

ASSEMBLED BALLASTLESS TRACK STRUCTURE AND LONGITUDINAL CONNECTING STRUCTURE AND ASSEMBLY METHOD OF THE SAME

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based upon and claims priority of Chinese Patent Application No. 201910884767.8, filed on September 19, 2019, the contents of which are herein incorporated by reference in their entirety.

TECHNICAL FIELD

[0002] The present invention belongs to the technical field of a ballastless track, and more specifically to a longitudinal connecting structure of an assembled sleeper slab-type or a track slab-type ballastless track structure, a ballastless track structure including the longitudinal connecting structure, and an assembly method of the ballastless track structure.

BACKGROUND

[0003] The ballastless track refers to a track structure that adopts concrete, asphalt mixture and other integral foundations instead of the loose gravel track bed. Compared with the ballasted track, the ballastless track avoids ballast splashing, has good smoothness and good stability, lengthens service life, improves durability and reduces maintenance work. Therefore, the ballastless track is increasingly being used. The construction of the slab-type ballastless track mainly involves the structures such as a track slab, a filling layer of asphalt mortar or self-compacting concrete, a base or a supporting layer, etc. Among these structures, the base or the supporting layer adopts a concrete structure, and the filling layer of asphalt mortar or self-compacting concrete laid on the base or the supporting layer is a structural layer for adjusting the structure of the

ballastless track, and supporting and transmitting force.

[0004] Currently, the main types of the slab-type ballastless track in China include CRTS I slab-type, CRTS II slab-type and CRTS III slab-type ballastless tracks. The CRTS I slab-type ballastless track is a unit slab. There are no longitudinal connection and transverse stopper between each two slabs. The unit slabs are laid on the cast-in place reinforced concrete base with bosses, which limit the unit slabs. In the unit slab-type ballastless track structure, each track slab is independent after being laid and installed. The disadvantages of the unit slab-type ballastless track structure lie in that after the train runs for a period of time, peeling would occur between the track slabs and the filling layer of asphalt mortar, and the longitudinal ends of the track slabs are prone to warping, which would undoubtedly adversely affect the stability and comfort when the train is running, as well as the service life of the track structure. Although there are corresponding solutions to improve the connection manner, in general, it is still difficult to address the problems, such as the stress and deformation between the slabs, and the complicated preparation process. Furthermore, it is impossible to overcome the problems of difficult assembly and maintenance of the entire ballastless track caused by too many special-shaped slabs in the current ballastless track.

[0005] The CRTS II slab-type ballastless track slab adopts a longitudinal connecting manner. The ballastless track slabs are longitudinally connected with each other, by longitudinal connecting structures formed through longitudinally fine rolled twisted steel bars and tensioning locks, and transverse stoppers are provided between slabs. Therefore, the CRTS II slab-type ballastless track can overcome some of defects of the CRTS I slab-type ballastless track. For example, a tensioning lock for longitudinal connection of ballastless track slabs is disclosed in the patent document CN201695285U, which realizes the longitudinal connection by connecting and locking of the steel bars longitudinally protruded from the track slabs. However, this type of connection is basically equivalent to the connection manner of longitudinal prestressed steel bars, the connecting structure of which is complicated and the implementation of which is relatively cumbersome. Furthermore, in the case that the rigid connection is in the condition of excessive temperature stress, the track slabs may be arched up, which would adversely affect the service life of the track structure, as well as the stability and comfort when the train is running.

[0006] A steel bar mechanical connecting device used in an assembled concrete building structure is disclosed in the patent document CN204370701U, in which the ends of the steel bars to be connected are jumped-up, and then are pierced to form sleeves, so as to realize the connection between the steel bars by the sleeves and connecting bolts. However, this type of connecting manner is complicated in structure and cumbersome to construct. The reserved gap between the clamping ring provided on the steel bar sleeve and the steel bar to be connected would also cause the assembled sleeper slabs or track slabs adjacent to each other to be not in the same plane. Moreover, the accuracy during construction is difficult to control.

SUMMARY

[0007] In view of at least one of the above defects or improvement requirements in the art, the embodiments of the present invention provide a longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure, a ballastless track structure including the longitudinal connecting structure, and an assembly method for the ballastless track structure. With the present invention, the accuracy during on-site laying construction can be improved, disassembly and installation are convenient, the construction difficulty can be reduced, the speed of on-site construction can be increased, the structure is simple and positioning of the sleeper slabs or the track slabs is simple.

[0008] In order to achieve the above objective, in the first aspect of the embodiments of the present invention, a longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure is provided. Longitudinal steel bars are pre-embedded in two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other and protrude from end surfaces of the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other. One of the longitudinal steel bars is spaced from another longitudinal steel bar matched with said one of the longitudinal steel bars, and two longitudinal steel bars are longitudinally connected with each other through an extrusion sleeve.

