塔式起重机

动臂装在高耸塔身上部的旋转起重机。作业空间大，主要用于房屋建筑施工中物料的垂直和水平输送及建筑构件的安装。由金属结构、工作机构和电气系统三部分组成。金属结构包括塔身、动臂和底座等。工作机构有起升、变幅、回转和行走四部分。电气系统包括电动机、控制器、配电柜、连接线路、信号及照明装置等。

塔式起重机简称塔机，亦称塔吊，起源于西欧。据记载，第一项有关建筑用塔机专利颁发于 1900 年。1905 年出现了塔身固定的装有臂架的起重机，1923 年制成了近代塔机的原型样机，同年出现第一台比较完整的近代塔机。1930 年当时德国已开始批量生产塔机，并用于建筑施工。1941 年，有关塔机的德国工业标准 DIN8770 公布。该标准规定以吊载(t)和幅度(m)的乘积(tm)一起以重力矩表示塔机的起重能力。

我国的塔机行业于 20 世纪 50 年代开始起步,相对于中西欧国家由于建筑业疲软造成的塔机业的不景气，上海波赫驱动系统有限公司我国的塔机业正处于一个迅速的发展时期。

从塔机的技术发展方面来看，虽然新的产品层出不穷，新产品在生产效能、操作简便、保养容易和运行可靠方面均有提高，但是塔机的技术并无根本性的改变。塔机的研究正向着组合式发展。所谓的组合式，就是以塔身结构为核心，按结构和功能特点，将塔身分解成若干部分，并依据系列化和通用化要求，遵循模数制原理再将各部分划分成若干模块。根据参数要求，选用适当模块分别组成具有不同技术性能特征的塔机，以满足施工的具体需求。推行组合式的塔机有助于加快塔机产吕开发进度，节省产品开发费用，并能更好的为客户服务。

塔机分为上回转塔机和下回转塔机两大类。其中前者的承载力要高于后者，在许多的施工现场我们所见到的就是上回转式上顶升加节接高的塔机。按能否移动又分为：走行式和固定式。固定式塔机塔身固定不转，安装在整块混凝土基础上，或装设在条形式 X 形混凝土基础上。在房屋的施工中一般采用的是固定式的。

设备特点和安全装置

塔式起重机的动臂形式分水平式和压杆式两种。动臂为水平式时，载重小车沿水平动臂运行变幅，变幅运动平衡，其动臂较长，但动臂自重较大。动臂为压杆式时，变幅机构曳引动臂仰俯变幅，变幅运动不如水平式平稳，但其自重较小。

为了确保安全，塔式起重机具有良好的安全装置，如起重量、幅度、高度和载荷力矩等限制装置，以及行程限位开关、塔顶信号灯、测风仪、防风夹轨器、爬梯护身圈、走道护栏等。司机室要求舒适、操作方便、视野好和有完善的通讯设备。

塔式起重机的检验产要点

1) 检查金属结构情况特别是高强度的螺栓，它的连接表面应清除灰尘、油漆、没迹和锈蚀，并且使用力矩手或专用扳手，按装配技术要求拧紧。

2) 检查各机构传动系统，包括各工作传动机构的轴承间隙是否合适，齿轮啮合

是不是良好及制动器是否灵敏。

3) 检查钢丝绳及滑轮的磨损情况，固定是否可靠。

4) 检查电气元件是否良好，名接触点的闭合程度，接续是否正确和可靠。

5) 检查行走轮与轨道接触是否良好，夹轨钳是否可靠。装设附着装置、内爬装置时，各连接螺栓及夹块是否牢固可靠。

常用塔机

以下分几个方面来具体介绍房建中常用的塔机。

(一)、塔机的金属结构

塔机的金属结构由起重臂、塔身、转台、承座、平衡臂、底架、塔尖等组成。

起重臂构造型式为小车变幅水平臂架，再往下分又有单吊点、双吊点和起重臂与平衡臂连成一体的锤头式小车变幅水平臂架。单吊点是静定结构，双吊点是超静定结构。锤头式小车变幅水平臂架，装设于塔身顶部，状若锤头，塔身如锤柄，不设塔尖，故又叫平头式。平头式的使结构形式更简单，更有利于受力，减轻自重，简化构造等优点。小车变幅臂架大都采用正三角形的截面。

