

**2010**

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**Rules for the Towing Survey of  
Barges and Tugboats**

# **APPLICATION OF "RULES FOR THE TOWING SURVEY OF BARGES AND TUGBOATS"**

1. Unless expressly specified otherwise, the requirements in the Rules apply to Towing Survey of Barges and Tugboats for which contracts for construction are signed on or after 1 July 2010.
2. The amendments to the Rules for 1999 edition and their effective date are as follows;

**Effective Date : 1 July 2010**

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## **Chapter 3      Towing Arrangements**

- Section 1      Towing arrangements and resistances  
- 103.1 has been partially amended.

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# CHAPTER 1 GENERAL

## Section 1 General

### 101. Application

These Rules apply to the tugboats and the barge which are engaged in cargo transportation by towing and to the survey for safe carrying at sea if Owner requests.

### 102. Definitions

The definitions specified in these Rules are to be as follows:

- (1) The tugboats is the ship which is used for towing or pushing (hereinafter called as "towing") the towed ship exclusively.
- (2) The barge is the ship without propulsion engine and is on-water structures for carrying cargoes at sea to be towed by tugboats generally.

### 103. Restriction in service area

1. Restriction in service area for tugboats is to be complied with Korean Ship Safety Act.
2. Restriction in service area for barges is to be complied with the **Rules and Guidance for the Classification of Steel Barge** or equivalent thereto.
3. In case of any one of the following conditions, it should not be engaged in cargo transportation in coastal service area and over.
  - (1) tugboats whose length is less than 20 m or whose main engine is smaller than 300 HP
  - (2) barge which has no sealing system in hatch or deck opening. However, when it may be accepted provided that it is deemed acceptable by the Society considering its special structures
  - (3) wooden barge and barge, whose tonnages are less than 50 gross tonnage
4. In spite of the **1** through **3**, it may be restricted in service area where deemed necessary considering the season, weather and its sailing routes, etc. ↓

## CHAPTER 2 STRUCTURES AND EQUIPMENT

### Section 1 Tugboats

#### 101. Structure of tugboats

Except where specified in this Chapter, structures, scantling, equipment, machinery, electrical equipment, steering gears, etc. of tugboats are to be complied with the Rules and **Korean Ship Safety Act** or equivalent thereto.

#### 102. Stability of tugboats

For the tugboats which are larger than 24 m and engaged in greater coastal area, the results of stability calculation are to be approved by the Society except the barge which is smaller than 500 gross tonnage and not engaged in international voyage.

#### 103. Communication equipment of tugboats

1. The radio installations required in the **Radio Wave Act of Korea** in accordance with the requirements of **Korean Ship Safety Act. 4. 1.** are to be provided in tugboats.
2. When a manned barge is to be towed, adequate radio installations are to be provided with the barge for communication even when the installations are out of order, and available measures such as hand flag signal are to be provided.

#### 104. Life-saving appliances of tugboats

Life-saving appliances are to be provided in accordance with the **Standard for Ship Life-Saving Appliances** on tugboats. And maximum number of persons to be carried on lifeboat or liferaft is to include the expected number of crews on barges.

#### 105. Measures for prevention of collision

A light, shape, sound and light signal appliances are to be provided in accordance with **1972 COLREG** on tugboats.

#### 106. Certificate of bollard pull

The certificate of bollard pull is to be provided on all tugboats.

### Section 2 Barges

#### 201. Structure of barges

Structural arrangements, scantling, equipment and other appliances are to be complied with the **Rules and Guidance for the Classification of Steel Barges** or equivalent thereto except otherwise specified.

#### 202. Stability of barges

1. In the stability of barges, the results of inclining experiment are to be more than the values of the following table unless it is deemed specially accepted by the Society.

Lightship condition	Full load condition
$GM \geq 0.164B$	$GM \geq 0.095B$
(Note) B : Breadth of barges	

- The inclining experiment may be dispensed with in case that service area is restricted within smooth water, weight and center of weight are easily calculated and its stability is deemed sufficient.

