TÜRK LOYDU

Chapter 13 – Escort Tugs

2012

This latest edition incorporates all rule changes. This rule is totally revised. Changes after the publication of the rule are written in red colour.

Unless otherwise specified, these Rules apply to ships for which the date of contract for construction as defined in IACS PR No.29 is on or after 27th of December 2012. New rules or amendments entering into force after the date of contract for construction are to be applied if required by those rules. See Rule Change Notices on TL website for details.

"General Terms and Conditions" of the respective latest edition will be applicable (see Rules for Classification and Surveys).

If there is a difference between the rules in English and in Turkish, the rule in English is to be considered as valid. This publication is available in print and electronic pdf version.

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SECTION 1

ESCORT TUGS

A. General

1. Scope

1.1 The requirements in this section apply to vessels specially intended for escort service.

1.2 In addition to these Rules, related sections of the current **TL** Rules for Classification of Steel Ships, Chapter 1, Hull, Chapter 4, Machinery, Chapter 5, Electrical Installation, are also applicable.

B. Character of Classification

1. Vessels built in compliance with the requirements in this section may be given the class notation **ESCORT TUG (p,V)**, where **p** indicates maximum transverse steering pull (FS in Fig.1) exerted by the escort tug on the stern of assisted vessel, and V, the speed at which this pull may be attained.

C. Definitions

1. The term *Escort Service* includes steering, braking and otherwise controlling the assisted vessel. The steering force is provided by the hydrodynamic forces acting on the tug's hull. See Fig.1.1.

Note:

As the hydrodynamic forces acting on the tug's hull increases approximately with the square of the speed, the steering ability increases more than proportionally with the speed. Escort service should therefore normally be undertaken in the speed range of 8 to 10 knots.

2. The term Escort test speed is understood to be the speed at which the full scale measurements or computer model simulation shall be carried out, namely 8 knots and or 10 knots.

3. The term Escort tug is understood to be the tug performing the escort service.

4. The term Assisted vessel is understood to be the vessel being escorted.

5. The Escort rating number (p,V) is defined as the steering force, p in tonnes determined according to Section F acting on the stern of assisted ship in tonnes, at **V** knots. If p is determined at both 8 and 10 knots the escort rating number will consist of 4 digits.

D. Document for Approval

The following plans and particulars shall be submitted for information:

- Towing arrangement plan including towline path and minimum breaking strength of towing line components
- Preliminary calculation of steering pull at 10 knots including propulsion components for balancing of oblique angular position of tug
- Preliminary and final stability calculations.

E. Arrangement and Design

1. The hull of the tug shall be designed to provide adequate hydrodynamic lift and drag forces when in indirect towing mode. Due attention shall be paid to the balance between hydrodynamic forces, towline pull and propulsion forces. Freeboard shall be arranged so as to avoid excessive trim at higher heeling angles. Bulwark shall be fitted all around exposed weather deck.

2. The towing winch shall have a load reducing system in order to prevent overload cause by dynamic oscillation in the towing line. Normal escort operation shall not be based on use of brakes on the towing winch. The towing winch shall be able to pay out towing line if the pull exceeds 50% of the breaking strength of towing line. The towing line shall have a breaking strength of at least 2.2 times the maximum mean towing pull as measured during the test.

3. The propulsion shall be able to provide ample thrust for manoeuvring at higher speeds for tug being in any oblique angular position.

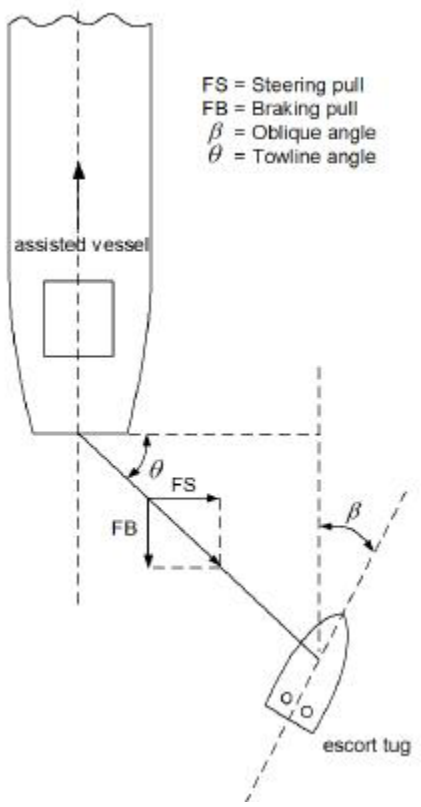

Fig. 1.1 Typical Escort configuration

F. Steering Force and Manoeuvring

1. Escort rating number

1.1 The escort rating number, (p,V), at 8 and or 10 knots.

p = FS·C (tonnes)

FS = Steering force from tug

C = k*28/t

k = 1.1

(28 secs is the manoeuvring time required by **TL** Rules Chapter 4, Machinery, Section 14, A.3.)

t = Manoeuvring time in sec. from maintained oblique position of tug giving maximum steering force on one side of assisted vessel to mirror position on the other side. Towline angle need not to be taken less than 30°.

2. Manoeuvring

2.1 The vessel shall be designed so that forces are in equilibrium with a minimum use of propulsive force except for providing forward thrust and balancing transverse forces during escorting service.

2.2 In case of loss of propulsion, the remaining forces shall be so balanced that the resulting turning moment will turn the escort tug to a safer position with reduced heel.

Note:

Due attention should be paid to sudden loss of thrust which may be experienced beyond certain angles of water inflow to propulsion units at higher speeds. Prediction of forces acting on the tug when escorting is necessary for scantling, manoeuvrability and preliminary stability calculations. Model testing may indicate hydrodynamic forces for indirect towing.

