命令模式

OUTFLOW [(tanklist)] [lsdraft [, loaddraft]] [/REG: reg] [/HULL: hullname]
    [/BOTtom: tank1[: area1 [..., tankn [:arean]]] [/CAPture:caplist]
    [/LENgth:length] [/BReadth:breadth] [/DEPth:depth] [/SPGR[:density]]
    [/PERM[: permeability]] [/DWG:weight] [/NBHD:n] [/OVER:pressure]
    [/STOP] [/SKIP] [/LOG[:logfile]

Measures compliance with MARPOL 73/78 Annex 1 regulation 12A as amended by MEPC.141(54) protecting against oil fuel tank outflow or Annex 1 regulation 23 protecting against oil cargo outflow using probabilistic methods (requires the AF module).

采用概率计算方法，衡量是否服从由 MEPC.141(54)修订的 MARPOL 73/78 Annex 1 regulation 12A，规定的关于防止燃油舱溢流，或者由 Annex 1 regulation 23，规定的关于防止货油溢流的要求（需要 AF 模块）。

参数说明

(tanklist)

The list of oil tanks used in connection with propulsion and auxiliary machinery (see reg 12A.3.1) or located in the cargo block length (see reg 23.4.2). A tank name may end in an asterisk to include all tanks whose names have the same beginning. If omitted, the current tank selection is used. If none, reg 12A assumes all tanks with contents "DIESEL OIL" or "FUEL OIL", and reg 23 assumes all "OIL" and alternate petroleum "@ temperature" tanks.

与推进或辅助机械（见 reg 12A.3.1）相连或位于货物区段(见 reg 23.4.2)的油舱列表。舱室名以*结尾表示以*之前字符开头的所有舱室。如果省略，则使用当前选中的舱室。如果没有当前舱室，reg 12A 默认为舱容物质为"DIESEL OIL" 或"FUEL OIL"的所有舱室，而 reg 23 默认为所有油舱"OIL"或原油"@ temperature"舱。

lsdraft

The molded midship lightship draft (see reg 12A.3.3, ignored for reg 23).If omitted, the LCF draft as currently loaded is assumed.

空船舯部型吃水（见 reg 12A.3.3，对于 reg 23 则忽略）。如果省略，则默认为当前装载下的 LCF 吃水。

loaddraft

The molded load line draft at mid-length of the summer freeboard draft waterline (see reg 12A.3.2 or 23.2.1). If omitted, the LCF draft as currently loaded is assumed.

夏季载重线中间的型吃水（见 reg 12A.3.2 或 reg 23.2.1）。如果省略，则假定为当前装载下的 LCF 吃水。

/REG:reg

Specifies the regulation to apply, either:

指定应用的规范，取其一：

12A - oil fuel outflow (default);

12A -燃油溢流（默认）；

23- oil cargo outflow for normal oil tankers;

23-普通油船货油溢流；

23C - oil cargo outflow for eligible combination carriers (see reg 23.3.1).

23C -混合货船的货油溢流（见 reg 23.3.1）。

/HULL:hullname
Specifies the hull part name. The default is HULL or (if absent) the first displacer part.

指定船体类子模型名称。默认为 HULL，如果缺失，则用第一个排水类子模型替代。

/BOTTOM:tank1[:area1[...,tankn[:arean]]]
Specifies the oil fuel tanks considered to bound the hull's bottom shell; if omitted, those tanks which touch the hull's bottom shell are assumed. Each listed tank may include its maximum horizontal projected area; if omitted, the area of the trapezoid projected by the portmost and starboardmost points from the tank's bottom to height Hw at each longitudinal location is used (see reg 12A.11.5.3.3).

指定与船底板相连的燃油舱；如果省略，则假定为所有触碰船底板的舱室。每个列出的舱室可包含其最大水平投影面积；如果省略，将使用舱室的最左舷和最右舷的点及舱室在每个纵向位置的高，计算出的最大梯形投影面积（见 reg 12A.11.5.3.3）。

/CAPTURE:caplist
Specifies the oil tanks bounded below by non-oil tanks (see reg 12A.11.5.4 or 23.7.4). If omitted, outflow from an oil tank may be captured by any non-oil tank which intersects its horizontal bounding rectangle with a lower tank bottom.

指定下端连接着非油舱的油舱（见 reg 12A.11.5.4 或 reg 23.7.4）。如果省略，油舱可能会溢流到任何水平矩形边界与油舱相交且舱底更低的非油舱。

/LENGTH:length
Specifies the effective vessel length (see reg 12A.3.9 or 23.2.6).If omitted, 96% of the waterplane length at 85% of the least molded depth to the deck edge is assumed.

