2026

Guidance for Anchor Handling Appliance

GC-46-E

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APPLICATION OF "GUIDANCE FOR ANCHOR HANDLING APPLIANCE"

1. Unless expressly specified otherwise, the requirements of this Guidance apply to anchor handling appliances installed on ships on or after 1 January 2026.

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CHAPTER 1 GENERAL

Section 1 General

101. General

1. This guidance apply to the anchor handling appliances that are subject to **SOLAS regulation II-1/3-13**, and which are installed on the ships classed with the Society or intended to be registered under the Society. Such appliances are generally installed on offshore support vessel (OSV), work vessel, etc.
2. Except as otherwise specifically provided in this guidance, the materials, equipment, devices, and construction of anchor handling appliances are to comply with the relevant requirements of the **Rules for the Classification of Steel Ships**(hereinafter referred to as the Rules).
3. Anchor handling appliances installed before 1 January 2026, and not registered under the Society are to be registered in accordance with this guidance no later than the date of the first renewal survey on or after 1 January 2026.
4. This guidance do not apply to windlasses or anchor windlasses used for the operation of the ship's own anchoring system.

102. Definitions

1. **Anchor handling appliance** refers to anchor handling winches, associated equipment and wires. Associated equipment generally include stern rollers, towing pins, shark jaws, etc.
2. **Anchor handling winch** means any winch for the purpose of deploying, recovering and repositioning anchors and mooring lines in subsea operations.
3. **Structural members** mean the structural parts of anchor handling appliances that transmit maximum line pull.
4. **A wire** means a dedicated line (wire rope, synthetic rope or chain cable) used for the handling of anchors by means of an anchor handling winch. The wire may include connecting loose gear.
5. **Loose gears** mean articles of ship's equipment such as chains, rings, hooks, shackles, clamps, etc., by means of which a load can be attached to an anchor handling appliance but which does not form an integral part of the appliance or load.
6. **Chain stopper** means a device used for securing and holding a section of wire, thereby relieving the load on the winch drum..
7. **Brake holding force** means the maximum force for which the winch brake is designed.
8. **Brake holding capacity** means the maximum line pull that the winch brake can withstand without slipping of the brake.
9. **Maximum line pull** means the maximum sustained force the winch is capable of pulling.
10. **Static bollard pull** means the maximum sustained pulling force a vessel is capable of generating at maximum power (i.e. 100% maximum continuous rating (MCR)) and zero forward speed. It is abbreviated to "BP" and expressed in tons (t)
11. **Safe working load** means the maximum static load at which the anchor handling winch or wire is used for anchor handling or towing purposes under specified operating conditions. It is abbreviated to "SWL" and expressed in tons (t). The safe working load shall not exceed the maximum line pull and static bollard pull.
12. **Responsible person** means a person appointed by the master or company as defined in SOLAS regulation IX/1, as appropriate, possessing the knowledge and experience required for the performance of duties specified in this Guidance.
13. **Overload test** means a test in excess of the maximum line pull, carried out in the presence of a competent person in order to check the structural integrity of the anchor handling winches and their

attachment to and adequacy of their supporting structure.

14. **A member Society of IACS** means any Society that is subject to verification of compliance with the QSCS (Quality System Certification Scheme), in accordance with Section 5 of Annex 1 of QSCS of IACS.

15. **Thorough examination** means a detailed assessment carried out annually in the presence of the Surveyor to determine whether the anchor handling appliances comply with the applicable requirements.

16. **Commissioning Test** means a comprehensive examination conducted upon initial installation on board or upon assignment application, and subsequently at Special Surveys, to verify that the appliance functions in accordance with its design intent and complies with the applicable safety and performance requirements.

17. **Certified** means that the anchor handling appliance has been documented as compliant with this Guidance, and such compliance has been verified by a surveyor of this Society.

18. **Maintenance** means any activity carried out by a responsible person to keep the anchor handling appliance in good working condition for continued safe use.

19. **Operational testing** means a test carried out by a responsible person to verify the correct functioning of a component or operation of the anchor handling appliance or its components.

20. **Self-inspection** means an assessment carried out by a responsible person to ascertain if the anchor handling appliances are in good working condition for continued safe use.

103. Equivalence

The equivalence of alternative designs and novel features which deviated from or are not directly applicable to this Guidance is to be in accordance with **Pt 1, Ch 1, 105.** of the Rules.

CHAPTER 2 CLASSIFICATION SURVEYS

Section 1 General

101. General

1. Unless otherwise specified in this chapter, anchor handling appliances are to comply with the relevant requirements of **Pt 1** of the Rules.

2. Application

(1) The requirements in this chapter apply to the tests and surveys for the anchor handling appliances.

(2) Where the structural members of the anchor handling appliances are permanently fitted to the hull structure or where they form an integral part thereof, the tests and surveys for these parts are to comply with the requirements in this Chapter and, in addition they are to comply with the relevant requirements of other Parts of the Rules.

(3) At the Periodical Surveys, the Surveyor may require surveys other than those specified in **Sec 3** in this Chapter if deemed necessary.

(4) At Annual Surveys, the Surveyor may reduce the extent and contents of the tests and surveys specified in **301.** if deemed appropriate, taking into account the purpose, construction, age, history, results of previous surveys, and the current condition of the anchor handling appliances.

3. Preparation for Surveys and Others

(1) All necessary preparations required for the survey, as well as any additional preparations deemed necessary by the Surveyor in accordance with the requirements of this guidance, are to be made by the applicant for the survey. These preparations are to include provisions for an easy and safe access, necessary facilities, and necessary records for the execution of the survey.

(2) The applicant for the survey is to arrange a responsible person who is well conversant with the survey items and responsible for the preparation of the survey to provide the necessary assistance to the Surveyor according to Surveyor's requests during the survey.

(3) The survey may be suspended where necessary preparations have not been made, any appropriate attendant mentioned in the previous (2) is not present, or the Surveyor considers that the safety for execution of the survey is not ensured.

