



SAFEX CONGRESS XVI

HS&E Outside the Factory: UN and Industry Perspectives on the Safe Transport of Explosives

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Objectives

- ❖ **Overview of explosives classifications**
- ❖ **Who Regulates Explosives?**
- ❖ **Current developments**



Class 1



- ❖ Explosives are “Class 1”
- ❖ Class 1 is a restricted class
- ❖ Some explosives are not Class 1 - “Forbidden” for transport

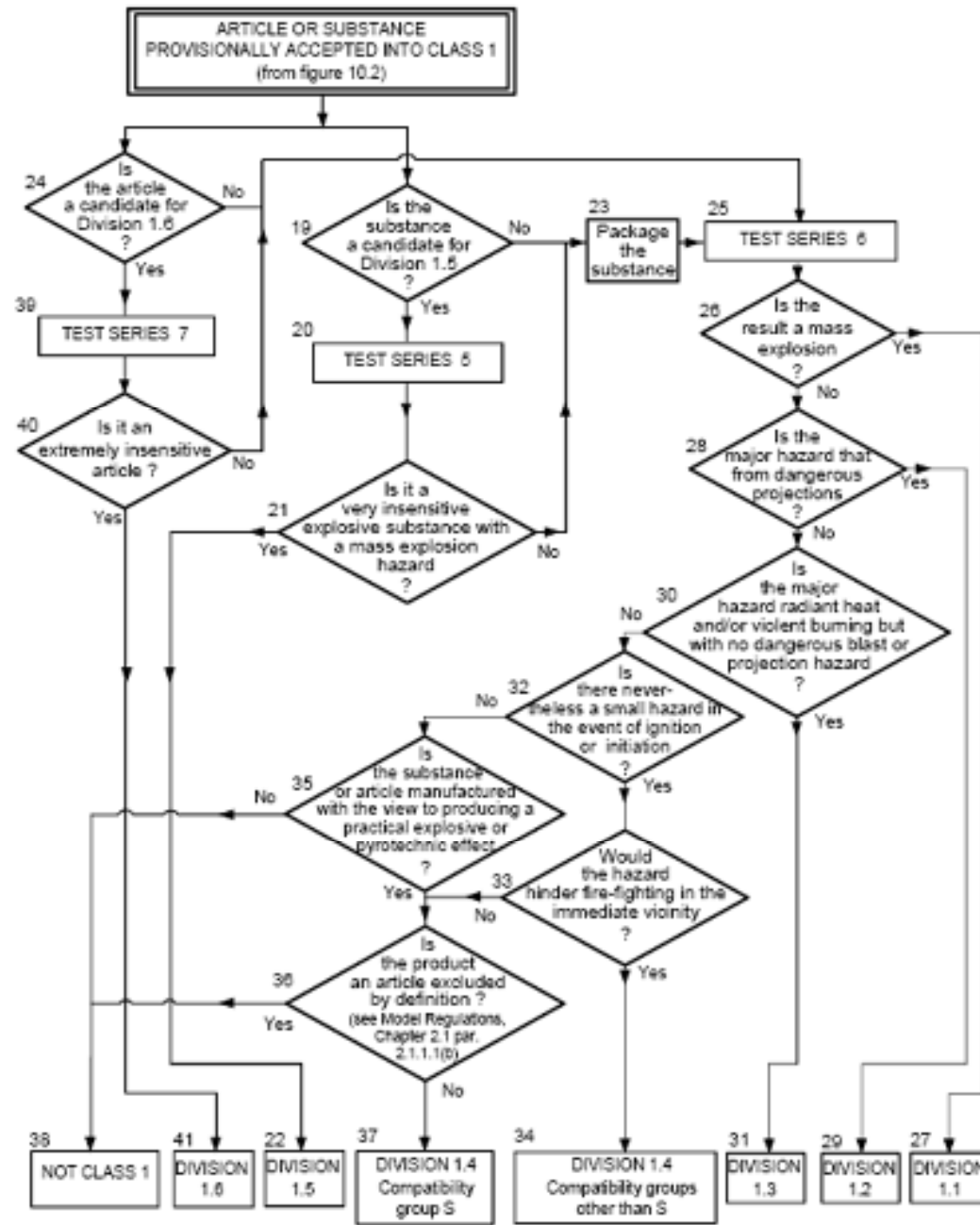
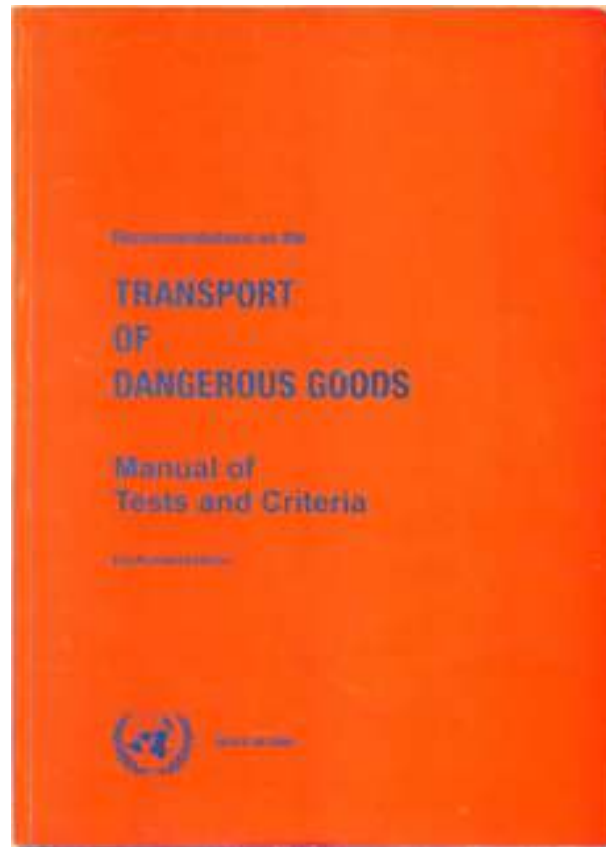