[0009] An inner diameter of the extrusion sleeve is greater than an outer diameter of

the longitudinal steel bar. Coupling ends of the two longitudinal steel bars are respectively inserted into two ends of the extrusion sleeve. The extrusion sleeve is deformed and performs a locking action under extrusion of a portable extruder.

[0010] In an embodiment of the present invention, a portion of each of the coupling ends of the longitudinal steel bars, which is inserted into the extrusion sleeve, at least includes three thread turns.

[0011] In an embodiment of the present invention, the longitudinal connecting structure is provided with a hoop stirrup in a cross section plane.

[0012] In the second aspect of the embodiments of the present invention, a longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure is provided. Longitudinal steel bars are pre-embedded in two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other and protrude from end surfaces of the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other. The longitudinal steel bars in the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other are spaced from each other. The longitudinal steel bars spaced from each other are longitudinally connected with each other through an extrusion sleeve.

[0013] An inner diameter of the extrusion sleeve is greater than an outer diameter of the longitudinal steel bar. Coupling ends of the longitudinal steel bars spaced from each other are respectively inserted into the extrusion sleeve. The extrusion sleeve can be extruded and deformed to lock the steel bars which are inserted into the extrusion sleeve.

[0014] In the third aspect of the embodiments, a longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure is provided. Connecting plates are pre-embedded in two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other and protrude from end surfaces of the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other. The connecting plates in the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other are connected with each other.

[0015] In the fourth aspect of the embodiments, an assembled sleeper slab-type or track slab-type ballastless track structure is provided. The assembled sleeper slab-type or

track slab-type ballastless track structure includes prefabricated sleeper slabs or prefabricated track slabs, a cast-in place layer, a foundation under a track, connecting filling portions and longitudinal connecting structures of an assembled sleeper slab-type or track slab-type ballastless track structure of any one of the above described embodiments.

[0016] In the above assembled sleeper slab-type or track slab-type ballastless track structure, a plurality of prefabricated sleeper slabs or prefabricated track slabs are longitudinally arranged at intervals. The prefabricated sleeper slabs or the prefabricated track slabs are assembled and connected, at two transverse ends, to each other in the intervals through the longitudinal connecting structures. In some or all of the intervals, the connecting filling portions are formed by reinforced concrete structures, to allow the connecting filling portions to form an assembled integrated structure with the prefabricated sleeper slabs or the prefabricated track slabs, and the prefabricated track slabs form a united stressed structure in the shape of a long slab unit.

[0017] In an embodiment of the present invention, the connecting filling portions are provided at two transverse ends of each of at least some of the intervals, and a limiting member is provided on the foundation under the track in each of at least some of the intervals. In the intervals each provided with both the connecting filling portion and the limiting member, the longitudinal connecting structures and the limiting member are embedded in the same connecting filling portion and formed integrally with the connecting filling portion to simultaneously achieve limitation and connection, such that a plurality of the prefabricated sleeper slabs or the prefabricated track slabs are assembled to form a track unit with a predefined length and form a united stressed structure.

[0018] In an embodiment of the present invention, the connecting filling portions are provided at the two transverse ends of each of at least some of the intervals, and a limiting member is provided on the foundation under the track in each of at least some of the intervals. In the intervals each provided with both the longitudinal connecting structures and the limiting member, the longitudinal connecting structures and the limiting member are embedded in the same connecting filling portion and formed integrally with the connecting filling portion to simultaneously achieve limitation and connection, such that a plurality of the prefabricated sleeper slabs or the prefabricated track slabs are assembled to form a track unit with a predefined length and form a united

stressed structure.

- [0019] In an embodiment of the present invention, the limiting member is configured as a planted bar, a pre-embedded member for a sleeve of a steel bar, a limiting boss or a preset steel bar on an upper surface of the foundation under the track.
- [0020] In an embodiment of the present invention, a limiting steel bar is included. One end of the limiting steel bar is fixedly arranged on the foundation under the track, and another end of the limiting steel bar is vertically arranged between two prefabricated sleeper slabs or track slab.
- [0021] Alternatively, a pre-embedded member for a sleeve of a steel bar is included, which is arranged on the foundation under the track.
- [0022] Alternatively, a limiting boss is included, which is arranged within the intervals.
- [0023] In an embodiment of the present invention, the longitudinal connecting structures are provided with a hoop stirrup in a cross section plane, and the hoop stirrup is connected with the limiting member.
- [0024] In an embodiment of the present invention, the prefabricated sleeper slabs or the prefabricated track slabs include a plurality of pairs of fastening rail supports, preferably 2-10 pairs, more preferably 4-6 pairs fastening rail supports.
- [0025] In an embodiment of the present invention, a middle portion of each of the prefabricated sleeper slabs or the prefabricated track slabs is provided with a lightening hole, and each of two longitudinal ends of each of the prefabricated sleeper slabs or the prefabricated track slabs is provided with a notch.
- [0026] In an embodiment of the present invention, a cover plate is placed on each of the lightening hole and the notch to form a smooth evacuation passage.
- [0027] In an embodiment of the present invention, the foundation under the track is equipped with a drain along its longitudinal direction.
- [0028] In an embodiment of the present invention, first limiting structures are arranged on both sides of the long slab unit, or a second limiting structure is arranged in the long slab unit.

