

命令模式

LIMits [(n)] type [[c1] angle1 [[c2] angle2 [[c3] angle3]] <|=|> minmax
Defines a required righting arm characteristic for a stability criterion.

根据稳性横准，定义需要的复原力臂数值特性。

LIMits [(n)] OFF
Deletes the nth limit, or all limits if (n) is omitted.

删除第 n 个限定条件，或忽略所有的限定条件。

LIMits [(n)] [REPort]
Displays one or all limits. If REPORT is omitted, display is to the screen only.

显示一个或所有的限定条件。如果省略 REPORT，只是屏幕显示限定条件。

LIMits AREA: DEGRees | RADians
Sets the default unit of area for use in limits (see "Area Units" below).

设定限定条件中面积默认使用的单位（查看下面的"Area Units"）。

LIMits Title description
Changes the title description for the stability criterion.

改变稳性横准的标题说明。

参数说明

(n)
The number of the limit to be defined or displayed; $1 \leq n \leq 99$. Note that only 20 limits may be simultaneously defined, and only 9 may be shown in MAXVCG reports.

定义或显示限定条件的数量， $1 \leq n \leq 99$ 。可同时定义 20 个限定条件，在 MAXVCG 报告中最多只显示 9 个限定条件。

type
The limit type may be one of the following:

限定条件可以为下面的类型。

[ABSolute]ANGLE, [ABSolute] AREA[: DEG | RAD],
[RESidual | REServe] RATIO, [ABSolute] RA, RAR, RASR, RISE,
GM [UPRIGHT], FLOODHT, INCL

c1
The first connecting word may be one of the following:

第一个连接词可以是下面的其一。

AT, @, FROM, BETWEEN

c2
The second connecting word may be one of the following:

第二个连接词可以是下面的其一。

TO, OR, AND

c3

The third connecting word may be one of the following:

第三个连接词可以是下面的其一。

OR, TO, AT, @, RANGE

angle1, angle2, angle3

These may take any of the following forms:

角度可以采用下面的形式:

angle for the given angle value relative to the initial heel (up to 8 different allowed);

相对于初始横倾角的角度（最多允许 8 个不同角度）。

ABSolute angle for the given angle value from zero heel (upright);

相对于横倾 0 度（正浮）的绝对角度。

MAX for the angle of maximum righting arm (residual except in ABS RA and RISE types);

复原力臂最大时的角度。

MAX0 for angle of maximum absolute righting arm (cannot be used with residual MAX);

复原力臂绝对值最大时的角度（不能与 Residual MAX 使用）。

FLD for the angle of downflooding (same as FLOOD or CRT);

进水点的角度。（和命令 FLOOD 和 CRT 相同）。

[n%]DI for n% (default=100%) of the deck immersion angle (respecting any margin);

n%甲板浸没时的角度（考虑界限线，默认为 100%浸水）。

[n%]DI0 for n% (default=100%) of the deck immersion angle (ignoring margin);

n%甲板浸没时的角度（忽略界限线）。

n%FB for the angle of n% minimum upright freeboard immersion (ignoring margin);

正浮状态 n%最小干舷浸没时的角度（忽略界限线）。

HF for the angle of half the minimum freeboard immersion (same as "50%FB");

最小干舷一半（50%）浸没时的角度（和"50%FB"相同）。

EQUil for the angle of equilibrium (the "first intercept");

平衡点的角度（第一个交点）。

EQU0 for the angle of equilibrium disregarding any external heeling or trimming moment.

平衡点的角度，忽略任何外加的横倾或纵倾力矩。

n%EQUPlus for n% (range=100%-300%) of the equilibrium angle;

n%倍的平衡角度。

RA0 for the angle of vanishing righting arm (the "second intercept");

复原力臂消失点的角度（第二个交点）。

RA00 for the angle of vanishing absolute righting arm;

复原力臂绝对消失点的角度。

HRA0 for the angle halfway between EQUIL and RA0;

平衡点角度与复原力臂消失点角度的中间角度。

PRE for the pre-roll heel angle (just before HEEL=*-ROLL or *±Φ command was done);

在横摇角之前的横倾角（刚执行 HEEL=*-ROLL 或 *±Φ 前的横倾角）。

ROLL for the ROLL angle relative to the angle of equilibrium and in the direction opposite to the direction of the heeling moment (or, if no heeling moment, opposite to the direction of equilibrium list; or if no list, opposite to the direction of heel angle progression; or if no heel angle progression, to port).

