

Creative Systems, Inc.
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GHS Probabilistic Damage Training Manual

GHS 概率破舱稳性计算训练手册

中英文对照

Rv. 04/2020 版本

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Updated on 更新于: 26 January 2023

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1.0 Overview of SOLAS Probabilistic Damage Stability Regulations SOLAS 概率破舱稳性规则概论

GHS is able to perform the calculations required by resolution MSC.216(82) which adopted the regulations on subdivision and damage stability as contained in SOLAS chapter II-1. These regulations are based on the probabilistic concept, using the probability of survival after collision as a measure of ships' safety in a damaged condition.

GHS 可用于海大决议 MSC.216 (82) 中关于 SOLAS 公约第 II-1 章分舱及破舱稳性计算。基于概率法，计算船体遭受碰撞损坏后残存的概率，衡量船舶破损后的安全。

To perform probabilistic damage calculations with GHS, the Advanced Features (AF) module is required. Use the Modules Wizard to determine if your license includes the use of this module. Simply enter the command, "RUN MODULES.WIZ" or run MODULES from the drop-down menu, Wizard\All. After the wizard is run, a window will appear containing a list of initials for GHS Optional Modules with Yes or No indicating whether each module is included in the license. If AF is not listed as present, then you need to contact Creative Systems to determine availability and costs.

使用 GHS 高级功能(AF)模块进行概率破舱计算。运行模块向导，确定是否有使用此模块的许可。可简单输入命令“RUN MODULES.WIZ”或者在 Wizard/All 下拉菜单中选择运行 MODULES。运行向导，显示初始 GHS Optional Modules 许可列表，用“Yes”或者“No”标示是否具有权限。如果没有 AF 权限，您需要联系 Creative Systems 公司或者 SINGTONG MARINE & OFFSHORE PTE LTD (SMO) 进行报价、购买事宜。

Two commands in the GHS command dictionary, DAMSTAB and DIVISION, with the proper parameters, are used to perform the probabilistic damage calculations. It is recommended that the DAMSTAB2 wizard be used as it simplifies the input of parameters for probabilistic damage stability calculations. Due to some requirements that apply to passenger vessels (wind heel, passenger moments, etc.), some calculations are performed only in the wizard and are not implemented in the GHS program. This booklet will only cover performing probabilistic damage calculations using the wizard.

在 GHS 命令库中，有 DAMSTAB 和 DIVISION 两个命令，配合适当的参数，可用于进行概率破舱稳性的计算。但更推荐使用 DAMSTAB2 向导用于概率破舱稳性计算，因为参数的输入更简单。由于客船的一些特殊要求（风压，乘客集中一舷产生的力矩等），其中某些计算只能在向导内执行，而 GHS 程序还不能实现这些特殊功能。本手册只包含运用向导计算概率破舱。

Excerpt from ANNEX 22 of RESOLUTION MSC.281(85) (Not a direct quote)

摘自决议 MSC.281(85)附录 22 (未直接引用)

The harmonized SOLAS regulations on subdivision and damage stability, as contained in SOLAS chapter II-1, are based on a probabilistic concept which uses the probability of survival after collision as a measure of ships safety in a damaged condition. This probability is referred to as the "attained subdivision index A" in the regulations.

SOLAS 公约第 II-1 章，归纳分舱和破损稳性的规范。基于概率法，计算船体遭受碰撞破损后残存的概率，衡量船舶破损后的安全。这个概率称之为“达到的分舱指数 A”。

The probability that a ship will remain afloat without sinking or capsizing as a result of an arbitrary collision in a given longitudinal position can be broken down to:

船舶沿船纵向方向受到碰撞破损保持漂浮而不沉没，不倾覆发生的概率可细分为：

- The probability that the longitudinal centre of damage occurs in just the region of the ship under consideration;
仅在纵向中心线区域内破损的概率。
- The probability that this damage has a longitudinal extent that only includes spaces between the transverse watertight bulkheads found in this region;

仅限定在水密横舱壁之间纵向延伸范围破损的概率。

- The probability that the damage has a vertical extent that will flood only the spaces below a given horizontal boundary, such as a watertight deck;

仅限定在水平分界线之下垂向范围破损的概率，如水密甲板。

- The probability that the damage has a transverse penetration not greater than the distance to a given longitudinal boundary; and

横向破损渗透不超过纵向边界发生的概率。

- The probability that the watertight integrity and the stability throughout the flooding sequence is sufficient to avoid capsizing or sinking.

保持水密完整性和稳性，在连续破损期间船舶不倾覆，不沉没的概率。

The first three of these factors are solely dependent on the watertight arrangement of the ship, while the last two depend on the ship's shape. The last factor also depends on the actual loading condition. By grouping these probabilities, calculations of the probability of survival, or attained index A, have been formulated to include the following probabilities:

前三个因素取决于船舶水密分割布置，后两个因素取决于船型。最后一个因素还取决于船舶真实装载工况。通过总结这些假定，残存概率的计算，达到的分舱指数 A 的计算可归纳如下假定。

- The probability of flooding each single compartment and each possible group of two or more adjacent compartments; and

单舱制，两舱制或者多舱制破损的概率；

- The probability that the stability after flooding a compartment or a group of two or more adjacent compartments will be sufficient to prevent capsizing or dangerous heeling due to loss of stability or to heeling moments in intermediate or final stages of flooding.

单舱制，两舱制或者多舱制破损后，由于失去稳性和中间或最终破损中的横倾力矩，满足不倾覆或无危险横倾的概率。

This concept allows a rule requirement to be applied by requiring a minimum value of A for a particular ship. This minimum value is referred to as the required subdivision index R. in the present regulations and can be made dependent on ship size, number of passengers or other factors legislators might consider important.

规范要求特定船舶要求达到的指数 A 不得小于最小值。此最小值称之为要求的分舱指数 R。根据 SLOAS,R 值取决于船型尺寸，乘客数量或者其他相关参数。

Evidence of compliance with the rules then simply becomes:

$$A \geq R$$

依据遵守规则:

$$A \geq R$$

It is the responsibility of the GHS user to know and understand the regulations concerning probabilistic damage stability before using the probabilistic damage ability of GHS and the DAMSTAB2 wizard.

GHS 用户在使用 GHS 概率破损功能和 DAMSTAB2 向导之前有必要了解和认识相关概率破损规范。

2.0 Before using the Wizard 用向导前的基础

Before using the wizard, the vessel's geometry file should be reviewed to be sure it is suitable for probabilistic damage calculations. All internal volume should be modeled as a compartment, or in GHS lingo, as tank class parts. A geometry file intended for intact or deterministic damage stability analysis may not be suitable for a damage stability analysis.

使用向导之前，需要对给定船舶模型进行评估以确定该船型适合于概率破舱计算。所有的内部空间必须定义为舱室。用于完整稳性和确定性破舱稳性计算的舱室，有可能不适于概率破舱稳性计算。

The specific gravity of the water should also be set in the geometry file as the wizard doesn't provide the option to change the specific gravity of the environment. (The specific gravity of the environment is stored in the saved condition files, so simply changing the SG in the GF file will not be sufficient to change an existing set of wizard files.)

水密度必须在船舶的模型文件内设定，向导没有提供改变水密度的功能（在装载工况里可以定义水密度，为此，简单改变水密度是不能满足实际装载工况）。

In addition to the GF file verification, some basic information should be collected prior to entering the wizard. At a minimum, vessels load drafts, critical points, tanks subject to crossflooding or progressive flooding should be determined.

在进入向导运行前，应对船舶模型进行确认，至少要对船舶吃水、进水点、舱与舱之间出现的连贯破舱点进行评估和确认。

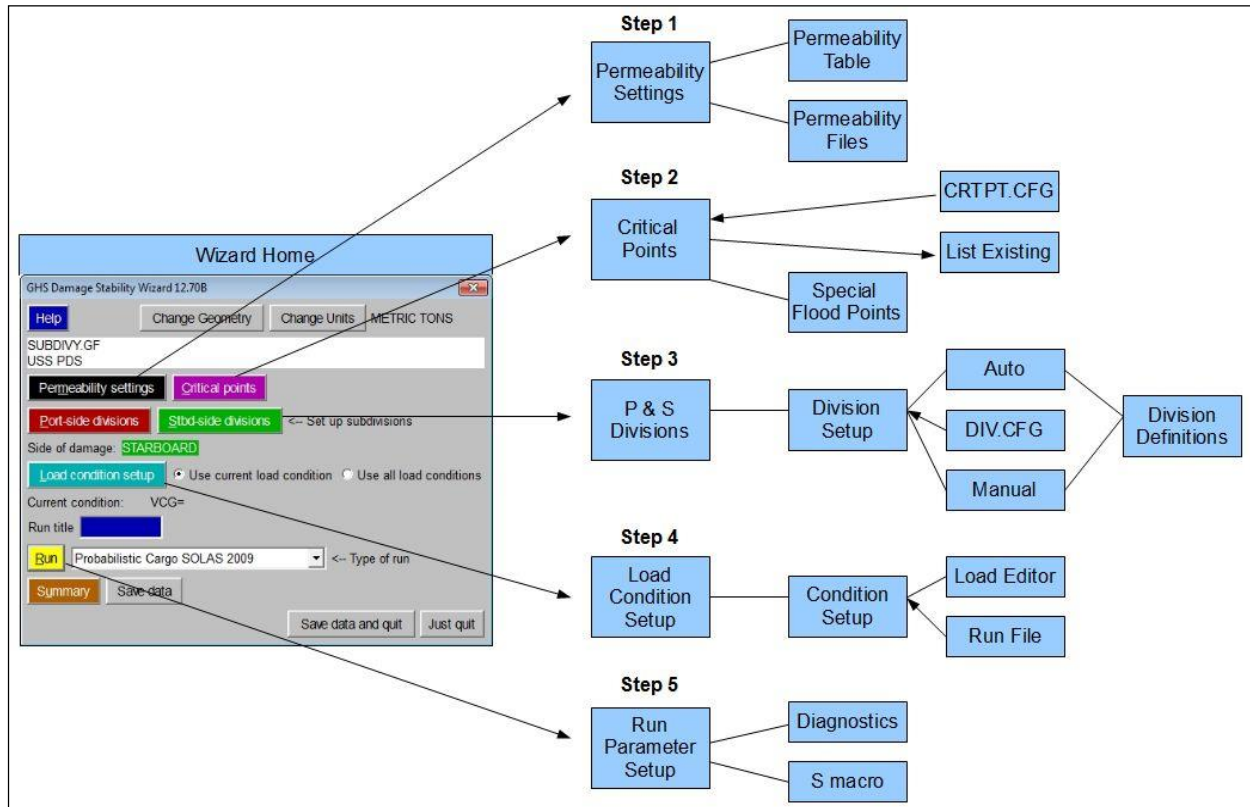
It is strongly suggested that a new folder be created for each probabilistic evaluation of a ship. The wizard creates numerous files. These are for storing the division definitions, load conditions, parameters for the selected regulation, report files, summary files, notes and trace files. For this tutorial, create a folder in a location and with a name of your choosing. Copy the geometry file into this folder. It is helpful to have a shortcut for GHS in this folder too.

强烈建议对每次进行的破舱稳性计算结果存放在不同的子目录下。其中包括不同的分舱定义、装载工况、参数选择、详细报告、总结报告、说明、计算过程报告。为了这次培训，可以创立一个子目录，把模型文件拷贝进来，可以创立一个捷径图标，可以帮助你迅速进入工作子目录。

3.0 Overview of the DAMSTAB2 Wizard DAMSTAB2向导概述

The procedure for completing a first run through the Damstab2 wizard consists of six main steps. The diagram below illustrates the main options for each step.

DAMSTAB2 向导从开始到结束共分 6 步，详见下图：



The wizard provides two convenient methods to specify the permeability for tanks according to Regulation 7-3 Permeability. The user can choose between entering the permeability of each group of compartments into a wizard template or read in a run file containing GHS permeability commands.

该向导提供了两种方便的方法，可根据法规 7-3 渗透率指定舱室的渗透率。用户可以选择将每组舱室的渗透率输入向导模板或读取包含 GHS 渗透率命令的运行文件。

The downflooding and weathertight points are required to evaluate the probabilistic regulations. Like permeability, the critical point input can be given directly or through a run file containing GHS commands. There are some special features such as progressive flooding if a tight point is immersed as equilibrium that are only available if the critical points are entered into the wizard interface.

需要浸水点和风雨密点来评估概率破舱法规。与渗透性一样，临界点输入可以直接或通过包含 GHS 命令的运行文件给出。有一些特殊功能，例如，如果将紧点浸入平衡，则渐进式进水，这些功能仅在将临界点输入向导界面时才可用。

If progressive flooding to tanks or compartments outside the division is to be considered, the affected tanks can be specified for each division.

当非本分舱区域内舱室或者船舱考虑累积进水，那么受影响的舱室，可以在各自分舱区域进行定义。

The geometry of the watertight subdivision will have some influence on the Attained Index, A as stated above. The wizard can automatically define the divisions or groups of compartments. These divisions can

also be set by the user. Doing so will change the computed Attained Index. It is up to the user to understand the regulations when specifying the divisions.

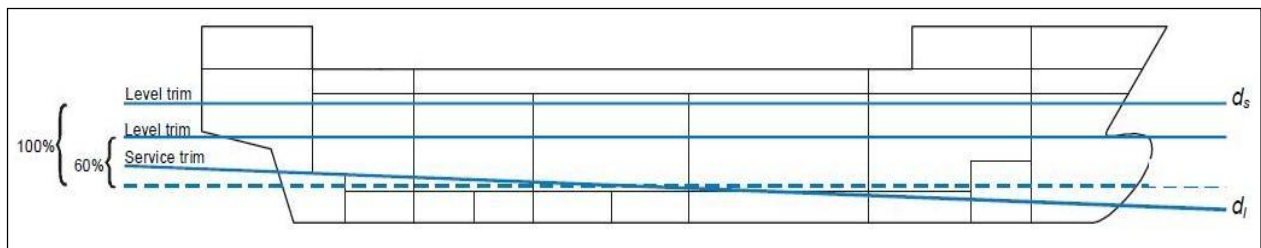
模型里面水密舱室分割影响如上所述的达到指数 **A**。本向导可以自动定义分舱或者舱，也可以自定义。不同的分舱会影响得到指数，分舱方式取决于用户分舱时对规范的了解。

The location of longitudinal bulkheads forming wing tanks and horizontal bulkheads (decks) will also effect the computed results. When wing tanks are fitted, the probability factor for damage is reduced taking into account that inboard tanks will be flooded only a small percentage of the time. Likewise, for spaces between decks. The locations of the longitudinal and horizontal subdivisions are measured from the side shell and baseline respectively.

由纵舱壁形成的边舱以及横舱壁（甲板）的位置也会影响结果。当船有边舱时，内部舱室破损的概率很小，可以减少整船破损的概率。同样的，对于甲板之间的空间也是如此。纵向和横向分舱分别从侧面外壳和基线分别计量。

The regulations require at least three load conditions be investigated. The results of these three conditions are combined in a weighted formula based on the expected time in service at each load condition. The 3 minimum drafts to be considered are the light load (dl), the subdivision draft (ds) and a partial load draft (dp). The partial load draft is defined as the light load draft plus 60% of the difference between the light load and subdivision drafts. The service trim is used at the light load draft, while level trim is used with subdivision and partial load drafts.

法规要求至少计算三种装载工况。这三种工况的结果根据每种装载工况下的预期使用时间组合在一个加权公式中。要考虑的 3 种最小吃水是轻载（dl）、分舱（满载）吃水（ds）和部分装载吃水（dp）。部分荷载吃水定义为轻载吃水加上轻载和分舱吃水之间差额的 60%。服务纵倾用于轻载吃水，而水平纵倾用于分舱和部分装载吃水。



These conditions can be handled in several ways within the wizard. A light ship weight can be specified by the weight and centers or calculated from draft and trim values. The vessel loading which achieves the required partial and subdivision drafts can be defined using either Load Editor or a run file containing LOAD and ADD commands. If the vessel tank loading will not influence the results (for example a deck cargo barge with all voids empty) a single weight and centers or draft and trim can define the load condition.

