary steps, through appropriate national procedures and/or legislation, to implement the Globally Harmonized System as soon as possible;

5. *Reiterates its invitation* to the regional commissions, United Nations programmes, specialized agencies and other organizations concerned to promote the implementation of the Globally Harmonized System and, where relevant, to amend their respective international legal instruments addressing transport safety, workplace safety, consumer protection or the protection of the environment, so as to give effect to the Globally Harmonized System through such instruments;

6. *Invites* Governments, the regional commissions, United Nations programmes, specialized agencies and other organizations concerned to provide feedback to the Subcommittee of Experts on the Globally Harmonized System on the steps taken for the implementation of the Globally Harmonized System in all relevant sectors, through international, regional or national legal instruments, recommendations, codes and guidelines, including, when applicable, information about the transitional periods for its implementation;

7. *Encourages* Governments, the regional commissions, United Nations programmes, specialized agencies and other relevant international organizations and non-governmental organizations, in particular those representing industry, to strengthen their support for the implementation of the Globally Harmonized System by providing financial contributions and/or technical assistance for capacity-building activities in developing countries and countries with economies in transition;

D
Programme of work of the Committee

Taking note of the programme of work of the Committee for the biennium 2015-2016 as contained in paragraphs 50 and 51 of the report of the Secretary-General,[1]

[10] ST/SG/AC.10/42/Add.3.
[11] ST/SG/AC.10/30/Rev.6.

Noting the relatively poor level of participation of experts from developing countries and countries with economies in transition in the work of the Committee and the need to promote their wider participation in its work,

1. *Decides* to approve the programme of work of the Committee;

2. *Stresses* the importance of the participation of experts from developing countries and from countries with economies in transition in the work of the Committee, calls, in that regard, for voluntary contributions to facilitate their participation, including through support for travel and daily subsistence, and invites Member States and international organizations in a position to do so to contribute;

3. *Requests* the Secretary-General to submit to the Economic and Social Council in 2017 a report on the implementation of the present resolution, the recommendations on the transport of dangerous goods and the Globally Harmonized System of Classification and Labelling of Chemicals.

II. Implementation of Economic and Social Council resolution 2013/25

A. Publications

2. As requested by the Economic and Social Council in its resolution 2013/25, the Secretary-General prepared the eighteenth revised edition[12] of the *Recommendations on the Transport of Dangerous Goods: Model Regulations*. The edition was published for official circulation in Arabic (69 copies), Chinese (50 copies) and Russian (106 copies), and for official circulation and sale in English (1,093 copies), French (309 copies) and Spanish (159 copies).

3. Amendment 2 to the fifth revised edition[13] of the *Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria* was published for official circulation in Arabic (74 copies), Chinese (60 copies) and Russian (90 copies) and for official circulation and sale in English (987 copies), French (179 copies) and Spanish (119 copies).

4. The fifth revised edition[9] of the *Globally Harmonized System of Classification and Labelling of Chemicals* was published for official circulation in Arabic (78 copies), Chinese (69 copies) and Russian (95 copies) and for official circulation and sale in English (1,115 copies), French (270 copies) and Spanish (176 copies).

5. Combined versions of the *Model Regulations*, the *Manual of Tests and Criteria* and the *Globally Harmonized System of Classification and Labelling of Chemicals* were also made available on a CD-ROM containing the English and French versions.

6. The *Model Regulations*, the *Manual of Tests and Criteria* and the *Globally Harmonized System* are available online in all languages on the website of the Economic Commission for Europe (ECE).[5]

[12] United Nations publication, Sales No. 13.VIII.1 and corrigenda.
[13] Ibid., Sales No. 13.VIII.3.

B. Implementation of the *Recommendations on the Transport of Dangerous Goods: Model Regulations*

7. In its resolution 2013/25, the Economic and Social Council invited all interested Governments, the regional commissions, the specialized agencies and the international organizations concerned, when developing or updating appropriate codes and regulations, to take into account the recommendations of the Committee.

