

BOX-TYPE PREFABRICATED COMPONENT SYSTEM AND OPERATION METHOD

TECHNICAL FIELD

The present invention relates to the field of construction, and particularly relates to a box-type prefabricated component system and operation method.

BACKGROUND ART

PPVC technology, with the official full name of "Prefabricated Prefinished Volumetric Construction", also known as "ox-type prefabricated assembly system" (or "prefabricated prefinished box-type building" or "3D modular building"), which involves a building that the entire room is processed in a prefabricated factory, in which the structure and decoration (including floors, walls, ceilings and the like) are completed and form independent modules, and these modular components are then transported to the construction site and assembled together, just like building blocks. It is a high-end product of building industrialization and is of high integrity itself.

The technology can improve the efficiency of construction by up to 50%, greatly cut down the labor cost and reduce the number of workers. Moreover, it can greatly reduce the environmental pollution. Because the main battlefield of production is transferred from the project to the factory, the noise and dust pollution faced during the construction process will also be greatly reduced.

At present, the technology generally uses the steel formwork for factory processing. PPVC structured are generally poured for three times, namely, the bottom slabs are poured the first time, the walls are poured the second time, and the roofs are poured the third time. The steel formwork system consists of bottom formwork, wall formwork and top formwork. The wall formwork is divided into internal-wall formwork and external-wall formwork. When resetting and demolding, manual demolding or manual adjustment of hydraulic mechanism is mostly used, which requires repeated adjustments and wastes time and labor cost. Moreover, it needs three times of casting for molding, resulting in a long waiting time.

SUMMARY

The present invention provides a box-type prefabricated component system and operation method to solve the problems of great manpower input, high labor intensity but low comprehensive work efficiency caused by the existing modular building using the steel formwork system.

In order to solve the above technical problem, the present disclosure provides the following technical solution:

a box-type prefabricated component system, including an inner formwork frame system, an outer formwork frame system, and an end formwork, where the inner formwork frame system, the outer formwork frame system, and the end formwork are enclosed to form a forming cavity, the forming cavity is used for concrete forming and solidification, one side of the outer formwork frame system is provided with a walking system extending away from the direction of the end formwork, and the inner formwork frame system is arranged on a walking system and moves to and from the outer formwork frame system through the walking system.

Preferably, the outer formwork frame system includes side steel external-wall members, steel bottom-wall members and steel rear-wall members, where the steel bottom-wall members are arranged on the pedestal, the side steel external-wall members are opposite sides of the steel bottom-wall members, the steel rear-wall members are arranged on one side of the steel bottom-wall members, and the other side is connected to the end formwork, a plurality of external formwork opposite-tie rod are arranged between the two side steel external-wall members, and the side steel external-wall members, the steel bottom-wall members, the steel rear-wall members and the end formwork are enclosed to form a slot for accommodating the inner formwork frame system.

Preferably, the side steel external-wall members include a plurality of H-shaped steels, connecting frame, diagonal connecting frames and side external-wall formwork, where the two sides of the H-shaped steel are welded to the connecting frame, the H-shaped steel is arranged side by side through the connecting frame, a diagonal connecting frame is arranged between the two connecting frames, a plurality of back ridges are arranged between the H-shaped steel and the side external-wall formwork, a side external-wall guide frame is hingedly arranged at both ends of the connecting frame, a first side external-wall tie rod is arranged between the side external-wall guide frame and the side external-wall formwork, a pedestal is provided with a side outer track that slides relative to the side external-wall guide frame, one side of the side outer track is provided with a second side external-wall tie rod that drags the movement of the side steel external-wall members, and a walkway plate and a guardrail are provided at the upper end of the H-shaped steels.

Preferably, the steel rear-wall member includes a rear-side track and a right-angle steel frame sliding on the rear-side track, the rear-side track is arranged on the pedestal, the right-angle steel frame is provided with an outer rear-wall formwork, a plurality of back ridges are arranged between the outer rear-wall formwork and the right-angle steel frame, the right-angle steel frame is connected to the steel bottom-wall member through a right-angle tie rod, a rear-wall tie rod that drags the movement of the right-angle steel frame is arranged between the pedestal and the outer rear-wall formwork, and a guardrail is arranged at the top of the right-angle steel frame.

Preferably, the steel bottom-wall member includes a bottom-wall formwork arranged on the pedestal, a longitudinal beam frame is arranged between the bottom-wall formwork and the pedestal, the two sides of the longitudinal beam frame are provided with a limiting tie rod capable of holding the movement of the H-shaped steel, and one end of the longitudinal beam frame is provided with a bottom diagonal tie rod linked to the right-angle tie rod.

Preferably, the inner formwork frame system includes at least 2 longitudinal trusses, a plurality of portal frames, an internal formwork assembly and a supporting assembly, where the longitudinal trusses are connected to the walking system through supporting legs, an electric screw rod that drives the longitudinal trusses to move upwards and downwards is arranged between the longitudinal trusses and the supporting legs, and the portal frames are evenly arranged on the longitudinal trusses; the internal formwork assembly includes a wall side formwork, an inner rear-wall formwork, a top formwork and a corner formwork assembly, where the supporting assembly includes an adjustable shoring and an inner supporting rod, the wall side formwork is arranged at both sides of the longitudinal truss through an adjustable shoring and an inner supporting rod, one side of the wall side formwork is pivotally connected to a flap, and a flap tie rod for realizing the rotation of the flap is arranged between the flap and the wall side formwork, the top formwork is arranged at the upper end of the portal frame, and the inner rear-wall formwork is arranged on the portal frame through the adjustable shoring and the inner supporting rod.

Preferably, the corner formwork assembly includes a wall corner formwork, a beam side formwork, a beam corner formwork, a balcony formwork and a beam bottom formwork, where the wall corner formwork is arranged between wall side formwork and the inner rear-wall formwork, the beam side formwork is arranged between the top plate

and the wall side formwork, the beam corner formwork is arranged on both sides of the beam side formwork, the balcony formwork is arranged on the upper end of the portal frame, and the beam bottom formwork is arranged between the balcony formwork and the beam side formwork.

Preferably, the walking system includes guide rails, guide rail supports, embedded sleeves and bottom beams, where the guide rail supports are arranged in alignment parallel on the pedestal, the embedded sleeves and the guide rail supports are arranged in alignment parallel on the bottom-wall formwork, the guide rails are arranged in parallel on the bottom-wall formwork and the pedestal through the embedded sleeves and the guide rail supports, the supporting legs are arranged on the bottom beams through an adjustment block, both sides of the bottom beams are provided with wheel sets and motors, and the bottom beams are arranged on the guide rails through the wheel sets, and the motors drive the wheel sets to drive the bottom beams to move to and from the guide rails.

