

INTELLECTUAL PROPERTY OFFICE OF SINGAPORE

CLAIM(S)

1. Date of Application: 15.02.2010
2. Application No.: 201001824-0
3. Date of Filing: 11.03.2011

Reference : CPS/89571/09/RMS

Title Of Invention : **RIGGING AND WIREROPE TESTING EQUIPMENT
- STRUCTURAL LIFTING FRAME ARRANGMENT /
APPARATUS FOR CRANE TESTING AND
ASSOCIATED LOAD TESTING METHOD**

Name of Applicant : RIGGING AND MARINE SERVICES PTE LTD

Address : 2 SENOKO CRESCENT SINGAPORE 758259

Device and Method for Testing of Loading Capacity of Cranes and / or Wire Ropes related to Crane Operations

This invention relates to a device and a method for the testing of wire ropes and their tensile or tension strength. The invention is particularly intended to apply for the testing of cranes for their loading capacity and such cranes may either be mounted on maritime vessels or otherwise on land.

The device comprises of:

1. an S.W. L. lifting frame,
2. an S.W. L. double-column spreader frame with trunnions placed on each head of the columns,
3. a pair of single column spreader beams with equally spaced trunnions on the sides of the column,
4. refillable water bags which act as test weights / loads,
5. rigging gear such as shackles, pins, wire-rope slings,
6. lifting lugs, load cells, and double-aperture link plates.

Drawings of the constituent parts of the device, their design calculations and technical specifications which comprise and form part of the invention (and which is the subject of this Claim) are also included herein.



164164



G00001

Claims

1. Apparatus or device for load testing of a crane by way of a single point lifting arrangement, and comprising of:
 - 1.1 an S.W. L. lifting frame,
 - 1.2 an S.W. L. double-column spreader frame with trunnions placed on each head of the columns,
 - 1.3 a pair of single column spreader beams with equally spaced trunnions on the sides of the column,
 - 1.4 refillable water bags which act as test weights / loads,
 - 1.5 rigging gear such as shackles, pins, wire-rope slings,
 - 1.6 lifting lugs, load cells, and double-aperture link plates.

The said apparatus or device will be readily appreciated and better understood by reference to the accompanying drawings as well as the technical designs and calculations which form part of the this Claim.

2. Method, as utilized by the apparatus or device as defined in Patent Claim 1, characterized in that the lifting capacity of the crane and/or otherwise the tensile or tension strength of the wire ropes used by the crane for lifting is tested by the direct transmittal of loading using a plurality of water bags as test weights through a single point lifting arrangement.
4. Apparatus or device according to Patent Claim No. 1.1, characterized in that the S.W.L. spreader or lifting frame is rectangular in shape, generally made of steel, with lifting lugs welded at the corners of both the under and upper sides of the framework that together with a combination and use of shackles, wire ropes and slings, are connected to and suspended below a centric wide body shackle that is secured with a link plate to a load cell which is hooked or otherwise roped to the wire ropes of the crane. The water bags, acting as test weights are suspended and are hung from the lifting lugs that are welded to the under-sides of the corners of the spreader or lifting frame. The said apparatus or device can be used singularly on its own or in combination with the apparatus or device according to Patent Claim No. 1.2 and 1.3 depending on the test load required.
5. Apparatus or device according to Patent Claim No. 1.2 and 1.3, characterized in that the S.W.L. spreader frame is made of two column beams, generally made of steel, which are joined or otherwise welded together at the two ends of the structure complete with securing secondary members and trunnions which are welded or otherwise placed at the heads of the columns. Single spreader beams are suspended from each of the two ends of the double-column spreader frame by slings or otherwise wire ropes with water bags, acting as test weights being suspended from the trunnions welded or otherwise placed equally apart on the

longitudinal side of the single spreader beam as well as on the side trunnions of the double-column spreader beam. The said apparatus or device can be used singularly on its own or in combination with the apparatus or device according to Patent Claim No. 1.1 depending on the load test required.

