

INLAND TRANSPORT OF DANGEROUS GOODS – AN OVERVIEW

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SUMMARY

This paper summaries the regulatory position concerning the transport of dangerous goods with particular reference to inland transport within Europe and recent initiatives on the part of the European Economic Commission.

HAZARDOUS MATERIALS

Almost every advanced manufacturing process utilises dangerous chemicals as raw materials or intermediates, and increasingly the end products are themselves potentially dangerous to health - pesticides, household cleaners, motor car chemicals, paints, aerosol sprays.

Some 15% of all freight containers contain items that are classified as hazardous and this percentage is growing as industry utilises more sophisticated materials and the regulations themselves are extended to cover more commodities.

We are concerned with the hazards posed during transport, and these are categorised under the United Nations system shown in Diagram 1. This system is applied in the regulations covering each transport mode, with variation in classifications and implementation that take account of the different threat posed in each mode. For example, some laundry chemicals may warrant little restriction for road transport, but pose a great threat when carried in the hold of a passenger aircraft, so the practical aspects of the respective regulations reflect this in rules such as packaging specifications.

When discussing hazardous materials, the distribution operation is broken into two categories:

- BULK

Primarily feedstock chemicals and fuels for industry and agriculture. For inland transport this includes barge traffic and road tanker/tank container/intermediate bulk container traffic, in which individual loads can extend to 30,000 litres (approx) for road and for rail tank wagons.

- PACKAGED

Traditionally extending from the smallest packagings (ie medical samples, cosmetics) up to the bulk quantities, this traffic includes all forms of containment and is moved by all modes. Because such a wide range of substances are

involved and the fact that packages are handled in transit by many persons unfamiliar with the exact regulatory requirements and properties of the substances concerned there is the increased need for information in this area.

Diagram 2 shows in simplified form the elements of the transport chain for hazardous materials.

Many processes involve primary shippers (ie chemical companies) supplying feedstocks to industry, where manufacturers become the secondary shippers of the product to market (an integrated chemical company can perform both roles). The dangerous goods competence of those involved in this chain generally declines rapidly downstream (left to right in the diagram whilst the information needs increase in volume and complexity. For example, a manufacturer of cellulose solvents is necessarily competent in dangerous goods transport, but a motor spares distributor re-packing and distributing the product with car paints is usually unfamiliar with the transport constraints.

REGULATIONS AND CODES OF PRACTICE

Several layers of regulations impact EEC internal, import and export traffic flows, including the regulations of main trading partners. Diagram 3 shows the bodies involved in promulgating the international codes of practice that, when adopted by signatory countries, are given the force of national law. The Commission of the European Communities has recently entered this regulatory arena and its emerging role is being followed with interest, not to say concern in some quarters.

Thus we have

- INTERNATIONAL CODES
- NATIONAL LAW
- LOCAL REGULATIONS (ie port/city/tunnel)

An objective for the single market is harmonised international and national regulations. This is achieved for rail and air through the RID and ICAO regulations, but road transport presents special difficulties. Table 4 lists the current status of adoption of the international ADR regulations as national regulations.

ROLE OF THE EUROPEAN COMMISSION

Some three years ago, following the 1984 Mont Louis incident in which this French ro-ro vessel sank after a collision off Ostend carrying amongst other items, containers of uranium hexafluoride, the European Parliament passed a resolution calling on the Commission to submit proposals for the regulation of "dangerous and radioactive substances and wastes".

The resulting report cited the complex arrangements of laws, conventions, regulations, agreements, codes and recommendations governing such movements, and concluded that the need existed for no less than six Directives or other instruments with the stated objectives of achieving greater harmony, more uniform adoption

and enactment and much stricter enforcement of existing dangerous goods legislation.

Fearing yet another layer of possibly counter-productive legislation, industry held its breath.

Unlike the UN-based committees responsible for developing and maintaining the present international codes which are only recommendations until adopted into law, the European Commission is able to impose requirements on the internal legislation of its member states and establish standards and which must be adopted in national regulations.