(4) Where repairs are deemed necessary as a result of the survey, the Surveyor will notify his recommendations to the applicant of the survey. Upon this notification, the repair is to be made to the satisfaction of the Surveyor.

3. Presentation of Certificates

All of the certificates for anchor handling appliances issued by the Society are to be kept on board and presented to the Surveyor when requested at the tests and surveys.

4. Records of the Surveys

The "Register of Ship's Anchor Handling Appliances including Wires" is to be made necessary entries on it and endorsed by the Surveyor at the completion of the Surveys.

5. Notification of Survey Results

(1) The Society is to notify the results of the Survey to the applicant in a form of Survey Report.

(2) The Survey Report in (1) above is to be kept on board and presented to the Surveyor when requested at the subsequent Survey.

102. Surveys of Anchor Handling Appliances

1. Kinds of Surveys

The kinds of Surveys for anchor handling appliances are as follows:

(1) Registration Surveys
  (A) Registration Surveys during Construction
  (B) Registration Surveys after Construction

(2) Periodical Surveys
  (A) Annual Surveys(Thorough examination)
  (B) Special Surveys(Commissioning test and thorough examination)

(3) Occasional Surveys

2. Due range

The timing of the Surveys of anchor handling appliances are to be in accordance with the followings:

(1) A Registration Surveys are to be carried out when the safety working load, etc. are assigned for the first time.
(2) The thorough examinations are to be carried out within 3 months before or after each anniversary date of periodical surveys for Classification.
(3) The commissioning tests are to be carried out at the Registration Survey and at the interval of 5 years from the date of completion of the previous commissioning test.
(4) Occasional Survey is to be carried out as follows except periodical survey.
(5) Notwithstanding (2) to (3) above, the postponement of inspection due to the force majeure is to be in accordance with the requirements specified in **Pt 1, Ch 1, 906. 6** of the Rules.

3. Periodical Surveys carried out in Advance

Periodical Surveys may be carried out in advance of the due date of each Survey upon application by the Owner.

103. Class notation

1. The anchor handling appliance that complies with the requirements stipulated in this Guidance and passes the Registration Survey specified in **Sec 2** is given the notation **AH(F)**. However, the anchor handling appliance that only passes the inspections specified in **203. 2** is given the notation **AH(P)**.

2. The anchor handling appliance intended also for towing that complies with the requirements stipulated in this Guidance and passes the Registration Survey specified in **Sec 2** is given the notation **AHT(F)**. However, the anchor handling appliance intended also for towing that only passes the inspections specified in **203. 2** is given the notation **AHT(P)**.

Section 2 Registration Surveys

201. Drawings and Other Documents to be Submitted

1. At a Registration Survey, it is to be ascertained that the strength and construction of the anchor handling appliances comply with this guidance based on the drawings and documents submitted to the Society. In this case, the applicant is to submit the relevant drawings and documents listed in below.

2. The relevant drawings and documents for approval

(1) For newly manufactured anchor handling appliances, the relevant drawings and documents listed from (A) to (L) are to be submitted for approval.
  (A) General arrangement of anchor handling appliances (including maximum line pull and safe working load)
  (B) Detailed drawings of anchor handling winch and its supporting structure (including structural dimensions, material specifications, and joint details)
  (C) Detailed drawings of stern roller, towing pin, shark jaw, and its supporting structure
  (D) Arrangement of wire
  (E) List of wire(showing the construction, dimensions, materials and locations. For those in compliance with the well-known code or standard, the type symbol may be used in place of dimensions and materials)
  (F) Construction drawings of driving gears
  (G) Power system diagram
  (H) Drawings of operation and control mechanism
  (I) Drawings of safety devices
  (J) Drawings of protective devices
  (K) Procedures for commissioning tests
  (L) Other drawings and documents as deemed necessary by the Society
(2) If the whole or part of the anchor handling appliances is manufactured at the same workshop in accordance with already approved drawings and documents, the approval of drawings and docu-

ments other than (A) and (B) may be omitted.
(A) Application for omission of drawing submission
(B) General arrangement of anchor handling appliances (including maximum line pull and safe working load)

3. The relevant drawings and documents for reference

(1) For newly manufactured anchor handling appliances, the relevant drawings and documents listed from (A) to (F) are to be submitted for reference.
(A) Specifications for anchor handling appliances
(B) Calculation sheets or check sheets relevant to drawings and documents for approval specified in **2** above
(C) Maintenance manual for anchor handling appliances
(D) Operation manual for anchor handling appliances
(E) Procedures for non-destructive testing
(F) Other drawings and documents as deemed necessary by the Society

(2) In addition to (1), submission of drawings of hydraulic motors, hydraulic pumps, steam cylinders, pneumatic motors, or internal combustion engines for operation of anchor handling appliances is to be in accordance with the following requirements in (A) to (C) according to the output:
(A) Where the output is less than 375 kW:
Submission of drawings may be omitted. However, name of manufacturer, type and principal particulars are to be described in the approval drawings of winches employed.
(B) Where the output is 375 kW or more:
Principal particulars, drawings of structural details and strength calculation sheet are to be submitted in one set for reference.
(C) Others:
Where the machinery is installed in ships under the classification of the Society for the first time, the requirements in (B) above are to be applied even when the output is less than 375 kW.

(3) The manuals specified in (1) (C) and (D) are to comply with the following requirements.
(A) A maintenance manual for an anchor handling appliances should be provided by the manufacturer. The maintenance manual should, as a minimum, include the following for each anchor handling appliance:
(a) description of the required self-inspection regime and maintenance schedules specific to the anchor handling winch, checklists and a list of key tools or other items for use when carrying out self-inspections and maintenance
(b) instructions for routine repairs/maintenance
(c) technical maintenance information
(d) information on recommended lubricants, oil and filter change
(e) information on bearing maintenance, if applicable
(f) lists of replaceable parts/components, as well as the self-inspection/maintenance/replacement procedures for these parts/components
(g) lists of sources of spare parts
(h) model forms for records of self-inspections and maintenance
(i) operational test procedures, as well as the pre/post-operational test self-inspection procedures
(j) list of components requiring particular attention during inspections, as well as the self-inspection/maintenance procedures for these components
(k) recommended intervals for replacement and overhaul of components and equipment
(l) information on the preservation of the coating and corrosion protection system
(m) information regarding special inspection and maintenance in cases where the anchor handling winch is not operated for long periods of time
(B) An operations manual for the anchor handling appliances should be provided by the manufacturer. The operations manual should, as a minimum, include the following for each anchor handling appliance:
(a) design, operational and environmental limitations
(b) compatible loose gear, if any
(c) safety instructions
(d) operating procedures, including emergency procedures, if any

4. At a Registration Survey of anchor handling appliances not built under Survey, the drawings and data to be submitted are to be same as specified in **2** and **3** above. However, some of these drawings

and documents may be omitted submitting the past survey records and certificates if deemed appropriate by the Society.