向导中有几种方法定义这些工况。通过给定空船重量和重心或者计算吃水和纵倾来定义空船重量。最深分舱吃水和部分吃水可以通过 **Load Editor**（装载编辑器）或者运行包含 **LOAD** 和 **ADD** 命令的文件来定义。如果舱室装载状态不影响结果（例如：空舱的货物甲板驳），简单的重量和重心或者吃水和纵倾就可以定义装载工况。

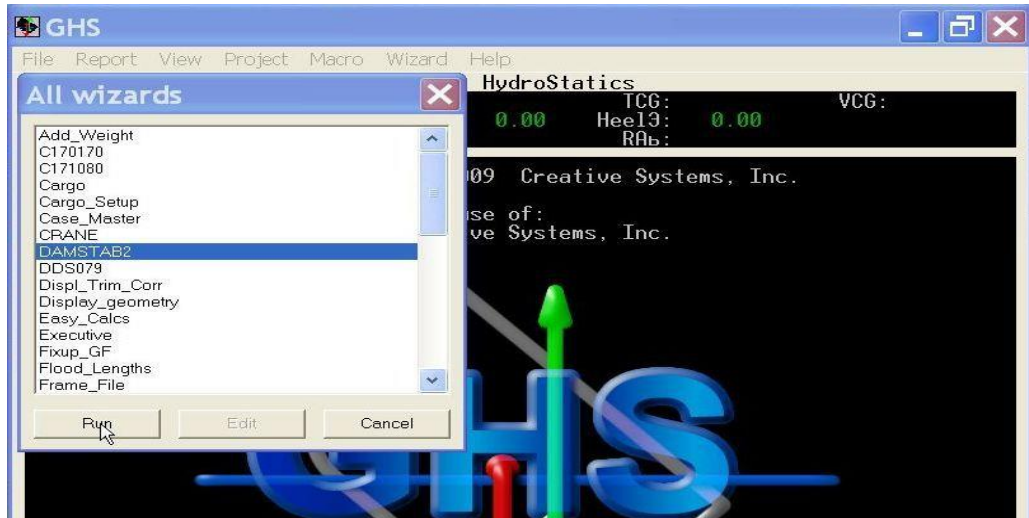
Again, it is the responsibility of the user to understand the regulations when selecting the locations of divisions, wings and decks.

再次，使用者在定义分舱的侧壁和甲板时，需了解和认识相关概率破损规范。

4.0 Getting started 准备运行

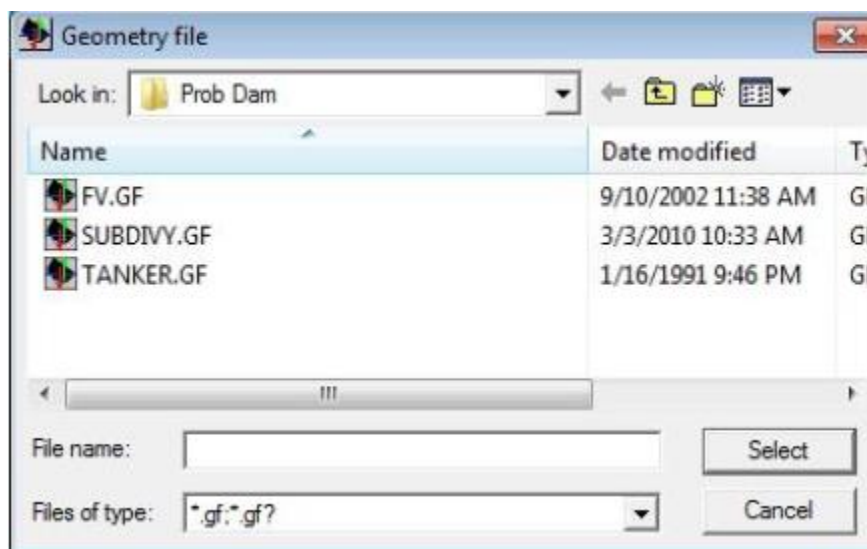
To access the wizard, use the pull down menu for Wizard, click the sub menu for All... , select DAMSTAB2 and click RUN.

要访问该向导，点击下拉菜单 Wizard，点击 ALL 子菜单...，选择 DAMSTAB2，然后点击运行。



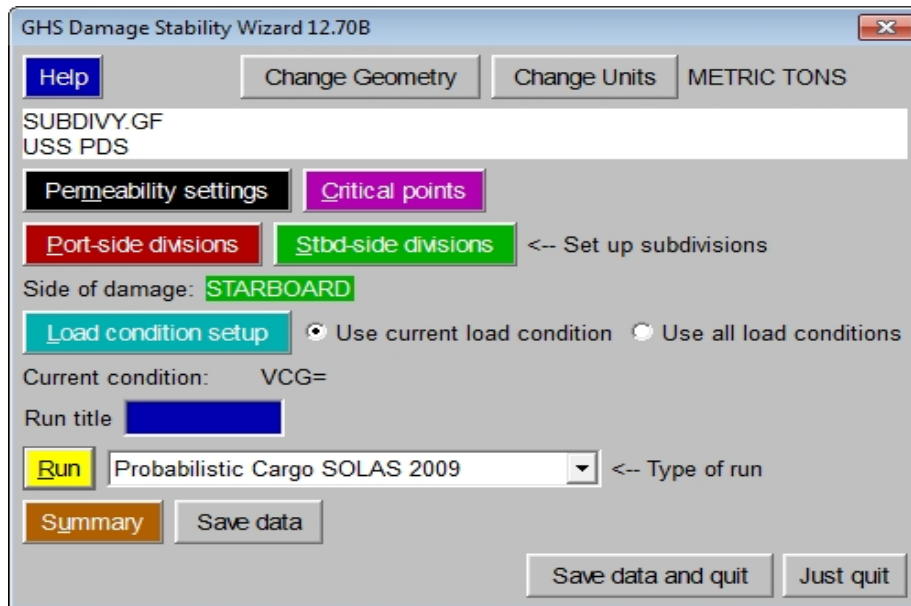
If no geometry file was in memory and if file DAMSTAB2.SAV doesn't exist, the following dialog box will appear. If the file DAMSTAB2.SAV exists, the front dialog box will open with the parameters from that file already loaded. If a geometry file was already loaded, the wizard will open ready to use that geometry file. For the exercise below, select SUBDIVY.GF.

如果没有模型文件和 DAMSTAT2.SAV 文件，会出现如下所示的对话框；如果 DAMSTAT2.SAV 文件存在，前面对的对话框打开已经加载在文件中的参数，如已经加载了模型文件，向导会打开这个模型文件。下面的练习中，选择 SUBDIVY.GF。



The main menu window will appear. The "Help" button will open a window with an overview of the Probabilistic Damage Stability wizard.

出现主菜单窗口。“Help”按钮可以打开一个新窗口，概述概率破损稳性向导。



The geometry file and units can be changed with the corresponding buttons. Many of the buttons have hot keys, which are indicated by the underlined letter in their labels. The “Permeability settings” and “Critical points” buttons allow you to edit the values in the wizard model. Regulation 7-3, Permeability, specifies permeabilities for cargo compartments at ds, dp, and dl. The wizard provides a table format to set the required values without having to make changes to the geometry file or have multiple files. Special critical points can be added when said points are connected to or protected by a tank or compartment. Critical points which are defined in the geometry file or a CRTPT.CFG file, can not be assigned to specific tanks or given special effects.

相应的按钮可变更当前的模型文件和工作单位，其余的按钮都可以用快捷键操作，快捷字母用下划线标示。可在向导内编辑“Permeability settings（渗透率）”和“Critical points（进水点）”。根据SLOAS第7-3条，渗透率，定义不同吃水DI, Dp, Ds货仓部分的渗透率，向导提供了表格用于更改定义，而不用在模型文件或者其他文件中更改。当进水点连接其他舱室或者船舱时，可定义特殊进水点。当进水点定义在模型或者CRTPT.CFG文件时，不能指定给特定的舱室或者给予某些特殊的定义。

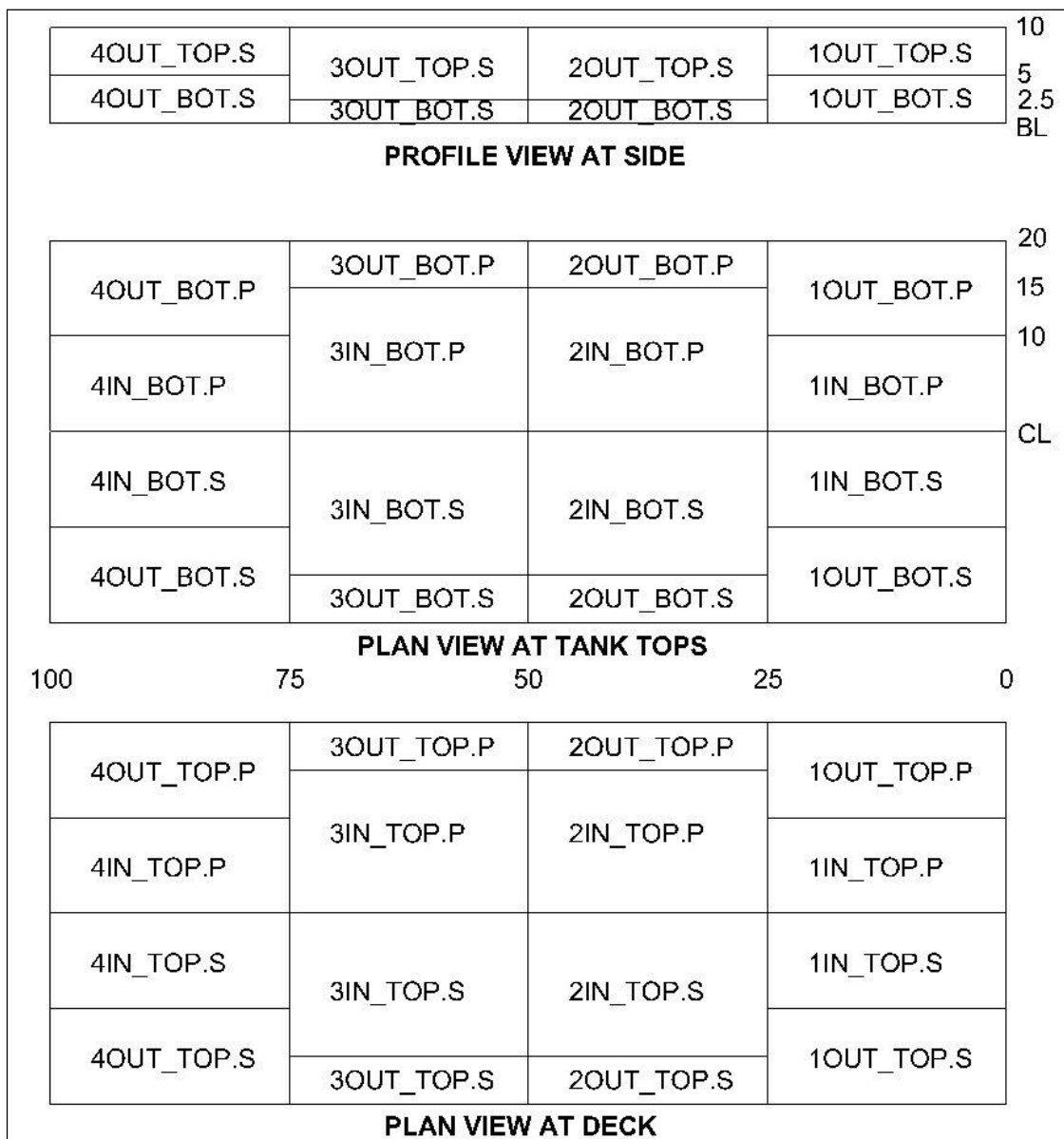
5.0 Your first Run with the Damstab2 wizard 第一次运行 Damstab2 向导

In this exercise, we will step through the minimum inputs needed to complete a probabilistic damage stability run for the light ship load condition. In later exercises, we will learn how to set up additional load conditions and then explore the various optional parameters needed when the vessel characteristics warrant a more complete analysis.

在本练习中，逐步输入最简要的完整运行概率破舱稳性向导的参数，运行空船装载工况。在随后的练习中，学习如何设置其他的装载工况，研究各种可选参数，保证更全面的分析船舶特性。

For this simple demonstration, the simple rectangular barge with 32 total tanks as shown will be used. It is in the SUBDIVY.GF geometry file.

对于这个简单的演示，将使用如图所示的带有 32 个总舱室的简单方形驳船。定义在 SUBDIVY.GF 几何文件。

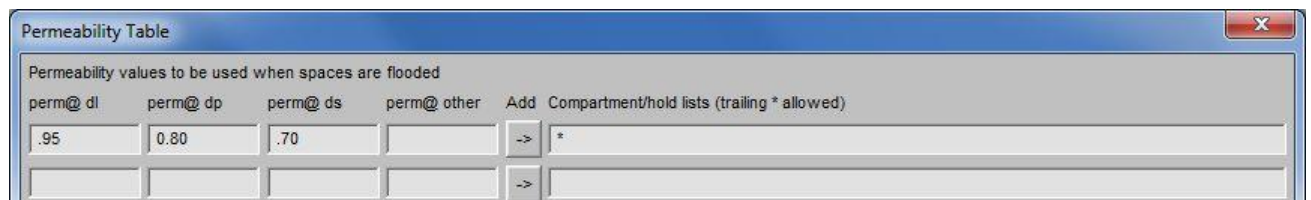


The first run will be for the light ship condition. The vessel has the following properties: Light ship weight = 8200 tonnes at a draft of 2.0 m, LCG = 50 m, VCG = 6.0 m. The Subdivision Loadline draft is required. We will use 8.5 meters.

第一次运行空船装载工况。本船参数如下：吃水 2.0 米，空船重量=8200 吨，LCG= 50 M，VCG= 6.0 米。8.5 米分舱吃水。

Click the Permeability settings button to bring up a window to select if you wish to use your own file or the table provided by the wizard. If you choose to use your file, instructions are given as to what file names to use and what parameters to include.

点击渗透率按钮，弹出选项，使用自定义文件或者向导表格。选择自定义文件，向导对于如何定义文件名和参数的进行操作说明。



For liquid cargo compartments, the permeabilities at the respective load conditions are 0.95 at dI, 0.80 at dP and 0.70 at dS. The “perm@other” column corresponds to the “other” label in the load condition setup dialog. For this analysis, we can set them easily in the table using a single asterisk since all the tanks in this model are for liquid cargo. The table should look like the figure above. Be sure the “Use table” button is selected when you are finished entering the permeabilities.

对于液货舱，其渗透率在各个装载工况中如下：DI 吃水 0.95，DP 吃水 0.8，DS 吃水 0.7。
“perm@other” 列对应于装载工况设置对话框中的“Other” 标签。在此计算中，我们可以使用单个星号在表中轻松设置它们，因为该模型中的所有舱室都用于液体货物。该表应如上图所示。确保在输入完渗透率后选择了“Use Table” 按钮：

Critical points can be assigned in the geometry file, in a CRTPT.CFG file or by using the Special Flood Points table. If the critical points are defined within the geometry file or in the CRTPT.CFG file, they may have any or all of the attributes available in GHS. By using the Special Flood Points table above, additional properties are available. Note the critical point numbers in the table start at 89 and decrease. This is so any existing critical points will not be overwritten. If there is no description given, any data on that line is ignored. The columns labeled Symm, Flood, Tight and Inactive (Noflood) set parameters recognized by GHS. Similarly, the “Flood to Tank” column sets the /TANK: tankname parameter. The “Inside Tank” dropdown box sets the /Inside: tankname parameter which allows a critical point to be considered protected due to its location inside another tank until the protecting tank is damaged.

