

2 各机构的故障及排除方法(表 6-2、表 6-3、表 6-4)

Problems and solutions of each structure (table 6-2, 6-3, 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 Failure (failure of each part of hoisting mechanism) and trouble-shooting of each mechanism

名称 name	故障及损坏情况 failure and damage condition	原因与后果 Reason and Result	排除方法 trouble-shooting Method
锻造吊钩 Forged Hook	吊钩表面出现疲劳性 裂纹 fatigue crack on hook surface	超载、超期使用、材质 缺陷 Overload, Overtime use, flaw of material	发现裂纹、更换 replace it if any crack found
	开口及危险断面磨损 wear of opening and dangerous section	严重时降低强度、易 断钩,造成事故 Lessen the rigidity, or it is easy to cause hook break and accident	磨损量超过危险断面 5%更换 replace hook when the abrasion over 5% of dangerous section
	开口部位和弯曲部位 发生塑性变形 Crack and wending parts have plastic deformation	长期过载,疲劳所致 Caused by Long time overload and fatigue.	立即更换 Replace immediately

叠片式吊钩(板钩) Laminated hook	吊钩变形 distortion of hook	长期过载、容易断钩 Long time overload, and it is easy to cause hook break;	换新 replace
	表面有疲劳裂纹 surface has fatigue crack	超期、超载、吊钩损坏 Overtime, overload and hook damage	换新 replace
	销轴磨损量超过公称直径的3%—5%; the abrasion of pin shaft is more than 3%—5% of nominal diameter	吊钩脱落 Hook fall off	换新 replace
	耳环有裂纹或毛刺; earring has crack or burr	耳环断裂 earring breakage	换新 replace
	耳环衬套磨损量达原厚的5% the abrasion of earring's lining reaches 5% of original thickness	受力情况不良 bad forced condition	换新 replace
	断丝、断股、打结、磨损 Breakage, knotting, abrasion	导致突然断绳 Cause to breakage of rope	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 according to standard when thread break, and replace the wire rope according to standard when it have abrasion
钢丝绳 wire rope			

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滑轮 pulley	滑轮绳槽磨损不匀 Uneven abrasion of block's groove	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 wheel	轮槽壁磨损量达原厚度的1/5,径向磨损量达绳径的1/2时应更换 replace it when abrasion of groove's wall reaches 1/5 of previous thickness, and gauge ware reaches 1/2 of wire rope diameter
	滑轮转不动 pulley can not rotate	轴损坏或轴承损坏 shaft damage and bearing damage	更换轴和轴承并加强润滑,检修 replace the shaft and bearing and then lubricate and maintain them
	滑轮倾斜、松动 pulley incline or loose	轴上定位件松动,或钢丝绳跳槽 keeper of shaft loose or wire rope hop out of groove	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
	滑轮裂纹或轮缘断裂。 crack of pulley or break of wheel flange	滑轮损坏。 pulley damage	更换。 replace
卷筒 drum	卷筒疲劳裂纹; Drum has fatigue crack	卷筒破裂; break of drum	更换卷筒; replace drum
	卷筒轴、键磨损 abrasion of drum's shaft and key	轴被剪断,导致重物坠落 break of shaft and cause the load fall off。	停止使用,立即对轴键等检修 stop using and inspect the shaft key immediately
	卷筒绳槽磨损和绳跳槽,磨损量达原壁厚的15%~20%。 Groove abrasion and rope hopping. The abrasion reaches 15%—20% of the original thickness	卷筒强度削弱,容易断裂;钢丝绳缠绕混乱。 The rigidity of drum becomes weaker and easy to break. And wire rope is twisted	更换卷筒。 replace the drum

齿轮 gear	<p>齿轮轮齿折断 Gear teeth break</p>	<p>运转中有异常声响,继续使用损坏传动机构 abnormal noise during operation, if continue to use it, will damage the transmission mechanism</p>	<p>更换新齿轮; replace the new gear</p>
	<p>齿轮磨损达原齿厚的15%—20%; Abrasion of gear reaches the 15%—20% of the original teeth thickness</p>	<p>工作时产生冲击与振动,继续使用损坏传动机构 impact and vibration occurred during working and then damage the transmission mechanism</p>	<p>更换新齿轮 replace the new gear</p>
	<p>齿轮裂纹 因“键滚”使齿轮键槽损坏; Gear crack, gear key groove damaged by rolling of key.</p>	<p>运转中有振动和异常声响,是超期使用,安装不正确所致齿轮损坏,使吊重坠落 Vibration and noise caused by overtime use and improper installation, which make load fall off</p>	<p>对起升机构应作更换,对运作机构等作修补或新加工键槽修复 replace lifting mechanism, for traveling mechanism, repair or renew the key</p>
	<p>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 teeth thickness; Carburized layer abrasion reaches 80% of the teeth thickness.</p>	<p>超期使用,热处理质量问题 overtime use, Bad material, improper heat treatment cause the damage of shaft.</p>	<p>更换:圆周速度$>8\text{m/s}$的减速器的高速级齿轮磨损时应成对更换。 replace: for the reducer with peripheral speed $>8\text{m/s}$, when there is some abrasion, replace pairs of high speed gear of reducer</p>