Preferably, the adjustment block includes an adjustment bump and a slider, where the adjustment bump is arranged directly above the wheel sets, the slider is slidingly connected to the adjustment bump through a slot, the supporting legs are slidingly connected to the slider, the bottom beam is further provided with an adjustment tie rod, one end of the adjustment tie rod is connected to the bottom beam, and the other end is connected to the slider.

A box-type prefabricated component operation method, including the following steps:

A. preparatory work:

1. Leveling the site to make the site elevation consistent;
2. positioning the axes of the inner formwork frame system and the outer formwork frame system to prevent the deviation of the inner formwork frame system and the outer formwork frame system; and
3. making the required pedestal.

B. erection of the side steel external-wall member

1. welding a bottom-wall formwork and a longitudinal beam frame together in a factory to form an entirety, splicing a polarity of the longitudinal beam frame according to the required shape, and connecting them with pins or screws and nuts, and then laying them on the pedestal.

C. erection of a walking system

1. placing the embedded sleeves on the bottom-wall formwork, and fixing the embedded sleeves at the same time, and placing guide rail supports on the pedestal. After the embedded sleeves and the guide rail supports are placed, verification should be conducted to ensure that the top elevations thereof are consistent, so that the guide rails are on the same plane and will not tilt when guide rails are placed;

2. placing the embedded sleeves on the bottom-wall formwork, and fixing the embedded sleeves at the same time to prevent them from deviation by force. After the embedded sleeves are placed, verification should be conducted to ensure that the top elevations thereof are consistent, so that the guide rails are on the same plane and will not tilt when guide rails are placed;

3. placing the guide rails, and fixing the guide rails at the same time to prevent them from deviation by force. It should be noted that after the guide rails are placed, verification should be conducted to ensure that the top elevations thereof are consistent, so that the guide rails are on the same plane and will not tilt; and

4. placing the bottom beams on the upper part of the guide rails, installing the wheel sets and the motors, and installing the supporting legs, the adjustment block and the adjustment tie rod according to the drawings.

D. erection of an inner formwork frame system

1. connecting a plurality of portal frames and the longitudinal trusses in place, installing an inner rear-wall formwork and a beam corner formwork through an adjustable shoring and an inner supporting rod, installing a corner formwork assembly in the corresponding position, fixing the remaining parts offsite, connecting the corner formwork assembly to the supporting legs and the walking system by means of a gantry crane, a lifting frame and the like, and connecting the electric screw rods on the longitudinal trusses to the supporting legs, so that the longitudinal trusses are capable of moving upwards and downwards; and

2. assembling a top formwork at the upper end of the portal frames.

E. erection of an outer formwork frame system

1. connecting a plurality of H-shaped steels through a connecting frame and a diagonal connecting frame to form an entirety;

2. connecting a side external-wall formwork to the H-shaped steels through back ridges;

3. installing a side external-wall guide frame, a side outer track and a second side external-wall tie rod that drive and the movement of side steel external-wall members on the pedestal;

4. hoisting and installing the side steel external-wall members on the bottom-wall formwork, having the side external-wall guide frame hinged with the connecting frame, connecting a first side external-wall tie rod to the back ridges, having the second side external-wall tie rod hinged with the connecting frame, making the bottom of H-shaped steel aligned with a limiting tie rod and adjusting the position; and

5. after a right-angle steel frame on a rear-side track are installed, installing an outer rear-wall formwork on the right-angle steel frame through the back ridges, making the same be in threaded connection to a bottom diagonal tie rod of the longitudinal beam frame through the right-angle tie rod, tightening the position of the right-angle steel frame, and installing the rear-wall tie rod simultaneously on the pedestal and the outer rear-wall formwork.

F. installation of a reinforcement cage

1. before the reinforcement cage is hoisted and installed, it is necessary to brush the release agent on the bottom-wall formwork;

2. hoisting the reinforced steel bars as a whole by means of a gantry crane and a lifting frame and putting the same into the pedestal, and carrying out the temporary reinforcement by the side external-wall formwork;

3. conducting the acceptance testing of the positions of the steel bars and embedded pipes, to ensure that the installation of reinforcement cage is completed;

4. conducting the verification again to ensure that the top elevations of the guide rails are consistent, and checking the axes and elevations thereof again; and

5. operating the walking system to push the inner formwork frame system to the predetermined position, checking the axes again, and using the adjustment block for fine-tuning of the positions of the supporting legs.

G. erection of the formworks

1. before the formwork erection is performed, it is necessary to brush the release agent on the outer rear-wall formwork, the side external-wall formwork, a wall side formwork, an inner rear-wall formwork, a top formwork and a corner formwork assembly;

2. making the side steel external-wall members and the steel rear-wall members slide in a precise manner to make the side external-wall formwork, the outer rear-wall

formwork and the bottom-wall formwork be in contact, so as to avoid grouting leakage caused by cracks;

3. having a supporting assembly held in a precise manner to make the wall side formwork, the inner rear-wall formwork, the top formwork and a corner formwork assembly be in contact, so as to avoid grouting leakage caused by cracks;

4. placing the positioning steel bars between the inner formwork frame system and the outer formwork frame system;

5. using the electric screw rods for automatically lifting and resetting the inner formwork frame system, to make the positioning steel bars between the inner formwork frame system and the outer formwork frame system be in contact;

6. checking the inner formwork frame system and the outer formwork frame system, and adjusting the electric screw rods and each jack repeatedly to make the whole system meet the acceptance testing requirements;

7. pulling the tops of the side steel external-wall members at both sides through the tie rods to make the side steel external-wall members at both sides connected to each other; and

8. installing an end formwork to form a closed concrete pouring surface, and locking all jacks at all positions are locked to prevent the deviation due to the displacements of jacks.

H. acceptance testing

1. organizing and conducting the acceptance testing, filling in the documents required for completion of the acceptance testing; and

2. when it is necessary to make adjustment, the acceptance testing should be performed again after the adjustment is completed until the acceptance testing is passed.

I. pouring of the concrete

1. when no error is found after a systematic check is performed, cleaning up sundries between the inner formwork frame system and the outer formwork frame system;

2. feeding the concrete uniformly and poured continuously in layers with intervals not exceeding the initial setting time of concrete;

3. when openings such as doors and windows are poured, the material should be poured evenly and symmetrically along both sides of the openings, and the distance between the vibrating spear and the edge of openings should not be less than 300 mm to

prevent deformation of the openings, to ensure that the concrete is compact and to reduce the air bubbles;

4. during the pouring of concrete, having at least two operators be on standby at all times to check the connections of pins, gaskets and jacks on both sides of the wall being poured, so as to prevent the pins and gaskets from falling off and the jacks from shrinkage; and

5. maintaining the concrete until the strength meets the design requirements before the formwork is removed.