塔身结构也称塔架，是塔机结构的主体。现今塔机均采用方形断面，断面尺寸应用较广的有：1.2m×1.2m、1.4m×1.4m、1.6m×1.6m、2.0m×2.0m;塔身标准节常用尺寸是 2.5m 和 3m。塔身标准节采用的联接方式，应用最广的是盖板螺栓联接和套柱螺栓联接，其次是承插销轴联接和插板销轴联接。标准节有整体式塔身标准节和拼装式塔身标准节，后者加工精度高，制作难，但是堆放占地小，运费少。塔身节内必须设置爬梯，以便司机及机工上下。爬梯宽度不宜小于 500mm，梯步间距不大于 300mm，每 500mm 设一护圈。当爬梯高度超过 10m 时，梯子应分段转接，在转接处加设一道休息平台。

塔尖的功能是承受臂架拉绳及平衡臂拉绳传来的上部荷载，并通过回转塔架、转台、承座等的结构部件式直接通过转台传递给塔身结构。自升塔顶有截锥柱式、前倾或后倾截锥柱式、人字架式及斜撑架式。

凡是上回转塔机均需设平衡重，其功能是支承平衡重，用以构成设计上所要求的作用方面与起重力矩方向相反的平衡力矩。除平衡重外，还常在其尾部装设起升机构。起升机构之所以同平衡重一起安放在平衡臂尾端，一则可发挥部分配重作用，二则增大绳卷筒与塔尖导轮间的距离，以利钢丝绳的排绕并避免发生乱绳现象。平衡重的用量与平衡臂的长度成反比关系，而平衡臂长度与起重臂长度之间又存在一定比例关系。平衡重的用量相当可观，轻型塔机一般至少要 3～4t，重型的要近 30t。平衡重可用铸铁或钢筋混凝土制成：前者加工费用高但迎风面积小;后者体积大迎风面大对稳定性不利，但简单经济，故一般均采用这种。通常的做法是将平衡重预制区分成 2 http://www.pohu-drive.com～3 种规格，宽度、厚度一致，但高度加以调整，以便与不同长度臂架匹配使用。

(二)、塔机的零部件

每台塔机都要用许多种起重零部件，其中数量最大，技术要求严而规格繁杂的是钢丝绳。塔机用的钢丝绳按功能不同有：起升钢丝绳，变幅钢丝绳，臂架拉绳，平衡

臂拉绳，小车牵引绳等。钢丝绳的特点是：整根的强度高，而且整根断面一样大小，强度一致，自重轻，能承受震动荷载，弹性大，能卷绕成盘，能在高速下平衡运动，并且无噪声，磨损后其外皮会产生许多毛刺，易于发现并便于及时处置。钢丝绳通常由一股股直径为 0.3～0.4mm 细钢丝搓成绳股，再由股捻成绳。塔机用的是交互捻，特点是不易松散和扭转。就绳股截面形状而言，高层建筑施工用塔机以采用多股不扭转钢丝绳最为适宜，此种钢丝绳由两层绳股组成同，两层绳股捻制方向相反，采用旋转力矩平衡的原理捻制而成，受力时自由端不发生扭转。塔机起升钢丝绳及变幅钢丝绳的安全系数一般取为 5～6,小车牵引绳和臂架拉绳的安全系数取为 3,塔机电梯升降绳安全系数不得小于 10。钢丝绳的安全系数是不可缺少的安全储备系数，绝不可凭借这种安全储备面擅自提高钢丝绳的最大允许安全荷载。由于钢丝绳的重要性，必须加强对钢丝绳的定期全面检查，贮存于干燥面封闭的、有木地板或沥青混凝土地面的仓库内，以免腐蚀，装卸时不要损坏表面，堆放时要竖立安置。对钢丝绳进行系统润滑可以提高使用寿命。