横摇角是相对于平衡横摇所产生的角度，其方向与横倾力矩相反（如果无横倾力矩，与初始横倾相反；无初始横倾，则与计算横倾方向相反；无计算方向，则为左舷）。

minmax

The minimum (or maximum) limit value. Must be non-zero except for ANGLE, INCL and FLOODHT limit types.

最小（或最大）限定值，除了 ANGLE, INCL 和 FLOODHT 限定类型外，此值不得为 0。

description

A stability criterion description up to 35 characters long.

稳性横准描述最多为 35 个字符。

Note: A "stability criterion" is considered to be composed of one or more limits pertaining to various aspects of the righting and heeling arm curves.

稳性横准包含单个或多个限定条件，所有参数都来自于复原和横倾力臂曲线。

Operation

操作

If a limit specification is given, the nth limit is defined (or redefined). If (n) is omitted, then the first available unassigned limit number is used.

如果定义了一个限定条件，那么就定义或重新定义了第 n 个限定条件。如果省略参数 n，那么使用未使用过的首个数字来对限定条件进行编号。

If the keyword OFF is given instead, then the nth limit is deleted, or all limits are deleted if (n) is omitted.

如果附加关键词 OFF, 那么将删除第 n 个限定条件。若省略参数 n, 那么将删除所有的限定条件。

A limit specification must begin with a type parameter, which defines the quantity whose bounds are to be set by the limit. The specification must end with a minmax value, the value of the boundary. Most of the limit boundaries are minimums; an exception is the angle at equilibrium, which is always a maximum limit.

限定条件的定义必须以类型参数开始, 限定条件的定义必须以数值边界范围结尾, 最小值或最大值。很多限定条件限定最小值, 但是平衡角总是限定最大值。

The minmax parameter must be immediately preceded by the less than (<), equal (=), or greater than (>) sign. These signs all have the same effect, so direction is determined by context.

最大最小值必须加上前缀符号小于 (<), 等于 (=), 或 大于 (>)来表示。这些符号有相同的效果, 方向有文字表述来指定。

Except for the GM limit, all types involve one to three heel angle specifications. The angle may either be an explicit number (degrees) or it may be a keyword which stands for the angle at some feature of the righting arm curve. Preceding each angle is a connecting word which helps to make the specification more readable.

除了 GM 限定值, 其它横准将涉及 1 个至 3 个个横倾角不等。角度可以用明确的角度值定义或用代表角度的复原力臂曲线特征关键词来定义。在每一角度前附加连接词可以使可读性加强。

ANGLE LIMITS

The Angle type of limit must involve at least one keyword angle. For example,

角度的限定至少涉及到一个关键词: ANGLE。例如:

LIMIT ANGLE AT MAX > 32

uses "MAX" to stand for the angle at the maximum value of the righting arm. When a single angle is given, it is measured from zero heel in either direction. Hence this example can equivalently use ABSOLUTE ANGLE in place of ANGLE or take the more complete form.

使用"MAX"表示复原力臂曲线最大值点的角度。当给出一个角度时, 它是从平浮状态测量的。因此, 这个例子可以等效地使用绝对角度代替角度, 或者采用更完整的形式。

LIMIT ANGLE FROM 0 TO MAX > 32

If a third angle is given, it is on equal footing with the second angle: both angles must equal or exceed the minimum. For example,

如果涉及第三个角度, 它和第二个角度的位置平等。两个角度位置必须平等或均大于最小值。

LIMIT ANGLE FROM EQUIL TO MAX OR FLD > 27

says that the angle from equilibrium to angle of maximum righting arm must be at least 27° and the angle from equilibrium to the downflooding angle must be at least

27°. Of course, the same specification could be accomplished by using two separate LIMIT commands.

