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INTERNET COMPENDIUM OF SAFETY RULES FOR THE TRANSPORT OF DANGEROUS MATERIALS

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Summary. The article presents basic information about laws applicable and required for the rail transport of hazardous materials. An internet compendium of safety principles is presented and discussed, as a useful tool to apply when transporting hazardous materials, to support the acquisition, expansion and testing of knowledge in this field.

Key words: compendium, transportation, dangerous materials, safety principles.

INTRODUCTION

Economic conditions force changes in the transport system. Increasingly, attention is drawn to the fast development of international transport by improving the legislative process and the organization of the transport process [1]. The changes should also include rules for the carriage of dangerous goods.

The basis of the dangerous materials transport process, inter alia, is the proper way of conduct of people who are directly involved in the implementation of the consignment of the material.

In Poland, despite the popularity of rail transport in recent years, transportation of dangerous materials by rail is about 18%, while road transport is the main method of transport of hazardous materials and involves about 81%. On the basis of reports of safety advisers, in 2007 about 100 million tons of dangerous goods were transported in Poland (on the road), and about 23 million tons (by the railway) [6].

Carriers operating rail transport of hazardous materials should pay particular attention to:

- training of persons actively engaged in the organization and the process of transporting dangerous goods,
- distribution and characteristics of hazardous materials released for transport by rail as well as their packaging and labeling,
- the operations of loading and unloading,
- shipping documentation,
- technical and operational conditions of railway vehicles, railway lines and markings,

- principles and organization of traffic at railway stations and ways of its surveillance according to the nature and extent of risks in timing and maneuvering [2, 3, 4, 12].

THE AIM AND THE RANGE OF WORK

These issues are described in the applicable legislation (laws, guidelines, station bulletins, official instructions), which contain detailed requirements for the safety of eliminating the danger to humans, environment and the proper organization of transport of hazardous materials by rail [10, 11].

Persons employed by carriers must be trained in the requirements related to such carriage and throughout the period of employment on an ongoing basis are subject to supplemental training. Changes in regulations require the conducting of periodic or ad hoc training [8, 13, 14]. For example, people involved in the filling and emptying of tanks should be trained in the requirements relating to the carriage of liquid fuels, according to the degree of their responsibilities and their duties. Training should include:

- general rules on the carriage of dangerous goods,
- specific provisions relating to their responsibilities and obligations,
- threats posed by dangerous goods, safe way of dealing with them, their protection and emergency procedures [15].

Training should be conducted prior to taking up the duties of the carriage of dangerous goods. Information on all of the trainings should be kept by the employer and employee, and verified by the new employment. Training should be supplemented periodically to reflect changes in the rules [8].

For quick access to the evolving knowledge in this area, an Internet compendium was developed on safety precautions when transporting hazardous materials.

Joomla1.5.x was used for the construction of the compendium - content management system that provides ready-made solution for building portal applications with different profiles, especially due to the availability of many additional components. As a software platform needed to run the application the following can be used: Apache, PHP scripting language and MySQL database server [7, 16].

The prepared compendium includes, among other things:

- current classification of hazardous materials, including:
  - explosives and explosive items,
  - gases,
  - inflammatory liquid materials,
  - solids, flammable, self-reactive substances and explosives, desensitized;
  - pyrophoric materials;
  - materials which, in contact with water, emit flammable gases;
  - oxidizing materials (oxidative);
  - organic peroxides;
  - toxic substances;
  - infectious materials;
  - radioactive materials;
  - corrosive materials;
  - miscellaneous dangerous substances and articles;
- safety rules;

- marking (marking principles) of rolling stock;
- example of a model sheet of hazardous chemicals;
- control questions in the form of quiz [6, 17, 18, 19, 20].

RESULTS

Examples of elements included in the compendium are presented in Figures 1, 2, 6. Additionally, Figure 5 shows a carriage for transporting hazardous materials, together with the description and the correct labeling.