变幅小车是水平臂架塔机必备的部件。整套变幅小车由车架结构、钢丝绳、滑轮、行轮、导向轮、钢丝绳承托轮、钢丝绳防脱辊、小车牵引绳张紧器及断绳保险器等组成。对于特长水平臂架(长度在 50m 以上)，在变幅小车一侧随挂一个检修吊篮，可载维修有员往各检修点进行维修和保养。作业完后，小车驶回臂架根部，使吊篮与变幅小车脱钩，固定在臂架结构上的专设支座处。

其它的零部件还有滑轮，回转支承，吊钩和制动器等。

(三)、塔机的工作机构

塔机的工作机构有五种：起升机构、变幅机构、小车牵引机构、回转机构和大车走行机构(行走式的塔机)。

(四)、塔机的电气设备

塔机的主要电气设备包括：

• 电缆卷筒-中央集电环;

• 电动机;

• 操作电动机用的电器，如：控制器、主令控制器、接触器和继电器。

保护电器，如：自动熔断器，过电流继电器和限位开关等。

• 主副回路中的控制、切换电器，如：按钮、开关和仪表等。

属于辅助电气设备的有：照明灯、信号灯、电铃等。

(五)、塔机的液压系统

塔机液压系统中的主要元器件是液压泵、液压油缸、控制元件、油管和管接头、油箱和液压油滤清器等。

液压泵和液压马达是液压系统中最为复杂的部分，液压泵把油吸入并通过管道输送给液压缸或液压马达，从而使液压缸或马达得以进行正常运作。液压泵可以看成是液压和心脏，是液压的能量来源。我国的塔机液压顶升系统采用的液压泵大都是 CB-G 型齿轮泵，CB 不齿轮的代号， 赫格隆 G 为固定的轴向间隙，工作压力为 12。5~16MPa。

液压缸是液压系统的执行元件。从功能上来看，液压缸与液压马达同是所工作油流的压力能转变为机械能的转换装置。不同的是液压马达是用于旋转运动，而液压是用于直线运动。

一个液压顶升接高的全过程是：

• 移动平衡重，使塔身不受不平衡力矩，起重臂就位，朝向与引进轨道方位相同并加以锁定，吊运一个塔身标准节安放在摆渡小车上;

• 顶升;

• 定位销就位并锁定，提起活塞杆，在套架中形成引进空间;

• 引进标准节;

• 提起标准节，推出摆渡小车;

• 使标准节就位，安装联接螺栓;

• 微微向上顶升，拔出定位锁使过渡节与已接高的塔身联固成一体。

(六)、塔机的安全装置

安全装置是塔机必不可少的关键设备之一，可以分为：限位开关(限位器);超负荷保险器(超载断电装置);缓冲止挡装置;钢丝绳防脱装置;风速计;紧急安全开关;安全保护音响信号。

限位开关按功能有：吊钩行程限位开关，回转限位开关，小车行程限位开关，大车行程限位开关。

(七)、塔机的防倾翻规定

严禁超载运行;不得斜牵重物;不许猛然急制动;禁止在大风中运行吊运作业;工作班后，必须把夹轨器夹紧，以防大风将塔机吹动溜出轨道。

(八)、自升式塔机的附着锚固

当自升式塔机在达到其自由高度继续向上顶升接高时，为了增强其稳定系数保持起重能力，必须通过锚固附着于建筑结构上。附着层次与施工层建筑总高度、塔机和塔身结构、塔身自由高度有关。一般来说，设置 2 道锚固着墨已可满足需要。在建筑物上的附着点的选择要注意：两附着加固定点之间的距离适当;固定点应设置在丁字墙和外墙转角处;对框架结构，附着点宜布在靠近柱的根部;布置在靠近楼板处以利传力和安装。

