Crusade towards correct Dangerous Goods declarations:

A COMPREHENSIVE OVERVIEW OF THE CURRENT DG DOCUMENT FLOW

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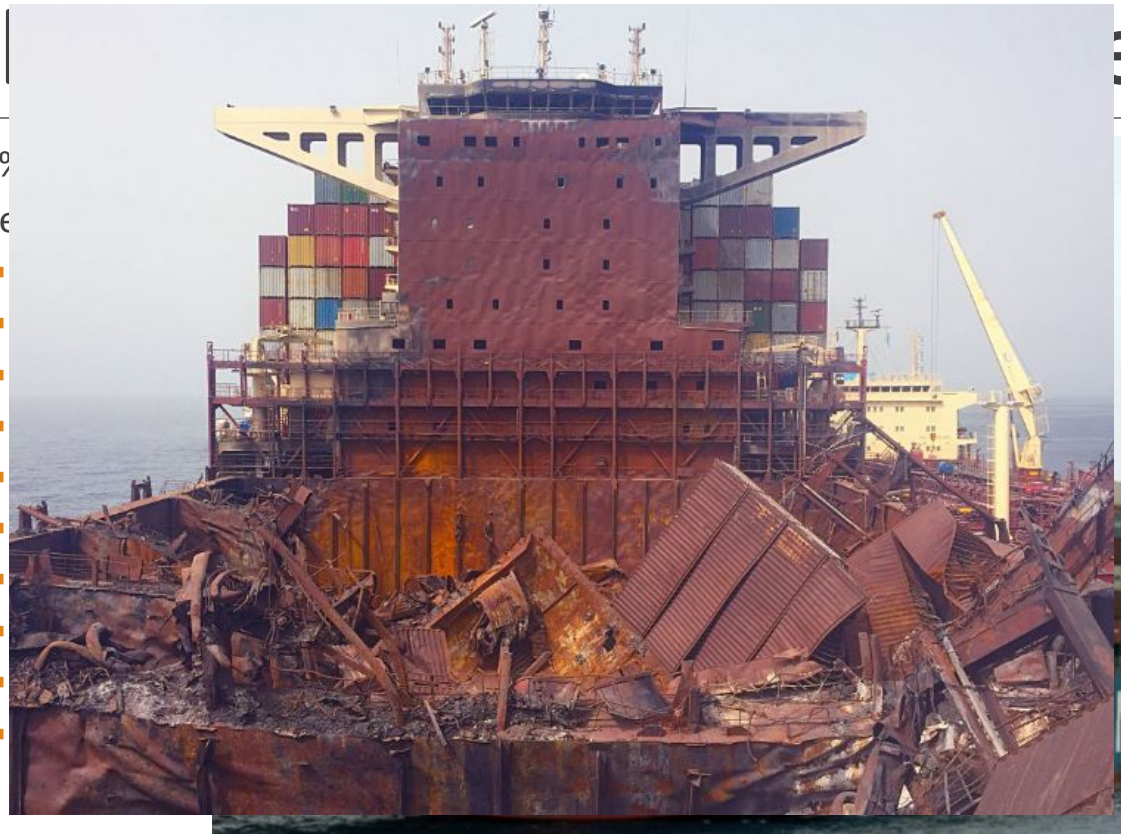