- [0029] In an embodiment of the present invention, there are slab gaps between a plurality of track units adjacent to each other and third limiting structures are arranged in some or all of the slab gaps.
- [0030] In an embodiment of the present invention, the prefabricated sleeper slabs or the prefabricated track slabs are non-prestressed slabs.
- [0031] In the fifth aspect of the present invention, an assembly method for assembled sleeper slab-type or track slab-type ballastless track structure described in any one of the above aspects is provided. The assembly method includes the following steps.
- [0032] In S1, a foundation under a track, successively placing prefabricated sleeper slabs at intervals is poured on the foundation under the track along a running direction of the track, in which a certain space is reserved between each prefabricated sleeper slab and the foundation under the track to perform initial adjustment and positioning of each prefabricated sleeper slab.
- [0033] In S2, prefabricated sleeper slabs are correspondingly and matchingly connected with each other through a plurality of longitudinal connecting structures to form one or more long slab units, then each long slab unit is correspondingly set into a ballastless track structure, and each prefabricated sleeper slab is positioned to make steel rails of the ballastless track structure overall horizontal.
- [0034] In S3, a limiting member is provided on the foundation under the track in each of some or all of the intervals. A filler is on-site poured at each of two transverse ends of each of the intervals provided with both the longitudinal connecting structures and the limiting member, to wrap and cover the longitudinal connecting structures and the limiting member, and the filler forms a connecting filling portion after curing, in which the longitudinal connecting structures, the limiting member and the connecting filling portion are integrally formed to simultaneously achieve limitation and connection. A filler is on-site poured at each of two transverse ends of each of some or all of the intervals in which no limiting member is provided, to wrap and cover the longitudinal connecting structures.
- [0035] The above improved technical features may be combined with each other as long as they not conflicts with each other.

[0036] In general, the above technical solutions conceived by the embodiments of the present invention have the following beneficial effects compared with the related art.

[0037] (1) In the longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention, the configuration of the connecting structure is simple, and each longitudinal connecting structure only includes an extrusion sleeve and exposed steel bars. The sleeper slabs or the track slabs adjacent to each other are arranged in the same horizontal plane, and connected with each other by the exposed steel bars adjacent to each other, so that the longitudinal and transverse positioning of the track arrangement structure can be completed. Moreover, the sleeper slabs or the track slabs are prefabricated through a formwork process.

[0038] (2) In the longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention, the manufacturing method thereof is simple. The sleeper slabs or the track slabs adjacent to each other are pre-connected by extrusion sleeves, which improves the assembly accuracy, reduces the production cost, and meets the requirements of fast and efficient production of the prefabricated slabs.

[0039] (3) In the longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention, on-site construction only needs to lay the prefabricated sleeper slabs or the track slabs in place, install the extrusion sleeves, and pour the filling material for one time, to ensure that the sleeper slabs or the track slabs are arranged at the same level, and the speed of on-site construction is fast.

[0040] (4) In the assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention, a plurality of prefabricated sleeper slabs or prefabricated track slabs which can be assembled and connected correspondingly with each other are provided, so that the prefabricated sleeper slabs or prefabricated track slabs can be arranged at intervals along the track direction on the foundation under the track. Correspondingly, the longitudinal connecting structures are provided between two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other to be correspondingly and matchingly connected with each other. Concrete then is poured in

the connecting region, so that the prefabricated sleeper slabs or prefabricated track slabs form an assembled integrated structure. Therefore, the effective connection of the prefabricated sleeper slabs or prefabricated track slabs is achieved and a united stressed structure in a form of a long slab unit is formed, which ensures the integrity of the connection and assembly of the prefabricated sleeper slabs or prefabricated track slabs, and improves the assembly accuracy and reliability of the ballastless track structure.