J. demolding of the outer formwork frame system

1. removing the end formwork to detach the side steel external-wall members from the end formwork;

2. loosening the opposite-tie rod used on the top of the side steel external-wall members to disconnect the side steel external-wall members at both sides;

3. loosening the connection of the bottom of the H-shaped steels to the limiting tie rod, so that the side steel external-wall members can move;

4. loosening the connection of the right-angle tie rod to the bottom diagonal tie rod, so that the steel rear-wall members can move; and

5. moving the side steel external-wall members through the second side external-wall tie rod, and moving the steel rear-wall members through the rear-wall tie rod, so that the side steel external-wall members and the steel rear-wall members are completely detached from the concrete contact surface, and the demolding of outer formwork frame system is then completed.

K. demolding of the inner formwork frame system

1. making flap tie rods of flaps at both sides shrunk, and having the flaps at both sides rotated inwards around the connection point of the wall side formwork;

2. making the adjustable shoring and the inner supporting rod shrunk to make the wall side formwork drive the flaps to be detached from the concrete contact surface;

3. making the electric screw rods shrunk, so that the side formwork and the top formwork are detached from the concrete contact surface;

4. having the walking system controlled to make the inner formwork frame system withdraw from the pouring position and fix the same; and

5. removing the guide rails on the embedded sleeves and removing the embedded sleeves.

L. hoisting of the prefabricated components

1. only after the demolding of the inner formwork frame system and the outer formwork frame system is completed, hoisting of the prefabricated components can be performed; and

2. hoisting and connecting the reserved hoisting parts in place, and hoisting the same as a whole by using a gantry crane and a lifting frame, and hoisting the prefabricated components to the next procedures to proceed with the operation of other procedures.

M. Steps F - L are repeated until all prefabrication work is completed, and Step B may be performed immediately after Step F is completed.

The present invention has the following beneficial effects:

Compared with the prior art, the present invention has the advantages: 1. good integrity. The one-time pouring of concrete can reduce one construction joint, so that the structural integrity and the concrete appearance quality are better; and the through-wall opposite-pulling process is avoided, so that no through-wall are required, and the structural appearance and the waterproof performance are better.

2. High degree of automation. Both the inner formwork frame system and the outer formwork frame system are controlled by the hydraulic systems, the first side external-wall tie rod, the second side external-wall tie rod, the real-wall tie rod, the electric screw rod, the adjustable shoring and the inner supporting rod all reserve 30% of the stroke, which is convenient to use the components in different sizes; and the automatic hydraulic pump station can change the action, stroke and pressure of the above various tie rods by adjusting the preset program, and can realize one-key shrinkage and resetting.

3. Rapid demolding and fast placement. The overall push-pull frame and formwork are adopted to reduce the number of times of use of large equipment such as gantry crane.

4. Light self-weight. The system is easy to disassemble and lift, convenient operation and fast construction speed, thereby reducing the manpower and labor intensity.

5. Convenient for secondary use. The system uses a small amount of aluminum formwork, which can be flexibly adjusted in size and convenient for secondary use.

The conception and specific structures of the present invention, as well as the effects produced by the present invention are further described below in conjunction with the accompanying drawings, so as to facilitate a complete understanding of the objectives, characteristics and effects of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a three dimensional diagram of the present invention;

FIG. 2 is a front view of the present invention;

FIGs. 3 - 4 are the internal structure diagrams of an inner formwork frame system;

FIG. 5 is a front view of an inner formwork frame system;

FIGs. 6 - 8 are the three-dimensional schematic diagrams of an outer formwork frame system;

FIG. 9 is a schematic diagram of a bottom-wall formwork;

FIG. 10 is a three dimensional diagram of a longitudinal truss; and

forming cavity 101; pedestal 102; external formwork opposite-tie rod 103; groove 104; H-shaped steels 201; connecting frame 202; diagonal connecting frames 203; side external-wall formwork 204; back ridge 205; side external-wall guide frame 206; first side external-wall tie rod 207; side outer track 208; second side external-wall tie rod 209; walkway plate 210; guardrail 211; rear-side track 301; right-angle steel frame 302; outer rear-wall formwork 303; right-angle tie rod 304; rear-wall tie rod 305; bottom-wall formwork 401; longitudinal beam frame 402; limiting tie rod 403; bottom diagonal tie rod 404; longitudinal truss 501; portal frame 502; supporting leg 909, vertical upright 907; T-shaped bar 9071; T-shaped strip 9072; electric screw rod 503; wall side formwork 601, inner rear-wall formwork 602, top formwork 603; adjustable shoring 604; inner supporting rod 605; flap 606; flap tie rod 607; wall corner formwork 608; beam side formwork 609; beam corner formwork 610; balcony formwork 611; beam bottom formwork 612; guide rail 701, guide rail support 702; embedded sleeves 703; bottom beam 704; wheel set 705; motor 706; adjustment bump 801; slider 802 and adjustment tie rod 803.

DETAILED DESCRIPTION OF THE EMBODIMENTS

In the description of the present disclosure, it should be understood that orientations or positional relationships indicated by the terms "center", "upper", "lower", "front", "back", "left", "right", and the like are based on the orientations or positional relationships shown in the accompanying drawings and are merely for facilitating the description of the present invention and simplifying the description, rather than indicating or implying that a device or an element referred to must have a particular orientation or be constructed and operated in a particular orientation, and thus will not be interpreted as limiting the present disclosure. In addition, the terms "first" and "second" are for descriptive purposes only and should not be construed as indicating or implying relative importance.

In the description of the present invention, it should be noted that, unless otherwise explicitly specified and defined, the terms “mounting”, “connecting” and “connection” should be understood in a broad sense, for example, they may be a fixed connection, a detachable connection, or an integrated connection; may be a mechanical connection, or an electrical connection; and may be a direct connection, or an indirect connection via an intermediate medium, or communication inside two elements. For those of ordinary skill in the art, the specific meanings of the above terms in the present invention could be understood according to specific circumstances. In addition, in the description of the present invention, “a plurality of” and “several” means two or more, unless otherwise expressly specified.

Referring to FIGs. 1 - 10, FIGs. 1 - 10 illustrate the best embodiment of a box-type prefabricated component system and operation method:

In the present embodiment, a box-type prefabricated component system, including an inner formwork frame system, an outer formwork frame system, and an end formwork, where the inner formwork frame system, the outer formwork frame system, and the end formwork are enclosed to form a forming cavity 101, the forming cavity 101 is used for concrete forming and solidification, one side of the outer formwork frame system is provided with a walking system extending away from the direction of the end formwork, and the inner formwork frame system is arranged on the walking system and moves to and from the outer formwork frame system through the walking system. When in use, the inner formwork frame system, the outer formwork frame system, and the end formwork form the forming cavity 101, and the concrete is then poured into the forming cavity 101 to form. After the concrete is solidified, the end formwork is removed, the inner formwork frame system and the outer formwork frame system are demolded, and the inner formwork frame system is removed from the interior of the formed concrete through the walking system, and the casting of a box-type prefabricated component is then completed.

