



高等职业教育规划教材

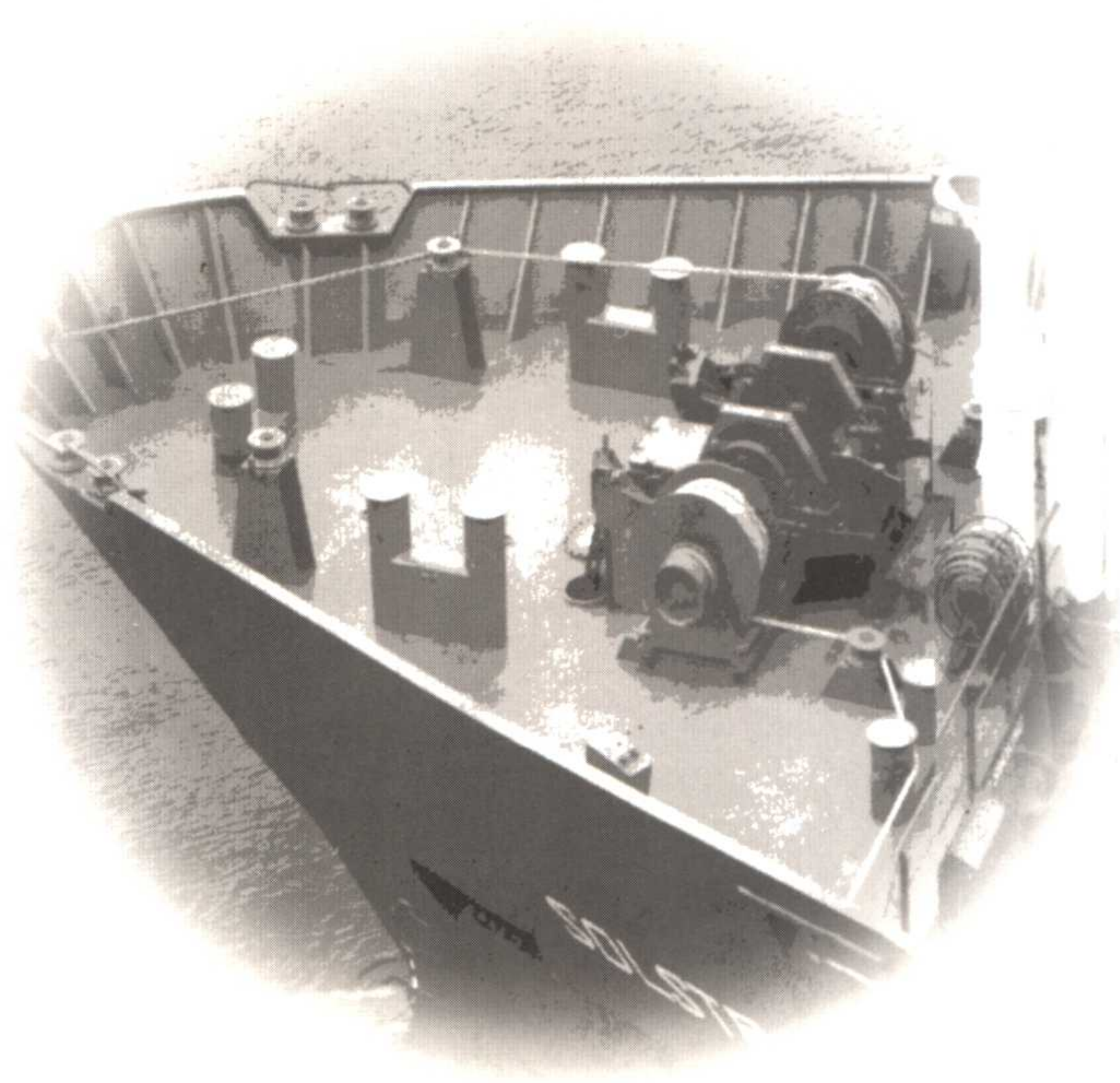
交通职业教育教学指导委员会推荐教材  
高等职业院校船舶技术专业教学用书

# 专业英语

船舶工程技术专业

● 张依莉 主编 ● 张宝华 主审

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Yingyu



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高等职业院校船舶技术专业教学用书

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## 内 容 提 要

本书是高等职业教育船舶技术类船舶工程专业交通职业教育教学指导委员会规划教材之一,按照《专业英语》教学大纲的要求而编写的。

本书共分十七个单元 25 课,主要包括:船舶形状、船舶类型、船舶分类简介、船体结构、船舶性能、船体建造工艺、焊接、推进装置、船舶设备、船用柴油机、船舶系统、船舶电气、通信和导航设备、保养和坞修、安全、法律法规、船厂方面的基本知识。