表示从平衡点到复原力臂最大值点的角度要大于 27 度，且从平衡点到进水点的角度也要大于 27 度。当然，可以利用两个分开的 LIMIT 命令表达相同的意思。

One small difference between the second and third angles becomes apparent only if angles cannot be identified, such as FLD when there are no active flood points and RA0 when the vessel is self-righting. The second angle must be found to avoid UNDEF failure, but no warning is given for an unidentified third angle.

只有当无法识别角度时，第二和第三角度之间的小差异才会变得明显，例如当没有进水点 FLD 时，当船舶自动扶正平衡时为 RA0。必须找到第二个角度以避免平衡定义失败，但对于未识别的第三个角度，没有发出警告。

A special case of this command considers for the terminating angle both TIGHT (weathertight) and normal downflooding points:

这种命令的一种特殊情况是终结角度为风雨密点和敞口进水点。

LIMIT ANGLE FROM EQUIL TO FLD OR TFLD > angle

where angle is the minimum angle measured from equilibrium at which a flood or a weathertight point would be immersed.

此角度为从平衡点到敞口进水点或风雨密点被浸没的最小角度。

In other forms of the LIMIT ANGLE command, TIGHT points are not considered for the FLD angle, even at equilibrium, unless the angle range and limit value are zero. For example,

在命令 LIMIT ANGLE 的其它形式中，TIGHT 点不被认为 FLD 角度，即使在平衡点，除非角度范围限制为 0。例如：

LIMIT ANGLE FROM EQUIL TO FLD > 0

does consider TIGHT points for the FLD angle; but

认为风雨密点角度为进水时的角度。但是

LIMIT ANGLE FROM EQUIL TO ABS 50 OR FLD > 20

considers only true downflooding points and ignores TIGHT points.

考虑真正的进水点忽略风雨密点

Using the "TO" connective keyword between the terminating angles causes the greater angle to be controlling. For example,

在终结角度中使用"TO"连接词，会使用其中较大的角，例如：

LIMIT ANGLE FROM EQUIL TO ABS 25 TO D10 > 0

requires equilibrium to be prior to 25 degrees unless deck immersion has not yet taken place, in which case the requirement is for equilibrium to be prior to deck immersion.

限制角度在平衡点到 25 度或甲板浸没时的角度（二者取大者）。

AREA LIMITS

The AREA limit type requires a minimum area under the righting arm curve between two angles. If a heeling moment is present, this is the "residual" area below the righting arm curve and above the heeling arm curve.

AREA 衡准类型要求复原力臂曲线下两个角度之间的最小面积。如果存在倾侧力矩，则这是复原力臂曲线下和倾侧力臂曲线上方的“富余”区域。

By contrast the "absolute" area (disregarding any heeling moment) can be evaluated using the ABSOLUTE AREA limit type. Angle keywords EQU0, MAX0, and RA00 always refer to the absolute righting arm curve, so should generally be used with ABSOLUTE AREA limits instead of their residual counterparts. For example,

相比之下，“绝对”面积（不考虑任何倾侧力矩）可以使用绝对面积衡准类型进行评估。角度关键字 EQU0、MAX0 和 RA00 始终是指绝对复原力臂曲线，因此通常应与绝对面积衡准一起使用实际值，而不是对应的“富余”值。例如：

LIMIT ABS AREA FROM EQU0 TO MAX0 > 0.08

assesses the area of the righting arm curve regardless of whether a heeling moment is present.

评估复原力臂曲线的面积，无论是否存在倾力矩：

When three angles are given, the area is from the first angle to the lesser of the second and third angles. For example:

当给定三个角度时，面积从第一个角度到第二个和第三个角度中的较小者。例如：

LIMIT AREA FROM ABS 30 TO ABS 40 OR FLD > 5.9

does not put any requirement on the area from 30° to the downflooding angle unless the latter angle is less than 40°

限定在 30 度到进水点角度或 40 度（二者取小者）的面积大于 5.9.

