

DONGQI GROUP



Ecumpi 'Etcpg

Maintenance&Operation Manual

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请在安装、使用前仔细阅读使用说明书，并严格按照有关安全操作规程进行作业。Please read instructions carefully before installation and use, and in strict accordance with the relevant rules of safe operation in the operations

一、起重机的维护保养与润滑 Maintenance and lubrication of the crane

为了保证起重机安全正常使用、延长零部件、元器件及起重机的使用寿命，必须对其进行经常性的检查与调整。In order to keep the crane safety and normal use, extend the service life of spare parts, components and the crane and must be frequent inspection and adjustment.

(一) 金属结构的检查 Metal structure of the inspection

桥式起重机的金属结构每年检查 1~2 次，重点为连接的松动、脱落、结构材料和焊接的开裂、桥架变形、结构件的腐蚀。金属结构的检查内容和判定标准见表 5-1 所示。Bridge crane's metal structure check 1 ~ 2 times a year, the key for the connection is loose, fall off, structure, material and welding crack, corrosion of bridge deformation and structure. Check the content and the metal structure decision criteria are shown in table 5-1

表 5-1 金属结构检查内容与判定标准 Metal structure checking contents and standards

检查项目 test item	检查内容 test content	判定标准 judge standard
桥架 bridge frame	检测主梁在起吊额定载荷时跨中的挠度，以及水平旁弯和其他变形。Detection of main girder across the deflection when lifting rated load, and horizontal side bending and other deformation.	下挠应 $<S/700$ （以水平线为基线）；旁弯及变形值应符合规定标准 Down warping should be $< S / 700$ (baseline) on a horizontal line; The bending and Deformation values should comply with the stipulated standards
	检查金属结构件有无裂纹、腐蚀、异常变形、整体扭曲、局部失稳； 检查连接部分有无松动、脱落、裂纹、腐蚀。Check whether there is any crack, corrosion on metal structure, abnormal deformation, distortion, local instability; Check the connection part is loose, fall off, crack, corrosion.	不得有裂纹、明显腐蚀、异常变形、明显扭曲和局部失稳； 不得有松动、脱落、裂纹、腐蚀。 No crack, corrosion, abnormal deformation, obviously distortions and local instability; No loose, fall off, crack, corrosion.
	检查金属结构表面防护。Check the metal structure surface protection.	不得有油漆起泡、剥落、明显锈蚀。 No paint blistering, peeling, obvious corrosion.

小 车 架 trolley frame	结构件 steel structure	检查有无裂纹、变形、开裂； 检查钢结构表面防护； 检查各连接有无松动、脱落。 Inspect for cracks, deformation, cracking; Check the steel structure surface protection; Check the connection is loose, fall off.	无裂纹、变形、开裂； 不得有油漆起泡、剥落、明显锈蚀； 无松动、脱落。 No crack, deformation, cracking; No blistering, peeling paint, obvious rust; No loose, fall off.
司机室和主梁连接 cab and the main girder connection		检查连接处母材及焊缝区有无裂纹； 检查螺栓等是否紧固可靠。Check the connection of parent metal and weld area crack; Check whether such as bolt fastening and reliable.	无裂纹； 应紧固可靠。 No crack; Should be tighten and reliable.

(二) 机构的检查与维护 Institutions of inspection and maintenance

1、起升机构的检查：起升机构检查的项目内容见表 5-2，对于起升机构和运行机构相同的零部件、设备等，如电动机、联轴器、减速器、轴和轴承等的检查，可参照表 5-3 相应的项目内容及判定标准进行。
Lifting mechanism of the inspection: check the hoist content of the project are shown in table 5-2, for the lifting mechanism and working bodies of the same parts, equipment, etc, such as motor, coupling, reducer, shaft and bearing inspection, the corresponding content of the project can reference table 5-3 and decision criteria.

表 5-2 起升机构检查标准 Hoisting mechanism inspection standard

检查项目 test item	检查内容 test content	判定标准 judge standard
制动器 brake	机械制动 器 mechanic brake 检查油量是否合适，是否漏油；机架有无裂纹与开裂；制动瓦块是否磨损严重，露出铆钉；油液是否清洁 Check whether oil is appropriate, whether the oil spill; Frame with and without crack and craze; Whether brake segment wear serious, exposed rivets; The oil is clean	油量合适，不漏油；无裂纹与开裂；未漏铆钉；油液无明显污染。 Oil quantity is appropriate, will not leak; No crack and craze; No leak rivets; The oil has no obvious pollution
卷筒装 配 drum device	卷 筒 drum 检查有无裂缝、变形与磨损；钢丝绳固定部分有无异常；钢丝绳脱槽痕迹，卷筒安装连接紧固 Inspect for cracks, deformation and wear; Wire rope fixed part without exception; Steel wire rope groove marks, drum installed fastening connection	无裂纹、无明显变形与磨损；正常；无脱槽痕迹；无松动、脱落 No crack, no obvious deformation and wear; Normal; Without groove marks; No loose, fall off

	轴和轴承 shaft and bearing	检查有无裂纹、变形、磨损；轴端挡板有无变形与松动；转动卷筒，检查轴承有无异常杂音、发热与振动；润滑情况 Inspect for cracks, deformation, wear and tear; End baffle with and without deformation and loose; Turn the drum, check whether there is any abnormal noise on the bearing, heat and vibration; Lubrication situation	无裂纹、明显变形与磨损；无变形松动；无异常振动、杂音、发热；润滑良好 No crack, obvious deformation and wear; No loose deformation; No abnormal vibration and noise, fever; Good lubrication
滑轮组 pulley group	滑轮 pulley	检查有无裂纹、缺损、磨损；绳槽有无异常；有无钢丝绳脱槽痕迹；压板及定位销轴是否有松脱 Inspect for cracks, defects, wear and tear; Wire rope without exception; Presence of steel wire rope groove marks; If there is a loose pressure plate and positioning pin shaft	无裂纹、明显变形与磨损；无异常磨损；无脱槽痕迹；无松脱 No crack, obvious deformation and wear; No abnormal wear and tear; Without groove marks; No loose
	轴及轴承绳挡、平衡滑轮等 Shaft and bearing rope block, balanced pulley, etc	检查有无裂纹及磨损；润滑情况；转动滑轮，有无异常声响和回转质量偏心；检查脱槽、脱落、变形、裂纹 Check the crack and abrasion; Lubrication situation; Turn the pulley, with or without abnormal sound and rotating mass eccentricity; Checking groove, peeling, deformation, crack	无裂纹、明显磨损；无异常声响和质量偏心； 无脱槽、脱落、变形、裂纹 No crack, obvious wear and tear; No abnormal sound and eccentric mass; No bath, peeling, deformation, crack
钢丝绳 steel wire	钢丝绳结构等 Steel wire rope structure, etc.	检查钢丝绳结构、直径是否与设计相符；吊具在下极限位置时，检查卷筒上的安全圈数 Check whether wire rope structure, diameter is consistent with design; Sling next limit position, check security turns on the reel	与随机图完全相符；要求有 2 圈以上安全圈 Consistent with completely deliver graph; Request more than 2 laps safety strap
	钢丝绳状态 State of steel wire rope	检查钢丝绳有无断丝、断股、露芯、扭结、腐蚀、弯曲、松散、磨损；高温环境使用钢丝绳应检查结构是否正确；尾端加工及固定是否正确；有无跳槽现象；有无附着尘土、沙子、杂质、水分 Check with and without broken wires, strands wire rope, core, kink, corrosion, bending, loose, wear and tear; High temperature environment used wire	1 个捻距内不得有 10% 以上的断丝，绳径不得小于公称尺寸 93%，不得有明显缺陷；结构应适合用途；不得有缺陷，且固定牢靠；无跳槽；不粘沙子、尘土及杂质、水分 One may be more than 10% of broken wires within the length of lay, rope diameter shall not be less than 93% nominal size, no have obvious flaw;

		rope should check whether the structure is correct; End processing and fixed is correct; Presence of job-hopping phenomenon; Presence of adhesive dust, sand, impurities and water	Structure should be suitable for use; Shall not have defects, and the fixation; No job; Not sticky sand, dust, moisture and impurities
	钢丝绳安装 使用 Cable installation	检查钢丝是否与结构件碰擦; 与各滑轮的接触状况 Check whether the steel wire brush with structural touch; Contact with the pulley	不得碰擦; 不得有明显的磨损; 压偏、松散 Shall not be scratches; no have obvious wear and tear; Partial pressure, loose
吊具 hook device	吊钩 hook	检查吊钩有无裂纹、变形与磨损; 转动吊钩, 轴承及螺纹部位有无异常声响; 钩口有无异常变形; 轴承等润滑情况 Check whether there is any crack, deformation and wear on hook; Rotating hook, bearing and screw parts have abnormal sound. Hook mouth with or without abnormal deformation; Bearing lubrication	无裂纹、明显变形与磨损; 转动平稳、无异常声响; 无异常变形; 润滑良好, 给油适量 No crack, obvious deformation and wear; Smooth rotation, no abnormal sound; No abnormal deformation; Good lubrication, oil feed amount
	葫芦板、连接件 hoist plate and connect parts	检查葫芦板、连接件的紧固, 要求无松脱; 销、轴、侧板无变形; 钢丝绳防脱装置功能正常; 轴承等润滑情况 Check the gourd fastening plate, fittings, requires no loose; Pin, shaft, side board without deformation; Wire rope resistance devices function properly; Bearing lubrication	紧固可靠、安全, 无松脱; 无变形; 功能正常且无变形; 无裂纹、无磨损、变形 Reliable fastening, safety, no loose; No deformation; Function is normal and no deformation; No crack, no wear, deformation
	抓斗 grab	所有结构与零件无变形、裂纹; 转动件运转灵活; 斗口闭合严密, 无明显磨损 All structures and parts without deformation, crack; Turn a flexible operation; Dou mouth tightly closed, no significant wear and tear	无变形、裂纹; 转动灵活; 抓散粒物料无严重渗漏、磨损正常 No deformation, crack; Flexible rotation; Grasp the grain materials no serious leakage, normal wear and tear

2、桥式起重机运行机构的检查维护: 桥式起重机和小车运行机构的检查项目、内容及判定标准见表 5-3。
Bridge crane operation inspection maintenance: bridge crane and the car running inspection items, contents and organization decision criteria are shown in table 5-3.

