

Special Training for Drivers of Vehicles Carrying Radioactive Materials in Germany

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Introduction

No rule, not even the best, serves its purpose if it is not complied with just because it is not known. This was recognized after a tank-truck accident in Spain. There a driver was driving his overfilled tank truck past a campground when, due to the absence of ullage, the liquid's expansion ruptured the tank shell. The released gas ignited. The exploding gas cloud killed over 200 people. The accident caused politicians in Germany, and indeed all over Europe, to think about training of dangerous goods drivers.

1. Training of tank-vehicle drivers

The greatest risk emanates from vehicles with tanks. So, after the accident in Los Alfaques (Spain), regulations for the training of tank-truck drivers in Germany were put into force in 1979. The training comprises imparting of knowledge on

- those regulations governing dangerous goods transport in general;
- types of hazards of dangerous goods;
- accident control;
- action to be taken after an accident or incident (emergency response): first aid, securing of traffic and other measures;
- hazard labelling;
- special duties of dangerous goods drivers;
- purpose and operation of technical equipment of trucks and
- special road behavior of tank trucks.

Within a very short period of time training papers had to be drafted and training centers had to be set up. Training was transferred to industry's self-administrative bodies, whose umbrella organization, the German Chamber of Commerce and Industry, established guidelines conducting the training and issued specimen training programs. Thus the first training courses were run within one year after publication of the regulations.

2. Industry administrates training

Up to a point, German industry practices self-surveillance. Locally competent chambers of commerce and industry (Industrie- und Handelskammer IHK) were established for this purpose. Each of approximately 90 chambers of commerce and industry is answerable only to itself and is centrally looked after by the German Chamber of Commerce and Industry (Deutscher Industrie- und Handelstag DIHT), which also serves as umbrella body. The DIHT, for instance, negotiates with the competent ministries.

Concerning the training programs, talks were held between the DIHT and the competent department for dangerous goods transport (the Federal Department of Transport). The DIHT established a working party of experts from shippers, carriers and technical control organizations (Dekra AG, TÜ, TÜV) to work out the details of dangerous goods drivers' training. The above-mentioned guideline provided for recognition and licensing of every training course by the local chamber of commerce and industry. Organizers of training courses must meet these conditions:

- suitable premises;
- suitable teaching aids;
- qualified teaching staff

and

- availability of training course to everybody interested.

Only when these conditions have been fulfilled will the licensing chamber of commerce and industry recognize the course.

For all measures taken by the German Chamber of Commerce and Industry, liaison with and approval by the Federal Department of Transport was obtained (Ridder, 1993a).

3. Training

Training courses are run by the licensed organizer and supervised by the licensing chamber of commerce and industry. The courses comprise theoretical and hands-on components. After the course has been completed, a written examination is conducted. Having passed this examination the driver is given a certificate of driver's training. This certificate is valid for 5 years and entitles its holder to drive tank trucks with dangerous goods during that period.

The training introduced in 1979 also covered drivers of tank-trucks carrying radioactive material. However, only one vehicle in Germany ever fell under this provision.

4. Development of dangerous goods drivers' training

In the beginning, the training obligation only applied to tank truck drivers in Germany. In 1984, it was extended to cover tank-truck drivers in cross-border carriage of dangerous goods within the territorial purview of the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR). Then the ADR agreement was valid in 17 European States, such as Austria, Belgium, Federal Republic of Germany, France, Italy, Luxemburg, Spain, Switzerland or The Netherlands. The ADR agreement is looked after by the Economic Commission for Europe (ECE), which has its secretariat in Geneva. Up to 1991, some 290,000 tank-truck drivers have been successfully trained. As has been proved by falling accident rates and less severe complaints from inspections, the training has proved its worth.

It soon became evident that carriage in tank trucks had become safer, but also that significant shortcomings could be observed where dangerous goods were carried as parcelled freight. This was true even for the carriage of radioactive materials. The ECE, on German initiative, agreed on special training for drivers of trucks carrying dangerous goods as parcelled freight in international traffic (so-called non-tank vehicle drivers' training). The training was introduced 1990, with a transitional period until 1995. The transitional periods contained in the international agreement were considered overly long by pre-unification Germany. Therefore non-tank vehicle drivers for domestic carriage were included much earlier in the training requirements for dangerous goods transports, as can be seen from the following dates:

- until 30.06.1991, driver's training for trucks subject to the labelling provisions and with a permissible total weight exceeding 38 tonnes, trucks carrying goods of hazard class 7, schedules 5 through 13, and trucks carrying goods of hazard class 1;
- until 31.12.1992, driver's training for trucks subject to the labelling provisions and with a permissible total weight exceeding 7.5 tonnes;
- until 31.12.1994, driver's training for trucks with a permissible total weight exceeding 3.5 tonnes.