A redeeming feature was the Commission's decision not to duplicate existing regulations.

The accommodation of previous EC-imposed Directives on national dangerous goods legislation has been uncomfortable to say the least. The adoption by the Commission of a quite different system for the classification of products for supply and use resulted in a duplication of labels and classifications under National laws. This new initiative went some way to re-dressing the balance by conceding that the earlier legislation might require modification in order to achieve the goal of a fully unified classification and labelling system for all hazardous substances and wastes transported and marketed within the Community.

However, about one year later the Parliament's Committee on the Environment, Public Health and Consumer Protection, in welcoming the initiative, added the far-reaching proposal that where the transport of dangerous substances is unavoidable "...it should be kept entirely separate from passenger transport. Mixed transport, e.g. on ferries or in aircraft, should be prohibited." Once again, industry held its breath in the face of admirable but impractical propositions. The committee opined that "A free transport market can be created in the European Economic Community by 1992 only if, at the same time, binding decisions on harmonisation are taken to guarantee the safety of humans and the environment when dangerous substances and wastes are transported." At the same time it proposed that there should be an additional progressive list of hazard categories for dangerous substances and waste with increasingly stronger controls for the more hazardous materials. In other words, another layer of regulation.

The Commission finally focused on four specific areas for proposals to the European Council of Transport Ministers relevant to road traffic:

1. Directive requiring member states to accept road vehicles conforming to ADR for international transport of dangerous goods or wastes.
2. Directive on the training of drivers of road vehicles carrying dangerous goods or wastes.
3. Directive on the training of road transport managers concerned with the transport of dangerous goods or wastes.

4. A directive for the enforcement of the regulations on the carriage of dangerous substances and wastes by road.

(further recommendations concern the sea mode)

Industry is responding to these and other Commission initiatives, for example on waste transport, in a constructive but it must be said, sometimes critical stance, especially where it is perceived that established and proven regulatory regimes are to be overlaid rather than strengthened. Bald statements from the Commission, such as "transport by rail is safer than road transport" find little favour without sound substantiation.

There may well be an argument in favour of switching dangerous traffic from road to rail, but I have yet to see any conclusive evidence that one of the modes is safer than the other. Arguments in favour of rail may include the fact that there is less likelihood of a product spill occurring on rail due to the highly regulated control in traffic flows by the railway signalling systems and that in the event of an incident the width of the railway tracks offer a barrier distance between spillages and the public. Conversely railways tend to run through City centres, whereas much road traffic moves on motorways which are usually routed around towns rather than through centres of population. A rail incident may involve very much larger quantities of dangerous goods than one on the road, as rail wagons may have a greater capacity than road vehicles, and wagons containing the same dangerous substances are often deliberately marshalled together.

Even if there were clear evidence that one mode of transport were safer than the other it would still be necessary to ensure that each mode is adequately safe. Certainly improvements in design of vehicles has been made over the years, these being reflected in the UIC (International Union of Railways), RID and ADR regulations. Since packages may well be conveyed by more than one means of transport it is essential that there is conformity in the regulations concerning packages for the various modes of transport and this has been achieved by the introduction of the UN performance test criteria into the separate regulations.

It is necessary to recognise that the current international dangerous goods regulations have a very much wider applicability than the EEC countries themselves, so in the interest of safety and of world trade it is necessary that the international regulations reflect the necessary safeguards. There may well be a place for EEC countries to agree amongst themselves on what needs to be in the international regulations and then put forward proposals. This way would be much more effective than the EEC imposing its own conditions which may be out of line with the thinking of the rest of the world.