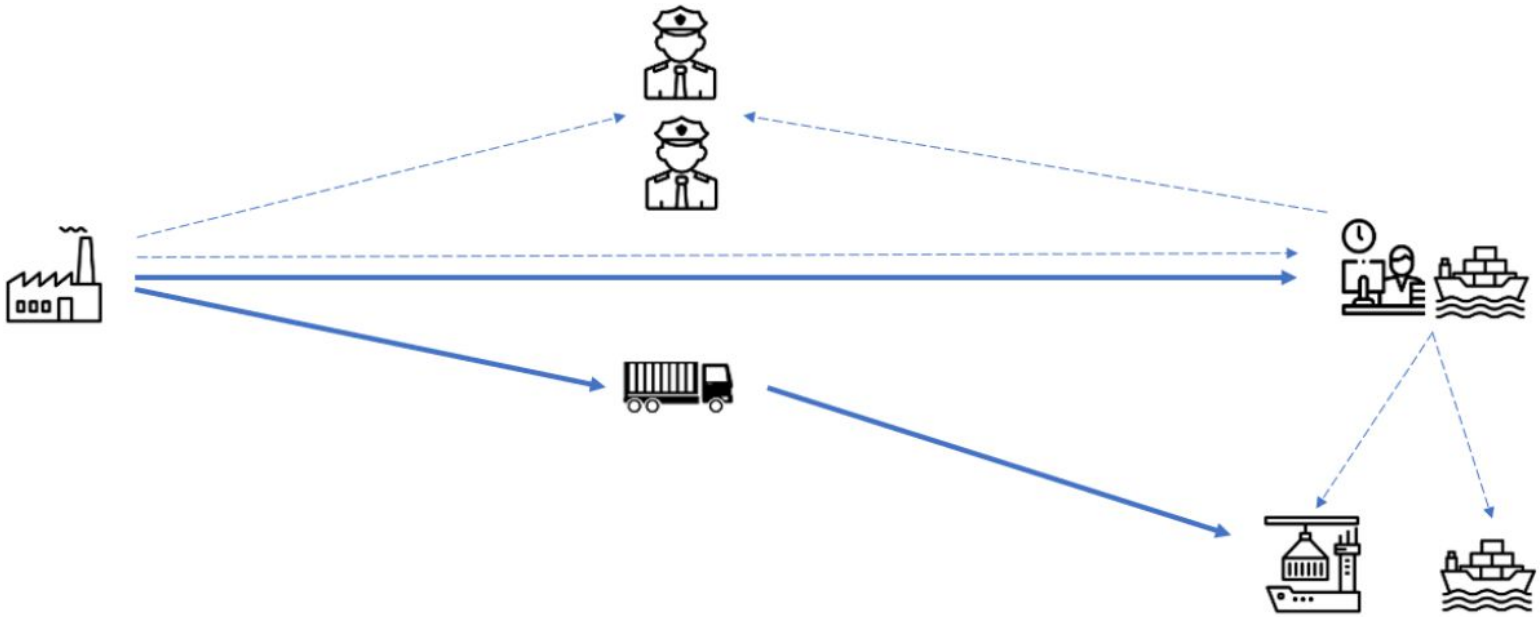
PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY	Emergency phone number:
10. Vessel	11. Port of loading ANTWERP	
12. Port of discharge SHUWAIKH	13. Destination KUWAIT	

14. shipping marks	Number and kind of packages, description of the goods (proper shipping name, hazard class, UN N°, packaging group)	NET (kg)	GROSS (kg)	Cube (m³)
	1) PAINT NARI WOOLSTAIN: 11 PG II SCP METAL TINS, 44 CARTONS UN 1263, PAINT, CLASS 3, FLASH PT - 4°	528 KG	590 KG	
	2) PAINT EASY COLOR GOLD PAINT(125ML, 250ML, 500ML) AND 750ML PG III 4720 METAL TINS, 130 CARTONS UN 1263, PAINT, CLASS 3, FLASH PT 23°	1512 KG	1665 KG	
	3) PAINT RELATED MATERIAL: NARI PLASTIC WOOD 500 AND 750 ML PG II 3600 METAL TINS, [illegible] CARTONS UN 1263, PAINT RELATED MATERIAL, CLASS 3, FLASH PT -13°	2100 KG	2310 KG	

15. Container/vehicle identification	16. seal number(s)	17. Container size/type	Tare (kg)	Total gross (incl.tare) (kg)
579873-0		20'	2220 kg	6.775,00 kg