表 5—3 桥式起重机和小车运行机构检查项目、内容、判定标准

Bridge crane and the car running items, content, standards agencies to check

检查项目 test item		检查内容 test content	判定标准 judge standard
电动机 motor	安装底座 install base	安装底座有无裂纹;连接有无松动、脱落 Install the base crack; Connect with and without loose, fall off	无裂纹、无松动或脱落 No crack, no loose or fall off
联轴器 coupling	键和键槽 key and key slot	检查键有无松动、出槽及变形; 检查键槽有无裂纹及变形 Check whether there is any looseness on key, out of the slot and deformation; Check the keyway crack and deformation	无松动、出槽及明显变形; 无裂纹及明显变形 No looseness, out of the groove, and obvious deformation; No crack and deformation significantly
	传动轴 drive shaft	转动联轴器、检查有无径向跳动、端面摆动 Turn the coupling, check the presence of radial run out and end face run-out	无明显径向跳动和端面摆动 No obvious radial runout and end face run-out
	橡胶弹性圈 buffer ring	检查变形与磨损程度 Check the deformation and degree of wear and tear	不得超过报废极限 Scrap shall not exceed the limit
	齿形联轴器 cog-wheel coupling	检查润滑情况,是否漏油; 是否有异常响声 Check lubrication, oil; Whether there are abnormal noise	给油适当,不漏油; 无异常声响 Appropriate to oil, no leak; No abnormal sound
	螺栓及螺母 bolts and nuts	检查螺栓、螺母有无松动与脱落 Check the bolt and nut loose and fall off	无松动或脱落 No loose or fall off
制动器 brake	制动器 brake	检查制动器工作情况 Check the brake performance	工作正常,发挥效能、不偏 磨 Normal work, a play efficiency, eccentric wear
	脚踏制动器 foot brake	检查踏板空隙及踩下时与底板间间隙是否正 常,杠杆系统有无松动或错位 Check with gap between floor and stepped on the pedal gap is normal, the lever system with and without loosening or dislocation	空间和间隙要适当;不得有 松动与错位 Space and clearance should be appropriate; no loosening and dislocation
	液压制动器 hydraulic brake	检查液面高度及有无漏油; 检查工作缸的功能、损伤、泄露; 检查推杆有无弯曲变形、油量、泄露 Check the liquid level height, and presence	油量适当、无泄露; 动作正常,不得有损伤和泄 露; 不得有明显弯曲,油量适

	of the spill; Check the function of the cylinder, damage and leakage; Check whether there is any bending deformation on push rod, oil, leaking	当, 无泄露 Oil quantity is appropriate, no leakage; Movement is normal, can't have damage and leakage; Can't have obvious camber, appropriate oil, no leakage
电磁制动器 electromagnetic brake	检查电磁铁动作情况 Check the electromagnet work situation	动作平稳, 无异常噪声、无异臭 Action is smooth, no abnormal noise, no smell
液压盘式制动器 hydraulic disk brake	检查油量及漏油情况, 连接与紧固件安装; 检查液压元件和圆盘工作状态, 有无非正常磨损和损伤 Check the oil and oil situation, connected with the fastener installation; Check the hydraulic components and disk working status, presence of abnormal wear and damage	油量适当, 无漏油, 无松动与脱落; 动作正确, 部件不得有严重磨损或损伤 Appropriate oil and no oil leak, no loose and fall off; Action is correct, no obvious wear and damage, no loose
电磁盘制动器 electromagnetic disk brake	检查电磁铁工作状态; 检查工作件有无异常磨损与损伤, 圆盘安装有无松动 Check the electromagnet work status; Check whether there is any abnormal wear and tear and damage on work piece, the disc to install without loose	动作平衡, 无异常噪声和异臭; 动作正确, 无明显磨损与损伤, 无松动 Balancing act, no abnormal noise and odor; Action is correct, no obvious wear and damage, no loose
制动轮与制动瓦 brake wheel and brake plate	检查制动轮安装有无松脱, 摩擦片有无剥落、损伤及偏磨; 弹簧是否老化, 制动轮有无裂纹、磨损及缺损; 制动间隙是否合适 Check whether there is any loose on brake wheel installation, presence of peeling and damage of lining and eccentric wear; Spring is aging, brake wheel crack and wear and defects; Brake clearance	无松动、无剥落、损伤及偏磨; 无老化; 无裂纹、损伤, 磨损正常; 制动间隙合乎要求 No looseness, no peeling, damage and partial grinding; No aging; No crack, damage, normal wear and tear; The brake clearance is required
行程和制动力矩调节机构 Stroke and the braking torque regulator	检查行程和制动力矩调节机构有无异常; 拉杆、销轴、杠杆及螺栓有无裂纹、弯曲变形与磨损 Check whether there is any abnormal on stroke and the braking torque adjusting	调节器适当, 动作平稳; 无裂纹、变形及明显磨损 Regulator, appropriate action is smooth; No crack,

		mechanism; Rod, pin, leverage, and bolt bending crack, deformation and wear	deformation and obvious wear and tear
	安装螺栓、销轴 Installation bolt, pin shaft	检查螺栓、螺母与销轴有无松脱 Check for loose bolts, nuts and pin	无松脱 No loose
减 速 器 reducer	齿轮箱体 Gear box body	检查有无裂纹、变形及损伤；安装连接有无松动与脱落；油量、油品、油质；漏油 Inspect for cracks, deformation and damage; Installation connected to the presence of loose and fall off; Oil, oil products, oil; The spill	无裂纹、明显变形与损伤；无松动与脱落；油量适当，无污染；无漏油 No crack, obvious deformation and damage; No loose and fall off; Oil quantity is appropriate, no pollution; No oil spill
	齿轮 gear	检查有无异常声响、发热和振动；齿面有无磨损及损伤；轮毂、轮盘、齿轮有无裂纹，变形及损伤；键有无松动，出槽及变形；键槽有无裂纹与变形；轮齿接触和啮合状态有无异常；润滑情况 For abnormal sound, heat and vibration; Tooth surface for wear and damage; Wheel hub, wheel, gear crack, deformation and damage; Button is loose, out of the slot and deformation; Keyway crack and deformation; State of gear teeth and meshing contact with and without exception; Lubrication situation	无异常声响、发热、振动；无明显磨损与损伤；无裂纹和变形及损伤；无松动出槽和明显变形；无裂纹变形；齿面接触良好，啮合深度适度；润滑良好 No abnormal sound, heat, vibration; No obvious wear and damage; No crack and deformation and damage; No loose out of the slot and obvious deformation; No crack deformation; Tooth contact is good, the mesh is moderately depth; Good lubrication
	齿轮箱盖 Gear case cover	检查有无裂纹、变形与损伤；连接与安装有无松脱 Inspect for cracks, deformation and damage; Connection and installation with and without loose	无裂纹、明显变形与损伤；无松脱 No crack, obvious deformation and damage; No loose
轴 shaft	转轴、心轴、传动轴 Shaft, spindle, and drive shaft	检查有无变形与磨损；传动轴是否有振摆；键及键槽松动、变形、裂纹 Check for deformation and wear; Shaft have pendulum; Key and keyway looseness, deformation, crack	无变形、损伤、润滑良好；无异常振动、噪声和明显的发热 No deformation, damage, good lubrication; No abnormal vibration,

			noise and heat
轴 承 bearing	滚动轴承 Rolling bearing	检查有无裂纹与损伤；润滑状况；检查在空载和负载工况下有无异常振动、发热、噪声 Inspect for cracks and damage; Lubrication conditions; Check whether there is any abnormal vibration on under no-load and load conditions, heat, noise	无裂纹、损伤、润滑良好；无异常振动、噪声和明显的发热 No crack, damage, good lubrication; No abnormal vibration, noise and heat
	滑动轴承 Sliding bearing	检查轴承有无磨损； 在空载和负载工况下是否烧损与发热 Check whether there is any wear on bearings; Under no-load and load conditions are burning with fever	无明显磨损； 不得有烧损或明显温升陡变 No significant wear and tear; Can't have damage or obvious abrupt change of temperature
车 轮 组 wheel group	轮缘 rim	检查有无裂纹、缺蚀、变形、磨损 Inspect for cracks, corrosion, deformation, wear and tear	无明显、缺蚀、明显变形、磨损 No obvious, lack of the corrosion, obvious deformation, wear and tear
	车轮踏面 Wheel tread	检查踏面有无磨损；主动车轮以及从动车轮直径误差；检查裂纹、变形、踏面表面剥落 Check whether there is any wear on tread; Driving wheel and driven wheel diameter error; Check the surface crack, deformation, tread spalling	无明显磨损；轮径误差值应符合相应标准；无裂纹与变形；无剥落 No significant wear and tear; Wheel diameter error values should comply with the relevant standards; No crack and deformation; No peeling off
	轮毂内轴承 Wheel hub inner bearing	检查滑动轴承的润滑情况； 空载和负载工况时的异常振动、噪音、温升； 检查滚动轴承的润滑情况、振动、噪音、温升等 Check the lubrication condition of sliding bearing; Non-load and load conditions when abnormal vibration, noise, temperature rise; Check the lubrication condition of rolling bearings, vibration, noise, temperature, etc	无异常 No abnormalities

	车轮轮毂与端梁侧板之间的贴板 The wheel hub and end beam strap between the side panel	检查有无摩擦、磨损；装配精度 For friction, wear and tear; Assembly precision	无摩擦、磨损；安装良好 Without friction, wear and tear; Install the good
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3、轨道的检查 Track inspection

起重机和小车的轨道，每年必须检查 2~4 次，轨道是起重机或小车平稳运行的基础，随着起重机运行时产生的冲击和振动，可能引起轨道安装的松动，连接件脱落、变形裂纹、精度指标超差，这些缺陷反过来又影响起重机或小车的正常运行。通过检查和调整，可以为保证起重机的正常运行提供条件，轨道检查项目、内容见表 5—4。Crane and trolley track, must check 2 ~ 4 times a year, the railway is the foundation of the crane or trolley running smoothly, as the runtime impact and vibration of the crane may cause loose track installation, fitting, deformation cracks, precision index super bad, these defects, in turn, affect the normal operation of the crane or trolley. Through inspection and adjustment, can provide conditions for guaranteeing the normal operation of the crane, rail inspection project; contents are shown in table 5-4.

表 5—4 轨道检查项目、内容及判定标准

The items, contents and standards track inspection

检查项目 test item	检查内容 test content	判定标准 judge standard
轨道 rail	钢轨 rail 检查有无裂纹、头部下陷、变形、侧面磨损 Inspect for cracks, subsidence, deformation, flank wear head	无裂纹、明显下陷、变形及严重磨损 No cracks, subsidence, distortion and serious wear and tear
轨道 rail	钢轨紧固螺栓 Rail fastening bolt 检查连接螺栓有无松动及脱落 Check the connection bolts loose and fall off	不得有松动与脱落 Shall not be loose and fall off
轨道 rail	连接板及垫板 检查螺栓有无松动、脱落；连接板和垫板有无移位、缺陷或脱落 Check the bolts loose, fall off; Connection plate and the plate have no shift, defect or loss	无松动脱落；不得有移位、缺陷及脱落 No loose fall off; Can't have shift, defects and fall off
轨道 rail	缓冲器及车挡 检查有无损伤及错位；安装有无松动、脱落 Inspect for damage and dislocation; Install any loose, fall off	无损伤、错位；无松动、脱落 No damage and dislocation; No loose, fall off
轨道 rail	钢轨接头 检查钢轨接头有无错位及间隙变化 Check whether there is any mismatch on rail joint and clearance	不得有明显错位及间隙变化 Can not have obvious dislocation and clearance changes

钢轨焊接安装 The rail welding installation	检查焊缝有无裂纹与开裂 Check weld crack and craze	不得有裂纹、开裂 Can not have crack, crack
几何尺寸误差 Geometry error	检查轨距、轨道中心线、轨顶高等偏差 Check the center-line and rail gauge, rail top higher deviation	各偏差不得超过规范规定值 The deviation is less than specification specified value

(三) 控制系统检查与电气设备的维护
Check control systems and electrical equipment maintenance

1、供电、电气元器件及控制系统的检查
Check power supply, electrical components and control system

桥式起重机的供电装置、驱动装置、电气元器件、控制及操纵系统的检查项目，内容见表 5.5。

Bridge crane power supply device, driving device, electrical components, control and control system of project examination, the content shown in table 5.5.