Committees responsible for framing international regulations can spend many hours deliberating on what improvements need to be made and then drafting the revised regulations, but all this is of little avail if the regulations are not observed in practice. This lack of observance may be deliberate or unintentional and may be due to a number of factors. For instance economic ones, such as carriers levying a surcharge on dangerous freight, or

others being due to lack of understanding or indeed knowledge of the regulations. In the past there has been a conflict between the regulations governing the individual modes of transport, but gradually this has been overcome mainly through harmonisation the United Nations recommendations. Whilst this process of harmonisation must still go on it is perhaps time that attention was paid to making the various regulations more logical and easily understandable thus making them easier to observe.

For air transport IATA has the requirement that each Freight Forwarder's office should employ someone who has passed a recognised dangerous goods course, but this requirement does not apply to other modes of transport and consequently dangerous goods are often consigned by persons with scant knowledge of the regulations. Commission initiatives in this area are to be welcomed.

In any event, our chart of regulators and regulations look set to become more complicated.

There is one final point to be made here, and it is this.

Hazardous materials are an integral and indivisible part of general freight. Invariably any accident involving hazardous materials is followed by demands from politicians and the media to ban this traffic or to introduce draconian controls, the impracticality of which is obvious after the most cursory study. Some transport companies, for example integrated 'door-to-door' operators, claim not to carry dangerous goods, only to find large quantities of them in their traffic because staff are not trained to exclude them, and in any case would have difficulty in doing so and maintain reasonable service.

The current regulatory regime, for all its shortcomings, has ensured remarkably safe distribution of millions of tons of hazardous materials over the past decades, and its effective enforcement and sensible development will continue this good record. In contrast to that approach, there is currently proposed US legislation that all 500,000 daily US domestic shipments of hazardous materials be tracked on a national database at an estimated annual cost to industry of \$12 billion.

The key to more effective control is consistent and uniform application and enforcement of existing rules.

- STATISTICS

Because 'danger' is not a customs category, there are no national or EC statistics produced on hazardous materials traffic, and a great weakness in debate on this subject is this lack of basic information. My own company is involved in a study for the UK Department of Transport, to estimate packaged dangerous goods flows in and out of UK seaports, the first time that this has been done.

STRUCTURAL CHANGE IN THE TRANSPORT INDUSTRY

The transport industry (at the "packaged goods" level) is undergoing radical change. Some elements have been evolving at a

strong but steady pace (intermodalism), others are new and proceeding rapidly (ie integration). All these affect dangerous goods transport. The most relevant developments are:

- Intermodalism Dangerous Goods packed in a freight container, rail or road vehicle may travel in a single journey by road, rail, sea or soon through sub-sea tunnel, creating significant modal and national regulatory problems.
- Integration The fastest growing sector is the 'door-to-door' or integrated carrier services. Founded on documents and small parcels traffic, these highly efficient operations are now developing into general freight (24 hours delivery throughout Europe) with wholly-owned aircraft and vehicle fleets. This sector presents critical (and currently largely ignored) problems for dangerous goods management.
- 'Just in time' supply This concept, being adopted across industry, has profound implications for dangerous goods. For example, instead of a ship tankload of solvent being moved to storage tanks at an electronics plant, tank-container loads may be received daily and held at the plant for direct discharge.
- Quality Management The concept of total quality management is rapidly gaining ground in dangerous goods distribution, spurred by the chemical producers as part of their evolving safety audit and environmental protection programmes.

DANGEROUS GOODS AND THE ENVIRONMENT

There are two types of threat to the environment posed by the inland transport of hazardous materials:

Environmental impact of normal operations

Over and above the normal environmental impact of vehicle emissions, there are such routine operations as cargo tank washings, residue disposal etc that are unique to hazardous materials transport. These are a matter for the national or local authorities concerned, and there are no centralised data available.

Environmental impact of incidents involving dangerous goods

The major large-scale dangerous goods incidents of the past have mostly involved sea-borne traffic although the Hebron and Los Alfaques disasters were exceptions that prompted public outcry and legislative change. The environmental factor remains largely a threat, for example of groundwater contamination from chemical or fuel spills. Directed against this all the regulatory and operational effort may be seen in the context of risk management, with cost benefit as part of the equation.

