



Risk Associated with Under Classification of Small Arms Ammunition

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- Conventional small arms ammunition (SAA) below .50 Cal. (12.7 mm) has traditionally been classified as 1.4 S.
- As a reminder, the UN classification divides Dangerous Goods Class 1 materials in 6 subdivisions (1.1 to 1.6) and 13 compatibility groups (CG).
 - **Division 1.4** = Substances and articles which present **no significant hazard**
 - **Compatibility Group S** = Substance or article so packed or designed that **any hazardous effects arising from accidental functioning are confined within the package** unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder or prohibit fire fighting or other emergency response efforts in the immediate vicinity of the package



- Question: is this classification always appropriate? In any situation?
- Where SAA is under classified, this may result in an **underestimation** of the actual risk posed by the ammunition.
- In order to get a better overview on how the nations classify their munitions, MSIAC has conducted an **international review** in the 2016-2020 timeframe, with the help of MSIAC and NATO contributing nations and the national HC databases hosted by MSIAC (see the MSIAC limited report L-215 for more detailed information).
- This presentation provides the output of this work with a focus on small arms ammunition (SAA) of .50 Cal. (12.7 mm) or less.

I. Hazard Classification in the Nations

I. Hazard Classification in the Nations

- MSIAC hosts a Hazard Classification database with input from 16 nations
- Data has recently been compared and analysed (L-215)

Table 10 : Available Information in most recent national contributions to the MSIAC HC database

		Australia	Belgium	Canada	Czech Rep.	Finland	France	Germany	Latvia	
Type of file		Access	Access	Access	PDF	Excel	Excel	Excel	Excel	
Number of articles (Total)		7412	1000	2470	207	207	2120	2010	207	
Most			Netherlands	Norway	Poland	Slovakia	Slovenia	Ukraine	UK	US
Type of file			Excel	Excel	Access	Excel	Excel	Excel	Excel	Excel
Number of articles (Total)			1357	1221	593	484	337	214	3855	18175
Number of articles from class 1			1355	885	594	463	337	202	3852	17013
Most recent contribution (year)			2012	2009	2011	2010	2018	2008	2018	2019
Hazard Storage sub-Division			No	Yes	No	No	Yes	No	Yes	Yes
Compatibility group			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sensitivity group			No	No	No	No	Yes	No	No	Yes
HD										
1.1										
1.2										
1.2.1		Rejected from Class 1	No	No	No	Yes	No	No	Yes	Yes
1.2.2		1.1	364	269	195	121	99	***	969	4786
1.2.3		1.2	168	155	126	77	20	***	584	2670
1.3		1.2.1 (SsD)		(36)			(5)		(125)	(1473)
1.3.1		1.2.2 (SsD)		(119)			(12)		(428)	(1138)
1.3.2		1.2.3 (SsD)		(0)			(0)		(4)	(59)
1.4		1.3	326	129	62	81	27	***	671	2876
1.5		1.3.1 (SsD)		(29)			(8)		(159)	
1.6		1.3.2 (SsD)		(99)			(19)		(468)	
		1.4	515	332	210	121	191	***	1628	7101
		1.5	0	0	0	0	0	0	0	0
		1.6	0	0	0	0	0	0	0	0
		NSN	Yes	Yes	No	Yes	Yes	No	No	Yes
		UN Number	Yes	No	Yes	Yes	Yes	No	Yes	Yes
		NEQ	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
		MCE	No	No	No	No	No	No	No	Yes
		Packaging	Yes ⁶	Yes	No	Yes	No	No	Yes	Yes ⁷