5. Notwithstanding **4** above, anchor handling appliances that have applied for the class notation **AH(P)** or **AHT(P)** for registration with the Society in accordance with **Ch 1**, **101. 3** may be exempted from submitting design-related drawings and data listed in **2** and **3** above.

202. Registration surveys during construction

1. Examinations for Workmanship

(1) The workmanship of anchor handling appliances is to be examined and ascertained to be in good order when any of the following (A) through (E) is relevant;
  (A) When requested by the Society during the process of manufacturing and assembling structural members
  (B) When structural members are installed on board the ship
  (C) For driving gears, at the times when the finishing work on major parts is completed and when the Surveyor considers necessary during the process of manufacture
  (D) When the subcontracted materials, parts or equipment are incorporated to the anchor handling appliances
  (E) Other cases when considered necessary by the Society

(2) Anchor handling appliances are to be examined and ascertained to be in good order by the following tests and surveys;
  (A) Testing as specified in **Pt 2, Ch 1** of the Rules where the materials need to be in compliance with the requirements in **Pt 2, Ch 1** of the Rules
  (B) Testing as specified in **Pt 2, Ch 2** of the Rules where the welding works need to be in compliance with the requirements in **Pt 2, Ch 2** of the Rules
  (C) Non-destructive testing where requested by the Surveyor
  (D) Shop trial of the driving gears
  (E) Operation tests of the anchor handling appliances
  (F) Operation tests of the safety devices and protective devices(including braking tests and electric power source cut-off tests with a testing weight equal to the maximum line pull applied)
  (G) Other tests considered necessary by the Society

(3) The driving unit and winch of the anchor handling equipment, in addition to the requirements of items (1) and (2), are to be in accordance with the following test and inspection guidelines.
  (A) Tests and examinations for driving machines, etc. for anchor handling appliances are to be in accordance with the following requirements (a) to (d):
    (a) Hydraulic motors and regulating valves attached thereto:
      (ⅰ) Where the output is less than 375 kW, shop tests may be replaced with the tests conducted by the manufacturer. In this case the Society may require submission of the test results, if it deems necessary.
      (ⅱ) Where the output is 375 kW or more, for tests except performance verification tests and open-up examinations, if manufacturers carry out internal tests and submit test reports, the presence of the Surveyor may be omitted. The hydraulic(water or oil) test is to be carried out at a pressure of 1.5 times the design pressure.
      (ⅲ) Notwithstanding the requirements (ⅰ) and (ⅱ) where the driving machines are installed on the class ship of the Society for the first time, the hydraulic test, performance verification test, and open-up examination are all to be carried out in the presence of the Surveyor.
    (b) Hydraulic pumps:
      Hydraulic pumps are to be dealt with in similar ways to (a) (ⅰ) to (ⅲ) above depending on the outputs of the driving motors.
    (c) Steam cylinders, pneumatic motors and internal combustion engines:
      These are to be dealt with in similar ways to (a) (ⅰ) to (ⅲ) above depending on each output. The hydraulic tests for the steam cylinders are to be carried out at a pressure of 1.5 times the design steam pressure and those for the valves directly connected to the cylinder are to be carried out at a pressure of 2 times the design steam pressure.
    (d) Driving motors for winches or hydraulic pumps and their control equipment:
      These are to comply with the requirements specified in **Pt 6** of the Rules and to pass the tests and examinations specified in **Pt 6** of the Rules thereof.

(B) Winches anchor handling winches are to be subjected to the tests and examinations mentioned in the following (a) and (b) at the shop tests after completion of assembly, including installation of driving machines, etc. In this case, one winch selected from those of the same type manufactured at the same time and to be installed on the same ship is to be tested in the presence of the Surveyor, and if the results are satisfactory, tests and examinations for other winches may be substituted by confirmation of the test results issued by the manufacturer.

(a) Electro-hydraulic winches

(ⅰ) Visual examinations and checking of the construction:
It is to be ascertained that no practically injurious defects exist in materials and workmanship and each movable part moves smoothly.

(ⅱ) No-load test:
The winch is to be operated with no load at the maximum speed for 30 minutes(15 minutes for each normal and reverse rotation) and be ascertained that the performance and each structural part is in good order.

(ⅲ) Load tests:
The winch is to hoist and lower the rated load for a period of 30 minutes continuously. (Pause of 20 seconds may be inserted between each hoisting and lowering operation, and effective lift is desirable to be 10 m or more.) During this operation, the temperature rise of the bearings, the hoisting speeds, the lowering speeds and the input power are to be measured and ascertained that they are in good order.

(ⅳ) Braking tests:
During hoisting and lowering the rated load for the winch, return the control handle to the neutral position and check the slip of the load to be 1.5 m or less. Manual releasing test of the brake is also to be carried out and ascertained to be in good order.

(ⅴ) Speed control tests

(ⅵ) Emergency assurance tests:
The emergency assurance devices provided in the winches is to be ascertained of the performance by cutting off power supply during lowering the rated load.

(ⅶ) Overload tests:
The winch is to hoist and lower a test load specified in **302. 2** several times. The winch is to be stopped at least three times during lowering the load and ascertained to be in good order.

(ⅷ) Adjustment of the over-pressure preventive device:
The adjusted pressure is to be checked as necessary.