Class 1 is not “Worse”

- ❖ Toxic Gas and Liquid
- ❖ Compressed Flammable Gas
- ❖ Organic Peroxide
- ❖ Self-Reactive
- ❖ Radioactive
- ❖ Corrosive
- ❖ Infectious Substance



UN Tests



Division 1.1

❖ **Substances and articles which have a mass explosion hazard**

❖ **Examples:**

UN 0027 BLACK POWDER, 1.1D

UN 0033 BOMBS with bursting charge, 1.1F

UN 0034 BOMBS with bursting charge, 1.1D

UN 0160 POWDER, SMOKELESS, 1.1C





Division 1.2



- ❖ **Substances and articles which have a projection hazard but not a mass explosion hazard**
- ❖ **Examples:**

UN 0035 BOMBS with bursting charge, 1.2D

UN 0268 BOOSTERS WITH DETONATOR, 1.2B

UN 0285 GRENADES, 1.2D

Division 1.3



- ❖ **Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard**

- ❖ **Examples:**

UN 0101 FUSE, NON-DETONATING, 1.3G
UN 0161 POWDER, SMOKELESS, 1.3C



Division 1.4



❖ **Substances and articles which present no significant hazard**

❖ **Examples:**

UN 0012 CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS, 1.4S

UN 0066 CORD, IGNITER, 1.4G

UN 0255 DETONATORS, ELECTRIC for blasting, 1.4B



Division 1.5

- ❖ **Very insensitive substances which have a mass explosion hazard**



- ❖ **Examples:**

UN 0331 EXPLOSIVE, BLASTING, TYPE B (AGENT, BLASTING, TYPE B), 1.5D

UN 0332 EXPLOSIVE, BLASTING, TYPE E (AGENT, BLASTING, TYPE E), 1.5D

UN 0482 SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI), N.O.S., 1.5D



Division 1.6

❖ **Extremely insensitive articles which do not have a mass explosion hazard**

❖ **Examples:**



0486 ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI), 1.6N

Multiple Divisions

- ❖ In the examples given, note that variations may be in different divisions



UN 0160, Powder, smokeless, 1.1C

UN 0161, Powder, smokeless, 1.3C

UN XXXX, Powder, smokeless, 1.4C



Who
Regulates
Explosives?



