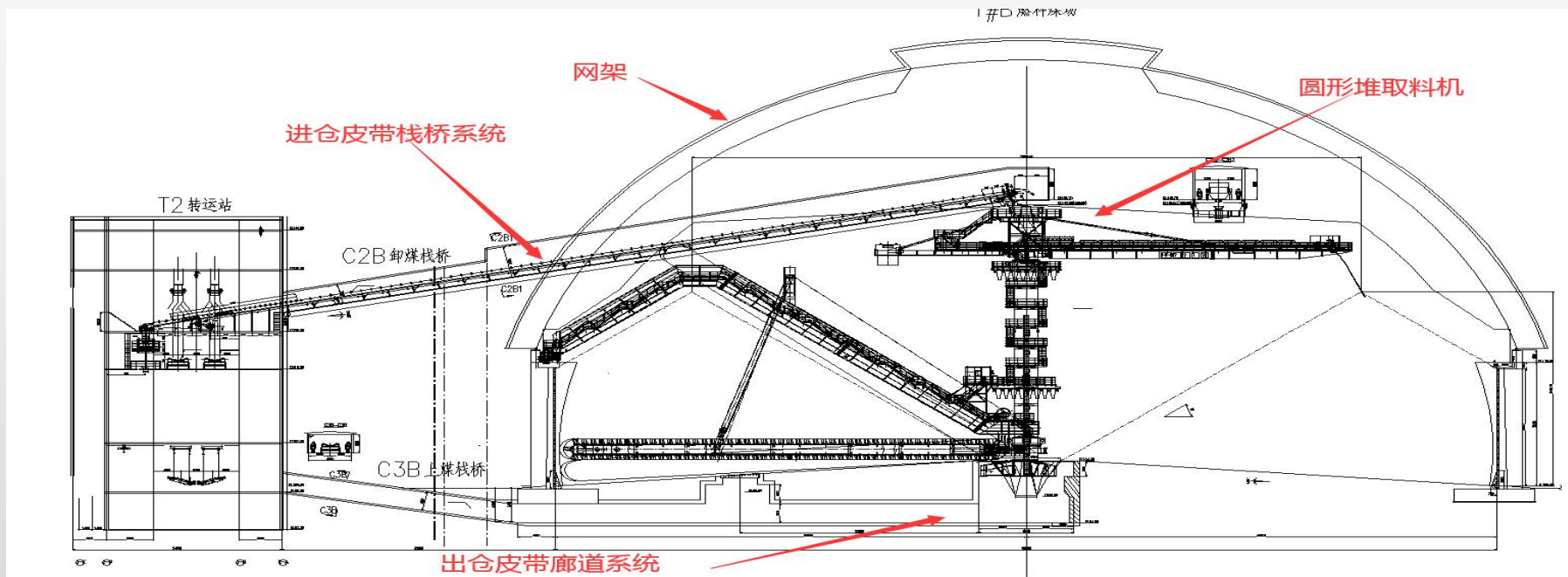


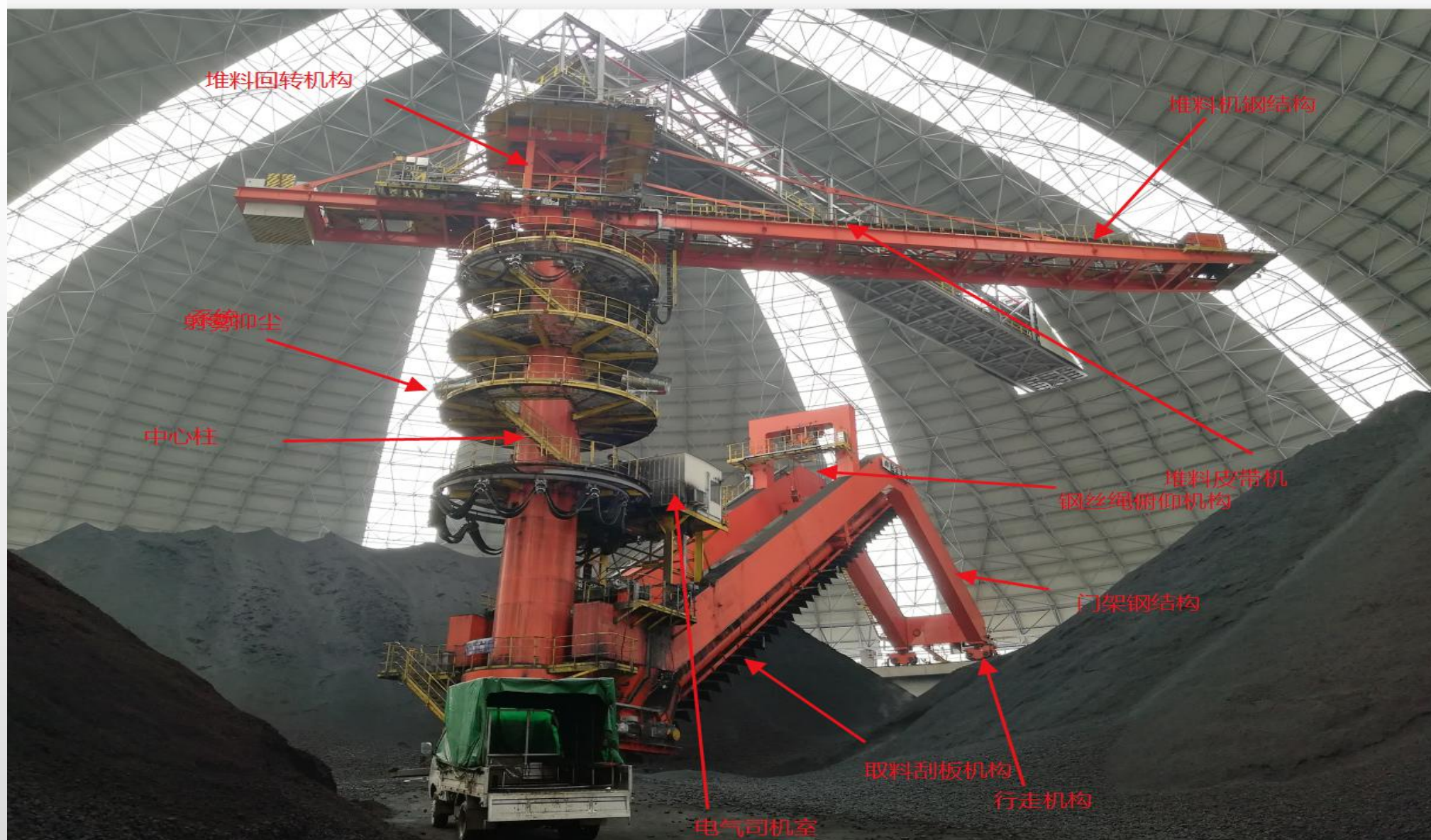
Introduction of circular stacker and reclaimer

一、Summary

Circular gantry scraper stacker and reclaimer is mainly used in building materials, coal, metallurgy, electric power, port and other industries, and is mostly used to stack limestone or coal and other bulk materials. The cantilever of the stacker is equipped with a belt conveyor, which passes through the steel structure grid roof of the circular stockyard from the belt conveyor on the trestle, and the input materials complete the ring conical stacking through the belt conveyor on the cantilever of the stacker; The reclaimer completes the reclaiming work via three linkage processes: traveling system, luffing system and scraper system. The scraper reclaimer scrapes the materials into the conical hopper under the central column along the slope of the pile, and outputs the materials through the vibrating feeder and underground belt conveyor.