指定船舶有效长度（见 reg 12A.3.9 或 reg 23.2.6）。如果省略，则假定为甲板边界最小型深85%处的 96%的水线长。

/BREADTH:breadth
Specifies the molded midship breadth if a ship has a metal shell, else the full midship breadth (see reg 12A.3.10 or 23.3.2). If omitted, the maximum overall breadth is assumed.

指定钢质船船中型宽，其他船为船中总宽度（见 reg 12A.3.10 或 reg 23.3.2）。如果省略，则假定为最大总宽。

/DEPTH:depth

Specifies the molded depth at mid-length of the highest deck reached by watertight transverse bulkheads other than aft peak bulkheads (see reg 12A.3.8 or 23.2.5). If omitted, the midship deck edge depth is assumed. Note the hull part requires a deck edge marking.

指定型深为水密横舱壁（而不是艉封板）在船中接触到的最高甲板深度（见 reg 12A.3.8 或 reg 23.2.5）。如果省略，则假定为船中甲板边缘深度。注意：需要甲板边线的记录。

/SPGR [:density]

Specifies the nominal density in all oil tanks; the default is 1.0 specific gravity (see reg 12A.11.2.3 or 23.4.4). If omitted, the current density in each oil tank is used and must range between 0 and 70 ˚API.

指定所有油舱的形式密度；默认比重为 1.0（见 reg 12A.11.2.3 或 reg 23.4.4）。如果省略，将使用每个油舱的当前密度，并且范围必须在 1-70 ˚API.之间。

/PERM [:permeability]

Specifies the nominal permeability for all oil tanks; the default is 0.99 (see reg 12A.11.2.4 or 23.4.5). If omitted, the current permeability for each oil tank is used.

指定所有油舱的形式渗透率；默认为 0.99（见 reg 12A.11.2.4 或 reg 23.4.5）。如果省略，将使用每个舱室当前渗透率。

/DWT:weight

Specifies the total deadweight at summer load line draft, which also overrides cargo oil tank densities (see reg 23.4.4). If omitted, the weight of the oil tank list at 98% filling is used.

指定夏季载重线吃水的总载重量，这将覆盖货油舱密度（见 reg 23.4.4）。如果省略，将使用所有油舱 98%的装载总量。

/NBHD:n

Specifies the number of evenly-spaced longitudinal bulkheads inside oil cargo tank (see reg 23.3.2 and 23.6). If omitted, no bulkheads are assumed. Note "the minimum distance from the ship's side to the outer longitudinal bulkhead of the tank" cannot be precisely determined without details of the bulkhead geometry, so is estimated as minimum distance to the tank wall added to the width of the tank divided by one plus the number of bulkheads (if any).

指定货油舱内部等分纵舱壁的数量（见 reg 23.3.2 或 reg 23.6）。如果省略，则假定为没有舱壁。注意"从船边到舱室外边缘纵舱壁的最小距离"必须要有舱壁布置详情才能准确确定，其估算值为到舱室边缘最小距离，与舱室宽度除以（1+舱壁数量）的值之和。

/OVER [:pressure]

Specifies overpressure (in current weight units divided by length units squared) for oil cargo tanks fitted to an inert gas system; the default is the minimum 5 kPa allowed (see reg 23.7.3.2). If omitted, then no overpressure is applied.

指定与惰性气体系统相间接的货油舱过压值（当前重量单位除以长度单位的平方）；默认最小许用为 5kPa（见 reg 23.7.3.2）。如果省略，则无任何过压。

/STOP

Stops compliance processing as soon as overall success or failure is determined.

一旦可以确定服从或不满足规范要求，立刻停止进程计算。

/SKIP

Skips consideration of geometry qualifications for shell closeness when measuring compliance (except for identifying bottom tanks if the /BOTTOM parameter was not included).

当测量服从性时，跳过外壳水密几何限制条件的考虑（除了底部舱室的识别，如果没有包含 /BOTTOM 参数的话）。

/LOG [:logfile]

Logs full calculation details to logfile; the default is "OUTFLOW.LOG".

记录所有计算细节到指定日志文档；默认为"OUTFLOW.LOG"文件。

Operation

操作

All provisions of MARPOL regulations 12A and 23 regarding oil tank protection are verified except paragraphs 12A.9, 12A.10, and 23.11, which pertain to piping valves and suction wells. Two tables are normally produced:

MARPOL 规范中 12A 和 23 关于油船保护的所有条款都可以计算验证，除了章节 12A.9, 12A.10 和 23.11 中关于管阀和吸口井的要求。通常生成两个表格：

(1) The Shell Distance table reports any oil tanks closer to the hull shell than the minimum distances required by regs 12A.6-8 or by 23.3.2 for deadweight less than 5000 MT. If no tanks are too close, then vessel compliance has succeeded, and the second table results are superfluous (but are shown anyway unless the /STOP parameter was included). The Shell Distance table also reports tanks that do not border the hull shell but are too close for maintenance and inspection according to reg 12A.11.8. Since computing these geometry qualifications can be time-consuming, they can be skipped by including the /SKIP parameter and specifying /BOTTOM tanks.