8. The provisions of the eighteenth revised edition[12] of the *Model Regulations* have been incorporated into the following international instruments:

(a) International Maritime Organization (IMO): International Maritime Dangerous Goods Code, amendment 37-14 (mandatory application for the 162 contracting parties to the International Convention for the Safety of Life at Sea from 1 January 2016, with the possibility of application on a voluntary basis from 1 January 2015);

(b) International Civil Aviation Organization (ICAO): 2015-2016 edition of the Technical Instructions for the Safe Transport of Dangerous Goods by Air (mandatory application for the 191 contracting parties to the Convention on International Civil Aviation from 1 January 2015);

(c) International Air Transport Association: Dangerous Goods Regulations 2015 (fifty-sixth edition) (applicable from 1 January 2015);

(d) ECE: European Agreement concerning the International Carriage of Dangerous Goods by Road (applicable from 1 January 2015, 48 contracting parties);

(e) ECE: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (applicable from 1 January 2015, 18 contracting parties);

(f) Intergovernmental Organization for International Carriage by Rail: Regulations concerning the International Carriage of Dangerous Goods by Rail (appendix C to the Convention concerning International Carriage by Rail) (applicable from 1 January 2015, 41 contracting parties).

9. In the member States of the European Union, the provisions of the European Agreement concerning the International Carriage of Dangerous Goods by Road, the Regulations concerning the International Carriage of Dangerous Goods by Rail and the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways, as amended, also apply to domestic traffic from 1 January 2015.[14]

10. The Common Market of the South (MERCOSUR) countries (Argentina, Brazil, Paraguay and Uruguay) are applying an agreement on the inland transportation of dangerous goods (Acuerdo para la Facilitación del Transporte de Mercancías Peligrosas en el MERCOSUR) based on the twelfth revised edition[15] of the *Model Regulations*, the Regulations concerning the International Carriage of

[14] Commission Directive 2014/103/EU of 21 November 2014, adapting for the third time the annexes to Directive 2008/68/EC of the European Parliament and of the Council on the inland transport of dangerous goods to scientific and technical progress (*Official Journal of the European Union*, L 335/15, 22 November 2014).

[15] United Nations publication, Sales No. E.01.VIII.4.

Dangerous Goods by Rail and the European Agreement concerning the International Carriage of Dangerous Goods by Road.

11. The Andean Community (Colombia, Ecuador, Peru and Plurinational State of Bolivia) have developed draft regulations based on the thirteenth revised edition[16] of the *Model Regulations*, the European Agreement concerning the International Carriage of Dangerous Goods by Road (2005) and the Regulations concerning the International Carriage of Dangerous Goods by Rail (2005), which are still under consideration.

12. In 1997, the Economic and Social Commission for Asia and the Pacific published the *Guidelines for the Establishment of National and Regional Systems for Inland Transportation of Dangerous Goods*,[17] recommending the implementation of the recommendations on the transport of dangerous goods. The transport ministers of the Association of Southeast Asian Nations (ASEAN) signed, on 20 September 2002, Protocol No. 9 to the ASEAN Framework Agreement on the Facilitation of Goods in Transit. The Protocol provides for the simplification of procedures and requirements for the transit transport of dangerous goods in ASEAN countries, using the Model Regulations and the European Agreement concerning the International Carriage of Dangerous Goods by Road. Annex I (Transport of dangerous goods) of the Greater Mekong Subregion Cross-Border Transport Agreement also requires the use of the Model Regulations and the European Agreement concerning the International Carriage of Dangerous Goods by Road for cross-border transport.

13. In 1999, the Central African Economic and Monetary Community (Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Equatorial Guinea and Gabon) adopted regulations concerning the transport of dangerous goods by road that are partly based on old provisions of the European Agreement concerning the International Carriage of Dangerous Goods by Road but that are not fully in line with the Model Regulations.