If the definition of transport is extended to include storage, then the risk (and the record) changes dramatically, as illustrated by the Sandoz fire and subsequent pollution of the Rhine.

Again to our knowledge there is no centralised information on the overall environmental impact of hazardous materials distribution, although studies are being carried out.

INFORMATION - THE VITAL LINK

No activity could be more information-dependent than hazardous materials transport. Complex technical data, often involving chemical names and classifications, is handled by normal clerical staff down an extended chain stretching from original manufacturer to final consumer. With paper-based procedures there are plenty of opportunities for breaks in the chain and little support for hard-pressed staff.

Apart from normal operational data, there is vital emergency response information, for which there may be no second asking or checking.

Automation presents a unique opportunity for hazardous materials transport, particularly by helping to eliminate the errors and omissions endemic in manual procedures. Programs can be written that will take a user through all the relevant requirements before and during the carriage of dangerous goods and, since these programmes are written in a logical way and bring together all the pertinent points no matter where they occur in the regulations themselves, consignees and carriers can have much more confidence in their ability to observe the regulations and thereby enhance safety.

The first stage of the transport industry's move into computerisation has proceeded slowly, with little co-ordination. One manifestation of this is the large number of software vendors, each with a small market share. Unlike its American counterpart, the European market has been inhibited and fragmented by language and trading barriers.

The second wave of automation looks set to proceed at a much faster pace. With the speedy agreement on Electronic Data Interchange (EDI) standards and harmonisation of EEC trade procedures, the adoption of information technology will be irresistible at all levels.

This presents a unique opportunity for better dangerous goods information management on a European scale, but there are formidable practical barriers.

With the implementation of the single market and interconnection of community national and international data networks, and with the goodwill and co-operation of those involved, better tools for environmental protection and accident prevention will help continue a good record.