要保证塔机的安全使用和取得比较长的使用寿命，必须对它进行润滑、故障排除、定期保养与零部件的检修。

我国塔式起重机行业的发展

50 年代初，我国**塔机**由仿制开始起步，1954 年仿制东德建筑师Ⅰ型塔机；60 年代自行设计制造了 25tm、40tm、60tm 几种机型，多以动臂式为主；70 年代，随着高层建筑的增多，对施工机械提出了新的要求，于是，160tm 附着式、45tm 内爬式、120tm 自升式等塔机相继问世；自上世纪 80 年代以来，我国塔机行业得到快速发展，尤其近几年，塔机销量持续攀高，2001 年行业统计销量 9738 台，2002 年成为世界上首个塔机年产量突破 10000 台的国家。2004 年，由于宏观调控作用以及起重机行业的结构调整，塔机的产销量有所回落，2005、2006 年，在经济高速增长的

强力拉动下，我国塔机的产销恢复高速增长，2006 年销量已超过 2 万台。

因为行业统计只统计了二三十家生产企业的销量，全行业销量肯定远远超过统计数字。勿庸置疑，我国已成为世界民用塔机的生产大国，也是世界塔机主要需求市场之一。据初步统计，目前我国取得生产许可证的塔机生产厂达 400 余家，而 80 年代还不足 100 家。

Tower Crane

Boom mounted on the upper part of the rotation of the tall tower crane. Operating a large space, mainly used for housing construction materials in the vertical and horizontal transportation and installation of building components. From the metal structure, working bodies and the electrical system consists of three parts. Metal structure including the tower moving arms and base and so on. The work of organizations including lifting,luffing, slewing and walking four parts. Electrical systems including motors, controllers, power distribution cabinets, connection lines, signals and lighting devices.

Short tower crane tower crane, also known as tower crane, originated in Western Europe. According to records, the first tower crane used in construction related to the patent granted in 1900. Emerged in 1905 with a fixed jib tower crane, and in 1923 produced the prototype of modern tower crane, in the same year the first relatively complete modern tower crane. 1930, when Germany began mass production of tower cranes, and used for building construction. In 1941, the tower crane industry standard DIN8770 published in Germany. The standard provides for crane set (t) and amplitude (m) of the product (tm) together to re-torque, said the tower crane lifting capacity.

China tower crane industry in the 20th century, 50 years started, as opposed to the Western European countries due to weakness in the construction industry caused by the tower crane industry in recession, Shanghai Poch Drive System Co., Ltd. tower crane industry in China is in a rapid period of development .

From the tower crane in terms of technological development, while an endless stream of new products, new products in the production efficiency, easy operation, and maintenance easier and more reliable operation in the increase in the tower crane, but there is no fundamental change in the technology. The tower crane research is towards modular development. The so-called modular, that is, to the tower structure as the core, according to structural and functional characteristics of the shaft broken down into several parts, and on the basis of seriation and general requirements, follow the modulus of the various parts of the system theory and then divided into a number of modules. According to parameters required, choose the appropriate modules were grouped with different performance characteristics of the tower crane technology to meet the specific needs of the construction. The implementation of modular tower crane tower crane production capacity will help to speed up the development progress of Lu, save product development costs, and better for customer service.

Slewing tower crane be divided into upper and lower rotary tower crane tower crane two broad categories. In which the carrying capacity of the former than the latter, in many we have seen the construction site is on a rotary festival add up on top of a high tower crane access. According to whether the move is further divided into: walking a line, and fixed. Fixed the fixed tower crane tower do not switch installed in the concrete block foundation, or installed in the form of X-shaped concrete foundation. In the housing construction generally use a fixed style.