CONTAINER/VEHICLE PACKING CERTIFICATE
I hreby declare that the goods described

21. Recieving organization receipt

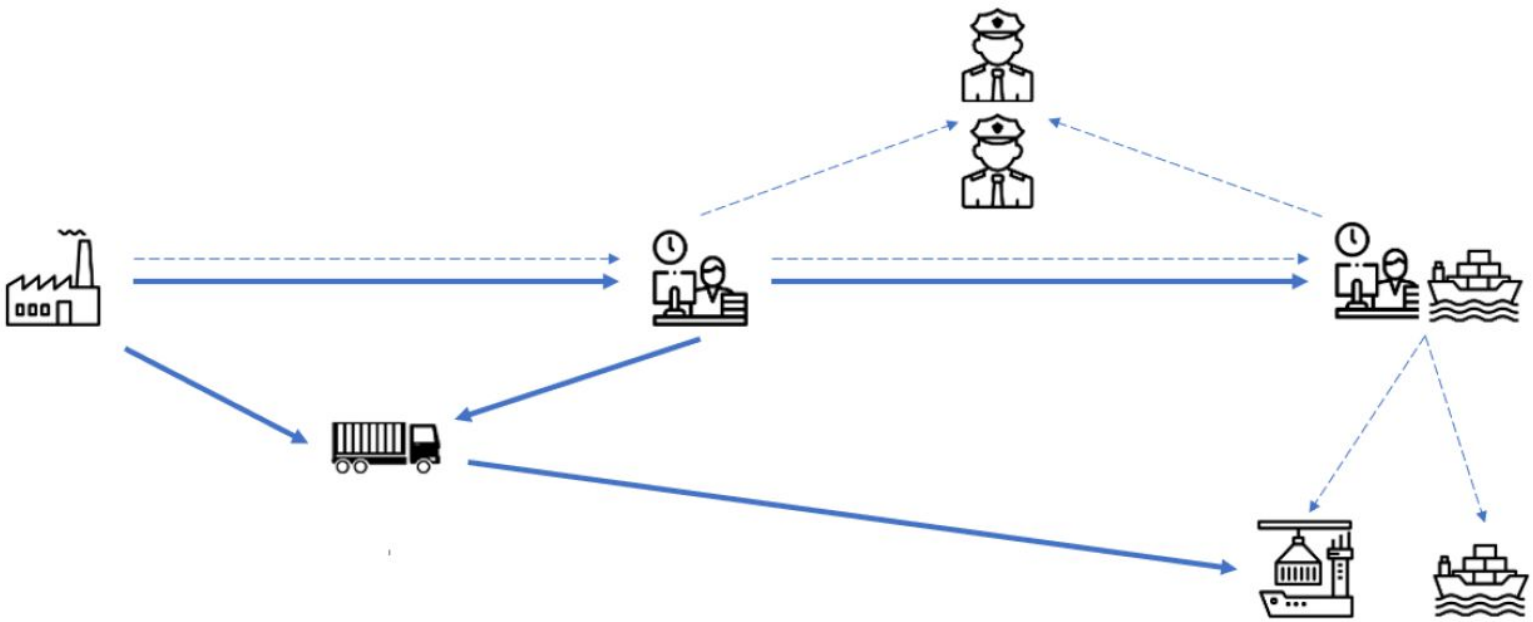


Scenario 1: shipper – ship agent

Scenario 1

The shipper sends EDI messages and a copy of the DGD to multiple stakeholders.

- Authorities:
  - Declaration to authorities multiple authorities
  - Note: Many studies have found that authorities do not communicate or share information amongst each other: hence multiple declarations
- Ship agent:
  - Receives EDI with booking information
  - Note: current booking platforms lack the ability to contain all DG info
  - Hence Ship agent must manually enter all DG details from DGD
  - Based on the info from the ship agent, the vessel is planned and terminal instructed (cfr. Segregation)
  - Ship agent also has to make declarations to the relevant authorities
- Transport company
  - As legally required the transporter must carry a copy of the DGD,
- Terminal
  - DGD will be provided to the terminal



Scenario 2: shipper – forwarder – ship agent

Scenario 2

The same logic as in scenario 1 applies here.