本书是针对三年制高等职业教育编写的,二年制的也可参考使用。同时,本书还适用于船员的考证培训和船厂职工的自学以及其他形式的职业教育。

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为深入贯彻《国务院关于大力发展职业教育的决定》，积极推进课程改革和教材建设，为职业教育教学和培训提供更加丰富、多样和实用的教材，更好地满足我国造船工业快速发展的需要，交通职业教育教学指导委员会航海类专业指导委员会委托交通职业教育研究会船舶技术专业委员会，联合组织全国开办有船舶技术类专业的职业院校及其骨干教师，编写了高等职业教育船舶工程技术专业、轮机工程技术(船舶动力机械与装置方向)专业和电气自动化技术(船舶电气方向)专业交通职业教育教学指导委员会规划教材。

本系列教材注重以就业为导向，以能力为本位，面向市场，面向社会，体现了职业教育的特色，满足了高素质的实用型、技能型船舶技术专业高等职业人才培养的需要。本系列教材在组织编写过程中，形成了如下特色：

1. 认真总结了全国开办有船舶技术类专业的职业院校多年来的专业教学经验，并吸收了部分企业专家的意见，代表性强，适用性广；
2. 以职业岗位的需求为出发点，适当精简了教学内容，减少了理论描述，具有较强的针对性；
3. 教材编写时在每章前列出了知识目标 and 能力目标等学习目标要求，每章结尾处编制了大量思考与练习题，便于组织教学和学生学习。

本系列教材是针对三年制高等职业教育编写的，二年制的也可参考使用。同时，本系列教材还适用于船员的考证培训和船厂职工的自学以及其他形式的职业教育。

《专业英语》是高等职业教育船舶技术类船舶工程技术专业交通职业教育教学指导委员会规划教材之一，按照《专业英语》教学大纲的要求，尽量从最新的国外原文资料中选择恰当内容，按船舶知识分类为十七个单元25课编写。主要内容包括：船舶形状、船舶类型、船舶分类简介、船体结构、船舶性能、船体建造工艺、焊接、推进装置、船舶设备、船用柴油机、船舶系统、船舶电气、通信和导航设备、保养和坞修、安全、法律法规、船厂方面的基本知识。

参加本书编写工作的有：主编江苏省无锡交通高等职业技术学校张依莉(编写第一至四、六、八、九单元共13课)，参编武汉交通职业技术学院吴琼(编写第五、十七单元共2课)、江苏省无锡交通高等职业技术学校吴志亚(编写第七、十至十三单元共7课)、江苏省无锡交通高等职业技术学校朱黄兵(编写第十四至十六单元共3课)。

本书由上海贝尔国际语言学校张宝华担任主审，在此表示感谢！

限于编者经历和水平，教材内容难以覆盖全国各地的实际情况，希望各教学单位在积极选用和推广本系列教材的同时，注重总结经验，及时提出修改意见和建议，以便再版修订时改正。

交通职业教育教学指导委员会航海类专业指导委员会

二〇〇六年三月



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# UNIT ONE THE SHAPE OF A SHIP

## 单元一 船舶形状

### ● 学习目标

#### 知识目标

1. 掌握船舶主要要素的定义；
2. 掌握船体形状主要参数的英文表达方式。

#### 能力目标

1. 能正确使用主尺度、尺度比、船型系数等英语词汇表述船体形状；
2. 熟悉主要船体总体图样。

## Lesson One

### 1. Principal Dimensions

All aspects concerning the measurement of seagoing vessels are arranged in the certificate of registry act of 1982. Part of the certificate of registry act is the International treaty on the measurement of ships, as set up by the IMO conference in 1969. The treaty applies to seagoing vessels with a minimum length of 24 metres and came into force in July, 1994.

#### 1.1 Fore Perpendicular (FPP, or FP)

This line crosses the intersection of the water line and the front of the stem.

#### 1.2 Aft Perpendicular (APP, or AP)

This line usually aligns with the centerline of the rudder stock (the imaginary line around which the rudder rotates).