Device characteristics and safety devices

Tower crane boom and struts form of sub-horizontal type two kinds. For the horizontal boom, the load car runs along the level luffing boom, luffing movement balance, its long boom, but the greater weight boom. Boom for the strut-type when the tractor boom luffing mechanism Pitch amplitude, amplitude motion than horizontal steady, but its relatively small weight.

In order to ensure the safety of tower crane has a good safety device, such as starting weight, range, height and load torque constraints such devices, as well as the travel limit switches, tower lights, wind instrument, wind clip-rail device, Ladders and athletic supporter circle, walkways and railings. Driver's cab demand for comfort, easy operation, good vision and good communications equipment.

Production points of the inspection of tower cranes

1) Check the structural condition of metal, especially high-strength bolts, which connect the surface to be cleared of dust, paint, no trace, and rust, and the use of hand or special torque wrench, according to assembly requirements tightened.

2) Check the transmission of various agencies, including the work of transmission suitability of the bearing clearance, the gear mesh is not good and the brake is sensitive.

3) Check the wear of steel wire rope and pulleys, fixed is reliable.

4) Check the electrical components are good contact points of the closure were the extent of follow-correct and reliable.

5) Check whether the running wheel and rail access to good, clip-rail clamp is reliable. The installation of attachment devices, within the climbing device, the connecting bolts and the clip block is solid and reliable.

Used tower crane

The following specific description in several aspects of the tower crane used room Jianzhong.

(A), the tower crane metal structure

The metal structure is composed of tower crane boom, tower, turret, bearings, balance arm, chassis, composed of apex.

Construction boom level luffing jib type of car, and then have a single hanging point down the minutes, double-hanging point and the lifting arm and balance arm fused hammerhead-type level luffing jib car. Single hanging point is statically determinate structure, twin-lift point is statically indeterminate structure. Hammerhead-type trolley level luffing jib installed at the tower top Zhuangruo hammer, shaft, such as hammer handle, no spire, it is also known as flat head style. Flat-style of making structure simpler and more conducive to the force, to reduce weight and simplify construction and so on. Most used car luffing jib equilateral triangle cross-section.

Tower structure, also known as the tower is the main body of the tower crane structure. Now adopt a square cross-section of tower crane, application of a broader cross-section dimensions are: 1.2m × 1.2m, 1.4m × 1.4m, 1.6m × 1.6m, 2.0m × 2.0m; tower section used the standard size is 2.5m and the 3m. Tower sections used in the standard connection method is to cover the most widely used set of stud bolt connection and connection, followed by the pin connection and flashboard pin socket connection. Standards Section has the overall standards of style tower-type tower sections and assembled the standard sections, the latter high precision machining, production difficult, but the stacking area is small, less freight. Ladder

tower section must be set so that driver and mechanic from top to bottom. Ladder width of not less than 500mm, ladder step spacing of not more than 300mm, set up a guard ring for each 500mm. When the ladder height of more than 10m, the ladder should be sub-switching, the switching office to install a closed platform.

Spire function is to bear arm and balance arm Cord Cord coming from the upper load, and through rotating tower, turret, bearings and other structural components-style passing directly through the turret to the tower structure. Since l have truncated conical tower column, forward or backward truncated cone column, Renzi Jia style and bracing Shelf.

Any slewing tower cranes are required to set up a balance weight, its function is to balance the weight bearing, which constitute the design required by the role of torque in the opposite direction and lifting the balance of torque. In addition to balance the weight, but also often installed in its rear lifting mechanism. Lifting bodies are placed, together with the balance weight arm in balancing the tail end of a re-allocation of the Department can play a role, two rope reel and the spire increase the distance between the guide wheel to facilitate the rope around and avoid the occurrence of emission the phenomenon of chaos rope. Balance the weight and balance amount is inversely proportional to the relationship between the length of the arm, while the balance of arm length and boom there is a certain percentage of the length of the relationship in between. Balance the considerable amount of heavy, light tower crane usually at least 3 ~ 4t, heavy to almost 30t. Balance weight can be made of cast iron or reinforced concrete: the high cost of the former process, but the small size wind; the latter were large in size to the stability of the windward big negative, but the simple economy, it is generally use this. The usual practice is to balance the emphasis on pre-divided into 2 http://www.pohu-drive.com ~ 3 kinds of specifications, width, thickness of the same, but the height should be adjusted to match the use of different arm lengths.