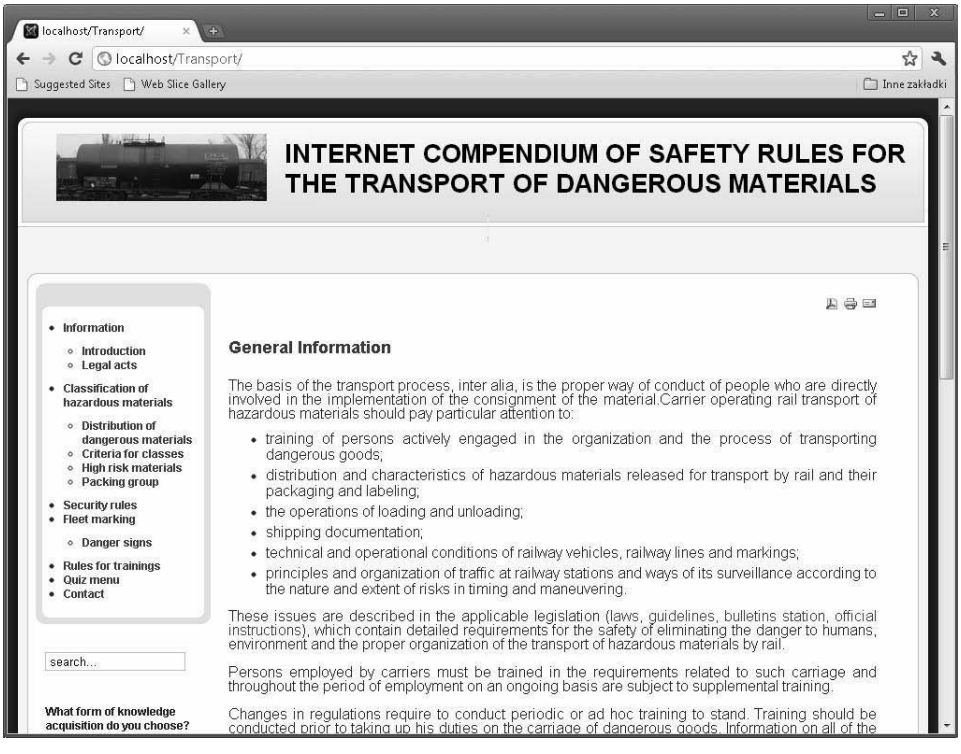

Fig. 1. Screenshot – Information

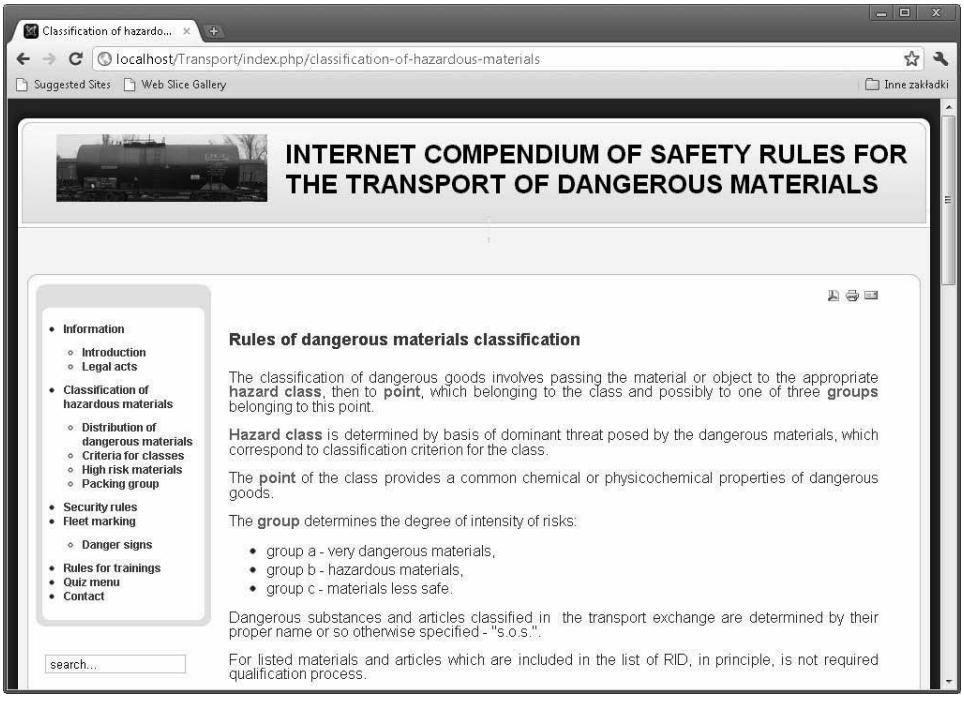

Fig. 2. Screenshot – Rules of dangerous materials classification

MARKING OF THE TRANSPORT UNIT - EXAMPLE

Proper marking of the transport unit for liquid fuel is composed of plates in orange (Fig. 3) and placards (Fig. 4). Approved method of marking is to:

- inform other participants about the existing threat,
- informing the emergency services taking action on the scene involving dangerous goods.