Specifically, in the present embodiment, the outer formwork frame system includes side steel external-wall members, steel bottom-wall members and steel rear-wall members, and the outer formwork frame system may be determined according to actual situation, but is not limited to the side steel external-wall member, the steel bottom-wall member and the steel rear-wall member only.

In the present embodiment, 2 side steel external-wall members are provided in total, and the two members are arranged on the left and right sides of the bottom-wall members,

respectively. The side steel external-wall members include 5 H-shaped steels 201, 4 connecting frame 202, 4 diagonal connecting frames 203 and 2 side external-wall formworks 204, where 2 of the connecting frames 202 are arranged front and back at the bottom of H-shaped steel 201, respectively, and the rest 2 connecting frames 202 are arranged at the middle and upper positions of H-shaped steel 201 to form an entirety; the 4 diagonal connecting frames 203 are arranged between the connecting frames 202 at the bottom to stabilize the frames. In order to facilitate the installation, 2 side external-wall formworks 204 are provided, which are a large and a small side external-wall formwork 204, respectively, the large side external-wall formwork 204 is arranged at the bottom layer, the small side external-wall formwork 204 is arranged at the upper layer, the side external-wall formwork 204 is connected to the H-shaped steels 201 through back ridges 205, and the back ridges 205 play a reinforcing role to prevent deformation when the concrete is poured. In order to facilitate the demolding, a side external-wall guide frame 206 is arranged at both ends of the connecting frame 202 at the bottom, respectively, where a first side external-wall tie rod 207 is arranged between the side external-wall guide frame 206 and the side external-wall formwork 204, the verticality of the side external-wall formwork 204 is adjusted by setting the first external-wall tie rod 207, a pedestal 102 is provided with a side outer track 208 that slides relative to the side external-wall guide frame 206, and one side of the track is provided with a second side external-wall tie rod 209 that drags the movement of the side steel external-wall members; when it is necessary to make demolding, the second side external-wall tie rod 209 shrinks, thereby dragging the entire side external-wall members to move in the direction of the side outer track 208. In order to check the pouring situation, a walkway plate 210 and a guardrail 211 are provided at the upper end of the H-shaped steels 201, and a staircase is arranged at the side of the outermost H-shaped steel 201 to facilitate climbing by workers. In order to reduce the pressure of the first side external-wall tie rod 207 during pouring, a plurality of external formwork opposite-tie rods 103 are arranged between the two side steel external-wall members.

More specifically, the steel rear-wall member includes a rear-side track 301 and a right-angle steel frame 302 sliding on the rear-side track 301, the rear-side track 301 is arranged on the pedestal 102, the right-angle steel frame 302 is provided with an outer rear-wall formwork 303, a plurality of back ridges 205 are arranged between the outer rear-wall formwork 303 and the right-angle steel frame 302, the right-angle steel frame

302 is connected to the steel bottom-wall member through a right-angle tie rod 304, a real-wall tie rod 305 that drags the movement of the right-angle steel frame 302 is arranged between the pedestal 102 and the outer rear-wall formwork 303, and a guardrail 211 is arranged at the top of the right-angle steel frame 302. The right-angle tie rod 304 is rigidly connected to the steel bottom-wall member, thereby fixing the position of the right-angle steel frame 302 to prevent it from moving during pouring and avoid grouting leakage caused by cracks; when it is necessary to demold, the right-angle tie rod 304 is removed first, and the real-wall tie rod 305 is then compressed, thereby dragging the entire right-angle steel frame 302 to move in the direction of the rear-side track 301 and realizing automatic demolding.

More specifically, the steel bottom-wall member includes a bottom-wall formwork 401 arranged on the pedestal 102, a longitudinal beam frame 402 is arranged between the bottom-wall formwork 401 and the pedestal 102, the two sides of the longitudinal beam frame 402 are provided with a limiting tie rod 403 capable of holding the movement of the H-shaped steel 201, and one end of the longitudinal beam frame 402 is provided with a bottom diagonal tie rod 404 linked to the right-angle tie rod 304. During installation, the lower end of each H-shaped steel 201 is provided with a concave groove 405, the limiting tie rod 403 is snapped into the concave groove 405 and is locked by a limiting plate 406, the limiting tie rod 403 plays a role in sharing a part of the weight, the limiting plate 406 also plays a role in limiting to prevent the outward displacement of the side steel external-wall members due to pressure during pouring.

More specifically, in the present embodiment, the inner formwork frame system includes 2 longitudinal trusses 501, 4 portal frames 502, an internal formwork assembly and a supporting assembly, where the longitudinal trusses 501 are connected to the walking system through supporting legs 909, and an electric screw rod 503 that drives the longitudinal trusses 501 to move upwards and downwards is arranged between the longitudinal trusses 501 and the supporting legs 909. In the present embodiment, the supporting legs 909 use the hollow steel square tube, a threaded block that is in threaded connection to the electric screw rod 503 is arranged on the top of each supporting leg 909, and the electric screw rod 503 engages with the threads of the threaded block, thereby driving the inner formwork frame system to move upwards and downwards. In the present embodiment, the 4 portal frames 502 are evenly arranged on the longitudinal truss 501, the internal formwork assembly includes a wall side formwork 601, an inner rear-wall

formwork 602, a top formwork 603 and a corner formwork assembly, and the supporting assembly includes an adjustable shoring 604 and an inner supporting rod 605; in the present embodiment, the wall side formwork 601 and the inner rear-wall formwork 602 are separately provided with a vertical upright 907, and the vertical upright 907 plays a role in strengthening the rigidity; the vertical upright 907 for the wall side formwork 601 is connected to the longitudinal trusses 501 through the adjustable shoring 604 and the inner supporting rod 605; specifically, the inner supporting rod 605 is arranged at the upper part, and the adjustable shoring 604 is arranged at the bottom part; in the present embodiment, a T-shaped bar 9071 is arranged on the top of the vertical upright 907, and a T-shaped strip 9072 matched with the T-shaped bar 9071 is arranged at both sides of the portal frame 502. During demolding, the adjustable shorings 604 of the wall side formwork 601 and the inner rear-wall formwork 602 and the inner supporting rod 605 shrink simultaneously, and vertical upright 907 moves inward in the direction of the T-shaped strip 9072, so that the demolding is performed. The electric screw rod 503 rotates, thereby making the inner formwork frame system move downwards on the whole, so that the top formwork 603 completes the demolding.

More specifically, one side of the wall side formwork 601 is pivotally connected to a flap 606, and a flap tie rod 607 for realizing the rotation of the flap 606 is arranged between the flap 606 and the wall side formwork 601. During demolding, the flap tie rod 607 shrinks and drives the flap 606 to rotate around the hinge joint with wall side formwork 601, thereby completing the demolding.

