LH 型电动葫芦桥式起重机

LH Model E.O.T. Crane with electric hoist.

制造许可证：TS2410035-2008

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说 明 书

Use Explanation Manual.

（5-32/8t）

概 述

General Introduction

LH 型电动葫芦桥式起重机（简称起重机）系列是以固定式的钢丝绳电动葫芦作为起重机（主钩和副钩）。安装在双轨小车上，与双梁桥架配套使用的起重机。

LH model E.O.T. Crane with electric hoist (shortly termed as E.O.T.)Series use fixed wire rope electric hoist as lifting mechanism (Main hook and Auxiliary hook). Fixed on bi-rail trolley, fitted with double girder bridge.

本产品适用于机械制造车间、仓库、料场、水电站检修、装配待场所，进行一般吊重装卸作业，本产品的工作环境温度为-25℃~+45℃，不适用于爆炸危险、火灾危险介质中和相对温度大于 85%，充满腐蚀性气体的场所，也不适用于吊运熔化金属和有毒、易燃、易爆的物品。

This product applies to mechanical manufacture workshop, warehouse, material yard, hydroelectric plant maintenance, assembly etc for common lifting, loading & unloading works. This product working environment is -25℃--+45℃, not applicable to explosive dangerous, fire danger carrier and relative temperature above 85%, places full of corrosive gas, nor lifting Melton metal, poisonous, flammable, explosive materials.

本系列产品没有司机室操纵断面和地面操纵两个品种共 144 个规格。

This series product is designed with driver’s cab control and ground control two kind’s altogether 144 models.

结构特性与工作原理

Structural features and work theory

本系列产品由桥架、双小车、大车和电气四个主要部件组成。

This series product is composed of bridge, double trolley, crane and electrical equipment four main parts.

采用固定式的钢丝绳电动葫芦作为起重机构，大车运行机构、司机室操纵时，分为双速和单速两种，用户无特殊要求者为单速，地面操纵时为单速。

Adopts fixed wire rope electric hoist as lifting mechanism, crane traveling mechanism, When use driver’s cabin operation, divided into single speed and double speed, if no specific requirements from customer, use single speed, ground control

with single speed.

本系列产品的起重量分为：5t、8t、10t、12.5t、16t、20t、32t 共七个吨位。

This series products capacity includes 5, 8, 10, 12.5, 16, 20, 32t altogether seven tonnage.

（1）桥架

（1） Bridge

桥架由主梁、端梁、走台、导电架、司机室、大车导电线挡架、栏杆和梯子等部件组成。

Bridge is composed of main girder, end carriages, walkways, conduction frame, driver's cabin, crane conduction end stop, ladders, handrails etc.

本系列起重机采用箱型结构，主梁与端梁用高强度螺栓连接。非导电侧设一通长走台。小车轨道采用 P15-P38 I 字型轨道，用压板固定。小车馈电采用柔性电缆或硬滑供电系统。

This series crane adopts box-type structure, main girder and end carriage use high tensile bolt to connect. Non-conduction side fixed one walkway platform. Trolley rail adopts P15-P38 I-type rail, fixed by fixture, Trolley feeding adopts flexible cable or hard sliding power supply system.

本系列设计了开式和闭式两种司机室。

This series design open and closed two kind driver's cabin.

主梁采用正半偏轨窄翼缘钢板焊接成的箱形梁。端梁为冲压 n 字型截面下翼缘钢板焊接成的箱形梁。非导电侧设有一通长走台，两端加宽用于检修和放置电气设备，安装很方便。桥架另一侧设有小车导电架，用以吊装柔性电缆供电系统。

Main girder adopts half positive local-bias-rail narrow rim steel plate welded box-type girder, End carriage is pressing N-type section lower rim steel plate welded box-type girder. Non-conduction side fixed with one long walkway, two sides widened for maintenance and place of electrical equipment and convenience of installation. Bridge the other side fixed with trolley Conduction Bridge for lifting flexible cable power supply system.

司机室设有闭式和开式两种，壳体结构采用冲压成形，司机室的视野大于 280 度，采用铝合金窗框，司机室内所有导线全部采用暗铺。

Cabin is fixed with open and closed two types, exterior structure adopts pressing forming, cabin scope above 280 degrees, adopts aluminum alloy window frame, cabin inside all lead adopts blind layout.

为了防止当小车行驶到极限位置时，吊具或钢丝绳与电源滑线相碰，在桥架的两根主梁间靠近电源的一端设置了导电线挡架。

In order to prevent when trolley from traveling to the limit position, hook or wire rope crash with power sliding wire, fix conduction wire end stop near bridge middle two main girders power supply.