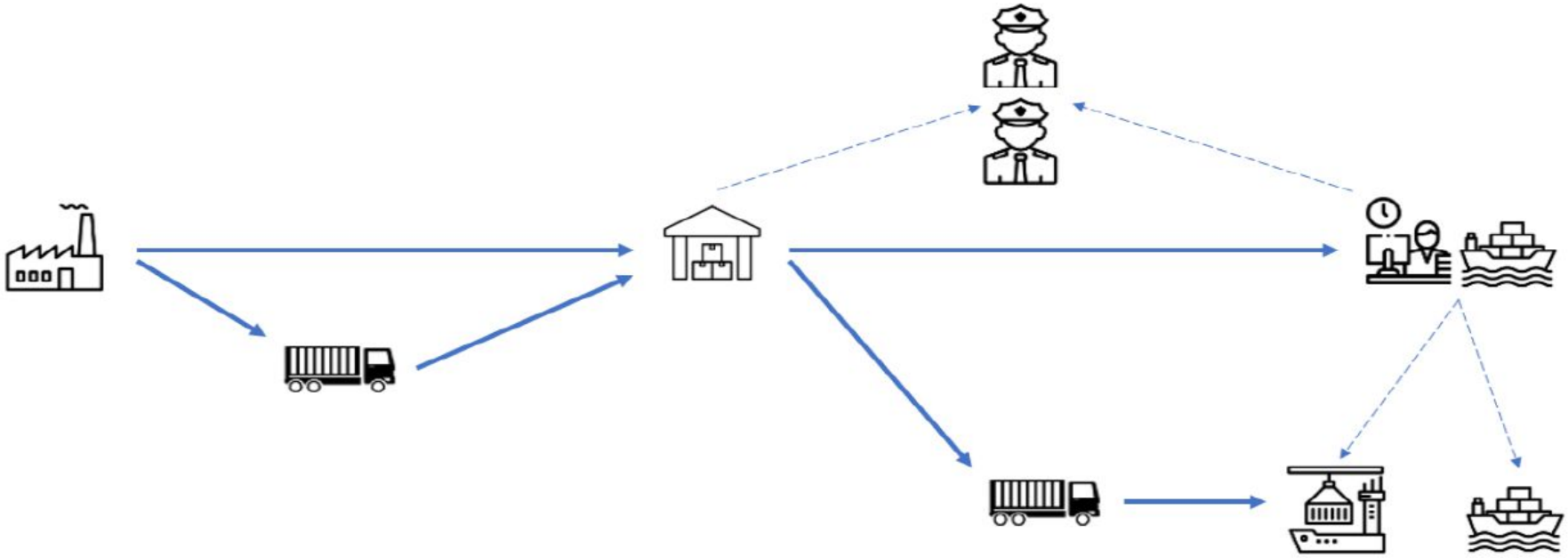
- The only difference here is the presence of an **additional stakeholder: the freight forwarder**.

An additional stakeholder in the chain means additional communication channels.

- In the best-case scenario, the shipper sends EDI message to freight forwarder containing the relevant information about the cargo to be shipped, the DGD is sent separately.
- In the other scenario all the information from the shipper must be manually entered by the freight forwarder

Once the freight forwarder found the best carrier, he will send and EDI message and DGD to the ship agent.

- Freight forwarder is only passing the information back and forth between shipper and ship agent



Scenario 3: shipper – consolidator – ship agent

Scenario 3

The third, possible scenario is the one involving a freight consolidator

In this case the goods shipped by the shipper are not yet containerized.

- This will be done by the consolidator, who will take up the role and associated responsibilities of the stuffer (cfr. signs the CPC).