14. With respect to domestic inland transport of dangerous goods in individual countries, except as described above, implementation of the recommendations on the transport of dangerous goods may vary considerably depending on the national procedures for enacting law or updating regulations. For example, the regulations applicable in the United States of America (Title 49 of the Code of Federal Regulations) are normally updated on a yearly basis and they have been updated to reflect the eighteenth revised edition[12] of the *Model Regulations*, with very few exceptions. The Canadian regulations reflect the eighteenth revised edition[12] of the *Model Regulations*. The *Australian Code for the Transport of Dangerous Goods by Road and Rail* (edition 7.3, 2014) is based on the seventeenth revised edition[18] of the *Model Regulations*. The twelfth revised edition[15] of the *Model Regulations*[15] has been adopted as a national standard in Malaysia and has been implemented through national legislation in Brazil. The regulations for road transport in Thailand are based on the 2013 edition of the European Agreement concerning the International Carriage of Dangerous Goods by Road[19] (reflecting the seventeenth revised edition[18] of the *Model Regulations*) and are currently being updated to reflect the

[16] Ibid., Sales No. E.03.VIII.5.
[17] Ibid., Sales No. E.98.II.F.49.
[18] Ibid., Sales No.E.11.VIII.1.
[19] Ibid., Sales No. E.12.VIII.1.

European Agreement concerning the International Carriage of Dangerous Goods by Road (2015 edition)[20] and the eighteenth revised edition[12] of the *Model Regulations*.

15. Although international transport of dangerous goods is facilitated by the harmonization of the major international conventions and agreements concerning the transport of dangerous goods with the Model Regulations, and their simultaneous updating, the fact that certain national regulations applicable to inland transport are not brought into line simultaneously, or completely, is still causing problems in international trade, in particular in the case of multimodal transport. For that reason, the Committee has maintained in its draft programme of work an item on global harmonization of regulations on the transport of dangerous goods with the Model Regulations.

16. Owing to the legally binding nature of the legal instruments based on the Model Regulations applicable to the international transport of dangerous goods, as listed in paragraph 8 above, packagings and tanks used for such international transport must conform to a design type complying with the construction and test requirements of the Model Regulations and approved by a competent authority. Such packagings and tanks bear a "UN" mark identifying, inter alia, the country that has approved the design type and the manufacturer. However, certain incidents or accidents have shown that certain packagings or tanks bearing the "UN" mark did not meet the requirements and that it was not always easy for the competent authorities in the country where the incident or accident occurred to contact the competent authority of the country where the packaging or tank was approved. The IMO, ICAO and ECE secretariats collect information on the contact details of competent authorities responsible for the enforcement of their respective international legal instruments, but the information is missing in many countries not only as regards approval of packagings and tanks, but also, more generally, as regards the competent authorities for the application of national regulations concerning land (road, rail, inland waterways) transport of dangerous goods. **Action recommended by the Committee to be taken by the Economic and Social Council with respect to this issue is reflected in part B, paragraphs 1 and 2, of the draft resolution contained in paragraph 1 of the present report.**

C. Implementation of the Globally Harmonized System of Classification and Labelling of Chemicals

17. The World Summit on Sustainable Development, held in 2002 in Johannesburg, in paragraph 23 (c) of its Plan of Implementation,[6] encouraged countries to implement the Globally Harmonized System of Classification and Labelling of Chemicals as soon as possible with a view to having the system fully operational by 2008.

18. Since the Globally Harmonized System addresses several sectors (transport, consumers, occupational health and safety and the environment), its effective implementation requires significant efforts from Member States to amend many existing legal texts concerning chemical safety in each sector or to enact new legislation.

[20] Ibid., Sales No. E.14.VIII.1.