（2）小车

（2） Trolley

小车运行机构可采用分别驱动和集中驱动，无要求者为分别驱动。小车架采用六梁结构，由两根端梁，两根纵梁和一，两根横梁组成。端梁为冲压成 n 字型截面同下翼缘钢板焊接成的箱形梁，纵梁和横梁均由槽钢制成，也可全部为拼焊箱形结构，各梁之间采用焊接连接。

Trolley traveling mechanism adopts separate drive and centralized drive, usually separate drive when no specific need. Trolley frame adopts six girders structure, composed of two end carriages, two vertical girder and one or two horizontal girders. End carriage is pressing n-type section welded with lower rim steel plate box-type girder, horizontal and vertical girder are all made by channel steel, also could be welded into box type structure, each girder adopts welding connection.

（3）大车

（3） Crane

大车运行机构采用分别驱动，驱动轮数为总轮数的 1/2。锥形转子鼠笼电机，车轮组轴承座与端梁焊后整体镗孔。

Crane traveling mechanism adopts separate drive, drive wheels number is 1/2 of total wheels number. Cone-shaped rotor squirrel cage motor, wheel group bearing base with end carriage welded boring hole.

大小车缓冲器均采用聚氨脂缓冲器。

Crane, trolley buffer all adopts rubber buffer.

（4）电气系统

（4） Electrical system

1、概述

1. Generalization.

起重机各个机构的运转，分别由驾驶室内的控制器或由地面控制按钮盒进行操作。控制器或地面控制按钮盒与电控设备相配合，对各机构电动机实现起动、调速、换向和制动。电控系统保证大车运行机构的操作控制器或地面控制按钮从快速以及直接操作到高速，都使运行电机从慢速起动而平稳地过渡到快速运行。当控制器控制运行电机从快速到停止或反向起动时，电控系统保证运行电机从快速平稳地过渡到慢速而后停止运行，或由快速平稳地过渡到慢速然后又反向慢速起动。提高了起重机的机械、电器寿命，使起重机的可靠性有了很大提高。

Crane each mechanism traveling, separately operate by driver cabin inside controller or ground control pushbutton box. Controller or ground control pushbutton box fitted with electrical control equipment for each mechanism motor start up, speed adjustment, direction alteration and brake. Electrical control system ensures crane traveling mechanism operation controller or ground control pushbutton from slow speed to fast speed and direct operation to high speed, make traveling motor from slow speed start up and stably transmit to fast speed traveling. When controller control traveling motor from fast speed to standstill or reverse direction start up, electrical control system ensures traveling motor from fast speed stably to slow speed then stop traveling, or from fast speed stably to slow speed then reverse direction slow speed start up. Enhance crane machine, electrical equipment life span to make crane reliability improved largely.

2、使用条件

2. Use conditions.

驾驶室操纵的起重机电气系统主回路，控制回路电压均为 V，50Hz。

Driver cabin operated crane electrical system main circuit, control circuit voltage are all 415V, 50HZ.

地面操纵的起重机电气系统主回路电压为 V，50Hz。

Ground operated crane electrical system main circuit voltage is 415V. 50HZ.

电控设备工作条件：

Electrical control equipment working conditions:

- 海拔 2000 米以下；
- Below 2000m sea level.
- 周围空气温度不高于+40℃，不低于℃。
- Ambient temperature no higher than +40 degrees, no lowers than -25 degrees.
- 电压波动在 5%；
- Voltage fluctuate within 5%
- 相对湿度不超过 85%；
- Relative humidity not above 85%
- 有防雨、雪及无水蒸气的场合。
- Rain, snow resistance and non vapor places.

如实际使用条件与上述不符，订货时应说明。

If not conform to above mentioned conditions, should indicate when place order.

3、电气设备

3. Electrical equipment

起重机各个机构的运转，分为在操纵室内操纵，地面按钮操纵，操纵室悬挂在起重机桥架靠端梁附近传动侧走台下面，操纵脚踏开关和风扇等设备，地面操纵用按钮盒操纵。按钮盒上有紧急开关和各机构控制按钮，小车挂缆导电器采用新型 C 轨道。新型滑车，桥架走台上装有集中控制电控箱和走线槽等电气设备，现将主要电气设备分述如下：

Crane each mechanism traveling is operated by driver cabin or ground pushbutton, cabin suspended below crane bridge end carriage side transmission walkway, operation cabin inside fixed with each mechanism operation controller, general power source switch, emergency switch, alarm used foot mounted switch and fan etc. Ground control use pushbutton box operation. Pushbutton box is fixed with emergency switch and each structure control button, trolley festoon conduction adopts new model C track. New model bogie, bridge walkway platform is fixed with centralized control electric control box and wiring section electrical equipment etc, now main electrical equipment sorted as follows:

(1)、电控箱

(1) . Electrical control box.