A special case of the area limit specification applies when the boundary is not constant but varies according to where the maximum righting arm occurs. It requires two adjacent Limits (using successive limit numbers). For example,

当浮力不是固定值，复原力臂曲线的最大值发生点不是恒定时，会使用特殊的面积限定方式。需要两个相邻的限定（使用相邻的限定标号）。例如：

LIMIT(1) AREA FROM 0 TO MAX AT 15 > 0.07**LIMIT(2) AREA FROM 0 TO MAX AT 30 > 0.055**

The interpretation is that the minimum area from zero to maximum righting arm is 0.07 if the angle at the maximum falls at or below 15° that it's 0.055 if the angle at the maximum is above 30° and that it varies linearly between 0.07 and 0.055 when the angle at maximum is between 15° and 30°. The RA command can combine these two adjacent limits into a single report line using its /LIMIT: COMBINE subparameter (see the RA command for details); note MAXVCG doesn't need a combine parameter because both limits return the same margin.

限定从平衡点角度到复原力臂曲线最大值点角度的最小面积，若复原力臂曲线的最大值点角度为 15 度或小于 15 度时，面积要大于 0.07。若复原力臂曲线的最大值点角度大于 15 度时，面积要大于 0.055。若复原力臂曲线的最大值点角度在 15 度和 30 度之间时，面积要大于 0.07 和 0.055 的线性插值。RA 命令可以使用其 /LIMIT: COMBINE 子参数将这两个相邻的衡准合并到一个衡准命令行中（有关详细信息，请参阅 RA 命令）；注意 MAXVCG 不需要组合参数，因为两个衡准返回相同的衡准参数。

The units of area in the length dimension are either feet or meters, depending on whether English or metric units are current. The angle dimension may be either radians or degrees. This may be specified by including the unit after the AREA keyword and separated from it by a colon. Unit may be either DEGRees or RADians. If not specified in this manner, the default angle unit is applied (see below under "Area Units"). For example

面积的单位为长度单位，英尺或米，取决于当前使用的英制或公制单位。角度单位为弧度或度。这可以在关键词 AREA 后通过单位设定。单位可以是度或弧度。如果不通过这种方式定义，会使用默认的单位。（查看下面的"Area Units"）。范例：

LIMIT AREA:RAD FROM 30 TO 40 OR FLD > 0.10

Note: For AREA limits, if the terminating angle comes after RA0, the area will be less than if it had been taken only to RA0. If the terminating angle (such as FLD) comes far beyond RA0, the area could be negative. Therefore, in most cases it is best to include RA0 as one of the terminating angles.

说明：对于面积限定，如果终结角度在 RA0 后，那么面积会小于终结角度在 RA0 处。如果终结角度在 RA0 后很远，那么面积可能是负的。因此，最好使用 RA0 做为其中的终结角度之一。

AREA RATIO LIMITS

The ABSOLUTE RATIO type (same as RATIO) refers to the ratio of the area under the righting arm curve to the area under the heeling arm curve between two angles. It applies when external heeling moments are specified by the HMMT command. For example,

ABSOLUTE RATIO (和 RATIO 相同)，表示在指定角度范围内，复原力臂曲线下的面积与横倾力臂曲线下的面积比值。适用于命令 HMMT 定义了横倾力矩后。例如：

LIMIT RATIO FROM 0 TO RA0 > 1.4

states that the area ratio from zero degrees to zero (residual) righting arm must be at least 1.4

说明从平衡点到复原力臂为 0（第 2 交点）之间的面积比大于 1.4。

Note that zero degrees here is relative to the initial heel angle. Hence, it could be the angle of equilibrium in the absence of any heeling moment - which may be other than zero with damage. The angle of zero residual righting arm (RA0) is actually the angle at which the descending righting arm curve crosses the heeling arm curve, or the "second intercept".

这里的 0 度是相对于初始的横倾角度。因此，如果没有横倾力矩作用时，0 度即平衡点，当出现破舱时，就不可能为 0 度。剩余复原力臂为 0 的点(RA0)实际上是复原力臂曲线下降段和横倾力臂曲线的交点，即第二交点。

The RESIDUAL RATIO type refers to the ratio of residual areas before and after equilibrium (the "first intercept"). Assuming that the angle of equilibrium Φ_0 falls between the first and second angles (Φ_1 and Φ_2) and that the area A1 is the residual area (taken as a positive quantity) from Φ_1 to Φ_0 and A2 is the residual area from Φ_0 to Φ_2 , then the "residual ratio" is A_2/A_1 .