19. In the transport sector, the Model Regulations have already been updated to reflect the relevant provisions of the fifth revised edition[9] of the *Globally Harmonized System*. All the major international instruments listed in paragraph 8 above have also been amended accordingly for effective application in 2015, as have all national regulations that are based on those instruments or that are regularly updated on the basis of the Model Regulations.

20. In the other sectors, the situation is more complex, because implementation requires the amendment or revision of a considerable number of different legal texts and guidelines for application.

21. Legal instruments or national standards implementing the Globally Harmonized System (or allowing its application) in one or several sectors have already been issued in Australia (2012), Brazil (2009), China (2010), Ecuador (2009), Japan (2006), Mauritius (2004), Mexico (2011), New Zealand (2001), the Republic of Korea (2006), the Russian Federation (2010), Serbia (2010), Singapore (2008), South Africa (2009), Switzerland (2009), Thailand (2012), the United States (2012), Uruguay (2009), Viet Nam (2009) and Zambia (2013), as well as in the 28 countries members of the European Union and the 3 countries members of the European Economic Area (2008).

22. Countries that have already implemented the Globally Harmonized System continue to update the legal instruments or national standards implementing the System, in accordance with the provisions of the revised editions of the *Globally Harmonized System*. For instance, between June 2013 and June 2014, the European Union published the fourth,[21] fifth[22] and sixth[23] adaptations of Regulation (EC) 1272/2008[24] to technical and scientific progress, aligning it with the provisions introduced by the fourth[25] and fifth[9] revised editions of the *Globally Harmonized System*. In 2014, Zambia also completed the alignment of its national standard on the Globally Harmonized System with the provisions of the fourth revised edition.[25]

23. Work on the revision and amendment of legal texts, standards and guidelines to achieve the implementation of the Globally Harmonized System as soon as possible continues in other countries.

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[21] Commission Regulation (EU) No. 487/2013 of 8 May 2013 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (*Official Journal of the European Union, L149/1 of 1 June 2013*).

[22] Commission Regulation (EU) No. 944/2013 of 2 October 2013 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (*Official Journal of the European Union, L261/5 of 3 October 2013*).

[23] Commission Regulation (EU) No. 605/2014 of 5 June 2014 amending, for the purposes of introducing hazard and precautionary statements in the Croatian language and its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (*Official Journal of the European Union, L167/36 of 6 June 2014*).

[24] Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006 (*Official Journal of the European Union, L353/1 of 31 December 2008*).

[25] United Nations publication, Sales No. E.11.II.E.6.

24. Legislative amendments to implement the Globally Harmonized System in the workplace in Canada received royal assent on 19 June 2014. The amended legislation and regulations are expected to come into force on or before 1 June 2015, with a transitional period for implementation. The proposed regulations will substantially harmonize Canadian classification and hazard communication in respect of workplace chemicals with those of the United States and other countries that have already implemented the Globally Harmonized System.

25. A regional Globally Harmonized System policy was agreed upon and signed by the ministries of trade and industry of the Southern African Development Community (SADC) member countries in 2012 for implementation of the Globally Harmonized System by January 2020.

26. Projects and activities relating to the implementation of the Globally Harmonized System were completed, initiated or continued during the period 2013-2014 in several countries (see paras. 29-31 below).

27. In order to monitor the status of implementation of the Globally Harmonized System, the secretariat has placed on its website[8] all the information it has collected from countries. The website provides the possibility for Government administrations to update this information or to submit new information for the various sectors concerned. **All countries are therefore invited to provide such information, as indicated in paragraph 6 of part C of the draft resolution contained in paragraph 1 above.**

28. Direct technical advice and expertise have been provided to stakeholders by some Member States and by the secretariat.

29. The Swedish Chemicals Agency, within the framework of its international development cooperation programme on chemicals management, assisted Tunisia in the implementation of the Globally Harmonized System and conducted workshops on the enforcement of Globally Harmonized System legislation in South Africa (October 2014), Thailand (April 2014) and Viet Nam (December 2014).