**203. Load-lines of barges**

- The load-lines in accordance with the requirements in **1966 ILLC** is to be indicated in the barges engaged on international voyage.
- In case of the barges engaging in coastal area, the freeboard is determined by the following formula and the method to be indicated is to be in accordance with requirements specified in **ILLC article 66**. However, if it is impracticable or unreasonable, the method to be indicated may be specially considered.

$$F = \frac{10(0.68 + C_b)K}{1.36}$$

*F* : freeboard (mm)

*C<sub>b</sub>* : block coefficient, however, it is not to be less than 0.68

*K* : the value obtained from the following table

Type of barges		<i>K</i>
<i>L</i> < 50 m	Cargo barges	0.8 <i>L</i>
	Oil barges	0.5 <i>L</i>
<i>L</i> ≥ 50 m	Cargo barges	$\left(\frac{L}{10}\right)^2 + \left(\frac{L}{10}\right) + 10$
	Oil barges	$0.8\left(\frac{L}{10}\right)^2 + \left(\frac{L}{10}\right)$
(Note) <i>L</i> : Length of barges (m)		

**204. Life-saving and fire-extinguishing appliances of barges**

- Two life buoys and the life jackets as many as the number of maximum persons on board are to be provided on a manned barges. However, if more than 5 crews are on board the barges which are used for international voyage, liferafts capable of maximum number of persons to be carried on are to be provided on board.
- If there are accommodation areas or galley in the barge, portable fire extinguishers are to be provided in each area.

**205. Other appliances of barges**

The requirements specified in **2** of **103.** and **105.** also apply to barges. ↓

## CHAPTER 3 TOWING ARRANGEMENTS

### Section 1 Towing arrangements and resistances

#### 101. Towing arrangements

Towing arrangements in tugboats and barges are divided into towing equipment and towing arrangements and specified generally as follows:

Name of towing arrangements		Tugboats	Barges	Remarks
towing equip- ment	tow-lines		○	it may be acceptable to be provided on barges
	chain for linking tow-lines	○	○	
	deltaplate	○		if may be necessary in accordance with the towing arrangements
	shackle for links	○	○	
towing	towing hook	○		only for fitted to hull with hook
	bollard, bit or fair-leader	○	○	
	capstan for towing	○		only if fitted

#### 102. Tow-lines

- The length of tow-lines is determined by the following formula. However, when its service area is restricted within smooth water, it is to be at the discretion of the Society.

$$S = K(L_1 + L_2)$$

$S$  : length of tow-line (m)

$L_1$  : length of tugboats or half length of barge (m)

$L_2$  : length of barge (m)

$K$  : the value obtained from following table

	Coastal area	Greater coastal area
$K$	2.0	3.0

- The strength of towing arrangements is to be in accordance with followings.

(1) Minimum breaking strength of tow-lines is to be in accordance with the following table.

Bollard pull (BP)(ton)	BP < 40	40 ≤ BP ≤ 90	BP > 90
minimum breaking strength of tow-lines (ton)	3×BP	(3.8-BP/50)×BP	2×BP

(2) in case of chain, shackle, deltaplate and ring, etc. for linking tow-line

$$T = 1.5 \times X$$

where,

$T$  : minimum breaking strength of chain, shackle, deltaplate, ring, etc. (ton)

$X$  : minimum breaking strength of tow-lines as specified in (1) (ton)

(3) in case of towing hook

$$T = 1.5 \times X$$

where,

$T$  : minimum breaking strength of towing hook (ton)

$X$  : minimum breaking strength of tow-line as specified in (1) (ton)

(4) in case of brackets, bollards, bits and fair leaders

$$T = 1.3 \times X$$

where,

$T$  : ultimate strength of brackets, bollards, bits and fair leaders (ton)

$X$  : minimum breaking strength of tow-line as specified in (1) (ton)

### 103. Total resistance of towed ships

1. Total resistance of towed ships is to be in accordance with followings and the values may be the requirements for determining the bollard pull of the tugboats.

$$R_t = R_f + R_w + R_a \quad (\text{ton})$$

$R_t$  : Total resistance of towed ships (ton)

$R_f$  : frictional resistance as obtained from the following formula

$$R_f = 0.000136 F_1 A_1 V^2 \quad (\text{ton})$$

Where,

$F_1$  : hull surface condition coefficient, 0.8

$A_1$  : surface area below the waterline ( $\text{m}^2$ )

$V$  : towing velocity (knots)