表 5.5 起重机电气、控制系统检查项目、内容及判定标准

Crane electrical items, contents and standards, control system check

检查项目 test item	检查内容 test content	判定标准 judge standard	
电动机 Motor	绕组 winding	检查绝缘电阻；有无发热 Check the insulation resistance; Presence of heat	绝缘电阻在规定范围；无异常发热 Insulation resistance within the prescribed scope; No abnormal fever
	轴承 shaft	检查润滑情况与异常响声 Check the lubrication condition and abnormal noise	润滑良好和无异常声响 Good lubrication and no abnormal sound
	滑环 slide ring	检查有无变色、裂痕，接线头有无松动 check for color, cracks, loose wiring head	无明显变色、伤痕、破裂或松动 No obvious color change, wounds, broken or loose
	电刷及导线 electric brush and conduct line	检查有无磨损和松动；压力；附着碳粉；转动电机轴有无松脱 Inspect for wear and loose; Pressure; Attached carbon powder; Turn the motor shaft with and without loose	无明显磨损、松动；压力适当；无附着碳粉；无火花 No obvious wear and loose; Appropriate pressure; No attached carbon powder; No spark

集电装置 current collect device	滑线及滑车轨道 Slide and The rails	电源滑线、集电轨道 power slide wire and current collect rail	检查有无变形、磨损、损伤；张紧装置动作是否正常；滑线与滑块的接触情况；绝缘子支承有无松脱 For deformation, wear and damage; Tensioning device is normal; Sliding contact with the slide block; Insulator supporting any loose	无明显变形、磨损、损伤；张紧力正常；接触良好；无松脱 No obvious deformation, wear and damage; Tension is normal; Good contact; No loose
		壳、盖、罩子 covers	检查有无损伤与变形；防触电装置是否正常 Inspect for damage and deformation; Prevent to get an electric shock device is normal	无损伤与明显变形；与滑线有足够间距 No damage and deformation obviously; With slide wire have enough spacing
		绝缘集电器 Insulation collector	检查绝缘集电器的接线有无异常 Check whether there is any abnormal on the electrical wiring insulation set	电缆心线、接头及外壳要可靠连接 Cable core wire, connector and shell to reliable connection
		绝缘子 insulator	检查有无脱落与松动、破裂与污垢 Inspect for peeling and loose, broken and dirt	无脱落、松动、破裂与污垢 No fall off, loose, broken and dirt
	集电器 collector	机械部分 Mechanical parts	检查有无磨损与损伤；润滑是否良好 Inspect for wear and damage; Lubrication are in good condition	无明显磨损、损伤；润滑良好 No obvious wear and damage; Good lubrication
		弹簧 spring	检查有无变形、腐蚀及疲劳损伤 检查磨损和损伤;润滑是否良好	无变形、无明显腐蚀及疲劳损伤 No deformation, no obvious corrosion and fatigue damage
		接线与绝缘 line connection and insulation	检查接线有无断线，绝缘子是否破损、污秽 Presence of bolt, check wiring insulator is damaged, defiled	无断线或破损、污秽 No break or damage and pollution
		接头螺栓 connect bolts	检查紧固部分有无松动脱落 Check whether there is any looseness on fastening parts fall off	无松动脱落 No loose fall off

	供电电缆 power supply cable	绝缘层 insulating layer	检查有无损伤 Inspect for damage	无损伤 no damage
		连接处 joints	检查紧固部分有无松动与脱落 Check the fastening part whether is loose and fall off	无松动脱落 No loose fall off
		电缆及导向装置 Cable and guide	检查电缆拉伸部分有无弯曲、扭曲及损伤； 电缆导向装置动作情况 Check the cable stretching part without bending, distortion and damage; Cable guide action	无弯曲、扭曲及损伤情况； 动作平稳 Without bending, distortion and damage; Move smoothly
电气元件及控制系统 Electric al and control system	开关 switch	开关、接触部分与保险器 Switches, contact part Points and insurance	检查开关动作有无异常、外形有无破损； 接触部分铰链和夹子的压力是否合适；保险器安装及容量是否合适 Check whether there is any abnormal on switch action, appearance without damage; Contact appropriate pressure part of the hinge and clip; Insurance device installation and capacity	动作正常、无破损；接触压力适当；安装正确，容量合适 Action is normal and without damage; Appropriate contact pressure; Installed correctly, suitable capacity
		接触器 contactor	触头 contact	检查触头接触压力及接触面破损 Check damaged contactor contact pressure and contact area
		弹簧 spring	检查有无损坏、变形、腐蚀以及疲劳老化 Inspect for damage, deformation, corrosion and fatigue aging	无损坏变形，明显腐蚀和疲劳老化 No damage deformation, corrosion and fatigue aging obviously

	可 动 铁 芯 Movable iron core	检查铁芯吸合面有无附着物；工作时有无异常声响，屏蔽线圈有无断线；检查限位块有无磨损及损伤；断路时有无间隙 Check whether there is any attachments on core surface absorption; Work there is no abnormal sound, whether there is shielded coil disconnection; Check spacing block for wear and damage; Break there is no gap	无附着物；无异常声响或断线；无明显磨损或损伤；无间隙 No attachments; No abnormal sound or break; No significant wear and tear or damage; No clearance
	消弧线圈 Arc suppression coil	检查紧固部分有无松动 Look for loose fastening parts	无松动 no loose
	消弧栅 Arc suppression gate	检查是否在原位置；是否烧损 Check if the original position; Whether the loss	应在原定位置；无明显烧损 Should be in the original position; No significant loss
	紧 固 件 fasteners	检查有无松动 Check for loose	无松动 No loose
继 电 器 relay	弹簧 spring	检查有无弯折、变形、腐蚀、疲劳损伤 For bending, deformation, corrosion and fatigue damage	无弯折、变形、明显腐蚀和疲劳损伤 No bending, deformation, corrosion and fatigue damage
	时间继电器 time relay	检查其限时功能 Check the limit function	限时准确 Timed accurately
	阻 尼 延 时 器 Damping decelerator	检查油筒是否脱落、漏油；油量及油质 Check whether the oil cylinder, oil spill; Oil and oil	无脱落、漏油；油量及油质正常 No loss, oil; Oil and oily to normal
	接 触 片 操 作 contact piece operation	检查接触面有无损坏及磨损 Check whether there is any damage on contact surfaces and wear	无明显损坏与磨损 No significant damage and wear
	机构及操作试验 mechanism and operation test	用手操作，检查动作状态 Operated by hand, check the action status	动作要正常 Action to normal

控 制 器 操 作 开 关 controller switch	内 部 配 线 inner wiring	检查连接端子连接情况；配线及绝缘有无污损、劣化；电线引入管口有无异常 Check the connection terminal connection; Wiring and defiled, insulation degradation; Wire into the nozzle without exception	无松动脱落；无损伤、污染及劣化；无损伤或明显劣化 No loose fall off; No damage, pollution, and degradation; No damage or obvious deterioration
	紧固连接 fix contact	检查紧固件有无松脱 Look for loose fasteners	无松脱 No loose
	触电保护装置 electric shock protection	检查触电保护装置有无异常 Check whether there is any abnormal on electric shock protection device	设备无破损、脱落、变形、劣化 Equipment without damage, loss, deformation and degradation
	动 作 状 态 action state	检查动作状态是否正常；零位限制器及手柄动作是否正常 Check whether the action status normally; Zero limiter and handle movement is normal	动作平稳；限制器和手柄停止位置要牢靠 Smooth movement; Limiter and handle to the stop position
	离合片及离合 辊 clutch disc and clutch roller	检查接触压力；紧固件无松动；离合辊润滑情况 Check the contact pressure; No loose fasteners; Clutch roller lubrication conditions	接触时完全，脱离时彻底；无松动；给油正常 Contact completely, from thoroughly; No loose; Oil to normal
	复位弹簧 reset spring	检查有无折损、变形、腐蚀及疲劳损伤 For fracture, deformation, corrosion and fatigue damage	无折损、变形、明显腐蚀及疲劳损伤 No fracture, deformation, corrosion and fatigue damage obviously
	轴 承 及 齿 轮 bearing and gear	检查润滑情况 Check the lubrication conditions	给油适量，润滑正常 enough oil, lubrication is normal
	接触片及触头 contact piece and contactor	检查接触面有无破坏及磨损；接触片接触深度 Check whether there is any damage on contact surfaces and wear; Contact asdepth	无明显破坏磨损；应完全接触 No significant damage and wear; Should be completely in contact with
绝 缘 棒 insulation rod	检查有无裂纹、污损 Inspect for cracks, soiled	无裂纹与明显污损 No crack and obvious soiled	

电气元件及控制系统 Electric al and control system		动作方向显示板 act direction indicate board	检查有无损伤及污染 Inspect for damage and contamination	显示明显, 无明显污损 Display obvious, no obvious soiled
		电线引入 electric line guide	检查电线引入管口有无异常 Check whether there is any abnormal on wires into tube	无损伤或明显变化 No damage or obvious changes
		悬垂开关 overhang switch	检查动作情况; 有无损伤、污染; 如为金属外壳, 检查外壳与地线接头有无松动; 橡胶套电缆是否承受不必要的外力; 外壳、盖、悬垂保护装置有无异常 Check the movement situation; Without damage, pollution; Such as metal enclosure, check whether there is any looseness on the shell with earth connection; Whether or not the rubber sets of cables are unnecessary force; Housing, cover, hanging protection device with and without exception	动作正常; 无损伤与污染; 无松动; 无额外受力; 无破损 Action is normal; No damage and pollution; No loose; No additional stress; Without damage
	电阻器 resistor	端子 terminal	检查紧固件有无松动 Look for loose fasteners	无松动 No loose
		电阻片 resistor disk	检查有无裂纹、损伤; 各片间有无接触; 有无松动; 端子附近接线及绝缘是否过热烧损; 绝缘体上是否积尘 Inspect for cracks, damage; Any contact between each piece; Any loose; Near the terminal wiring and insulation are overheating damage; Whether dust on insulators	无裂纹、损伤; 无接触; 无松动; 无烧坏; 不得堆积粉尘 No crack and damage; Out of contact; No loose; No burn out; Shall not be piled up dust
		连接 fasten connect	检查紧固有无松动 Check whether there is any looseness on fastening	无松动 No loose

线路及通讯 Line communication	机内明线 inner lines	检查保护层有无损伤；有无过紧、扭曲、线夹松动现象 Check whether there is any damage on protective layer; Too close, twisted, clamp loose phenomenon	无损伤；不应过紧，扭曲、松动等 No damage; Should not be too loose or too tight, distorted, become loose, etc
	照明及信号灯 lighting and signal	检查照明亮度是否合适；接头部分有无松动；紧固件是否松动；灯泡和防护装置有无破损 Check lighting levels are appropriate; Joint part whether is loose; Whether fasteners loose; Light bulbs and protective gear have damaged	确保仪表和操作部分有充足的亮度；无松动；无破损 Ensure the brightness of the instrument and operation part have enough; No loose; Without damage
	通讯装置 communication device	检查通话设施功能 Check call facilities functions	要求通话正常 Request normal calls
	电路绝缘电阻 insulation resistor	测定配电电路各支路绝缘电阻有无异常 Measuring insulation resistance for various loops power distribution circuit	绝缘电阻值应在规定的范围之内 Insulation resistance value should be within the prescribed scope

2、电气设备的维护 Electrical equipment maintenance

建立电气检修制度，各种检修周期的规定按起重机的工作级别及环境条件而定，以下所列各种检修制度系指一般情况而言。Build electrical maintenance system to make all kinds of the provisions of the repair cycle according to the working level of crane and environmental conditions, the following listed various maintenance system refers to the general case.

日检修—由起重机司机每日交接班时进行。检修范围如下：Daily maintenance is carried out by crane driver in daily shift changes. Maintenance scope is as follows

清除电气设备外部的灰尘、污泥及油类等附着物，用手探测电动机、电磁铁、控制器触头、电阻器等发热情况，检查轴承有无漏油现象，主要设备的电线接头是否紧密，在打开观察孔盖或外壳时，应防止灰尘、铁屑等侵入线包内部。将观察所得的各种特殊情况记录下来。Clean electrical equipment external attachments such as dust, dirt and oil, with the hand contact detection of motor, solenoid, controller, resistor, such as heating situations, check the bearing without oil leakage phenomenon, the main equipment of the wire connection is tight, when open access plate or shell, should prevent such as dust, iron wire inside the package. Record the observation results.