REFERENCES

Hazardous Cargo Bulletin, London
OECD Road Transport Research Group

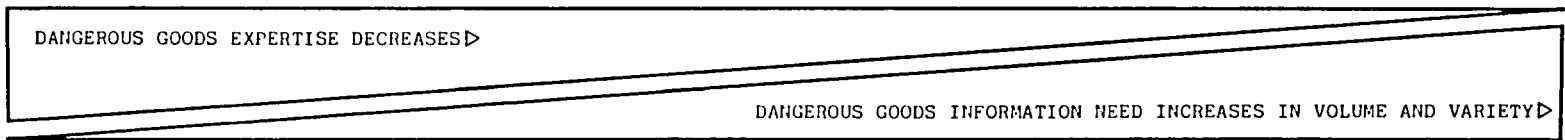
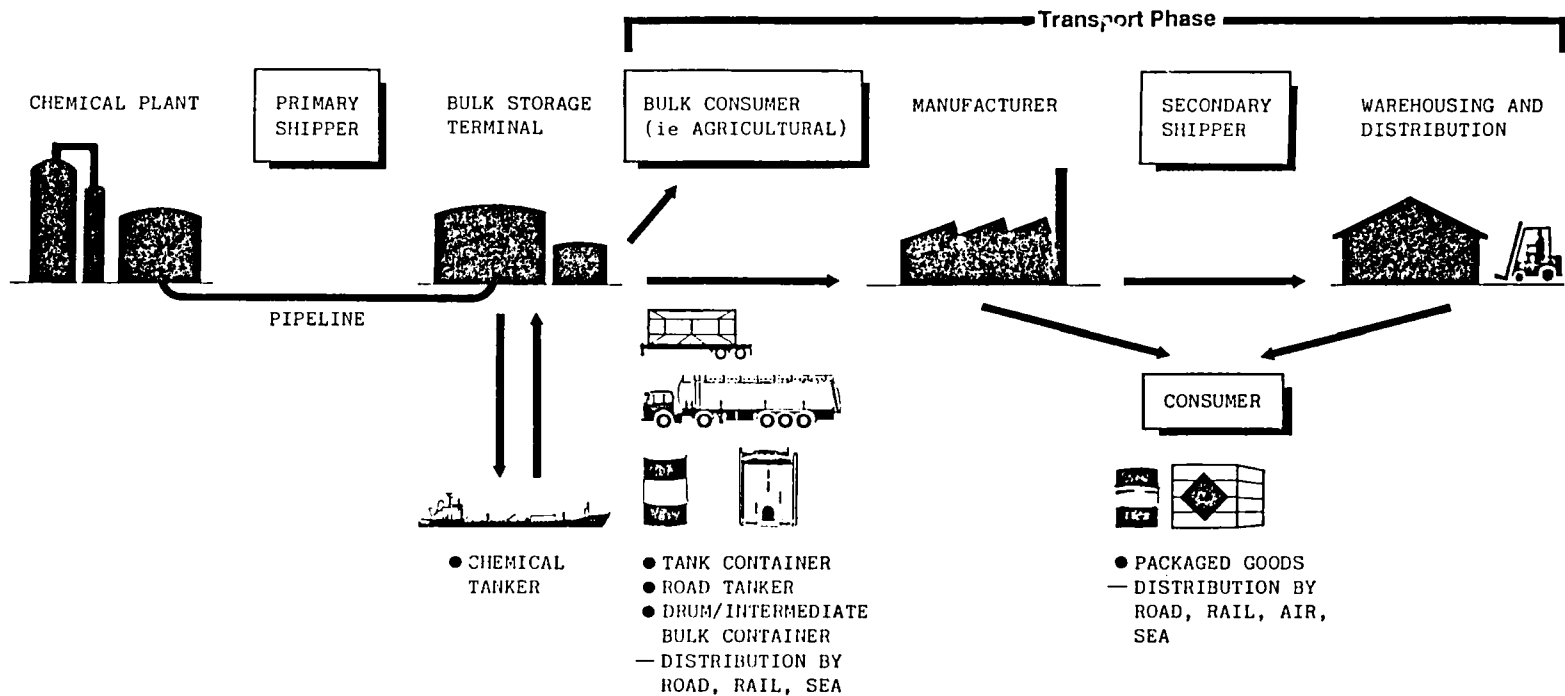


