

TRAINING COURSES FOR THE TRANSPORT OF RADIOACTIVE MATERIALS IN FRANCE

O. Kimmel

CEA/SAC, INSTN, 91191 Gif sur Yvette Cedex, France

SUMMARY

European regulations require that all drivers of vehicles transporting radioactive materials attend an approved training course and pass a test. The *arrêté* of 5 December 1996 that specifies this training conforms with the requirements of the European agreement on the international transport of dangerous materials by road (ADR). The new rules for the teaching program, the qualification of instructors and the conditions of the final test are more restrictive than the previous ones.

The main difficulty with this course is that people without scientific training have to assimilate theoretical notions and complicated know-how. The course should give candidates a basic understanding of the radiological risk associated with radioactive materials, and some basic notions needed to prevent accidents and to implement safety measures to protect themselves and the environment.

INTRODUCTION

Every year, 300,000 packages of radioactive material are transported in France. Two thirds are for medical, pharmaceutical or industrial use and the remainder for use in nuclear power plants. The transport operations are carried out in accordance with the *arrêté* of 5 December 1996 covering the road transport of dangerous goods, which is the national regulatory text in force. This regulation is aimed at guaranteeing load safety and public safety throughout transport operations. Load safety, which involves controlling exposure, contamination and criticality risks, essentially depends on the cask. Public safety, which includes aspects such as equipment maintenance, vehicle fittings, personnel training and security, is the particular responsibility of the link in the transport chain constituted by the driver, who has to be trained so that he can play his safety role to the full.

The training given must make the candidate aware of the radiological risks associated with radioactive materials and give him basic, indispensable information on accident prevention. He is also told how to take the initial, indispensable steps to set up safeguards for himself and the environment.

Since 1980, drivers have been trained to transport radioactive materials at the National Institute for Science and Technology (INSTN), which is part of the French Atomic Energy Commission and the only approved body in France. Taking the regulatory training as a basis, the INSTN submits a training program and teaching methods to the competent authority for validation. The regulations also stipulate that in addition to the initial training period, there should be regular refresher courses.

Basic training

The basic training period lasts 35 hours and is intended for drivers who have never transported radioactive materials. The first 18-hour period is common to the transport of dangerous materials (toxic, corrosive, explosive etc.) and also covers the corresponding regulations in this field.

The second part is devoted entirely to radioactive materials. The theoretical aspects of radioactivity, contamination and exposure risks and radiological protection are dealt with, following which the regulations governing the transport of radioactive materials are explained in detail. Students are tested at the end of the basic training period. The test comprises 50 multiple choice questions. A training certificate is awarded to all students obtaining 70% (equivalent to $\geq 14/20$).

The new European regulation slightly lengthens the training period, (35 hours instead of 30), but more importantly, it requires a higher level of knowledge. This is why certain aspects such as the training scenario have to be improved.

The instructor has to be aware of the fact that his students may have professional worries and personal problems which may affect concentration. The methods he uses must take this into account. The most difficult aspect is having personnel with no scientific background understand complex, theoretical ideas. Therefore, from the outset, the driver must be assured that he is capable of learning. This is why the teaching method used alternates theory and practical training and exercises, thereby reducing the amount of abstract information given throughout the training period. Practical training accounts for 25% of the overall course, tutorials and exercises 10%. The link between theory and practice should always be pointed out so that what is learned can be made more concrete and be shown to be of real use. This can be demonstrated by exercises based on actual situations. This gives the students the chance to become involved without fear of being judged by others.

During the training period, students take part in extinguishing different types of fire (Figure 1) and learn about chemical reactions (Figure 2).



Figure 1 - Extinguishing a hydrocarbon fire.



Figure 2 - Introduction to the chemical reactions of transported substances.

When the time comes to specialise, they are taught how to use detection equipment and are confronted with a simulated full-scale accident (Figure 3).