(ⅸ) Open-up examinations
The Society may require an open-up examination of the part where abnormality is found.

(ⅹ) Other tests deemed necessary by the Surveyor.

(b) The shop test for steam winches, electric winches, and winches driven by internal combustion engines are also to be carried out in accordance with the requirements specified in (a) above for electro-hydraulic winches (except (a) (ⅷ) above).

2. On board installation survey

(1) Survey for connection between the structural members and hull structure
(A) Survey for welded connection between the structural members and hull structure
(B) Non-destructive test (When considered necessary by the Surveyor)
(2) Commissioning tests
(3) Other tests considered necessary by the Society

203. Registration Surveys after Construction

1. Anchor handling appliances assigned the class notation AH(F) or AHT(F)

(1) Submission of drawing and other data specified in **201.**
(2) Verification of inspection certificates, or materials and equipment certificates issued by a member Society of IACS for anchor handing appliances
(3) Commissioning tests. However, if the certificates and inspection records issued by a member Society of IACS are properly maintained, only the functional test may be performed, and the

commissioning tests may be deferred to the next scheduled commissioning tests.
(4) Other tests considered necessary by the Society

2. Anchor handling appliances assigned the class notation AH(P) or AHT(P)

(1) Thorough examinations
(2) Commissioning tests

Section 3 Periodical Surveys

301. Annual Surveys

The Annual Surveys are to include a thorough examination of the anchor handling appliance as described below, and the maintenance records, including self-inspections in accordance with the maintenance manual for each appliance, shall be verified.

1. Anchor handling winch and associated equipment

(1) At Annual Surveys, the following items in (A) are to be visually examined for anchor handling winch and associated equipment, and ascertained to be in good order. Where considered necessary by the Surveyor, the items in (B) are to be examined.
(A) Items to be examined
(a) Structural members
(b) Connection between the structural members and hull structure
(c) Driving systems
(d) Operation tests for safety devices and protective devices
(e) Markings of the maximum line pull, etc., and the effectiveness of the relevant certificates
(f) Preservation of the instruction manuals on board the ship
(B) Items to be examined where considered necessary by the Surveyor
(a) Checking of plate thickness of the structural members
(b) Open-up examination of the driving systems
(C) Criteria for repair or renewal of the structural members
The corrosion, abrasion, or other defects specified in the following are found in structural member are, as a rule, to be repaired or renewed:
(a) Structural members in which amount of wear and tear reaches 10 % of the original dimensions. However, this may not be applied where steel plates having enough margin to the thickness required by this guidance is used.

2. Wire

(1) At Annual Surveys, the following items in (A) through (C) of wire are to be visually examined and ascertained to be in good order. However, where considered necessary by the Surveyor, the items in (B) are to be opened up and examined.
(A) Wire ropes for their full length
(B) Loose gear (rings, hooks, shackles, cramps, etc.)
(C) Markings of the safe working loads and identification symbols, and the effectiveness of the relevant certificates
(2) In case where some of wire need to be repaired or renewed at times other than at the Periodical Surveys, the Society may accept an autonomous inspection carried out by ship's master or his representative. In this case, the personnel who carried out an autonomous inspection is to record the following (A) through (F) for the wire renewed in the Register of Ship's Anchor Handling Appliances including Wire, and show this Register of Ship's Anchor Handling Appliances including Wire and the certificates of the wire concerned to the Surveyor for his approval at the next Periodical Survey or Occasional Survey.
(A) Names and identification symbols
(B) Locations in service
(C) Safe working loads
(D) Testing loads
(E) Dates of renewal or repairs and dates of commencement of use
(F) Reasons for renewal or repairs
(3) Criteria for repair or renewal of wire
The corrosion, abrasion, or other defects specified in the following are found in wire are, as a rule, to be repaired or renewed:

(A) Wire ropes
(a) Those in which 5 % or more of total number of independent wires(except filler wires) were broken within a length of 10 times the diameter of wire rope
(b) Those in which reduction in diameter of the wire rope reaches 7 % or more of the diameter
(c) Those in which kink or other injurious deformation occurred
(d) Those in which significant corrosion occurred at the surface of independent wires or inside the wire rope
(e) Those deemed necessary by the Surveyor
(B) Loose gear
(a) Those in which injurious deformation occurred
(b) Those in which crack occurred
(c) Those in which amount of abrasion or corrosion reaches 10 % or more of the original dimensions

302. Special Surveys

The Special Surveys are to be carried out by performing the commissioning test specified in paragraph **1**, followed by the thorough examination prescribed in **Ch 2, 301**.

1. Test Method

(1) In the case of anchor handling appliance that is being designated for the first time with a safe working load, etc., the commissioning test method is to conform to the requirements of (A) to (B).
(A) The commissioning test should include the following:
(a) Function tests: The correct working of the winch and its control system are to be verified over the entire operating range through a functional test at the light load.
(b) An overload test: The capacity and integrity of the anchor handling winch, the attachment of the winch to ship and the adequacy of the ship's supporting structure are to be verified.
(c) Test of emergency release and residual holding force in the wire: The test is to be performed with the wire attached to an onshore fixed strong point, or an anchor on the seabed or a similar arrangement.
(d) Test of residual brake holding force after emergency release: The residual brake holding force after emergency release is to be verified.
(e) Performance test: The performance of the whole winch system including static bollard pull test and brake holding capacity test is to be verified. Where it is not practicable to verify the brake holding capacity by testing, the same may be demonstrated through calculations. Anchor handling winches that are not designed for towing do not need to undergo the bollard pull test.
(B) In case of wire, the test load is to be loaded in the method considered as appropriate by the Society.

2. Overload test

(1) At Overload Tests, anchor handling appliances are to be examined under the supervision of a Surveyor by applying loads at least equal to the following test loads. However, the wire (including accessories) with overload test records and certificates, as well as the wire for anchor handling appliances in accordance with the requirement in **203. 2**, may undergo the overload test with the test load specified in (A).
(A) The test loads for anchor handling winch and associated equipment are to be as given in **Table 2.1.** However, in cases where the winch and associated equipment are also intended for towing purposes, the test may be substituted with a static bollard pull test.