More specifically, the corner formwork assembly includes a wall corner formwork 608, a beam side formwork 609, a beam corner formwork 610, a balcony formwork 611 and a beam bottom formwork 612, where the wall corner formwork 608 is arranged between wall side formwork 601 and the inner rear-wall formwork 602, the beam side formwork 609 is arranged between the top plate and the wall side formwork 601, the beam corner formwork 610 is arranged on both sides of the beam side formwork 609, the balcony formwork 611 is arranged at the upper end of the portal frame 502, and the beam bottom formwork 612 is arranged between the balcony formwork 611 and the beam side formwork 609. Before installation, the wall corner formwork 608, the beam side formwork 609, the beam corner formwork 610, the balcony formwork 611 and the beam bottom formwork 612 are applied with the release agent in advance, and may be removed manually after the inner formwork frame system is removed.

More specifically, the walking system includes guide rails 701, guide rail supports 702, embedded sleeves 703 and bottom beams 704. In the present embodiment, the guide rail supports 702 are arranged in alignment parallel on the pedestal 102 directly in front of the outer formwork frame system, the embedded sleeves 703 and the guide rail supports 702 are arranged in alignment parallel on the bottom-wall formwork 401, the guide rails 701 are arranged in parallel on the bottom-wall formwork 401 and the pedestal 102 through the embedded sleeves 703 and the guide rail supports 702, the lower ends of the supporting legs 909 are arranged on the bottom beams 704 through an adjustment block, both sides of the bottom beams 704 are provided with wheel sets 705 and motors 706, and the bottom beams 704 are arranged on the guide rails 701 through the wheel sets 705. In the present embodiment, the adjustment block includes an adjustment bump 801 and a slider 802, where the adjustment bump 801 is arranged directly above the wheel sets 705, the slider 802 is slidingly connected to the adjustment bump 801 through a slot, the supporting legs 909 are slidingly connected to the slider 802, the bottom beam 704 is further provided with an adjustment tie rod 803, one end of the adjustment tie rod 803 is connected to the bottom beam 704, and the other end is connected to the slider 802. During installation, after the supporting legs 909 are connected with the electric screw rod 503, the slider 802 is adjusted by adjusting the adjustment tie rod 803, so that the position of the supporting legs 909 is adjusted to better match the electric screw rod 503. When the inner mold is demolded, the electric screw rod 503 rotates and the screw engages with the threads of the threaded block, so that the longitudinal trusses 501 move downwards. When the top formwork 603 descends down to the specified height, the motor 706 starts and drives the wheel sets 705 to rotate, thereby driving the inner formwork frame system to push out the pouring position.

A box-type prefabricated component operation method, including the following steps:

A. preparatory work

1. the site is leveled, so that the site elevation is consistent;
2. the axes of an inner formwork frame system and an outer formwork frame system are positioned to prevent the deviation of the inner formwork frame system and the outer formwork frame system; and
3. the required pedestal 102 is made.

B. erection of a side steel external-wall member

1. a bottom-wall formwork 401 and a longitudinal beam frame 402 are welded together in a factory to form an entirety, a polarity of the longitudinal beam frame 402 are spliced according to the required shape, and connected with pins or screws and nuts, and then laid on the pedestal 102.

C. erection of a walking system

1. the embedded sleeves 703 are placed on the bottom-wall formwork 401, and the embedded sleeves 703 are fixed at the same time, and guide rail supports 702 are placed on the pedestal 102. After the embedded sleeves 703 and the guide rail supports 702 are placed, verification should be conducted to ensure that the top elevations thereof are consistent, so that the guide rails 701 are on the same plane and will not tilt when guide rails 701 are placed;

2. the embedded sleeves 703 are placed on the bottom-wall formwork 401, and the embedded sleeves 703 are fixed at the same time to prevent them from deviation by force. After the embedded sleeves 703 are placed, verification should be conducted to ensure that the top elevations thereof are consistent, so that the guide rails 701 are on the same plane and will not tilt when guide rails 701 are placed;

3. the guide rails 701 are placed, and the guide rails 701 are fixed at the same time to prevent them from deviation by force. It should be noted that after the guide rails 701 are placed, verification should be conducted to ensure that the top elevations thereof are consistent, so that the guide rails 701 are on the same plane and will not tilt; and

4. the bottom beams 704 are placed on the upper part of the guide rails 701, the wheel sets 705 and the motors 706 are then installed, and the supporting legs 909, the adjustment block and the adjustment tie rod 803 are installed according to the drawings.

D. erection of an inner formwork frame system

1. a plurality of portal frames 502 and the longitudinal trusses 501 are connected in place, an inner rear-wall formwork 602 and a beam corner formwork 601 are installed through an adjustable shoring 604 and an inner supporting rod 605, a corner formwork assembly is then installed in the corresponding position, the remaining parts are fixed offsite, the corner formwork assembly is then connected to the supporting legs 909 and the walking system by means of a gantry crane, a lifting frame and the like, and the electric screw rods 503 on the longitudinal trusses 501 are connected to the supporting legs 909, so that the longitudinal trusses 501 are capable of moving upwards and downwards; and

2. a top formwork 603 is assembled at the upper end of the portal frames 502.

E. erection of an outer formwork frame system

1. a plurality of H-shaped steels 201 are connected through a connecting frame 202 and a diagonal connecting frame 203 to form an entirety;

2. a side external-wall formwork 204 is connected to the H-shaped steels 201 through back ridges 205;

3. a side external-wall guide frame 206, a side outer track 208 and a second side external-wall tie rod 209 that drive and the movement of side steel external-wall members is installed on the pedestal 102;

4. the side steel external-wall members are hoisted and installed on the bottom-wall formwork 401, the side external-wall guide frame 206 is hinged with the connecting frame 202, a first side external-wall tie rod 207 is connected to the back ridges 205, the second side external-wall tie rod 209 is hinged with the connecting frame 202, and the bottom of H-shaped steel 201 is aligned with a limiting tie rod 403 and the position is adjusted; and

5. after a right-angle steel frame 302 is installed on a rear-side track 301, an outer rear-wall formwork 303 is installed on the right-angle steel frame 302 through the back ridges 205, and is in threaded connection to a bottom diagonal tie rod 404 of the longitudinal beam frame 402 through the right-angle tie rod 304, the position of the right-angle steel frame 302 is tightened, and the rear-wall tie rod 305 is simultaneously installed on the pedestal 102 and the outer rear-wall formwork 303.

F. installation of a reinforcement cage

1. before the reinforcement cage is hoisted and installed, it is necessary to brush the release agent on the bottom-wall formwork 401;

2. the reinforced steel bars are hoisted as a whole by means of a gantry crane and a lifting frame and put into the pedestal 102, and are temporarily reinforced by the side external-wall formwork 204;

3. the positions of the steel bars and embedded pipes are checked and accepted, to ensure that the installation of reinforcement cage is completed;

4. verification is conducted again to ensure that the top elevations of the guide rails 701 are consistent, and the axes and elevations thereof are checked again; and

5. the walking system is operated to push the inner formwork frame system to the predetermined position, the axes are checked again, and the adjustment block is used for fine-tuning of the positions of the supporting legs 909.