[0041] (5) In the assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention, the intervals between the prefabricated sleeper slabs or the prefabricated track slabs adjacent to each other are correspondingly provided with a limiting member. The concrete is on-site poured onto the longitudinal connecting structures and the limiting member, so that the limiting member and the longitudinal connecting structures are simultaneously wrapped and covered in the concrete structure, and then the prefabricated sleeper slabs or the prefabricated track slabs and the foundation under the track form an integrated structure. In this way, the simultaneous connection and limitation of the prefabricated sleeper slabs or the prefabricated track slabs is effectively achieved, the direct hard connection during the connecting process of the existing sleeper slabs is avoided, the accuracy and the reliability of the connection of the sleeper slabs is ensured, the time for connecting the sleeper slabs is shortened, the efficiency of the arrangement of the ballastless track structure is improved, and the arrangement cost of the ballastless track structure is reduced.

[0042] (6) In the assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention, the longitudinal connecting structures and the limiting member can be arranged by pre-embedding planted bars, respectively. The arranging and connecting manners are simple, which can improve the arrangement efficiency of the ballastless track structure and shorten the construction period. The longitudinal connecting structures and the limiting member are simultaneously wrapped and covered by on-site pouring the concrete, to form an integrated connection-limitation structure, which effectively improves the stability of the structure, ensures the accuracy of the connection and the limitation, and improves the operation stability of the ballastless track structure.

[0043] (7) In the assembled sleeper slab-type or track slab-type ballastless track

structure in the embodiments of the present invention, a middle portion of each of the sleeper slabs is provided with a lightening hole, and/or each of both sides of each of the sleeper slabs are provided with a notch to form a frame slab, which can effectively reduce the weight of the sleeper slabs, reduce the difficulty of transportation and laying of the sleeper slabs, and save materials. The lightening holes and/or the notches can correspond to the drain in the foundation under the track, which facilitates cleaning the debris in the drain, achieves the rapid inspection and maintenance of the drainage function of the drain, and improves the application convenience of the ballastless track structure.

[0044] (8) In the assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention, the ballastless track structure is formed by corresponding connecting a plurality of prefabricated sleeper slabs with each other in series along the track direction, and the surface of each of the sleeper slabs is horizontal. Moreover, after providing lightening holes and notches in the prefabricated sleeper slabs, a cover plate is placed on each of the lightening holes and the notches, so that the upper end surface of each of the lightening holes and the notches can be covered. In this way, the region between two steel rails of the ballastless track structure is ensured to be horizontal, thereby facilitating the evacuation of people in emergency situations, and avoiding the inconvenience walking of people caused by convex structures, provided for the connection requirements, on the end surface of the existing ballastless unit slab. Thus, the ballastless track structure can be more effectively adapted to applications such as subways, to meet the safe evacuation requirements of the ballastless track.

[0045] (9) In the assembled sleeper slab-type or a track slab-type ballastless track structure in the embodiments of the present invention, the ballastless track structure is formed by assembling a plurality of prefabricated sleeper slabs or prefabricated track slabs, and it is generally an assembled structure. Once the ballastless track structure has track hazards in the later application process, the post-pouring region of the hazard position of the track structure can be destroyed to unlock the prefabricated sleeper slabs or the prefabricated track slabs at the hazard position, so that the prefabricated sleeper slabs or the prefabricated track slabs at the hazard position can be replaced or adjusted, which significantly reduces the maintenance time and maintenance cost of the ballastless track.

[0046] (10) In the assembled sleeper slab-type or track slab-type ballastless track

structure in the embodiments of the present invention, a certain length of the prefabricated sleeper slabs or the prefabricated track slabs are provided to assemble them into a long slab unit. According to different regions of use, sleeper slabs or track slabs with different length can be used. In addition, the prefabricated sleeper slabs or the prefabricated track slabs can be configured as short slabs, which can improve the curvilinear adaptability of the prefabricated sleeper slabs or the prefabricated track slabs, reduce the types and quantity of non-standard slabs and curved slabs, reduce the cost for prefabricating the sleeper slabs or the track slabs, improve the economy of the ballastless track structure, and facilitate the later laying and the fine adjustment.

[0047] (11) In the assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention, after several prefabricated sleeper slabs or prefabricated track slabs are assembled into a long slab unit, limiting members are correspondingly provided between long slab units adjacent to each other, or provided on both sides of the long slab unit, or provided on the slab bodies of some or all of the prefabricated sleeper slabs or the prefabricated track slabs in the long slab unit, so that each long slab unit can be accurately limited, which ensures the stability and accuracy of the arrangement of the long slab unit, and improves the application accuracy of the ballastless track structure.