RESIDUAL RATIO 表示在平衡角（第一交点）前后一定角度范围内剩余复原力臂面积的比值。设平衡角 Φ_0 位于角度 Φ_1 和 Φ_2 之间，A1 为 Φ_1 到 Φ_0 的剩余复原力臂面积，A2 为 Φ_0 到 Φ_2 的剩余复原力臂面积，那么面积比为 A_2/A_1 。

The ratio of the residual area to the area under the righting arm curve can be expressed by the ABSOLUTE RATIO where, if the limit of the latter is X, the limit of the former is $1 - 1/X$. Note when the Residual Ratio between two angles is equal to 1.0, so is the Absolute Ratio.

剩余复原力臂面积与复原力臂曲线下的面积比可以用 ABSOLUTE RATIO 开表示。如果后面的比值为 X，那么前面的比值为 $1 - 1/X$ 。当两角度间的剩余面积比率为 1 时，绝对比率也就为 1。

The RESERVE RATIO type refers to the ratio of positive residual area to positive absolute area for any specified angle range. The only valid first angle is EQU0, which may be omitted. Areas are terminated at any specified second and third angles and the angle RA00 of vanishing absolute righting arm, which is an automatic terminating angle since only positive area is considered. For example,

储备比率类型是指任何指定角度范围内正剩余面积与正绝对面积的比率。唯一有效的第一个角度是 EQU0，可以省略。区域以任何指定的第二和第三角度以及消失绝对复原力臂的角 RA00 终止，这是一个自动终止角度，因为只考虑正面积。例如：

LIMIT RESERVE RATIO TO ABS 40 OR FLD > 0.4.

means residual area must be 40% absolute area until 40° or downflooding or RA00 occurs.

表示剩余面积必须是绝对面积的 40%，直到发生 40° 或浸水或 RA00。

Except when using RESERVE RATIO, it is generally advisable to include RA0 as one of the terminating angles. See the note in AREA limits above.

除了运用 RESERVE RATIO 外，通常建议把 RA0 做为终结角度之一。查看上面的 AREA 面积衡准说明。

ARM LIMITS

The RA limit applies to the value of the residual righting arm at a certain angle. This angle may be given explicitly or it may be represented by one of the keywords MAX or FLD. The keywords EQUIL and RA0 do not apply since the righting arm is always zero there by definition.

RA 限定适用于限定在某角度时的剩余复原力臂值。角度可以明确给定或使用关键词 MAX 或 FLD 给定角度。不使用关键词 EQUIL 和 RA0，因为在此角度下的剩余复原力臂为 0。

One or two angles may be included in this specification. For example,

在定义中可以包含一个或多个角度。例如：

LIMIT RA AT 33 OR MAX > 1.05

means that the righting arm must be at least 1.05 at 33° unless the maximum is greater than 33° in which case it must be at least 1.05 at the maximum.

表示要求力臂在 33 度或其最大值（二者取大者）大于 1.05。

Note that the interpretation of the alternate termination angles (in this case 33° and angle of maximum righting arm) is opposite to that used with the AREA and ANGLE limits; here it is the greater angle which applies. If you want the lesser angle to apply, substitute the word "TO" for "OR":

注意在此限定中的角度选择与在 AREA 和 ANGLE 限定中的选择相反，在此限定中选择大的角度。如果要选择小的角度，使用"TO"替代"OR"。

LIMIT RA AT MAX TO 33 > 1.05

means that the righting arm must be at least 1.05 at the maximum unless the maximum is greater than 33° in which case it must be at least 1.05 at 33°

表示要求在 33 度或力臂值最大点角度（二者取小者）处的剩余力臂大于 1.05。

The ABSOLUTE RA type indicates that the value of the absolute righting arm is used instead of the residual righting arm. Any use of the MAX keyword with the ABS RA type represents the angle of maximum absolute righting arm. For example,

ABSOLUTE RA 表示绝对的复原力臂值而不是剩余的复原力臂值。ABS RA 中的关键词 MAX 代表绝对复原力臂值最大点的角度。例如：

LIMIT ABS RA AT MAX TO 33 > 1.05

ARM RATIO LIMITS

This limit measures the ratio between the righting arm and the heeling arm at a particular angle or range of angles. If a range of angles is used, the first angle must be Equilibrium.