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轴 shaft	裂纹 crack	材质差,热处理不当,导致 损坏轴 Bad material, improper heat treatment cause the damage of shaft.	更换 replace
	轴弯曲超过0.5mm / m Bending of shaft is more than 0.5mm/m	导致轴颈磨损,影响传动, 产生振动 cause damage of shaft neck and influence the transmission and cause vibration	更换或矫正 Change or rectify
	键槽损坏 damage of key groove	不能传递扭矩 unable to transmit torsion	起升机构应作更换,运行 机构等可修复使用 for lifting mechanism, replace them, for traveling mechanism, repair them
车轮 wheel	踏面和轮辐轮盘疲劳裂纹 wheel tread and wheel flange have fatigue crack	车轮损坏; Damage of wheel	更换 replace
	主动车轮踏面磨损不均 匀; Uneven abrasion of drive wheel tread	导致车轮啃轨,车体倾斜 和运 leads to rail gnawing tilt of crane	成对更换 replace in pairs

	<p>踏面磨损达轮圈厚度的15%</p> <p>Abrasion of tread reaches 15% of wheel flange thickness</p>	<p>行时产生振动;车轮损坏</p> <p>vibration when traveling; damage of wheel</p>	<p>更换</p> <p>replace</p>
	<p>轮缘磨损达原厚度的50%</p> <p>Wheel flange abrasion reaches 50% of the original thickness.</p>	<p>由车体倾斜、车轮啃轨所致,容易脱轨</p> <p>Due to the crane tilt and rail gnawing and cause derailment</p>	<p>更换</p> <p>replace</p>
制动器零件 brake part	<p>拉杆上有疲劳裂纹</p> <p>Fatigue crack on lever</p>	<p>制动器失灵</p> <p>brake fails to work</p>	<p>更换</p> <p>replace</p>
	<p>弹簧上有疲劳裂纹</p> <p>Fatigue crack on spring</p>	<p>制动器失灵</p> <p>brake fails to work</p>	<p>更换</p> <p>replace</p>
	<p>小轴、心轴磨损量达公称直径的3%~5%</p> <p>The abrasion of minor shaft and mandrel reaches 3%-5% of the nominal diameter</p>	<p>抱不住闸</p> <p>Fails to brake</p>	<p>更换</p> <p>replace</p>
	<p>制动轮磨损量达原轮缘厚度的40%~50%</p> <p>the abrasion of brake wheel reaches 40% ~ 50% of the original wheel flange thickness</p>	<p>吊重下滑或溜车</p> <p>load fall off or crane slide</p>	<p>更换</p> <p>replace</p>

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	<p>制动瓦摩擦片磨损达2mm或者达原厚度的50%。</p> <p>Brake shoe friction shim wear 2mm, or to 50% of primary thickness</p>	<p>制动器失灵</p> <p>bad break</p>	<p>更换摩擦片</p> <p>replace friction shim</p>
联轴器 Coupling	<p>联轴器内有裂纹;</p> <p>crack on coupling</p>	<p>联轴器损坏</p> <p>damage of coupling</p>	<p>更换</p> <p>replace</p>
	<p>连接螺栓有松动</p> <p>loose in connection bolts</p>	<p>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</p> <p>Impact and vibration duiring braking/starting will cause bolts reakage and falling of load</p>	<p>拧紧</p> <p>Tightened</p>
	<p>齿形联轴器齿轮磨损或折断</p> <p>Abrasion or breakage of coupling gear</p>	<p>缺少润滑、工作繁重、打反车所致联轴器损坏</p> <p>Lack of lubrication, heavy workload, start oppositely will lead to damage of coupling</p>	<p>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;</p> <p>For the lifting mechanism, when the abrasion of gear teeth reaches 15% the original thickness, replace it, and for the traveling mechanism, when the abrasion of gear teeth reaches 30% the original thickness, replace it</p>