[0048] (12) The structure of the assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention has a simple configuration. Further, the assembly method of the assembled sleeper slab-type or track slab-type ballastless track structure is simple, so that the ballastless track structure can be rapidly obtained by assembling. The connection and limitation of the sleeper slabs or the track slabs have high accuracy and strong reliability. Moreover, the assembly efficiency of the track is high, and the arrangement period of the track is short. Thus, the arrangement cost of the ballastless track structure is effectively reduced, the waste of materials is reduced, and the service life of the track is improved. Therefore, the assembled sleeper slab-type or track slab-type ballastless track structure in the embodiments of the present invention has important popularization and application value.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0049] FIG. 1 is a stereoscopic structural schematic view of an assembled sleeper slab-type or track slab-type ballastless track structure in embodiments of the present invention;
- [0050] FIG. 2 is an overall structural explosion view of an assembled sleeper slab-type or track slab-type ballastless track structure in embodiments of the present invention;
- [0051] FIG. 3 is a transverse sectional view of an assembled sleeper slab-type or track slab-type ballastless track structure in embodiments of the present invention;
- [0052] FIG. 4 is a longitudinal sectional view of a longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure in embodiments of the present invention;
- [0053] FIG. 5 is a top plan view of a longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure in embodiments of the present invention; and
- [0054] FIG. 6 is a partial diagrammatic view of a longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure in embodiments of the present invention.
- [0055] In all the accompanying drawings, the same reference numerals indicate the same technical features. Specifically: 1. prefabricated sleeper slab; 101. slab body; 102. longitudinal steel bar; 103. lightening hole; 104. extrusion sleeve; 1041. extrusion rib; 2. cast-in place layer; 3. foundation under a track; 301. drain; 4. limiting member; 401. limiting steel bar; 402. filling portion; 5. steel rail.

DETAILED DESCRIPTION

- [0056] In order to make the purpose, technical solutions and advantages of the embodiments of the present invention more clear, the embodiments of the present invention will be further illustrated in detail in combination with accompanying drawings and embodiments hereinafter. It should be understood that the specific implementations described here are used only to explain the embodiments of the present invention, rather than limit them.

[0057] Furthermore, the technical features involved in the various implementations of the embodiments of the present invention described below may be combined with each other as long as they do not conflict with each other.

[0058] An overall structural schematic diagram of an assembled sleeper slab-type or track slab-type ballastless track structure in embodiments of the present invention is shown in FIG.1 and FIG. 2. In FIG.1 and FIG. 2, prefabricated sleeper slabs or prefabricated track slabs adjacent to each other are correspondingly connected and assembled at intervals from each other along a longitudinal direction to form a ballastless track structure. In an embodiment of the present invention, the prefabricated sleeper slabs 1 are taken as an example for illustration. Of course, the prefabricated sleeper slabs can also be correspondingly connected and assembled in a arrangement manner described in the following embodiments to form the ballastless track structure.

[0059] In an embodiment of the present invention, the ballastless track structure includes prefabricated sleeper slabs 1, a cast-in-place layer 2 and a foundation under a track 3 which are arranged in a manner that they are successively matched with each other. The foundation under the track 3 is arranged along the track direction. In an embodiment, the foundation under the track 3 can be a concrete base or a foundation backfill layer formed by pouring reinforced concrete. The foundation under the track 3 is configured to bear the prefabricated sleeper slabs 1 and steel rails 5 arranged on the sleeper slabs 1, as well as a train running on the steel rails 5. In an embodiment of the present invention, a width and a thickness of the foundation under the track 3 are not specifically defined, which can be selected according to actual needs, and thus is not described in detail here. In an embodiment of the present invention, as shown in FIG. 3, a drain 301 is correspondingly provided on the foundation under the track 3, so as to timely discharge and reduce water accumulated in the track. In an embodiment of the present invention, the drain 301 can be arranged along the track direction. Moreover, in an embodiment of the present invention, the drain 301 can be arranged in the middle of the foundation under the track 3. Of course, in an embodiment of the present invention, it is also possible to provide two drains 301 arranged side-by-side at two sides of the foundation under the track 3, or to provide one drain 301 arranged at either side of the foundation under the track 3, which can be selected according to actual needs, and is not described in detail here.

[0060] In an embodiment of the present invention, the cast-in layer 2 is arranged between the prefabricated sleeper slabs 1 and the foundation under the track 3. The cast-in layer 2 can be obtained by casting after the prefabricated sleeper slabs 1 are placed on the foundation under the track 3, and then are correspondingly connected with each other, roughly adjusted and finely adjusted, so that the prefabricated sleeper slabs 1 and the foundation under the track 3 are closely attached to each other. In this way, the foundation under the track can subject a vertical force transmitted by the prefabricated sleeper slabs 1, and play a role in buffering and uniformly bearing the force. The arrangement of the cast-in layer 2 can fully achieve the adjustment of the prefabricated sleeper slabs 1 during the construction process, so as to ensure the levelness or flatness of the ballastless track at each position, and guarantee the operation smoothness of the track. In an embodiment of the present invention, after the prefabricated sleeper slabs 1 are correspondingly arranged on the foundation under the track 3, the distance between each prefabricated sleeper slab 1 and the foundation under the track 3 is adjusted, so that the steel rails 5 arranged on the prefabricated sleeper slabs 1 can be correspondingly connected, and the corresponding splicing accuracy of the track can be ensured. In an embodiment of the present invention, after the prefabricated sleeper slabs 1 are arranged on the foundation under the track 3, there is a certain distance therebetween, and then the prefabricated sleeper slabs 1 are roughly adjusted and finely adjusted. Concrete of corresponding thickness then is poured into the distance between the prefabricated sleeper slabs 1 and the foundation under the track 3 to form the cast-in layer 2 of the ballastless track structure.