To complete the simulation of real-life situations, case studies are carried out in small groups, with the focus on shipping declarations. Since these situations are very similar to what they are

likely to encounter, student motivation is of the utmost importance. Case studies allow the students to put into practice the knowledge they have acquired throughout the week.

This type of training, where students are actively involved, is only feasible in small numbers. The law stipulates that there should be no more than 20 students at any one time.

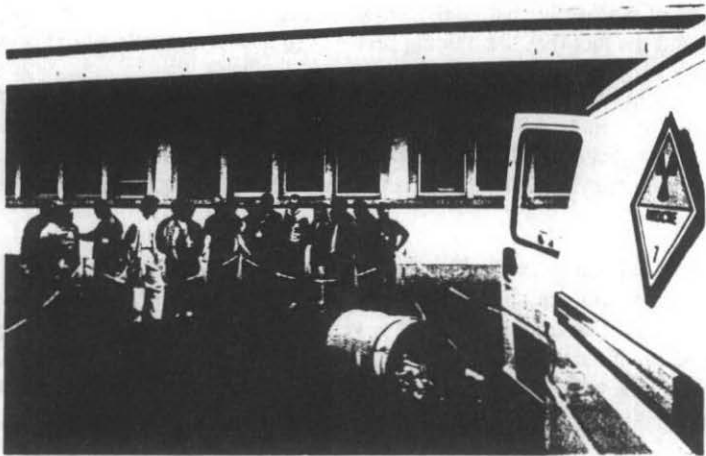


Figure 3 - Simulated accident involving a vehicle transporting radioactive materials

Refresher training

The law stipulates that drivers qualified to transport radioactive materials be eligible for refresher training every five years.

This allows students to refresh their memories before they forget everything they have learned and constitutes an opportunity to bring them up-to-date with the latest techniques and regulations. It also means that they stay alert and dangerous behaviour is avoided.

The subjects dealt with are the same as those covered during the basic training period but the time spent on them is shorter (21 hours) since the students already have the basics. The end-of-course test is the same as that already mentioned.

Different teaching methods are used during refresher courses since professional experience and situations experienced by drivers are used to further their knowledge. An interactive "question and answer" type method is used to stimulate the students' thought processes. Theoretical aspects are covered only when required or to introduce changes in the regulations.

In 1996, the 94% of students obtained their certificates, the pass mark being 50%. Since the frequency of refresher courses was changed by law (arrêté of 15 September 1992), increasing from four to five years, there was no refresher training course in 1997.

CONCLUSION

In France, over 2000 drivers have qualified to date in specialisation No. 7 (training certificate in the transport of radioactive materials). In 1997, the pass rate rose to 95% despite regulatory requirements and the fact that the training periods required a higher level of knowledge.

However, it is mainly during refresher training courses that experience feedback from drivers is gathered so that it can be used in subsequent training courses (both basic and refresher), making them more lively. Much information and practical experience can be gained from these 3-day sessions and they make a significant contribution on both the human and regulatory levels.

Driver training is obligatory in the 28 countries which have signed the European agreement on the international transport of dangerous goods by road (ADR). However, it does not cover all transport operations. Certain types are not governed by regulations or do not require specially-trained drivers. In this case, drivers should have been made aware of the risks of exposure associated with this type of transport and should have a certificate from their employer attesting to this.

In all cases, human reliability, which is the essential component of safe transport, depends on strict, practical driver training, regularly updated to take technical and regulatory changes into account.

REFERENCES

Accord européen relatif au transport international des marchandises dangereuses par route (ADR) - ECE/TRANS/115.

Arrêté du 5 décembre 1996 relatif au transport des marchandises dangereuses par route (dit arrêté ADR) - Journal Officiel du 27/12/96 - Ministère de l'équipement, du logement, des transports et du tourisme.

L'organisation du contrôle de la sûreté du transport des matières radioactives par H. MIGNON - Direction de la Sûreté des Installations Nucléaires. Revue CONTROLE n° 120/décembre 97.

Le nouveau formateur - I. FEUILLETTE - Editions DUNOD. 1996.