进水点可以定义在模型文件，**CRTPT.CFG** 文件或者使用向导特殊进水点定义文件。进水点定义在模型文件或者 **CRTPT.CFG** 文件中，这些进水点具有 **GHS** 部分或者全部属性。通过设置特殊进水点，进水点可具有额外属性。注意特殊进水点是从 **89** 号开始的，并降序排列，保证之前的进水点不被重叠。如果没有描述项，那么此进水点将被忽略。通过列 **Symm, Flood, Tight** 及 **Innactive (Noflood)** 设置 **GHS** 参数。类似的 “**Flood to Tank**” 列中设置/**TANK:** 舱室名参数。“**Inside Tank**” 下拉菜单设置/**Inside:** 舱室名参数，定义此进水点设置在 **inside tank** 内部且被 **inside tank** 保护，直至 **inside tank** 破损。

Many of the columns display tool tips if the mouse hovers over the input field, for example:

鼠标悬停在输入栏时显示提示语句，例如：

Protect Long - Ignore point if outside damaged division range

Protect Long-忽略超出破损区域的进水点

Layer Trans - Ignore point if penetration inboard layer (B) is less than this (0-3)

Layer Trans-忽略向内穿透深度小于（0-3）的进水点

Inside Tank - name of tank/compartment which protects this flooding point

Inside Tank - 指定的舱室/隔间可以保护此进水点

Effect, None - no change to tank type (standard)

Effect, None - 不改变舱的类型（标准）

Flood – change flood to tank to type FLD if tight point and immersed at equilibrium

Flood - 水密进水点在平衡角被淹没时，则将舱室改变为破损

Load - similar to Flood but capture flooding water as intact level

Load - 类似 **Flood**，但破损后进水量按照完整工况水线

The options **Protect Long**, and **Layer Trans** are not meant to be used for typical downflooding points, rather they provide a method to model a pipe or a valve that could cause flooding of a space if it was damaged and immersed.

Protect Long 和 **Layer Trans** 选项并不适用于典型的进水点，而适用于当管子或者阀被破损或浸没导致进水的方法。

Special Flood Points

Adjust maximum number of special flood points

#	Description	Location			Symm	Status			Protect Layer		Inside Tank	Flood to Tank	Effect		
		L	T	V		Flood	Tight	Inactive	Long	Trans			None	Flood	Load
89	1in_bot	24.000	8.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88	1out_bot	24.000	12.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87	1in_top	24.000	9.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86	1out_top	24.000	11.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85	2in_bot	26.000	13.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		2IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84	2out_bot	26.000	17.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		2IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83	2in_top	26.000	14.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		2IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
82	2out_top	26.000	16.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		2IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81	3in_bot	74.000	13.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		3IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80	3out_bot	74.000	17.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		3IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79	3in_top	74.000	14.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		3IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78	3out_top	74.000	16.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		3IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77	4in_bot	76.000	8.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		4IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76	4out_bot	76.000	12.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		4IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75	4in_top	76.000	9.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		4IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74	4out_top	76.000	11.000	11.000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		4IN_BOT.S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Ok Cancel

The next step is to set up the divisions. Click the “Stbd-side divisions” button. then open the help window. Time should be taken to read and digest this information. If a message appears stating that the number of division slots can't be zero, enter 1 temporarily and click “Help” again.

下一步是设置分舱。点击“STBD-side divisions”按钮，然后打开“Help”窗口。应该花时间阅读和消化这些信息。如果出现一条消息，指出分区槽数不能为零，请暂时输入 1，然后再次单击“Help”按钮。

Division Setup

Help

Subdivisions on STARBOARD side

Option 1. **Auto** Assign/reassign divisions automatically - limit number of divisions to approximately: 12

Option 2. **DIV.CFG** Take DIVISION commands from your run file named DIV.CFG

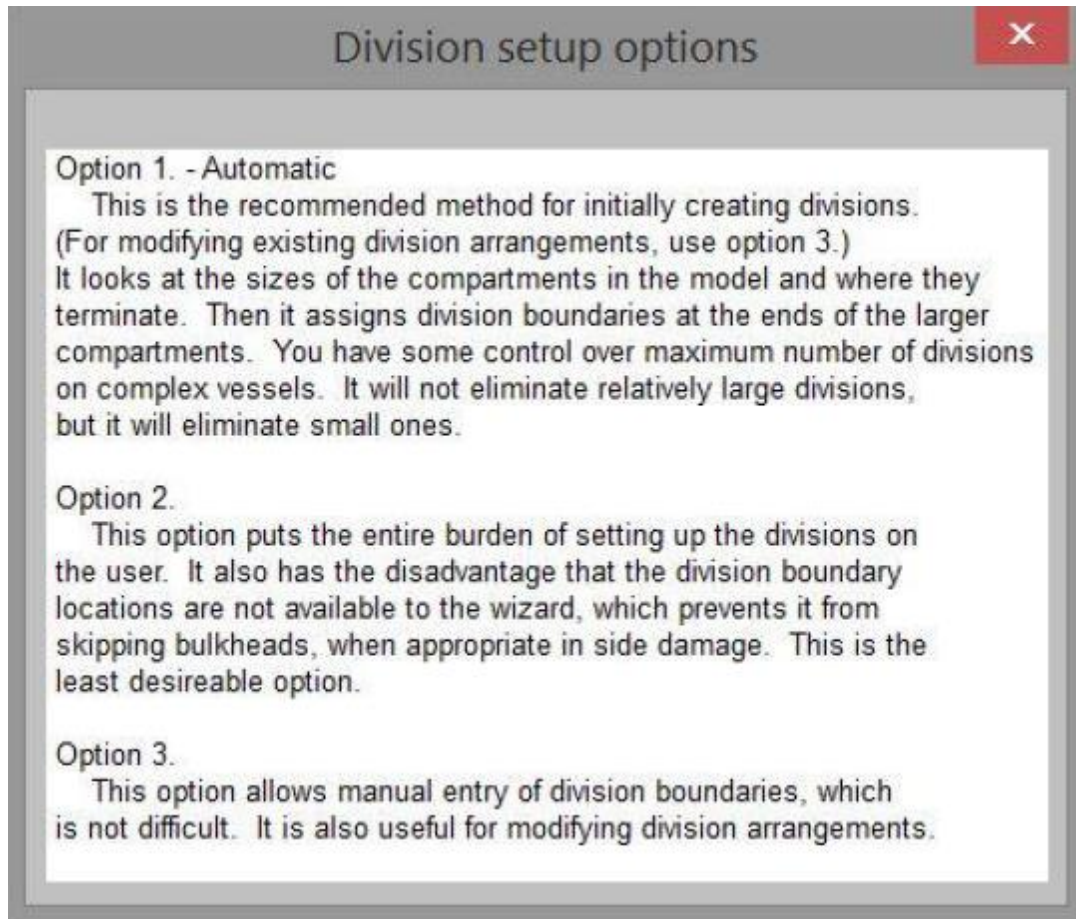
Note: If option 2 is used, the divisions established via that run file cannot be edited with Option 3.

Option 3. **Manual** Enter new or refine existing divisions

Currently there are slots allocated for 4 divisions. Number of divs to show per page: 12

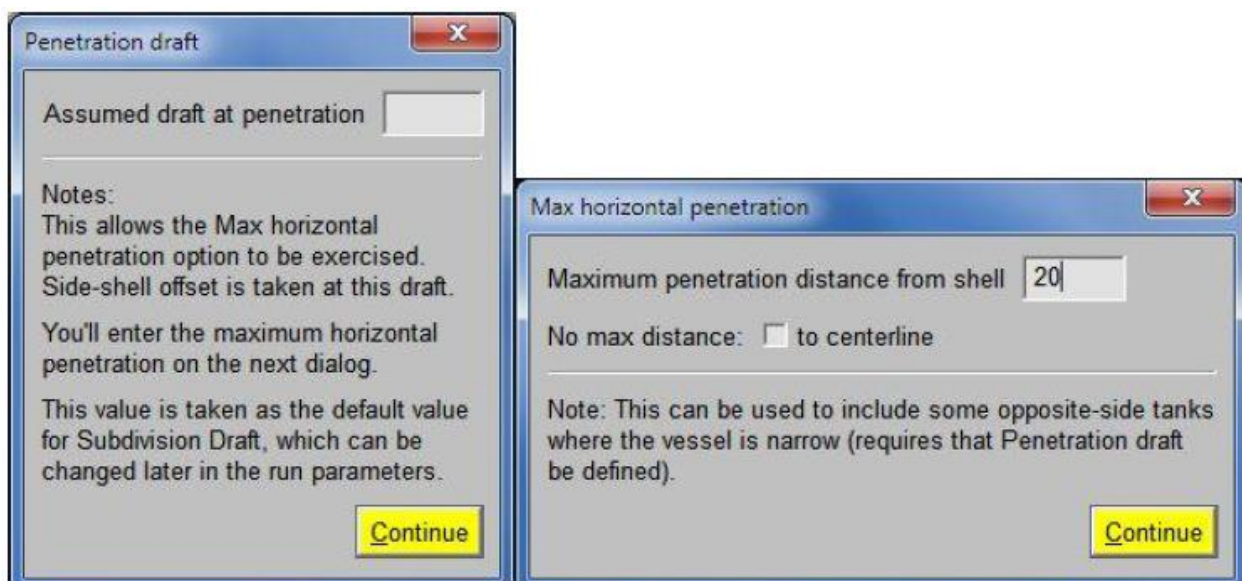
Change number of division slots to: 4 **Change**

Back to main



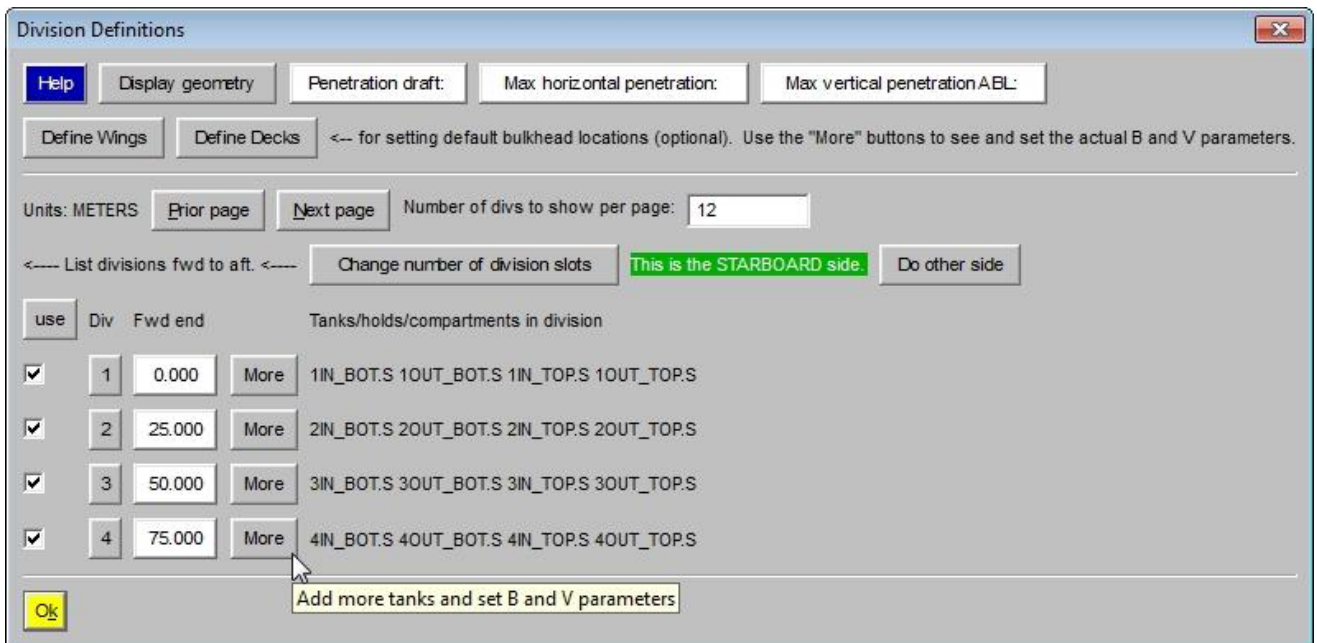
After reading about the three methods for defining divisions, close the help window and click “Auto”. The Penetration draft window will appear, followed by the Max horizontal penetration window. These two windows collect input that GHS uses to determine which tanks belong in a particular division. Clicking Continue starts a new instance of GHS, which will calculate divisions based on the geometry. That session will close, the Division Definition box will then appear, and the generated divisions will be shown.

阅读定义分舱的三种方法后，关闭帮助窗口并单击“Auto”。将出现“最大横向穿透”窗口，然后是“最大水平穿透”窗口。这两个窗口收集GHS用于确定哪些舱室属于特定分区的输入。单击继续将启动一个新的GHS实例，该实例将根据几何图形计算除分舱。该对话框将关闭，然后将显示“分舱定义”框，并显示生成的分舱。



The divisions are at the obvious locations for this vessel. Since there are only 4 divisions, the “Prior page” and “Next page” button have no effect. If you change the “Number of divs to show per page”, use the “Prior page” and “Next page” buttons to update the window rather than clicking “OK”. The “Change number of division slots” button returns to the previous window to allow the user to change the number of divisions. “Do other side” has the same effect as pressing the “Port-side Divisions” button in the previous window and is used when the arrangements are asymmetrical or port heel is expected. The “use” button give options to check a single division or to check all. The check boxes provide a way to speed up the analysis by only considering checked divisions. The tanks in each division are listed to the right of the “More” button will be discussed later.

本船分舱较为明显，由于只有 4 个分舱，Prior page” 上一页和 “Next page” 下一页按钮不起作用。当选择改变 “Number of divs to show per page”,使用 “Prior page” 和 “Next page” 按钮更新界面，而不是 “OK”。 “Change number of division slots” 按钮选项，返回到上一个窗口，本窗口允许用户改变分舱。 “Do other side” 和点击之前的窗口里的 “Port-side Divisions” 按钮具有相同的效果，当左右舷的布置不对称或者左舷需要时使用该按钮。 “USE(使用)” 按钮用于检查单个分舱或者所有分舱，检查框只适用于快速检查分舱。各分舱右边的 “More” 按钮，将在后面讨论。

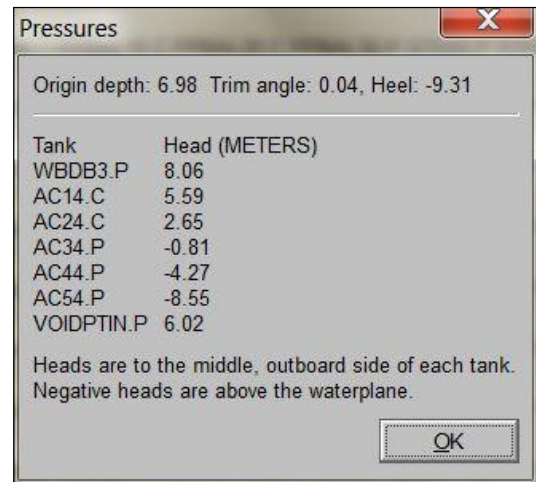


Note that in many cases, hovering the mouse cursor over a button or field will produce a pop up tip similar to the one shown for the bottom “More” button above.

请注意，在许多情况下，将鼠标光标移到某个按钮或字段将产生一个弹出提示类似于底下的 “更多” 按钮，如上图所示。

Clicking any of the numbered buttons for the first time will bring up the Load Condition menu to be discussed next. Once a loading is defined, these buttons display the dialog box shown below on the left. “Display Status” opens a Condition Graphic window illustrating the division. “Show pressures” brings up the window shown below on the right indicating the amount of head for each tank in the division. These figures are used in the calculations required to evaluate crossflooding arrangements.