本起重机采用集中控制方式，是用来对起重机上交流电动机的过载保护以及失压、零位、安全和各机构限位保护。它与控制器相配合，控制各机构电动机的运行。还提供动力，控制和照明回路的电源。电控箱内装有总接触器、熔断器及控制用交流接触器、时间继电器等。

This crane adopts centralized control method, used for overload protection of crane A.C.motor and voltage lose, zero position, safety and each mechanism limit protection. It fitted with controller to control each mechanism motor traveling. Also providing motivation, control and illumination circuit source. Electrical control box inside fixed with general contactor, fuser and control A.C.contactor, time relay etc.

(2) 、小车导电装置

(2) . Trolley conduction device.

本装置采用 C 型轨道导电装置。主要由“C”型轨道若干个轨道接头，轨道支架、牵引滑车、电缆滑车、终端央等零部件组成。

This device adopts C-type rail conduction device. Mainly composed of C-type track several rail joints, rail frame, pulling bogie, cable bogie, end stops etc.

(3)、限位和安全开关

(3). Limit and safety switch.

起重机运行、小车运行起升机构均装有限位开关，以阻止各机构的运行行程。当限位开关断开后，相应的电路被切断停止运转。再次接电源时，机构性能向相反方向运转，从而保障了安全。

Crane traveling, trolley traveling lifting mechanism all fixed with limit switch to prevent each parts traveling distance. When break down of limit switch, related circuit is power off and stop traveling. When get powered on again, mechanism performance travel at the reverse direction, thus ensures the safety.

为了防止驾驶人员和检修人员发生意外事故，在驾驶室平台上，驾驶室通往栏杆的门上均装有安全开关，当门打工时，安全开关动作，切断电路，以保护人员安全。

In order to prevent operator and maintenance personnel from accidents, on driver cabin platform, safety switch is fixed on gates to end carriages, when opening of gates, safety switch work, circuit power off to ensure personnel safety.

4、各机构控制原理

4. Each mechanism control theory.

起重机的电系统由动力回路和控制回路组成其原理如下：

Crane electrical system is composed of motive circuit and control circuit, its basic theory as follows:

(1)、司机室操纵

(1). Driver's cabin operation.

1)、安装在司机室，进入操纵平台时的平台门安全开关 1AK 和起重机桥架栏杆门安全开关 2AK，只要任意打开一只都会使主接触器 XC 自动断开，从而切断电源，以防止检修人员发生触电和意外事故。

1) Safety switch 1AK fixed in cabin to operation platform and crane bridge handrail safety switch 2AK, Opening each of them would make main contactor XC automatically break off, thus break down the power to prevent maintenance personnel from electric shock and accidents.

2)、各机构控制器的零位触点是用保证主接触器当控制手柄未放回零位时不能接通。

2) Each mechanism controller zero position joints are used for ensuring main contactor power off when control stick not back to zero position.

3)、紧急开关 JK 是供驾驶人员遇有紧急情况时切断总电源。

3) Emergency switch JK is used for driver and operator to cut off general power source when meeting with emergent situations.

4)、起升机构和小车的限位开关与各自的控制机构配合起到限位的作用，当限位开关动作后都会使主接触器 XC 断电，断掉总电源，从而使所有机构停止动作，只有当所有机构回零后，重新启动，对应机构向相反方向运行，才能使起重机恢复正常。

4) Lifting mechanism and trolley limit switch is fitted with each control mechanism to act limit position, when working of limit switch would cause main contactor XC power off of general power source, thus stop all mechanism working. Only when all mechanism back to zero position, restart, then related mechanism would travel at the reverse direction thus put crane back to normal.

(2) 起升机构原理

(2) Lifting mechanism theory.

起升机构的正反运行用控制机构来实现，快慢速转换，由接触器来实现。

Lifting mechanism forward and backward traveling is realized by control mechanism, fast and slow speed inversion is realized by contactor.

安装、调整

Installation, adjustment.

起重机安装前，首先按装箱单清点零、部件是否齐全。检查桥架部件、小车及其它零部件在运输过程中有否损坏或变形，如有则应先修复好再进行安装。

Before crane installation, check packing lists the components. Inspect bridge parts, trolley and other components status during transportation to see whether there is any destruction or deformity, if there is, should repair before installation.