#### 1.3 Load Line

The water line of a ship lying in the water. There are different load lines for different situations, such as:

##### 1.3.1 Light Water Line

The water line of a ship carrying only her regular inventory.

##### 1.3.2 Deep Water Line

The water line of maximum load draught in seawater.

##### 1.3.3 Water Line



The load line at the summer mark as calculated in the ship design by the ship builder.

1.3.4 Construction Water Line (CWL)

The water line used to determine the dimensions of the various components from which the vessel is constructed.

1.4 Deck Line

Extended line from the topside of the fixed deck at the ship's side.

1.5 Molded Dimensions

Distance between two points, measured on inside plating (or outside framing).

1.6 Base Line

Top of the keel.

1.7 Plimsoll Mark

The Plimsoll mark or Freeboard mark consists of a circle with a diameter of one foot and a horizontal line which goes through the center of the circle. This level indicates the minimum freeboard in salt water at the summer time. Beside the circle is a number of horizontal lines indicating the minimum freeboard as above. Summer freeboard: S. Other conditions: Tropical: T, Winter: W, Fresh (water): F, Tropical Fresh: TF, and for small ships less than 100m: Winter North Atlantic: WNA. All of them are connected by a vertical line.

The draught marks, Plimsoll Line and Plimsoll Mark are permanent marks. Usually this means that they are carved into the hull (Fig. 1.1).

1.8 Length between Perpendiculars ( $L_{pp}$ )

Distance between the Fore and the Aft Perpendicular.

1.9 Length over All ( $L_{oa}$ )

The horizontal distance from stem to stern.

1.10 Length on the Water Line ( $L_{wl}$ )

This is the length of design water-line or the length of full-load waterline.

1.11 Breadth ( $B$ )

The greatest breadth, measured from side to side outside the frames but inside the shell plating.

1.12 Breadth over All

The maximum breadth of a ship as measured from the outer hull on starboard to the outer hull on port side.

1.13 Draught at the Stem ( $T_f$ )

It's the vertical distance between the water line and the underside of the keel, as measured on the fore perpendicular.

1.14 Draught at the Stern ( $T_a$ )

The vertical distance between the water line and the underside of the keel as measured from the aft perpendicular.