第一次点击任意某字按钮将弹出下一个要讨论的装载工况菜单。装载定义后，显示左下方对话框中的按钮， “Display Status (显示状态)” 可打开分舱图形窗口。 “Show pressures” 弹出下面右图所示的窗口，显示分舱状态下每个舱室穿透深度。本操作得出的数据用于计算评估横贯装置的布置。

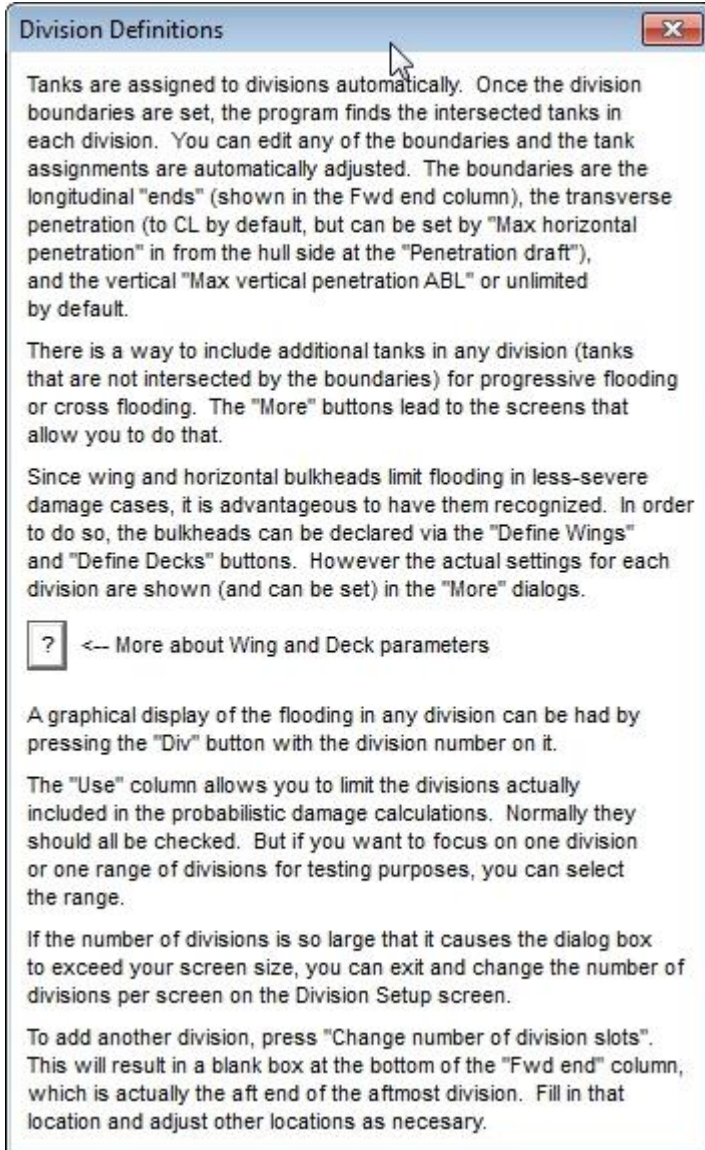


Clicking the yellow “OK” button at the bottom left of the “Division Definitions” window returns to the main menu. From the main menu, click “Load condition setup” to enter the data for one of the load conditions. If one of the “Div” buttons was clicked in the previous window, this window will appear directly.

点击“Division Definitions（分舱定义）”窗口左下角黄色的“OK”按钮返回到主菜单。在主菜单界面，点击“Load condition setup(工况设置)”进入某一装载工况数据设定。如果在之前，“DIV”按钮已被点击，那么设置界面会直接出现。

Additional information about the functions available in the Division Definitions window is available from within the wizard by clicking the blue Help button at the top left of the dialog. The template which appears is shown below.

有关“分舱定义”窗口中可用函数的其他信息，可通过单击对话框左上角的蓝色“Help”按钮在向导中获取。



出现的模板如下所示。

The wizard will locate the divisions based on the ends of the larger tanks. These locations can be edited.

向导会依据较大舱室的边界定位分舱，这些位置边界是可以编辑的。

Vertical and horizontal penetration distances can be assigned.

指定垂向和水平渗透距离。

Tanks can be added for progressive or cross flooding.

可加入舱室用于累积进水和横贯进水。

Wing and horizontal bulkheads can be set. We will ignore them for now.

可设置侧壁和水平舱壁。本练习忽略此定义。

Once the divisions are defined, the next step is to establish the load condition to be evaluated. Do do that, click on the "Load condition setup" button in the main wizard dialog.

定义分舱后，下一步是确定要评估的装载工况。为此，单击主向导对话框中的“装载工况设置”按钮。

The light ship VCG is required. In fact, none of the other buttons work until a value is entered. Enter 6.0 as a VCG. The information in the box is to establish the water plane. When the draft and trim is known, enter those values in the boxes on the left. If the weight and LCG is known, enter that in the boxes on the right and select the radio button on the right also. Since this is the empty load of a barge, we will consider this condition the Light ship condition. Click the radio button for Light ship and enter 2.0 for the draft and 0 degrees for the trim.

空船 VCG 是非常必要的，实际上，除非 VCG 输入一个值，不然其他按钮不会起作用。VCG 输入 6.0。在本对话框下建立水线面。如果吃水和纵倾已知时，在左边相应空格输入数值；如果空船重量及 LCG 已知时，在右边相应空格输入数值，并选择右边单选按钮“light ship”。由于驳船空载，考虑空船状态为空船装载工况。点击“Light ship”单选按钮，2 米吃水，零纵倾。

If in subsequent runs the loading produces a non-zero total TCG, the intact heel will not be zero. If zero heel is desired, check the zero heel box to adjust the TCG. The “Check current load status” button displays a summary of weight, centers, trim and heel. We will discuss the next three buttons in the next run when we start adding loads.

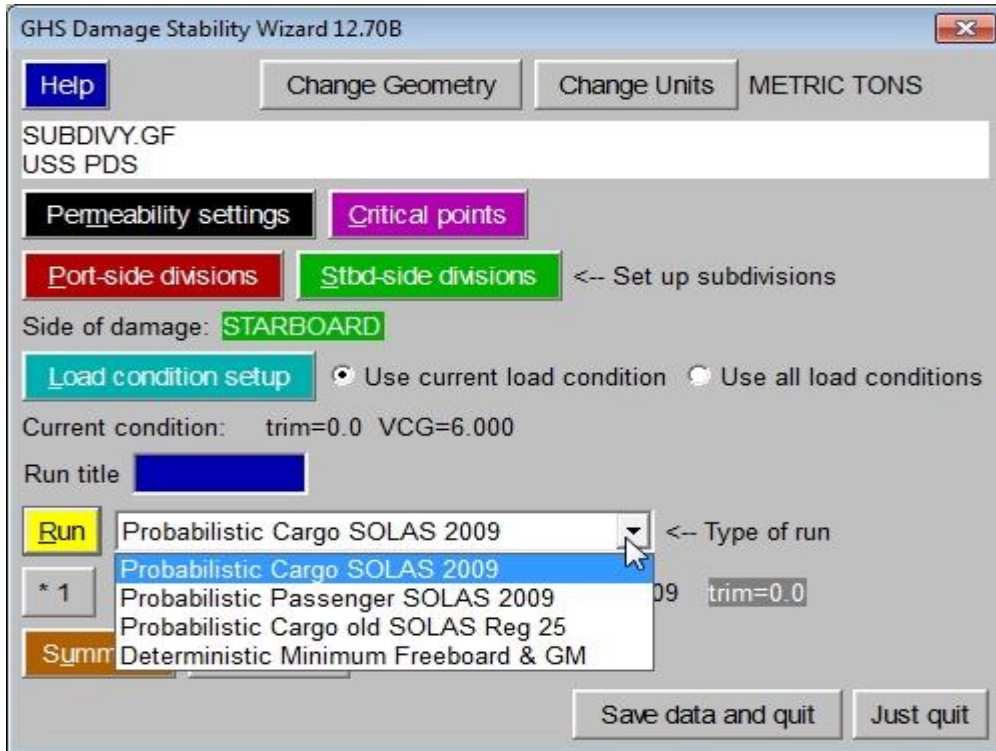
如果在随后运行装载工况时产生了一个非零总 TCG，完整工况下横倾不为零。如果想使用零横倾，检查对话框并调整 TCG。“Check current load status”可显示重量，重心，纵倾和横倾。下一次运行中我们将讨论接下来的三个按钮。

The Trial VCG is for setting an assumed VCG higher than the load case VCG. This allows the user to find a maximum VCG that still satisfies the regulations. Note that the Trial VCG should be equal to or higher than the Light ship VCG. For this exercise, use the same VCG of 6 m as there are no loads in this condition. We will see how to adjust the Trial VCG in the next run.

Trial VCG 是用于设置假定 VCG，此 VCG 需高于装载工况的 VCG。用户可以通过设置假定 VCG，得到满足规范要求的最大 VCG。注意，Trial VCG 需大于等于空船 VCG。在本练习中，由于在这种情况下没有装载，所以使用相同 6 米的 VCG。在下次运行中我们将看到如何调整试验 VCG。

Be sure to set the condition name to Light-service draft (dl). Use the “Save this condition” button before continuing. Clicking OK will return to the main menu.

确认设置该装载工况为轻载吃水（DI）。在继续之前 “Save this condition（保存此工况）” 按钮。单击确定返回到主菜单。



Select the option to Use the current condition. The trim and VCG of the current condition is shown. Enter a Run title if desired, this is optional. The title will appear in the report and the first three letters are used in the report file name. The fields for the starting page number and the page prefix trigger the Page [number] /Prefix: [code] and are also optional (see Help Page for more information).

选择使用当前装载状态选项。显示当前的纵倾和 VCG。如果需要，请输入运行标题，这是可选的。标题将显示在报表中，前三个字母用于报表文件名。起始页码和页面前缀的字段触发页面 [编号] /前缀： [code]，也是可选的（有关详细信息，请参阅帮助页面）。

For this exercise select the Type of run for cargo vessel regulations. Clicking Run brings up the corresponding box to enter the necessary parameters to execute the calculations depending on which regulation was selected.

在这个练习中选择运行规范，选择货船规范。点击“Run”运行，弹出对话框，此对话框需输入计算参数，此计算参数取决于所选中规范。

The Subdivision length is indicated on the top line by showing the locations of the ends of the divisions in geometry file coordinates. If Ls does not equal the length indicated, change the values as needed. In this case, the ends of the barge defines Ls as 100 m. The Subdivision Breadth is taken as the overall breadth of the model as a default. A different value can be entered if the Subdivision Breadth of the vessel is different.

在顶行位置通过模型分舱两端坐标显示分舱长度。假如 Ls（分舱长度）不等于指定长度，需要改正该值。本例中驳船分舱长度为 100 米，模型总宽度为默认分舱宽度，如果船舶的分舱宽度不同可以输入一个不同的值。

The Subdivision Loadline Draft is required. The pop up tip suggests the GHS manual for more information. We will use the summer load line draft of 8.5 m. A maximum vertical extent of damage can be specified, if omitted, Hmax will be computed according to the regulations. This is only applicable when using the earlier Regulation 25 rules.

需填写分舱装载吃水，弹出的提示表示通过 GHS 使用手册获取更多信息。我们使用 8.5 米夏季载重线吃水。定义最大垂向破损范围，如果省略该值，按照规范计算 Hmax，这仅适用于较早的第 25 条规定。

A Special Purpose Ship is one that carries people that are part of the ship's crew or passengers. Research ships, cable laying ships and training vessels are examples. Such ships are considered passenger ships and the special personnel are treated as passengers.

特殊用途船是指船上人员一部分是船员，一部分是乘客。例如:科研调查船，铺缆船和训练船。此类船舶视为客船或者视特殊人员为乘客的船。

SDI216 Cargo parameters

Units: METERS

Subdivision Length Terminals Aft: 100.000 Fwd: 0.000

Subdivision Breadth 40.000

Subdivision Loadline Draft []

Maximum possible vertical extent of damage above BL (Hmax) [] (optional)

Special Purpose Ship Number of persons: 500 (Normally used with the Passenger version.)

Include bottom damage probability of survival report Setup

Message to add to title page: []

Include division graphics in report

Stop after 2 simultaneous divisions flooded.

Quick mode All penetration mode

Check stability in both directions Disable user-assigned flooding

Respect division ends for flooding of inboard spaces

Take maximum RA within limited range

Include notes in report

Diagnostics S macro Launch run Back to main

Bottom damage probability of survival, required by Regulation 9, is available as an option during the initial runs for side damage and when testing certain cases. The probability of survival must not be less than 1.0 for bottom damage. The location and extents of damage are based on vessel dimensions and are the defaults. The run will terminate if the probability of survival falls below the minimum unless the user selects the option to find a lower VCG so the requirement is satisfied.

在运行初始边舱破损和测试工况期间，根据规范第 9 条，可选择计算底部破损的残存概率。底部破损残存概率不得小于 1.0。根据船舶尺寸和默认值决定破损位置和范围。运行结束，如果残存概率小于许用，用户需选择更低的 VCG，直至满足要求。

A message can be entered to be included on the title page in addition to the Run title entered in the main menu. The option to include division graphics will include a Condition Graphic plot of the flooded condition in addition to the default intact condition. The remaining inputs will be discussed later.

除了在主菜单中输入的运行标题，还可在标题页输入其他信息。除显示完整装载工况图像之外，还可显示破损工况的图像。其余的输入项将在后面讨论。

Click "Launch run" to start the calculations.

单击 "Launch run (启动运行)" 开始计算。

Discussion of Output

The wizard produces a report that is automatically displayed in the GHS preview window. This report is named DS2-n.pf where n is the number of the run. The title page includes the usual GHS header, the wizard version used to produce the report, a description of the regulation used, the load condition and a Condition Graphic image of the vessel. The particulars of each division listing the tanks in each division appear the following page(s). The flood point information is next, followed by the load condition, the permeability settings and the result summary. The results of the analysis should look like this.

向导生成的报告会显示在 GHS 的预览窗口，这个报告被命名为 DS2-n.pf，其中 n 是运行的次数。标题页中通常包含 GHS 标题，生成报告的向导版本，所使用的规范的描述，装载工况和船舶装载工况图像。在装载工况之后，显示进水点初始设置和总结表。分析结果如下。

Executing DAMSTAB /sdi216C /side:STARBOARD /L:0,100 /B:40 /DLL:8.5 /macro:PROBSURV									
PROBABILISTIC DAMAGE STABILITY MSC.216(82)									
Cargo Vessel Version									
Subdivision length: 100.000					Terminals: 0.000, 100.000a				
Breadth: 40.000					Draft: 2.000				
Subdivision load line draft: 8.500									
Divisions	P	Smin	P*S*V	A	Depth	Trim	Heel	Range	MaxRA
None	0.00000	1.000	0.000	0.000	2.000	0.00	0.00	50.21	10.625
1	0.21642	1.000*	0.216	0.216	3.351	1.08f	1.96s	22.05	9.118
2	0.18284	1.000*	0.183	0.399	2.551	0.27f	1.50s	40.72	10.541
3	0.18284	1.000*	0.183	0.582	2.073	0.27a	1.50s	40.72	10.541
4	0.21642	1.000*	0.216	0.799	1.467	1.08a	1.96s	22.05	9.117
1-division damage:				0.799	Probability of damage: 0.799				
1+2	0.06707	1.000*	0.067	0.866	5.395	2.44f	6.48s	33.78	4.703
2+3	0.06698	1.000*	0.067	0.933	2.843	0.00	4.18s	35.69	8.912
3+4	0.06707	1.000*	0.067	1.000	1.145	2.44a	6.48s	33.76	4.702
2-division damage:				0.201	Probability of damage: 0.201				
1+2+3	0.00018	0.971*	0.000	1.000	3.928	1.41f	3.60s	14.19	3.533
2+3+4	0.00018	0.970*	0.000	1.000	1.471	1.41a	3.60s	14.19	3.531
3-division damage:				0.000	Probability of damage: 0.000				
Attained index in this condition:				1.000	Total probability of damage: 1.000				
Required index:				0.492					
Values marked with * computed by macro.									
Distances in METERS.								Angles in deg.	