Table 2.1 Test Load for Anchor Handling Winch and associated equipment

Safe Working Load SWL (t)	Test load T(t)
$SWL < 20$	$1.25 \times SWL$
$20 \leq SWL < 50$	SWL + 5
$50 \leq SWL$	$1.1 \times SWL$

(B) The test loads for loose gears are to be as given in **Table 2.2.** However, in cases where the loose gears are also intended for towing purposes, the test loads are to be as given in **Table 2.3.**

Table 2.2 Test Loads for Loose gear

Article of Gear	Safe Working Load SWL (t)	Test load T (t)
Chain, ring, hook, shackle, clamp, and similar gear	$SWL \leq 25$	$2 \times SWL$
	$25 < SWL$	$(1.22 \times SWL) + 20$

Table 2.3 Test Loads for Loose gear for Towing

Article of Gear	Static Bollard Pull BP (t)	Test load T (t)
Towing hook, and similar gear	$BP < 50$	$2 \times BP$
	$50 \leq BP < 150$	$BP + 50$
	$150 \leq BP$	$1.33 \times BP$

(C) The test loads for ropes are to satisfy the following formula;

$$T \geq W \cdot f$$

where,
T : Test loads for ropes (t)
W : maximum line pulls of ropes (t)
f : Safety factors specified in **Ch 3, 202.**

(2) Overload Tests for anchor handling winches which are newly constructed, as a rule, are to be carried out after having been assembled at the shops, as well as after having been installed on board the ships. If the results of the shop tests are satisfactory for one anchor handling winch selected from those of the same type manufactured at the same time and to be installed on the same ship, those for other anchor handling winches my be substituted by confirmation of the test results issued by the manufacturer. If it is considered by the Surveyor that the Overload Tests are impractical at the manufacturer's shop, the Overload Tests at the shop may be dispensed with subject to carrying out the Overload Tests on board.

Section 4 Occasional Surveys

401. General

1. Occasional survey shall be conducted in the following cases other than the period when the anchor handling appliance is subject to regular inspection:
(1) When the safe working load of the anchor handling winch is to be changed
(2) When changes affecting the strength, stability or life of the anchor handling winch are to be made
(3) When changes affecting the main structural parts of the anchor handling winch are to be made
(4) When any parts or functions of the anchor handling winch affecting the strength, safety or structural integrity are to be modified
(5) In other cases deemed necessary by our classification society

2. After repairs, modifications or alterations of a major character, anchor handling winches are to be

tested in accordance with **302. 1** (1) (A). If the emergency release system is affected by these repairs, modifications or alterations of a major character, the anchor handling winches are to be additionally tested in accordance with **302. 1** (1) (A) (c) and (d).

3. Occasional survey shall confirm that the anchor handling appliance satisfies the criteria specified in this Guidance. ⚓

CHAPTER 3 ANCHOR HANDLING APPLIANCE

Section 1 Anchor Handling Winches and Associated Equipment

101. General

1. Application

The requirements in this section apply to the structural parts of anchor handling winches and associated equipment.

102. Design Loads

1. Scantlings of foundations and supports of anchor handling winches are to be based on 1.5 times the specified maximum line pull or the maximum brake holding capacity of the winch whichever is the greater. In the case of anchor handling winches intended for towing, scantlings are to be based on minimum 2.2 times the maximum static bollard pull of the vessel.
2. Scantlings of foundations and supports of shark jaws are to be based on 2 times the safe working load as specified by the designer.
3. Scantlings of foundations and supports of towing pins are to be based on 2 times the safe working load specified by the designer.
4. Scantlings of foundations and supports of stern roller are to be based on 2 times the safe working load as specified by the designer or 2 times the specified maximum line pull of the anchor handling winch whichever is the greater.

103. Strength and Construction

1. General

(1) The strength of structural members is to be analyzed to determine their dimensions according to requirements in **102.**. The strength assessment is to be based on net scantlings.
(2) For structures connected by bolts and nuts, proper considerations are to be given to the decrease of effective sectional areas.
(3) When considered necessary by the Society may require the confirmation of the appropriateness of strength analyses by examination of models or the things in question.

2. Supporting structure and foundation

(1) The stress in the supporting structure and foundation due to the design loads specified in **102.** is not to exceed the allowable stress values for each type of stress specified in **Table 3.1**.

Table 3.1 Allowable Stress σ_a

Kind of stress		
Tension	Shear	Combined stress(for DSA)
$0.9\sigma_Y$	$0.52\sigma_Y$	$1.0\sigma_Y$

(NOTES)

1. σ_Y : Specified yield stress or proof stress of material $(\mathrm{N/mm^2})$
   For steel material of $\sigma_Y \geq 0.83 \cdot \sigma_T$, the value of $0.83 \cdot \sigma_T$ is to be applied instead on σ_Y. where σ_T : Specified tensile stress of material$(\mathrm{N/mm^2})$

2. The combined stress is to be the value obtained from the following formula:

$$\sqrt{\sigma_x^2 + \sigma_y^2 - \sigma_x\sigma_y + 3\tau_{xy}^2} \qquad (\mathrm{N/mm^2})$$

where,

σ_x : Applied stress in x-direction at the middle of plate thickness $(\mathrm{N/mm^2})$
σ_y : Applied stress in y-direction at the middle of plate thickness $(\mathrm{N/mm^2})$
τ_{xy} : Applied shear stress in the $x-y$ plane $(\mathrm{N/mm^2})$

3. Anchor handling winch

(1) The anchor handling winch is to be capable of withstanding the maximum forces from hoisting, rendering, and braking, including dynamic effects, without exceeding the following stress values.
   (A) When hoisting including dynamic effects at relevant layer: $0.75\sigma_Y$
   (B) When braking at relevant layer as specified in **302. 2** (D): $0.75\sigma_Y$
   (C) When rendering loads when the drum starts to rotate in the opposite direction of the applied driving torque: $0.95\sigma_Y$

(2) Buckling and fatigue is to be considered according to a recognized standard or the relevant requirements of the Rules.