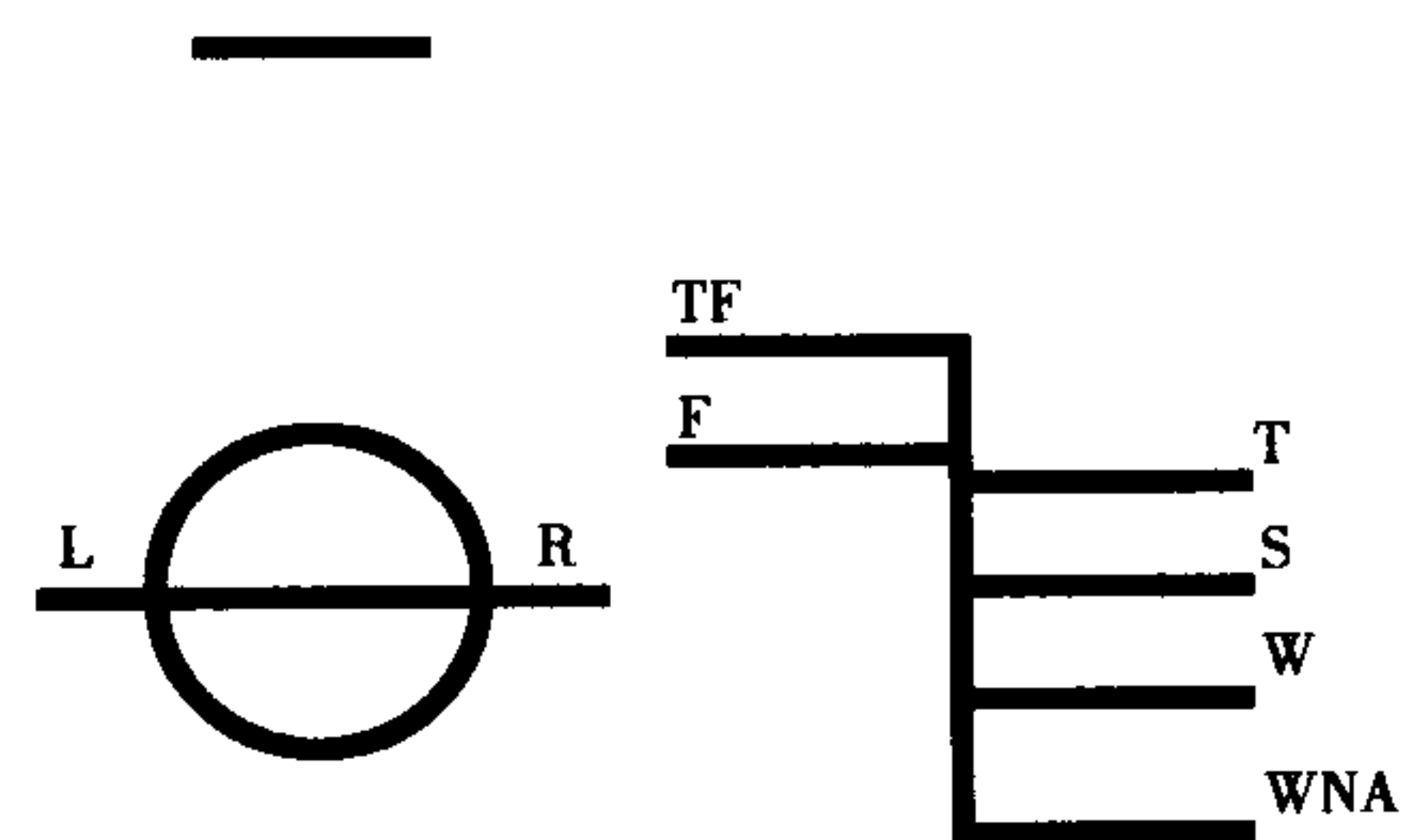


Fig. 1.1

S-Summer (for water with a density of 1.025t/m<sup>3</sup>); T-Tropics (ditto); W-Winter (ditto); WNA-Winter North Atlantic (ditto); F-Fresh water; TF-Tropical Fresh water



### 1.15 Trim

This is the difference between the draught at the stem and the draught at the stern.

### 1.16 Down and Trimmed By The Head.

It's the condition under which the draft is larger at the stem than that at the stern.

### 1.17 Down and Trimmed By The Stern.

It's the condition under which the draft is larger at the stern than that at the stem.

### 1.18 Depth

The vertical distance between the base line and the upper continuous deck.

### 1.19 Freeboard

The distance between the water line and the top of the deck at the side (at the deck line).

### 1.20 Sheer

This is the upward rise of a ship's deck from amidships towards the bow and stern. The sheer gives the vessel extra reserve buoyancy at the stem and the stern.

### 1.21 Camber

It's the athwart-ship's curvature of the weather deck. The curvature helps ensure sufficient drainage.

## 2. Proportions & Form Coefficients

### 2.1 Proportions

The ratios of some of the dimensions discussed above can be used to obtain information on resistance, stability and maneuverability of a ship. Some widely used relations are:

#### 2.1.1 $L/B$

The ratio of length and breadth can differ quite dramatically depending on the type of vessel.

Common values are as follows:

Passenger ships            6 ~ 8

Freighters                 5 ~ 7

Tug boats                 3 ~ 5

A larger  $L/B$  value is favorable for speed, but unfavorable for maneuverability.

#### 2.1.2 $L/D$

It's the length/depth-ratio. The customary values for  $L/D$  vary from 10 to 15. This relation plays a role in the determination of the freeboard and the longitudinal strength.

#### 2.1.3 $B/T$ ( $T = \text{Draught}$ )

It's the breadth/draught-ratio, which varies from 2.3 to 4.5. A larger breadth in relation to the draught (a larger  $B/T$ -value) gives greater initial stability.

#### 2.1.4 $B/D$

The breadth/depth-ratio, which varies from 1.3 to 2. If this value becomes larger, it will have an unfavorable effect on the stability (because the deck will be flooded when the vessel has an inclination) and on the strength.





## 2.2 Form Coefficients

Form coefficients give clues about the characteristics of a vessel's shape from the water line down into the water. This makes it possible to get an impression of the shape of the underwater body of a ship without extensive use of any data. However, the form coefficients, as non-dimensional numbers, do not contain any information on the dimensions of a ship.