30. The secretariat was invited to provide information about the Globally Harmonized System, its status of implementation and the work of the Committee of Experts and its two subcommittees, at several seminars, conferences or workshops organized by industry associations, private institutions, or governmental or United Nations bodies in Belgium (April 2013), Colombia (February and May 2014), the Democratic Republic of the Congo (January 2014), Guatemala (February 2014), Kenya (June 2013), Mexico (February 2014), Spain (February 2013) and the United Kingdom of Great Britain and Northern Ireland (November 2013).

31. With the logistic, technical or financial support of several Member States, international organizations (International Labour Organization (ILO) the United Nations Environment Programme (UNEP), World Health Organization (WHO)), intergovernmental organizations (Organization for Economic Cooperation and Development (OECD) and the European Union), governmental agencies and the private sector, several additional capacity-building and training activities or projects were conducted, in particular:

(a) Within the framework of the United Nations Institute for Training and Research (UNITAR)/ILO Global Capacity-building Programme on the Globally Harmonized System and the UNITAR/ILO/OECD World Summit on Sustainable

Development Global Partnership for Capacity-building to Implement the Globally Harmonized System:

(i) Country-based projects were completed in Barbados, the Gambia, the Republic of the Congo and Zambia and were initiated or continued in Benin, Bolivia (Plurinational State of), Cameroon, Chile, Colombia, the Democratic Republic of the Congo, Guatemala, Haiti, Kiribati, Kyrgyzstan, Madagascar, Mali, Mexico, Tajikistan, Togo and Tunisia;

(ii) Regional projects and activities were conducted in the Caribbean and South-East Asian countries. These projects and activities included:

a. Development of a subregional Globally Harmonized System capacity assessment and a regional implementation strategy for the Caribbean region;

b. A Globally Harmonized System review conference for South-East Asia followed by a one-day Globally Harmonized System training workshop for the occupational and health sector;

c. A regional campaign on chemical safety for consumers in the countries of South-East Asia;

(iii) Development and updating of guidance, training and resource materials:

a. Updating of the existing guidance materials in accordance with the provisions of the fifth revised edition of the *Globally Harmonized System* is ongoing;

b. Work on the adaptation of the training courses to e-learning courses has been completed and three rounds of e-learning courses have been conducted;

c. Ongoing development of a management scheme for implementing the Globally Harmonized System as part of the Inter-Organization Programme for the Sound Management of Chemicals Toolbox for Decision-making in Chemicals Management;

(b) Asia-Pacific Economic Cooperation: meetings of the Chemical Dialogue and follow-up meetings of various working groups where Globally Harmonized System implementation issues are under consideration;

(c) Within the framework of the Inter-Organization Programme for the Sound Management of Chemicals:

(i) Development of the Inter-Organization Programme for the Sound Management of Chemicals Toolbox for Decision-making in Chemicals Management (various organizations of the Inter-Organization Programme for the Sound Management of Chemicals);

(ii) All newly prepared or updated International Chemical Safety Cards have included Globally Harmonized System labelling since 2006 (currently 440 chemicals) (WHO/ILO);

(iii) Incorporation of Globally Harmonized System classification into recommended restrictions on the availability and use of pesticides used for

locus control (Food and Agriculture Organization of the United Nations (FAO)/WHO).

32. The Subcommittee of Experts on the Globally Harmonized System has also continued its cooperation with treaty bodies that administer certain international conventions dealing with specific aspects of chemical safety in order to facilitate the implementation of the Globally Harmonized System through such conventions (Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; Montreal Protocol on Substances that Deplete the Ozone Layer; Stockholm Convention on Persistent Organic Pollutants; Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; and Convention on the Transboundary Effects of Industrial Accidents).