	键槽压溃与变形; Press or deformation of key groove	脱键、不能传递扭矩 cannot transmit the moment of torsion key falls off	对起升机构应更换,对其他机构修复使用; for lifting mechanism, replace them, for other mechanisms, repair them
	销轴、柱销、橡皮圈等磨损。 Abrasion in shaft, pin and rubber ring etc	启、制动时发生强烈的冲击与振动 heavy impact and vibration when starting or braking	更换已磨损件。 Replace worn parts
滚动轴承 rolling bearing	温度过高 Temperature is too high	润滑油污垢 lubricating oil dirt	清除污垢,更换轴承 clean dirt, replace bearing
		完全缺油 Completely lack of oil	按规定加注润滑油 add lubrication oil as required
	异常声响(继续哑音) abnormal noise (Continue to dead sound)	油过多 Too much oil	检查润滑油数量 check the quantity of labrication
		轴承污垢 dirty bearing	清除污垢 clean dirty
	金属研磨声响 metal grinding noise	缺油 lack of oil	加油 add oil
锉齿声或冲击声 topping or impact sound	轴承保持架、滚动体损坏 Damage of coupling support, rolling body	更换轴承 Replace bearing	

滑动轴承 sliding bearing	过渡发热 over heating	轴承偏斜或压得过紧 incline of bearing and press too tight	消除偏斜,合理紧固 Eliminate deflection, tighten reasonably
		间隙不当 improper clearance	调整间隙 adjust clearance
		润滑剂不足 lack of lubrication	加润滑油 add lubrication
		润滑剂质量不合格 bad lubricants	换合格的油剂 use good and qualified lubrication

表 6-3 桥式起重机故障及排除(起升机构部件部分)

Table 6-3 Fault and troubleshooting(lifting mechanism part)

故障名称 name		故障原因 cause	排除方法 Solutions
制 动 器 brake	不能闸住制动轮 (重物下滑) fail to lock brake wheel(load fall down)	杠杆的铰链被卡住 Hinges of leverage is stuck	排除卡住故障,润滑 Remove stuck and give lubrication
		制动轮和摩擦片上有油污 oil on the brake wheel and friction shim	清洗油污 Clean oil dirt
		电磁铁芯没有足够的行程 lack of travel distance of magnet iron core	调整制动器 adjust brake
		制动轮或摩擦片有严重磨损 Brake wheel and friction shim have heavy abrasive wear	更换摩擦片 replace friction shim

		主弹簧松动和损坏 main spring loose or damage	更换主弹簧或锁紧螺母 replace main spring and nut
		锁紧螺母松动、拉杆松动 Lock nut and lever loose	紧固锁紧螺母 Fasten lock nut
		液压推杆制动器叶轮旋转不灵 Hydraulic thruster impeller not work	检修推动机构电气部分 Check electrical part of thruster
	制动器不松闸 Brake fails to release	电磁铁线圈烧毁 Magnetic wire burn down	更换 Replace
		通往电磁铁导线断开 Disconnection of wire to magnetic conductor	接好线 Connect the wire
		摩擦片粘连在制动轮上 Shoe block on on braking wheel	用煤油清洗 Clean with kerosene
		活动铰被卡住 Gemel stuck	消除卡住现象、润滑 Eliminate the lock and lubricate it.
		主弹簧力过大或配置太重 Main spring force is too large or configuration is too heavy	调整主弹簧力 Adjust the main spring
		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)	顶杆调直或更换顶杆 Straighten the mandril or change the mandril

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		油液使用不当 Improper oil application	按工作环境温度更换油液 Change oil according to working condition
		叶轮卡住 Impeller is locked	调整推杆机构和检查电器部分 Adjust push rod and check electrical part
		电压低于额定电压85%,电磁铁吸合力不足。 85% lower than the rated load, magnetic force is not enough	查明电压降低原因,排除故障 Find out the reason of voltage reduction eliminate the trouble.
制动器发热,摩擦片发出焦味并且磨损很快 Break heating, friction shim release scorcked smell and get worn soon.		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 braking wheel when break loose, so cause friction	调整间隙 Adjust clearance
		两闸瓦与制动轮间隙不均匀,或者间隙过小 Asymmetrical distance from shoes to braking wheel	调整间隙 Adjust clearance
		短行程制动器辅助弹簧损坏或者弯曲 Supporting spring damage or bending	更换或修理辅助弹簧 Replace or repair the spring
		制动轮工作表面粗糙 Rough surface of break wheel	按要求车削制动轮表面 Turning the surface of brake according to requirements