Under the header, the parameters used in the DAMSTAB command are given. The number of divisions damaged are shown in groups in the table. The first column "P", is the probability of being damaged. The second column is labeled "Smin" indicating the probability of survival when damaged. The label "Smin" indicates that the search for the minimum S has been performed, otherwise the column would be labeled simply "S". The "P*S*V" column is the product of P, S, and V. V is the factor for any horizontal bulkhead or

报告到此页摘要处结束。

```
===== Notes =====

Final flooding is with damaged compartments freely open to the sea
(lost buoyancy).

Max RA taken within full Range.
R1 is the non-dimensional range. M1 is the non-dimensional maximum RA.
Trace off

Div 1
1IN_BOT.S 1OUT_BOT.S 1IN_TOP.S 1OUT_TOP.S
Damaged between 0.00 and 25.00a
Final equilibrium heel: 1.96 K: 1.000
Min downflooding height is 7.548, point 84
STBD range: 22.05 R1: 1.000 max RA: 9.118 M1: 1.000
heel at downflood: 24.02 critical pt 84
S Final = 1.0000

Div 1
1IN_TOP.S 1OUT_TOP.S
Damaged between 0.00 and 25.00a
Final equilibrium heel: 0.00 K: 1.000
Min downflooding height is 9.000, point 88
STBD range: 40.68 R1: 1.000 max RA: 10.816 M1: 1.000
heel at downflood: 40.68 critical pt 84
S Final = 1.0000
```

The first section, provides comments and information pertaining to the run. After that, the intermediate results are presented, grouped by the damage cases. The tanks assumed flooded in each damage case are listed. Note that in the two cases for division 1 damage, the first group includes all the tanks and the second only includes two tanks.

第一部分是注释和运行相关信息，然后是破舱组合中间过程计算，列出各破舱工况中破损舱室。注意到分舱 1 有两种破损工况，一种包含所有舱室，另一种只包含两个舱室。

The wizard checks for all possible combinations of damage in the division. Since damage to the upper tanks may be more critical due to the higher VCG, this case is included. Only the case giving the lowest attained index is included in the summary table. This feature can be turned off by checking the box for the Quick mode in the “parameters” window. Since the regulation calls for all damage combinations to be checked, this option includes a note on the title page of the report if turned on.

向导检查所有可能的分舱破舱组合。虽然上部舱室的破损由于较高的 VCG 显得比较关键，但是这种状况依旧会被考虑。在总结表中只显示工况得到最小的指数。在“parameters（参数）”窗口，此功能可通过检查快速模式框关闭。由于规范规定需检查所有破舱组合，此选项如果开启，将会显示在报告文件的扉页。

The final equilibrium angle is used to determine K, the coefficient used to determine S-final. The lowest flood point, which determines the range of stability, is given. The range and the maximum RA values are used to find the respective non-dimensional values which are then used to calculate S final.

K 值由最终平衡角决定，最终 S 值由系数决定。给定的最低进水点决定了稳性范围角。范围角度和最大回复力臂值决定相应的无量纲值，用于计算最终 S 值。

6.0 Second Run – partial load condition 第二次运行-部分吃水工况

SOLAS probabilistic damage stability regulations don't address liquid loads in tanks, but the wizard goes beyond this particular regulation and permits them. It is the user's responsibility to know the particulars of the regulation to be evaluated and provide input and select options accordingly.

SOLAS 概率破舱稳性法规不涉及舱室中的液体装载，但向导超越了这一特定规定并允许它们。用户有责任了解要评估的法规的细节，并提供输入并相应地选择选项。

For demonstration purpose, we will add some loads to sink the vessel to the partial load draft rather than simply specifying the draft and trim. According to Regulation 2 in MSC.216(82), the partial draft exceeds the light-service draft by 60%(ds - dl). For the light-service draft of 2.0 m and the subdivision draft of 8.5 m, the partial draft is 5.9 m. The trim is the same as the subdivision draft.

出于演示目的，我们将添加一些载荷以将船舶达到部分装载吃水，而不是简单地指定吃水和纵倾。根据 MSC.216 (82) 条例 2，接下来，我们加一些装载使船达到部分吃水，部分吃水需超过轻载吃水的 60% (Ds-Dl)。轻载吃水 2.0 米，分舱吃水 8.5 米，那么部分吃水等于 5.9 米，纵倾和分舱吃水一样。

After exiting the preview window, you should be back at the main wizard window. This would be a good time to click the "Save data" button if you haven't already. To start another load case, click the "Load condition setup" button to get to the Condition Setup window. Save the light load condition using the "Save this condition button. This is not the same as the Save wizard data we just did. Now you are ready to start the next load case.

退出预览窗口，回到主向导窗口。如果你还没有准备好，最好点击“保存数据”按钮。启动另一个装载工况，点击“Load condition setup”进入工况装载设置界面。保存轻载吃水装载工况。这和我们之前保存的向导数据时不一样的，现在准备启动新的装载工况。

Click "Add loads using Load Editor" and load the inboard tanks, tops and bottoms, in divisions 1 and 4 to 95%. Then add a deck load of 6400 mt at 50 m aft, on CL and at 12 m high. Press "Solve" and the header information should look like this.

点击“Add loads using Load Editor (使用装载编辑器增加装载)”，装载分舱 1 和 4 内部，顶部和底部舱室到 95%。然后在距尾部 50 米，高度 12 米处增加 6400 吨甲板载荷。按“Solve”，标头信息如下：



Notice the VCG as loaded is 7.141 m. Close Load Editor to return to GHS and the Condition Setup window in the DAMSTAB2 wizard. Enter this value for the Trial VCG. The loaded tanks now will produce free surface effects, which can be treated as a liquid CG shift, or as a free surface correction. The equilibrium waterplane will not be effected, but the range of stability and maximum righting arms will differ slightly. Which one you use is up to you or the classification society. The results below are from a run using the FSM option. Select the Intermediate draft button, save this condition and click "Ok".

注意到此装载 VCG 是 7.141 米。关闭装载编辑器以返回到 GHS 和 DAMSTAB2 向导中的“工况 (Condition) 设置”窗口。输入此 VCG 到 Trial VCG。装载的舱室会产生自由液面影响，这可以被视为液体重心的移动或者自由液面修正。自由液面不会影响水线面，只会对稳性角度范围和最大复原力臂有轻微影响，使用哪设置取决于你或者船级社，下面的结果是使用了 FSM 选项运行。选择中间吃水按钮，保存此工况并点击“OK”。

Click "Run", check the values in the Cargo Parameters box and launch the run. The report preview will open with the changes for the new load condition. In the Status report, page 4, the light ship VCG is 5.999. This is simply a numerical difference, but it demonstrates that the Trial VCG was used as the total VCG and since the VCG of the loads are fixed, GHS adjusted the LIGHT SHIP VCG accordingly. If a higher Trial VCG was entered, then the LIGHT SHIP VCG would have been higher.

点击“Run”，检查货船参数中的值，并启动运行。报告预览可以打开新变化的装载工况。在状态报告的第4页，空船VCG是5.999米，这是简单的数值差异，表明Trial VCG已经被当做总VCG使用，此时装载的VCG是固定不变的，GHS相应的调整空船VCG。输入更高的Trial VCG，空船重量VCG会变得更

Note the permeability of 0.80 should be displayed for all tanks.

注意此时所有舱室渗透率是0.8。

Executing DAMSTAB /sdi216C /side:STARBOARD /L:100 /B:40 /DLL:8.5 /N1:500 /macro:PROBSURV									
PROBABILISTIC DAMAGE STABILITY MSC.216(82)									
Cargo Vessel Version									
Subdivision length: 100.000					Terminals: 0.000 , 100.000a				
Breadth: 40.000					Draft: 5.900				
Subdivision load line draft: 8.500									
Divisions	P	Smin	P*S*V	A	Depth	Trim	Heel	Range	MaxRA
None	0.00000	1.000	0.000	0.000	5.899	0.00	0.00	16.23	4.826
1	0.21642	0.933*	0.202	0.202	6.078	0.15f	1.92s	12.13	3.470
2	0.18284	0.894*	0.164	0.365	7.233	0.69f	4.14s	10.23	2.318
3	0.18284	0.894*	0.164	0.529	6.037	0.69a	4.14s	10.23	2.318
4	0.21642	0.933*	0.202	0.731	5.823	0.15a	1.92s	12.13	3.470
1-division damage:				0.731	Probability of damage: 0.799				
1+2	0.06707	0.743*	0.050	0.781	9.031	2.09f	9.31s	4.89	0.712
2+3	0.06698	0.000*	0.000	0.781	8.741	0.00	18.82s	0.00	
3+4	0.06707	0.743*	0.050	0.831	5.389	2.09a	9.31s	4.89	0.712
2-division damage:				0.100	Probability of damage: 0.201				
1+2+3	0.00018	0.000*	0.000	0.831	3.011	2.24f	156.46s	0.00	
2+3+4	0.00018	0.000*	0.000	0.831	-0.903	2.24a	156.46s	0.00	
3-division damage:				0.000	Probability of damage: 0.000				
Attained index in this condition:				0.831	Total probability of damage: 1.000				
Required index:				0.492					
Values marked with * computed by macro.									
Distances in METERS.								Angles in deg.	

Note: If permeability is left as the default value of 0.985, all the 2-division damage cases have an S value of 0.

注意：如果省略此渗透率，会采用默认渗透率0.985，那么所有两舱制破损时的S值为0。

The probability of damage is the same since the divisions are the same. The probability of survival has decreased. For the case with divisions 2 and 3 flooded, there is no range of stability due to the flood points, therefore the chance of survival is zero. When 3 divisions are flooded, the vessel capsizes.

分舱相同破损的概率相同。残存概率减少。由于分舱2和3破损工况，由于进水点使角度范围不满足要求，因此次工况残存概率为0，残存概率减少。三舱制破损，船已倾覆。

Baseline draft: 6.082 @ Origin, Trim: Fwd 0.15 deg., Heel: Stbd 1.92 deg.							
Part			Weight(MT)	LCG	TCG	UCG	
LIGHT SHIP			8.200.00	50.000a	0.000	6.000	
DECK LOAD 1			6.400.00	50.000a	0.000	12.000	
Total Fixed			14.600.00	50.000a	0.000	8.630	
	Load	SpGr	Weight(MT)	LCG	TCG	UCG	FSM
1IN_BOT.P	0.950	1.025	1,198.93	12.472a	4.941p	2.376	2106.93
1IN_TOP.P	0.950	1.025	1,198.93	12.472a	4.941p	7.376	2106.93
4IN_BOT.S	0.950	1.025	1,198.93	87.472a	5.059s	2.376	2106.93
4IN_TOP.S	0.950	1.025	1,198.93	87.472a	5.059s	7.376	2106.93
4IN_BOT.P	0.950	1.025	1,198.93	87.472a	4.941p	2.376	2106.93
4IN_TOP.P	0.950	1.025	1,198.93	87.472a	4.941p	7.376	2106.93
Total Tanks			7,193.58	62.472a	1.600p	4.876	12641.56
Total Weight			21,793.58	54.117a	0.531p	7.391	
			Displ(MT)	LCB	TCB	UCB	RefHt
HULL		1.025	24,411.21	49.643a	0.749s	2.990	-6.078
1IN_BOT.S	Flooded	1.025	-1,025.00	12.500a	5.000s	2.500	-6.078
10UT_BOT.S	Flooded	1.025	-1,025.00	12.500a	15.000s	2.500	-6.078
1IN_TOP.S	Flooded	1.025	-249.51	12.391a	5.229s	5.612	-6.078
10UT_TOP.S	Flooded	1.025	-318.12	12.414a	15.180s	5.779	-6.078
Total Displacement		1.025	21,793.58	54.106a	0.383p	2.965	
Righting Arms:				0.001	0.000s		
RIGHTING ARMS vs HEEL Total CG: LCG = 54.118a TCG = 0.550p UCG = 7.971							
Depth	Trim°	Heel°	Displ(MT)	RA0	RA0	FP Ht	
6.079	0.15f	1.92s	21,793.58	0.000	0.000	4.413(84)	
6.440	0.47f	6.92s	21,793.62	0.000	1.488	2.645(84)	
6.781	0.81f	11.92s	21,793.71	0.000	2.986	0.837(84)	
6.991	0.98f	14.04s	21,793.76	0.000	3.468	0.001(84)	
7.318	1.19f	16.92s	21,796.04	0.000	3.910	-1.200(84)	
7.989	1.62f	21.92s	21,793.57	0.000	4.217	-3.394(84)	
8.147	1.73f	23.07s	21,793.58	0.000	4.224	-3.904(84)	
8.641	2.08f	26.92s	21,789.75	0.000	4.139	-5.587(84)	
9.193	2.49f	31.92s	21,793.58	0.000	3.854	-7.714(84)	
9.665	2.88f	36.92s	21,793.77	0.000	3.446	-9.772(84)	
10.075	3.27f	41.92s	21,793.76	0.000	2.956	-11.759(84)	
10.417	3.64f	46.92s	21,793.76	0.000	2.410	-13.660(84)	
10.684	3.99f	51.92s	21,793.74	0.000	1.826	-15.457(84)	
10.873	4.31f	56.92s	21,793.72	0.000	1.214	-17.137(84)	
10.976	4.59f	61.92s	21,793.70	0.000	0.585	-18.684(84)	

True FSM artifice used.

The equilibrium heel angles are the same. Only the free surface effects from the loaded tanks are present. The free surface effects of the flooded tanks are not included. The lowest flood point is point #84 at 4.415 from the wizard, 4.413 from GHS. The range is from equilibrium to the point of down flooding, 12.13 from the wizard, 12.12 from GHS. The maximum righting arm is 3.470 from the wizard, 3.468 from GHS.

平衡横倾角相同。仅显示装载舱室的自由液面影响，不包含破损舱室的自由液面影响。最低进水点是#84，在向导内高度 4.413，在 GHS 中 4.413。从平衡点到进水点的范围角，在向导内是 12.13，在 GHS 中 12.12。最大复原力臂在向导中是 3.470，在 GHS 中是 3.468。

7.0 Third run – Subdivision draft condition 第三次运行-分舱吃水工况

Repeat the steps above to add a fixed weight of 10660 mt at 50 m aft, on CL, and 14 m high. Be sure to reset the Trial VCG. After reviewing the report file, return to the main wizard program and click the “Summary” button. This produces a summary of all three runs.

重复上述步骤，在船尾 50m 处，船中，14m 高处增加固定重量 10660 吨。确定重新设置 Trail

Summary for SDI216C - Probabilistic Cargo SOLAS 2009 trim:0.00							
Run 1-1 Light-service draft (dl)	Starboard	trim:	0.00	att index:	1.000		
Run 2-1 Intermediate draft (dp)	Starboard	trim:	0.00	att index:	0.831		
Run 3-1 Deepest draft (ds)	Starboard	trim:	0.00	att index:	0.000		
Warning: This attained index is less than the minimum $0.5 \times 0.492 = 0.246$							
Draft	@LCF	Attained	Factor	Weighted	VCG	FSM	VCG+
dl	2.00	1.000	0.2	0.200	6.000	0	6.000
dp	5.90	0.831	0.4	0.332	7.141	16827	7.837
ds	8.50	0.000	0.4	0.000	9.239	16827	9.722
Attained index:					0.5324		
Required index:					0.4920		

VCG。检查报告之后，返回主向导程序，点击 “Summary” 按钮，生成所有三个运行文件的总结。

The individual attained indexes are present. Since the third one did not meet the requirement that it must be at least 50% of the required, a warning is given. The three attained indexes are then combined in a weighted summation to find the overall attained index. Since it is greater than the required index, no warning is given.