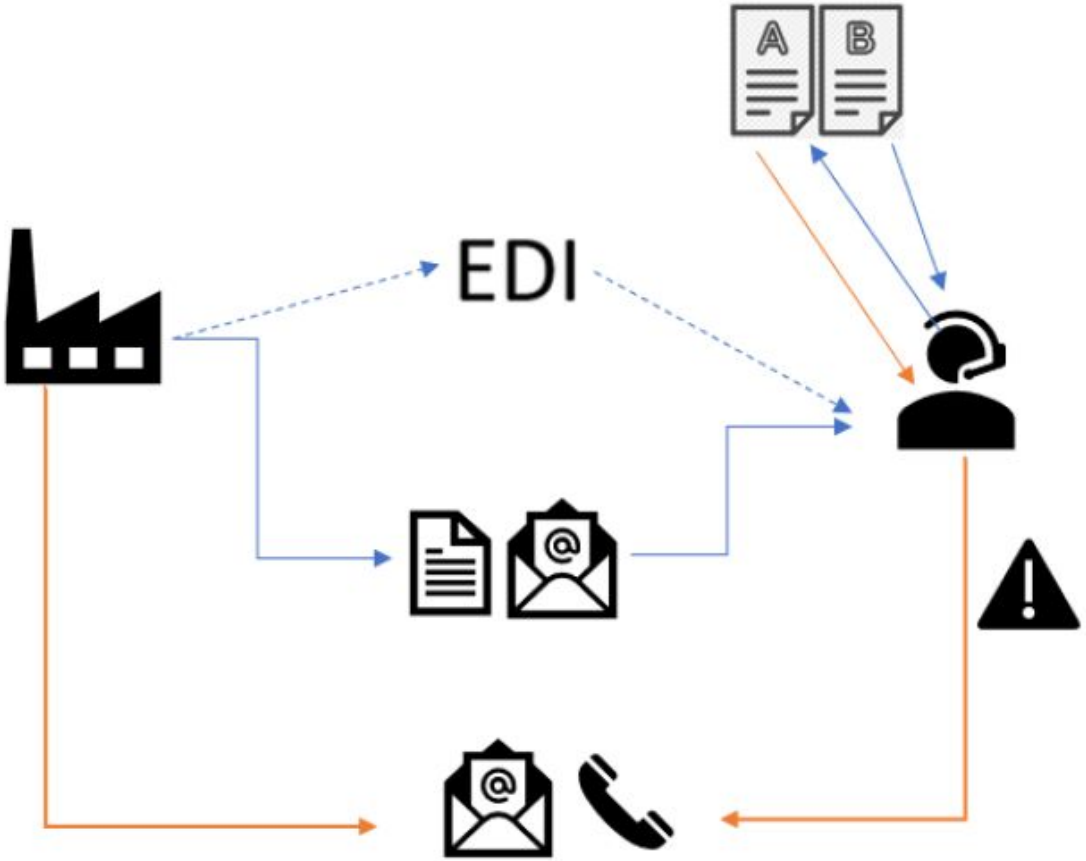
In this case the shipper will only provide the paper documents to the freight consolidator: DGD, packing list,…

The goods are brought to the warehouse of the freight consolidator. The transport of the DG goods must be accompanied by the DGD from the shipper.

The freight consolidator will load the cargo in the container, together with the cargo of other shippers, mark and placard the container accordingly and signs the CPC.

The DGD's from the X number of shippers and the CPC are then sent to the ship agent. Who will manually enter the DG details from the shipment in his booking system.

Both freight consolidator and ship agent declare the goods to the appropriate authorities.



Additional communication

- Provisional and Final data (DGD)
- Blue flow: no additional communication/problems
- Orange flow: additional communications via different channels

Human factor: scientific proof

- The U.S. Coast Guard Research & Development Center concluded that human error is the cause in 75-96% of marine incidents
  - (Rothblum, 2000).

- More studies identify human error as a significant factor in the transport in general and specifically transport of dangerous goods
  - (Galieriková, Sosedová, Dávid, & Bariak, 2018), (Al-Shammari & Oh, 2018).