6. The apparatus or device as defined in Claim 1, wherein the S.W.L. lifting frame, the S.W.L. double-column spreader frame, the pair of single column spreader beams, re-fillable water bags together with various types of rigging gear are respectively separately stored and transported to enable assembly at the test site, and thereafter dismantled on site after the test, for separate storage and transportation.
7. In combination with a crane have a hook suspended therefrom a method of testing the capacity of the crane by loading thereof with a plurality of test weights, using water bags, comprising the steps of: using a single point lifting arrangement, by positioning or suspending the test weights secured from a lifting frame, such as the spreader beam, double-column spreader beam or the rectangular lifting frame, as the case may be, at a location in underlying alignment below the crane, and assembling facilities on the hook and the frame / beam for transmittal of the loading by test weights on said frame / beam directly to the crane through said hook, said positioning of the test weights being effected by securing the various water bags, as required, and filling the same with water, to effect the desired test weightage, and which is suspended from the said frame / beam in underlying alignment below the crane.
8. Device or apparatus according to Patent Claim No. 1, characterized in that the maximum lifting capacity for testing is 1400 tonnes.
9. Device or apparatus according to Patent Claim No. 1.1 and Patent Claim No. 4, characterized in that the device or apparatus, when used singularly has a maximum lifting capacity for testing of 700 tonnes.
10. Device or apparatus according to Patent Claim No. 1.2 and 1.3 and Patent Claim No. 5, characterized in that the device or apparatus, when used together, has a maximum lifting capacity for testing of 1140 tonnes.
11. Method according to Patent Claim No. 1, characterized in that the object of the invention is to provide a more versatile method of load testing a wide variety of different types and sizes of cranes, as well as the tension / tensile strength of the respective crane's wire ropes, in a less cumbersome and less costly manner.

Background of the Invention

The testing of cranes in regard to their load weight capacity typically was hampered either to the use of one large fixed weight or a plurality of smaller individual weights

which on aggregate, could not provide for testing of the load weight to the capacity of 1400 tonnes.

Solution Provided by / Advantages of the Invention

The invention provides for such maximum test weight capacity to be achieved. Furthermore the device or apparatus not only provides for a plurality of weights to provide and accommodate for various sizes and types of cranes (as well as the various different tension / tensile strengths of the individual crane's wire ropes), it also represents a more versatile method of load testing in a less cumbersome and less costly manner.

The invention also provides for savings in costs in that it is characterized by the use of water bags which are re-fillable and can be subsequently decanted or emptied leaving only the canvas bags to be folded and stored away.

The apparatus and device can also be dis-mantled or dis-assembled into smaller structural components so that it may be transported or stored away in a less cumbersome manner.

Description of Figures

A more complete appreciation of the invention and many of its attendant advantages will be readily appreciated if the same becomes better understood by reference to the detailed description provided herein when considered in connection with the following drawings which are annexed to this present patent application:

The various design calculations, technical designs and drawings are also regarded as part of the present Patent Claims and are annexed herein.

FIG.1

FIG.2

FIG.3

FIG.4

FIG.5

FIG.6

FIG.7

FIG.8

FIG.9

FIG.10

FIG.11

FIG.12

FIG.13

FIG.14

FIG.15

FIG.16

FIG.17

FIG.18

FIG.19

FIG.20

FIG.21

FIG.22

FIG.23

FIG.24

FIG.25

FIG.26

FIG.27

FIG.28

FIG.29

FIG.30

FIG.31

FIG.32

FIG.33

FIG.34

FIG.35

FIG.36

FIG.37

FIG.38

FIG.39

FIG.40

FIG.41

FIG.42

FIG.43

FIG.44

FIG.45

FIG.46

FIG.47

FIG.48

FIG.49

FIG.50

FIG.51

Preferred Embodiment

The invention relates to a method and apparatus for load testing of a crane by way of a single point lifting arrangement.

There are three preferred embodiments, namely and as described in Patent Claim No. 1, Patent Claim No.4 and Patent Claim No. 5.

Obviously, other modifications and variation of the present invention may be possible in light of the foregoing descriptions, explanation of methods and teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practised otherwise than as specifically described and such variants may also include devices or apparatus with different test load capacities apart from those that have been particularly described.