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DEPARTMENT OF MARINE ADMINISTRATION
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Date: 12th October 2017

Directive (14/2017)

Guidance for Winch Load Test in Shop

Applicable to: Ship owners, Recognized Organizations, Shipping Companies, Flag State Surveyors

1. The Department of Marine Administration circulated this directive in the exercise of the power of Section 294(B), paragraph (b) of Myanmar Merchant Shipping Act.

2. Pursuant to the provision of Section 213(A) of Myanmar Merchant Shipping Act and the International Convention for the Safety of Life at Sea, 1974, the Department of Marine Administration circulated this guidance for winch load test in shop for Myanmar Vessels engaged on International Voyage.

3. The purpose of this directive is to ensure the winch load test in shop for Myanmar vessels engaged on International Voyage to be complied with the requirements of the International Convention for the Safety of Life at Sea, 1974, as amended and the IMO – Regulations on Approval of Marine Equipment.

Maung Maung Oo
Director General
Department of Marine Administration

THE REPUBLIC OF THE UNION OF MYNAMR

MINISTRY OF TRANSPORT AND COMMUNICATIONS

DEPARTMENT OF MARINE ADMINISTRATION

Guidance for Winch Load Test in Shop

Date: 11.1.2018 **Revise - 00**

Content

TOWING WINCH SHOP TEST PROCEDURE

1. Application:

This procedure is used to inspection and test the towing winch which to be fitted on Myanmar Ships.

2. Workshop test

2.1 Load test conditions:

- Winch are only allowed to be tested after completely assembled, all parts have been checked and approved by maker and flag surveyors.
- Location: To be carried out at the workshop of manufacturer or approved test firm.
- Means of test: There shall be test bench, on which 1 hydraulic cylinder to a diameter of not less than 200 mm and piston and rod. Diameter of cylinder and piston rod shall be printed on test firm. There is a hydraulic power pack station to push and pull the cylinder. The hydraulic line connected to piston rod side of hydraulic cylinder shall be fitted with a safety valve with pressure gate which can be adjusted in order to meet the requirement based on the load. The safety valve opening pressure shall be abject to get the require.
- Measuring tools: pressure gauge, thermometer.

2.2 Check the condition before test:

Before attempting to test the technical staff is the responsibility to review the entire technical condition of the winch:

- Check the geometry and status of the main components, assemblies, parts (flanges, bolts, setting bolts, shaft, pins, bearing … etc.).
- Check the electric motor insulation, electric equipment.
- Check the hydraulic system and parts.

2.3 Participants:

- Shipowner' representative
- Classification' representative
- Factory' representative
- Flag surveyor and technicians

2.4 No-load test:

Before attempting to carry out no-load test, a hydraulic test with a static pressure of P = 1.5xWorking pressure, in 10 minutes test period.

No-load test:

- Testing time in each direction: 15 minutes
- Testing suddenly changing direction: 10 minutes Measuring table:

No.	Description	No-load test	Remark
I	***Pull direction***		
1	Speed (m/s)		
2	Current (A)		
3	Hydraulic pressure (Bar)		
II	***Slack direction***		
1	Speed (m/s)		
2	Current (A)		
3	Hydraulic pressure (Bar)		
II	***Open/engage the clutch***		

2.5 Load test

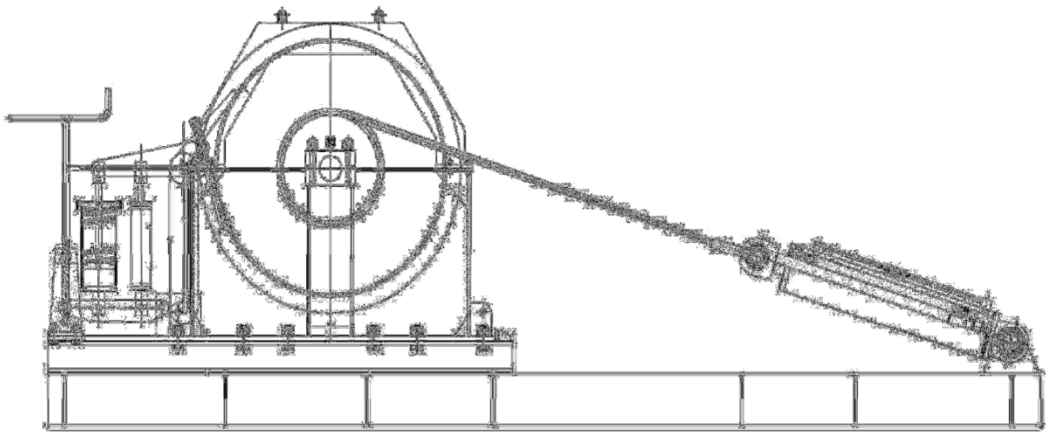

Figure -1

Load test is carried out with a force depending on size and type of vessel in regular for the test to use in cover of ship berth in which shall be 40 to 60 ton force. Set up the safety bar, opening bar pressure on testing hydraulic power pack shall be calculated as below.