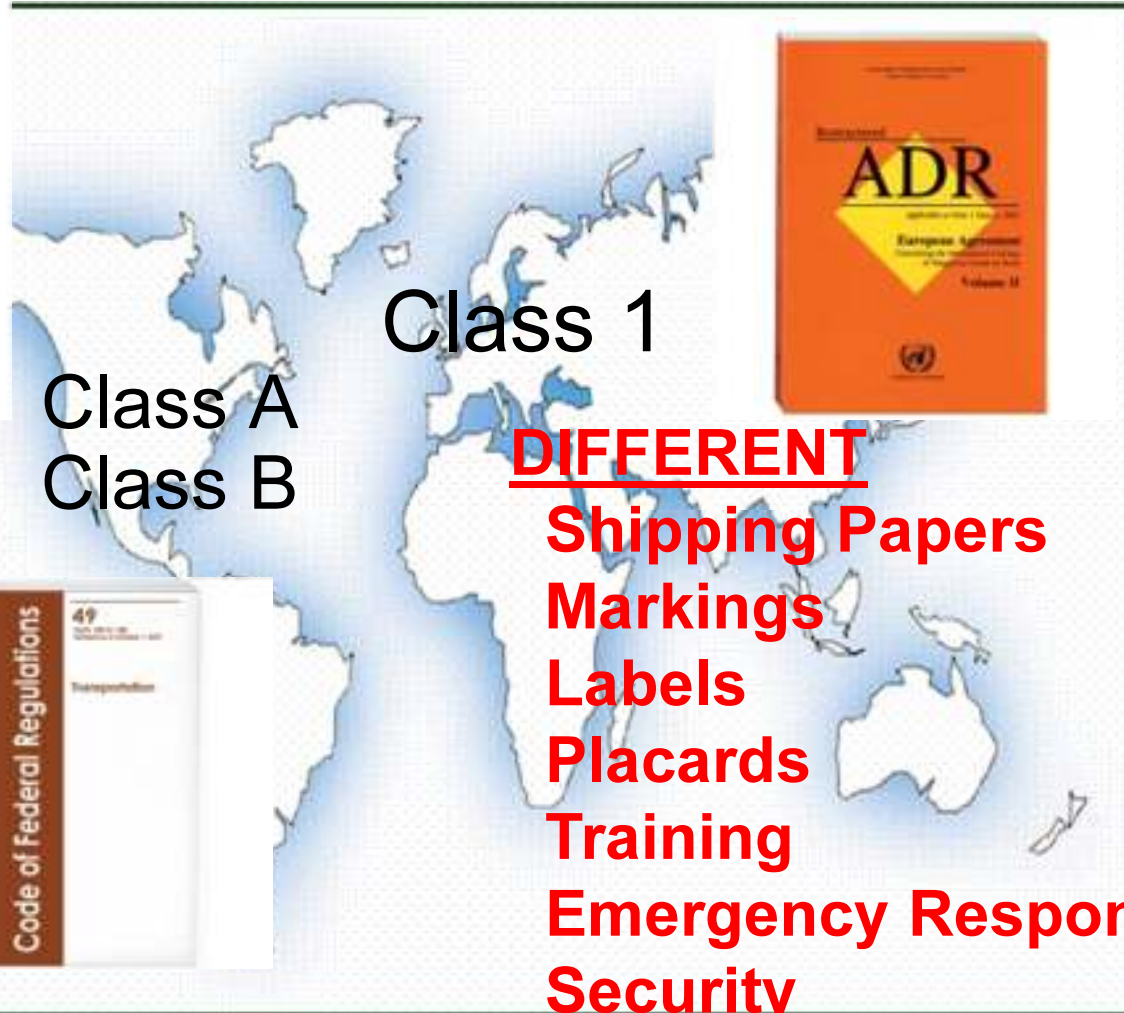
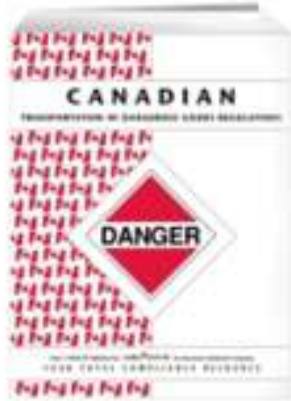
Each Country or Region Regulates Explosives



- ❖ EU RID/ADR/ADN
- ❖ US HazMat Regulations
- ❖ Canadian Transport of Dangerous Goods



Incompatibility



Class A
Class B

Class 1

- DIFFERENT**
- Shipping Papers**
- Markings**
- Labels**
- Placards**
- Training**
- Emergency Response**
- Security**

TDG ADVISOR

Harmonization

Palais de Nations



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UN Sub-Committee of Experts on the Transport of Dangerous Goods





UN Process

- ❖ Four meetings per biennium
- ❖ NGO's must obtain permission to attend
- ❖ Only governments can vote



UNECE

United Nations Economic Commission for Europe



UN Explosives Working Group

- ❖ **Meets in July each year during Plenary**
- ❖ **All explosives proposals are discussed**
- ❖ **Provides guidance to delegations who then vote**



IGUS EPP



- ❖ **International Group of Experts on the Explosion Risks of Unstable Substances**
- ❖ **Working Group on Explosives, Propellants and Pyrotechnics**
- ❖ **TNO, INERIS, CERL, HSL, industry, many more**
- ❖ **Discuss testing, incidents and regulatory changes**



Current

Developments



New 6(d) Test

- ❖ **Modified 6(a) single package test**
- ❖ **No confinement**
- ❖ **Tests effects outside the package when not degraded by flame**
- ❖ **May eliminate products from 1.4S**



6(d) Test Criteria

- ❖ **Damage to witness plate beneath the package**
- ❖ **Fireball >1m from package**
- ❖ **Amount of package disruption**
- ❖ **Projectile energy >8J**



6(d) Test Results

- ❖ **Fails shaped charges with 19g perforator**
- ❖ **Fails cartridges, power device with 300g of propellant**