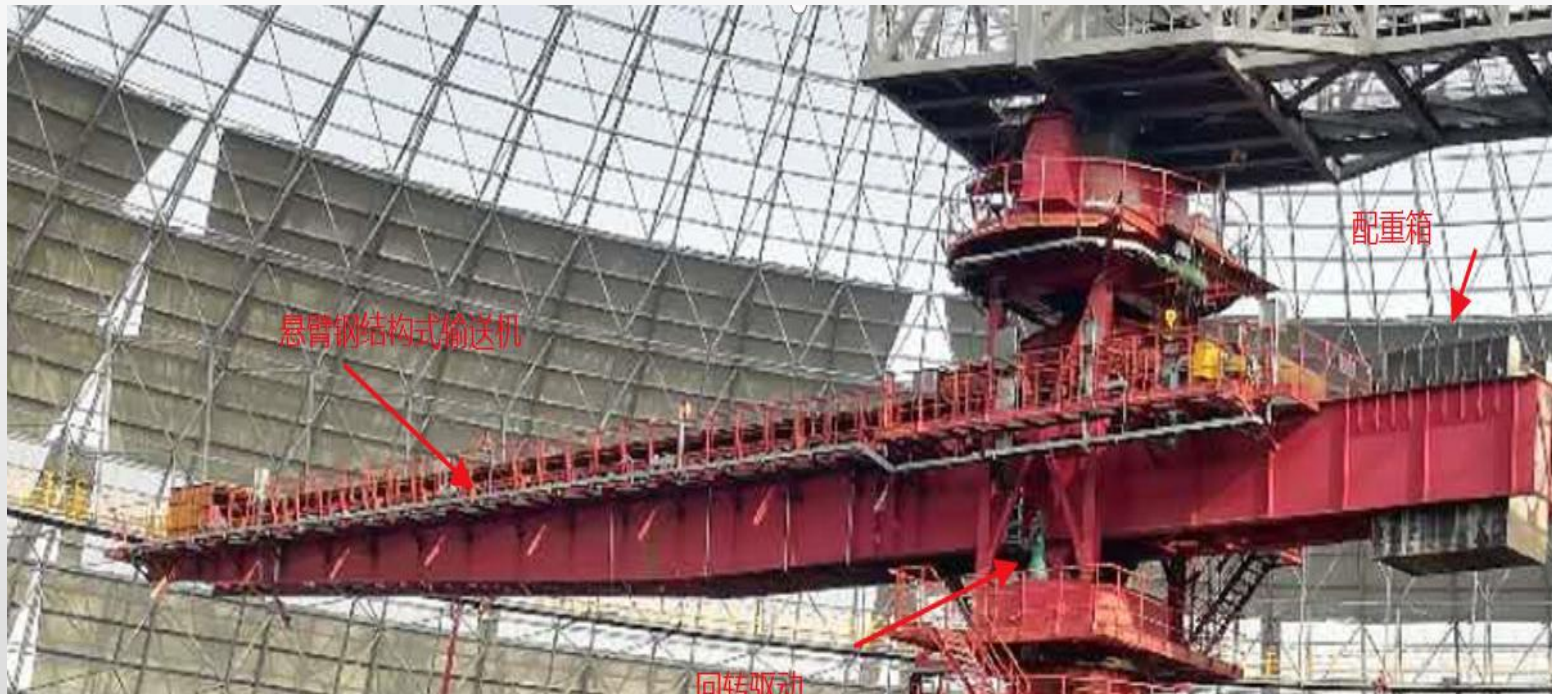


二、 Main components of circular stacker and reclaimer



1. Stacking steel structure, cantilever belt conveyor

The cantilever stacker takes the central column as the center, one end is the belt conveyor with cantilever steel structure, and the other end is the counterweight box. The middle stacking slewing part is connected with the central column by slewing bearing, and the stacker can rotate by meshing the pinion on the slewing driver with the gear on the central column. The materials entering the circular stockyard are unloaded at the head of the cantilever belt conveyor and directly stacked to the stockyard. The stacker rotates at a certain angle for slope stacking until it is stacked into an annular pile.



There are two main structural types of cantilever stacker, cantilever fixed type and cantilever luffing type.
Comparison of the two types of stacker :

- ① The advantages of the fixed stacker are simple structure and low cost. The disadvantage is that when the lower part of the stacker is not stacked or the material pile is low, the difference is huge, and the dust in the stockyard is more serious (even with spray system).
- ② The luffing stacker using the hydraulic cylinder to raise or lower the cantilever . Its advantage is cantilever can raise up and down according to the stacking height to reduce the material drop and avoid dust flying. As well, it can reduce the height of the central column and reduce the cost. The disadvantage is that the structure is more complex.