G. erection of the formworks

1. before the formwork erection is performed, it is necessary to brush the release agent on the outer rear-wall formwork 303, the side external-wall formwork 204, a wall side formwork 601, an inner rear-wall formwork 602, a top formwork 603 and a corner formwork assembly;

2. the side steel external-wall members and the steel rear-wall members slide in a precise manner to make the side external-wall formwork 204, the outer rear-wall formwork 303 and the bottom-wall formwork 401 be in contact, so as to avoid grouting leakage caused by cracks;

3. a supporting assembly is held in a precise manner to make the wall side formwork 601, the inner rear-wall formwork 602, the top formwork 603 and a corner formwork assembly be in contact, so as to avoid grouting leakage caused by cracks;

4. the positioning steel bars are placed between the inner formwork frame system and the outer formwork frame system;

5. the electric screw rods 503 are used for automatically lifting and resetting the inner formwork frame system, to make the positioning steel bars between the inner formwork frame system and the outer formwork frame system be in contact;

6. the inner formwork frame system and the outer formwork frame system are checked, and the electric screw rods 503 and each jack is repeatedly adjusted to make the whole system meet the acceptance testing requirements;

7. the tops of the side steel external-wall members at both sides are pulled through the tie rods to make the side steel external-wall members at both sides connected to each other; and

8. an end formwork is installed to form a closed concrete pouring surface, and all jacks at all positions are locked to prevent the deviation due to the displacements of jacks.

H. acceptance testing

1. the acceptance testing is organized and conducted, and the documents required for completion of the acceptance testing are completed; and

2. when it is necessary to make adjustment, the acceptance testing should be performed again after the adjustment is completed until the acceptance testing is passed.

I. pouring of the concrete

1. when no error is found after a systematic check is performed, sundries between the inner formwork frame system and the outer formwork frame system are cleaned up;

2. the concrete should be fed uniformly and poured continuously in layers with intervals not exceeding the initial setting time of concrete;

3. when openings such as doors and windows are poured, the material should be poured evenly and symmetrically along both sides of the openings, and the distance between the vibrating spear and the edge of openings should not be less than 300 mm to prevent deformation of the openings, to ensure that the concrete is compact and to reduce the air bubbles;

4. during the pouring of concrete, at least two operators should be on standby at all times to check the connections of pins, gaskets and jacks on both sides of the wall being poured to prevent the pins and gaskets from falling off and the jacks from shrinkage; and

5. the concrete is maintained until the strength meets the design requirements before the formwork is removed.

J. demolding of the outer formwork frame system

1. the end formwork is removed to detach the side steel external-wall members from the end formwork;

2. the opposite-tie rod used on the top of the side steel external-wall members are loosened to disconnect the side steel external-wall members at both sides;

3. the connection of the bottom of the H-shaped steels 201 to the limiting tie rod 403 is loosened, so that the side steel external-wall members can move;

4. the connection of the right-angle tie rod 304 to the bottom diagonal tie rod is loosened, so that the steel rear-wall members can move; and

5. the side steel external-wall members are moved through the second side external-wall tie rod 209, and the steel rear-wall members are moved through the rear-wall tie rod 305, so that the side steel external-wall members and the steel rear-wall members are completely detached from the concrete contact surface, and the demolding of outer formwork frame system is then completed.

K. demolding of the inner formwork frame system

1. flap tie rods 607 of flaps 606 at both sides are shrunk, and the flaps 606 at both sides are rotated inwards around the connection point of the wall side formwork 601;

2. the adjustable shoring 604 and the inner supporting rod 605 are shrunk to make the wall side formwork 601 drive the flaps 606 to be detached from the concrete contact surface;

3. the electric screw rods 503 is shrunk, so that the side formwork 601 and the top formwork 603 are detached from the concrete contact surface;

4. the walking system is controlled to make the inner formwork frame system withdraw from the pouring position and fix the same; and

5. the guide rails 701 on the embedded sleeves 703 are removed and the embedded sleeves 703 are removed.

L. hoisting of the prefabricated components

1. only after the demolding of the inner formwork frame system and the outer formwork frame system is completed, hoisting of the prefabricated components can be performed; and

2. the reserved hoisting parts are hoisted and connected in place, and hoisted as a whole by using a gantry crane and a lifting frame, and the prefabricated components are hoisted to the next procedures to proceed with the operation of other procedures.

M. Steps F - L are repeated until all prefabrication work is completed, and Step B may be performed immediately after Step F is completed.

CLAIMS

1. A box-type prefabricated component system, characterized in that the system comprises an inner formwork frame system, an outer formwork frame system, and an end formwork, wherein the inner formwork frame system, the outer formwork frame system, and the end formwork are enclosed to form a forming cavity (101), the forming cavity (101) is used for concrete forming and solidification, one side of the outer formwork frame system is provided with a walking system extending away from the direction of the end formwork, and the inner formwork frame system is arranged on a walking system and moves to and from the outer formwork frame system through the walking system.

2. The box-type prefabricated component system according to claim 1, characterized in that the outer formwork frame system comprises side steel external-wall members, steel bottom-wall members and steel rear-wall members, wherein the steel bottom-wall members are arranged on the pedestal (102), the side steel external-wall members are opposite sides of the steel bottom-wall members, the steel rear-wall members are arranged on one side of the steel bottom-wall members, and the other side is connected to the end formwork, a plurality of external formwork opposite-tie rod (103) are arranged between the two side steel external-wall members, and the side steel external-wall members, the steel bottom-wall members, the steel rear-wall members and the end formwork are enclosed to form a groove (104) for accommodating the inner formwork frame system.

3. The box-type prefabricated component system according to claim 2, characterized in that the side steel external-wall members comprise a plurality of H-shaped steels (201), connecting frame (202), diagonal connecting frames (203) and side external-wall formwork (204), wherein the two sides of the H-shaped steel (201) are welded to the connecting frame (202), the H-shaped steel (201) is arranged side by side through the connecting frame (202), a diagonal connecting frame (203) is arranged between the two connecting frames (202), a plurality of back ridges (205) are arranged between the H-shaped steel (201) and the side external-wall formwork (204), a side external-wall guide frame (206) is hingedly arranged at both ends of the connecting frame (202), a first side external-wall tie rod (207) is arranged between the side external-wall guide frame (206) and the side external-wall formwork (204), a pedestal (102) is provided with a side outer track (208) that slides relative to the side external-wall guide frame (206), one side of the side outer track (208) is provided with a second side external-wall tie rod (209) that drags

the movement of the side steel external-wall members, and a walkway plate (210) and a guardrail (211) are provided at the upper end of the H-shaped steels (201).