这个限定在某角度或角度范围内复原力臂与横倾力臂的比值。如果使用角度范围，第一个角度必须为平衡点角度。

Identified by the keyword RAR, and using the separators BETWEEN and AND, the distinctive look of this limit is illustrated by the following example:

此限定使用关键词 RAR, 使用 BETWEEN 和 AND 表示角度范围，下例说明：

LIMIT RAR BETWEEN EQU AND 20 > 1.5

An example of the single-angle version is:

指定角度处的力臂比值:

LIMIT RAR AT MAX > 2.0

If a third angle is presented, it represents an alternate termination of the range (as in the AREA limit) such that the lesser of the second and third angles is used. For example,

如果出现第三个角度，像在面积限定中，使用第二个或第三个角度（取小者）做为终结角度，例如：

LIMIT RAR BETWEEN EQU AND RAO OR FLD > 2.5

ARM SINE RATIO LIMITS

The RASR limit checks the ratio between the absolute righting arm and the function:

RASR 限定核对绝对复原力臂与下面公式计算值的比值：

$$v * \sin ((h-eq0) * 180 / range)$$

where:

v = limit value 限定数值

h = heel angle 横倾角度

eq0 = equilibrium without heeling moment 无横倾力矩的平衡点角度

range = angle beyond equ0 at which sine curve goes to zero

range 是指越过平衡点（正弦曲线的 0 点）角度

The ratio is checked at every angle for which the righting arm is calculated between two given angles. For example,

在给定两角度范围内的任何角度的比值都要校核。例如：

LIMIT RASR FROM 5 TO 60 RANGE 90 > 0.5

checks the ratio in the interval 5 degrees to 60 degrees. The sine function has a range between zeroes of 90 degrees. The limit is considered to be satisfied when the ratio of the absolute righting arm to the sine function is at least 0.5 at every angle in that range.

校核 5 度到 60 度区间的比值。函数公式的角度范围为 90 度。如果在此角度范围内每一角度处的绝对复原力臂和函数值的比值大于 0.5，那么满足限定要求。

This type of limit is particularly useful when the righting arm curve is complex and not well characterized by traditional measures of area, range, maximum arm, etc.

当复原力臂曲线复杂，不方便用传统的面积，范围，最大复原力臂表征时，此类限定非常有效。

Note that a sine curve with a range of 180 degrees with a peak amplitude of 1.4 ft (0.43 m) has the following characteristics:

180 度范围正弦曲线，峰值为 1.4 英尺(0.43 米)，有如下特征：

Area to 30 = 10.74 ft-deg (0.057 m-rad)

0 度到 30 度的面积为 10.74 英尺-度（0.057 米-弧度）。

Area to 40 = 18.75 ft-deg (0.10 m-rad)

0 度到 40 度的面积为 18.75 英尺-度（0.10 米-弧度）。

Arm at 30 degrees = 0.7 ft (0.21 m)

在 30 度处的复原力臂为 0.7 尺（0.21 米）。

These values are roughly equivalent to the limits in the traditional energy criterion. The exception is the GM, which is 1.4 ft (0.43 m) for the sine curve and 0.5 ft (0.152 m) in the energy criterion. The RASR limit provides for a starting angle at which the ratios are to be checked which may be set several degrees beyond equilibrium, thus allowing the initial slope of the RA curve (GM) to be less than would be required if the ratio checking began at equilibrium.

这些值和传统的能量横准限定值是大致等效的。不同在于 GM 值，正弦曲线的 GM 值为 1.4 英尺（0.43 米），能量横准的 GM 值为 0.5 英尺（0.152 米）。RASR 横准提供了不仅校核起始角处的力臂比值，而且还校核几个越过平衡点的角度处的力臂比值，这样可以校核复原力臂 RA 曲线在平衡点处的斜率（GM）值。

The RASR limit simultaneously checks range, area and maximum RA while guaranteeing that the righting arm curve does not dip below expected values leading to undesirable stability characteristics.