4. Associated equipment

(1) Chain stopper
The chain stopper is to be capable of withstanding the load specified in **102. 2**, including dynamic effects, without exceeding an allowable stress ($\sigma_a = 0.75\sigma_Y$) corresponding to 75% of the specified yield strength or proof stress of the material.

(2) Towing pins
The towing pins are to be capable of withstanding the loads and towline angles specified in **102. 3**, including dynamic effects, without exceeding an allowable stress ($\sigma_a = 0.75\sigma_Y$) corresponding to 75% of the specified yield strength or proof stress of the material.

(3) Stern roller
   (a) The length of the stern roller is to be kept to a minimum while being sufficient to accommodate the widest anticipated anchor to be served.
   (b) The minimum outer diameter of the stern roller is to be not less than 17 times the diameter of the anchor handling wire rope.
   (c) The stern roller is to be capable of withstanding the loads specified in **102. 4**, including dynamic effects, without exceeding an allowable stress ($\sigma_a = 0.75\sigma_Y$) corresponding to 75% of the specified yield strength or proof stress of the material.

5. Anchor handling winch Fixing Bolts

(1) Any material having a tensile strength exceeding 1.18 $\mathrm{kN/mm^2}$ and yield stress exceeding 1.06 $\mathrm{kN/mm^2}$ is not to be used for the bolts fixing the slewing-rings except when special considerations have given to the strength characteristics of the bolts.

(2) Special considerations are to be given to the tightening force of fixing bolts.

(3) The fixing bolts are to be capable of withstanding the loads specified in **102.**, including dynamic effects, without exceeding an allowable stress ($\sigma_a = 0.60\sigma_Y$) corresponding to 60% of the specified yield strength or proof stress of the material.

Section 2 Wire

201. General

1. Application

The requirements in this section apply to the wire(including loose gear) used in anchor handling appliances.

202. Rope

1. The rope for handling anchors shall be wire rope or fiber rope of appropriate diameter.

2. Splicing of wire ropes in the middle is not permitted.

3. The wire ropes are to be subjected to suitable corrosion prevention treatment.

4. Terminal treatments of ropes are to comply with the following (1) through (6), as a standard:

(1) A loop splice should have at least three tucks with a whole strand of rope, followed by two tucks with half the wires cut out of each strand.

(2) All tucks other than the first should be against the lay of the rope. If another form of splice is used, it should be as efficient as that described in (1) above.

(3) A splice in which all the tucks are with the lay of the rope should not be used in the construction of a sling or in any part of a cargo handling appliance where the rope is apt to twist about its axis.

(4) If a loop is made or a thimble secured to a wire rope by means of a compressed metal ferrule, the ferrule should be made to a manufacturer's standard conforming to the following (A) through (E):

(A) The material used for the manufacture of the ferrule should be suitable, particularly to withstand plastic deformation without any sign of cracking.

(B) The correct size(both in diameter and length) of ferrule should be used for the diameter of the rope.

(C) The end of the rope that looped back should pass completely through the ferrule.

(D) The correct dies should be used for the size of the ferrule.

(E) The correct closing or compression pressure should be applied to the dies.

(5) Where zinc or other alloy is cast in socket to hold the end of rope, work is to be done in accordance with the manufacturer's criteria conforming to the following requirements (A) through (D):

(A) Rope length necessary to make alloy casting is to be ensured.

(B) Oil and dirt adhering to independent wires are to be completely removed and proper clean surfaces are to be ensured by treatment before casting work.

(C) Casting temperature suitable to the characteristics of the alloy is to be properly maintained.

(D) Socket is to be preheated before casting of alloy.

(6) The terminal fitting of any wire rope should be capable of withstanding the following loads (A) or (B).

(A) Not less than 95 % of the minimum breaking load of the rope in the case of a rope of a diameter of 50 mm or less

(B) Not less than 90 % of the minimum breaking load of the rope in the case of a rope of a diameter above 50 mm

5. The safety factor of wire rope is to be greater than the values specified in **Table 3.2**. The safety factor of fiber rope is to be greater than 1.5 times the safety factor of wire rope.

Table 3.2 Safety factor of wire rope

Safe Working Load SWL (t)	Safety factor
$SWL < 10$	2.5
$10 \leq SWL < 160$	$(760 - SWL)/300$
$160 \leq SWL$	2.0

6. The rope safety factor of anchor handling equipment used for towing is calculated by replacing the safe working load (SWL) in **5** with the static bollard pull (BP).

7. The breaking strength of rope is to be greater than the values obtained by multiplying the safe working load or, where applicable, static bollard pull by the safety factor.

203. Loose Gears

1. The breaking strength of each loose gear is to be greater than the value obtained by multiplying the safe working load by safety factor of 2.5. The breaking strength for loose gear for towing is to be greater than the static bollard pull times 2.5.

Section 3 Machinery, Electrical Installations and Control Engineering Systems

301. General

1. Application

The requirements in this section apply to the machinery, electrical installations and control engineering systems used in the anchor handling appliances.

302. Machinery

1. General

The driving systems of the anchor handling appliances are to operate steadily at the rated speed under the maximum line pull.

2. Hoisting Machinery

(1) The construction of the hoisting machinery is to comply with the following requirements (A) through (E):

(A) The drum end flange diameter is to have an allowance corresponding to not less than 2.5 times the rope diameter as measured from the outer rim of the outermost layer of ropes in service condition.

(B) The pitch circle diameter of winch drum is to be not less than 15 times the diameter of the wire rope and 6.5 times the diameter of the fiber rope.

(C) The length of winch drum is to generally be designed to accommodate at least 50 m of wire rope on the inner layer.

(D) The braking system complying with the following requirements (a) through (d) is to be provided:

(a) The brake is to normally act directly on drum.