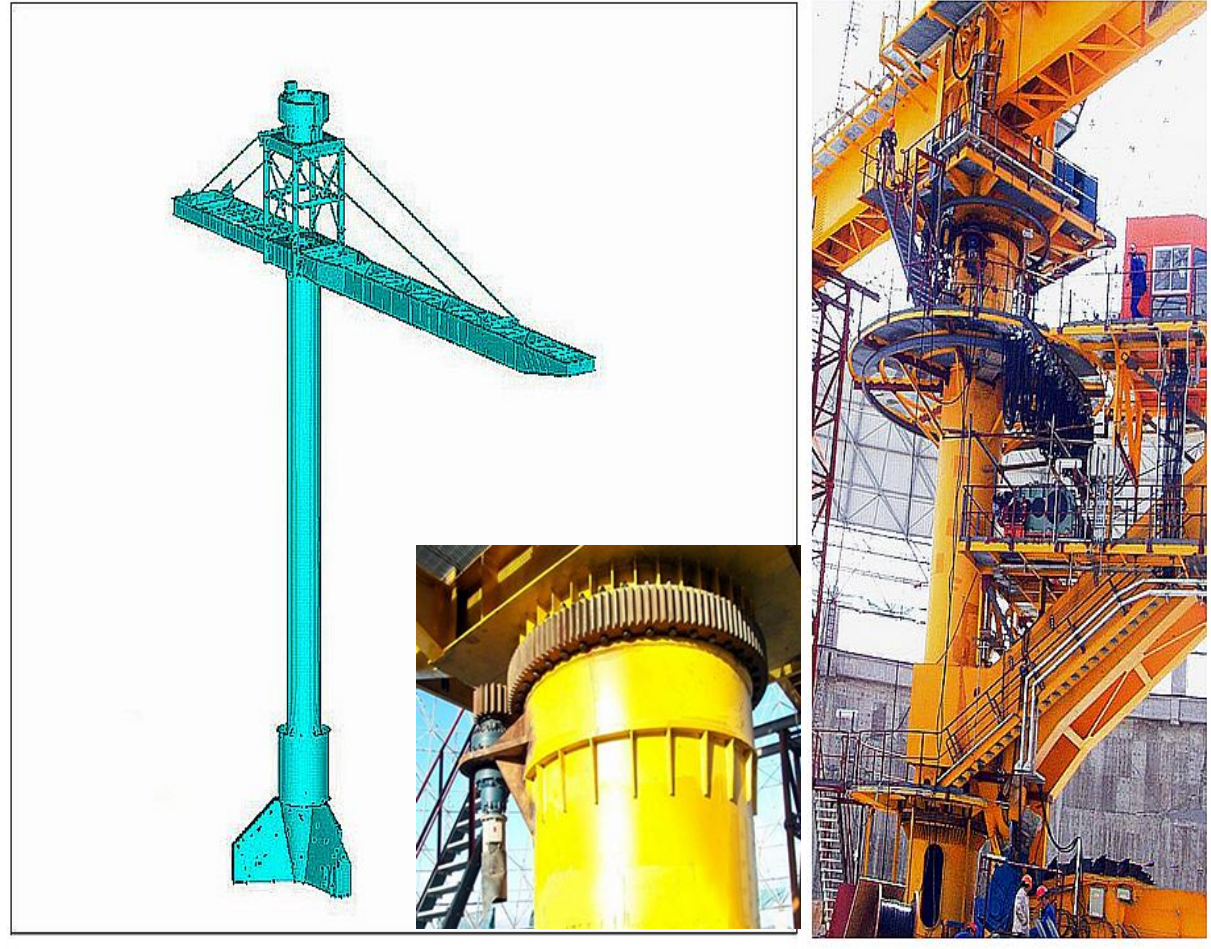


2. King column and slewing mechanism of circular stacker and reclaimer

(1) The king column of the stacker reclaimer is located in the center of the circular stockyard. It is an important component of the stacker reclaimer. It not only bears the load of the main components and the input trestle, but also is the installation center of the components. Therefore, its manufacturing and installation process requirements are very high. It is made of steel plate rolled into a cylindrical shape and welded and assembled. The utility model is provided