RASR 限定可同时检查范围，面积和最大 RA，确保复原力臂曲线不会低于预期值而生成不理想的稳性特征曲线。

Another form of the RASR limit applies only at the least of a series of angles, at which the ratio of the absolute righting arm to that angle's sine should be greater than the limit value:

另外一种形式的 RASR 限定适用于一系列角度，在某角度的绝对复原力臂与角度正弦值的比值大于限定值：

LIMIT RASR AT ang1 [OR ang2 [OR ang3]] > minvalue

ARM RISE LIMIT

The special RISE limit deals with the value of the absolute righting arm at its maximum relative to its value at equilibrium. Like the Arm Ratio limit, it can only be used when a heeling moment is present (otherwise, a division by zero at equilibrium would occur). The "rise" is the increase in the absolute righting arm from the angle of equilibrium (or "first intercept") to the angle where it is at its maximum. The limit is expressed as the ratio between the rise and the value at equilibrium. For example,

RISE 限定最大复原力臂与在平衡点处的复原力臂的比值。像力臂比值，它只适用于当有外加横倾力矩时（否则会被 0 除而无意义）。"rise" 表示最大复原力臂相对于平衡点处的复原力臂的增加值。限定可以用增加值与平衡点处的绝对复原力臂的比值来表达。例如：

LIMIT RISE > 0.667

would be met when the absolute righting arm at equilibrium is less than 60% of its value at maximum; i.e.,

平衡点处的绝对复原力臂要小于最大复原力臂的 60%。

$$RA1/RA_{max} < 0.6$$

Therefore 因此

$$(RA_{max} - RA1) / RA1 > 0.667$$

Alternatively, a minimum RISE limit can be specified over an angle range:

可以在指定的角度范围内设定最小的力臂值增量。

$$LIMIT RISE FROM angle1 TO angle2 > rise$$

Any use of the MAX keyword with the RISE type represents the angle of maximum absolute righting arm (unless residual MAX appears in other LIMITs).

任何在 RISE 类型中使用的关键词 MAX 表示绝对复原力臂最大时的角度。（排除出现在其它的 LIMITs 限定中的 MAX）。

GM LIMITS

The GM limit normally refers to the equilibrium angle (either default EQUIL or EQU0); however, zero heel may be used by declaring GM UPRIGHT. For example,

GM 限定一般参考平衡点角度（默认 EQUIL 或 EQU0）；然而，在定义正浮 GM(GM UPRIGHT) 时，参考横倾为 0。例如：

$$LIMIT GM UPRIGHT > 0.15$$

Using the GM UPRIGHT limit insures that the vessel will be stable in the upright position -- a condition not guaranteed by any of the other limits. Note that GM refers to a property of the absolute righting moment, without regard to any heeling moment which may be in effect.

限定正浮 GM 值后就可以确保船舶正浮时的稳性，不需要额外的限定来保证。GM 值参考绝对的复原力距，不考虑任何的横倾力矩的影响。

FLOOD HEIGHT LIMITS

The FLOODHT form defines a limit for the height of the lowest normal downflooding point above the waterplane at the given angles (or EQUIL if none is given):

FLOODHT 限定在某角度下（平衡点角度或不指定）最低敞口进水点距水面的最小高度。

$$LIMIT FLOODHT [AT angle1 [TO angle2]] > height$$

A special case of this command limits the height at equilibrium of both weathertight and normal downflooding points within a specified range of Critical Point numbers (or all if none is given):

限定制定进水点（如果没有规定，默认是全部）在船舶平衡位置时距离水面的最小高度。

$$LIMIT FLOODHT AT POINT n1 [TO n2] > height$$

INCLINATION LIMITS

The INCL form defines a limit for the steepest inclination in degrees at the given angles (or EQUIL if none is given):

限定船舶在某角度下（平衡时的角度或不指定）的倾斜增量。

LIMIT INCL [AT angle1 [TO angle2]] < inclination

Area Units 面积单位:

LIMIT AREA specifies whether areas under righting arm curves are subsequently to be expressed in units of length-degrees or length-radians. Unit must be either DEGrees or RADians. For example,

LIMIT AREA 限定复原力臂曲线下的面积时使用单位长度-角度 或 长度-弧度。单位必须是度（DEGrees）或弧度（RADians）。例如:

LIMIT AREA: DEGREES

If not specified, foot-degrees are used in English mode and meter-radians are used in metric mode. These original default values are restored by the LIMITS OFF and UNITS commands.