[0061] In an embodiment of the present invention, in order to improve the reliability of the connection between the cast-in layer 2 and the prefabricated sleeper slabs 1 as well as the reliability of the connection between the cast-in layer 2 and the foundation under the track 3, the lower surface of each prefabricated sleeper slab 1 and/or the upper surface of the foundation under the track 3 are "textured". In such a way, the roughness of the lower surface of each prefabricated sleeper slab 1 and/or the upper surface of the foundation under the track 3 is increased and the flatness of the lower surface of each prefabricated sleeper slab 1 and/or the upper surface of the foundation under the track 3 is decreased. Accordingly, the static frictions of the connections of the cast-in layer 2 with the prefabricated sleeper slabs 1 and with the foundation under the track 3 are increased, to allow the stabilities of the connections of the cast-in layer 2 with the prefabricated

sleeper slabs 1 as well as with the foundation under the track 3 to be improved. Thus, the prefabricated sleeper slabs 1 and the foundation under the track 3 form a united stressed track structure through the cast-in layer 2, thereby improving the force stability of the ballastless track structure.

[0062] The prefabricated sleeper slabs 1 of an embodiment of the present invention are shown in FIG. 1 and FIG. 2, which have a slab-like structure. Furthermore, the prefabricated sleeper slabs 1 of an embodiment of the present invention are non-prestressed slabs. Of course, the prefabricated sleeper slabs 1 can also be provided in a form of prestressed slabs, which can be achieved by relevant technical means in the art according to actual needs. In an embodiment of the present invention, a plurality of prefabricated sleeper slabs 1 can be successively arranged on the foundation under the track 3 at intervals along the track direction and correspondingly connected in series with each other to form an integrated ballastless track structure. Two prefabricated sleeper slabs 1 adjacent to each other are matchingly connected after being aligned on sides of the two prefabricated sleeper slabs. In an embodiment of the present invention, a plurality of pairs of fastening rail supports for correspondingly installing the steel rails 5 are arranged on top of the prefabricated sleeper slabs 1 by being spaced from each other along the track direction. In an embodiment of the present invention, the number of pairs of the fastening rail supports spaced from each other on the prefabricated sleeper slabs 1 is 4. Of course, the number of pairs of the fastening rail supports arranged on the prefabricated sleeper slabs 1 can be set, according to the length of the prefabricated sleeper slabs 1 or the space between two fastening rail supports adjacent to each other, to, for example, 2, 3, 5, 6, 7, 8, 9, 10, etc. In an embodiment of the present invention, the number of pairs of the fastening rail supports can be specifically set to 4 to 6.

[0063] In an embodiment of the present invention, longitudinal connecting structures are provided between the two prefabricated sleeper slabs 1 adjacent to each other. In an embodiment of the present invention, longitudinal steel bars 102 are provided on the sides of the two prefabricated sleeper slabs 1 which can be correspondingly connected with each other. The longitudinal steel bars 102 are arranged along the length direction of the prefabricated sleeper slabs 1, i.e., the track direction of the ballastless track structure. Furthermore, in an embodiment of the present invention, the longitudinal steel bars 102 are arranged at intervals on the sides of the prefabricated sleeper slabs 1. After the two

prefabricated sleeper slabs 1 are aligned with each other, the longitudinal steel bars 102 on the facing sides of the two prefabricated sleeper slabs 1 can be aligned with each other respectively, and then correspondingly connected with each other.

[0064] As shown in FIG. 4, FIG. 5 and FIG. 6, in an embodiment of the present invention, longitudinal steel bars 102 are pre-embedded in the two prefabricated sleeper slabs 1 adjacent to each other and protrude from end surfaces of the two prefabricated sleeper slabs adjacent to each other. One of the longitudinal steel bars 102 are spaced from another longitudinal steel bar matched with said one of the longitudinal steel bars, and two longitudinal steel bars 102 are longitudinally connected through an extrusion sleeve 104. An inner diameter of the extrusion sleeve 104 is greater than an outer diameter of the longitudinal steel bar 102. Coupling ends of the two longitudinal steel bars 102 are respectively inserted into two ends of the extrusion sleeve 104. The extrusion sleeve 104 is deformed and performs a locking action under extrusion of a portable extruder. The outer portion of the extrusion sleeve 104 is formed with a plurality of extrusion ribs 1041. In an embodiment of the present invention, a portion of each of the coupling ends of the longitudinal steel bars 102 which is inserted into the extrusion sleeve 104 at least includes three thread turns, so as to ensure the locking force.