with a stacking steel structure, a rolling bearing for the stacking rotary part and a cable drag connecting various equipment components

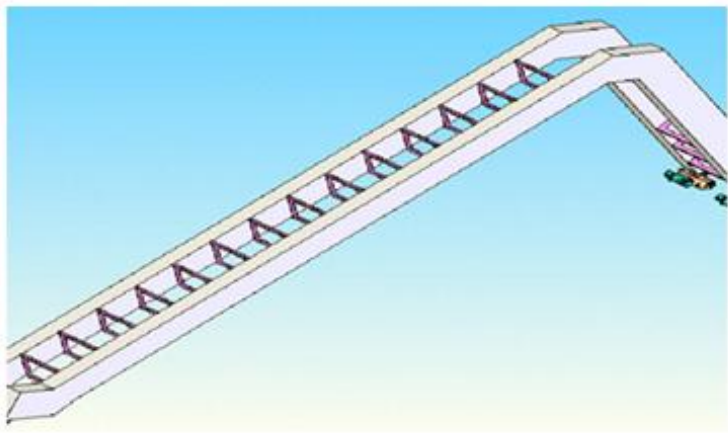
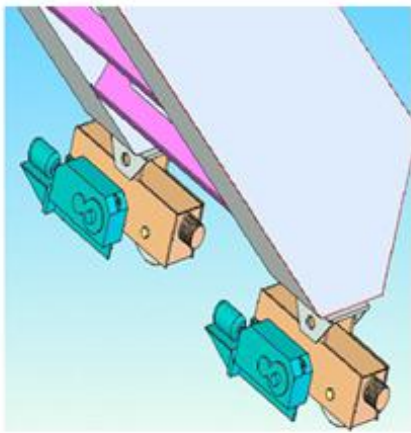
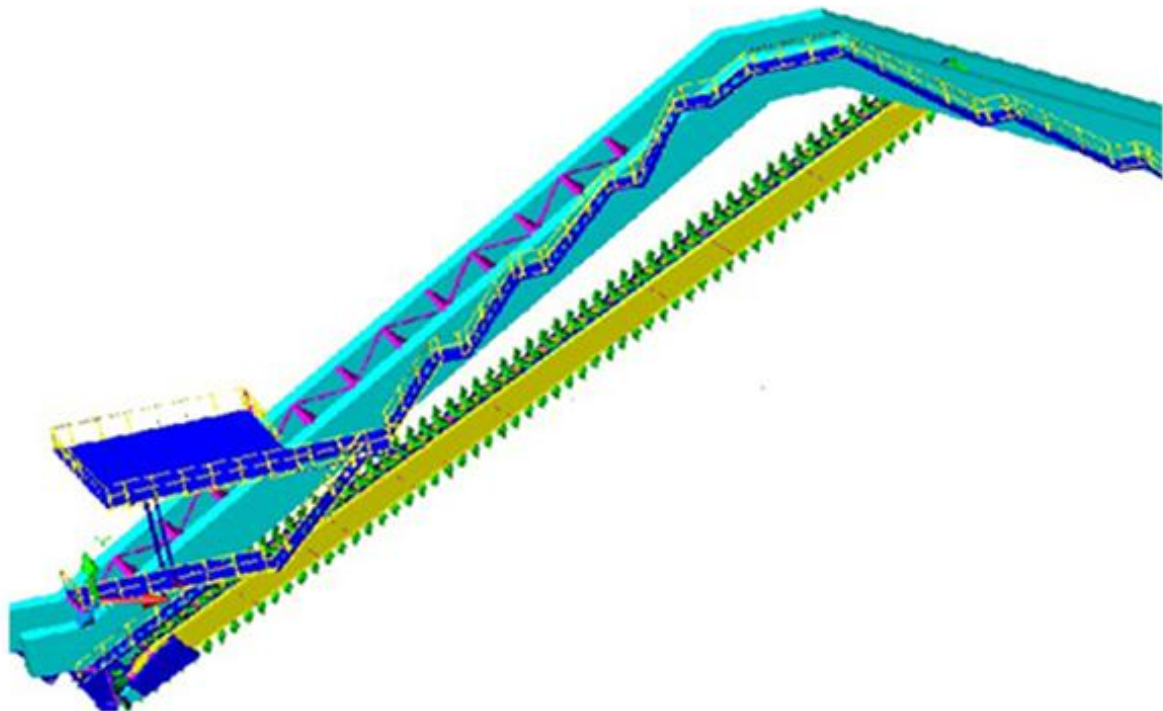
(2) The top of the king column is the stacking rotary part, the upper part of which is connected with the belt conveyor trestle entering the circular stockyard through the rotary bearing and serves as a support point for the trestle load, and the lower part is connected with the middle column through the rotary bearing.