显示各自得到的指数。由于第三个指数没有满足 50%指数的要求，发出警告。三个达到指数整合成一个总达到指数，由于它大于要求指数，没有发出警告。

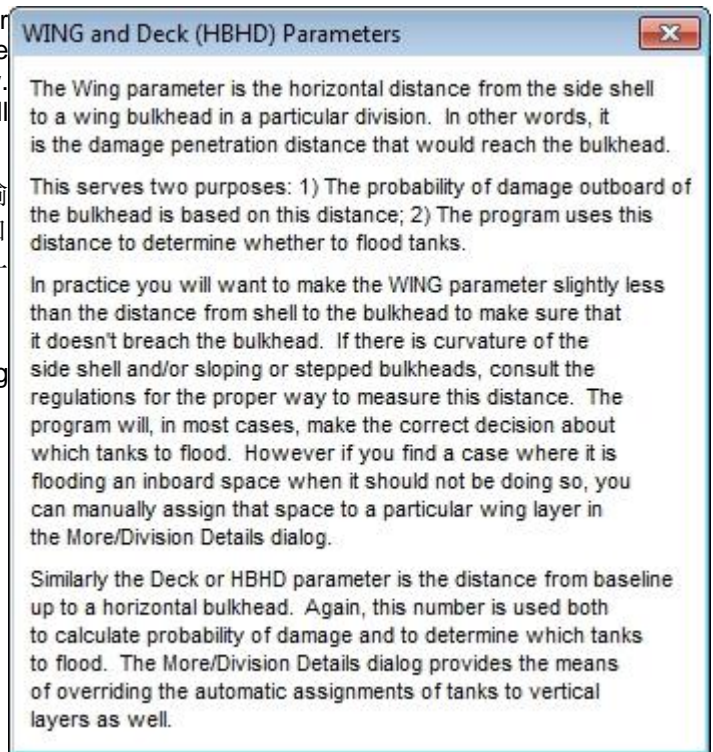
Add Wings and Bulkheads 添加侧壁和舱壁

To see if the wing and horizontal bulkheads offer any benefit, the location and distances must be entered. Return to the Division Definition Window. Opening the help button and clicking on the “?” will display some helpful information.

增加侧壁和舱壁看是否有利于破损计算，输入时需输入位置和距离。回到分舱定义窗口。打开帮助按钮，然后点击“？”会显示一些有用的信息。

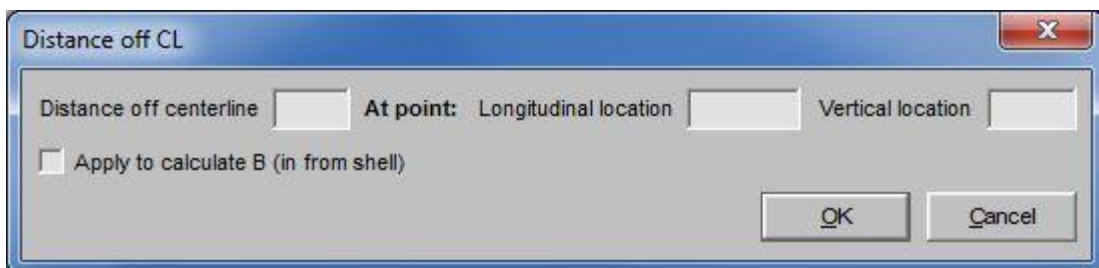
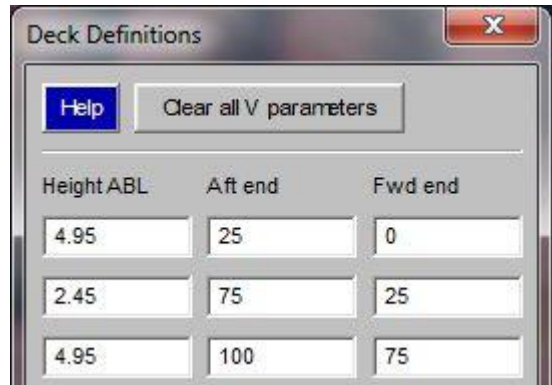
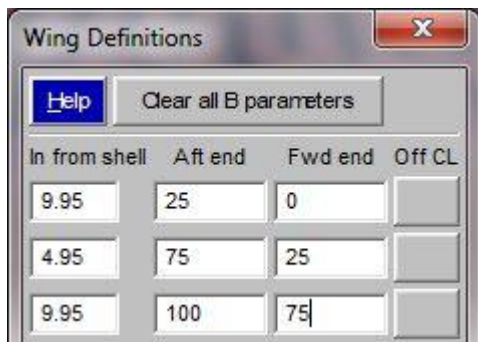
The regulations need to be consulted for sloping and stepped bulkheads.

规范需考虑斜舱壁和阶梯式舱壁。



There are two ways to enter the locations of these bulkheads. Returning to the Port-side or Stbd-side Division windows and selecting option 3, Manual, the Define Wings and Define Decks buttons will display a table for the distances and locations. As recommended above, the distances are slightly less than the actual distances. For our vessel, the entries would be as follows.

有两种方式输入这些舱壁位置。返回左舷或右舷分舱窗口，选择选项3“Manual（手动）”，提供定义侧壁定义和甲板位置和距离的表格。如上所建议，设置距离比实际距离略小。对于本船，输入数据如下：

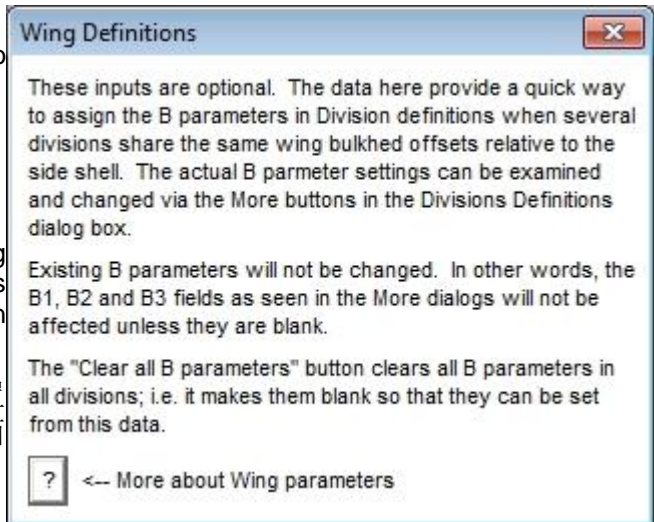


The help window explains how to enter the data into the tables.

帮助窗口提示如何将数据输入到表中。

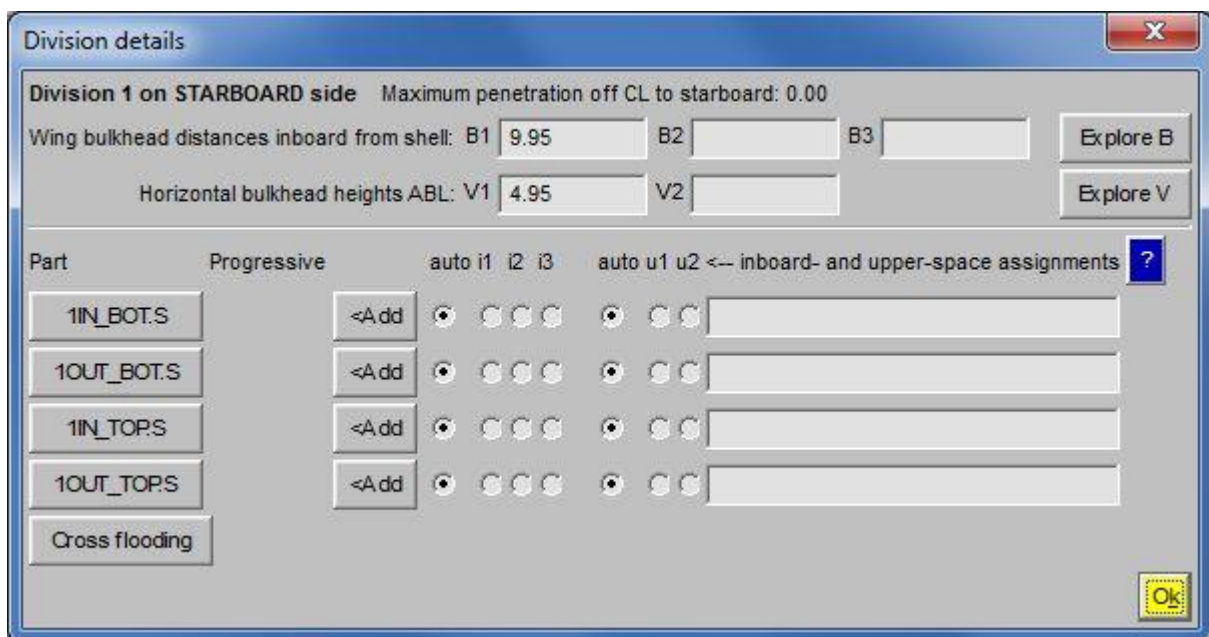
For this vessel, defining the wings and decks using the table above is adequate. Once set, the values entered can be checked by clicking the More button in the Division Definition window.

对于本船，定义侧壁和甲板如上表所示。设置完毕，输入的数据可以通过点击分舱定义界面“More”按钮进行检查。



Using the More button for each division allows you to assign these locations on a division by division basis. This is helpful when there are canted bulkheads near the ends of a vessel.

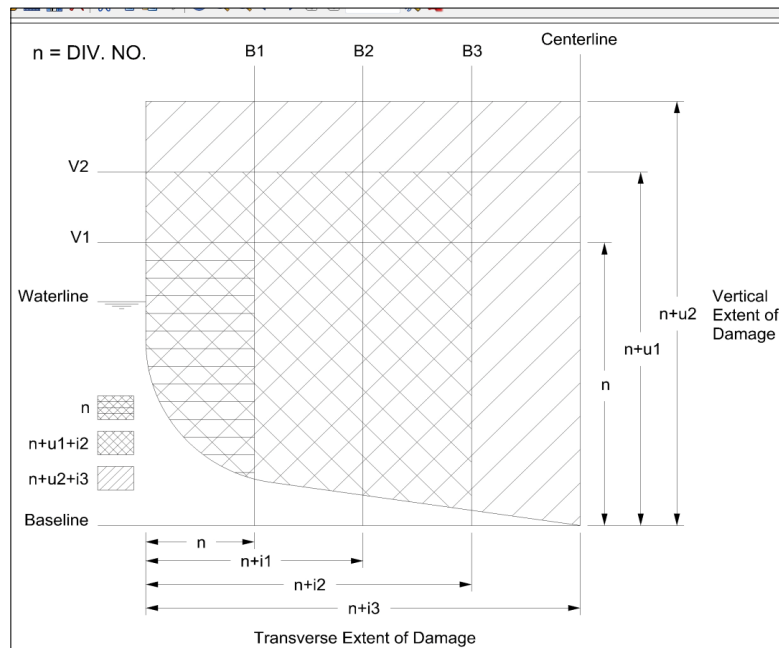
使用“More”按钮，每个分舱允许在分舱基础上指定位置，这么做有利于船首尾斜舱壁的分舱。



The bulkhead and deck location for this division is displayed in B1 and V1. Tanks inboard of B1 are automatically assigned to i1, tanks inboard of B2 are assigned to i2, tanks above V1 are assigned to u1 and so on. The automatic assignments can be overridden with the radio buttons. If this is done, a comment can be made in the space provided. The diagram below illustrates the damage extents of the different layers using the terminology that will appear in the reports.

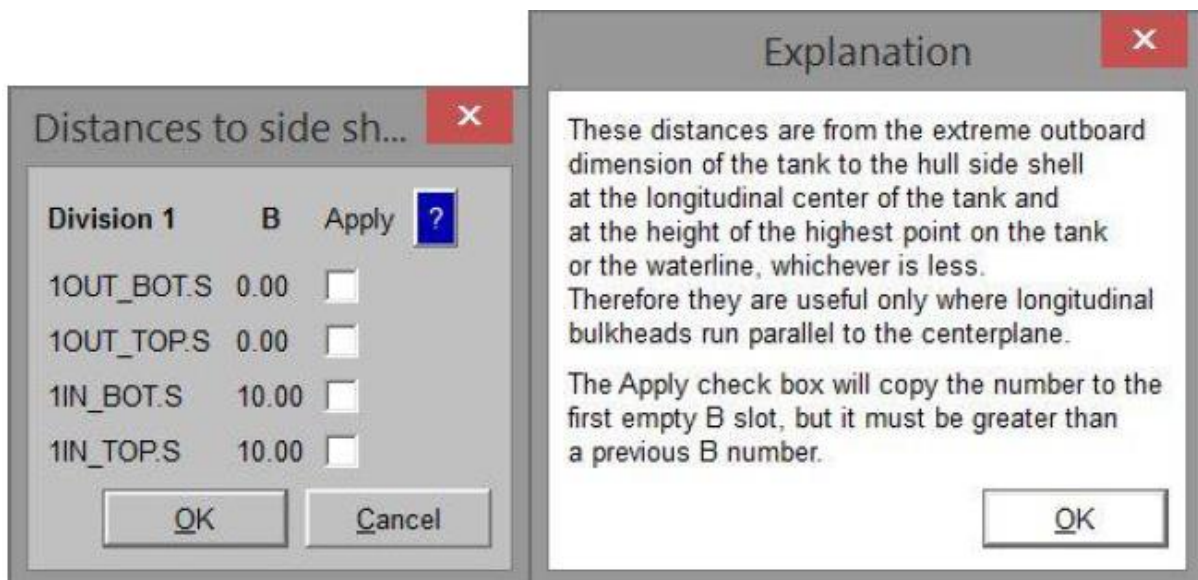
我们可以看到在此分舱区域内舱壁和甲板位置分别显示在 B1 和 V1。B1 舷内的舱室自动分配给 i1，B2 的舷内舱室自动分配给 i2，V1 以上的舱室分配给 u1，依此类推。可以使用单选按钮覆盖

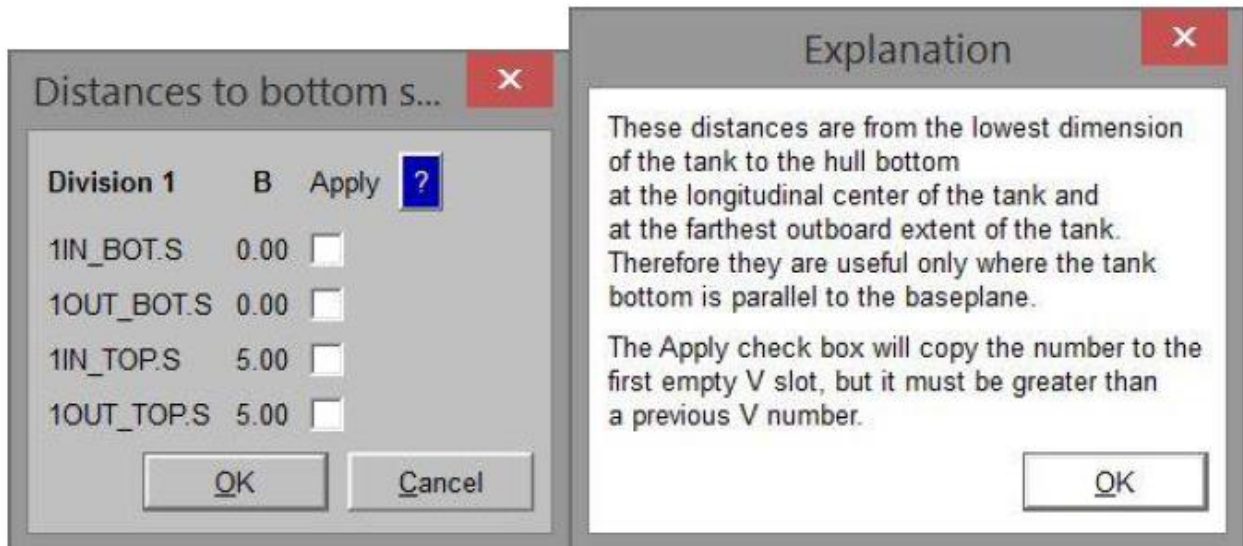
自动分配。如果这样做，可以在提供的空间提供备注。下图使用将在报告中显示的术语说明了不同图层的破损程度。



The explore B and V buttons can be used to have the wizard pick out some of the tank border that might make sensible wings or bulkheads. The user has the final choice of which of the boundaries to choose. The dialog boxes and their respective help windows are shown below.