III. Work of the Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals during the biennium 2013-2014

A. Meetings held

33. The following meetings were held during the biennium 2013-2014:

(a) Subcommittee of Experts on the Transport of Dangerous Goods: forty-third session, 24 to 28 June 2013 (ST/SG/AC.10/C.3/86 and Add.1); forty-fourth session, 25 November to 4 December 2013 (ST/SG/AC.10/C.3/88); forty-fifth session, 23 June to 2 July 2014 (ST/SG/AC.10/C.3/90 and Add.1); and forty-sixth session, 1 to 9 December 2014 (ST/SG/AC.10/C.3/92);

(b) Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals: twenty-fifth session, 1 to 3 July 2013 (ST/SG/AC.10/C.4/50); twenty-sixth session, 4 to 6 December 2013 (ST/SG/AC.10/C.4/52); twenty-seventh session, 2 to 4 July 2014 (ST/SG/AC.10/C.4/54); and twenty-eighth session, 10 to 12 December 2014 (ST/SG/AC.10/C.4/56);

(c) Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals: seventh session, 12 December 2014 (ST/SG/AC.10/42 and Add.1-3).

34. The following 29 countries participated in the work of the Committee as full members of the Subcommittee of Experts on the Transport of Dangerous Goods or the Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals or of both Subcommittees: Argentina, Australia, Austria, Belgium, Brazil, Canada, China, Finland, France, Germany, Italy, Japan, Kenya, the Netherlands, New Zealand,[26] Norway, Poland, Portugal, Qatar,[26] the Republic of Korea, the Russian Federation, Serbia,[26] South Africa, Spain, Sweden, Switzerland,[27] the United Kingdom, the United States and Zambia.[26]

[26] Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals only.

[27] Subcommittee of Experts on the Transport of Dangerous Goods only.

35. India, Mexico and Morocco, full members of the Subcommittee of Experts on the Transport of Dangerous Goods, Denmark, Greece, Nigeria, Senegal and Ukraine, full members of the Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals, and the Czech Republic and the Islamic Republic of Iran, full members of both Subcommittees, did not participate.

36. The Governments of Bulgaria, Ireland[27], Luxembourg,[27] New Zealand,[27] Romania, Slovakia, Switzerland,[26] Thailand, the former Yugoslav Republic of Macedonia[27] and Zambia[27] were represented by observers. The European Union, eight specialized agencies and intergovernmental organizations and 45 non-governmental organizations also participated.

37. Liaison was maintained with the international bodies or organizations responsible for individual modes of transport, in particular ECE, ICAO, IMO and the Intergovernmental Organization for International Carriage by Rail.

38. The Committee paid special attention to the coordination of its own activities with those of other international organizations whose activities impinge on the field of transport of dangerous goods or of classification and labelling of chemicals, such as the International Atomic Energy Agency (IAEA), the Universal Postal Union (UPU), ILO, WHO, UNITAR and OECD, to ensure that their work would complement, rather than duplicate or clash with, its own activities and recommendations.

39. Secretariat services were provided by the secretariat of ECE.

B. Work of the Subcommittee of Experts on the Transport of Dangerous Goods

40. During the biennium 2013-2014, the Subcommittee discussed various questions related to its terms of reference in accordance with the programme of work laid out in document E/2013/51, in paragraph 47 (a).

41. On the basis of that work, the Committee adopted amendments[2] to the eighteenth revised edition[12] of the *Recommendations on the Transport of Dangerous Goods: Model Regulations* and to the fifth revised edition[28] of the *Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria* consisting mainly of new or revised provisions concerning:

(a) The listing and classification of some existing and new dangerous substances and articles (for example, fireworks, polymerizing substances, internal combustion engines and machinery, organic peroxides, polyester resin kits, radiation detectors and ammonia dispensers), related packing and test methods, and the revision of some packing and tank requirements;

(b) Electric storage systems (including testing, packing and marking of lithium batteries);

(c) The testing of explosives;

[28] United Nations publication, Sales No.E.09.VIII.3.

(d) Packing instructions for liquids or liquefied gases charged with compressed gases;

(e) The applicability of International Organization for Standardization standards to the manufacture of new pressure receptacles or service equipment.