G. Stability

1. General

The stability of the ship for the loading conditions defined in Part A, Chapter 1, Hull, Section 26, B.2.2 is to be in compliance with the requirements in Part A, Chapter 1, Hull, Section 26, B.10 and B.11.

2. Additional criteria

The two following intact stability criteria are to be complied with:

$A \geq 1.25\ B$

$C \geq 1.40\ D$

where:

A = Righting lever curve area, in m-rad, measured from the heeling angle θ_C to a heeling angle of 20° (see Fig. 1.2)

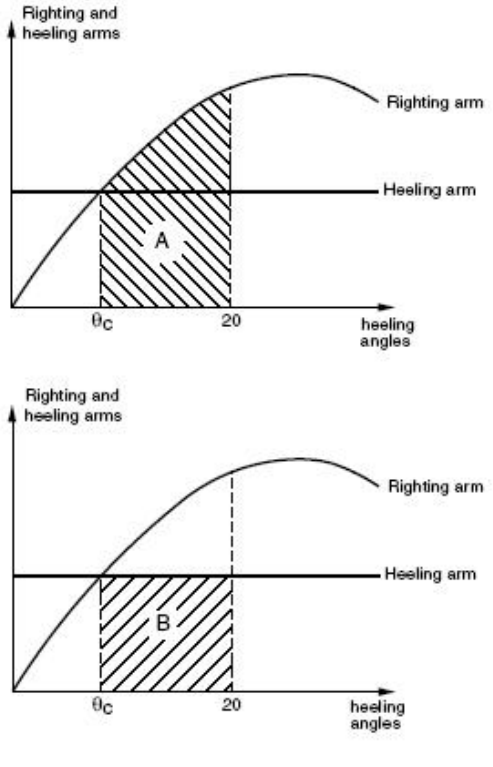

Fig. 1.2. Definition of the areas A and B

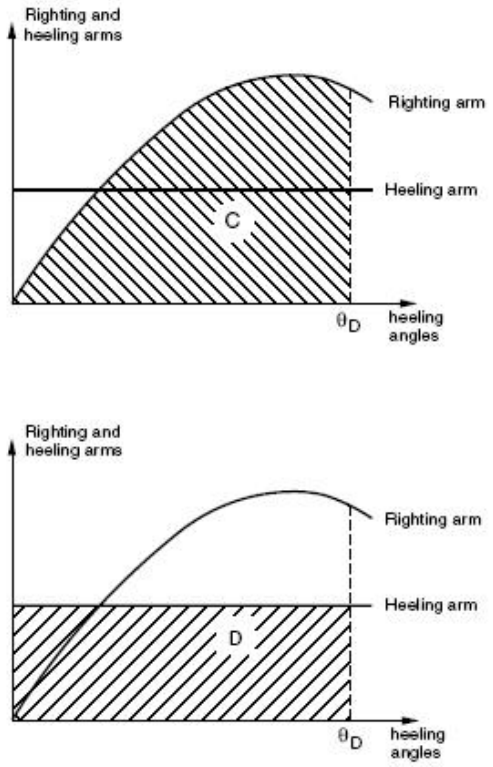

Fig. 1.3. Definition of the areas C and D

B = Heeling arm curve area, in m-rad, measured from the heeling angle θ_C to a heeling angle of 20° (see Fig. 1.2)

C = Righting lever curve area, in m-rad, measured from the angle 0° heel to the heeling angle θ_D (see Fig. 1.3)

D = Heeling arm curve area, in m-rad, measured from the angle 0° (heel to the heeling angle θ_D (see Fig. 1.3)

θ_C = Heeling angle of equilibrium, corresponding to the first intersection between heeling and righting arms, to be obtained when the maximum steering force FS is applied from the tug

θ_D = Heeling angle, to be taken as the lesser of:

- the angle of downflooding
- 40°.

The heeling arm curve is to be obtained from the full scale tests, for the maximum steering force FS.

Moreover, the heeling arm is to be assumed constant from the angle of equilibrium θ_C to an angle equal to 20°.

H. Full Scale Testing

1. Procedures

1.1 A plan with documentation covering the full scale trials shall be approved prior to the trials being undertaken.

1.2 The documentation shall include a towing arrangement plan showing different components in towing gear including the load cell. Verification of SWL of strong points onboard the assisted vessel shall be submitted.

1.3 The escort test speed is 8 knots and or 10 knots. The speed should be taken relative to the sea. Estimates of current during the trials may be required.

Note:

The current may be estimated by logging speed by GPS and relative log in separate runs while proceeding with and against the current.

2. Recordings during full scale trials

2.1 At least the following data shall be recorded continuously in real time mode during trials for later analysis:

- Position of assisted vessel and escort tug shall be recorded by differential gps equipment
- Speed of assisted vessel by differential GPS
- Speed of assisted vessel by log relative to the sea
- Heading of both vessels from gyro compasses
- Rudder angle on assisted vessel
- Heeling angle on tug
- Towline tension
- Length of tow line
- Angle of tow line.

Weather condition and sea state shall be noted. Manual measurements shall be read as back up to continuous readings. Bearing from tug to assisted vessel shall be recorded. Suitable test forms shall be used.

Note:

Assisted vessel shall sail on auto pilot during trials. Size of vessel shall be sufficient as to withstand steering forces from tug without using too large angles.

I. Alternative to full-scale tests

1. Maximum steering force

The maximum steering force FS that the tug applies on the assisted ship is to be evaluated by a computer model programme that considers a quasi-steady solution, in which the horizontal forces and moments are balanced. The programme is also to consider the hydrodynamic forces on the escort tug's hull and underwater appendages, the forces acting on the rudder and the thrusts of the propellers.