$R_w$  : wave making resistance as obtained from the following formula

$$R_w = 0.014 C F_2 A_2 V^2 \quad (\text{ton})$$

where,

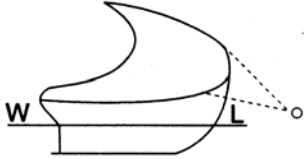
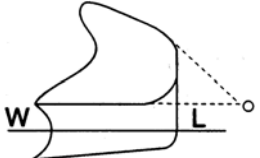
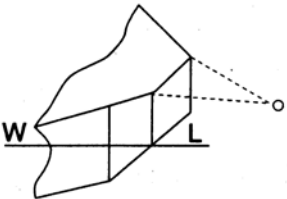
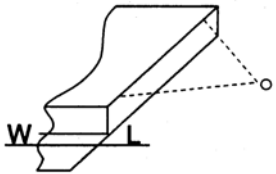
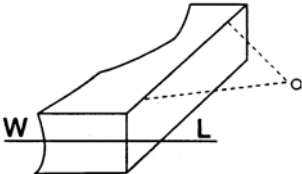
$C$  : resistance coefficient of rough sea condition, 1.2

$A_2$  : hull cross sectional area below the waterline ( $\text{m}^2$ )

$V$  : towing velocity (knots)

$F_2$  : bow shape coefficient as obtained from the following table



Bow shape	$F_2$
	0.2/0.4
	0.3/0.5
	0.4/0.6
	0.3/0.5
	0.8/1.0

$R_a$  : air resistance as obtained from the following formula

$$R_a = 0.0000195 C_s C_H A_3 (V_w + V)^2 \quad (\text{ton})$$

where,

$A_3$  : total cross sectional area exposed to wind above the waterline ( $\text{m}^2$ )

$V$  : towing velocity (knots)

$C_s$  : shape coefficient of hull surface facing the wind as obtained from the following table

Shape of hull surface	$C_s$
spherical	0.4
cylindrical	0.5
leg brace	0.5
leg cord	0.7
large flat. hull/deck house	1.0
clustered deck house	1.1
latticed structure	1.25
crane, beam, etc.	1.5

$C_H$ : coefficient of height from waterline to center of area facing the wind as obtained from the following table

Height from waterline (m)	$C_H$
0 - 15.3	1.0
15.3 - 30.5	1.1
30.5 - 46.0	1.2
46.0 - 61.0	1.3
61.0 - 76.0	1.37
76.0 - 91.5	1.43
91.5 - 106.5	1.48
106.5 - 122.0	1.52
122.0 - 137.0	1.56
137.0 - 152.5	1.60
152.5 - 167.5	1.63
167.5 - 183.0	1.67
183.0 - 198.0	1.70
198.0 - 213.5	1.72
213.5 - 228.5	1.75
228.5 - 244.0	1.77
244.0 - 256.0	1.79
more than 256	1.80

$V_w$ : wind velocity due to service area as obtained from the following table.

Service area	Wind velocity (knots)
Smooth water	29.16
Coastal water	36.93
Sea going	50.54

2. In addition to the requirements of 1, added resistance due to significant wave height in the following table is to be considered.

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Significant wave height (m)	Added resistance (ton)
1.5	1.0
3.0	5.5
4.5	10.0
6.0	14.0
7.5	16.0



## CHAPTER 4 SURVEY OF TOWINGS

### Section 1 Survey of towing

#### 101. Application

The requirements in this Chapter apply to the checking of seaworthiness of barges and tugboats, and to the safety inspection of towing arrangement (hereinafter referred to as the "survey of towing") by Owner's request before cargo transportation.

#### 102. Submission of data

1. The Owner is to submit the application for survey of towing and following data to the Society.
  - (1) Certificate for surveys of ships or barges
  - (2) Certificate for bollard pull of tugboats specified in **Ch 2. 106**
  - (3) Towing plans including followings
    - (A) Main information of tugboats and barges
    - (B) Number of person on board (in case of manned barges)
    - (C) Service area, towing speed, cargo volume, cargo weight and duration of operation
    - (D) Calculation results of total resistance of barge
    - (E) Strength calculation results and plans of towing arrangement
  - (4) Other data where this Society considers necessary
2. In case of the tugboats and barges holding the certificates of towing approved by the Society already, the data as specified in 1. (1) and (C) and (E) of (3) are to be submitted and the others may be dispensed with.