1、桥架的拼装

1. Bridge assembly and installation.

为了便于运输和贮存，桥架分成两根主梁和两根端梁，安装时先将主、端梁用高强度螺栓拼装成桥架，本系列共用Φ20 和Φ24 两种高度螺栓，材料是 45 号钢，主、端梁拼装前，要求将接触面的浮锈用钢丝绳清理干净，拧紧螺母的力距当其直径为 20 时，是 456Nm，其直径为 24 时，是 798Nm。拧紧螺母时要按一定的规程进行。桥架拼装后，其主要尺寸偏差满足 JB3695-94。LH 电动葫芦双梁起重机标准的要求。

For convenience of transportation and storage, bridge is divided into two main girders and two end carriages. When installation, should assembly main girders and end carriages with high tensile bolts into bridge frame, this series adopts φ20 and φ24 two kinds high tensile bolts, material is No.45 steel, Before main end carriage assembly, it is required to clean contactor surface floating rust with steel wire brush. When diameter is 20 inches, moment for fasten nut is 456Nm, when diameter is 24 inches, moment for fasten nut is 798 Nm. Fastening of nut should proceed according to certain process. After assembly of bridge, its main dimension tolerance should meet requirements of JB 3695-84, LH E.O.T. crane with electric hoist standard.

2、小车安装

2. Trolley installation.

把整台小车安放在已拼装好的桥架轨道上，主动轮应和轨面接触，被动轮和轨面的间隙应满足 JB3695-94。LH 电动葫芦双梁起重机标准的要求。

Put whole set trolley on already assembly bridge track, drive wheel should contact with rail surface, idle wheel and rail surface gap should meet requirements of JB3695-84, LH E.O.T. crane with electric hoist standard.

3、桥架其它附属部件的安装

3. Bridge other accessory parts installation.

司机室、走台、走台栏杆、电缆滑车架、大车缓冲器底座、大车导电线挡架，小车撞头架及大车导电架等部件应按要求进行安装。

Driver cabin, walkway, handrail, cable bogie frame, crane buffer base, crane conduction wire end stop, trolley end stop and crane conduction frame other parts should installed as per requirements.

4、起升机构是成品的电动葫芦，应检查其钢丝绳安装是否符合合成品附给的电动葫芦使用说明书中的要求，有不符合要求的部分需加以改正。

4. Lifting mechanism is finished electric hoist, should inspect its wire rope installation conformity to finished accessory electric hoist use explanation requirements. Any unconformity parts should be corrected.

5、电气设备安装

5.lectrical equipment installation：

电气设备在安装前应严格检查无件是否完整无缺，绝缘、触点等的性能是否完好，电动机、控制器等电气设备，导线接处是否松动和脱落，是否潮湿等。导线的敷设应按照有关规定，导线的接头和导电轨应保证接触性能良好，所有电气设备的外壳均应可靠接地。

Electrical equipment parts should be strictly inspected for intact status, insulation, contact joints performance before installation, motor, controller other electrical equipment ,lead joints loose status and humid situations etc. lead layout should as per related regulations, lead joints and conduction rail should ensure good performance, all electrical equipment shell should be reliably earthen.

大车运行机构在试运行时，不但要观察两台电机在转行方向是否相同，而且要观察两台电机在运行时的速度是否一致。

When commissioning of crane travelling mechanism, not only need to inspect two motors travelling direction conformity, but also speed of two motors.

6、起重机的试运转

6. Crane commissioning.

在起重机试运转前，必须认真检查机械和电气的各部件安装是否符合要求，各零部件连接是否有松动，各润滑部位是否加油，润滑情况是否良好，否则应消除之，必须检查电动机正反转方向是否符合要求，特别是起重机运行机构的两只电动机旋转方向必须一致。

Before crane commissioning, must inspect mechanical and electrical each parts installation conformity to standard, each parts connection status, each lubrication parts oil charging situations, otherwise should remove problems, must inspect motor forward and backward travelling direction conformity situations, esp. crane travelling mechanism to motors rotation directions must in conformity.

当确认起重机处在完全正常的情况下，就可以试运转，此时端梁栏杆门均应关上，控制手柄均在零位，再按上启动按钮，把电路接通，起重机即进入运转状态。

When confirmation of crane under totally normal situations, could execute commissioning. At this time, end carriage handrail gate should be closed, control stick at zero position, then push start button, connect with power source, crane then enters into travelling status.

1、起重机的空载试车

1. Crane no-load commissioning.

空载试车按下列程序和要求进行：

No-load commissioning could be performed according to following procedures and requirements:

（1)、用手转动各机构的制动轮，使最后一根轴（如车轮轴）旋转一周时不能有卡住现象。

（1） Use hand to rotate each mechanism brake wheel, make last shaft（such as wheel shaft）rotate one circle without stuck.