### 2.2.1 Waterplane-coefficient ( $C_w$ )

The waterplane-coefficient gives the ratio of the area of the water line  $A$  and the rectangular plane spanned by  $L_{wl}$  and  $B$ . A large waterplane-coefficient in combination with a small block-coefficient (or coefficient of fineness) is favourable for the stability in both athwart and fore and aft direction.

$$\text{Waterplane-coefficient } (C_w) = A_w / L_{wl} \times B$$

### 2.2.2 Midship Section Coefficient ( $C_m$ )

The midship-coefficient gives the ratio of the area of the midship section ( $A_m$ ) and the area spanned by  $B$  and  $T$ .

$$\text{Midship-coefficient } (C_m) = A_m / B \times T$$

### 2.2.3 Block Coefficient, Coefficient of Fineness ( $C_b$ )

The block coefficient gives the ratio of the volume of the underwater body and the rectangular beam spanned by  $L_{wl}$ ,  $B$  and  $T$ . A vessel with a small block coefficient is referred to as 'slim'. In general, fast ships will have a small block coefficient.

$$\text{Block coefficient } (C_b) = V / L_{wl} \times B \times T$$

Customary values for the block coefficient of several types of vessels are:

Tanker	0.80 ~ 0.90
Freighter	0.70 ~ 0.80
Container vessel	0.60 ~ 0.75
Reefer	0.55 ~ 0.70
Frigate	0.50 ~ 0.55

### 2.2.4 Prismatic Coefficient ( $C_p$ )

The prismatic coefficient gives the ratio of the volume of the underwater body and the block formed by the area of the midship section ( $A_m$ ) and  $L_{wl}$ . The  $C_p$  is important for the resistance and hence for the necessary power of propulsion.

$$\text{Prismatic coefficient } (C_p) = V / L_{wl} \times A_m$$

The maximum value of all these coefficients is reached in the case of a rectangular beam, and will equal to 1 while the minimal value is theoretically 0.

## New Words & Verb Phrases

1 principal [ 'prɪnsəp(ə)l, -sɪp- ]

*adj.* 主要的, 首要的

2 dimension [ di'menʃən ]

*n.* 尺寸, 尺度



- |   |               |
|---|---------------|
| 3 aspect [ 'æspekt ]                      | n. 外表, 样子     |
| 4 concerning [ kən'sə:niŋ ]               | prep. 关于      |
| 5 registry [ 'redʒistri ]                 | n. 登记, 船舶的国籍  |
| 6 perpendicular [ ,pə:pən'dikjule ]       | n. 垂线         |
| 7 intersection [ ,intə(:)'sekʃən ]        | n. 交叉点        |
| 8 keel [ ki:l ]                           | n. 龙骨         |
| 9 draught [ drɔ:ft ]                      | n. 吃水         |
| 10 determine [ di'tə:min ]                | n. 测定, 决定     |
| 11 various [ 'vɛəriəs ]                   | adj. 多样的      |
| 12 component [ kəm'pəunənt ]              | n. 成分         |
| 13 extend [ iks'tend ]                    | adj. 延长的      |
| 14 topside [ 'tɒpsaid ]                   | n. 最上层        |
| 15 freeboard [ 'fri:bɔ:d ]                | n. 干舷         |
| 16 horizontal [ ,hɔ:ri'zɒntl ]            | adj. 水平的      |
| 17 indicate [ 'indikeit ]                 | v. 表示         |
| 18 tropical [ 'trɒpikl ]                  | adj. 热带的      |
| 19 stern [ stə:n ]                        | n. 船尾         |
| 20 frame [ freim ]                        | n. 框架         |
| 21 starboard [ 'stɑ:bəd, -bɔ:d ]          | n. 右舷         |
| 22 trim [ trim ]                          | n. 纵倾         |
| 23 depth [ depθ ]                         | n. 型深         |
| 24 sheer [ ʃiə ]                          | n. 舷弧         |
| 25 camber [ 'kæmbə ]                      | n. 梁拱         |
| 26 curvature [ 'kə:vətʃə ]                | n. 曲率         |
| 27 ensure [ in'sjuə ]                     | v. 保证         |
| 28 sufficient [ sə'fiʃənt ]               | adj. 充分的      |
| 29 drainage [ 'dreinidʒ ]                 | n. 排水         |
| 30 amidships [ ə'midsʃips ]               | adv. 在船中部     |
| 31 buoyancy [ 'bɔ:ɪnsi ]                  | n. 浮力, 浮性     |
| 32 inventory [ 'invəntri ]                | n. 总量, 存货     |
| 33 ratio [ 'reiʃiəu ]                     | n. 比率         |
| 34 resistance [ ri'zistəns ]              | n. 阻力         |
| 35 stability [ stə'biliti ]               | n. 稳性         |
| 36 maneuverability [ mənənu:vərə'biliti ] | n. 操纵性        |
| 37 favorable [ 'feivərəbl ]               | adj. 有利的      |
| 38 customary [ 'kʌstəməri ]               | adj. 习惯的      |
| 39 initial [ i'niʃəl ]                    | adj. 最初的, 初始的 |
| 40 longitudinal [ lɒndʒi'tju:dinl ]       | adj. 纵向的, 经度的 |



