Decisions by the criticality working group
4-5 June 2018
CSI limits for seagoing vessels

Table 11. CSI Limits for Freight Containers and Conveyances Containing Fissile Material

<table>
<thead>
<tr>
<th>Type of Freight Container or Conveyance</th>
<th>Limit on Sum of CSIs in a Freight Container or Aboard a Conveyance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Under Exclusive Use</td>
</tr>
<tr>
<td>Seagoing Vessel(^a):</td>
<td></td>
</tr>
<tr>
<td>(i) Hold, compartment or defined deck area:</td>
<td></td>
</tr>
<tr>
<td>Packages, overpacks, small freight containers</td>
<td>50</td>
</tr>
<tr>
<td>Large freight containers</td>
<td>50</td>
</tr>
</tbody>
</table>

- 3 main issues about this Table:
  - The notion of closed containers in IMO Regulation.
  - The limitation of CSI by hold might be too restrictive as sea transport and seagoing vessel (bigger vessel) has evolved.
  - No limit for the CSI on a vessel appears to have no basis, possibly a mistake. An effort to find a justification has started.
CSI limits for seagoing vessels

Notion of closed containers

The presence of the wall of a closed container has no effect on the subcritical margin of fissile materials when considering package array.

The criticality safety assessment of packages never considers the negative or positive effect of any surrounding transport equipment considering that the environment conditions, as specified in the regulations, are representative of the most severe conditions for criticality safety.

The criticality specialists expressed that there is no need to specify closed containers in Table 11 for CSI limit.

Decisions by the Criticality WG:

Concerning the notion of closed containers in Table 10, the WG suggests TRANSSC (TTEG radioprotection?) to look at this TI limit justification.

WG suggests that TRANSSC include the justification about closed/open freight containers in Table 11 in the Committee’s report for time being and send all clarifications/justifications regarding CSI and TI limits to IMO, as soon as they are all finalised.
CSI limits for seagoing vessels

Limitation of CSI by hold

A discussion about the possibility of mixing of fissile packages inside a hold have been performed.

It seems that, due to the condition of stowage of large freight containers inside the hold of container-ships, the mixing of fissile packages from the whole hold of a container-ship might be too restrictive. The limitation of CSI by bay might be sufficient.

➡ During next WG meeting, additional justification about these points should be presented and discussed.
Stowage of large freight containers in container-ship

Bay numbering (even numbers: 40-foot containers, odd numbers: 20-foot containers)

Typical arrangement for a 2000 TEU container-ship (medium size)
Exclusive use in para 570 e)

“Unpackaged or packaged fissile material classified in accordance with para. 417(e) shall be transported under exclusive use on a conveyance with no more than 45 g of fissile nuclides.”

On what “object” the term “exclusive use” should be applied: to the whole conveyance or only to the containers loaded with the fissile materials or packages?

There is a general agreement that they could have other goods than the fissile material in the conveyance but there should not have other additional fissile material.

→ Proposition of new paragraph in the SSG-26:

“570.X For the purpose of para. 570 (e), when exclusive use applies to vehicles or large freight containers, other non-radioactive cargoes may be carried on the same vessel, hold or defined deck area of a vessel, or in the same aircraft, provided they are not carried in those vehicles or large freight containers.”
Discussion about national assessment of fissile packages - Project of questionnaire

During the previous WG, there was a general agreement that sharing national practices might be interesting.

Such a work might be interesting in particular to have a view on practices in different countries (and not to review these practices), but also, when the interpretation of the regulation is different in function of countries (this is the case for the confinement system) or to find a solution in case of an issue for the transport of fissile excepted material (for example, for the transport of washed 30B cylinders).
Discussion about national assessment of fissile packages - Project of questionnaire

During this WG, there was interesting discussions about what could be the first questions and possible answers.

After this discussion, the WG wonders about the best way to ask these questions: either closed question (the answer should be yes or no) or open question (the answer correspond to a comment). The WG agrees that a questionnaire with 2 parts may be a good solution.

What is the position of TRANSSC about this proposition?

The WG will have exchanges by email (or in the SharePoint of the TTEG) about the questionnaire before TRANSSC37 and will have new discussions about this topic during the next WG before TRANSSC37.
Other discussions during the WG

Other topics were also discussed during the WG. For example:

- **Criticality safety at low temperatures**: work on this topic are on study. When results will be available, this WG could be a place to share results.

- **Concept of preventing danger of 10 cm cube and birdcage design**: the WG had discussions about the technical basis of this requirement.

- **Fissile exception as per para 417(f)**: an application is in progress in UK. The WG will be interested in a presentation of this application if it is possible.

- **Technical Basis Document**: a presentation related to the fundamental principles for nuclear criticality safety was performed. This topic might be included inside the TBD when the WG will have discussion on it.
Thank you for your attention!