Contents of the training of non-tank truck drivers follow the example of the tank-truck drivers' training; the duration of the course is 20 hours.

By now the first non-tank vehicle drivers have been trained, and it can be stated that this training measure will prove to be a success.

The Economic Commission for Europe (ECE), effective as from 1.1.1993, has extended its range of training subjects by:

- instruction on environmental protection during carriage, with focus on transport of wastes;
- general information on liabilities under civil law;
- instruction on multimodal transport.

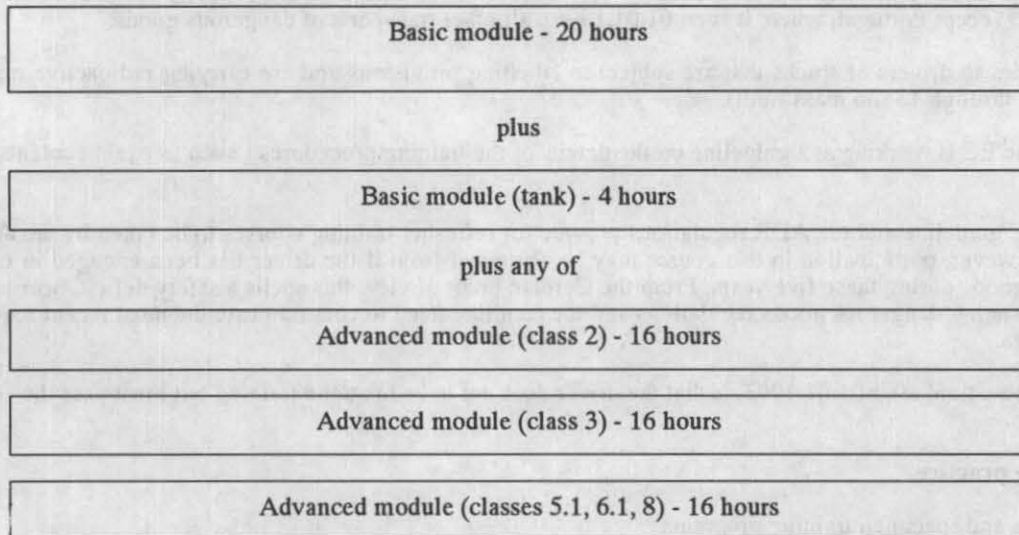
Furthermore, for non-tank truck drivers the subject of handling and stowage of packages was introduced.

5. Integrated training system

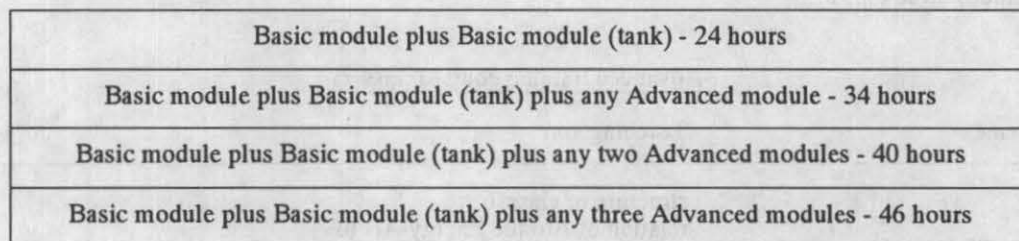
Training of non-tank vehicle drivers, too, was transferred to the German Chamber of Commerce and Industry as part of industry's self-administration. It worked out new principles that combined training of tank-truck drivers and non-tank truck drivers in an integrated system. The new system provides for each dangerous goods driver to take a basic

course. This basic course deals with general provisions for the carriage of dangerous goods, such as classification according to hazards, labelling of trucks, duties and responsibilities of driver etc (Ridder, 1993b). The basic course extends to 20 hours and is concluded by a check of successful completion of the training (Ridder and Lauer, 1992a). This check uses the multiple-choice method.