旬日检修（或双周检查）—由电气工作人员执行，司机也需要参加。检修范围如下：Ten days check (or double week check) - performed by electrical worker and drivers also need to attend. Maintenance scope is as follows

清除各电气设备内部的灰尘、污泥等附着物。观察电动机的刷架、炭刷滑环等磨损情况，电动机、电

磁铁、继电器及电磁开头等在运行时所发出的音响是否正常，检查并修理控制器与开关的触头。To clear the dust, sludge and other attached objects inside the electrical equipment. Observe the motor brush frame, carbon brushes, slip ring and wear motor and electromagnet, electromagnetic relay and the beginning at run time whether the sound made by normal, check and repair the controller and contactor of the switch.

年检修或大修由电气工作人员执行，检修范围如下：Years of maintenance or repair carried out by electrical workers, maintenance scope is as follows

拆开各项电气设备进行清理，检修各项设备的支架，洗净电动机的滚动轴承并另换新润滑脂，测量定子与转子间空隙，如发现不均匀时需要更换滚动轴承。测量绝缘电阻，必要时进行干燥，各种缺陷在年修时应全部修好，无法修理的部件应该更换，年修或大修范围均由各项设备实际磨损与陈旧程度来决定。Disassemble all the electrical equipment to clean and repair the equipment supporting frames; wash the rolling bearing of the motor and the other new grease, measure the gap between the stator and rotor, such as uneven found need to be replaced when the rolling bearing. Measuring insulation resistance, dry, and when necessary the various defects should be repaired all in years, and can't repair parts should be replaced, repair or overhaul range are determined by the actual wear and the degree of the old equipment.

在起重机上必须备有而且只允许用干式灭火器。最常用的为四氯化碳灭火器，不允许使用泡沫灭火器，干沙只能用来扑灭导线的着火，而不能用来扑灭电动机的着火。On the crane must be equipped with and only allowed with dry fire extinguisher. The most commonly used for carbon tetrachloride fire extinguisher, are not allowed to use foam extinguisher, dry sand can only be used to put out the fire of the wire, and cannot be used to put out the fire of the motor.

当发生火灾时，首先应该设法切断电源，此时用紧急开关或保护盘上的刀闸开头来切断电源。当保护盘前面的导线着火时，应切断馈电线上的刀闸开关。When there is a fire, first of all, should try to cut off power supply, this time with an emergency switch or breaker plate on the beginning of protection to cut off power supply. When the wires in front of protection plate were caught on fire, workers should cut off the breaker switch feeders.

着过火的起重机要经过清擦、干燥与检查所有电气设备及电气布线，修复合格以后才能再用。The burnt crane should be made dry and check that all electrical equipment and electrical wiring, repair qualified, then the machine can be used again in the future.

(四) 起重机的润滑 The crane lubrication

起重机设备润滑情况的好坏直接影响起重机各机构的正常运转，凡是有轴、孔配合的部位和有相对运动磨擦的机械部位都要进行定期润滑，因此，使用和维修人员必须经常检查各润滑点的润滑情况，按时给各润滑点加油，根据用户的需求，其润滑有分点润滑和集中润滑，一般情况下 $\leq 75t$ 采用分散润滑， $> 75t$ 一般宜采用集中润滑。Crane equipment lubrication situation directly affects the normal operation of crane agencies, where the shaft friction, hole with the location and relative motion of mechanical parts should be lubricated regularly, therefore, the use and maintenance personnel must be regularly check the lubrication condition of all lubricating points, all lubricating points on time to support him, according to the needs of users, the equinoctial lubrication and centralized lubrication, typically 75 or less t adopt dispersing lubrication, $> 75 t$ appropriate USES centralized lubrication in general.

1、起重设备各润滑点分布 Hoisting equipment all lubricating points distribution

①吊钩轴两端及吊钩螺母下的推力轴承 Hooks on both ends of the shaft and hook the thrust bearing

under the nut

- ②固定滑轮轴（在小车架上） Fixed sliding shaft (on the trolley)
- ③钢丝绳 Steel wire
- ④各减速器 Each reducer
- ⑤齿轮联轴器 Gear coupling
- ⑥各轴承座（包括车轮组及轴承箱） The bearing seat (including the wheel group and the bearing box)
- ⑦电动机轴承 Motor bearing
- ⑧制动器各铰点 Brake each hinge point
- ⑨抓斗的上下滑轮轴、导向滚轮 Grab the drop shaft, guide roller
- ⑩电缆导电中滑车的轴承 Cable of the conductive block in the bearing

2、润滑条件与润滑材料 Lubrication condition and lubrication materials

起重设备必须采用合适的润滑油脂，定期润滑和及时更换，润滑装置和各润滑点必须保持清洁，表 5-6 是各机构主要零部件润滑时间的一般规定和推荐用的润滑材料。Lifting equipment adopts appropriate lubricating oil, lubricated and timely replacement, lubrication device and the lubrication points must be kept clean, table 5-6 is the major parts of the body lubrication time general provisions and the recommended lubrication materials.

表 5-6 典型零部件的润滑材料及其润滑周期

Typical components of the lubrication materials and lubrication cycle

序号 No.	零部件名称 Name of spare parts	润滑周期 lubrication cycle	润滑条件 lubrication condition	润滑材料 lubrication material
1	钢丝绳 steel wire	一般 15~30 天一次，根据实际使用中的润滑情况而定 15-30 days one time for one piece depends on the situation	把润滑脂加热到 50~100 浸涂至饱和为止；不加热涂抹 Heat the grease to 50-100 °C to full, don't daub heating	钢丝绳麻心脂 Wire rope hemp hearts fat (SH0388-1992)； 石墨钙基润滑脂 Graphite calcium base grease
2	减速器 reducer	使用初期每季换一次，以后可根据油的清洁情况半年至一年换一次 Using quarterly in early time, in one time according to the cleaning of oil situation after six months to one year	油池飞溅润滑；循环喷油润滑 Splash lubrication oil pool； Circulating oil lubrication	L-CKC100、L-CKC150、L-CKC220 按减速器说明书要求 according to the reducer instruction
3	开式齿轮 open type gear	半月一次，每季或半年清洗一次 a half months one time, clean in season or half an year		明齿轮脂 gear grease (HG1-26-73)

4	齿 轮 联 轴 器 gear coupling	每月一次 once per month	工作温度在-20~120 ℃ 低于-20 ℃ Working temperature is-20~120℃; Below -20℃	通用锂基润滑脂 general lithium base grease 1、2、 3号(GB7624-1994); 54号低温润滑脂 Low temperature grease (SH0385-1992)
5	滚 动 轴 承 rolling bearing	3 ~ 6 个 月 一 次 3-6 months one time		
6	滑 动 轴 承 sliding bearing	酌情 depends		
7	卷 筒 内 齿 盘 gear disk in drum	大修时加油 add oil when overhaul		
8	电 动 机 motor	年修或大修 annual repair or overhaul	一般电动机; H级绝缘和湿热地带 Normal motor H degree insulation and hot and humid area	3号锂基润滑脂 (GB7324-1994); 复合铝基润滑脂 (SH/T0378-1992)' No. 3, lithium base grease Composite aluminum base grease (SH/T0378-1992)
9	制 动 器 各 铰 点 each brake point	每 月 一 次 once per month		工业用锂基润滑脂 Industrial lithium base grease

3、润滑注意事项 Lubrication points for attention

①润滑材料必须保持清洁。Lubrication materials should be kept clean

②不同牌号的润滑脂，不可混合使用。Do not mix up different type of grease.

③经常检查润滑系统的密封情况。Check the sealing of the lubrication system.

④选用适宜的润滑材料和按规定添加润滑脂的时间，进行润滑工作。Choose appropriate materials and in accordance with the provisions, add the time of the grease lubrication, lubrication.

⑤应用压力注脂法（油枪或油泵）添加润滑脂较好，尽量避免用涂沫方法添加润滑脂。因润滑脂不易进到磨擦面上，必要时应设法把润滑脂推送到磨擦面上。Use pressure greasing technique (oil gun or pump) add grease is better, as far as possible avoid using add grease coating spray method. Because the grease is not easy to into the friction surface, if necessary, should be managed to push grease to the friction on the surface.

⑥只有在起重机完全断电时，才允许进行润滑操作（电动干油集中润滑除外）Only in the crane power off in full, allowing for lubrication operation (except dry electric centralized lubrication oil)

⑦应保证管路不被挤、压、碰伤。Shall ensure that piping is not squeezed, pressure, and bruising.

⑧需要拆卸管路时，必须将管端或连接处防护好，以免碰伤或混入机械杂质，重新安装时，要认真清除接头处的污垢，确保油路清洁。When it is needed to remove the piping, pipe or joint protection must be good, in order to avoid bruising or mixed with mechanical impurities, reinstall, carefully remove dirt, joint

to ensure that the oil clean.

⑨潮湿地区不宜选用钠基润滑脂，因其吸水性强，易失效。It is not suggested to choose sodium base grease in damp areas. Because of its water imbibition is strong, it is easy to fail.

⑩各机构没有注脂点的转动部位，应定期用稀油点注在各转动部位缝隙中，以减少机件的磨损和防止锈蚀。It should be regularly use single point injection in the rotating parts gap in order to reduce the wear parts and prevent corrosion when institutions do not on the rotational position of the point.

⑪润滑点润滑时，应适当转动以使润滑脂均匀分布。Make appropriate rotation so that the grease evenly distributed lubrication points.

⑫各种润滑油料等如未达到规定更换间隔时间，已发现受污或变质时，并应予以立即更换。All kinds of lubrication oil such as do not meet the specified time interval of replacement, have been found contaminated or deterioration, and should be replaced immediately.

二、起重机常见故障及处理 Common troubles and disposal

起重机械在使用过程中，机械零部件、电气控制和液压系统的元器件，不可避免地发生老化、磨损，并引发故障，导致同一故障的原因可能不是一一对应的关系。因此要对故障进行认真分析，准确地查找真正的故障原因，并采取相应的消除故障的方法来排除。从而恢复故障点的技术性能，以下为桥式起重机常见故障及处理。

With the using of crane, machine parts, electric control and hydraulic pressure system parts would inevitably have abrasion or damage. And one fault maybe caused by a lot of things, so we should carefully analyze and eliminate the fault accordingly. The followings are the main faults and the methods.

1、金属结构部分故障（表 6-1） Fault of steel structure (Table 6-1)

表 6-1 金属结构部分故障

Table 6-1 Fault of steel structure

故障名称 Fault	故障原因 Causes	排除方法 Eliminating Method
主梁腹板或盖板 发生疲劳裂纹 Fatigue crack of main web plate and cover plate	长期超载使用 Overload for long time	裂纹不大于 0.1mm 的，可用砂轮将其磨平，对于较大的裂纹，可在裂纹两端钻大于 $\varnothing 8$ 的小孔，然后沿裂纹两侧开 60° 的坡口，进行补焊。重要受力构件部分应用加强板补焊，以保证其强度。When crack is less than 0.1mm, use grinding wheel grinds it. For bigger crack, drill $\varnothing 8$ hole at each side of the crack and open 60° on both sides of the groove, and weld.

主梁腹板有波浪形变形 Wave-like distortion of main web plate	超负荷使用, 使腹板局部失稳 Overload makes part lose balance.	采取火焰矫正, 消除变形, 锤击消去内应力, 严禁超负荷使用。 Rectify with fire, remove distortion, eliminate internal stress with hammer, and strictly prohibit overload operation.
主梁旁弯变形 Distortion of main girder	工作应力叠加所致, 运输和存放不当 Wrong transportation and storage cause working stress	用火焰矫正法, 在主梁的凸起侧加热, 并适当配用顶具和拉具 Rectify with fire. Heating the heaving part of main girder and use some tools too.
主梁下沉变形 Main girder sinking distortion	主梁结构应力 腹板波浪形变形 超载使用 热效应的影响 存放、运输不当及其他 Main girder structure stress Web plate wave-likes distortion overload heating effect Wrong storage, transportation etc.	采用预应力法矫正, 采用火焰矫正后, 并沿主梁下盖板用槽钢加固 Adopt method of prestressing force, and rectify with fire, and reinforce with channel steels.