 L-215
 April 2020

A REVIEW OF INTERNATIONAL HAZARD CLASSIFICATION

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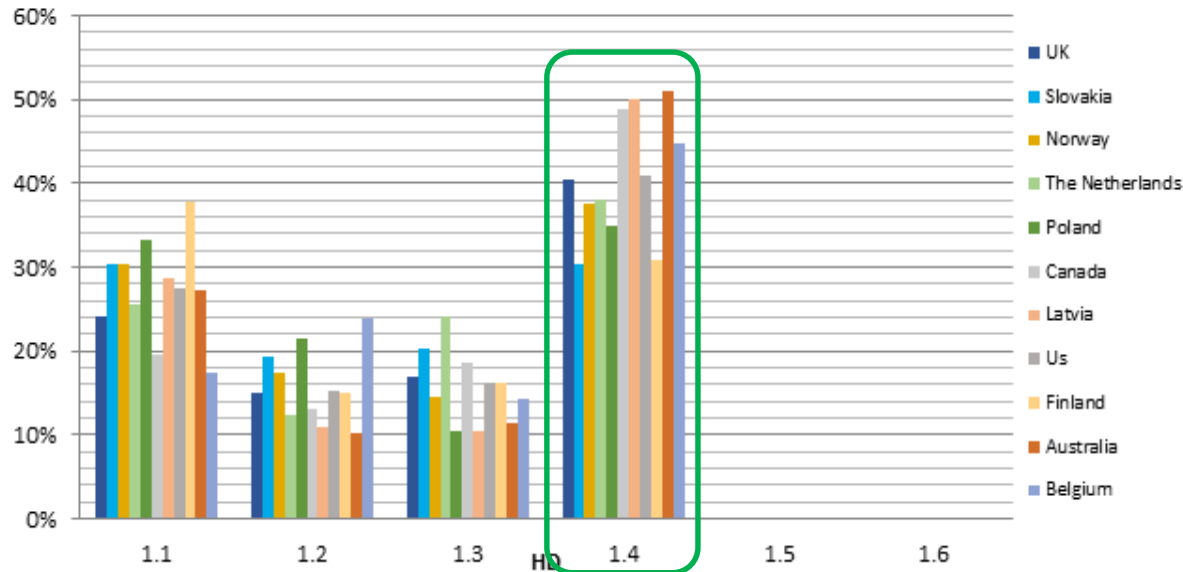

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- Large differences in provided data format and fields.
 - Use of Storage sub Divisions
 - Use of Sensitivity Groups
 - Maximum Credible Event (relevant for HD1.2)
 - NSN, packaging information
- Development of an automated HC Database Exchange (HCDx).
 - Search across all nations and data fields for hazard classification data
 - Specifications are ready, development planned for 2022

I. Hazard Classification in the Nations

- Items in Hazard Division 1.4 often represent the highest percentage of HD assignments in the contributing nations.

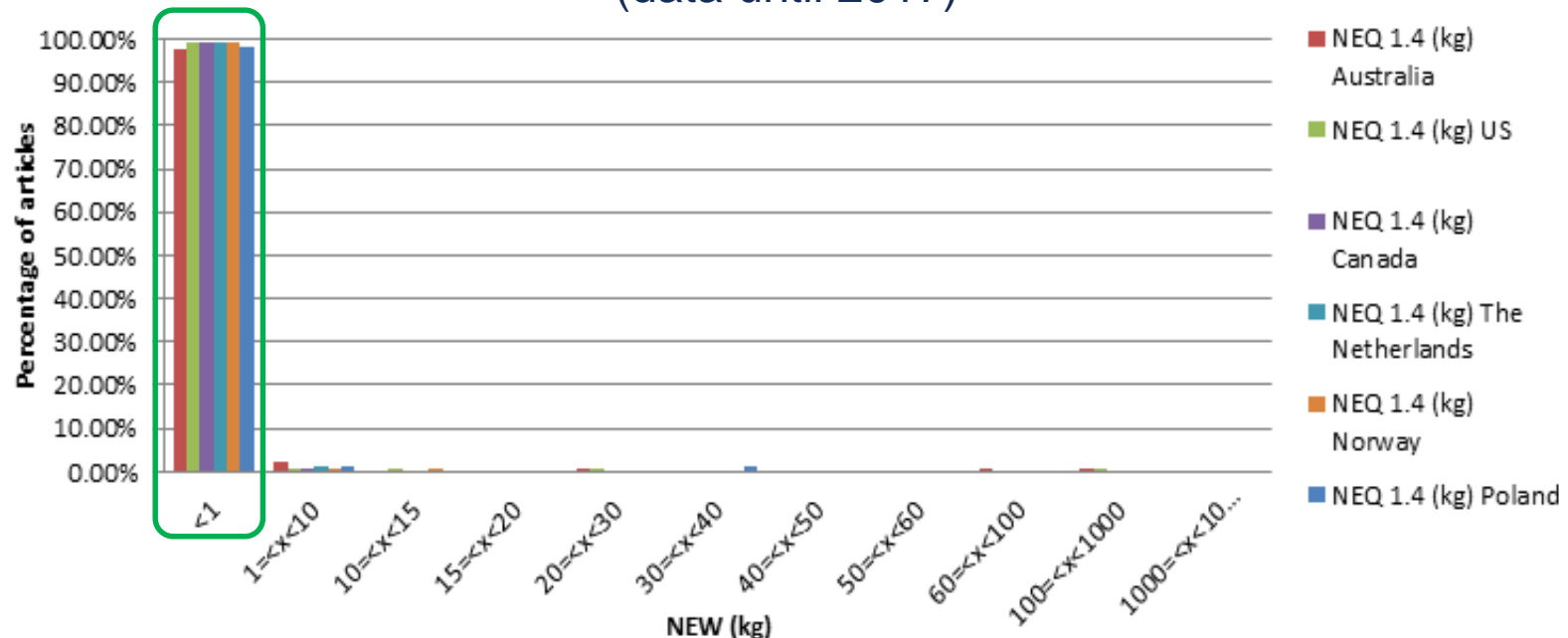
Percentage of HD assignment by nations
(data until 2017)