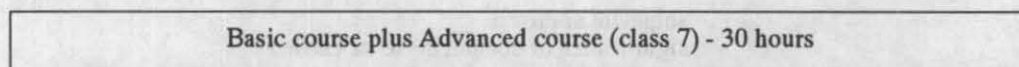
If the dangerous goods driver then wants to drive tank trucks he has to take the respective advanced training course or courses. The advanced courses comprise a basic course (tank), which focuses on road behavior and technical equipment of tank trucks, and advanced courses covering issues specific to the respective classes (Ridder and Lauer, 1991 and 1992b). An overview is given below:



The durations given above refer to the modules taken separately; however, combinations of modules can be taken in fewer hours:



In order to be certified for transport of radioactive material the driver has to attend the advanced module (class 7), which lasts 10 hours (Ridder, 1992a). So, after taking the basic module plus the advanced module (class 7) totalling 30 hours, the driver may transport radioactive materials.



The obligation to take the training courses for class 7 only applies to schedules 5 through 13, irrespective of permissible total weight of the truck.

6. Activities of the European Community

Some EC Member States had introduced driver's training for domestic dangerous goods transport, and training was also required within the framework of the ADR agreement for cross-border between them (Commission of the European Communities, 1987; Commission of the European Communities, 1989).

The introduction of the Single European Market as of 01.01.1993 presents problems: the internal market permits entrepreneurs to carry traffic within any Member State. In practice, this would mean domestic carriage with the accompanying obligation to abide with the training regulations in force in that Member State. This would not have been practicable.

The Commission of the European Communities, Direction General for Traffic, as early as 1989 therefore turned to this question and submitted a proposal for a guideline on the training of truck drivers to the European Council. The Council gave its consent, and on 21.12.1989 the Guideline on the Training of Drivers Carrying Dangerous Goods (89/684/EWG) was promulgated in the official gazette of the European Community. The guideline obliges the Member States to introduce compulsory training for domestic dangerous goods transports within three years. The training will be roughly comparable to that of the ADR provisions. Thus a driver holding an ADR-certificate may carry out domestic transports within any other Member State.

The EC guideline contains the following deadlines for its coming into effect:

- 01.07.1992: truck drivers for explosive substances, and for tank transports with a capacity upwards of 3,000 liters;
- 01.01.1995 (except Portugal, where it is on 01.01.1996): all other transports of dangerous goods.

It also applies to drivers of trucks that are subject to labelling provisions and are carrying radioactive materials of schedules 5 through 13 (no mass limit).

Presently the EC is working at a guideline on the details of the training procedures (such as exact contents, duration etc.).

Both the EC guideline and the ADR regulations provide for refresher training courses to be taken by the driver after 5 years. However, participation in this course may be abstained from if the driver has been engaged in carriage of dangerous goods during these five years. From the German point of view this spells a safety deficit, bearing in mind the ever-changing dangerous goods regulations and the resulting need to communicate the most recent requirements to the drivers.

Another innovation, after 01.01.1993, is that the driver does not have to attend training but must pass the concluding examination.

7. Training practice

7.1 Subjects and specimen training programs

Training is carried out on the basis of the DIHT's training programs, which have been worked out by competent experts and apply to all local chambers of commerce and industry. The specimen program for the advanced course (class 7) includes these topics:

<u>Advanced training course (class 7)</u>	
Group of themes	Teaching aim
general provisions	structure of class 7 relation of Atomic Energy Act to dangerous goods law contents of Atomic Energy Act and Rule on the Carriage of Dangerous Goods by Road
duties and responsibilities	shipment approval significance of documents to be carried on the transport unit information requirements for accidents punishment options (fines / penalties)
types of hazards of substances	properties of radioactive substances hazards to the human body special effects of released substances
hazard information and hazard labelling	transport documents documents to be carried on the transport unit hazard labels
packaging, truck equipment,	distinctive features of dangerous goods packagings

carriage	safety and protective equipment fundamentals of radiation protection securing of load
emergency measures	measures to be taken with radioactive substances

7.2 Teaching and training aids

Recognition and licensing of training organizers is conditional on the availability of suitable teaching and training aids:

- literature;
- wall posters;
- various objects for demonstration purposes;
- slides;
- videos and
- overhead films.

These aids are on offer from several specialised publishing houses. It is up to the organizer where he wants to buy his aids - however, quality and price are decisive.

As was outlined above, anybody intending to organize dangerous goods training courses has to obtain recognition and licensing from his local chamber of industry and commerce. Fulfillment of certain conditions is required, and the organizer must conduct the course according to the terms of the license. Anybody may be licensed: technical control organizations, driving schools or companies employing many dangerous goods drivers. Training should comprise as many hands-on components as possible, such as fire-fighting exercise or actual securing of a parcelled load.