(b) The brake is to be capable of holding at least 1.25 times the maximum torque created from maximum line pull including dynamic effect, and the brake is to be capable of stopping the rotation of the drum from its maximum speed. In the case of anchor handling winch also used for towing purposes, the holding capacity is to be sufficient to withstand the torque created when 80% of the minimum breaking load of the towline acts on the first layer.

(c) The power operated braking system is to operate automatically when the manoeuvring is returned to its neutral position.

(d) The power-operated braking system is to operate automatically in the event of a power supply failure. In this case, an emergency retrieval system for anchor lowering is to be provided.

(E) Clutchable drums are to be provided with effective locking system capable of restricting rotation of the drum. The locking system is be, as a rule, capable of resisting the torque not less than 1.25 times the torque required when the maximum line pull is applied to the anchor handling appliances.

(2) The winding of the wire rope into the winch drum is to comply with the following (A) and (B) except in cases where the winch drum is equipped with the over-winding prevention device.

(A) For grooved winch drums, the angle between the direction in which the wire rope is caught

in the groove of the drum and the direction of the wire rope when it is caught in the groove (i.e. the limiting fleet angle) is to be 4° or less.
(B) For winch drums other than grooved drums, the limiting fleet angle is to be 2° or less.

(3) The rope end is to be secured to the drum in such a manner tat it functions as a weak link in case of the rope needs to be released and that it does not damage any part of the rope.
(A) The wire rope shall be capable of withstanding a load equal to twice the drum load while at least four full turns remain on the drum.
(B) Under normal operating conditions, when the complete working length of rope has been paid out, at least 3 full turns are to remain on an an ungrooved drum, and at least 2 full turns are to remain grooved drum.

3. Spooling device

Anchor handling winches are to be equipped with remotely operated spooling devices.

4. Chain stopper

(1) Anchor handling vessels are to be equipped with chain stoppers.
(2) A chain stopper is to be equipped with an audible alarm which is activated when the stopper is either being engaged or disengaged.
(3) A chain stopper is to be equipped with an emergency release that is functional in all conditions, including dead-ship situations.
(4) Emergency release of chain stopper is to include disengaging of pins and other equipment that may prevent releasing the wire or cause the wire to get stuck/entangled during release.
(5) Emergency release of the chain stopper is to be designed for remote operation in order to minimize the risk of injury to personnel.
(6) The emergency release mechanism of the chain stopper is to be protected against unintentional activation.
(7) Instructions for the operation of the emergency release are to be clearly displayed at the navigation bridge and locally at the emergency release control mechanism.
(8) After an emergency release, the chain stopper system us to be inspected for signs of damage or deterioration. Any identified damage or deterioration should be rectified before the chain stopper is put back into service.

303. Power Supply

1. General

(1) The equipment, piping and cables consisting of the electric, hydraulic, pneumatic or steam power supply system and their arrangements are, as a rule, to comply with the relevant requirements of the Rules.
(2) The construction, strength etc. of internal combustion engine used as the prime mover are to comply with the requirements in **Pt 5** of the Rules.
(3) The drive device of the anchor handling winch is to be capable of maintaining at least 1.25 times the maximum torque generated by the maximum line pull including dynamic effects without releasing the rope.

304. Control Engineering Systems

1. General

(1) The electric, hydraulic or pneumatic equipment used for the control, alarm and safety systems are, as a rule, to comply with the relevant requirements of the Rules.
(2) The control, alarm and safety systems are to be designed on the basis of the principle of fail-safe.

2. Control System

(1) Control systems are to be so arranged as not interfere with the operator or qualified other personnel giving signals for operation.
(2) The anchor handling winches are to be capable of hoisting and lowering in a controlled manner, and to be provided with adjustable speed control between the minimum and maximum speeds.
(3) The winch operating controls are to be designed to pay out the wire by moving the control lever away from the winch operator and heave in by pulling the control lever towards the operator. All operating controls are to d be permanently marked with signs indicating their purpose and the operating direction.

(4) The winch operating controls are to be of the "hold-to run" type, which will cause the hoisting or lowering motion to automatically stop when the control lever is released by the operator.
(5) For electric winches, local power disconnecting switch is to be provided at the position in the proximity of the place of operation.

3. Safety System

(1) Anchor handling winches are to be equipped with tension control to ensure that the system is not overloaded in the event that the anchor being handled gets stuck, entangled or is exposed to similar situations.
(2) Winches are to be provided with continuous load monitors and an audible and visual overload alarm.
(3) The overload alarm are to be programmable for lower levels of load.

4. Protection System

(1) For the rotating parts of the driving machinery, electrical installations and steam pipes, necessary means to protect the operator are to be provided.
(2) Steam winches are to be arranged not to interfere with the operator's field of vision by the steam.
(3) Anchor handling winches should be designed to facilitate emergency release of the load on the wire in a safe and controlled manner, both under normal as well as dead-ship conditions.
(4) The controls for actuation of the emergency release should be placed at the main control station. Emergency release function may also be available at the local control station.
(5) Emergency release control should be protected against unintentional activation.
(6) The design and operation of the emergency release should take into consideration restrictions on the pay-out speed of the wire due to inertia and any restrictions due to onboard arrangements.
(7) Instructions for the operation of the emergency release should be clearly displayed at the navigation bridge and locally at the winch.
(8) After an emergency release, the complete anchor handling winch system is to be inspected for signs of damage or deterioration. Any identified damage or deterioration is to be rectified before the anchor handling winch is put back into service.

Section 4 Certification, Marking and Documentation

401. General

1. Application

The requirements in this Section apply to the certification, marking and documentation of the anchor handling appliances.

402. Assignment of Safe Working Load, etc.

1. General

The Society assigns the maximum line pull, etc., for the anchor handling appliances that have passed the inspection and load tests specified in **Sec 2.**

403. Marking of Safe Working Load

The safe working load (t) of the anchor handling appliances is to be permanently marked on the equipment by welding bead or an equivalent method.