1）船壳距离表，它报告任何到船壳距离小于 reg 12A.6-8 要求的油舱，和载重量小于 5000 公吨 reg 23.3.2 中要求的油舱。如果没有舱室过近，则船舶服从要求，这样第二个表格结果就是多余的（但仍然会显示，除非包含了参数/STOP）。船壳距离表也会根据 reg 12A.11.8 的要求，报告那些不挨着船外壳，但是距离对于维护和检查太狭窄的舱室。由于进行这些测量很耗时，所以可以使用参数/SKIP 跳过，并且指定/BOTTOM 舱室。

(2) The Probable Outflow table reports values for each oil tank according to the accidental oil outflow performance standard specified by reg 12A.11 or by 23.3.1 for at least 5000 MT deadweight. Outflow is calculated separately for side damage, bottom damage at zero tide, and bottom damage at minus 2.5 m tide, then combined into an overall mean oil outflow parameter using the rule:

2）概率溢流表，它根据 reg 12A.11 中规定的发生意外油品溢流的要求，报告每个油舱的值，而对于大于等于 5000 公吨载重量的船舶则参照 reg 23.3.1 中的要求报告。溢流对边舱破损，0m 潮汐底部破损，-2.5m 潮汐底部破损，分别进行独立计算，然后使用以下方法求出溢流的总平均数：

$$Om = 0.4 * Oms + 0.6 * (0.7 * Omb0 + 0.3 * Omb2.5)$$

These values are shown in the Probable Outflow table as non-dimensional percentages of the total capacity of all oil tanks at 98% filling (see reg 12A.3.13 or 23.4.4), with subtotals for each row and column. Bottom outflow may be reduced by a factor of 60% for certain oil tanks captured by non-oil compartments, which can be overridden using the /CAPTURE parameter. The total mean oil outflow parameter is assessed by comparison with a success criterion which ranges between 1.0% and 2.1% depending upon total oil tank capacity.

这些数值显示在概率溢流表中，作为所有油舱 98%装载时总舱容的无因次百分比（见 reg 12A.3.13 或 reg 23.4.4），同时每行和每列各有小计。某些底部溢流可以用系数折减到 60%，这是由于某些油舱下边与非油舱连接，这个系数可使用参数/CAPTURE 设置。总平均油溢流参数是通过与一个服从计算的衡准对比评估而来的，该衡准根据总油舱舱容的不同，取值在 1.0% 和 2.1%之间。

Following table presentations, overall regulation compliance and reason for success or failure is reported. Note that an oil fuel tank list succeeds immediately if its total capacity is less than 600 cu.m and fails immediately if any individual tank capacity exceeds 2500 cu.m, but in either case the full table calculations are presented unless the /STOP parameter was included.

在表格后，将报告总体服从规范要求与否，及其原因。注意：如果总油舱容小于 600 立方米，则燃油舱室列表计算立即满足要求；如果任何独立油舱舱容大于 2500 立方米，则计算立即不满足要求。这两种情况都会显示完整的计算内容，除非使用了参数/STOP。

Additional calculation details may be sent to a log file by including the /LOG parameter.

额外的计算细节可通过参数/LOG 写入到 log 文件中。

Some of regulation 12A and 23's definitions allow multiple interpretations or may depend on information not available to the program. For example, reg 12A.11.2.4 states that oil fuel tank permeabilities "shall be taken as 0.99, unless proven otherwise" - so the OUTFLOW command uses the current oil fuel tank permeabilities, but allows this default to be overridden by 0.99 (or as specified) using the /PERM parameter. In other cases, reasonable default behavior is provided which can be likewise overridden using optional parameters such as /LENGTH, /BREADTH, /DEPTH, /SPGR, etc. Note that shell closeness is measured at right angles to the shell at each longitudinal location as shown by figure 2 for reg 12A.8, regardless of ambiguous wording in reg 12A.6. Measurements that reference the side shell stop at each component's deck edge marking, or if none, the midship depth set by the /DEPTH parameter.