[0065] Of course, the connection of the longitudinal steel bars 102 is not limited to the above form, which can also be achieved by providing a lap joint for the longitudinal steel bars 102 matched with each other. Both ends of the lap joint are welded with two longitudinal steel bars 102 to achieve the longitudinal connection of the two prefabricated sleeper slabs 1. Moreover, the longitudinal connecting structures are not limited to the above-mentioned form of the longitudinal steel bars 102, and other forms can also be selected according to actual needs. For example, in another embodiment, connecting plates are provided on the sides of two prefabricated sleeper slabs 1, and then longitudinal bolts are correspondingly arranged, for correspondingly connecting the two prefabricated sleeper slabs 1, thereby achieving the longitudinal connection of the prefabricated sleeper slabs 1. Alternatively, in another embodiment, members, such as steel plates, iron parts, etc., are pre-embedded into the ends of the prefabricated sleeper slabs 1, and in the later stage, a firm and reliable connection is formed by bolting, welding or hinging, etc., so as to achieve the assembly and connection of the prefabricated sleeper slabs 1.

[0066] In an embodiment of the present invention, a plurality of longitudinal steel bars

102 are arranged on the connecting sides of the prefabricated sleeper slabs 1 and are provided at both ends of each above-mentioned side, respectively. Moreover, in an embodiment of the present invention, the number of the longitudinal steel bars 102 arranged on each of both ends of each above-mentioned side is 4. That is, the number of the longitudinal steel bars 102 arranged on both connecting end surfaces of each prefabricated sleeper slab 1 is 8. Therefore, the two prefabricated sleeper slabs 1 can be correspondingly connected by eight sleeves after being aligned with each other. In an embodiment of the present invention, the longitudinal steel bars 102 and corresponding sleeves form longitudinal connecting structures, so as to achieve the longitudinal connection of the prefabricated sleeper slabs 1, and form an integrated unit along the track direction. Of course, the longitudinal steel bars 102 between the two prefabricated sleeper slabs 1 can be all matchingly connected with each other by sleeves, or can be partly correspondingly connected with each other by sleeves.

[0067] In an embodiment of the present invention, a plurality of prefabricated sleeper slabs 1 can be correspondingly connected with each other along the longitudinal direction by corresponding connection of the longitudinal connecting structures, to form a long slab unit with a certain length. Therefore, in an embodiment of the present invention, the ballastless track structure can be constituted by correspondingly combining one or more long slab units. In an embodiment of the present invention, the long slab unit can form an integrated stressed structure, i.e., a track unit, with the foundation under the track 3 through the cast-in layer 2. Therefore, the ballastless track structure can be formed by correspondingly assembling a plurality of track units along the longitudinal direction, and each track unit is used as an integrated stressed structure to subject the force of the ballastless track structure.

[0068] In an embodiment of the present invention, slab gaps are formed between long slab units, and a limiting structure is correspondingly arranged in the slab gap, and is configured for correspondingly achieving the limitation of the long slab units. The limiting structure can be a bosse, a cylindrical member, etc. The limiting structure can be selectively provided or provided in each slab gap, which can be selected according to actual needs, and is not described in detail here.

[0069] Of course, the limitation of the long slab unit is not limited to the above-mentioned limiting structure, which can be provided in other forms according to actual

needs. For example, in an embodiment, limiting structures are arranged on both sides of the long slab unit, and the limiting structures on the sides of the long slab unit are correspondingly connected to the foundation under the track to achieve the limitation of the long slab unit. In an embodiment of the present invention, the limiting structures can be anchor steel bars or connecting bosses vertically arranged on the sides of the prefabricated sleeper slabs 1. Correspondingly, in another embodiment, the surfaces of part or all of the prefabricated sleeper slabs 1 of the long slab unit can be vertically pierced with through holes or can be provided with sleeves for connecting surfaces of two slabs, so that after the long slab unit is assembled in place, the limitation of the long slab unit can be achieved by planting bars or providing limiting steel nails in the above-mentioned through holes or sleeves. The planted steel bars or the limiting steel nails are matched into the foundation under the track to ensure the stability of the limitation of the long slab unit. In addition, the limitation of each long slab unit can also be provided in other forms according to actual needs, which is relatively easy to be achieved by related technical means in the art. Therefore, it is not described in detail here.