探索 B 和 V 按钮可用于让向导挑选出一些可能构成合理侧向或舱壁高度的舱室边界。用户可以最终选择选择哪个边界。对话框及其各自的帮助窗口如下所示。





The wizard provides two methods to expand the division tanklist: "Additional tanks" and "Progressive Flooding". Both options are accessed from the division details window, click "More" in Division Definitions. Each is described by a note once the button is clicked. No time calculation is performed for either option.

该向导提供了两种方法来扩展舱室列表：“附加舱室”和“累积式进水”。这两个选项都可以从分部详细信息窗口访问，单击分舱定义中的“More”。单击按钮后，每个都由注释描述。不会对任一选项执行时间计算。

The “Additional tanks” button permanently adds a tank to a division regardless of its location. During the calculation it will be automatically be damaged depending on the longitudinal and vertical extent of damage just like any other tank in the division.

“附加舱室”按钮将舱室永久添加到列表中，无论其位置如何。在计算过程中，它将根据纵向和垂直破损程度自动损坏，就像该列表中的任何其他舱室一样。

The progressive flooding buttons (" $<$ Add") are more specific. Each button selects an additional tank(s) to be damaged when the tank it is associated with is damaged. Progressive flooding tanks do not have to be located within the division boundary. If the linking tank isn't damaged due to the extent of damage, then the specified tank will likewise not be flooded for that extent. See the discussion of + prefix in the operation section of Help DIVISIONS for more information. An option to perform intermediate flooding only in the progressive flooding tanks is provided as an option before launching the run for passenger vessels.

累积式破舱按钮（“ $<$ 添加”）更具体。每个按钮都会选择一个与其关联的舱室破损时要破损的其他舱室。累积式破损舱室不必位于分区边界内。如果连接舱室没有因破损程度而破损，则指定的舱室同样不会在该程度上被淹没。有关详细信息，请参阅“帮助分舱”的操作部分中对 + 前缀的讨论。在开始客船运行之前，提供了仅在累积式溢流舱中进行中间溢流的选项。

Accepting the input above, click Ok to return to the Division Definition window, click Ok again to return to the main window to rerun the deepest draft case. Looking at the report shows that an attained index of 0.106 was achieved. The previous run produced an attained index of zero. Including the wing and deck locations did improve the attained index, however, the vessel still fails.

完成上述输入后，单击确定返回到分舱定义窗口中，再次单击确定返回到主窗口，重新运行最深吃水工况。综观报告显示，得到 0.106 的达到指数，之前的计算的达到指数是 0。加入侧壁和甲板位置提高了达到指数，但是，该船稳性仍然不满足要求。

8.0 Passenger Vessel Exercise 客船练习

For this demonstration, a simplified passenger vessel with tanks and critical points will be used. It is in the LINER14.GF geometry file. Before starting this new sequence of stability assessments with the DAMSTAB2 wizard, create a new working directory containing the geometry file. It is helpful to have a shortcut for GHS in this folder too.

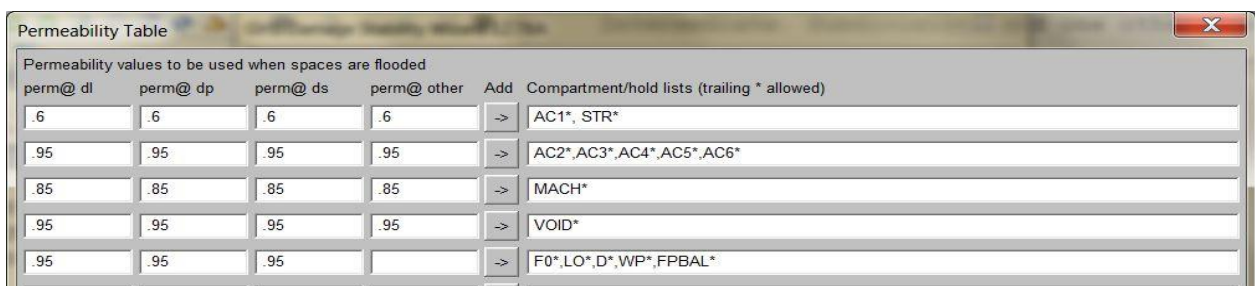
本演示中，计算简单客船，此客船带有舱室和进水点，模型在 LINER14.GF 模型文件中。在开始用 DAMSTAB2 向导进行一系列稳性分析之前，创建包含模型文件的新文件夹，在此文件夹下建立一个 GHS 快捷方式便于使用。

As is always the case when starting fresh with a new geometry file, we must setup the model in the wizard which includes setting the following: permeability for tanks, critical points, division definitions and vertical and horizontal bulkhead locations (for each division if not continuous). The process below is covered in less detail since this has already been covered with the SubDivy model. A few notes are provided as well as a set of screen shots to use as a guide.

一般在建立新模型时，模型向导需设置以下参数：舱室渗透率，进水点，分舱定义和纵向垂向舱壁位置定义（如果不连续，需定义每个分舱）。因为很多详细参数已经被 SubDivy 模型定义，下面的过程将不再详细介绍，一些注意事项和截图作为指导。

Permeability settings – There are two available methods to set the permeability for the internal compartments. The first is to select the “Use Table” option and copy the permeability settings as follows:

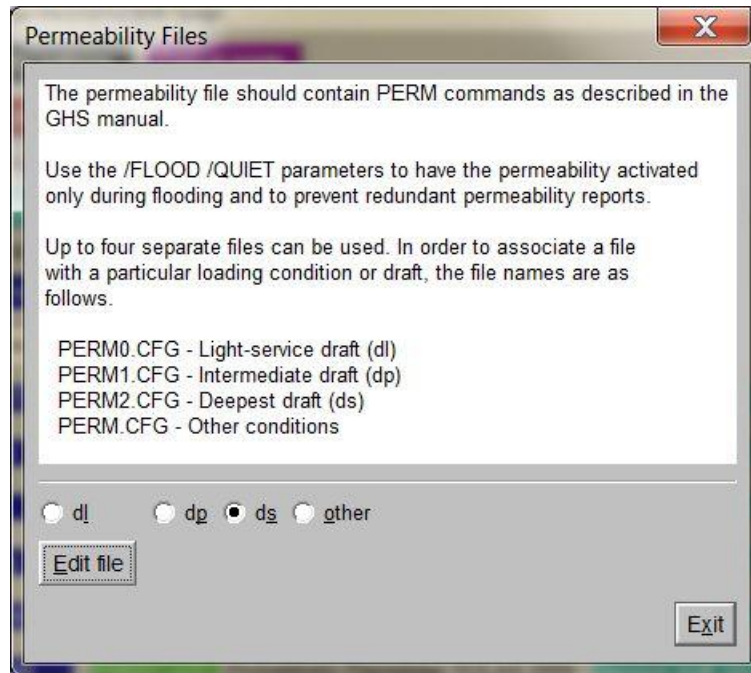
渗透率设置-设置内部渗透率有两种方法，第一种，选择“Use Table”选项，复制渗透率如下所示：



perm@ dl	perm@ dp	perm@ ds	perm@ other	Add	Compartment/hold lists (trailing * allowed)
.6	.6	.6	.6	->	AC1*, STR*
.95	.95	.95	.95	->	AC2*,AC3*,AC4*,AC5*,AC6*
.85	.85	.85	.85	->	MACH*
.95	.95	.95	.95	->	VOID*
.95	.95	.95		->	F0*,LO*,D*,WP*,FPBAL*

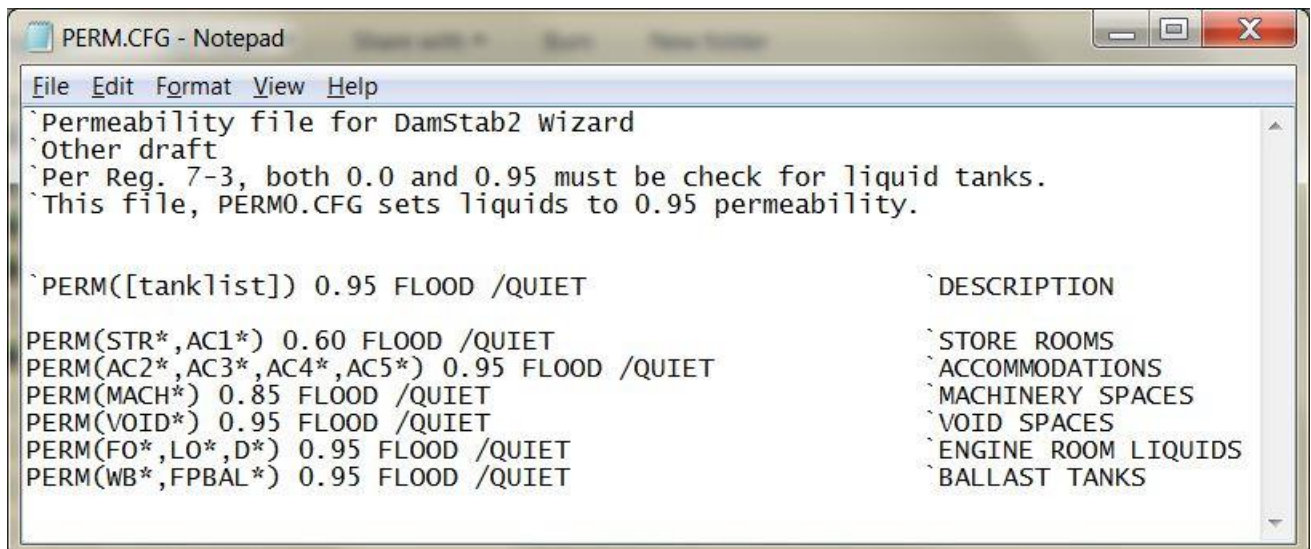
The second option is to select a text file, which lists the permeability for each tank. If this option is used, a file must be generated for each draft and named according to the instructions in the wizard.

第二种，选择文本文件，文件中列出每个舱室的渗透率。如果选择该选项，必须设置各个吃水的运行文件且该文件需根据向导指南命名。



An example of a permeability file is shown in the image below:

渗透率样例文件，如下图所示：



Critical points – Since the downflooding points are already set up in the geometry file they do not need to be entered into the Wizard again. The existing points in the GF file can be verified by clicking on “List Existing Critical Points”. Additional critical points and special critical points can be added within the Wizard and both sets of points will be considered.

进水点 – 由于进水点已在模型中定义，向导无需再次定义。已定义的模型进水点可以通过点击“List Existing Critical Points”进行检查核实，额外的进水点和特殊进水点可通过向导设置，两种设置方法都有效。

Port divisions – Use the Auto division maker with 11 divisions. Enter the subdivision draft (6.0 m) when prompted for the penetration draft. After pressing continue, enter the maximum penetration distance from the shell. The regulations state this value should be $beam/2$, which for the LINER14.GF is 14.15 meters.

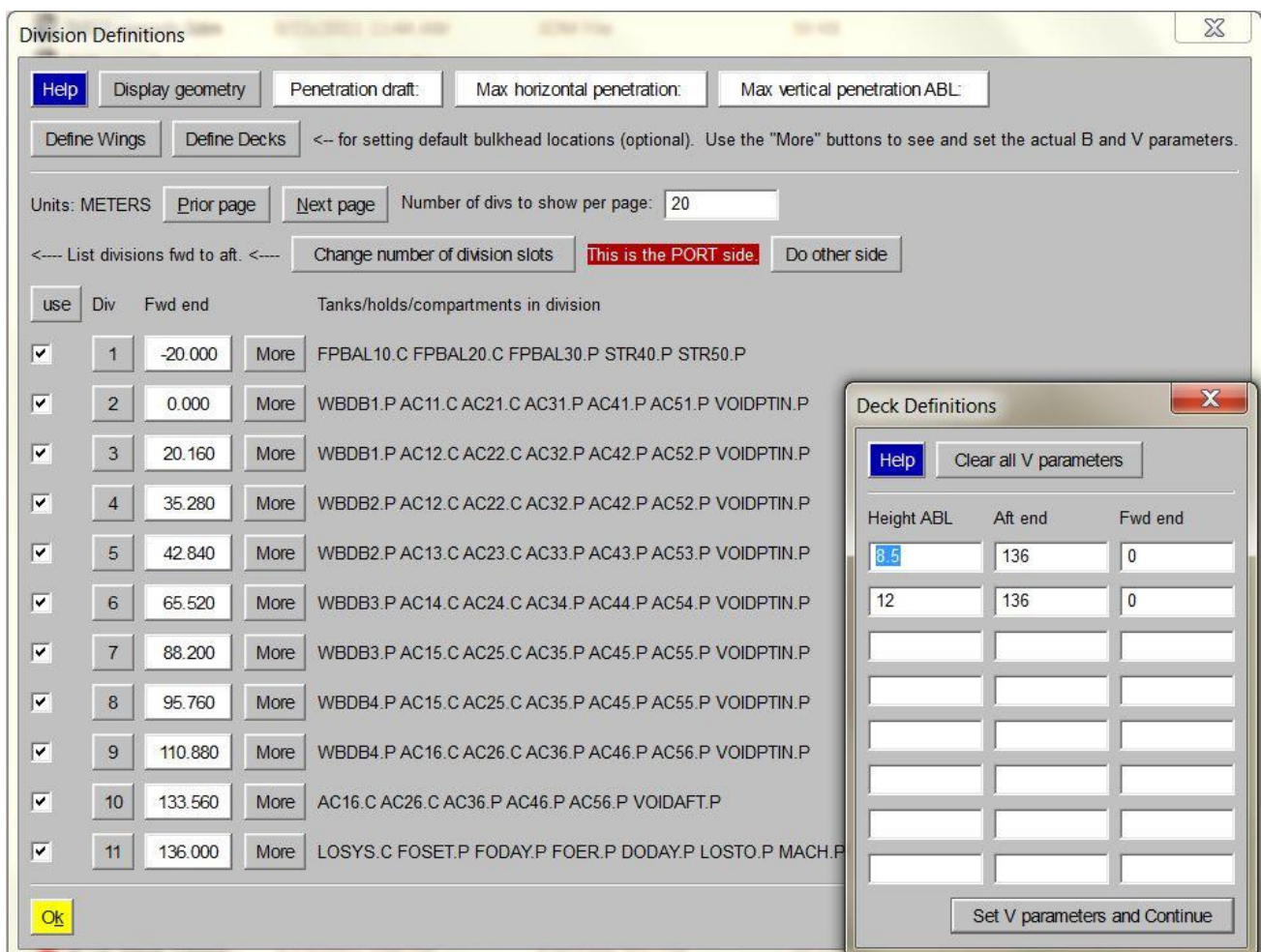
左舷分舱 - 采用自动划分, 划分 11 个分舱区域。当提示输入分舱吃水时, 则输入分舱吃水 (6.0 m)。按继续后, 输入与舱室的最大穿透距离。法规规定该值应为船宽/2, 对于 LINER14.GF 为 14.15 米。

Next we need to set the deck definitions for the two decks above the subdivision waterline, which is 6.0 m. The first two decks above the waterline are located at 8.5 and 12.0 m above the baseline. Enter these values into the “Define Decks” window along with the longitudinal extent of the decks which is 0 to 136a.