(3) In order to enable the slewing bearing device to bear large vertical force, horizontal force and overturning moment, the slewing bearing support type is adopted. The rotary bearing is protected by a dust cover. Its structure can adapt to the harsh



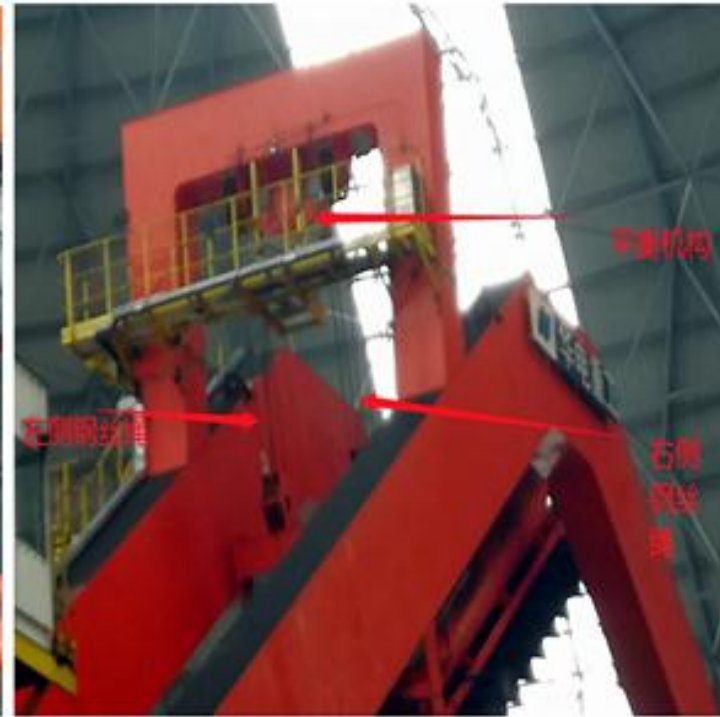
3.Gantry stacker

- The gantry scraper reclaimer is mainly composed of gantry, traveling mechanism, reclaiming luffing mechanism and scraper reclaimer. The gantry is the main component of the rotation, luffing and load support of the scraper reclaimer. The scraper reclaimer is set under the gantry. The luffing mechanism adopts mechanical winch type, and one end of the gantry is connected with the central column by roller bearing, The other end is supported on the circular track on the upper part of the stockyard retaining wall, and the rotation of the reclaimer is driven by the traveling wheel on the circular track. The gantry reclaimer has a robust structure, and most of the weight of the gantry is borne by the retaining wall, which significantly improves the stress state of the central column and makes the operation more reliable .
- The traveling mechanism is composed of driving wheel group, traveling electrical detection and control system and lubrication system. Considering the requirements of two-way movement of the swing gantry under the most unfavorable conditions, two traveling wheels are used as the driving wheels. The wheel set is mechanically driven by variable frequency speed regulation. Stepless speed regulation of working travel speed and non working travel speed (in order to ensure the normal and safe operation of circular stacker reclaimer, set slow and fast speeds respectively according to the on-site operation conditions, i.e. working travel speed and non working travel speed). In order to ensure that the stress of the gantry is reasonable and the wheel pressure of each wheel group under the gantry is the same, the gantry is hinged with the two wheel groups, and each hinge point adopts through shaft type. In addition, the joint bearing is used at the connection between the gantry and the walking structure to ensure that the gantry can automatically adapt to the change of track. The lubrication of each supporting bearing and hinge shaft of the traveling mechanism adopts grease centralized lubrication.



4.Reclaimer luffing mechanism:

- (1) The luffing mechanism is composed of driving device, drum assembly, double steel wire rope and pitching electrical detection and control system. The luffing operation of scraper reclaimer is completed through the pitching mechanism, so as to achieve the purpose of layered reclaiming.
- (2) The luffing mechanism using double steel wire rope single winding, and the balance mechanism is adopted at the intersection of the two steel wire ropes to ensure that the stress of the left and right steel wire ropes is balanced and the work is safer.
- (3) The driving device of the luffing mechanism is mechanically driven by frequency conversion and speed regulation to accurately control the amplitude variation, so as to control the change of the reclaiming amount. In order to ensure the safety and accurate and reliable positioning of the pitching mechanism, the driving device adopts double braking system



5. Scraper reclaimer

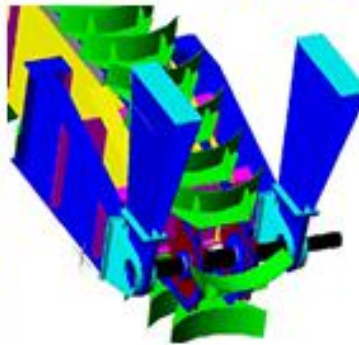
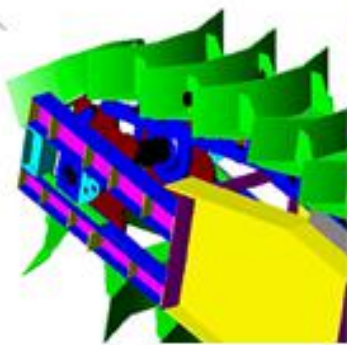
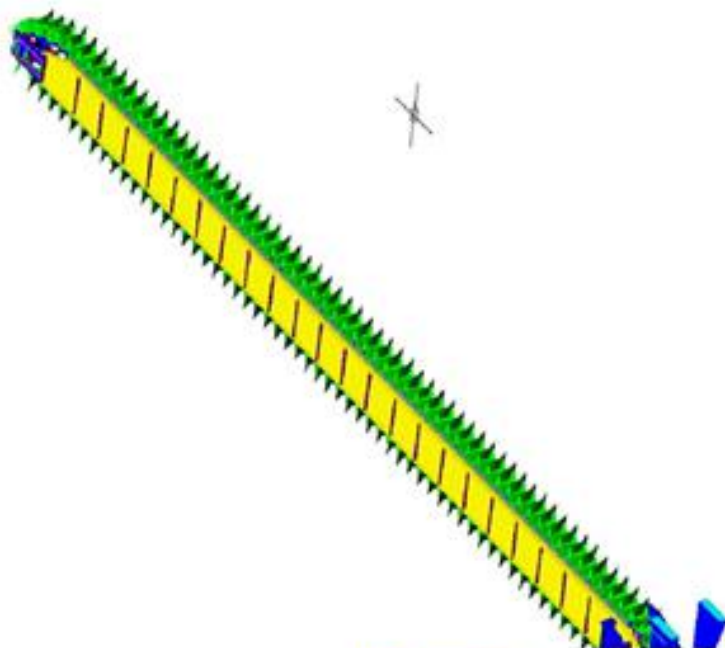
(1) The scraper reclaimer adopts a sprocket to drive the roller chain, and then the roller chain drives the scraper to reclaim. This method has large traction, small linear resistance and durability. It is a reclaiming method integrating reclaiming and transportation.

(2) The scraper is fixed on the double chain mechanism, and the sprocket is driven by the motor at the rear for circular movement. The scraper scrapes the materials at the lower part of the stacker into the conical hopper at the lower part of the king column.