I. Hazard Classification in the Nations

- The analysis of the Net Explosive Quantity (NEQ) of HD 1.4 items shows that SAA and small items (fuzes, igniters) represent the vast majority of them.

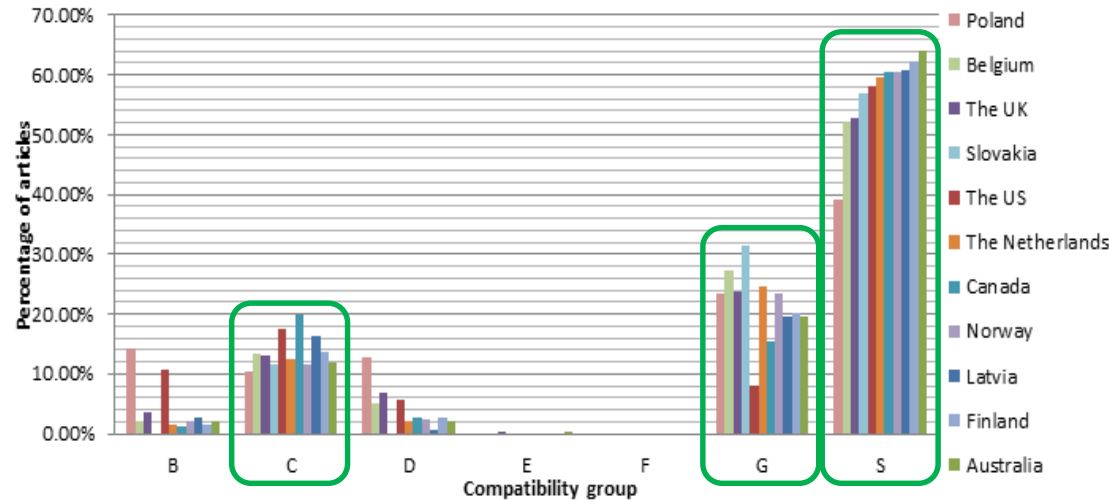
NEQ for HD 1.4 assignments
(data until 2017)



I. Hazard Classification in the Nations

- In almost all nations, more than 50% of HD 1.4 items are classified as HD 1.4 S.
- The other main CG used in HD 1.4 are:
 - CG C: Propellant explosive substance or other deflagrating explosive substance or article containing such explosive substance.
 - CG G: Pyrotechnic substance, or article containing a pyrotechnic substance, or article containing both an explosive substance and an illuminating, incendiary, tear- or smoke-producing substance (other than a water-activated article or one containing white phosphorous, phosphides, a pyrophoric substance, a flammable liquid or gel, or hypergolic liquids).