Desensitized Explosives

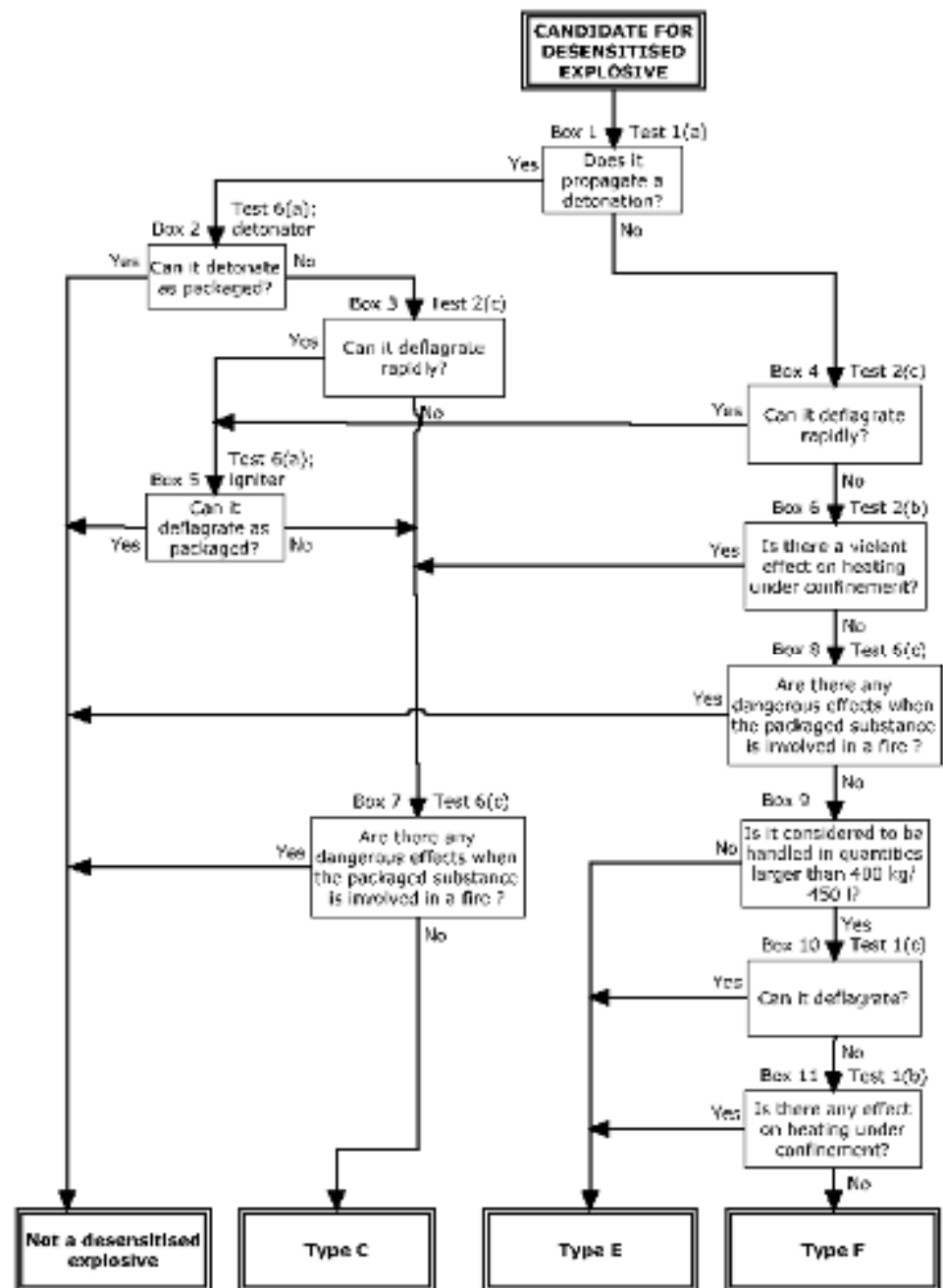
- ❖ **Changes for the Globally Harmonized System of Classification & Labeling**
- ❖ **Now affecting transport**
- ❖ **New Division 4.4 replaces Class 3 and Division 4.1**
- ❖ **New test regime**





Desensitized Explosives Test Regime

- ❖ Fail
- ❖ Type C: 100kg?
- ❖ Type E: 400 KG
- ❖ Type F: >400kg





New 1.4C Smokeless Powder

- ❖ UN 0509
- ❖ Powder, smokeless 1.4C
- ❖ Previously 1.1C & 1.3C
- ❖ Acknowledges product testing as 1.4





Fireworks NEQ

- ❖ **Australian proposal to class 1.2/1.3 fireworks as 1.1**
- ❖ **Applies in freight containers**
- ❖ **CHAF project**





Conclusion

- ❖ We have a system of harmonized explosives regulations
- ❖ Industry is a part of the process





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