(3) The scraper adopts the folded plate structure with forward inclination on both sides, which is welded by steel plate and has sufficient strength and stiffness. There are scraping teeth on both sides of the scraper. This structure can cut the material laterally most effectively, and the scraper does not stick to the material and has no return. The scraper body and roller chain are connected by high-strength bolts, which is convenient for maintenance and disassembly. The chain can be divided into built-in chain and external chain according to the placement position of the roller. Compared with the built-in chain, the external chain has the advantages of low noise and maintenance free

(4) The scraper driving device is composed of motor, reducer, hydraulic coupling, etc. The driving device is impact resistant and convenient for maintenance. The driving device is equipped with electrical double safety and overload protection, and is equipped with good shock absorption device.

(5) The tensioning device of the scraper reclaimer is set at the head sprocket. The tensioning device is hydraulic tensioning, with constant tension and easy operation and adjustment.

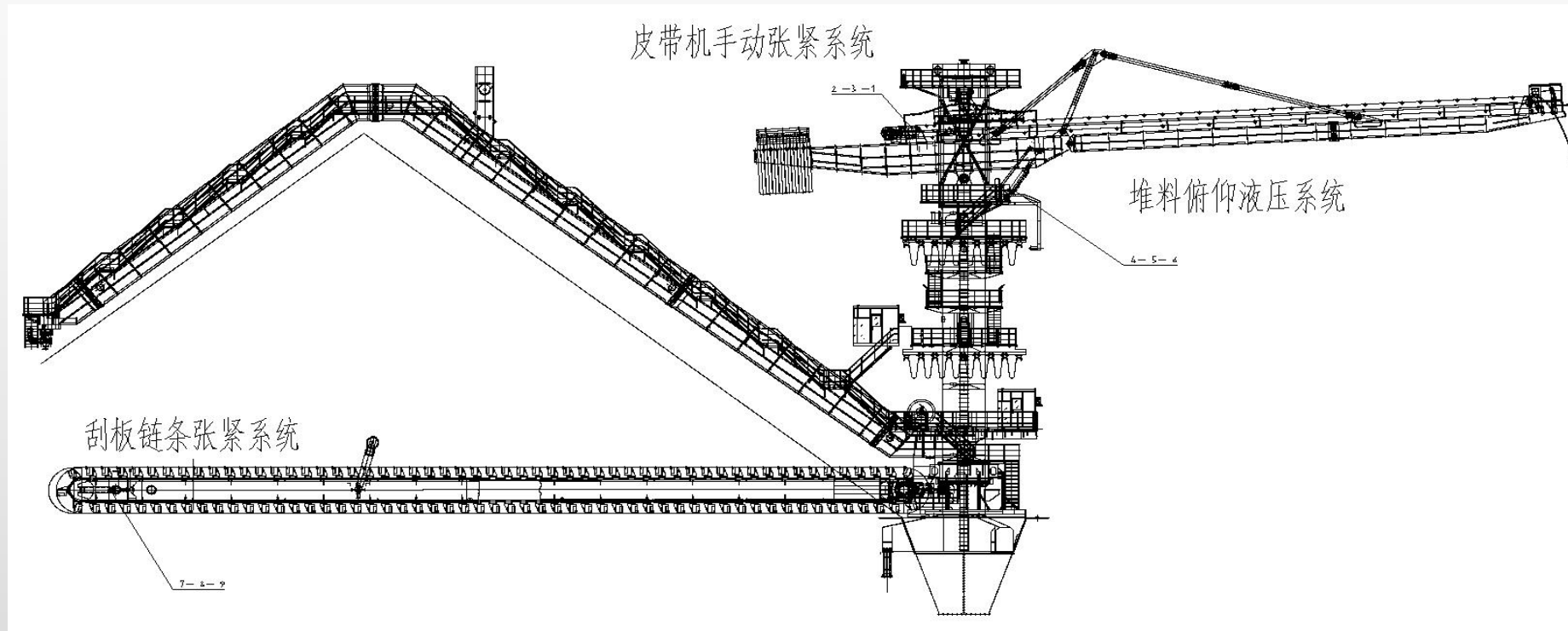


6. Hydraulic system

The hydraulic system of stacker reclaimer mainly includes stacker luffing hydraulic system, scraper chain tensioning hydraulic system and belt conveyor manual tensioning hydraulic system

The luffing control hydraulic system is composed of main pump motor unit, control valve unit, oil cylinder, oil tank assembly, hydraulic accessories and hydraulic pipelines. The pipeline of the luffing cylinder is equipped with a pipeline rupture safety valve and a safety valve group.

The tensioning cylinder control hydraulic system is composed of pump motor group, control valve group, accumulator, oil cylinder, oil tank assembly, hydraulic accessories and hydraulic pipelines. The tension of the tensioning cylinder can be adjusted by the corresponding pressure reducing valve.



7. Lubrication system

The centralized lubrication system of stacker reclaimer is composed of stacker mechanism, reclaimer mechanism, scraper conveying sprocket mechanism (built-in chain) and open gear mechanism.

