LOCOPIAS IMDG IMPLEMENTATION

March 2018

The IMO is a United Nations specialized agency which develops international legislation dealing with two key issues for the maritime industry:

- The safety of life at sea
- Prevention of pollution from ships

To this end the IMO has, among other things, drawn up two international conventions to address these issues:

- The SOLAS Convention (covering safety of life at sea)
- The MARPOL Convention (covering pollution prevention)

To supplement the principles laid down in the SOLAS and MARPOL Conventions, the IMO developed the International Maritime Dangerous Goods (IMDG) Code.
The IMDG code contains detailed technical specifications to enable dangerous goods to be transported safely over sea by vessel and is intended to protect crew members and to prevent marine pollution. The IMDG Code became mandatory for adoption by SOLAS signatory states from 1st January 2004.

Verification against the IMDG is now implemented in the LOCOPIAS container module. A screenshot of the GUI of the container module including the IMDG extension is shown below.

Fig.1: LOCOPIAS container module including IMDG extension

1. TRANSPORT OF DANGEROUS CARGO

When transporting dangerous cargo, the following 3 things are important;

1. Every ship transporting dangerous cargo has a so-called “document of compliance”. This document indicates in which holds/decks dangerous substances are allowed or may not be transported.
2. There are stowage requirements for dangerous substances. These relate to a single Cargo Transport Unit (CTU), for example a container. Examples of stowage requirements are; away from heat source, not near living quarters, ventilated hold only etc.
3. For combinations of dangerous substances (within a single CTU or between 2 CTU’s) there are segregation requirements. These are divided into 4 categories of segregation, from 1 (“away from”) to 4 (the strictest segregation requirements) and depends on the substance classes of both products. Only substances which do not have a mutual segregation requirement (1 to 4) can be loaded in a single CTU.

The IMDG code extension in the LOCOPIAS container module assists in the loading of dangerous cargo by real time validation against the IMDG code. It presents the operator an overview of occurring conflicts in segregation and stowage requirements. For the time being it is only available for container vessels with closed cargo holds. However if the market demands for it, implementation in other modules of LOCOPIAS can be applied to the RoRo module, general cargo module and for container vessels with open cargo holds.
Current implemented version is amendment 38-16 (currently the most actual version of the IMDG code).

2. IMDG TOOLKIT

For the implementation of the IMDG code in LOCOPIAS a toolkit (DLL) from the UK based company "Exis Technologies" is used. They have various tools (both stand-alone applications and online web-based), with which they serve various (large) maritime container shippers / carriers. The toolkit contains an extended database with all IMDG substance information (Dangerous goods list) as well as various procedures to request all kinds of segregation and stowage information and has been fully integrated in LOCOPIAS. Exis Technologies will keep their toolkit up to date with the latest amendment, thus ensuring LOCOPIAS can always be equipped with the latest version of the IMDG code.
The IMDG Code is evolving and is updated every two years to take account of:

- New dangerous goods which have to be included.
- New technology and methods of working with or handling dangerous goods.
- Safety concerns which arise as a result of experience.
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3. DEFINITION OF SUBSTANCES

In the container module of LOCOPIAS, a list of substances can be defined for each CTU.
Input of substances is by UN number or by name of the substances. During the input of substances LOCOPIAS checks for segregation and stowage conflicts within the CTU. The conclusion (complies/does not comply) is printed at the bottom of the screen. Substances can be excluded, overridden or indicated as transported in limited or excepted quantities. If variations exist of a substance, the operator is prompted with a popup menu, in which he can select the required variation. The variation can also be changed in the menu directly.