41	dramatically [drə'mætɪkəli]	adv. 显著地
42	inclination [ˌɪnklɪ'neɪʃən]	n. 倾向, 趋势
43	freighter ['freɪtə]	n. 货船
44	coefficient [kəʊi'fɪʃənt]	n. 系数
45	clue [klu:]	n. 线索
46	extensive [ɪks'tensɪv]	adj. 广泛的
47	non-dimensional	n. 无因次
48	midship	n. 船中
49	rectangular [rek'tæŋɡjʊlə]	adj. 矩形的
50	span [spæn]	n. 横跨
51	waterplane-coefficient	n. 水线面系数
52	block-coefficient	n. 方形系数
53	midship section coefficient	n. 中剖面系数
54	prismatic-coefficient	n. 棱形系数
55	refer [rɪ'fə:]	v. 归诸于, 认为是
56	slim [slɪm]	adj. 苗条的
57	reefer ['ri:fə(r)]	n. 冷藏船(车)
58	frigate ['frɪɡɪt]	n. 护卫舰
59	athwart [ə'θwɔ:t]	adv. 横跨着
60	hence [hens]	adv. 因此, 从此
61	prismatic [prɪz'mætɪk]	adv. 棱镜的
62	theoretically [θiə'retɪkəli]	adv. 理论上
63	international treaty	国际条约
64	the certificate of registry	船舶登记证书
65	IMO—International Maritime Organization	国际海事组织
66	come into force	生效, 实行
67	regular inventory	额定载荷
68	the front of the stem	首柱
69	align with	与……平行
70	rudder stock	舵杆
71	Plimsoll mark (Plimsoll 为姓氏)	吃水标志
72	port side	左舷
73	vertical distance	垂直距离
74	the upper continuous deck	上层连续甲板
75	water line	设计水线
76	reserve buoyancy	储备浮力
77	longitudinal strength	纵向强度
78	initial stability	初稳性





79	be used to	习惯于
80	be flooded	为水所淹
81	the rectangular beam	立方体
82	in the case of	在……情况下

## 参考译文

### 1. 主尺度

所有海船外表特征表述依据于 1982 年的登记证书规定。登记证书规定的部分出自国际海事组织于 1969 年协商提出的船舶尺度国际条约,该条约于 1994 年 7 月实行。条约定义的海船最小长度为 24 米。

#### 1.1 首垂线

穿过首柱与设计水线交点的垂线。

#### 1.2 尾垂线

通常与舵杆中心线(舵绕着旋转的假想线)重合。

#### 1.3 载重线

船舶浮于水上时的水线,不同位置有不同的载重线,如:

##### 1.3.1 空载水线

船舶仅携带额定空载状态载荷时的水线。

##### 1.3.2 满载水线

船舶在海水中最大载荷时的吃水线。

##### 1.3.3 设计水线

由船舶建造者设计计算的夏季载重线标志。

##### 1.3.4 结构水线

用于测定船舶各种结构成分尺度的水线(结构设计所依据的水线)。

#### 1.4 甲板(边)线

从船舶最上层(连续)甲板延伸的甲板边线。

#### 1.5 型尺度

由船舶内表面(或外部框架)测得的两点之间距离。

#### 1.6 基线

(水平)龙骨底线。

#### 1.7 吃水标志

船舶吃水标志或干舷标志是由一个直径为 1 英尺的圆及通过圆心穿过圆周的水平线所组成。这条水平线表示夏季最小吃水干舷,该圆旁边的水平线上标示了最小干舷代号:夏季干舷——S。其他还包括:热带——T,冬季——W,淡水——F,热带淡水——TF,对小于 100 米的船舶还有北大西洋冬季——WNA。它们用一条垂线连接。

吃水标志、干舷标志或吃水线都是永久性标记,通常被刻在船体外壳上。