2、各机构的故障及排除方法 (表 6-2、表 6-3、表 6-4)

Faults of all mechanism and eliminating methods (Table 6-2, Table 6-3, Table 6-4)

表 6-2 桥式起重机各机构故障 (起升机构各零部件故障) 及排除方法

Table 6-2 Mechanism fault of overhead crane (fault of lifting mechanism) and eliminating methods

名称 Name	故障及损坏情况 Faults and Abrasion	原因与后果 Reasons and Results	排除方法 Eliminating Methods
锻造吊钩 Forged hook	1、吊钩表面出现疲劳性裂纹; Surface has fatigue crack 2、开口及危险断面磨损; Crack and dangerous section abrasion 3、开口部位和弯曲部位发生塑性变形。Crack and wending parts have plastic deformation	1、超载、超期使用、材质缺陷; Overload, overtime, flaw of material 2、严重时降低强度、易断钩, 造成事故; Lessen the intensity, or it is easy to cause hook break and accidents 3、长期过载, 疲劳所致。 Long time overload and fatigue	1、发现裂纹、更换; Check crane and replace hook 2、磨损量超过危险断面 10% 更换; Replace the hook when the abrasion over 10% dangerous section. 3、立即更换。Replace immediately
叠片式吊钩(板钩)	1、吊钩变形; distortion of hook 2、表面有疲劳裂纹; surface has fatigue crack 3、销轴磨损量超过公称直径的	1、长期过载、容易断钩; Overtime overload, and it is easy to cause hook break 2、超期、超载、吊钩损坏;	1、换新 replace 2、更换 replace 3、更换 replace 4、更换 replace

Laminated hook	<p>3%-5% ; The abrasion of pin shaft is more than 3%-5% of nominal diameter.</p> <p>4、耳环有裂纹或毛刺； Earring has crack and burr</p> <p>5、耳环衬套磨损量达原厚的50%。The abrasion of earring's lining reaches 50% thickness</p>	<p>Overtime, overload and hook abrasion</p> <p>3、吊钩脱落； Hook breaks off</p> <p>4、耳环断裂； Earring rupture</p> <p>5、受力情况不良。 Bad strained condition</p>	5、更换 replace
钢丝绳 wire rope	<p>断丝、断股、打结、磨损 Thread break, bundle break, knot and abrasion</p>	导致突然断绳 Cause to break	<p>断股、打结停止使用；断丝，按标准更换；磨损，按标准更换 Stop to use it when wire rope break and knot; Replace when thread break, and replace the wire rope when it have abrasion.</p>
滑轮 Pulley	<p>1、滑轮绳槽磨损不均； Uneven abrasion of block's groove</p> <p>2、滑轮转不动； Pulley cannot turn</p> <p>3、滑轮倾斜、松动； Pulley incline and loose</p> <p>4、滑轮裂纹或轮缘断裂。 Crack of pulley or break of wheel flange</p>	<p>1、材质不均匀、安装不合要求，绳和轮接触不良； Material asymmetry, bad installation and bad connection of rope and block</p> <p>2、轴损坏或轴承损坏； shaft abrasion and bearing abrasion</p> <p>3、轴上定位件松动，或钢丝绳跳槽； keeper of shaft loose or wire rope hop out of groove</p> <p>4、滑轮损坏。 Pulley abrasion</p>	<p>1、轮槽壁磨损量达原厚度的 1/10，径向磨损量达绳径的 1/5 时应更换； We should replace it when abrasion of groove's wall reaches 1/10 previous thickness, and gauge ware reaches 1/5 of wire rope diameter</p> <p>2、更换轴和轴承并加强润滑，检修； Replace the shaft and bearing and then lubricate them and more maintenance.</p> <p>3、紧固轴上定位件，对钢丝绳跳槽进行检修； Fasten the keeper and repair the wire rope's hopping.</p> <p>4、更换 replace</p>
卷筒 Drum	<p>1、卷筒疲劳裂纹； Drum fatigue crack</p> <p>2、卷筒轴、键磨损； Abrasion of drum's shaft and pin</p> <p>3、卷筒绳槽磨损和绳跳槽，磨损量达原壁厚的 15%~20%。</p>	<p>1、卷筒破裂； break of drum</p> <p>2、轴被剪断，导致重物坠落； Break of shaft and cause the fall of load</p> <p>2、卷筒强度削弱，容易断裂； 钢丝绳缠绕混乱。</p>	<p>1、更换卷筒； Replace it</p> <p>2、停止使用，立即对轴键等检修； Stop using it and inspect the shaft immediately</p> <p>3、更换卷筒。 Replace the drum</p>

	Groove abrasion and rope hopping. The abrasion reaches 15%-20% of the thickness	The intensity of drum becomes weaker and easy to break. And wire rope are twisted	
齿轮 Gear	<p>1、齿轮轮齿折断; Gear teeth break</p> <p>2、齿轮磨损达原齿厚的 15%~20%; abrasion of gear reaches the 15%-20% of the thickness</p> <p>3、齿轮裂纹; crack of gear</p> <p>4、因“键滚”使齿轮键槽损坏; Abrasion of gear groove due to the rolling of key</p> <p>5、齿面剥落面占全部工作面积的 30%，及剥落深度达齿厚的 10%; 渗碳层磨损 80%深度。 Flack section reaches 30% of the working area. And the depth reaches 10% of the thickness. And carburized layer abrasion reaches 80% of the thickness.</p>	<p>1、工作时产生冲击与振动, 继续使用损坏传动机构; When working will cause impact and vibration and then damage the transmission mechanism</p> <p>2、运转中有振动和异常声响, 是超期使用, 安装不正确所致; Vibration and noise caused by overtime use and improper installation</p> <p>3、齿轮损坏; Gear damage</p> <p>4、使吊重坠落; Load fall off</p> <p>5、超期使用, 热处理质量问题。 Overtime use and bad heating treatment.</p>	<p>1、更换新齿轮; Change gear</p> <p>2、更换新齿轮; Change gear</p> <p>3、对起升机构应作更换, 对运作机构等作修补; Replace the lifting mechanism and repair the traveling mechanism.</p> <p>4、对起升机构应作更换, 对运行机构可新加工键槽修复; Renew the key</p> <p>5、更换: 圆周速度>8m/s 的减速器的高速级齿轮磨损时应成对更换。 Replace: for the reducer its rim speed >8m/s, when there is some abrasion of the gear, we must replace it.</p>
轴 shaft	<p>1、裂纹; Crack</p> <p>2、轴弯曲超过 0.5mm/m; Curving of shaft is more than 0.5mm/m</p> <p>3、键槽损坏。 Groove of key abrasion</p>	<p>1、材质差, 热处理不当, 导致损坏轴; Bad material, improper heat treatment cause the damage of shaft</p> <p>2、导致轴颈磨损, 影响传动, 产生振动; Cause damage of shaft and influence the transmission and bring vibration</p> <p>3、不能传递扭矩。 Unable to transmit torsion</p>	<p>1、更换; replace</p> <p>2、更换或矫正; replace or rectify</p> <p>3、起升机构应作更换, 运行机构等可修复使用。 Replace the lifting mechanism and repair the traveling mechanism</p>
车轮 wheel	<p>1、踏面和轮辐轮盘疲劳裂纹; Foot surface and wheel spider have fatigue crack</p> <p>2、主动车轮踏面磨损不均匀; Uneven abrasion of drive wheel surface</p> <p>3、踏面磨损达轮圈厚度的 15% Abrasion of wheel surface reaches</p>	<p>1、车轮损坏; Abrasion of wheel</p> <p>2、导致车轮啃轨, 车体倾斜和运行时产生振动; The wheel nibble the rail and the crane incline and bring vibration when traveling.</p> <p>3、车轮损坏;</p>	<p>1、更换; Replace</p> <p>2、成对更换; Replace in pairs</p> <p>3、更换; Replace</p> <p>4、更换。 Replace</p>

	<p>15% of wheel thickness; 4、轮缘磨损达原厚度的 50%。 Wheel flange abrasion reaches 50% of the previous thickness.</p>	<p>Abrasion of wheel 4、由车体倾斜、车轮啃轨所致，容易脱轨。Due to the crane incline and wheel nibble the rail and it is easy to bring digression</p>	
<p>制动器 零件 break part</p>	<p>1、拉杆上有疲劳裂纹；Fatigue crack on lever 2、弹簧上有疲劳裂纹；Fatigue crack on springs 3、小轴、心轴磨损量达公称直径的 3%~5%；The abrasion of minor shaft and mandrel reaches 3%-5% nominal diameter 4、制动轮磨损量达 1~2mm，或达原轮缘厚度的 40%~50%；The abrasion of break wheel reaches 1-2mm,which is 40%~50% of the previous thickness 5、制动瓦摩擦片磨损达 2mm 或者达原厚度的 50%。The abrasion of break tile reaches 2mm,which is 50% of the previous thickness</p>	<p>1、制动器失灵；No work of break 2、制动器失灵；No work of break 3、抱不住闸；Cannot break 4、吊重下滑或溜车；Load fall off and crane slide 5、制动器失灵。Bad break</p>	<p>1、更换；Replace 2、更换；Replace 3、更换；Replace 4、重新车削、热处理，车削后保证大于原厚度的 50% 以上。起升机构中制动轮磨损量达 40% 应报废；Re-turning and heat treatment, but the thickness is more than 50% of the previous thickness. Do not use it when the abrasion of break wheel is more than 40% of the thickness. 5、更换摩擦片。Replace the rubbing tile</p>
<p>联轴器 Coupling</p>	<p>1、联轴器半件内有裂纹；Crack on coupling 2、连接螺栓及销轴孔磨损；Abrasion in connection bolts and pin hole 2、齿形联轴器齿轮磨损或折断；Coupling gear abrasion and break 4、键槽压溃与变形；Groove distortion 5、销轴、柱销、橡皮圈等磨损。Abrasion in shaft, pin and rubber etc.</p>	<p>1、联轴器损坏；Damage 2、起制动时产生冲击与振动、螺栓剪断、起升机构中则易发生吊重坠落；When breaking it causes impact and vibration. The bolt breaks off and the loads fall off. 3、缺少润滑、工作繁重、打反车所致联轴器损坏；Lack of lubrication, heavy duty etc. 4、脱键、不能传递扭矩；Can not transmit the moment of torsion 5、启、制动时发生强烈的冲击与振动。Have impact and</p>	<p>1、更换；Replace 2、对起升机构应更换新件，对运行等机构补焊后扩孔；Replace parts to the lifting mechanism, and overlaying welding for the traveling mechanism and then larger the hole 3、对起升机构，轮齿磨损达原厚 15% 即应更换。对运行机构，轮齿磨损量达原齿厚的 30% 时更换；For the lifting mechanism, when the abrasion of gear teeth</p>

		vibration when starting and breaking.	reaches 15% the thickness, replace it ,and for the traveling mechanism, the abrasion of gear teeth reaches 30% the thickness, replace it. 4、对起升机构应更换，对其他机构修复使用；Replace the lifting mechanism and repair other mechanism. 5、更换已磨损件。Replace the worn parts.
滚动轴承 Rolling bearing	1、温度过高；High temperature 2、异常声响（继续哑音）； Abnormal noise 4、金属研磨声响；Noise of grinding 4、锉齿声或冲击声。Noise of filing teeth and impacting	1、润滑油污垢完全缺油或油过多； Lack of oil or too much oil 2、轴承污垢；Bearing fouling 3、缺油；Lack of oil 4、轴保持架、滚动体损坏。 Damages on supporter of bearing and roller	1、清除污垢，更换轴承，检查润滑油数量；Clean and replace the bearing. Check the lubrication. 2、清除污垢；Clean the fouling 3、加油；Add oil 4、更换轴承。Change the bearing
滑动轴承 Sliding bearing	过渡发热 over heat	1、轴承偏斜或压得过紧； Skewness of bearing and Press tightly 2、间隙不当；Improper clearance 3、润滑剂不足；Lubrication shortage 4、润滑剂质量不合格。 Lubrication in bad quality	1、消除偏斜，合理紧固； Get rid of skewness and fasten properly 2、调整间隙；Adjust clearance 3、加润滑油；Add lubrication 4、换合格的油剂。Use good lubrication