42. The Subcommittee updated guiding principles intended to explain the rationale behind the provisions contained in the Model Regulations and to guide regulators when assigning transport requirements to specific dangerous goods.

43. The Subcommittee considered the issue of possible further measures to facilitate global harmonization of regulations on the transport of dangerous goods with the Model Regulations already discussed in the previous biennium (see also para. 15 above). It agreed again that additional efforts should be made to improve harmonization at the worldwide level. **Governments and international organizations concerned are invited to provide feedback by drawing attention to requirements in their national, regional, or international instruments that deviate from the Model Regulations.**

44. **The action recommended by the Committee to be taken by the Economic and Social Council with respect to the work of the Subcommittee of Experts on the Transport of Dangerous Goods is reflected in part A, paragraphs 1 to 6, of the draft resolution contained in paragraph 1 of the present report.**

C. Work of the Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals

45. During the biennium 2013-2014, the Subcommittee discussed various questions related to its terms of reference in accordance with its programme of work laid out in document E/2013/51, paragraph 47 (b).

46. On the basis of that work, the Committee adopted amendments[10] to the fifth revised edition[9] of the *Globally Harmonized System of Classification and Labelling of Chemicals* intended to update, clarify or to complement the System concerning, in particular, the following:

(a) A new hazard class for desensitized explosives and a new hazard category for pyrophoric gases;

(b) Further clarification of the classification criteria for explosives, specific target organ toxicity following single exposure, aspiration toxicity and hazardous for the aquatic environment;

(c) Examples of labelling of small packagings;

(d) Further rationalization of the precautionary statements;

(e) Information to be included in section 9 of the Safety Data Sheet.

47. The Subcommittee kept under review progress made in the implementation of the Globally Harmonized System on the basis of reports submitted by its members and participating intergovernmental and non-governmental organizations.[8]

48. The Subcommittee continued to cooperate with treaty bodies established under international conventions concerning chemical safety to promote the

implementation of the Globally Harmonized System through such conventions (see also para. 27 above).

49. **The action recommended by the Committee to be taken by the Economic and Social Council with respect to the work of the Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals is reflected in part C, paragraphs 1 to 7, of the draft resolution contained in paragraph 1 of the present report.**

IV. Programme of work and schedule of meetings for the biennium 2015-2016

50. The Committee agreed that the programme of work for the biennium 2015-2016 should be as follows:

(a) Subcommittee of Experts on the Transport of Dangerous Goods:

(i) Explosives and related matters (including amendments to the list of dangerous goods; tests and criteria for flash compositions; review of tests series 6; review of tests in parts I and II of the *Manual of Tests and Criteria*; review of packing instructions for explosives, harmonized standards for security markings; classification of fireworks; classification of articles under UN No. 0349; review of chapter 2.1 of the Globally Harmonized System);

(ii) Listing, classification and packing (including amendments to the list of dangerous goods);

(iii) Electric storage systems (including testing of lithium batteries, transport of large batteries; thermal batteries);

(iv) Transport of gases (including global recognition of United Nations and non-United Nations pressure receptacles);

(v) Miscellaneous proposals of amendments to the Model Regulations (including dangerous goods in machinery, apparatus or articles Not Otherwise Specified, articles containing small quantities of dangerous goods, marking and labelling issues, packaging issues and tank issues);

(vi) Cooperation with IAEA (including transport of radioactive material possessing additional hazards);

(vii) Global harmonization of transport of dangerous goods regulations with the Model Regulations;

(viii) Guiding principles for the Model Regulations (updating, including rationale for assignment of E codes) and development of guidance for the use of the Model Regulations;

(ix) Issues relating to the Globally Harmonized System (including corrosivity criteria; criteria for corrosion to metals; criteria for water-reactivity, classification and testing of oxidizing solids; classification criteria for flammable gases; expert judgement/weight of evidence; references to OECD Guidelines; use of the *Manual of Tests and Criteria* in the context of the Globally Harmonized System);