一些 12A 和 23 规范的定义允许多重解释或取决于程序不可获得的信息。例如，reg 12A.11.2.4 指出燃油舱的渗透率"应取 0.99，除非另外证明"- 那么命令 OUTFLOW 使用当前燃油舱渗透

率，但是也允许使用/PERM 参数覆盖该默认值为 0.99（或另外指定）。其他情况下，其他默认参数同样可使用相应可选参数进行覆盖，例如/LENGTH, /BREADTH, /DEPTH, /SPGR，等等。注意根据 reg 12A.8 表 2，船壳距离的量取为每个纵向位置到船壳的垂直距离，而不采用 reg 12A.6. 中的模糊定义。参考侧壳的测量值会停止在每个组件的甲板边缘标记处，如果没有，则停止由/DEPTH 参数设置的船中深度。

Display Output

显示输出

If present, the Shell Distance table lists all oil tanks whose inset distance from the hull shell fails regulation provisions 12A.6, 12A.7, 12A.8, 12A.11.8, or length fails 23.3.2. Table columns are the tank name, inset direction (either "Side" or "Bottom", or distance for reg 23), minimum inset distance found (or tank length for reg 23), required inset value, percentage achieved, and the regulation provision which failed. There may be multiple lines for the same tank if it fails multiple provisions. The minimum inset distances for any tank in both the side and bottom directions are also reported.

如果出现，船壳距离表列出所有嵌入距离不符合规范 12A.6, 12A.7, 12A.8, 12A.11.8 规定或长度不满足规范 23.3.2 规定的油舱。表的列项依次为舱室名，布置方位（"Side" 或 "Bottom"，对 reg 23 而言是距离），最小嵌入距离（对 reg 23 而言是舱室长度），规定的嵌入距离，达到的百分比，及不符合哪条规范。如果一个舱室不符合多项规范，则会出现多行该舱室信息。同样会列出所有舱室在两舷边和船底方向的最小嵌入距离。

If present, the Probable Outflow table summarizes mean outflow calculations for all oil tanks. Table columns are tank name, probability of side damage, side outflow percentage (same as the tank capacity as a percentage of total oil fuel tank capacity), mean side outflow percentage (product of the previous two columns), probability of bottom damage times any capture factor (marked with an asterisk if the 60% capture factor was applied), bottom outflow percentage at zero tide, mean bottom outflow percentage at zero tide (product of the previous two columns), bottom outflow percentage at -2.5 m tide, mean bottom outflow percentage at -2.5 m tide, and the tank's composite mean outflow percentage (40% side, 42% bottom at zero tide, and 18% bottom at -2.5 m tide). Subtotals are reported for all mean outflow columns.

如果出现，概率溢流表总结所有油舱的平均溢流计算结果。表的列项依次为舱室名，边破损概率，边溢流百分比（等同于舱容对于总舱容的百分比），平均边溢流百分比（前两列的乘积），底部破损概率乘以任何折减系数（如果折减系数为 60%，则标记为*），0m 潮汐时底部溢流百分比，0m 潮汐潮时平均底部溢流百分比（前两列的乘积），-2.5m 潮汐时底部溢流百分比，-2.5m 潮汐时平均底部溢流百分比，舱室的综合平均溢流百分比（40%为舷边，42%为 0m 潮汐底部，18% 为-2.5m 潮汐底部）。所有平均溢流列均有小计。

Overall regulation compliance is reported along with the effective cause for success or failure.

报告总体是否服从规范，以及成功或失败的实际原因。

Nondisplay Output

无显示输出

none.

无

Examples

样例

Measuring compliance for all DIESEL and FUEL OIL tanks at lightship draft 5:

计算空船在吃水 5 米时的柴油和燃油是否服从规范要求：

OUTFLOW 5

Measuring for tank names beginning FO and DO, stopping as soon as possible:

计算以 FO 和 DO 开头的舱室是否服从规范要求，确定后即停止计算：

OUTFLOW (FO*,DO*) 5 /STOP

Measuring using captured tanks FODT* and FOSET.P, logging to OUTFLOW.LOG:

计算时考虑舱室 FODT* 和 FOSET.P 底部连接非油舱，并记录到 OUTFLOW.LOG：

OUTFLOW 5 /CAP:"FODT*,FOSET.P" /LOG

Measuring for load draft 7, none captured, spgr 1.0, and permeability 0.99:

计算时考虑装载吃水为 7 米，无底部连接舱室，比重为 1.0，渗透率 0.99：

OUTFLOW 5, 7 /CAP /SPGR /PERM

Measuring for length 100 and breadth 20, skipping shell distance tests:

计算时考虑船长 100 米和船宽 20 米，跳过船壳距离检测：

OUTFLOW 5 /LEN:100 /BR:20 /SKIP

Measuring cargo oil compliance for 10000 MT deadweight and 2 bulkheads per tank:

计算是否服从规范要求，计算时考虑 10000 公吨载重量，并且每个舱室含 2 个舱壁：

OUTFLOW /REG:23 /DWT:10000 /NBHD:2

Measuring combination carrier compliance including 5 kPa overpressure:

计算混合货船的货油溢流否服从规范要求，计算时考虑包含 5kPa 过压：

OUTFLOW /REG:23C /OVER