（2)、小车行走：空载小车沿轨道来回行走三次，此时，不应有明显打滑。主动车轮应在轨道全长上接触。起动制动应正常可靠。限位开关的动作准确。小车上的缓冲器与桥架上的碰头相碰的位置准确。

(2) Trolley traveling: no-load trolley travel three times along rail, meanwhile, should

not occur obvious sliding. Drive wheel should fully contact with track. Start up and brake should be reliable and normal. Limit switch working should be precise. Trolley buffer joint position with bridge should be precise.

（3）、空钩升降：开动起升机构，使空钩上升、下降三次，此时，起升机构限位开关的动作应准确可靠。

(3) Empty hook lifting: Start up lifting mechanism to perfom empty hook lift and fall for three times, meanwhile, lifting mechanism limit switch working should be reliable.

（4）、把小车开到跨中，起重机沿厂房全长行走两次，以验证房架和轨道，然后以额定速度往返行走三次，检验行走机构的工作质量。此时，启动或制动时，车轮不应打滑，行走平稳，限位开关的动作准确，缓冲器工作正常。

(4) Trolley travels to mid-span, crane travels twice along workshop whole length to test house frame and rail, then travels three times at rated speed back and forth to test traveling mechanism work quality. Then when start up and brake, wheel should not slide, traveling should be stable, limit switch working precisely, buffer works normally.

2、起重机的静载试车（进行超载试车，必要时可以适当调整起升机构的制动器）

2. Crane static load commissioning （Perform overload commissioning, if necessary, could adjust lifting mechanism brake）

静载试车按下列程序和要求进行：

Static load commissioning should be performed as per following procedures and requirements.

(1)、将小车开到端部极限位置，待机平稳后，标记出主梁中点的零位置。

(1). Trolley travels to end limit position, when stablized, mark main girder mid-point zero position.

(2)、将小车开到主梁中部，然后平稳地提开，逐步加载至额定起重量，离地 100mm，悬吊 10 分钟，然后测量主梁中部的下挠度。此时中部的下挠度不得超时宜跨长 L 的 1/800。如此试验三次，在第三次试验卸载后不得有残余变形。每次试验间歇时间不小于 10 分钟。

(2).Trolley travels to mid-girder, then away stably, gradually add load to rated capacity, above ground 100mm, suspend for 10 minutes, then measure mid main girder lower

deflection. This mid lower deflection should not excess 1/800 of span L. test this way for 3 times, when finishing of the 3rd test without any deformity. Each test interval time should no less than 10 minutes.

(3)、在上述试验满足后，可作超额定载荷 25%的试车（即提升 1.25 倍起重量），方法与要求同上。

(3). After performing of above tests, could perform 25% rated capacity commissioning.（that is lift 1.25 times of rated capacity）, method and requirements same as above.

(4)、上述试验结束生，应检查起重机各部分不得有裂纹，连接松动或损坏等现象出现。

(4). After above tests, should inspect crane each parts status, whether there is cracks, connection loose or destruction.

为了减少吊车梁弹性变形对试车测录的影响，静载试车时，应把起重机开到厂房的柱子附近。

In order to reduce crane girder elastic deformity effect upon commissioning report, when static load commissioning, should let crane travel till workshop pillar nearby.

3、起重机的动载试车

3. Crane dynamic load commissioning.

动载试车按下列程序和要求进行：

Dynamic load commissioning should be performed as per following procedures and requirements.

(1)、先让起重机提升额定起重量试验，试验时应同时开动二个机构，按起重机的工作类型规定的循环时间作重复的起动、停车、正转、反转等动作，时间不少于 1 小时，此时，各机构的制动器，限位开关及电气控制应准确可靠，车轮不打滑，桥架的振动正常，机构运转平稳，卸载后各零部件无裂纹和损坏，各连接处不得有松动。

(1). First perform rated capacity lifting test, should also start two mechanism at same time. Perform repeated start up, stop, forward and backward rotation as per crane work type stipulated circle time, time no less than one hour. Meanwhile,each mechanism brake,limit switch and electrical control should be precise and reliabel, wheel not slide, bridge vibration normaly, mechanism stable travel, each parts without crack and destruction after unloading, each connection joints without loose.

(2)、上述试车结果良好时，可在超额定载荷 10%的情况下，作与上述方法和要求相同内

容的试车。

(2) If above tested results prove well, could perform commissioning same as above methods and requirements under conditions of 10% overload conditions.