接下来我们需要为水线以上的两层甲板定义, 水线是 6 米, 这两层甲板分别距基线高 8.5 米和 12.0 米, 在 “Define Decks (甲板定义)” 输入这些值, 同时输入纵向延伸长度从 0 到 136a。

Starboard divisions – select “Do other side” → Stbd → then click “Auto” and “Continue” to generate the division definitions on the Starboard side. Again set the deck definitions.

右舷分舱 - 选择 “Do other side” → STBD → 然后点击 “Auto” 和 “Continue” 生成右舷的划分定义。再次设置甲板定义。



We are almost ready for our first run, the next step is to set up and save the following three load conditions and save all our files thus far.

第一次运行准备基本完成, 下一步就是建立并保存以下三个装载工况以及迄今所有设置值。

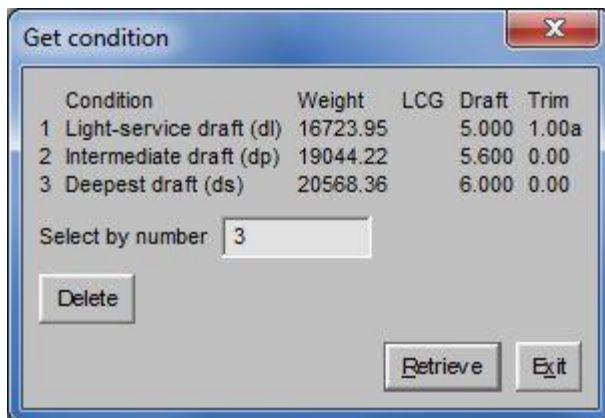
The draft and trim values for the Light-service (dl), Intermediate draft (dp), and Deepest draft (ds) follow:

轻载吃水 (Dl) , 部分吃水 (Dp) 和最深吃水 (Ds) 吃水和纵倾如下:

1. Light-service (dl)	5.0 m	1.0 degrees aft trim
轻载吃水 (dl)	5.0m	船尾纵倾 1.0 度
2. Intermediate draft (dp)	5.6 m	0.0 degrees aft trim
部分吃水 (dp)	5.6 m	船尾纵倾 0.0 度
3. Deepest draft (ds)	6.0 m	0.0 degrees aft trim
最深吃水 (ds)	6.0 m	船尾纵倾 0.0 度

Both the Lightship VCG and the Trial VCG should be set to 9.0 meters.

无论是空船 VCG 还是试验 VCG 都应设置到 9.0 米。



Set up the "SDI216 Passenger parameters" window with the values as shown. For a vessel this size, 1000 passengers is a good estimate. Be sure to click, "Includes notes in report". This prints the Survival Probabilities for each set of damages tanks for each division.

按如下值设置“SDI216 Passenger parameters”参数。基于本船尺寸，预估载有 1000 名乘客。确认点击“Includes notes in report”，输出每组分舱破损时的残存概率。

SDI216 Passenger parameters

Units: METERS

Subdivision Length Terminals Aft: 156.240 Fwd: -20.000

Subdivision Breadth 28.307

Subdivision Loadline Draft 8.000

Maximum possible vertical extent of damage above BL (Hmax) (optional).

Maximum number of passengers 1000 Maximum beam: 28.307

Special Purpose Ship

Survival Craft heeling moment 0 METRIC TONS-METERS

Number of passengers for whom lifeboats are provided 1000

Number of persons in excess of lifeboat capacity 0

Include intermediate stages of flooding Do stages only in progressive flooding

Passenger crowding moment <-- Leave blank for automatic calculation based on Max number of passengers.

Wind heeling moment <-- Leave blank for automatic calculation of wind heeling moment.

Include side damage probability of survival report Setup

Include bottom damage probability of survival report Setup

Message to add to title page: Starboard All Divisions

Include division graphics in report

Stop after 2 simultaneous divisions flooded.

Quick mode All penetration mode

Check stability in both directions Disable user-assigned flooding

Respect division ends for flooding of inboard spaces

Take maximum RA within limited range

Include notes in report

Diagnostics S macro

Launch run Back to main

The information needed and options available for a cargo vessel run are the same for a passenger vessel. There are additional parameters needed for a passenger vessel run. The prompts for, “Maximum number of passengers”, “Survival Craft heeling moment”, the “Number of passengers for whom lifeboats are provided” for and the “Number of persons in excess of lifeboat capacity” are self explanatory.

货船所需的信息以及可供运行选项，对客船来说是相同的。运行客船向导需要额外的参数，对提示词“乘客上限人数”，“救生艇筏横倾力矩”，“提供乘客救生艇的人数”和“超过救生艇容量人数”进行声明。

The options to include intermediate stages of flooding as required by SOLAS for passenger ships is located in the middle of the window. Three methods are available which govern how intermediate stages are applied to the tanks in the division.

根据《海上人命安全公约》对客船的要求，包括中期进水的选项位于窗口中间。有三种方法可用于控制如何将中间阶段应用于列表中的舱室。

1. **Intermediate flooding of all tanks in damage extent** - One stage of flooding with intermediate phases of flooding applied to all tanks in the current damage extent. Includes tanks added to a division as progressive flooding tanks or additional tanks.
 1. 所有舱室在破损范围内的中间进水 — 一个阶段的进水，中间的进水阶段适用于当前破损范围内的所有舱室。包括作为累积式进水舱室或附加舱室添加到列表的舱室。
 2. **Do stages only in progressive flooding tanks** - Flooding stage is any discrete step during the flooding process, including the stage before equalization (if any) until final equilibrium has been reached. This method assumes instantaneous flooding of all tanks within the extent of damage that are not designated as progressive flooding tanks.
 2. 仅在累积式进水阶段 — 淹没阶段是进水过程中的任何步骤，包括平衡之前（如果有）的阶段，直到达到最终平衡。该方法假设在未指定为累积式进水舱室的破损范围内对所有舱室进行瞬时淹没。
 3. **Exclude progressive flooding tanks from intermediate flooding calculation** — regulations state that intermediate should be calculated for all flooding stages including the stage prior to equalization via crossflooding. If cross-flooding tanks are assigned using the <Add button (or + prefix in div.cfg) then this provides a way to calculate S_i for all non-progressive tanks. Any progressive flooding tanks which are omitted from intermediate phases of flooding are reported in the notes section.
 3. 将累积式进水舱室排除在中间进水计算之外 — 法规规定，应计算所有进水阶段的中级，包括通过交叉调平之前的阶段。如果使用<添加 Add 按钮（或 div.cfg 中的+前缀）分配左右舷交叉调平舱室，则提供了一种计算所有非渐进式舱室 S_i 的方法。在进水的中间阶段省略的任何渐进式进水舱室都在注释部分报告。

Passenger crowding moment can be given to override the moment computed from the number of passengers and maximum beam. Wind heeling moment can be specified if the superstructure is not included in the model or determined by other means.

乘客移动力矩可通过乘客人数和最大船宽计算。如果模型不包含上层建筑直接定义风倾力矩，或者通过其他方式定义。

Like the bottom damage probability of survival for cargo vessels, passenger vessel are also subject to side damage probability of survival. The side and bottom damage calculations for passenger vessels are required per Regulations 8 and 9. The probability of survival must not be less than 0.9 or 1.0 for side or bottom damage respectively. The location and extents of damage are based on vessel dimensions and are the defaults. The run will terminate if the probability of survival falls below the minimum unless the user selects the option to find a lower VCG so the requirement is satisfied.

除类似货船进行底部破损残存概率计算，客船还需计算边舱破损的残存概率。根据规范第 8 和 9 条规定，客船需计算底部破损和边舱破损，边舱和底部破损残存的概率分别不得小于 0.9 和 1。破损的位置和范围根据船型尺寸是默认的。运行结束，如果残存概率小于许用，用户需选择更低的 VCG，直至满足要求。

S report (Reg 8)

Damage length Penetration inboard Vertical extent

Penetration draft

Starting at location (fwd) Ending at location (aft) Skip division bulkheads

Include STATUS reports

Stop if least S is less than Lower VCG rather than stop

Ignore hull deductions

S report (Reg. 9 - Bottom Damage)

Damage length Shift damage location by of damage length.

Starting at location (fwd) Ending at location (aft) 0

Transverse extent Fwd of location Transverse extent Aft of that location

Shift damage location by of damage width.

Vertical extent Start at shell Maximum shell above BL

Include STATUS reports

Stop if least S is less than Lower VCG rather than stop

For areas of the vessel that are covered by a double bottom, assign areas to omit using the template below. These areas will not be included in the deterministic bottom damage assessment.

对于双层底覆盖的舱室区域，请使用以下模板指定要省略的区域。这些区域将不包括在确定性底部损坏评估中。

Areas to omit from the bottom damage assessment

Areas to omit are rectangular, bounded longitudinally between L1 and L2, and transversely between T1 and T2. They can be used to identify areas which are protected by a double bottom.
 $L1 < L2$. $T1 < T2$.

Area	L1	L2	T1	T2
1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

9.0 Run Options 运行选项

The bottom area of the window covers the following options. They are the same for both cargo vessels and passenger vessels.

窗口的底部包含以下选项，货船和客船选项都是相同的。

- Stop after n simultaneous divisions flooded 停止于 n 舱制破损

Forces the run to end after the specified number of adjacent divisions are flooded. Also, the run will end when there is no contribution to the attained index for a given set of divisions.

根据给定的分舱数破损强行结束计算。另外，当分舱破损贡献的达到指数是零时，运行也会停止。

- Quick mode 快速模式

Turns off checking for worst case combinations of flooding to shorten the time of runs. For example, in the case of horizontal bulkheads, the wizard will check the case with only the upper compartments flooded as the higher VCG may be more critical.

关闭该校核最糟糕的破损组合，以缩短运行时间。例如，在水平舱壁情况下，向导将只校核比较苛刻且 VCG 较高的上部舱室。

- All penetration mode 所有穿透模式

Considers all penetration combinations under multi-division damage.

考虑全穿透多舱制破损。

- Check stability in both directions, for asymmetrical vessels or loadings

对于非对称或非对称装载船舶，需检查左右两个方向。

- Disable user-assigned flooding 禁用用户指定的破损

Overrides the layer assignments in the Division Details window.

忽略在分舱窗口详细定义。

- Respect division ends for flooding of inboard spaces 考虑内部破损的分舱边界

Uses the division ends when accounting for the tanks most outboard extent.

当舱室超出定义范围时，用分舱两边界值。

- Take the maximum RA within the limited range 在限定范围角内取最大的复原力臂值

- If unchecked, the maximum right arm within the entire range of stability will be used to determine the s factor.

- 如不限制， s 因数取决于最大复原力臂发生在整个稳性范围角内。

- If checked, the maximum righting arm will be taken within the limited ranges specified in Regulations 7-2 (16 degrees for S_{final} , 7 for S_{int}). This is a conservative interpretation.

- 如控制，根据规范第 7-2 条，最大复原力臂取决于限定的范围角内（ $S_{final}=16^\circ$ ， $S_{int}=7^\circ$ ）。此方式为保守计算。

- Eliminate angular tolerance for tight point immersion 忽略进水点浸水的角度公差

Useful if tight point height is limiting stability. The default evaluation method includes a slight angle tolerance for tight point immersion, so if a tight point is well off centerline, it must be higher above the waterline than a point closer to centerline. Checking this option removed this conservative tolerance.

如果紧密的点高度限制了稳定性，则很有用。默认评估方法包括对紧密点浸入的轻微角度容差，因此如果紧密点远离中心线，则它必须高于水线，然后更靠近中心线的点。选中此选项会删除此保守容差。

- Create notes files 创立注释文件
 - The notes files which provide useful information about each case in the evaluation. This information can help determine the reason for failure particularly if it is related to downflooding or tight point immersion.
 - 注释文件提供有关评估中每个破损情形的有用信息。此信息有助于确定故障原因，特别是如果它与进水或水密点浸没有关。

- Include notes in the report. 报告中注意事项
 - Eliminating the notes files reduces the number of files in the DAMSTAB2 wizard directory.
 - 删除注释文件会减少 DAMSTAB2 向导目录中的文件数。
 - Sometimes it is preferable to eliminate the notes pages (which can be numerous) from reports and keep them as separate files.
 - 有时最好从报告中删除注释页（可能很多），并将它们保留为单独的文件。

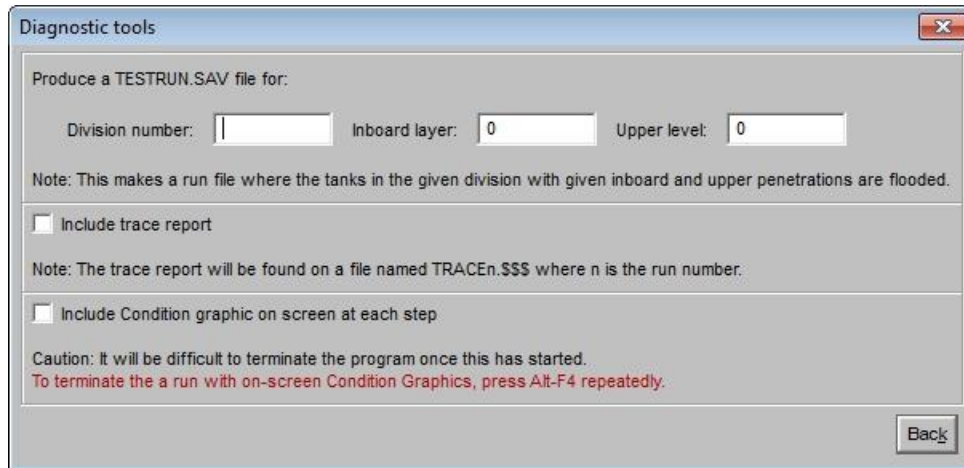
Note: Some of the options above deviate from the regulations in order to reduce calculation time. These can be useful in the early stages of an analysis.

注：以上一些违反规范的选项，是为了节约计算时间，适用于分析的早期阶段。

10.0 Diagnostic & S macro 诊断和宏S

The Diagnostic button provides several ways to obtain or view intermediate results for checking and troubleshooting.

诊断按钮提供了几种方法来获取或查看中间结果以便进行检查和排除错误。



Specifying a division and the desired layer and level, a run file is produced and executed at the end of the Probabilistic Damage run. The results show the equilibrium condition and the tanks that are flooded. A righting arm calculation and graph is included. Of particular usefulness, a trace file provides output which shows intermediate values calculated during the run with additional explanatory notes. The last option will enable the display, on the screen only, of a Condition Graphics window for all cases with a non zero S_{min} .

指定一个分舱区域，层（穿透深度）和水平线（垂向高度），生成一个可运行的在文件，此文件位于概率破舱文件的尾部。结果显示当前平衡时的工况，舱室破损状态，回复力臂以及曲线表。一个跟踪文件提供输出值特别有用，它显示计算出的中间值和额外注释。最后一个选项将启用条件图形窗口显示在屏幕上，适用于非零 S_{min} 的工况。

Terminating the run by pressing the Alt-F4 key is not recommended as it may cause the program to behave erratically. It may be better practice to select the division(s) of concern in the Division Definition window to shorten the run time and reducing the output.

按 Alt-F4 键终止运行，但不推荐这样，因为它可能导致程序运行不稳定。养成选择在相关分舱定义窗口分舱的习惯，可以缩短运行时间，减少输出。

The "S macro" button displays information if a user wants to use their own macro to calculate the S factor. The contents of such a macro will not be discussed here as it is beyond the scope of this manual.

如果用户想使用自己的宏命令来计算 s 因数，“S macro”按钮会显示信息。宏命令语句不在此论述，因为它超出了本手册的范围。