After each module, for instance basic module, basic module (tank) or advanced module (class 7) the driver must take an examination. After all examinations have been passed, the driver will be issued with a certificate for driving dangerous goods vehicles. The certificate will be customized to the specific module(s) the driver has passed, such as "parcelled freight truck", "tank truck" or "truck for carriage of radioactive materials". This certificate is called the ADR-certificate.

8. Specialized transport companies

Carriage of radioactive materials in Germany is performed by two specialized transport companies, each employing upwards of 1,000 drivers, that carry in particular radiopharmaceuticals in express service. The companies themselves train their drivers on weekend courses. Because of the high staff turnover in this branch of transport these companies are considering to modify their logistics of transport towards concentration of radioactive carriages on certain drivers, which would reduce the number requiring training to some 50.

9. Atomic energy law and traffic law

Historically speaking, law on atomic energy was already applicable in the Federal Republic of Germany when provisions on the carriage of radioactive materials were included in the traffic law during the early 1970s. Traffic law, based on the IAEA recommendations on the carriage of radioactive materials, thus replaced the atomic energy law provisions. Only one provision was retained, since traffic law did not provide for driver training until 01.07.1991: that the carrier has to caution the driver once every half year on the peculiarities of radiation protection and keep this cautioning on record. The driver, during carriage, has to carry a corresponding certificate with himself. In practice this leads to cautioning on a half-yearly basis under atomic energy law on the one hand plus initial / refresher training under traffic law every five years on the other.

Attempts at bringing these two fields of law into line have come to nothing so far. The atomic law cautioning, though, will again be justifiable once the Federal Republic of Germany follows the example set by the European Community's and the ADR regulations internationally to substitute refresher training with recognition of 5 years of uninterrupted employment as dangerous goods driver.

It should be added that under traffic law the carrier is obliged to employ only reliable dangerous goods drivers and to introduce them to the operation of special types of trucks as well as to the handling of the respective items of truck equipment (K. Ridder, 1992b).

Furthermore, under traffic law companies that pack, carry or ship radioactive materials of schedules 5 through 13

have to appoint a so-called Dangerous Goods Officer. This dangerous goods officer has to give supplementary training to the drivers.

10. Economics and politics

It has already been said that dangerous goods drivers' training has basically proved its worth; falling accident rates and less severe complaints from inspections of dangerous goods trucks speak for themselves. So far so good. However, from an economic point of view, training costs money. It has been estimated that some 1.2 million dangerous goods drivers and dangerous goods officers have to be trained in Germany. Training costs are some US \$ 80,000,000 annually, plus about US \$ 210,000,000 in worktime lost. Every year between 20 and 25 transport accidents with parcelled dangerous goods occur where the quantity released is in excess of 100 liters or kilograms. There are also approximately 60 tank-truck accidents every year. Even assuming a total of US \$ 34,000,000 in damage, and roughly twice as much for damage prevented through the training, drivers' training does not appear justifiable on economic considerations.

However, I believe the training has to be justified by politics. Public and States' concern for safety in environmental matters is growing, worldwide. In Germany, the Green party - which once was not taken seriously - and its policy of environmental protection has shaken up the other political parties, was elected to the Federal Parliament and supplied ministers in Land governments. It has a say in transport policy, which it considers secondary to environmental protection:

- at Federal and Land level, ministries of the environment have been established, which now argue over competencies with the ministries for transport and for industry;
- the media respond to growing public interest by ever more frequent coverage of dangerous goods accidents.

All this does not support the economic, but the political case for dangerous goods drivers' training.

12. Concluding remarks

Transports of radioactive materials are considered particularly dangerous compared to other dangerous goods. Instinctively one thinks of Chernobyl (1986) and nuclear bombs (1945). It is less well known that transport of radioactive materials is extremely safe, and that no fatal accidents have occurred during transport. This is, of course, due to the transport philosophy of the International Atomic Energy Agency (IAEA), as laid down in its Recommendations for the Safe Transport of Radioactive Material (International Atomic Energy Agency, 1990; see also United Nations, 1990).

Although safety is guaranteed by the packaging, the above-mentioned sensitivity urgently requires training of drivers of radioactive material shipments. Material damage can be compensated for, but there is still the moral and political condemnation of a transport company whose employees' conduct has been incorrect.

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