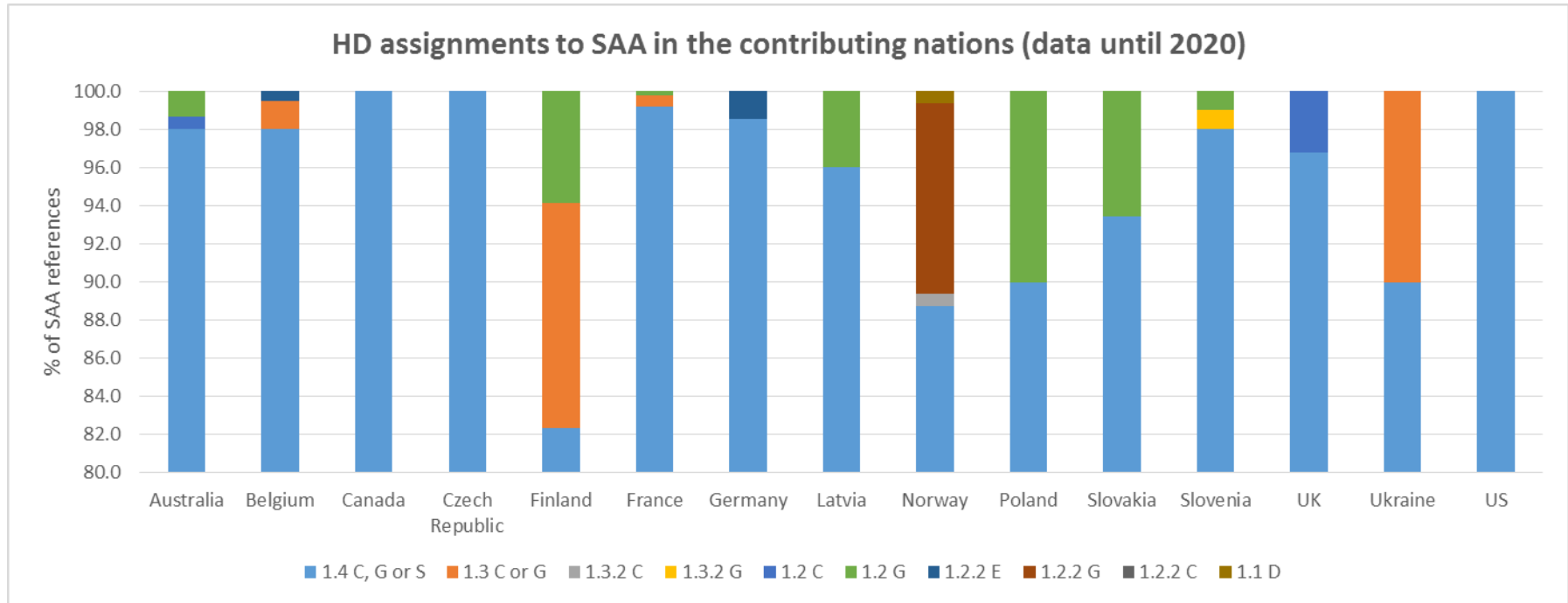
HC assignments by CG and nations for HD 1.4 (data until 2017)



II. Classification of SAA in the Nations

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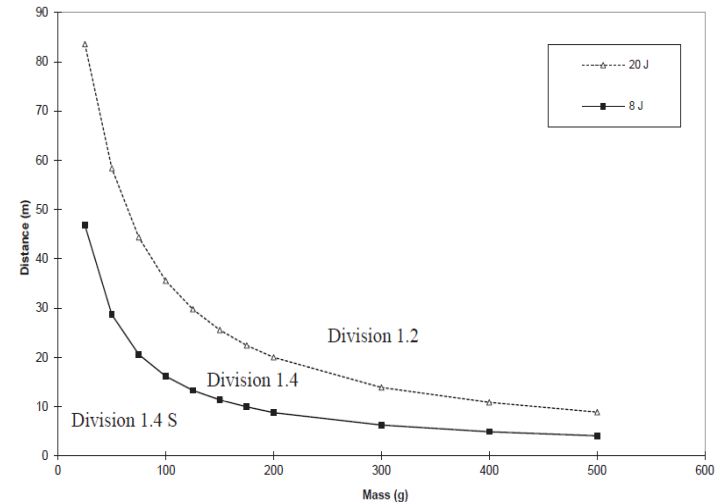
- If we focus on SAA of .50 Cal. or less, the distribution in HD is as follows:



- The analysis of the previous chart shows that the great majority of SAA of calibre up to .50 in. (or 12.7 mm) are classified 1.4 C, G or S.
- The exceptions include:
 - Cartridges containing incendiary and/or tracer projectiles are sometimes classified **1.3(.2) C or G**
 - Cartridges containing incendiary and/or tracer projectiles are sometimes classified **1.2(.2) C, E or G**
 - One 12.7 mm reference is classified **1.1 D** (Norway)
- It can be noted that all SAA up to .50 are classified, without exception, 1.4 C, G or S in Canada, in Czech Republic, and in the US.

II. Classification of SAA in the Nations

- Some misclassifications and non-uniformities in HCC across nations were found during this analysis. A few examples:
 - The classification of a 12.7 mm MP in HD 1.1 seems unrealistic (as confirmed by Norway).
 - The compatibility groups C or G are usually assigned to munitions that do not pass the kinetic energy criterion to be included in 1.4 S → it seems unusual that SAA should be assigned to compatibility group D or E.
 - Some cartridges 12.7x99 mm classified in 1.2 G were purchased abroad and their HCC was accepted on face value.
 - 12.7 mm cartridges with bullet B-32 or BZT are classified **1.2 G** in Australia and in Poland, but they are classified **1.3 G** in Ukraine.



- In the specific case of small arms ammunition (SAA), the US have a unique regulation.
- Two regulations for transportation of munitions co-exist:
 - TB 700-2 within the Department of Defence (DOD)
 - 49 CFR for a commercial venture with no DOD involvement
- Regarding SAA, these regulations indicate that cartridges and small arms may be assigned a classification code of 1.4S by the manufacturer provided they meet the following criteria:
 - Not a forbidden explosive
 - Ammunition for rifle, pistol, or shotgun
 - Ammunition with inert projectile or blank ammunition
 - Limitation in caliber:
 - **Not exceeding 50 caliber** for rifle or pistol cartridges or **8 gauge** for shotgun shells (in 49 CFR)
 - **Less than .50 caliber cartridges** including those used in machine guns or containing a small tracer in the projectile and shotgun shells **not exceeding 12 gauge** (in TB 700-2)

- Moreover, the 2001 DOD memo states that:

*(...) the current inventory of Small Arms Ammunition and all future similar technology Small Arms Ammunition, with no incendiary or high explosive projectiles, **shall be deemed IM-compliant.***

- Also in Canada and France, SAA are often exempt of IM assessment. As stated in the French DGA instruction 1184:

*“Munitions containing small quantities of active materials and not representing serious hazards in the logistic phase, i.e. potential classification in hazard division **HD 1.4** in accordance with the UN Manual of Tests and Criteria, are exempt from the [IM] process (...).”*

- These exemptions and default hazard classifications are convenient but they could lead to **under classification of SAA** if done without judgement (e.g. HC on face value, successive classifications by assimilation).
- Does it cover all situations?



II. Classification of SAA in the Nations

Key figures for a convoy transporting troops and munitions (with SAA being by far the most represented category, in number) in Mali

In comparison with a Parisian employee, 1 convoy log. in Mali would represent :



- The analysis of the National Hazard Classification database hosted by MSIAC for the nations showed that:
 - HD 1.4 articles are the most frequently occurring
 - For HD 1.4, CG S occurs the most, but also C and G.
- A more focused analysis on HCC for SAA showed that:
 - The great majority of SAA of caliber up to .50 in. (or 12.7 mm) are classified 1.4 C, G or S. 100% in USA, CAN and CZE.
 - SAA that are not classified in HD 1.4 are typically cartridges containing incendiary and/or tracer projectiles, which is justified.
 - Thanks to this analysis, it was possible to spot some misclassifications and non-uniformities in HCC across the nations.
- Classification by default and exemptions for SAA may lead to safety breaches. Why not revisit the classification of your SAA stockpile ?