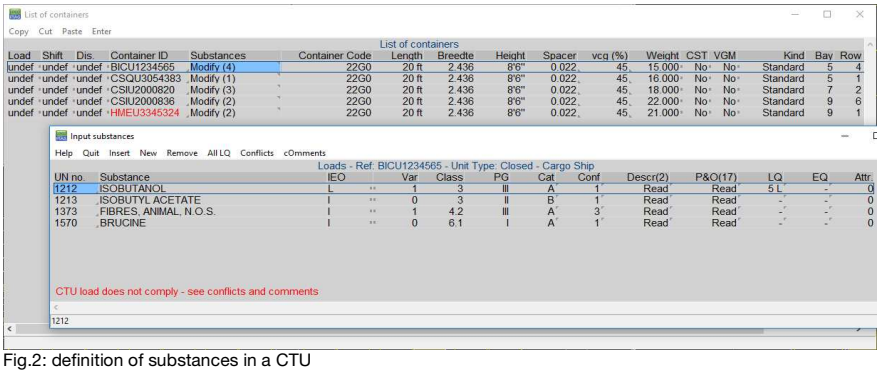

Fig.2: definition of substances in a CTU

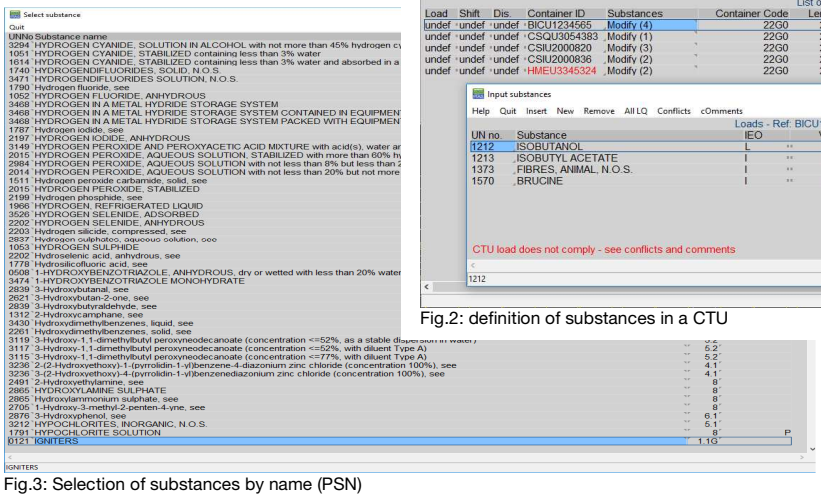

Fig.3: Selection of substances by name (PSN)

4. SEGREGATION SINGLE CTU

If the segregation applies to the loading of substances in a single CTU, any conflict (a segregation requirement > 0) makes the CTU invalid and according to the IMDG code this CTU is not allowed to be loaded on the vessel. The CTU substance list (fig.2) shows a CTU loaded with 4 different UN substances. The conclusion in the bottom shows that there are conflicts and the CTU does not comply. The popup window (fig.4) shows the conflicts within the CTU (segregation is required between the different substances in the CTU). All conflicts must be solved first before the CTU is loaded. (Redistribution of cargo in CTU's, or apply the limited- or excepted quantity indication to the substance).

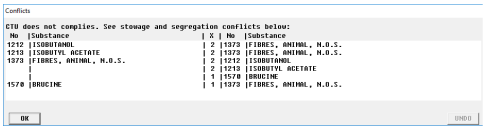

Fig.4: Segregation conflicts in a single CTU

5. STOWAGE COMMENTS SINGLE CTU

Based on the substances and their combinations the stowage comments as given in column 16a of the dangerous goods list apply. For a positioned CTU the applicable stowage comments are presented in the following categories:

- Stowage non-compliant (checked by LOCOPIAS, does not comply)
- Stowage compliant (checked by LOCOPIAS, does comply)
- Stowage not checked (Not all stowage comments can be checked by LOCOPIAS. Not checked comments are listed in this category)

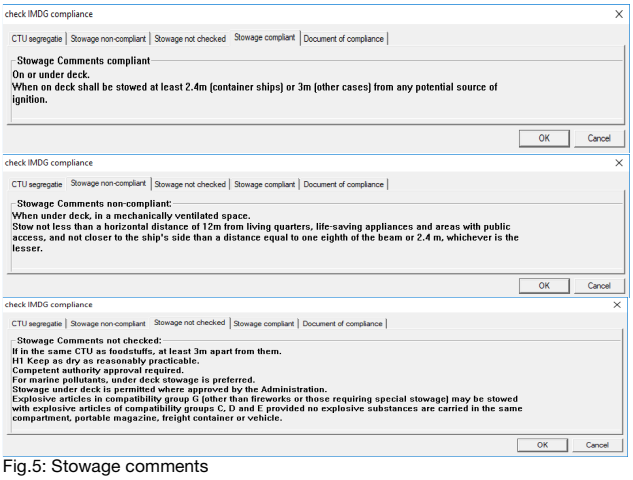

Fig.5: Stowage comments

The following stowage comments are checked by LOCOPIAS;