#### 103. Certificates of barges

1. When a barge which does not classed with the Society is to be surveyed for towing, the application for survey of the barge is to be made by the Owner before the survey of towing.
2. At the application of 1., the barge is to be surveyed in accordance with the requirements specified in **Chapter 2. Section 2** and **Rules and Guidance for Classification of Steel Barges**. Where barges have undergone the survey to the satisfaction of the Surveyor, the certificate for survey of the barges is issued.
3. The valid term of the certificate is 2 years. Even though it is not suitable for the strength specified in **Rules and Guidance for Classification of Steel Barges**, where the actual condition of hull and equipment is deemed in order, valid term of the certificate may be the period within one year as decided by the Surveyor.
4. For a barge classed with the Society, if requested by the Owner, the certificate for survey of barge may be issued after reviewing the survey reports. In this case, the valid term of the certificate is to be taken as the expiry date of next Special Survey.

#### 104. Survey of towing

1. The survey of towing by tugboats is to be carried out as following:
  - (1) Checking whether it has undergone Special Survey following the Rules for the Classification of Steel Ships or the Korean Ship Safety Act, and it may keep up the seaworthiness by reviewing the survey reports and etc.
  - (2) Reviewing the last survey reports for primary members of ship side plating, deck plating and watertight bulkhead, etc above waterline and underwater parts. Where, however, it deemed necessary by the Surveyor, overall inspection of hull may be requested.
  - (3) Surveying all openings in exposed area and checking the operational performance of all closing appliances.
  - (4) Surveying actual status of navigation appliances, anchoring and mooring equipment, fire-extinguishing system, bilge system, overboard discharging valves and etc.
  - (5) Surveying actual status and operational performance of communication equipment, life-saving ap-

pliances and collision prevention measures as specified in **Chapter 2 Section 1**.

2. The survey of towing by barges is to be carried out as followings:
  - (1) Checking the valid term of certificate as specified in **103**, is effective or it has undergone Special Survey following the Rules for the Classification of Steel Ships, it may keep up the seaworthiness.
  - (2) Reviewing last survey reports for underwater parts and primary members like as ship side plating above waterline, deck plating and watertight bulkhead. Where, however, it deemed necessary by the Surveyor, overall inspection for hull may be requested.
  - (3) Surveying all opening in exposure area, overboard discharging valves and sea suction valves, and checking the operational performance of all closing appliances. The effectiveness of closing appliances in cargo hatchway is surveyed carefully.
  - (4) Checking the sealing conditions of all opening in exposure area, overboard discharging valves and sea suction valves and the securing conditions of ventilator, funnel and etc. after covering with canvas. However, if it is manned barges, minimum necessary entrance, overboard discharging valves and sea suction valves for crew may be provided on board.
  - (5) For the scuttle without cover fitted at boundary of enclosed area giving access to exposure area or space below freeboard deck, checking whether the sealing measure from sea water is effective, even if the window is broken.
  - (6) Carrying out sounding for all compartment and checking whether the bilge is fully discharged.
  - (7) Checking keeping up the proper draft and trim for towing. Adjusting the draft and trim if necessary.
  - (8) Fixing the rudder at center.
  - (9) Checking the conditions of necessities like as emergency ration, drinking water and etc. for crew and emergency electric power sources, if it is a manned barge.
  - (10) Verifying the load line of barge or checking the cargo loading and securing condition on barge.
  - (11) Surveying actual status and operational performance of life-saving appliances, communication equipment and collision prevention measures specified in **Chapter 2 Section 1**.
  - (12) Where the barge operate within smooth water or service area reached in 2 hours, relaxation from requirements specified in (3) to (11) may be accepted.
3. The survey of towing arrangements is to be carried out as following.
  - (1) Confirming materials and scantling of rope for towing, chain, shackle and etc. written in arrangement of towing arrangements and checking the conditions of them.
  - (2) Surveying actual status of capstan for towing, deltaplate, towing hook, bollard(or bit, fair-leader) and etc.
  - (3) Confirming arrangement of towing arrangements. Especially it is deemed that the locations of rope for towing or chain are to be such that there is possibility of indent due to contact with hull components when towed, it is reinforced adequately or proper means to reduce the friction of guide roller to a minimum are provided.

### 105. Towing Certificates

1. Where the tugboats, barges and towing arrangements have undergone the survey to the satisfaction of the Surveyor, the certificate of towing is to be issued.
2. Towing certificate is restricted to a single voyage and valid term of the certificate is determined by the Surveyor within the voyage period.
3. Even if the certificate is not expired, valid term of the certificate is deemed completed, provided that the voyage is finished.
4. The method of description of the towing certificate is to be in accordance with the guidance as specified by the Society. ↓

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