维护的保养

Maintenance and keeping.

起重机的正确使用的维护保养对安全生产和起重机的使用寿命有很大的关系，因此，必须定期对起重机进行检查，检查必须符合 GB6067-85《起重机械安全规程》和其它有关文件规定的要求，具体方法可按下述内容进行。

Crane correct use and keeping maintenance have great influence on safe manufacture and crane use life span. Therefore, must perform inspection and test at certain times.inspection must conform to 《GB 6067-85》《Crane machines safety regulations》and other related documents requirements, detail method could be performed as follows:

（1)、机械设备的维护和保养

（1）. Mechanical equipment maintenance and keeping.

下列分别说明主要零部件的维护和保养：

Following specifically indicate main components maintenance and keeping.

1、润滑：起重机各机构的使用质量和寿命，很大程度取决于经常而正确的润滑。

1. Lubrication: Crane each mechanism use quality and life span largely depends upon usual and correct lubrication.

一般每三个月内应检查润滑部位的润滑部位的润滑情况，进行加油或更换没油液；对于使用频繁，在环境恶劣的情况下，使用的起重机要本酌情缩短加油周期，以保证良好的润滑情况。

Commonly inspect the lubrication conditions of lubricated parts each 3 months, perform oil charge or change oil; for frequently used under bad environment conditions crane should shorten oil charge peroid to ensure good lubrication conditions.

本系列起重机各机构采用分散润滑方式，因此必须随时检查油杯，保证畅通无阻。

This series crane each mechanism adopts separate lubrication methods, thus must inspect oil gun at any time to ensure smooth working.

润滑油（脂）的采用与机构的工作特性和温度有关，在温度比较高的场所可选用粘度大的油或脂。

Lubrication grease adoption matters much to mechanism working property and temperature, in high temperature places could select high viscidity grease or oil.

大小车轮中的轴承，吊钩滑轮，固定滑轮和其它部分的滚动轴承可用 3 号钙基润滑滑脂，油加热后的混合体润滑，其比例为 4：1。

Big and small wheel bearing, hook pulley block, fixed pulley and other parts rolling bearing could use No3 Calcium base lubrication grease, oil heated mixed material for lubrication, its scale is 4:1.

减速器齿轮采用油池飞溅润滑，使用齿轮油（SYB1103-62S），夏季用 HL-30，冬季用 HL-20，注入箱内的润滑油量用油针测定，油面应达到油针上下两刻线之间。

Gearbox gears adopts oil splash lubrication, use gear oil（SYB1103-62S）,Summer use HL-30, winter use HL-20, infused lubricant quantity into box could be measured by oil needle, oil surface should up to oil needle above or below two scales.

2、钢丝绳：为防止钢丝绳因松懈而降低强度，起升机构工作时，应避免吊具组打转。

2. Wire rope: In order to prevent wire ropes from loos thus lower temperature,

钢丝绳必须按时正确的润滑，润滑应用浸有煤油的抹布清洗旧油，绝对禁止用金属刷子或其它尖锐器具清洗钢丝绳上的污物，也绝对禁止使用酸性或其他具有强烈腐蚀性的润滑剂。

when lifting mechanism works, should prevent hooks goup from rotation.Wire rope must lubricate correct, lubrication should use rag dipped into koresene to clean oil remains. Totally fobidden to use metal brush or other sharp tools to clean spots on wire ropes; nor forbidden to use acid or other strong corrosive lubricant.

钢丝绳是否继续安全使用，应根据选用的电动葫芦的说明书的规定。

Whether wire rope could continue to use , should accort to electric hoist explanation regulations.

3、吊具组：吊具是起重机中的重要部件之一，必须定期检查，如果发现有下列情况之一时，吊钩或其他附属零件应立即报废，更换新钩或零件（吊钩严禁焊补后使用）。

3. Hook block: Hook is one of crane most important parts, must inspect at certain

times, if found one of the following situations, hook or other accessary parts should be wasted at once, change for new hook or parts （Hook is forbidden to use after weld remedy）

(1). 表面出现任何裂纹；

(1). Cracks found on surface

(2). 危险断面或吊钩顶部产生塑性变形；

(2). Dangerous section or hook top found plastic deform

(3). 吊钩扭转变形超过 10°；

(3). Hook torsion deformity over 10 degree.

(4). 吊钩危险断面的磨损达到了原断面高度的 10%；

(4). Hook danger section abrasion up to original section height 10%

(5). 吊钩开口度比原尺寸增加 15%；

(5). Hook mouth degree increased 15% of original dimensions.

