## Transport of Dangerous Goods in Serbia by Rail



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## National legislation on Transport of Dangerous Goods (TDG)

- Law on the transport of dangerous goods (88/2010, Nov 2010) and adopted rulebooks
- Authority for the transport of dangerous goods (Feb 2013)
- New Law on the transport of dangerous goods (104/16, 83/2018, 95/2018 other law and 10/2019 other law)
- Department For Air Traffic And Transport Of Dangerous Goods
- Regulation on transportable pressure equipment (30/2017, 2010/35/EU - TPED)



#### Law regulates:

- The conditions for performing domestic and international TDG in road, railway and inland waterway on the territory of the Republic of Serbia;
- requirements in regards to the packaging, transportable pressure equipment and/or tanks, or means of transport aimed for TDG;
- The conditions for appointing bodies which examine and control the vessels for TDG;
- > Jurisdictions of **state bodies and organizations** in the process;
- Conditions and requirements, which the participants in the process of TDG ought to fulfil,
- Supervision, as well as any other matters in regards to the TDG.



## International agreements

- ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road);
- RID (Convention concerning International Carriage by Rail (COTIF) –Convention concerning International Carriage by Rail (COTIF) Appendix C – Regulations concerning the International Carriage of Dangerous Goods by Rail (RID));
- ADN (European Agreement Concerning International Transport of Dangerous Goods by Inland Waterways (ADN));
- ICAO Technical Instructions (Annex 18 to the Chicago Convention on International Civil Aviation);
- IAEA (International Atomic Energy Agency) Regulations for the Safe Transport of Radioactive Material.







RID Committee of Experts

Working Party on the TDG (WP.15)





#### Department for transport of dangerous goods

- appoint bodies for performing the conformity assessment procedure for packaging or transportable pressure equipment or tank for the transport of dangerous goods and perform supervision over their work;
- appoint bodies for performing conformity assessment procedures for railway tanks (other than TPE) and perform supervision over their work;
- operations which refer to issuance of a license to a company or another legal entity for training of candidates for the position of safety adviser in transport of dangerous goods
- designated examination body in process of obtaining the certificate for safety adviser in transport of dangerous goods RID
- collect and analyze annual reports of the safety adviser for the transport of dangerous goods and propose amendments of the regulations;
- notify the appointed bodies for conformity assessment to the ministry competent for keeping registers of the appointed bodies for conformity assessment; etc.
- translating and publishing RID

Directorate for Railways

- issue the permit for exploitation of railway wagons in accordance with the law regulating the safety and interoperability of the railway
  - appoints entry in charge of maintenance (ECM)

## **Dangerous Goods**

- may jeopardize people's health;
- cause contamination of the environment or impose material damage;
- have dangerous properties for people's health and environment;
- specified by laws, other regulations and international contracts;
- In the basis of their nature or properties and condition, and related to transport, may be dangerous for safety or have proven toxic, corrosive, flammable, explosive or radioactive effects;

Dangerous goods also include raw materials of which dangerous goods are produced as well as waste if possess the properties of dangerous goods.



#### Class 1:

Explosive substances and articles (e.g. ammunition, bombs, industrial explosives, fireworks)







**Class 2:** Gases (e.g. Butadienes, propan)







**Class 3:** Flammable liquids (e.g. diesel fuel, gazoline)









**Class 4.1:** Flammable solids, selfreactive substances, polymerizing substances and solid desensitized explosives (e.g. Sulphur, molten; matches, safety)



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**Class 4.2:** Substances liable to spontaneous combustion (e.g. phosphorus, white or yellow, under water or in solution phosphorus)









**Class 4.3:** Substances which, in contact with water, emit flammable gases (e.g. calcium carbide)







**Class 5.1**: Oxidizing substances (e.g. chromium trioxide, anhydrous-5.1+6.1+8)









## **Class 6.1:** Toxic substances (e.g. toluene di-iso cyanate)







#### **Class 6.2:** Infectious substances (e.g. clinical waste) 6 CLINICAL WASTE FOR INCINERATION ONLY MEDIUM DUTY PPROVED WEIGHT 5 KGS (1) 5H4/Y5/S/98/GB/3281





## **Class 8:** Corrosive substances (e.g. sodium hydroxide solution)







**Class 9:** Miscellaneous dangerous substances and articles (e.g. Sodium hydroxide solution, Lithium batteries)







## Participants in TDG by rail

- Safety obligations of the participants
- Main participants: Consignor, Carrier, Consignee
- Other participants: Loader, Packer, Filler, Tank-container/portable tank operator, Tank-wagon operator, Railway infrastructure manager, Unloader and Entity in charge of maintenance (ECM)