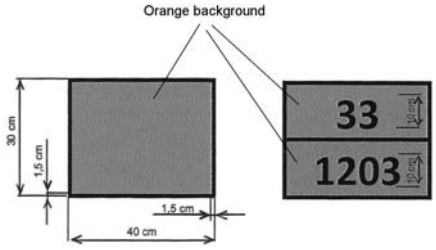

Fig. 3. Orange plates [9]

The transport unit carrying dangerous goods should be provided with two rectangular reflective plates in orange - plain or with numbers. Numbers (number) placed on the tables mean: the number in the upper part is the number of hazard identification, while the bottom - a UN number of the liquid fuel.

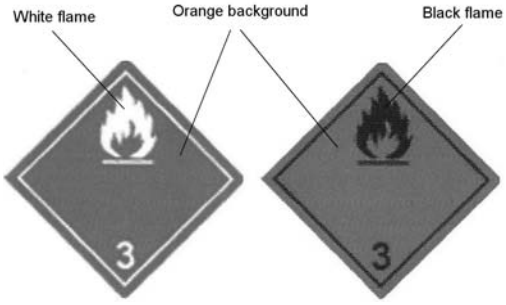

Fig. 4. A sample class of label 3 [9]

Transport unit carrying liquid fuel should be provided with warning stickers affixed to the carriage, with background in a contrasting color. The shape of a square rotated at an angle 45° and a side length of 25 cm. Boards and stickers should be visible, weather resistant, numbers and symbols indelible, remaining in transit in their seats and remaining legible after 15 minutes in a fire [3, 9].