表 6-3 桥式起重机故障及排除

Table 6-3 Faults and eliminating method of overhead crane

故障名称 name	故障原因 reason	排除方法 eliminating methods
不能闸住制动轮	1、杠杆的铰链被卡住；Gemel of lever is locked. 2、制动轮和摩擦片上有油污； Break wheel and tile have fouling.	1、排除卡住故障，润滑； Eliminate the fault and lubricate it 2、清洗油污；Clean the fouling

制 动 器	(重物下滑) Cannot break (load slide off)	3、电磁铁芯没有足够的行程; Magnetic moving distance too short 4、制动轮或摩擦片有严重磨损; Serious abrasion of braking wheel and friction 5、主弹簧松动和损坏; Main spring loose or damage 6、锁紧螺母松动、拉杆松动; Fasten nut loose or push bar loose 7、液压推杆制动器叶轮旋转不灵 Push bar cannot rotate smoothly	3、调整制动器; Adjust the break 4、更换摩擦片; Change the friction tile 5、更换主弹簧或锁紧螺母; Change the spring and fasten the bolts 6、紧固锁紧螺母; Fasten the bolts 7、检修推动机构电气部分。 Inspect the electric part of push bar
	制动器不松闸 Break cannot loose	1、电磁铁线圈烧毁; Magnetic wire burn 2、通往电磁铁导线断开; Disconnection of wire to magnetic iron 3、摩擦片粘连在制动轮上; Shoe block on braking wheel 4、活动铰被卡住; Gemel stock 5、主弹簧力过大或配置太重; Main spring over pressed 6、制动器顶杆弯曲, 推不动电磁铁 (在液压推杆制动器上); Push bar inflected ,can not move the magnetic iron(hydraulic push bar break) 7、油液使用不当; Improper oil fluid 8、叶轮卡住; Impeller locked 9、电压低于额定电压 85%, 电磁铁吸合力不足。85% lower than the rated voltage. Not enough magnets.	1、更换; Change 2、接好线; Connect the wire 3、用煤油清洗; Clean with kerosene 4、消除卡住现象、润滑; Eliminate the lock and lubricate it 5、调整主弹簧力; Adjust the main spring 6、顶杆调直或更换顶杆; Straighten the mandril or change the mandril 7、按工作环境温度更换油液; Change oil according to working condition 8、调整推杆机构和检查电器部分; Adjust push bar and check the electric part. 9、查明电压降低原因, 排除故障。 Find out the reason, eliminate the obstacle
	制动器发热, 摩擦片发出	1、闸瓦在松闸后。没有均匀的和制动轮完全脱开, 因而产生摩擦; Shoe can't fully disengage	1、调整间隙; Adjust clearance 2、调整间隙; Adjust clearance

	<p>焦味并且磨损很快 Break overheat, brake-shoe burnt and a lot of abrasion</p>	<p>braking wheel when break loose, so bring friction. 2、两闸瓦与制动轮间隙不均匀, 或者间隙过小; Asymmetrical distance from brake shoe to braking wheel. 3、短行程制动器辅助弹簧损坏或者弯曲; Assistant spring of short traveling break is damaged or bent. 5、制动轮工作表面粗糙。 Rough surface of break wheel</p>	<p>3、更换或修理辅助弹簧; Replace or repair the spring 4、按要求车削制动轮表面。 Turning the surface of brake according to requirements.</p>
	<p>制动器容易离开调整位置, 制动力矩不够稳定 The break is easy to deviate from the adjusted place. And the breaking moment is not steady.</p>	<p>1、调节背紧螺母没有拧紧; The nut of adjusting is loose 2、螺纹损坏。The screw thread is damaged</p>	<p>1、拧紧螺母; Fasten the nut 2、更换。Replace it.</p>
	<p>电磁铁发热或有响声 Iron overheat or big noise</p>	<p>1、主弹簧力过大; Main spring over pressed 2、杠杆系统被卡住。Push bar is blocked. 3、衔铁与铁芯贴合位置不正确, Keeper and iron core are improperly jointed</p>	<p>1、调整至合适大小; Adjust main spring properly 2、消除卡住原因、润滑。 Eliminate the block and make lubrication 3、刮平贴合面 Make the joint place smooth.</p>
减 速 器 Reducer	<p>有周期性齿轮颤动现象, 从动轮特别明显 The idle wheels have obvious cyclic vibration</p>	<p>节距离误差过大, 齿侧间隙超差 Error of distance is too big</p>	<p>修理、重新安装 Repair or re-install</p>
	<p>1、剧烈的金属摩擦声, 减速器振动, 机壳叮当作响; Big grating, and vibration of reducer, noise on cover too. 2、齿轮啮合时, 有不均匀的敲击声, 机壳振动。 Knocks of gear joggling, vibration of machine cover.</p>	<p>1、传动齿轮侧隙过小, 两个齿轮轴不平行、齿轮有尖锐的刃边; Gap of transmission gears too small, non-parallel gears, sharp gears 2、轮齿工作面不平坦, 齿面有缺陷、轮齿不是沿全齿面接触, 而是在一角上接触。 Rough working face of gear And defectiveness of gear working</p>	<p>1、修正、重新安装; Mending or re-install 2、更换齿轮。Replace the gear</p>

		face.	
	壳体, 特别是安装轴承处发热 The cover especially where the bearing is stalled is overheat.	1、轴承破碎; Bearing is crashed 2、轴颈卡住; Axle journal is blocked 3、轮齿磨损; Abrasion of gear teeth 4、缺少润滑油。 Shortage of lubrication oil.	1、更换轴承; Replace the bearing 2、更换轴承; Replace the bearing 3、修整齿轮; Finish the gear 4、更换润滑油。 Add lubricating oil
	剖分面漏油 Leak of oil	1、密封失效; No longer hermetic 2、箱体变形; Box inflected 3、剖分面不平; Some surface not flat 4、连接螺栓松动。 Connection bolt loose	1、更换密封件; Replace oil seals 2、检修箱体剖分面, 变形严重则更换; Check box, replace it when heavy damaged. 3、剖分面铲平; flatten the surface 4、清理回油槽, 紧固螺栓。 Clean the return chute, and fasten the nuts
	减速器在底座上振动 Vibration of reducer's base	1、地脚螺栓松动; Feet bolts loose 2、与各部件连接轴线不同心; Non-concentricity of all parts 3、底座刚性差。 Bad rigidity of base	1、调整地脚螺栓; Adjust feet bolts 2、对线调整; Adjust cater-corner 3、加固底座, 增加刚性。 Reinforce the base and add the rigidity
	减速器整体发热 Overheat of reducer	润滑油过多 Too much lubrication oil	调整油量 Adjust the quantity of oil
钢丝绳滑轮系统 Wire-rope and sheaves	钢丝绳迅速磨损或经常损坏 Wire rope abrasion and damage	1、滑轮和卷筒直径太小; Small diameter of wheel and drum. 2、卷筒上绳槽尺寸绳径不相匹配, 太小; The wire rope does not match with the groove of drum. 3、有脏物, 缺润滑; Smearly or lack of lubrication 4、起升限位挡板安装不正确, 经常磨绳; Lifting limit grind the rope 5、滑轮槽底或轮缘不光滑, 有缺陷。	1、更换挠性更好的钢丝绳, 或加大滑轮或卷筒的直径; Replace wire ropes. Use bigger wheel or drum. 2、更换起吊能力相等, 但直径较细的钢丝绳, 或更换滑轮及卷筒; Use thinner wire-rope but with same capacity, or change sheaves and drum. 3、清除、润滑; Clean or lubricate 4、调整。 Adjust

		Groove not smooth	
	个别滑轮不转动 Some wheel cannot rotate	轴承中缺油、有污垢和锈蚀 Lack of oil, smeary or rusty.	润滑、清洗 Lubricate and clean

表 6-4 桥式起重机故障及排除（大小车运行机构）

Table 6-4 Faults and eliminating method of overhead crane (Traveling mechanism of crane and trolley)

故障名称 Name		故障原因 Fault	排除方法 Eliminating Methods
起 重 机 大 车 运 行 机 构 Travelin g mechani sm of crane	桥架歪斜运 行、啃轨 Bridge deflection, gnawing rail	1、两主动车轮直径误差过大； Different diameter of two main wheel 2、主动车轮不是全部和轨道接触； Main wheel do not touch the rail overall fully. 3、主动轮轴线不正； Improper axes 4、金属结构变形； Inflection of steel structure 5、轨道安装质量差； Bad quality of rail installation 6、轨顶有油污或冰霜。 Rail top smeary or frost	1、测量、加工、更换车轮； Measure, machining or replace wheel 2、把满负荷小车开到大车落后的一端， 如果大车走正，说明这端主动轮没和轨 道全部接触，轮压小。可加大此端主动 车轮直径； Bigger the diameter of small wheel 3、检查和消除轴线偏斜现象； Check and eliminate the decline 4、矫正； Rectify 5、调整轨道，使轨道符合安装技术条件； Adjust the rail according to installation requirements 6、消除油污和冰霜。Clean the smeary and frost
小 车 运 行 机 构 Travelin g mechani sm of trolley	打滑 Slippery	1、轨顶有油污等； Smear on the top of rail 2、轮压不均； Uneven wheel load 3、同一截面内两轨道标高差过大； Big difference between two rail's height. 4、启、制动过于猛烈。 Violent start and break	1、清除； Clean it 2、调整轮压； Adjust the wheel load 3、调整轨道至符合技术条件； Adjust the rail according to requirements 4、改善电动机启动方法，选用绕线式电 动机。 Better starting method, use winding motor
	启动时车身扭 摆 Crane sway	1、小车轮压不均或主动车轮有一 只悬空； Uneven wheel load or one of the main wheels hangs in the air 2、啃轨。 Gnaw the rail.	1、调整小车三条腿现象； Adjust the wheel 2、解决啃轨。 Eliminate the gnawing