(B), the tower crane spare parts

Each tower crane must be used in many kinds of lifting parts, of which the largest number of technical requirements are strict and complicated rope specifications. Tower crane wire rope used in accordance with different functions are: lifting wire rope, rope luffing, jib ropes, balance the arm ropes, trolleys and other traction rope. Steel wire rope is characterized by: the entire root, high strength, but also the whole root sections, the size of the same intensity, light weight, able to withstand shock loads, flexible enough to winding into a disk, can be balanced at high speed movement, and no noise, wear and tear After the skin will produce a number of glitches, easy to detect and facilitate the timely disposal. Steel wire rope is usually a Unit diameter 0.3 ~ 0.4mm thin twisted wire strand, and then twisted into rope by the Unit. Tower crane is used in interactive twist, is characterized by loose and difficult to reverse. On the strand cross-sectional shapes, the high-rise building construction with the tower crane to adopt the multi-strand rope is not reversed, the most appropriate, such a wire rope consists of two layers composed of the same strand, two strand twisting in the opposite direction, using the principle of rotating torque balance twist crafted by force does not occur when the free end of the reverse. Hoisting Tower Crane luffing rope and wire rope safety factor usually taken to be 5 ~ 6, car towing rope, and boom Cord of the safety factor of 3, tower crane lifts Lifting Sheng An all-coefficient of not less than 10. Steel wire rope safety factor is indispensable for security reserve factor, by virtue of this security must not be arbitrarily raised the rope reserves face the maximum allowable safe load. Because of the importance of steel wire rope, we must

strengthen the comprehensive inspection of wire rope on a regular basis, stored in dry closed surface, there are wooden floors or asphalt concrete warehouse floor to prevent corrosion, loading and unloading not to damage the surface of the pile when placed erect. Systematic lubrication of the rope can increase the service life.

Luffing jib tower crane trolley is the level of essential parts. Change car set by the frame structure, steel wire rope, pulleys, line wheels, guide wheels, steel wire rope supporting the wheel, steel wire rope anti-roll off, car towing rope tensioning device and the broken rope composed of insurance, etc.. For the talent level of boom (more than 50m in length) in amplitude with the car at the side of an overhaul hanging baskets may contain members of the maintenance and repair of all maintenance points to the repair and maintenance. Job finished, the roots boom car driven across the border to make baskets with luffing car separated from the structure fixed to the boom supports the dedicated office.

Other parts are wheels, slewing ring, hook and brakes and so on.

(C), the tower crane working body

The tower crane working body there are five: hoisting mechanism, varying from agencies, car towing agencies, institutions and carts Traveling rotary body (walking style tower crane).

(D), the tower crane electrical equipment

The main tower crane electrical equipment including:

* Cable Reels - Central collector ring;

* Motor;

* Operation of electrical motors, such as: controller, master controller, contactors and relays.

Protection of electrical appliances, such as: automatic fuses, overcurrent relays and limit switches.

* Vice-loop in the main control switch electrical appliances, such as: buttons, switches and meters.

There are auxiliary electrical equipment: lights, lights, bells and so on.

(5), tower crane's hydraulic system

Tower crane hydraulic system's main components are hydraulic pumps, hydraulic cylinders, control components, tubing and fittings, fuel tank and hydraulic oil filters and so on.