① Lubricating points of the stacking mechanism: upper and lower slewing large bearings, oil cylinder hinge points, stacking arm hinge points and drum bearings. Lubrication method: automatic double line / progressive hybrid centralized lubrication system, with PLC control.

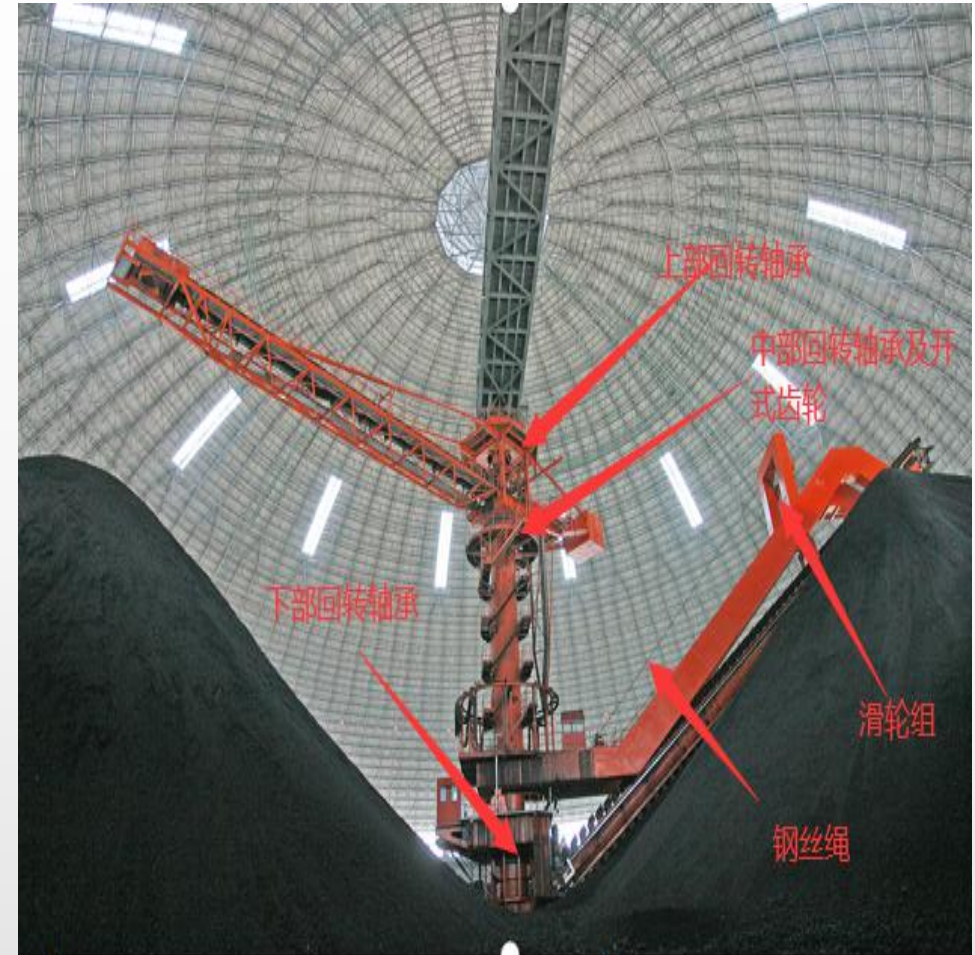
② Lubrication points of reclaiming mechanism: lower rotary large bearing, luffing pulley block of reclaiming arm, traveling mechanism, etc.

Lubrication method: automatic double line / progressive hybrid centralized lubrication system, with PLC control.

③ The oil dropping lubrication system of scraper conveying sprocket consists of oil tank, liquid level switch, electromagnetic switch, oil dropping regulating valve and pipeline accessories, which mainly realizes the oil lubrication of scraper conveying chain on both sides.

Lubrication method: automatic oil dripping lubrication, adjustable oil dripping amount, and PLC control

④ Rotary open gear lubrication mode: automatic oil dripping lubrication, and the lubrication amount is controlled by PLC.



8. Water spray dust controlled system

The water spray dust controlled system on the stacker reclaimer is composed of booster pump, pipeline, filter, manual valve, electric valve, check valve, automatic drain valve, pressure gauge, flowmeter, water level gauge and spray nozzle group.

The position and function of nozzle group are as follows:

- 1) Around the outside of the lower hopper at the head of the arm stacking belt conveyor, the nozzle group sprays water to form an umbrella water curtain to control the dust generated by stacking in the spray.
- 2) The material receiving of the cantilever stacking belt conveyor is enclosed in the guide chute. Spray water on the nozzle group to control the dust in the closed guide chute.
- 3) Auxiliary spray system: it is mainly composed of two remote sprayers, which are installed at the central column of the stacker reclaimer. The head of the auxiliary stacker arm can effectively suppress the dust in the stockyard.