$$\text{Area of piston} \quad A = \frac{\pi}{4}(D^2 - d^2) = 3.14 \times 0.25\,(D^2 - d^2)$$

D^2 = cylinder Diameter

d^2 = piston rod diameter

$$p = f \times 1000/A$$

+ f : Load force (ton)

+ p: setting pressure (bar)

+ A: Working area of piston (cm^2)

- Start operating towing winch, use towing winch to pull the piston, check the pressure on pressure gauge until the pressure increases and gets calculated pressure.
- Measure the pulling length in order to check the speed.
- Stop pulling, and keep in gets for 15 minutes.
- Release the pressure.

Measuring table:

No.	Description	Load test	Remark
1	Speed (m/s)		
2	Current (A)		
3	Hydraulic pressure (Bar)		

2.6 Overload test

- Allowable Overload is 10 percent normal working load .
- Overload test is carried out with a force of 100 percent of normal working load Ft = 1.1 x Pulling force = 44 tons
- Test time: 02 minutes
- Set up the safety valve on testing hydraulic power pack with pressure in accordance with 1000 percent load test pressure.

$$P = F \times 1000/A$$

$F = 1.1 \times$ working load

$= 1.1 \times f$

$$P = 1.1 \times \frac{f}{A}$$

- Start operating towing winch, use towing winch to pull the piston, check the pressure on pressure gauge until the pressure increases and gets to calculated pressure .
- Stop pulling, and keep the pressure in 2 minutes.
- Release the pressure.

Measuring table:

No.	Description	Over load test	Remark
1	Current (A)		
2	Hydraulic pressure (Bar)		

2.7 Brake Test:

- Using hydraulic jack to carry out brake test, with Brake holding force depending on size and type of vessel for the vessel with the towing of 40 tons shall need the brake holding force of 80 tons and for the vessel with the towing winch of 60 ton shall need 100 tons of brake holding force.
- Located the jack at the position shows in figure 2 to be measure the distance, L_2 between center of break ton and center of hydraulic located jack.

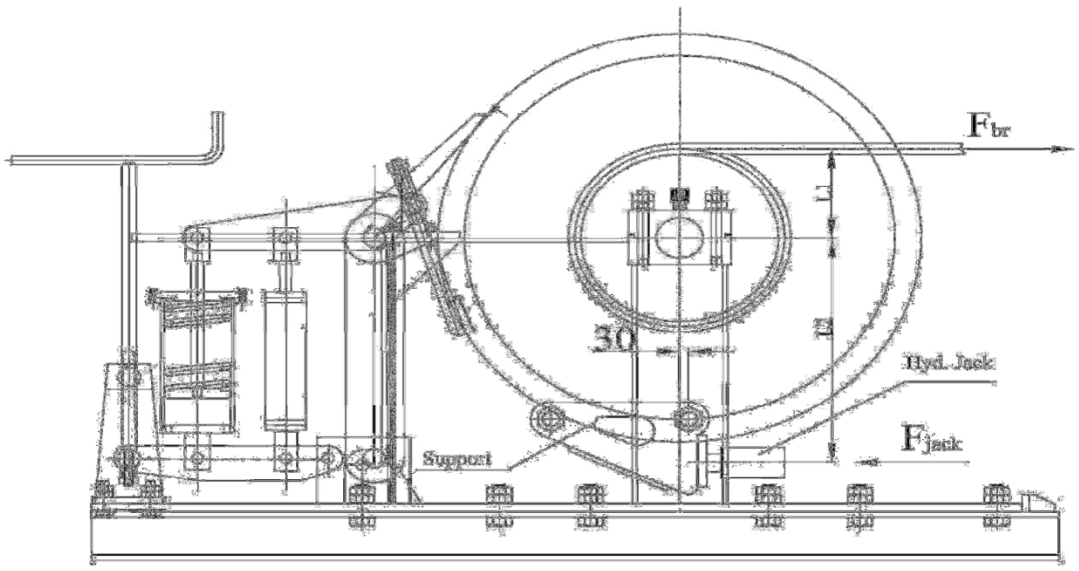

Figure -2

- Check to ensure that the brake is on working position.
- Working area of jack piston , a = $\frac{\pi}{4}(D^2 - d^2)$ =3.14 × 0.25 $(D^2 - d^2)$ mm^2