	<p>制动器容易离开调整位置,制动力矩不够稳定</p> <p>The brake is easy to deviate from the adjusted position . And the breaking torque is not steady</p>	<p>调节背紧螺母没有拧紧;螺纹损坏</p> <p>Fasten nut is loose. Screw thread damage</p>	<p>拧紧螺母;更换</p> <p>Fasten nut; Replace it.</p>
	<p>电磁铁发热或有响声</p> <p>Magnetic overheat or abnormal noise</p>	<p>主弹簧力过大</p> <p>Main spring is over pressed</p>	<p>调整至合适大小</p> <p>Adjust to proper extent</p>
		<p>杠杆系统被卡住</p> <p>Push bar is blocked</p>	<p>消除卡住原因、润滑</p> <p>Eliminate the block and make lubrication</p>
		<p>衔铁与铁芯贴合位置不正确</p> <p>Wrong position of iron core and mandrel</p>	<p>刮平贴合面</p> <p>Leveling fitting surfaces</p>
<p>减速器 reducer</p>	<p>有周期性齿轮颤动现象,从动轮特别明显</p> <p>phenomenon of periodic cyclical gear vibration, especially for the driven wheel</p>	<p>节距误差过大,齿侧间隙超差</p> <p>Section distance error, gear side clearance beyond tolerance</p>	<p>修理、重新安装</p> <p>Repair, re-install</p>
	<p>剧烈的金属摩擦声,</p>	<p>传动齿轮侧隙过小,两个齿轮轴不平行、</p>	<p>修正、重新安装</p> <p>adjust, re-install</p>

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<p>减速器振动,机壳叮当作响 Severe metal friction sound, reducer shake, shell tinkers.</p>	<p>齿轮有尖锐的刃边 Gear backlash that is too small, gear axes are not parallel, gear has sharp edges</p>	
<p>齿轮啮合时,有不均匀的敲击声,机壳振动 gear meshing, irregular rattle, shell shake.</p>	<p>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 teeth surface is not flat, teeth with flaws, gear contact surface are not completely clench, but contact on one angle</p>	<p>更换齿轮 replace gear</p>
<p>壳体,特别是安装轴承处发热 shell heating especially the place where bearing installed</p>	<p>轴承破碎 bearing damage</p>	<p>更换轴承 replace bearing</p>
	<p>轴颈卡住 bearing neck is stunk</p>	<p>更换轴承 replace bearing</p>
	<p>轮齿磨损 bearing wear</p>	<p>更换齿轮 replace gear</p>
	<p>缺少润滑油 lack of lubrication oil</p>	<p>更换润滑油。 Replace lubrication oil</p>
<p>剖分面漏油 oil leakage of subdivision surfaces</p>	<p>密封失效 seal failure</p>	<p>更换密封件 replace sealing parts</p>
	<p>箱体变形 shell deformation</p>	<p>检修箱体剖分面,变形严重则更换 check Subdivision surfaces, replace it when heavy damaged</p>
	<p>剖分面不平 Subdivision surfaces not flat</p>	<p>剖分面铲平 Subdivision surface levelled</p>

		连接螺栓松动 Connection bolt loose	清理回油槽, 紧固螺栓 Clear the return chute, and fasten the nuts
		地脚螺栓松动 Anchor bolt is loose	调整地脚螺栓 adjust anchor bolt
	减速器在底座上振动 reducer shake on base	与各部件连接轴线不同心 shaft center lines are not match	对线调整 Diagonal line adjustment
		底座刚性差 base rigidity is not enough	加固底座, 增加刚性 reinforce base and increase rigidity
	减速器整体发热 Heating of reducer	润滑油过多 Too much oil	调整油量 Adjust oil level
钢丝绳 滑轮系 统 Rope And pulley	钢丝绳迅速磨损或经常损坏 Wire rope abrasion and damage	滑轮和卷筒直径太小 Diameter of pulley and drum are too small	更换挠性更好的钢丝绳, 或加大滑轮或卷筒的直径 change wire rope with better flexibility, increase the diameter of pulley and drum
		卷筒上绳槽尺寸绳径不匹配, 太小 The wire rope diemension does not match with the groove of drum, it is too small	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 of same capacity, or change sheaves and drum
		有脏物, 缺润滑 dirty and lack of oil	清除、润滑 Clean and lubricate

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		<p>起升限位挡板安装不正确,经常磨绳 False installation of lifting baffle and cause rope abrasion frequently</p>	<p>调整 Adjust</p>
		<p>滑轮槽底或轮缘不光滑,有缺陷 Pulley groove and wheel edge not smooth, and have defects</p>	
	<p>个别滑轮不转动 some pulleys cannot rotate</p>	<p>轴承中缺油、布污垢和锈蚀 Bearing lacks of oil; dirt and corrosion in bearing</p>	<p>润滑、清洗 lubricate, clean</p>