(b) Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals:

(i) Classification criteria and related hazard communication, including:

a. Explosives and related matters (including the review of chapter 2.1 of the Globally Harmonized System); revision of the test methods in parts I and II of the *Manual of Tests and Criteria*;

b. Revision of the *Manual of Tests and Criteria*;

c. Corrosion of metals (pitting corrosion and suitability of tests C.1 for solids);

d. Water-reactivity;

e. Classification of flammable gases;

f. Use of cellulose for testing oxidizing solids and liquids;

g. Practical classification issues;

h. Corrosivity criteria;

i. Dust explosion hazards;

j. Aspiration hazards: viscosity criterion for classification of mixtures;

k. Nanomaterials;

(ii) Hazard communication issues, including guidance on labelling of small packagings; and improvement of annexes 1-3 and further rationalization of precautionary statements;

(iii) Implementation issues, including:

a. The possible development of a global list of chemicals classified according to the Globally Harmonized System;

b. Activities to facilitate the coordinated implementation of the Globally Harmonized System and monitor its status of implementation;

c. Strengthening and increasing cooperation with United Nations programmes and specialized agencies and regional, governmental and intergovernmental organizations, as well as non-governmental organizations responsible for the administration of international agreements and conventions dealing with the management of chemicals, so as to give effect to the Globally Harmonized System through such instruments;

(iv) Development of guidance on the application of the criteria, as needed, including examples illustrating application of the classification criteria and any related hazard communication issues, and alignment of guidance in annex 9 (section A9.7) and annex 10 to the Globally Harmonized System with the criteria in chapter 4.1;

(v) Capacity-building, including:

a. Reviewing reports on training and capacity-building activities;

b. Providing assistance to United Nations programmes and specialized agencies involved in training and capacity-building activities, such as UNITAR, ILO, FAO and the WHO/International Programme on Chemical Safety, through the development of guidance materials, advice with respect to their training programmes and identification of available expertise and resources.

51. Bearing in mind that, in accordance with Economic and Social Council resolution 1999/65, the maximum number of meeting days allocated to the Committee and its subsidiary bodies is 38 (76 meetings), the Committee agreed that the schedule of meetings for the period 2015-2016 should be as follows:

2015

22-26 June 2015: Subcommittee of Experts on the Transport of Dangerous Goods, forty-seventh session (10 meetings)

29 June-1 July (morning) 2015: Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals, twenty-ninth session (5 meetings)

30 November-9 December (morning)[29] 2015: Subcommittee of Experts on the Transport of Dangerous Goods, forty-eighth session (15 meetings)

9 (afternoon)[29]-11 December 2015: Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals, thirtieth session (5 meetings)

Total: Subcommittee of Experts on the Transport of Dangerous Goods:

25 meetings; Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals: 10 meetings

2016

27 June-6 July (morning)[29] 2016: Subcommittee of Experts on the Transport of Dangerous Goods, forty-ninth session (15 meetings)

6 (afternoon)[29]-8 July 2016: Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals, thirty-first session (5 meetings)

28 November-6 December 2016: Subcommittee of Experts on the Transport of Dangerous Goods, fiftieth session (14 meetings)

7-9 December (morning) 2016: Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals, thirty-second session (5 meetings)

9 December (afternoon) 2016: Committee, eighth session (1 meeting)

Total: Subcommittee of Experts on the Transport of Dangerous Goods:

[29] With the possibility for both subcommittees to combine their meting allotment and meet jointly for the full day on 9 December 2015 and 6 July 2016.

29 meetings[29]; Subcommittee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals: 10 meetings; Committee: 1 meeting

52. **Action recommended by the Committee to be taken by the Economic and Social Council with respect to its programme of work is reflected in part D, paragraphs 1 to 3, of the draft resolution contained in paragraph 1 of the present report.**