如果未指定，面积单位会使用英制单位的英尺-度 (foot-degrees) 和公制单位的米-弧度 (meter-radians)。这些默认的初始值可以有命令 LIMITS OFF 和 UNITS 命令来恢复。

If an individual LIMIT specification contains "AREA: unit", it temporarily overrides whatever unit is currently in effect.

如果个别的衡准 LIMIT 含有指定的单位 ("AREA: unit") 时，会暂时使用指定的单位而忽略当有效的单位。

Stability Criterion Description 稳性横准说明

LIMIT TITLE assigns the given description (which may be any text up to 35 characters long) as the title of the current stability criterion. It is shown in the limits display header and plot header followed by the word CRITERION. For example,

LIMIT TITLE 定义当前使用稳性横准的标题（可以多达 35 个字符长）。此标题会显示在横准显示顶端。例如:

LIMIT TITLE IMO CHEMICAL CODE III

would result in "IMO CHEMICAL CODE III CRITERION" being shown in the header.

顶部会显示标题"IMO CHEMICAL CODE III CRITERION"。

Display Output

显示输出

Display mode is activated when no parameters beyond (n) are given. For example, 当除了数值参数(n)，没有其它参数时，显示模式会被激活。例如:

LIMIT(1)

lists the first limit on the screen. All limits are displayed if (n) is omitted. The limits are automatically displayed in the RAH/LIM and MAXVCG command outputs.

屏幕显示第一条限定条件。如果省略数值(n)，会显示所有的限定条件。在命令 RAH/LIM 和 MAXVCG 输出中限定条件会自动显示。

Nondisplay Output:**无显示输出**

none.

无

Examples**样例**

A typical criterion in metric units:

公制单位的典型横准

LIMITS OFF `Ensures that any existing limits are cleared. 清空所有的横准

LIMIT AREA FROM 0 TO 30 > 0.055

LIMIT AREA FROM 0 TO 40 OR FLD > 0.090

LIMIT AREA FROM 30 TO 40 OR FLD > 0.030

LIMIT RA AT 30 > 0.200

LIMIT ANGLE FROM 0 TO MAX > 25

LIMIT GM UPRIGHT > 0.150

LIMITS `Displays resulting criterion on the screen. 屏幕显示所用横准

A criterion for damage conditions in English units:

英制单位破舱稳性横准

LIMIT ANGLE FROM EQUIL TO RA0 > 20

LIMIT RA AT MAX > 0.328

LIMIT ABSOLUTE ANGLE AT EQUIL < 25

LIMIT ANGLE FROM EQUIL TO FLD > 0

A drilling unit dynamic stability criterion:

钻井平台动稳性横准

LIMIT ABSOLUTE RATIO FROM 0 TO RA0 OR FLD > 1.4

Limiting the absolute angle after roll:

Roll 后限制绝对角度

LIMIT ANG AT ROLL < 30

Limiting the angle of equilibrium to between 25 and 30 degrees depending on the angle of deck immersion (note the terminating angle on the first limit is the greater of 25 or DI since the "TO" keyword is used, so it will be controlling whenever the angle of deck immersion is less than 30; the second limit is controlling whenever deck immersion is greater than 30):

限定平衡角在 25 度和 30 度之间，取决于甲板浸没时的角度。（当 DI 小于 30 度时，第一个衡准的终结角度为 25 度或甲板浸没角度 DI（二者取大者）。当 DI 大于 30 度时，使用第二衡准。）

LIMIT ANGLE FROM EQU TO ABS 25 TO DI > 0

LIMIT ANGLE FROM EQU TO ABS 30 > 0

Limiting residual range of stability (RA0 minus EQU) to 7°plus 150% of the equilibrium angle for self-elevating mobile offshore drilling units:

衡准稳距范围为 7. 在可移动自升式平台中，应考虑 250%的平衡角度。

LIMIT ANGLE FROM 250%EQUPLUS TO RA0 > 7