2、桥式起重机电气设备部分故障及排除（表 6-5，表 6-6）

Overhead crane electrical parts' faults and eliminating methods

表 6-5 桥式起重机电气设备部分故障与排除

Table 6-5 Overhead crane electrical parts' faults and eliminating methods

故障名称 name	故障原因 reasons	排除方法 eliminating methods
交流电动机 AC Motor 整个电动机均匀过热 Overheat of the whole motor	1、接电率 (JC%) 加大, 引起过载; Overload due to heavy JC%.2、在低电压下工作; Working in low voltage 3、电动机选择不当; Use the improper motor 4、检修后改变了起重机性能参数。 Changed the parameter after inspection	1、减低起重机繁重程度或更换 JC% 相应电动机; lower the load ,replace with a proper motor 2、电压低于 10% 额定电压、停止工作; Stop working when 10% lower the rated voltage 3、选择合适电动机; Use proper motor 4、维修, 保持起重机设计参数。Maintenance, keep the designed parameter
定子局部过热 Part of the stator overheat	定子硅钢片之间局部短路 Partial short of stator's silicon steel tile	消除引起短路的原因, 用绝缘漆抹在修理的地方 Eliminate the short, coated the repaired part with insulated lacquer.
定子绕组局部过热 winding part of stator overheat	1、接线错误; Connection fault 2、某相绕组中的两处, 与外壳短路; Short due to two winding points with the cover	1、检查并排除接线错误; Check and eliminate the fault 2、修复某相绕组。Repair the Windings
转子温度升高, 定子有大电流冲击, 电动机在额定负荷时不能达到全速 Rotor overheat, stator heavy current impact, motor cannot reach full speed with rated load.	1、绕组端头、中性点或并联绕组间接触不良; Bad connection between winding end, neutral or parallel windings 2、绕组与滑环间接触不良; Bad connection between winding and slide rings 3、电刷器械中有接触不良处; Bad connection between some electric brush 4、转子电路中有接触不良。Bad connection between some rotor loop	1、检查焊接处, 消除缺陷; Check the welding, and eliminate the faults 2、检查连接状况; Check the connection 3、检查调整电刷器械; Adjust the electric brush 4、检查松动与接触不良的情况并修理; 检查电阻, 断裂的更换。 Check whether it is loose and the condition of bad connection. Check the resistance and change the burnt one.
电动机在工作时振动 Motor vibrates when working	1、电动机轴和减速器轴不同心; Non-concentricity of motor and reducer's axis. 2、轴承损坏和磨损; Damage and abrasion	1、重新对线安装; Re-installation 2、更换轴承; Change the bearing 3、检修。Inspect

	on bearing 3、转子变形。Deformation of stator	
电动机工作时发出不正常的声响 Motor makes abnormal noise	1、定子相位错移； Stator wrong position 2、定子铁芯压紧； Stator impact 3、轴承磨损； Abrasion of bearing 4、槽楔子膨胀。 Groove wedge expands	1、检查接线并改正； Check connection and rectify 2、检查定子并修理； Check and repair stator 3、更换轴承； Replace bearing 4、锯掉膨胀的楔子或更换 Saw off expanded wedge or replace
电动机有承受负荷后转速变慢 Rotating speed becomes slower with load	1、转子端部连接处发生短路； short on rotor end 2、转子绕组有两处接地。 Rotor loop grounding	1、检查并消除短路现象； Eliminate short circuit phenomenon 2、检查每匝线圈，修理破损，消除短路。 Check loop, repair the break and eliminate short
电动机运行时定子与转子摩擦 Stator rubs with the rotor when motor working	1、轴承端部连接处发生短路； Short on bearing connection 2、转子绕组的线圈连接不正确，使磁通不平衡。 Improper winding and unbalance of the magnet	1、更换失效轴承；检查端盖的位置；清除定子、转子铁芯上的飞刺； Change the invalid bearing, check the cover; eliminate the abnormal thing on stator and iron core of stator. 2、检查并使线圈接线正确，测定子每相中的电流应相等。 Check the loop and make sure it is in proper way. Test the stator and make every phase has equal currency.
电动机工作时电刷上冒火花或滑环被烧焦 Spark on motor carbon brush or slide ring burnt	1、电刷研磨不好； Bad grinded brush 2、电刷在刷握中太松； Brush is too loose 3、电刷及滑环脏； Brush and slide ring are smeary 4、滑环不平，造成电刷跳动； Slide ring is not plat, and cause the hopping of brush. 5、电刷压力不足； No enough press on the brush. 6、电刷牌号不对； Improper brush 7、电刷间电流分布不均匀。 Uneven currency between brushes.	1、磨好电刷； Better the brush 2、调整电刷或研磨合适； Adjust the brush, or properly grind it. 3、用酒精将滑环擦干净； Clean the slide ring with alcohol. 4、车削和磨光滑滑环； Turning and grinding the slide ring. 5、调整电刷压力（18~20KPa）； Adjust the pressure of brush（18~20KPa） 6、更换； Replace it 7、检查刷架馈电线及电刷，并

			<p>矫正。</p> <p>Check feeding wire and brush, and rectify them.</p>
	滑环开路 slide ring open circuit	滑环与电刷器械脏污 Slide ring and brush are smeary	清污除垢 Clean the smear.
交 流 电 磁 铁 alternating electromagnet	线圈过热 The loop overheat	<p>1、电磁铁吸力过载；Magnetic iron overload.</p> <p>2、磁流通路的固定部分与活动部分之间存在着间隙；Fixed part and stationary part of close circuit cannot touch.</p> <p>3、线圈电压与电网电压不相符合。I Improper voltage of loop and network.</p>	<p>1、调整弹簧拉力；Adjust the spring</p> <p>2、消除间隙；Eliminate the gaps</p> <p>3、更换线圈，或改变接法。Replace the loop and change the connection way.</p>
	工作时声响较大 Big noise when working	<p>1、电磁铁过载；Magnetic iron overload</p> <p>2、磁流通路的工作表面上有污垢；Loop surface have smear.</p> <p>3、磁力系统偏斜。Declination of magnetic system</p>	<p>1、调整弹簧；Adjust the spring</p> <p>2、消除污垢；Eliminate the smear</p> <p>3、调整制动器机械部分，消除偏斜 Adjust the mechanical part and eliminate the declination.</p>
	不能克服弹簧作用力 Cannot overcome spring action	<p>1、电磁铁过载；Magnetic iron overload</p> <p>2、主弹簧力过大；Bigger spring</p> <p>3、电网中电压低。Low voltage of net work</p>	<p>1、2、调整制动器主弹簧力；Adjust the main spring of break.</p> <p>3、暂停工作。Stop working</p>
交 流 接 触 器 和 继 电 器 AC contactor and relay	线圈发热 loop heating	<p>1、线圈过载；loop overload</p> <p>2、磁流通路的活动部分接触不到固定部分。Fixed part and stationary part of close circuit cannot touch</p>	<p>1、减小活动触头对固定触头的压力；Reduce pressure which the moving touching points produce to fixed touching points.</p> <p>2、消除偏斜、卡塞、污垢或更换线圈。Eliminate declination, block, smeary and replace the loop.</p>
	接触器嗡嗡声增高 Bigger noise of contactor	<p>1、线圈过载；Loop overload</p> <p>2、磁流通路表面上污垢；Loop surface have smear</p> <p>3、磁力通路自动调整系统中卡塞现象。Self-adjusting system of magnetic loop is blocked</p>	<p>1、减小触头压力；Reduce the pressure of touching point</p> <p>2、消除脏污；Clean the smear</p> <p>3、消除卡塞。Eliminate the block</p>
	接触器发热或烧毁（损） Contactor	<p>1、触头压力不足；Not enough pressure of touching point</p> <p>2、触头脏污。Smeary touching point</p>	<p>1、调整压力；Adjust the pressure</p> <p>2、排除或更换。Eliminate or replace</p>

	overheat or burnt		
	主接触器不能接通 Main contactor cannot switch on	1、闸刀开关没合上，紧急开关没合上； Knife switch open, emergency switch open 2、仓口开关没合上； Door switch open 3、控制器手柄没放回零位；The controller is not put to zero. 4、控制电路熔断器烧断； Control circuit breaker burnt 5、线路无电。 No current	1、2、闭合开关； Close the switch 3、手柄回零； Put the controller to zero. 4、检查或者更换熔断器； Check or replace the fuse 5、检查线路有无电压。 Check the voltage of the wire.
	起重机运行中经常掉闸 Power-off protection happens frequently	1、触头压力不足； Low contact pressure 2、触头烧损； Touching point burnt 3、触头脏污； Touching point smeary 4、超负荷运行，造成电流过大； Working overload causes heavy currency. 5、滑线不平行，集电器和滑线接触不良。 Unparallel line cause bad connection between collector and line.	1、调整触头压力； Adjust the pressure of touching point. 2、更换或者打磨修理触头； Replace or file the touching point 3、清洗； Clean it 4、减少负荷； Reduce the load 5、修整轨道或地沟滑触线。 Repair the rail and line
	吸合时动作迟缓 Slow suction	1、动静磁铁极面间隙过大； Too big gap between polar 2、机械底板上部较下部突出。 The upper part is projected then lower part of mechanical plate	1、缩短极面间隙； Shorten the gap 2、将器件垂直安放。 Put the thing updown.
液 压 电 磁 铁 Hydraulic magnetic iron	通电后推杆不动作 Push bar cannot work when switch on	1、推杆卡住； Push bar is blocked 2、网络电压低于额定电压的 85%； The network voltage is 85% less than rated one. 3、延时继电器（ZLo 硅整流器上）延时过短； Delay-relay delay too short. 4、整流装置不动作； Rectifying device cannot work. 5、整流装置损坏； Rectifying device damage 6、时间继电器常开触头不动作； Time-relay cannot work 7、无油或严重漏油。 No oil and Heavy leakage	1、消除卡塞； Eliminate the block 2、提高电压； Raise the voltage 3、调整延时继电器 $t_{延} \approx 0.5s$ ； Adjust the relay time $\approx 0.5s$ 4、修复或更换； Repair or change 5、修复或更换； Repair or change 6、检修触头； Check the touching point 7、修理密封装置、补油。 Repair the sealed equipment and fill the oil
	推杆行程小 Short traveling	1、油量不足； No sufficient oil 2、活塞与轴承间有气体。 Gas between	1、补充油量； Supply the oil 2、排放气体。 Release the gas

distance of push bar	piston and bearing	
电磁铁工作后，行程逐渐减小 Magnetic moving distance too short	1、油缸漏油； Oil leaking 2、齿形阀片及动铁芯阀片密封不严；Bad seal of gear valve and iron core valve 3、密封圈严重损坏。 Seal ring badly damage	1、更换油缸； Change the oil tank 2、清除阀片上的机械杂质； Clean the mechanical impurity of valve 3、更换密封圈。 Change the seal ring
启动时间过长 Start too long	1、电压过低； Low voltage 2、运动部分卡住； The moving part is blocked 3、制动器制动力矩过大。 The moment of break is too big	1、提高电压； Raise the voltage 2、排除卡住故障； Eliminate the block 3、调整制动力矩至额定值。 Adjust the moment to rated one .
制动时间过大 Break too long	1、时间继电器触头打不开； Cannot open the contactor point of timing relay 2、运动部分卡住； The moving part is blocked. 3、油路堵塞； Oil circuit is jammed 4、机械部分故障。 Mechanical part Fault	1、检修触头； Inspect the touching point 2、排除卡塞； Eliminate the block 3、疏通油路； Dredge the oil circuit 4、消除机械故障。 Eliminate the mechanical fault

表 6-6 桥式起重机电气控制及线路故障分析与排除

Table 6-6 Overhead crane electrical parts' faults and eliminating methods

故障名称 Name	故障原因 Reasons	排除方法 Eliminating Methods
保护箱的刀开关闭合时，控制回路的熔断器烧毁 Breaker burnt when the protective knife-switch shut off	在控制回路中该相接地 The relative phase contact ground	用兆欧表检查该相接地部分，予以排除 Check with ohmmeter, eliminate the earthing.
某机构控制器转动后，过电流继电器动作 Protective relay works when certain system running	1、保护该电动机的过电流继电器的整定值不符合要求； The setting data of maximum relay does not reaches the requirements. 2、该机构的机械传动部分某环节卡住而造成电动机过载。 Transmission part blocked causes motor overloaded.	1、按下式调整继电器原整定值 $I_{\text{额定}} = (2.25 \sim 2.5) I_{\text{额}}$ ； Adjust the relay I rating value = $(2.25 \sim 2.5) I$ 2、检修传动部分，排除卡住现象。 Check the transmission part, eliminate the block.
控制器合上后电动机不转 Motor cannot work after controller switched on.	1、一相断电，电动机发出声响； Noise from motor when one phase power off.	1、找出损坏处，接好线； Find out the damage and rewire it. 2、找出损坏处，接好线； Find out the