  D^2 = cylinder diameter

  d^2 = piston rod diameter

- Using the hand pump to increase pressure of jack up to 623 bar, then the jack force will be equivalent 40 tons at distance 900mm off drum center line, and equivalent to 100 tons at the first layer on drum, see the function below:

$$\text{Jack pressure} = \text{Fjack/a}$$

Fjack = Force on Jack

Fbr = Fore on Brake

a = working area of jack piston (mm^2)

$$\text{Fjack} = \text{Fbr} \times \frac{L_1}{L_2}$$

L_1 = radius of warping drum

L_2 = distance between radius of rope diameter

1kN = 0.01bar

1 ton = 10 kN

1 bar = 1 kg/ cm^2

$$\text{F jack} = \text{F br} \times \frac{L_1}{L_2}$$

Fbr =t ×10

D = Distance of hydraulic piston (cm^2)

$$P \times 3.14 \times 0.25 \times (D^2 - d^2) = t \times 10 \times \frac{L_1}{L_2}$$

$$P \times 3.14 \times 0.25 \times D^2 = t \times 10 \times \frac{L_1}{L_2}$$

- Keep the pressure , P bar for 10 m

Release the pressure

No.	Description	Brake test	Remark
1.	Hydraulic jack pressure (Bar)		

Annex I

Towing Winch Load Test Report

MINISTRY OF TRANSPORT AND COMMUNICATIONS
DEPARTMENT OF MARINE ADMINISTRATION
MARINE ENGINEERING DIVISION

Report No.
Port of.
Date.

Towing Winch Load Test Report

This is to satisfy

That the under signed surveyor to the Myanmar Maritime Administration did, at the request of owner representative, attend the …… of

Vessel Name : ……

Port of registry : ……

Official Number : ……

Call Letter : ……

Machinery or Equipment : ……

Model No : ……

Serial No : ……

Specification : ……

in order to witness the …… at …… in accordance with the National Guidance and Procedure for Type Approval of Equipment, reports as follow:

..... **short tons measured on continuous pulling test;**

……..**short tons measured on overload test;**

……..**short tons measure on brake test;**

…….……
Surveyor:
Engineering Division,
Department of Marine Administration

Test data

Sr.No	Description	Pressure	Start	Stop	Result
1	**Load Test**				
2	**Overload Test**				
3	**Brake Test**				

Annex II

1. Type Approval Certificate for Marine Equipment

2. Approval for Fit Certificate (No. /)

Certificate No – /2018

THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF TRANSPORT AND COMMUNICATIONS
DEPARTMENT OF MARINE ADMINISTRATION

TYPE APPROVAL CERTIFICATE FOR MARINE EQUIPMENT

The certificate is issued under the authority of the Department of Marine Administration, Myanmar to:

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attest to certify that the undersigned did, at the request of the manufacturer, attend their works for the purpose of inspecting and testing the products listed below:

TOWING WINCH

Equipment Name :
Manufacture :
Capacity :
Model No :
Description :
Pulling Speed :

Following items of inspection and testing were carried out and, so far as can be seen, found complying with approved drawings.

- Reviewing of the material test report(s);
- Reviewing of works certificate with test reports;
- Load test with weight of 40 short tons, overload test with weight of 44 short tons and brake test with weight of 79.3 short tons on each steps while the winch was at factory.
- Visual inspection.

Date of Issue _____

Surveyor

Director General
Department of Marine Administration

THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF TRANSPORT AND COMMUNICATIONS
DEPARTMENT OF MARINE ADMINISTRATION

APPROVAL FOR FIT CERTIFICATE (NO. /2018)

The certificate is issued under the authority at the Republic of the Union of Myanmar to:

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to attest that appropriate examinations and tests have been carried out, in the presence of Surveyor to the Government of the Republic at the Union of Myanmar, to check that the product detailed below complies with the relevant requirements of the Administration.

Equipment Name	:
Quantity	:
Description	:
Type/ Model	:
Maximum Working Load	:
Reference of the Type Approval	:
Piece/ Serial Number	:
Pulling Speed	:

Notes:

Final acceptance will be subjected to satisfied test on board the vessel.

Date of Issue _____

Director
Marine Engineering Division
Department of Marine Administration