(6). 吊钩部分退刀槽或过渡圆角附近出现疲劳裂纹；

(6). Hook parts groove or transitional round angle side found fatigue cracks.

(7). 螺母、吊钩横梁出现任何裂纹和变形。

(7). Screw, hook girder found any crack and deformity.

4、滑轮出现下列情况之一时，应予报废：

4. Any of the following situations found of pulley, should be wasted and change anew.

(1). 裂纹；

(1). Crack

(2). 轮槽不均匀磨损达 3mm；

(2). Wheel slot uneven abrasion up to 3mm.

(3). 滑轮壁厚磨损达原壁厚的 20%；

(3). Pulley wall thickness abrasion up to orginal 20%.

(4). 因磨损使轮槽底部直径减少量达钢丝绳直径的 50%。

(4). Due to abrasion make wheel slot bottom diameter reduction up to wire rope diameter 50%.

(5). 其它损害钢丝绳的缺陷。

(5). Other wire rope flaws.

5、减速器：减速器应定期检查齿轮的润滑，齿轮付的啮合和轴承温度等情况，如发现异常情况应立即停车检修。

5. Gearbox: gearbox should inspect gear lubrication at certain times, gear and bearing temperature, when found abnormal situations, should stop for maintenance at once.

(1). 在减速器使用初期（半年内），每三个月应更换一次润滑油，以后根据油液的分解、氧化和清洁程度，每半年更换一次润滑油，换油时应用煤油冲洗油箱内壁；

(1). When gearbox used for the first half year, should change lubrication oil once each 3 months, later as per oil liquid decompose, oxidation and clean degrees to change lubrication oil each half year, when change oil, should use kerosene to clean oil tank inside wall.

(2). 减速器应每半年打开箱盖详细检查一次，检查员齿轮有无点蚀、擦伤、胶合和裂纹等缺陷，轴承和密封零件是否磨损，并根据不同要求进行更换或修复；

(2). Every half year, should open gearbox cover for detailed inspection, inspect gears whether there is corrosion, abrasion, adhesion and crack flaws etc; Bearing and sealed parts whether found any abrasion and as per different requirements to change and repair.

(3). 减速器出厂时已作静面密封，当开箱检修时应将结合面上的残余密封胶清除干净，再均匀涂上新的液态密封胶，待胶液少许聚合后，再合箱并紧固螺栓；

(3). Gearbox is sealed and airproof before dispatch, when open box for inspection and repair, should clean adhesion surface remains sealed glues, then paint new liquid seals glue evenly, wait for some while, then close box and fasten bolts.

(4). 急剧地正反运运转会明显降低减速器的使用寿命，并影响其安全使用，应避免上述情况。

(4). Sharply and suddenly traveling forward and backward would evidently reduce gearbox use life span and affact its safe use, should prevent above situations.

6、车轮装配应定期检查，当出现下列情况之一时，应报废：

6. Wheel assembly should inspect at certain times, when found the following conditions, should be changed anew and wasted.

(1). 裂纹；

(1). Crack.

(2). 轮缘厚度磨损达原厚度的 50%；

(2). Wheel rim thickness abrasion up to original 50%.

(3). 轮缘厚度弯曲变形达原厚度的 20%；

(3). Wheel rim thickness bend deformity up to original 20%

(4). 轮缘厚度弯曲变形达原厚度的 20%；

(4). Tread thickness abrasion up to original 15%

(5). 当运行速度低于 50m/min 时，椭圆度达 1mm，运行速度高于 50m/min 时，椭圆度达 0.5m。

(5). When traveling speed lower than 50m/min, ellipse degree up to 1mm, traveling speed above 50m/min, ellipse degree up to 0.5mm

(6). 两个主动车轮的工作直径由不均匀磨损所造成的，相互偏差不得超过其公称直径的 1/600。如超过此值，应重新车光，重车后的车轮应满足第 4 条规定。

(6). Two drive wheels working diameter tolerances due to uneven abrasion should not excess diameter 1/600. if excess this value, should polish anew, changed wheel should meet requirements of No.4.

（2）、金属结构的维护和保养

（2）. Metal structure maintenance and keeping.

1、桥架

1. bridge.

桥架是起重机金属结构中最主要的受力构件，保养工作的好坏直接关系到起重机的安全性能。因此，使用时应注意：

Bridge is main stressful parts of crane metal structure, keepping work condition matters much to crane safety performance. Thus should aware of the followings when use:

(1). 必须避免急剧的启动，制动以及与另一台起重机相碰，因为这种急剧动作，应使会桥架产生很大的附加动载荷；

(1). Must prevent from sudden start up, brake and crash with another crane, because this sudden action would cause large additional dynamic load on bridge.