1. Marking for Anchor Handling Winches

(1) Anchor handling winches are to be provided with a permanently affixed name plate which should include at least the following information.
(A) details of the manufacturer (name, address)
(B) model name/number
(C) serial number
(D) date of manufacture and date of installation
(E) details of power supply

(F) details of wire (e.g. length, diameter)
(G) maximum brake holding capacity, metric tons
(H) maximum line pull, metric tons
(I) safe working load, metric tons
(J) maximum static bollard pull, metric tons
(K) placeholder for the classification society's surveyor's stamp
(L) drum size
(M) winch speed

(2) If upon completion of a thorough examination, the Surveyor considers the anchor handling winch to be unsafe for operation or not in compliance with the applicable requirements of this guidance, then that anchor handling winch is to be taken out of service until any deficiency is rectified to the satisfaction of the Surveyor. The anchor handling winch is to be clearly marked "not to be used" and the status is to be recorded in Register of Ship's Anchor Handling Appliances.

2. Marking for Wire

(1) On the loose gear other than wire ropes and fibre ropes, the test load, the maximum line pull and the identification symbols are to be marked by using stamps at the conspicuous place and no adverse effects are to be caused for both their strength and service.
(2) The stamp marks are to be coated with anti-corrosive paint and framed with paint for easy recognition.
(3) Notwithstanding the requirements in (1) and (2) above, where it is difficult to make direct stamp mark or marking with paint, other means may be taken when approved by the Society.
(4) If upon completion of a thorough examination, the Surveyor considers the wire of the anchor handling appliance to be unsafe for operation or not in compliance with the applicable requirements of this guidance, then that wire should be taken out of service until any deficiency is rectified to the satisfaction of the Surveyor. The wire is to be clearly marked "not to be used" and the status is to be recorded in Register of Ship's Anchor Handling Appliances.

404. Documentation

1. Kinds of Documents

The kinds of the documents issued by the Society for anchor handling appliances and loose gear are to be as specified in the followings:

(A) Register of Ship's Anchor Handling Appliances (Form AH1)
(B) Certificate of Test and Thorough Examination of Anchor Handling Appliances(Form AH2)
(C) Certificate of Test and Thorough Examination of Loose Gear for Anchor Handling Appliances (Form AH3)
(D) Certificate of Test and Thorough Examination of Wire Rope for Anchor Handling Appliances (Form AH4)
(E) Certificate of Test and Thorough Examination of Fibre Rope for Anchor Handling Appliances (Form AH5)
(F) Factual Statement of Test and Thorough Examination of Non-certified Anchor Handling Appliances(Form AH(SOF))

2. Timing of Issuance of Documents

The timing of issuance of documents specified in **Par 1** above is to be as given in **Table 3.3** depending on the tests and survey.

Table 3.3 Timing of Issuance

Kind of Documents		Timing of Issuance
A	**AH1**	When, upon application for assignment, the anchor handling appliance passes the Registration Survey for the first time
B	**AH2**	(1) When, upon application for assignment, the anchor handling appliance passes the Registration Survey specified in **Ch 2, 202.** or **203. 1** for the first time (2) When the safe working load, etc. of anchor handling appliances registered according to **Ch 2, 202.** or **203. 1** is altered (3) When the anchor handling appliance registered according to **Ch 2, 202.** or **203. 1** passes the Special Surveys specified in **Ch 2, 302.**
C	**AH3** **AH4** **AH5**	(1) When, upon application for assignment, the anchor handling appliance passes the Registration Survey specified in **Ch 2, 202.** or **203. 1** for the first time (2) When wire (including loose gear) is replaced or repair at time of the Periodical Surveys and the Occasional Survey, and when the contents of autonomous inspection is recognised appropriate by the Society
D	**AH(SOF)**	(1) When, upon application for assignment, the non-certified anchor handling appliance passes the Registration Survey after construction specified in **Ch 2, 203. 2** for the first time (2) When the safe working load, etc. of anchor handling appliance registered in accordance with **Ch 2, 203. 2** is altered (3) When the anchor handling appliance registered according to **Ch 2, 203. 2** passes the Special Surveys specified in **Ch 2, 302.**

3. Revocation of the Documents

(1) The whole or part of the certificates specified in **Par 1** above will be revoked when either of the following (A) through (I) is relevant:
- (A) When application is made by the shipowner for cancellation or alteration of the assignment of the safe working load, etc.
- (B) When the construction, arrangement or rigging of the anchor handling appliances are altered
- (C) When the anchor handling appliances are removed
- (D) When the surveys specified in **Sec 2** are not subjected to
- (E) When the anchor handling appliances are considered to be unserviceable by the Surveyor
- (F) When the contents in the certificates are intentionally altered
- (G) When the contents in the certificates have become illegible due to foul or damage
- (H) When the specified fee covering the survey is not paid
- (I) In case where the Society has a doubt on the effectiveness of the certificates, etc.

(2) The certificates which become invalid in accordance with the provisions in (1) above are to be returned to the Society without delay.

4. Reissuance and Corrections of Documents

In case where the certificates, etc. become invalid in accordance with the provisions of the preceding **Par 3** (1) above or lost, the Society will reissue the certificates or make necessary corrections thereto depending on the circumstances involved.

405. Preservation of Documents

1. General

The Certificates issued by the Society in accordance with the requirements in **404.**, and the instruction manual for anchor handling appliances are to be preserved aboard the ship.

2. Instruction Manual

(1) The instruction manual mentioned in **Par 1** above is to note essential items necessary for operation and maintenance of the anchor handling appliances among those given in the following (A) through (M).

(A) General arrangement of anchor handling appliances
(B) Date of manufacture and date of installation
(C) Details of power supply
(D) Details of wire (e.g. length, diameter)
(E) Maximum brake holding capacity, metric tons
(F) Maximum line pull, metric tons
(G) Safe working load, metric tons
(H) Maximum static bollard pull, metric tons
(I) Placeholder for the classification society's surveyor's stamp
(J) Drum size
(K) Winch speed
(L) Commission testing procedures
(M) Operation manual and maintenance manual

(2) It should be ensured that the documentation on board can be unambiguously related to the actual winch, i.e. by referring to the unique serial number. ⚓

GUIDANCE FOR
ANCHOR HANDLING APPLIANCE

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