UN No.	Name and description	Class C	cation code	Packing group	Labels	Special provi- sions	Limited and excepted quantities		Packaging		Portable tanks and bulk containers		RID Tar	sks	Transport category	Special provisions for carriage		or cantage	Colis express (express	Hagard identifi- cation No.	
									Packing instructions	Special packing provisions	Mixed packing provi- sions	Instruc- tions	Special provi- sions	Tank code	Special provi- sions		Packages	Bulk	Loading, Pa unloading and handling	parcels)	
	312	2.2	2.2	21.13	5.2.2	3.3	3.4/3	512	4.1.4	4.1.4	4.1.10	4252	4253	43	4.3.5, 6.8.4	1.1.3.1(c)	7.2.4	7.3.3	75.11	7.6	5.3.2.3
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9a)	(9b)	(10)	(11)	(12)	(13)	(15)	(16)	(17)	(18)	(19)	(20)
1003	AIR, REFRIGERATED LIQUID	2	30		2.2+5.1 (+13)		0	EO	P203		MP9	175	TP5 TP22	RxBN	TU7 TU19 TA4 TT9 TM6	3	W5		CW9 CW11 CW36	CE2	225
1005	AMMONIA, ANHYDROUS	2	2TC		2.3+8 (+13)	23 379	0	EO	P200		MP9	T50 (M)		PxBH(M)	TU38 TE22 TE25 TA4 TT8 TT9 TM6	1			CW9 CW10 CW36		268
1006	ARGON, COMPRESSED	2	14		2.2 (+13)	378 653 660 662	120 ml	E1	P200		MPS	(54)		CxBN(M)	TA4 TT9	3			CW9 CW10 CW36	CE3	20
1008	BORON TRIFLUORIDE	2	2TC		2.3+8 (+13)	373	0	EO	P200		MP9	(M)		PxBH(M)	TU38 TE22 TE25 TA4	1			CW9 CW10 CW36		268







#### Shunting labels (column (5) of Table A)

No. 13

Shunt with care

No. 15

Loose shunting or hump shunting forbidden. Shall be accompanied by a motive power unit. Shall not bump, or be bumped by, other wagons.

105 mm minimum

red triangle with an exclamation mark in black on white background

105 mm minimum

three triangles, red, with black exclamation mark

#### Orange-coloured plate marking





- Class 1: permit for transport issued by the Ministry of Interior;
- Class 7: permit for transport issued by Serbian Radiation and Nuclear Safety and Security Directorate;
- Permit for transport of waste Ministry of the Environment





Additional guidance to dri	ject to prevailing circumstances	by class and on actions sub	Inctru	ction in writing	chall			
Danger labels and plac- ards, description of the hazards	Hazard characteristics	Additional guidance	boin	drivor's cab	Shan			
(1)	(2)	(3)		unver s cab				
Oxidizing substances		es	N					
	Risk of vigorous reaction, ignition and explosion in con- tact with combustible or flammable substances.							
Organic peroxides	Risk of exothermic decomposition at elevated tempera- tures, contact with other substances (such as acids, heavy-metal compounds or amines), friction or shock. This may result in the evolution of harmful and flamma- ble gases or vapours or self-ignition.		Additional guidance to dr	ivers on the hazard characteristics of dangerous goods	s, indicated by marks, and on			
0.2 Tovio substances			-	actions subject to prevailing circumstances				
TORIC SUBSLATICES	But all a second and a second second		Mark	Hazard characteristics	Additional guidance			
	Kisk of intoxication by innalation, skin contact or inges-		(1)	(2)	(3)			
6.1	Risk to the aquatic environment or the sewage system.		× ·					
Infectious substances	Risk of infection. May cause serious disease in humans or animals.		Environmentally hazardous substances	Risk to the aquatic environment or the sewage system.				
6.2 Radioactive material	risk to the aquatic environment of the sewage system.		Elevated temperature sub- stances	Risk of burns by heat.	Avoid contact with hot parts of the wagon or container and the spilled substance,			
TA TC TC TD	Risk of intake and external radiation.	Limit time of exposure.	Equipment for personal protection to be carried in the driver's cab The following equipment* shall be carried in the driver's cab:					
Fissile material	Risk of nuclear chain reaction.		<ul> <li>portable lighting appara</li> <li>for the driver</li> </ul>	us;				
V			<ul> <li>suitable warning clothing</li> </ul>	l-				
7E			The equipment is he look	a adabta shafi il canasanu ka sunalamaska dassardura ka	- months a participal engative trans			
Corrosive substances	Risk of burns by corrosion. May react vigorously with each other, with water and with other substances.		The equipment to be kept	avasable shall, if necessary, be supplemented according to	existing national specifications.			
V	Spilled substance may evolve corrosive vapours.							
8	Risk to the aquatic environment or the sewage system.							
Miscellaneous dangerous substances and articles	Risk of burns.							
	Risk of fire.							
	Risk of explosion. Risk to the aquatic environment or the sewage system.							