Human factor: reasons of mistake

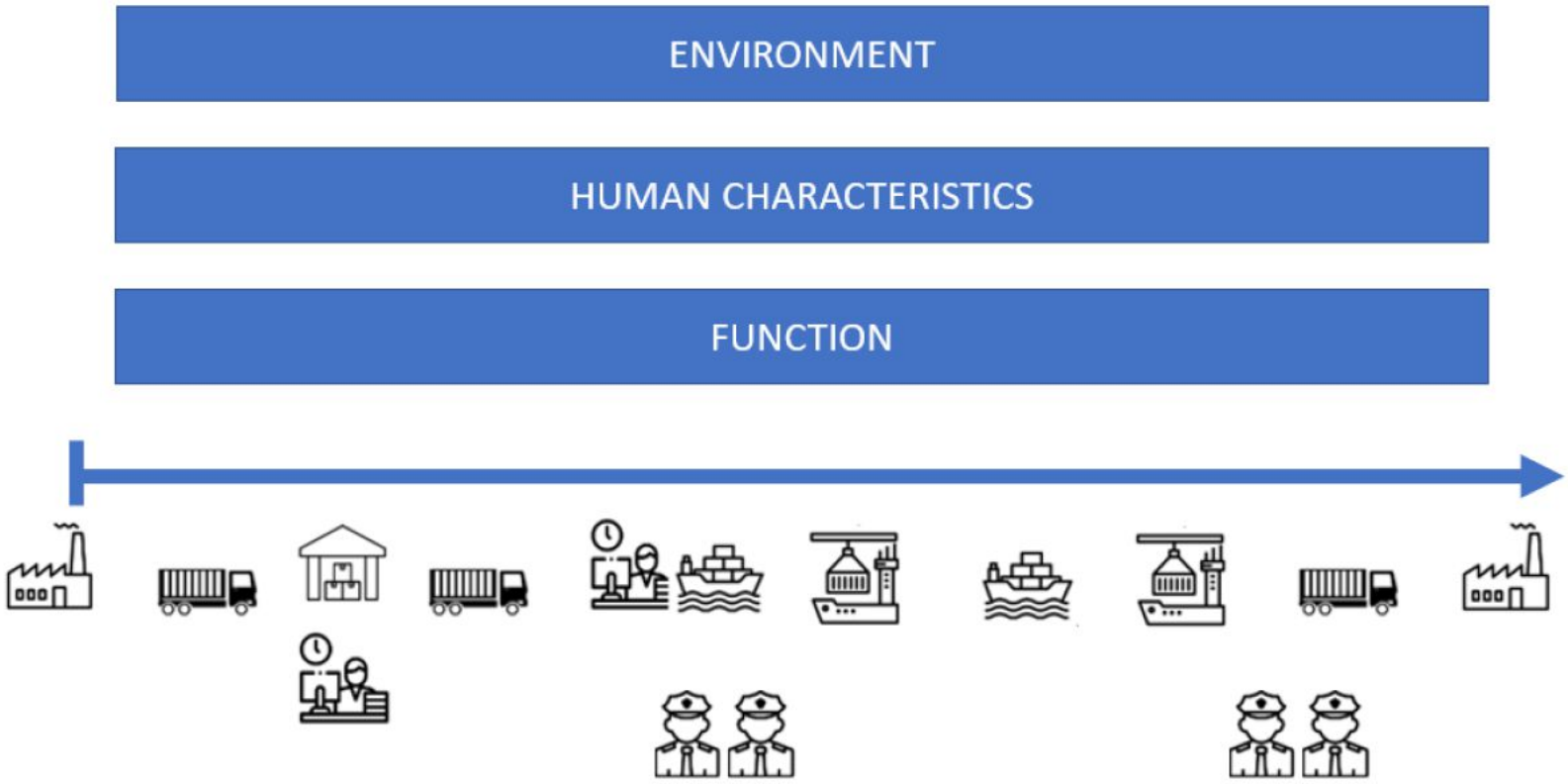
Environment:

- Time constraints: pressure and stress
- Legal complexity: various local and international regulations
- Meteorological conditions
- Distracting factors: for instance, noise in the office
- Economy
- Multiple stakeholders: reproduction of data (lack of overall EDI connection)

Human characteristics

- Concentration constraints
- Physical condition: for example, fatigue, sickness
- Psychological factors (cfr. Heuristics)
- Skills and knowledge

Function of the stakeholder


ENVIRONMENT
HUMAN CHARACTERISTICS
FUNCTION

IT solution?

1. User-related
   - Multiple stakeholders
   - Different levels of IT penetration (own IT solutions in a different scale)
   - Compatible IT infrastructure is a big investment (vs. small businesses)
2. Policy Related
   - Local and international regulations cause of the complexity
3. Technology-related
   - Low compatibility between the systems of the stakeholders
   - Present EDI providers are insufficient for DG cargo

Recommendations

- Sustainable cooperation between all private and public stakeholders on an international level
  - Role for FONASBA?
- Appoint a dangerous goods safety advisor(s) (DGSA) for every actor in the chain

THANK YOU!