4. The box-type prefabricated component system according to claim 3, characterized in that the steel rear-wall member comprises a rear-side track (301) and a right-angle steel frame (302) sliding on the rear-side track (301), wherein the rear-side track (301) is arranged on the pedestal (102), the right-angle steel frame (302) is provided with an outer rear-wall formwork (303), a plurality of back ridges (205) are arranged between the outer rear-wall formwork (303) and the right-angle steel frame (302), the right-angle steel frame (302) is connected to the steel bottom-wall member through a right-angle tie rod (304), a rear-wall tie rod (305) that drags the movement of the right-angle steel frame (302) is arranged between the pedestal (102) and the outer rear-wall formwork (303), and a guardrail (211) is arranged at the top of the right-angle steel frame (302).

5. The box-type prefabricated component system according to claim 4, characterized in that the steel bottom-wall member comprises a bottom-wall formwork (401) arranged on the pedestal (102), a longitudinal beam frame (402) is arranged between the bottom-wall formwork (401) and the pedestal (102), wherein the two sides of the longitudinal beam frame (402) are provided with a limiting tie rod (403) capable of holding the movement of the H-shaped steel (201), and one end of the longitudinal beam frame (402) is provided with a bottom diagonal tie rod (404) linked to the right-angle tie rod (304).

6. The box-type prefabricated component system according to claim 1, characterized in that the inner formwork frame system comprises at least 2 longitudinal trusses (501), a plurality of portal frames (502), an internal formwork assembly and a supporting assembly, wherein the longitudinal trusses (501) are connected to the walking system through supporting legs (909), and an electric screw rod (503) that drives the longitudinal trusses (501) to move upwards and downwards is arranged between the longitudinal trusses (501) and the supporting legs (909); the portal frames (502) are evenly arranged on the longitudinal truss (501), the internal formwork assembly comprises a wall side formwork (601), an inner rear-wall formwork (602), a top formwork (603) and a corner formwork assembly, wherein the supporting assembly comprises an adjustable shoring (604) and an inner supporting rod (605), the wall side formwork (601) is arranged at both sides of the longitudinal truss (501) through an adjustable shoring (604) and an inner supporting rod (605), one side of the wall side formwork (601) is pivotally connected to a

flap (606), and a flap tie rod (607) for realizing the rotation of the flap (606) is arranged between the flap (606) and the wall side formwork (601), the top formwork (603) is arranged at the upper end of the portal frame (502), and the inner rear-wall formwork (602) is arranged on the portal frame (502) through the adjustable shoring (604) and the inner supporting rod (605);

7. The box-type prefabricated component system according to claim 6, characterized in that the corner formwork assembly comprises a wall corner formwork (608), a beam side formwork (609), a beam corner formwork (610), a balcony formwork (611) and a beam bottom formwork (612), wherein the wall corner formwork (608) is arranged between wall side formwork (601) and the inner rear-wall formwork (602), the beam side formwork (609) is arranged between the top plate and the wall side formwork (601), the beam corner formwork (610) is arranged on both sides of the beam side formwork (609), the balcony formwork (611) is arranged on the upper end of the portal frame (502), and the beam bottom formwork (612) is arranged between the balcony formwork (611) and the beam side formwork (609).

8. The box-type prefabricated component system according to claim 6, characterized in that the walking system comprises guide rails (701), guide rail supports (702), embedded sleeves (703) and bottom beams (704), wherein the guide rail supports (702) are arranged in alignment parallel on the pedestal (102), the embedded sleeves (703) and the guide rail supports (702) are arranged in alignment parallel on the bottom-wall formwork (401), the guide rails (701) are arranged in parallel on the bottom-wall formwork (401) and the pedestal (102) through the embedded sleeves (703) and the guide rail supports (702), the supporting legs (909) are arranged on the bottom beams (704) through an adjustment block, both sides of the bottom beams (704) are provided with wheel sets (705) and motors (706), and the bottom beams (704) are arranged on the guide rails (701) through the wheel sets (705), and the motors (706) drive the wheel sets (705) to drive the bottom beams (704) to move to and from the guide rails (701).

9. The box-type prefabricated component system according to claim 8, characterized in that the adjustment block comprises an adjustment bump (801) and a slider (802), where the adjustment bump (801) is arranged directly above the wheel sets (705), the slider (802) is slidingly connected to the adjustment bump (801) through a slot, the supporting legs (909) are slidingly connected to the slider (802), the bottom beam (704) is further provided

with an adjustment tie rod (803), one end of the adjustment tie rod (803) is connected to the bottom beam (704), and the other end is connected to the slider (802).

10. A box-type prefabricated component operation method, comprising the following steps:

A. preparatory work:

1) leveling the site to make the site elevation consistent;

2) positioning the axes of the inner formwork frame system and the outer formwork frame system to prevent the deviation of the inner formwork frame system and the outer formwork frame system; and

3) making the required pedestal (102).

B. erection of the side steel external-wall members

1) welding a bottom-wall formwork (401) and a longitudinal beam frame (402) together in a factory to form an entirety, splicing a polarity of the longitudinal beam frame (402) according to the required shape, and connecting them with pins or screws and nuts, and then laying them on the pedestal (102).

C. erection of a walking system

1) placing the embedded sleeves (703) on the bottom-wall formwork (401), and fixing the embedded sleeves (703) at the same time, and placing guide rail supports (702) on the pedestal (102). After the embedded sleeves (703) and the guide rail supports (702) are placed, verification should be conducted to ensure that the top elevations thereof are consistent, so that the guide rails (701) are on the same plane and will not tilt when guide rails (701) are placed;

2) placing the embedded sleeves (703) on the bottom-wall formwork (401), and fixing the embedded sleeves (703) at the same time to prevent them from deviation by force. After the embedded sleeves (703) are placed, verification should be conducted to ensure that the top elevations thereof are consistent, so that the guide rails (701) are on the same plane and will not tilt when guide rails (701) are placed;

3) placing the guide rails (701), and fixing the guide rails (701) at the same time to prevent them from deviation by force. It should be noted that after the guide rails (701) are placed, verification should be conducted to ensure that the top elevations thereof are consistent, so that the guide rails (701) are on the same plane and will not tilt; and

4) placing the bottom beams (704) on the upper part of the guide rails (701), installing the wheel sets (705) and the motors (706), and installing the supporting legs (909), the adjustment block and the adjustment tie rod (803) according to the drawings.