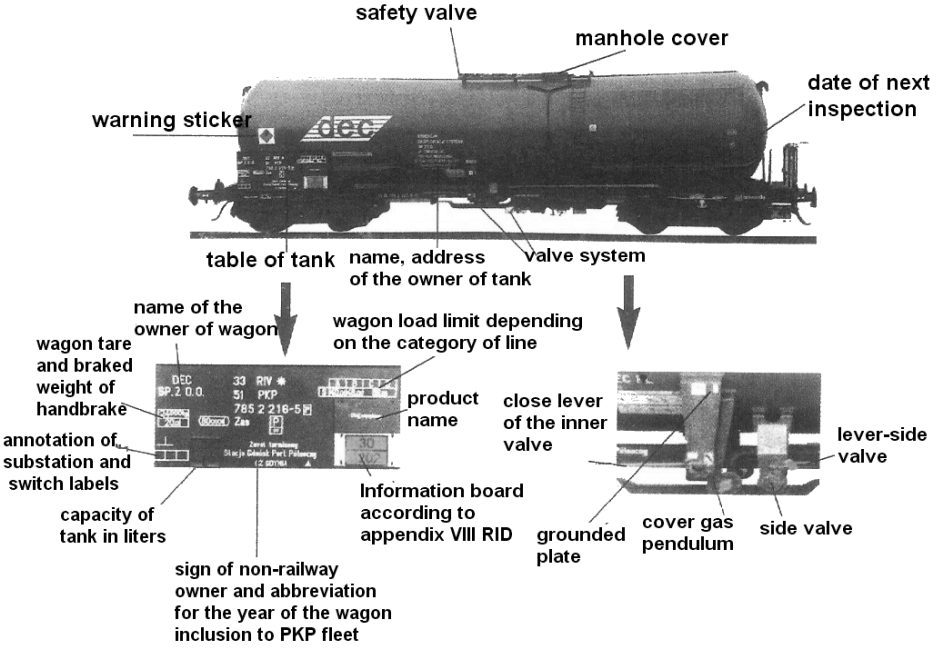

Fig. 5. Model of properly labeled carriage

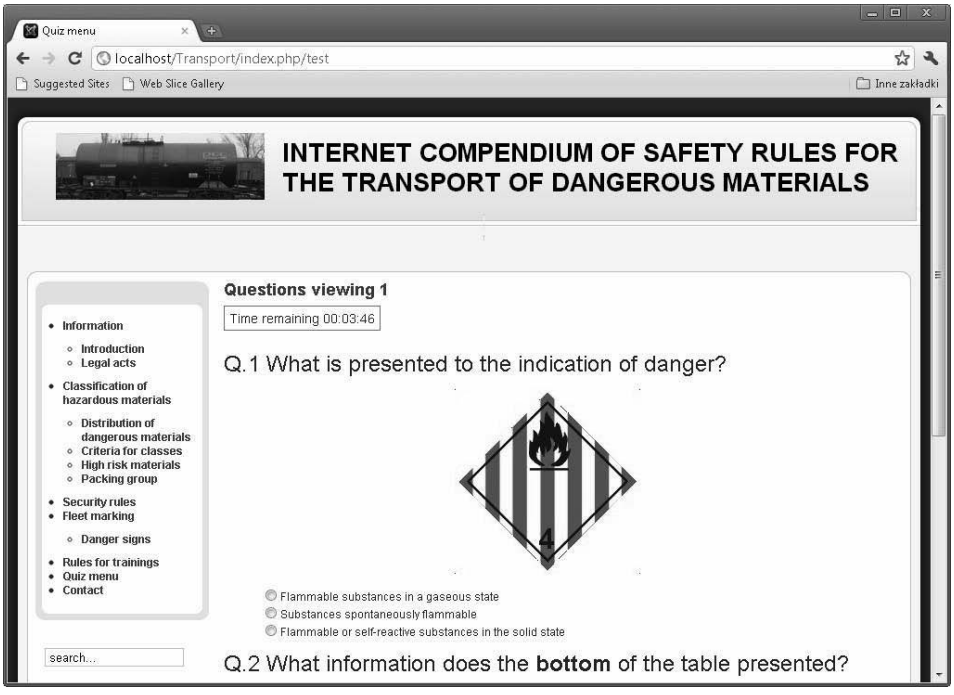

Fig. 6. Screenshot – Quiz consisting of a set of 10 diverse questions

CONCLUSIONS

The developed system is a form which complements the required training for those involved in the transportation of hazardous materials.

Building online compendium of using content management system does not require additional training on computer use, or using additional software. Access to the content is possible both via the Internet and within internal network in a company.

Ease of use of the collected information is provided by the legibility of the menu, which allows for quick access to current regulations and requirements, whether using a personal computer or mobile devices.

In addition, a simple form is provided for all users to verify their knowledge with the placed set of control questions.

Furthermore, the technology applied for the construction of the compendium allows to easily extend and customize its contents to the changing rules of carriage of hazardous materials, as well as to create a new set of control questions.