DIAGRAM 2 DANGEROUS GOODS TRANSPORT CHAIN

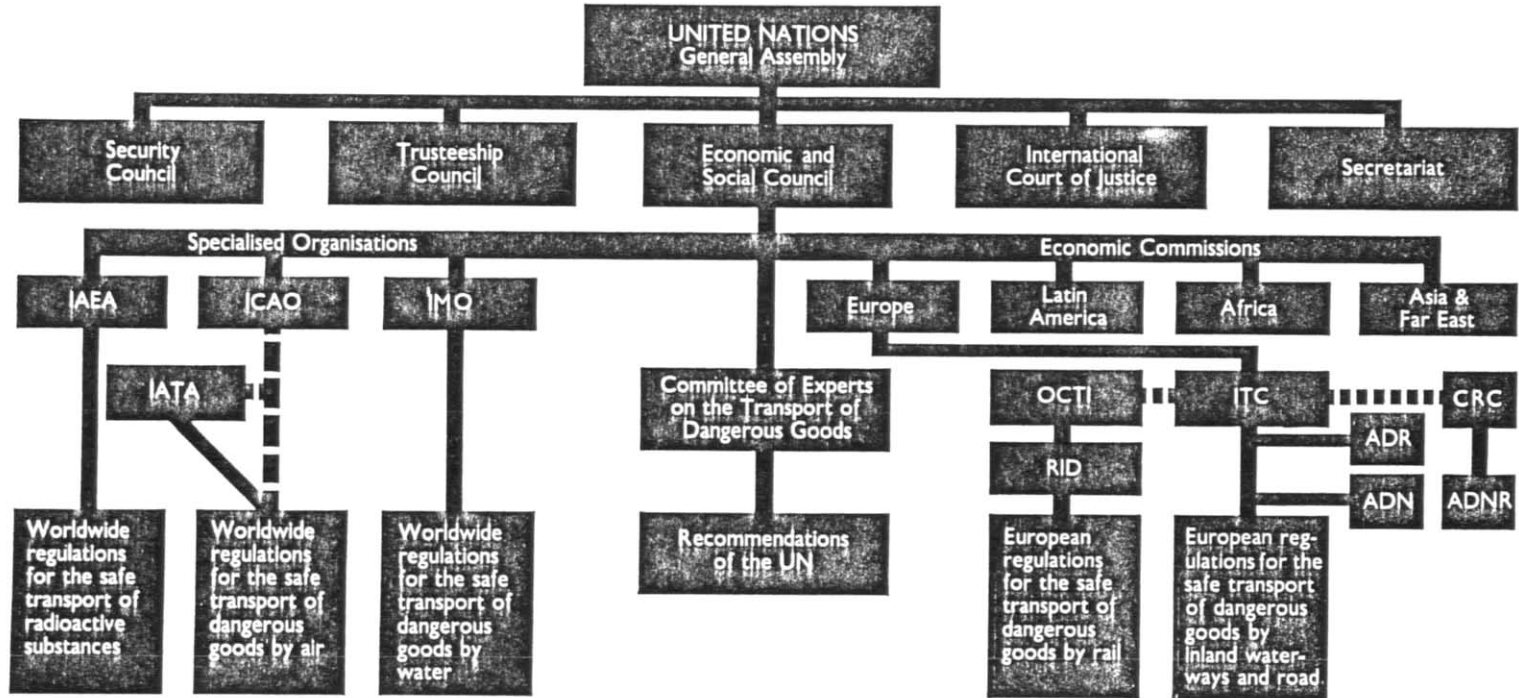


DIAGRAM 3 MAJOR ORGANISATIONS INVOLVED IN THE REGULATIONS FOR THE INTERNATIONAL TRANSPORT OF HAZARDOUS MATERIALS

TABLE 4**National Regulations for Road Transport in Relevant Member States**

(Source: OECD Road Transport Research Group and EXIS)

Belgium

Since 15 March 1976 Belgium has had national regulations on the transport of dangerous goods. For 95% of the goods these regulations are the same as the ADR rules. For the other 5% the national rules are stricter than ADR ie. for goods of Class 3 (flammable liquids), Class 1 (explosives) and Class 5.1 (goods which contribute to combustion). The national rules are less strict than ADR for gas-oil.

Denmark

Denmark has been a party to the ADR agreement since 1 August 1981. The aim is to issue a body of national rules very similar to the ADR agreement.

Technical specifications similar to the ADR have been adopted for Class 2 (compressed gases), Class 6.1 (poisonous substances) and Class 8 (corrosive substances). The regulations for Classes 3 (flammable liquids), 5.1 oxidizing substances and 5.2 (organic peroxides) have been in line with ADR since 1986. For Classes 4 (flammable solids) and 6.2 (repugnant substances and substances liable to cause infection) there are no regulations for national transport in Denmark. The regulations for Class 1 (explosives) are very old and different from the ADR regulations. Labels according to EEC directive 67/658/EEC are permitted for national transport of dangerous goods in Denmark.

Federal Republic of Germany

The regulations for the carriage of dangerous goods by road in Germany are stated in the "Gefahrgutverordnung Strasse (GGVS)". These regulations are very similar to the ADR. The differences mainly concern authorisation for other dangerous goods to be carried and additional types of packaging.

The FRG is proposing domestic regulations diverting dangerous goods traffic from road to rail (including 'piggyback' carriage) for certain types of journey.