D. erection of an inner formwork frame system

1) connecting a plurality of portal frames (502) and the longitudinal trusses (501) in place, installing an inner rear-wall formwork (602) and a beam corner formwork (601) through an adjustable shoring (604) and an inner supporting rod (605), installing a corner formwork assembly in the corresponding position, fixing the remaining parts offsite, connecting the corner formwork assembly to the supporting legs (909) and the walking system by means of a gantry crane, a lifting frame and the like, and connecting the electric screw rods (503) on the longitudinal trusses (501) to the supporting legs (909), so that the longitudinal trusses (501) are capable of moving upwards and downwards; and

2) assembling a top formwork (603) at the upper end of the portal frames (502).

E. erection of an outer formwork frame system

1) connecting a plurality of H-shaped steels (201) through a connecting frame (202) and a diagonal connecting frame (203) to form an entirety;

2) connecting a side external-wall formwork (204) to the H-shaped steels (201) through back ridges (205);

3) installing a side external-wall guide frame (206), a side outer track (208) and a second side external-wall tie rod (209) that drive and the movement of side steel external-wall members on the pedestal (102);

4) hoisting and installing the side steel external-wall members on the bottom-wall formwork (401), having the side external-wall guide frame (206) hinged with the connecting frame (202), connecting a first side external-wall tie rod 207 to the back ridges (205), having the second side external-wall tie rod (209) hinged with the connecting frame (202), making the bottom of H-shaped steel (201) aligned with a limiting tie rod (403) and adjusting the position; and

5) after a right-angle steel frame (302) on a rear-side track (301) are installed, installing an outer rear-wall formwork (303) on the right-angle steel frame (302) through the back ridges (205), making the same be in threaded connection to a bottom diagonal tie rod (404) of the longitudinal beam frame (402) through the right-angle tie rod (304), tightening the position of the right-angle steel frame (302), and installing the rear-wall tie rod (305) simultaneously on the pedestal (102) and the outer rear-wall formwork (303).

F. installation of a reinforcement cage

1) before the reinforcement cage is hoisted and installed, it is necessary to brush the release agent on the bottom-wall formwork (401);

2) hoisting the reinforced steel bars as a whole by means of a gantry crane and a lifting frame and putting the same into the pedestal (102), and carrying out the temporary reinforcement by the side external-wall formwork (204);

3) conducting the acceptance testing of the positions of the steel bars and embedded pipes, to ensure that the installation of reinforcement cage is completed;

4) conducting the verification again to ensure that the top elevations of the guide rails (701) are consistent, and checking the axes and elevations thereof again; and

5) operating the walking system to push the inner formwork frame system to the predetermined position, checking the axes again, and using the adjustment block for fine-tuning of the positions of the supporting legs (909).

G. erection of the formworks

1) before the formwork erection is performed, it is necessary to brush the release agent on the outer rear-wall formwork (303), the side external-wall formwork (204), a wall side formwork (601), an inner rear-wall formwork (602), a top formwork (603) and a corner formwork assembly;

2) making the side steel external-wall members and the steel rear-wall members slide in a precise manner to make the side external-wall formwork (204), the outer rear-wall formwork (303) and the bottom-wall formwork (401) be in contact, so as to avoid grouting leakage caused by cracks;

3) having a supporting assembly held in a precise manner to make the wall side formwork (601), the inner rear-wall formwork (602), the top formwork (603) and a corner formwork assembly be in contact, so as to avoid grouting leakage caused by cracks;

4) placing the positioning steel bars between the inner formwork frame system and the outer formwork frame system;

5) using the electric screw rods (503) for automatically lifting and resetting the inner formwork frame system, to make the positioning steel bars between the inner formwork frame system and the outer formwork frame system be in contact;

6) checking the inner formwork frame system and the outer formwork frame system, and adjusting the electric screw rods (503) and each jack repeatedly to make the whole system meet the acceptance testing requirements;

7) pulling the tops of the side steel external-wall members at both sides through the tie rods to make the side steel external-wall members at both sides connected to each other; and

8) installing an end formwork to form a closed concrete pouring surface, and locking all jacks at all positions are locked to prevent the deviation due to the displacements of jacks.

H. acceptance testing

1) organizing and conducting the acceptance testing, filling in the documents required for completion of the acceptance testing; and

2) when it is necessary to make adjustment, the acceptance testing should be performed again after the adjustment is completed until the acceptance testing is passed.

I. pouring of the concrete

1) when no error is found after a systematic check is performed, cleaning up sundries between the inner formwork frame system and the outer formwork frame system;

2) feeding the concrete uniformly and poured continuously in layers with intervals not exceeding the initial setting time of concrete;

3) when openings such as doors and windows are poured, pouring the material evenly and symmetrically along both sides of the openings, and making the distance between the vibrating spear and the edge of openings not be less than 300 mm to prevent deformation of the openings, to ensure that the concrete is compact and to reduce the air bubbles;

4) during the pouring of concrete, having at least two operators be on standby at all times to check the connections of pins, gaskets and jacks on both sides of the wall being poured, so as to prevent the pins and gaskets from falling off and the jacks from shrinkage; and

5) maintaining the concrete until the strength meets the design requirements before the formwork is removed.

J. demolding of the outer formwork frame system

1) removing the end formwork to detach the side steel external-wall members from the end formwork;

2) loosening the opposite-tie rod used on the top of the side steel external-wall members to disconnect the side steel external-wall members at both sides;

3) loosening the connection of the bottom of the H-shaped steels (201) to the limiting tie rod (403), so that the side steel external-wall members can move;

4) loosening the connection of the right-angle tie rod (304) to the bottom diagonal tie rod, so that the steel rear-wall members can move; and

5) moving the side steel external-wall members through the second side external-wall tie rod (209), and moving the steel rear-wall members through the rear-wall tie rod (305), so that the side steel external-wall members and the steel rear-wall members are completely detached from the concrete contact surface, and the demolding of outer formwork frame system is then completed.

K. demolding of the inner formwork frame system

1) making flap tie rods (607) of flaps (606) at both sides shrink, and having the flaps (606) at both sides rotated inwards around the connection point of the wall side formwork (601);

2) making the adjustable shoring (604) and the inner supporting rod (605) shrink to make the wall side formwork (601) drive the flaps (606) to be detached from the concrete contact surface;

3) making the electric screw rods (503) shrink, so that the side formwork (601) and the top formwork (603) are detached from the concrete contact surface;

4) having the walking system controlled to make the inner formwork frame system withdraw from the pouring position and fix the same; and

5) removing the guide rails (701) on the embedded sleeves (703) and removing the embedded sleeves (703).

L. hoisting of the prefabricated components

1) only after the demolding of the inner formwork frame system and the outer formwork frame system is completed, hoisting of the prefabricated components can be performed; and

2) hoisting and connecting the reserved hoisting parts in place, and hoisting the same as a whole by using a gantry crane and a lifting frame, and hoisting the prefabricated components to the next procedures to proceed with the operation of other procedures.

M. Steps F - L are repeated until all prefabrication work is completed, and Step B may be performed immediately after Step F is completed.