REFERENCES

1. Chernetskaya N., Kolodyazhnaya L.: Rational ways of development of railway transportations by international transport corridors (review). TEKA Komisji Motoryzacji i Energetyki Rolnictwa. OL PAN, 10A, 70-77.
2. Instrukcja o technice pracy manewrowej Ir-9. http://www.plk-sa.pl/fileadmin/PDF/akty_prawne_i_przepisy/instrukcje/Ir-9.pdf.
3. Instrukcja o postępowaniu przy przewozie koleją towarów niebezpiecznych Ir-16. http://www.plk-sa.pl/fileadmin/PDF/akty_prawne_i_przepisy/instrukcje/Ir-16.pdf.
4. Łangowski K. 2010.: Ramy prawne bezpieczeństwa w transporcie towarów niebezpiecznych (1) – ADR. Bezpieczeństwo Pracy. Nauka i praktyka 03/2010. CIOP-PIB. Warszawa. s. 17-21.
5. Łangowski K. 2010.: Ramy prawne bezpieczeństwa w transporcie towarów niebezpiecznych (2) – klasyfikacja. Bezpieczeństwo Pracy. Nauka i praktyka 10/2010. CIOP-PIB. Warszawa. s. 13-17.
6. Michalik J. S., Grzegorczyk K., Gredecki S., Piękniewski M., Słomka L., Janik P., DziewulskiD., Zając S. 2009.: Zagrożenia poważnymi awariami drogowymi w transporcie drogowym niebezpiecznych chemikaliów w Polsce. Bezpieczeństwo Pracy. Nauka i praktyka 09/2009. CIOP-PIB. Warszawa. s. 6-9.
7. Pakiet CMS Joomla. http://www.joomla.org/.
8. Pawlak H., ŚcibiszM. 2010.: Opinion of the carriers preparation to road transportation of dangerous materials. TEKA Komisji Motoryzacji i Energetyki Rolnictwa. Vol. 10, s. 326-332.
9. Pułkowski M., Domański W. 2010.: Bezpieczeństwo transportu drogowego paliw płynnych w cysternach – podstawowe obowiązki uczestników przewozu. Bezpieczeństwo Pracy. Nauka i praktyka 09/2010. CIOP-PIB. Warszawa. s.9-13.
10. Przewóz towarów niebezpiecznych. http://www.utk.gov.pl/portal/pl/4/171/ Przewoz_koleja_towarow_nibezpiecznych.html.
11. Regulamin dla międzynarodowego przewozu kolejami towarów niebezpiecznych (RID) Aneks I do Przepisów ujednoliconych o umowie międzynarodowego przewozu towarów kolejami (CIM), będący zał. C do Konwencji o międzynarodowym przewozie kolejami (COTIF).
12. Rozporządzenie Ministra Infrastruktury z dnia 1 maja 2004 r. w sprawie wzoru formularza rocznego sprawozdania z działalności w zakresie przewozu towarów niebezpiecznych oraz sposobu jego wypełniania (Dz. U. Nr. 118, poz. 1239).
13. Rozporządzenie Ministra Infrastruktury z dnia 12 lipca 2004 r. w sprawie egzaminu dla kandydatów na doradców i dla doradców do spraw bezpieczeństwa przewozu koleją towarów niebezpiecznych (Dz. U. Nr 164, poz. 1717, z późn. zm.).
14. Rozporządzenie Ministra Infrastruktury z dnia 21 maja 2004 r. w sprawie wzoru świadectwa do spraw bezpieczeństwa przewozu koleją towarów niebezpiecznych (Dz. U. Nr 135, poz. 1445).
15. Rozporządzenie Ministra Infrastruktury z dnia 21 maja 2004 r. w sprawie szczegółowych wymagań w stosunku do podmiotów prowadzących kursy początkowe i doskonalące oraz zakresu tych kursów (Dz. U. Nr 135, poz. 1446).
16. Środowisko pracy dla pakietu CMS Joomla. http://www.wampserver.com /en/.
17. Umowa europejska dotycząca międzynarodowego przewozu drogowego towarów niebezpiecznych (ADR), sporządzona w Genewie 30 września 1957r. 20 marca 1975r. Dz. U. Nr 35, poz. 189.
18. Ustawa z dnia 28 października 2002r.Przewóztowarów niebezpiecznych. Dz. U. Nr 199, poz. 1671.

19. Ustawa z dnia 31 marca 2004 r. o przewozie koleją towarów niebezpiecznych (Dz. U. Nr 97, poz. 962, z późn. zm.).
20. Ustawia z dnia 28 marca 2003r. o transporcie kolejowym (Dz. U. z 2007 r. Nr 16, poz. 94).

INTERNETOWE KOMPENDIUM ZASAD BEZPIECZEŃSTWA PRACY PRZY TRANSPORCIE MATERIAŁÓW NIEBEZPIECZNYCH

Streszczenie. W artykule przedstawiono podstawowe informacje dotyczące aktów prawnych stosowanych i wymaganych przy transporcie kolejowym materiałów niebezpiecznych. Opisano i zaprezentowano internetowe kompendium z zakresu zasad bezpieczeństwa pracy przy transporcie materiałów niebezpiecznych jako narzędzie do wspomagania pozyskiwania, rozszerzania i sprawdzania wiedzy z tego zakresu.

Słowa kluczowe: kompendium, transport, materiały niebezpieczne, zasady bezpieczeństwa.