France

The French legislation concerning the transport of dangerous goods was stated in the regulation of 15 April 1945 (RIMD), but this was reviewed in May 1985 with a transitional period until 1 May 1990. These rules were developed in France earlier than in other nations, therefore the international agreements were not the basis for the original legislation, although the review brings the French legislation partly into line with ADR. The main differences from ADR are:

- Some classes are different from those of ADR, but the review brought Classes 3, 6.1 and 8 into line as far as packaging and testing is concerned. Those classes which are different from ADR are further divided into categories and groups with their own restrictions.
- The labels are slightly different and they must be applied to all vehicles carrying dangerous goods, including packaged goods.
- The form of the transport document is more strictly defined.

To meet a decision of 30 July 1975 vehicles transporting dangerous goods with a PMA above 10 tonnes must have a speed limit set at 80 km/h. There are route limitations and restrictions concerning days on which it is prohibited to drive trucks with dangerous goods. The French regulations are under review for ADR harmonisation.

Greece

Greece is not a party to the international ADR agreement. The reason given is that the ADR agreement is still under study prior to being submitted to the Parliament. There is no national legislation on the transport of dangerous goods in Greece and there is no special training for drivers of vehicles transporting dangerous goods.

Ireland

Ireland has not yet signed the ADR agreement. The reason given is that the inland transport of dangerous goods is not of very great importance and the entire ADR agreement must be translated into Irish in order to be approved by the Irish Parliament. However, Ireland's domestic legislation (Dangerous Substances - Conveyance of Scheduled Substances by Road (Trade or Business) - Regulations 1980 and Amendments 1986) is very similar to the ADR agreement and refers to ADR

in all the main points. Substances of ADR Classes 2, 3, 4.1, 4.2, 5.1, 5.2, 6.1 and 8 are declared dangerous. Substances of ADR Class 1 are governed by the Department of Justice. Substances of Class 6.2 are omitted. Class 7 comes under the Nuclear Energy Board. Differences to ADR regulations are:

- Some general rules concerning the routing of dangerous goods.
- Packaging and labelling in accordance with the Community Directive 67/548/EEC or other international or national regulations is deemed to comply with the Irish regulations.

Italy

In Italy a set of rules was stated in August 1980 based on the ADR classification and following 90% of the ADR regulations. However, some derogations are possible and regulations for national transport are less tough than for international.

The Netherlands

National transport of dangerous goods by road has to comply with the regulations of the VLG (Vervoer Over Land van Gevaarlijke Stoffen) which is in fact the same as ADR plus:

- Rules for routing of dangerous goods.
- Extensive professional training requirements.
- Special conditions for explosive goods (Class 1).
- More extensive information requirements.

Portugal

Portugal, as a new member European Community state, applies the ADR regulations for international and national transport.

Spain

Spain, as a new member state of the European Community, follows the ADR regulations for the international transport of dangerous goods. For domestic transport the Spanish regulations are practically copies of the international ones with minor amendments. With regard to road transport the TPC (Reglamento Nacional de Transportes de Mercanias Peligrosas por Carretera) is applied.

United Kingdom

In recent years United Kingdom legislation concerning the transport of dangerous goods has been comprehensively revised enabling much earlier legislation to be revoked. Four sets of regulations now control:

- a) Carriage in road tankers and tank containers.
- b) Classification, packaging and labelling of dangerous substances.
- c) The operational aspects of the carriage of packaged dangerous goods by road.
- d) The loading, unloading and storage of dangerous goods in ports/harbour areas.

All these regulations were made under the 1974 Health and Safety at Work Act and are consistent, as far as possible, with the Recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods. The United Kingdom uses the Hazchem Hazard Code for the placarding of tank vehicles and tank containers. Vehicles carrying packaged dangerous goods above a certain specified quantity are required to display blank orange (ADR) plates. Drivers of both tankers and vehicles carrying packaged goods must receive instruction and training. Recently the UK has initiated moves towards harmonisation of domestic regulations with ADR.