2: Additional guidance shown in column (3) of the Table may be adapted to reflect the classes of dangerous goods to be carried and their means of transport and, if necessary, to supplement them according to existing national specifications.



#### Amount of dangerous goods transported by rail in tonnes

#### Distribution of the amount of dangerous goods transported by rail in 2019.



## SCENARIO OF ACCIDENT CAUSED BY TRANSPORT OF DANGEROUS GOODS

1. Adverse event with most severe consequences EMERGENCY EVENT IN THE TRANSPORT OF DANGEROUS GOODS – DIMITROVGRAD (railroad tank carrying ammonia)







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#### Adverse event with most severe consequences – EMERGENCY EVENT IN THE TRANSPORT OF DANGEROUS GOODS (railroad tank)

Leakage of (2–3 tons of) poisonous corrosive gas UN 1005, AMMONIA, ANHYDROUS

(the real problem also is the handover of a composition at a station in the territory of a country when a locomotive leaves the territory)



Event location	Railway station Dimitrovgrad, III receiving and dispatching track
Spatial dimension	Affected area
	The area affected by the gas is about 600 meters in diameter with the center at the railway station.
	zone populated by more than two fifths of the inhabitants of Dimitrovgrad, namely about 2,700 people.
Intensity	Intensity of the event? Intensive "gas hissing" due to the crack in the tank vehicle body. The event is accompanied by a rapid spread of smoke cloud.
	Name of gas: UN 1005, AMMONIA, anhydrous Hazard: • Flammable gas
	<ul> <li>Contains cooled liquid gas, may cause frostbite or injuries</li> <li>Causes severe skin burns and eye damage</li> <li>Toxic if inhaled</li> </ul>
	<ul> <li>H400 Very toxic to aquatic life</li> <li>EUH071 Corrosive to the respiratory tract</li> </ul>
	Ministry of constructition, transport and infrastract

#### Map of Dimitrovgrad with marked radius of 600m with the center at the railway station





#### Example of intervention due to leakage on the valve





#### Example of intervention due to leakage on the valve





#### Matrix 4: The risk assessment



The above shows that there is a Very High level of risk from emergency event in transport of hazardous material on the railway station in Dimitrovgrad.



## 2018. Disaster Risk Assessment of the Republic of Serbia

# 2020.National plan of protection and rescue of the Republic of Serbia



#### Jasenovik, January 19, 2019



#### Jasenovik: January 19, 2019





#### Jasenovik, January 19, 2019





#### Evacuated 400 inhabitants of Jasenovik village





#### Beograd, Jajinci, June 28, 2017, inaccessible terrain





#### Resnik, February 29, 2020 - 7 wagons UN 1202 and UN 1203





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## Resnik, February 29, 2020 - 7 wagons UN 1202 and UN 1203





#### Dangerous goods monitoring department in Serbian Railway Infrastructure

	Transport route	Number of wagon	] Dan ОДЕЉ	Dangerous goods monitoring department ОДЕЉЕЊЕ ЗА ПРАЋЕЊЕ ОМ И ПП								
Incl and the second se	Jarya Ilpase	2 bicasias (1999)	Verme messes	Classes etc.	Quantity Haza iden num	d u min UN Spoj UN UN number rd tification bers	Densioner Consignor	Consignee	Hammy kill figure for hequild second entry (second second	Passessergia questa Passessergia questa Comparate Co		
number DG	Date	station		service	]	bers				to the consignee		



Draft Law on Liability for Environmental Damage

#### Problems:

- 1. a disproportionate relationship between insurance premiums and the amount of damage
- 2. unequal position of domestic and foreign carriers
- 3. the inability to guarantee the repair of damage by the capital of the company
- 4. the lack of interest of insurance and reinsurance companies in solving the problem
- Possible solution:

**1. Establishment of a fund nationally or internationally** Ministry of constructition, transport and infrastracture

# Problem of participants in the transport of dangerous goods in Hungary















#### Penalties are levied on all participants in the chain even though the wagon returns empty



Problems:

- Condition of the tanks (marking of tanks, checking of tanks during loading / unloading, checking of technical correctness ...)
- Conditions of rail infrastructure
- Training of workers in contact with the transport of dangerous goods by rail
- A small number of inspectors

It's necessary

- Periodicly training and assessment of employees
- Consult domestic conformity assessment bodies for tanks
- Check the essential elements of the tank when entering or leaving
- Each transport participant must carry out controls

It is advisable to:

- For each shipment to take pictures of the tanks so it can be seen that the tanks are properly marked and that the values are provided



## THANK YOU FOR YOUR ATTENTION!

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