(2). 定期对主梁进行挠度测量，以验证主梁是否超出规定的变形；

(2). Measure main girder deflection at certain times to test main girder deformity.

(3). 检查主梁、端梁焊缝，这些都是主要焊缝，如发现焊缝有裂纹时，立即停止使用。然后将有裂纹的焊缝铲除，用优质焊条（E4303）重焊，重焊时应注意工艺，确保焊接质量和防止焊接变形，检查主梁与端梁的连接螺栓是否有松动现象；

(3). Inspect main girder, end carriage weld, these are all main welds. If found cracks of welds, should stop using at once. Then remove weld crack, use good quality welding rod （E4303）and reweld. When rewelding, should pay attention to process to ensure welding quality and prevent welding deformity, inspect main girder and end carriage connection bolts loos situations.

(4). 当发现主梁有残余变形时（或腹板失稳），应立即停止使用，经研究后。制定修复办法；

(4). When found remains deformity of main girders（or web plate unstable）, should stop using at once, after study to work out maintenance methods.

(5). 桥架修复或加固后，均应进行试车，试车方法同上所述，合格后方可应用。

(5). After bridge repair or reinforce, should perfom commissioning, method same as above , could put into use after qualified.

2、轨道

2. Rail.

主要观察轨道是否平直，压板是否牢固，是否有松动现象。如发现小车行走时卡轨，应该设法矫正轨道或调整车轮。

Mainly inspect rail, fixtures loose situations. If found stuck with rail of trolley, should seeks to correct rail or adjust wheel.

3、电气设备的维护和保养

3. Electrical equipment maintenance and keeping.

为了保证起重机可靠安全工作，必须制订符合 GB6067-85 规定的电气设备的检修制度，并熟悉设备的各种故障产生的原因和消除故障的办法。现将主要设备的维护分述如下：

In order to ensure crane reliable and safe working, must work out electrical equipment maintenance system as per GB6067-85. also know well equipment all problems cause and method to remove problems. Now main electrical equipment maintenance as follows：

1. 为延长起重机电气设备的使用寿命，应经常保持电气设备如：控制箱内接触器的清洁，防止漏电击穿、短路等现象的发生；

1．In order to prolong crane electrical equipment use life span, should always keep electrical equipment such as: clean of controller box contactor, prevent electricity leak, short circuit etc.

2. 检查控制器及接触器的触头是否有烧结等现象，如有这些情况应及时更换或用砂布磨平后再使用；

2. Inspect controller and contactor joints burning status, if found, should change in time or use gauze to polish then use.

3. 挂缆导电小车导轨上的铁锈和污物随时清除干净，保持牵引滑车运行正常；

3. Cable conduction trolley rail rust and spots should be cleaned at any time, keep bogie working normally.

4. 使用载荷限制器，并经常注意控制系统的可靠性，并视情况调整零位。

4. Use load limit device, should pay attention to control system reliability and adjust to zero position.

4、安全操作注意事项

4. Safe operation notice:

1、起重机的驾驶人员必须符合《GB6067-85》起重机械安全规程中有关规定的要求。

1. Crane operator must conform to 《GB6067-85》crane machine safety regulations requirements.

2、不准超载起吊重物。

2. Not allowed to overload lifting heavy cargo.

3、严禁吊运货物在人头上越过。

3. Forbidden to lift material above man head.

4、空中运行时，吊具位置不得低于一个人的高度。

4. When travel, hook position should not lower than one man height.

5、严禁用吊具组斜拉提升重物，也严禁利用起重机拔埋在地下的器物。

5. Forbidden to lift heavy cargo with hooks, nor use crane to lift materials underground.

6、不得利用电机的突然反转为机构的制动。

6. Could not use motor sudden inversion as mechanism brake.

7、禁止利用限位开关作为正常操作下的停电，限位开关只是在操纵设备意外或司机疏忽时才让它起作用。

7. Forbidden to use limit switch as power off under normal operation. Limit switch only acts when operation accidents or driver neglect.

8、起重机在每次运转时，必须先发出警告信号。

8. Each time of crane travel, must give off alarming signal.

9、在提升接近额定载荷的重物时，应先考虑制动器能否刹住，以保安全。

9. When lifting heavy materials near rated capacity, should consider whether brake could work to ensure safety.

10、操作控制器时，不宜瞬时由零档推向额定速度档，而应逐档推动。

10. When operation of controller, not good to push zero position to rated speed step suddenly, should push gradually.

11、起重机不准载人作业。

11. Crane should not work loaded with persons.