- On or under deck / On deck / Prohibited.
- Contains both on-deck-only and under-deck-only items.
- On deck in closed CTU or under deck in closed CTU.
- On deck only in closed CTU.
- On deck in closed CTU or under deck.
- Open units must be stowed under deck.
- SW2 Clear of living quarters.
- Not to be transported in closed CTU's. ~~Long international voyages are authorized only with the approval of the competent authority.~~ Only part of this stowage comment is checked. The ~~Striked~~ part is not checked by LOCOPIAS.
- Not to be stowed within a horizontal distance of 6m from potential sources of ignition.
- Stow not less than a horizontal distance of 12m from living quarters, life-saving appliances and areas with public access, and not closer to the ship's side than a distance equal to one eighth of the beam or 2.4 m, whichever is the lesser.
- When on deck shall be stowed at least 2.4m (container ships) or 3m (other cases) from any potential source of ignition.
- SW3 Shall be transported under temperature control.
- SW1 Protected from sources of heat.
- SW11 Cargo transport units shall be shaded from direct sunlight. Packages in cargo transport units shall be stowed so as to allow for adequate air circulation throughout the cargo.

6. SEGREGATION BETWEEN PAIRS OF CTU'S

As with the loading of a single CTU (section 4.), the segregation requirements also apply to CTU's mutually. The difference, however, is that although there may be a segregation requirement (conflict) between 2 CTU's, this is met by the mutual position of the CTU's in the vessel.
The segregation requirement translates into a "prohibited zone" around the reference CTU. This zone is determined by distances in 3 directions. The distance is given in container sizes (for example 6m in length direction, 2.4m in cross direction), a fixed distance (for example 24m) and/or by intermediate bulkheads or decks.

7. GUI OF LOCOPIAS CONTAINER MODULE INCLUDING IDMG

In the Graphical User Interface of the LOCOPIAS container module an additional IMDG info window is available. This window contains one line of information per CTU and one line for each segregation requirement between all possible combinations of 2 CTU's.
By selecting a row in the IMDG info window, the reference CTU (left column) is highlighted in the cross sections in light red. If applicable the incompatible CTU is highlighted in a darker red color. For the specific combination of 2 CTU's, the prohibited is drawn with a red line around the reference CTU. The prohibited area is determined according IMDG 7.4.3.2 table of segregation of containers on board containerships with closed cargo holds. If the incompatible CTU is completely outside the prohibited area, the segregation requirement is fulfilled.

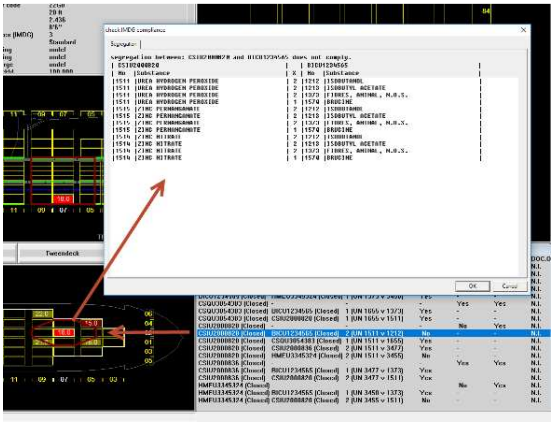

Fig.6: IMDG user interface

8. DETERMINATION OF PROHIBITED AREA

Due to segregation requirements a prohibited area is constructed around a reference CTU. In LOCOPIAS this is implemented according IMDG 7.4.3.2 and MSC.1/Circ.1440 1 June 2012. LOCOPIAS constructs and takes into account the exact line between the outermost corners. Furthermore the prohibited area is automatically extended if other (non IMDG) containers protrude the constructed prohibited area.

9. AVAILABILITY AND PRICING

The IMDG extension is available as of today.
The price for a license for a single vessel of the LOCOPIAS IMDG extension amounts 1500 euro.
Furthermore a yearly subscription is required to work with this module and the Exis Hazcheck database. The cost for this subscription amounts 200 euro (price level 2018).