Hydraulic pump and hydraulic motor is a hydraulic system of the most complex part of the oil suction pump through the pipeline to the hydraulic cylinders or hydraulic motors, hydraulic cylinder or motor so that normal operation can be carried out. Hydraulic and hydraulic pump can be seen as the heart, is the hydraulic energy source. Our tower crane hydraulic jacking system, hydraulic pumps are mostly used in CB-G-type gear pump, CB does not gear code, Hagglunds G for a fixed axial gap, the working pressure of 12. 5 ~ 16MPa.

Hydraulic cylinder is a hydraulic system of the implementation of the components. From the functional point of view, hydraulic cylinders and hydraulic motors of the same pressure of working oil flow can be transformed into mechanical energy conversion device. The difference is that hydraulic motor is used for rotary movement, while the hydraulic pressure is used for linear motion.

Then a high hydraulic jacking the whole process is:

* Mobile balance weight, so that the tower is not unbalanced moment, lifting arm in place, towards the same direction with the introduction of the track and be locked, lifting a standard tower section placed in a small car ferry;

* Jacking;
* Pin in place and locked, when you mention piston rod, in the set of planes in the formation of the introduction of space;
* The introduction of standard knots;
* Standard section brought the introduction of car ferry;
• the standard section in place, install the bolts;
* Slightly upward jacking, pull out the lock position to make the transition Festival and has received high tower together into one solid.

(6), tower crane safety devices

Safety device is essential for the tower crane, one of the key equipment, can be divided into: limit switch (stopper); overload Insurance devices (overload power plant); buffer only block devices; steel wire rope anti-off device; anemometer ; emergency safety switch; security audio signal.

Limit switches according to the functions are: hook travel limit switch, rotary limit switches, trolley travel limit switch, carts travel limit switch.

(G), the provisions of the tower crane anti-tipping

Non-overloading operation; not oblique pull heavy loads; not allowed to suddenly emergency braking; prohibit running wind lifting operations; working class, must be clip-rail clamping device to prevent the wind blowing the tower crane slipped out of orbit.

(8), since the l-type tower crane attachment anchor

When the self-climbing tower crane in achieving a high degree of their freedom to continue to pick up high-jacking, in order to enhance its stability factor to keep lifting capacity, they must anchor attached to the building structure. Attachment level, the total construction and construction-layer height, tower crane and tower structures, freedom tower height. In general, set the two anchor dwell already meet their needs. Attachment points on the building options to note: two fixed-point distance between the reinforcement attachment appropriate; fixed point should be set at the T-walls and wall corners; right frame structure, attachment points for appropriate column in close proximity to the roots of cloth; arranged near the floor for the benefit and installation of power transmission.

To ensure the safe use of tower crane and access to a long life, it must be lubricated, troubleshooting, regular maintenance and repair parts.

The tower crane industry in the development of

The early 50s, my tower crane from the imitation started, in 1954 East German architects generic type Ⅰ tower crane; 60 years designed and manufactured 25tm, 40tm, 60tm several models, and many more moving the main arm; 70 years With the increase in high-rise buildings, the construction machinery made new demands, so, 160tm attachment style, 45tm in climbing, 120tm jack-up tower crane have been brought forth and so on; 80 years since the last century, since the tower crane industry in China to be rapid development, especially in recent years, the tower crane sales continued to climb in 2001, industry statistics sales of 9738 units in 2002 to become the world's first tower crane annual output of 10,000 units a breakthrough state. In 2004, due to the role of macroeconomic regulation and control as well as the crane industry, the restructuring of production and sales of tower crane has dropped slightly, 2005,2006, in the strong economic growth driven by China's resumption of the tower crane production and sales growth in 2006, sales have been more than 20,000 units.

Because the industry statistics which only a couple dozen manufacturers sales, certainly far more than industry-wide sales figures. Needless to say, China has become the world's civilian power production of the tower crane, tower crane is the world's major demand markets. According to preliminary statistics, China to obtain production licenses tower crane production plant more than 400, but 80 years less than 100.