	<p>2、转子电路断线; Rotor electricity break off.</p> <p>3、线路无电压; No voltage</p> <p>4、控制器内触头没真正接触; Bad connection between controller's internal touching points.</p> <p>5、集电刷发生故障; Collector faults</p> <p>6、制动器故障, 不能松闸。Break fault, it cannot release.</p>	<p>damage and rewire it.</p> <p>3、找出损坏处, 接好线; Find out the damage and rewire it.</p> <p>4、检修控制器; Inspect the controller</p> <p>5、检修集电刷; Inspect the collector</p> <p>6、检修制动器。Inspect the break</p>
<p>控制器合上后电动机仅能单向转动 Motor can only run in one direction</p>	<p>1、控制器反向触头接触不好或控制转动机构有故障; Controller's reversal contactor point cannot work well or some wrong with the rotor mechanism</p> <p>2、配电线路发生故障; Electric fault</p> <p>3、工作机构运动到极点, 压开了限位开关; Break the limit when working mechanism travel to the end.</p> <p>4、限位开关发生故障。Fault in limit switch</p>	<p>1、检修控制器调整触头; Inspect the controller and adjust the touching point</p> <p>2、用短接法找出故障并消除; Find out the fault and eliminate with the methods of short-circuit.</p> <p>3、只能单方向运转时, 将故障排除; Eliminate the fault when it run in one direction</p> <p>4、检查限位开关, 消除故障。Check the limit switch, and eliminate the fault.</p>
<p>终点限位开关动作后, 主接触器不释放 Contactor fail after limit switch open</p>	<p>1、终点开关电路中发生短路; Short of end switch</p> <p>2、接至控制器的导线错乱。Wiring fault</p>	<p>1、检修, 消除短路; Inspect and eliminate the short</p> <p>2、纠正配线错误。Rewire</p>
<p>控制器工作时发生卡塞和冲击 Tuck and bump when controller working</p>	<p>1、定位机构发生故障; Limit fault</p> <p>2、触头撑住于弧形室内。Contactor point located in camber</p>	<p>1、消除故障; Eliminate the fault</p> <p>2、调整触头位置。Adjust the location of touching points</p>
<p>运行中控制器扳不动 Controller can not pull when working</p>	<p>1、定位机构故障; Limit fault</p> <p>2、触头烧灼粘接。Touching points are burnt together.</p>	<p>1、调整压力; Adjust the pressure</p> <p>2、清洗触头。Clean the touching points</p>
<p>发电机不激磁 Motor can not excite</p>	<p>1、激磁回路断线; Excite loop-line break</p> <p>2、发电机转向相反。Motor rotating oppositely</p>	<p>1、检查激磁回路; Check the excite loop</p> <p>2、调换驱动电动机转子两相接线; Change the wiring two phase of driving motor's stator</p>
<p>电源切断后 (控制回路分断) 保护箱接触器不掉闸</p>	<p>1、控制回路中有接地或短路之处; Control loop-line grounding or short;</p>	<p>1、检查出接地或短路, 排除故障; Find out grounding and short,</p>

Protective contactor failure after power off	2、接触器触头焊住，对主回路继续供电。Weld the contactor, supply the electricity for loop.	eliminate the faults. 2、锉削烧焦的触头，使接触良好。File the burnt contactor point, better the connection.
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三、起重机的使用须知 Operation notice for crane

(一) 安全技术规则 Technical rules for crane

1、使用起重机必须遵守的安全技术规则：Technical rules for safety that must be abided in applying of the crane

①应有专职人员来操纵起重机。

The crane should be operated by special person(s).

②起重机侧面，必须挂上注明起重机的最大起重量、跨度、工作级别、制造厂的标牌。

A label plate showing maximum hoisting weight, span, working system and manufacturer must be hung on the flank of the crane.

③起重机工作的时候，除操纵室外，其余地方不准站人。

During the operation, person(s) can stay no where on the crane except the control cabin.

④在起重机上进行监测或修理时，起重机必须断电。

When inspection or maintenance is being carried out on the crane, the power must be cut off.

⑤起重机不带重物运行时，吊钩离地 2.5 米（即超过一个人的高度）。

When the crane is traveling without heavy load, the hook should be 2.5m from the ground(above one person's height).

⑥严格禁止起重机在搬运重物时，重物从人头上越过。

It is strictly forbidden for the crane traveling across the head of person with heavy load.

⑦起重机带重物运行时，重物最低点离重物运行线路上的最高障碍物至少 0.5 米。

When crane travels with heavy load, the lowest point must be 0.5m higher than the tallest objects on the way.

⑧严格禁止用吊钩运送或起升人员。

It is strictly forbidden to lift or transport person(s)

⑨禁止用任何方法从起重机上抛下物品。

Throwing object from crane is forbidden.

⑩工具、备品、紧固件、杂物等必须贮存在专门的箱子内，禁止随便放在起重机上，以避免物件落下时发生人身或损坏设备事故。

Objects like tools, spare parts, fastener and sundries must be kept in the special box. It is forbidden to put them on the crane in order to avoid any injury or harm to equipment or human body.

⑪起升液态金属、有害液体及重要物品时，不论重量多少，必须先稍微起升重物离地 150~200 毫米，验证制动器的可靠性以后再正常起升工作。

When hoisting liquid metal, harmful liquid or important object, no matter it is heavy or light, it must be lifted 150~200mm from the ground first, validate the reliability of the brake and then start normal operation.

⑫禁止将易燃物品（如煤油等）贮放在起重机上，做好起重机上的防火工作。

Forbid to store flammable material (such as kerosene) on the crane for fireproofing.

⑬ 露天使用的起重机，当风力大于六级时停止工作。

Crane being applied outdoor should stop working when wind is stronger than Grade 6

⑭ 露天起重机不工作时，必须设法将起重机可靠固定（如吊钩挂上地锚、车轮处塞斜铁等），以防起重机被风刮走发生意外事故。

When the crane outdoor stays off working, it must be reliably fastened (for example, link the hook to ground anchor and put blocks to the wheels) in order to prevent accident.

⑮ 必须对起重机进行定期的安全检查，其中包括用试验荷重对起重机进行静负荷和动负荷的试验，将结果存入设备档案。

Crane must be regularly checked for sake of safety, including dead load test and dynamic load test. The record should be kept in file.

3、电气设备检修安全技术规则：Safety technical rules for maintenance of electric equipments

① 只许专职的电气人员担任起重机电气的维修工作。

Only professional electrical technicians are permitted for maintenance of electric equipments.

② 修理时，必须采用电压在36伏以下的携带式照明灯。

Only pocket light under 36 volt can be used during maintenance.

③ 当须带电工作时，一定要带戴上橡胶手套，穿上橡胶靴并使用有绝缘手柄的工具。应有专人监护电器开关，一旦发生危险时应立即切断电源，所有靠近导电部分的地方都必须用栅栏围起来。

If it is necessary to do the maintenance with power on, rubber gloves and rubber shoes must be worn and tools with insulated handle must be used. The switch must be watched by special person and the power should be cut off immediately in case there is any danger. Barrier must be set up to separate those parts that may bring electricity.

④ 电动机、电气设备外壳上的所有金属部分可能发生导电的地方必须接地。

The metal shell of the electromotor and electrical equipment and other metal parts should be earthed.

(二) 司机职责 Duties of the operator

1、熟悉起重机的用途。设备、操作方法以及保养规则。

Be familiar with the function of the crane, the method of operation and maintenance rules.

2、严格遵守安全技术规则。Strictly abide by the safety technical rules.

3、起重机开始操作前应做到：Following steps should be done before operating the crane

① 了解电源供电情况，电源电压（大车导电器间电压）低于额定值的90%时不应开动起重机。

Check condition of power supply, the crane will not be started when the voltage of power supply is under 90% of the rated value.

② 在总刀开关断开的情况下进行起重机的检视工作，检查主要部分的连接和使用情况，对个别机构进行必要调整。

Before turning on the power, check main parts of the crane to ensure the connecting and running parts in condition and make adjustment if necessary.

③ 检查起重机是否有遗留工具或其他物品，以免在工作时落下，发生人身或损坏设备事故。

Check if there are any tools or other goods left on the crane in order to avoid them dropping from the crane

while working and thus making injury or damage to equipment or human body.

④按规定对设备的各润滑点加油。Oil the lubricating points according to the rules.

⑤对露天工作的起重机，不使用时应妥善作防风措施。For crane applied outdoors, take windproof measures when it stays off work.

⑥在主开关接电之前，司机必须将所有控制器的手柄转至零位，并将所有门关好。起重机工作时，严禁桥架和大车轨道上有人。

Before turning on the main switch, operator must turn all the controllers to zero position and close all the doors. During operating, there should not be persons on the bridge or on the rails.

⑦起重机在每次开动前，必须发出开车警告信号（电铃）。

Before every startup, warning alarm (electric bell) should be sent out.

⑧必须注意被吊起的重物，不得超过额定的起重量。The object hoisted should not be over the rated load.

⑨司机必须与挂钩工人紧密配合，步调一致。移动和起升重物，只应听从挂钩工人所发出的信号，但“停车”信号不论由谁发出，均应停车。Operator must cooperate well with hook worker and only defer to hook worker's signal, but must stop the crane no matter who gives "stop" signal.

⑩吊起重物时，必须在垂直的位置，不允许利用移动大车及小车拖动重物。

Object to be hoisted must be vertically under the hook. It is not allowed to drag the object by moving the crane or trolley.

⑪起重机及小车接近边缘位置时必须以最缓慢的行速，在不碰撞挡架的条件下，逐步靠近。

When the crane or trolley is reaching a end position, it must gradually reach the end at slowest speed without any hitting of the block.

⑫起重机的控制器应逐级开动，在机构完全停止运转前，禁止将控制器从顺转位置直接反到逆转位置来进行制动，但在防止事故发生的情况下可以偶尔用来作为紧急措施，但控制器只能打在反向一档而后必须检查确定机构部件没有损伤的情况下才能继续工作。

The controller should be started step by step. Before the mechanism completely stop, turning the controller from veering to reversing is not allowed, but in emergency situation, it can be used to avoid possible accident. In this situation, the controller can only be turned to first shift of the reverse, and the mechanism must be checked before next operation.

⑬司机要保证防止与另一起重机相撞。在一台起重机发生故障的情况下，才能允许用相邻另一台起重机来推动这一台，在这种情况下两台起重机须无负荷，而且用最低的速度缓慢地移动。

Operator must assure that the crane will not run against another crane. Only in the situation that one fails to operate, can another comes pushes it. In this situation, both cranes should move at the slowest speed without any load.

⑭在电压显著降低或电力输送中断的情况下，主刀开关必须断开，并将所有的控制器拉到零位上。

In the situation that voltage drops markedly or power is cut off, the main switch must be turned off and all controllers should be in zero position.

⑮起重机的电动机突然停电或线路电压下降剧烈时，应将所有控制器拉到零位，司机室内总开关必须马上切断。司机即以信号通知挂钩工人。

When the motor's power is suddenly cut off or voltage of circuitry drops suddenly, all the controllers should be turned to zero position. The main switch in the cab should be turned off immediately and operator should notice the hook worker promptly.

⑯ 起重机吊有重物 and 下放吊具时，司机不得离开操纵室。

When hanging load or lowering downing load, operator is not allowed to leave from control cabin.

⑰ 当起重机工作完毕以后，吊具应升到上面的位置，使控制器处在零位，并断开主刀开关。

Lift the hook on high position, put controller on zero position and turn off the main switch after finishing work.

⑱ 工作完毕后司机必须拉开总刀开关和断开电锁。

Operator must turn off the main switch and cut off electric lock after work.

⑲ 每班工作完后清扫和擦抹起重设备，再一次检查各部分情况，为下班作好必要的准备工作。

Clean and re-check the crane after finishing work. Make preparation for next work.

⑳ 交接班时，当班司机将起重机交接纪录本一并交给当班司机，并将其中操作中所发现的问题，报告有关部门及接班司机。

When handing over the work, get the note book ready to the next operator, and report the problem found in operation to him and related department.

㉑ 司机在离开起重机时，起重机必须停放在规定的停车点并固定好。

When operator departs from the crane, the crane must be stopped on the given points and be fastened.



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