[0070] In an embodiment of the present invention, after the two prefabricated sleeper slabs 1 adjacent to each other are correspondingly connected with each other through the longitudinal connecting structures, a connecting filling portion can be provided corresponding to the longitudinal connecting structures. In an embodiment of the present application, the filling portion is obtained by on-site pouring reinforced concrete or organic materials into an interval between the two prefabricated sleeper slabs 1. Of course, in an embodiment of the present invention, connecting filling portions can be correspondingly provided at two transverse ends of each of all intervals, or connecting filling portions can only be correspondingly provided at two transverse ends of each of some of the intervals, which can be provided according to actual needs. In an embodiment of the present invention, before on-site pouring the reinforced concrete on the longitudinal connecting structures, a hoop stirrup in a cross section plane can be arranged on the longitudinal connecting structures, so that a plurality of the longitudinal connecting structures and the connecting filling portion in the interval between two slabs are connected into an integrated structure. The number of the hoop stirrup can be set to one, or more than one which are arranged to be spaced from each other along the longitudinal direction. Moreover, the connection manner of the hoop stirrup and the longitudinal connecting structures is not specifically limited here. The hoop stirrup and

needs. For example, in an embodiment, limiting structures are arranged on both sides of not specifically limited here. In an embodiment of the present invention, after the longitudinal connecting structures between the two prefabricated sleeper slabs adjacent to each other are correspondingly connected with each other, and the hoop stirrup is matchingly connected with the longitudinal connecting structures to form an integrated frame structure, the reinforced concrete is correspondingly on-site poured onto the above-mentioned integrated frame structure. In this way, the arrangement stability of the connecting filling portions between the two prefabricated sleeper slabs 1 is higher. A plurality of prefabricated sleeper slabs 1 can correspondingly form a stable long slab unit, that is, form a united stressed structure, so that prefabricated sleeper slabs 1 in the long slab unit are not subjected to a force separately, but are subjected to a force as a whole, thereby ensuring the force stability of the long slab unit and even the ballastless track structure.

[0071] In an embodiment of the present invention, a limiting member is correspondingly arranged in the interval between the two prefabricated sleeper slabs 1 adjacent to each other. In an embodiment, the limiting member is a limiting steel bar 401 vertically arranged on the foundation under the track. That is, one end of the limiting steel bar 401 is fixedly arranged on the foundation under the track 3, and another end of the limiting steel bar 401 is vertically arranged between the two prefabrication sleeper slabs 1. Of course, the connection manner of the limiting steel bar 401 with the foundation under the track 3 can be selected according to actual needs, for example, the limiting steel bar is connected with the foundation under the track by on-site planting a bar, or is pre-embedded and fixed on the foundation under the track 3. Furthermore, the limiting member can also be provided in other forms, such as a preembedded member for the sleeve of the steel bar which is arranged in the foundation under the track 3, or a limiting boss which is arranged within the intervals. In an embodiment of the present invention, it is possible to provide one or more limiting members, which can be set according to the setting form of the limiting members or actual needs. Moreover, in the track direction of the ballastless track, each of the intervals between the prefabricated sleeper slabs 1 can be provided with a limiting member, or some of the intervals can be provided with a limiting member, which can be set according to actual needs, and is not described in detail here.

[0072] In an embodiment of the present invention, if a limiting member is provided in

the interval between the two prefabricated sleeper slabs 1 adjacent to each other, it is arranged after the longitudinal connecting structures are correspondingly connected with each other. In an embodiment of the present invention, if the longitudinal connecting structures are correspondingly provided with a hoop stirrup, the limiting member and the hoop stirrup can be correspondingly and matchingly connected with each other, so that the limiting member and the longitudinal connecting structures form an integrated structure. And then the reinforced concrete is poured onto the above-mentioned integrated structure, to form a filling portion 402 as shown in the figures. The filling portion 402 simultaneously wraps and covers the limiting member and the longitudinal connecting structures, so that the limiting member and the longitudinal connecting structures form an integrated structure, thereby simultaneously achieving limitation and connection. In this way, the longitudinal connecting structures, the limiting member and the connecting filling portion are integrally formed, so that the prefabricated sleeper slabs 1 form an integrated stressed structure.

[0073] In an embodiment of the present invention, a middle portion of each of the prefabricated sleeper slabs 1 is provided with a lightening hole 103 penetrated through two end surfaces of the slab body 101, so that each prefabricated sleeper slab 1 becomes a frame slab structure. Moreover, the position of the lightening hole 103 is aligned with the drain 301 arranged in the middle of the foundation under the track 3, which not only reduces the weight of the prefabricated sleeper slabs 1, saves materials and facilitates transportation and installation, but also greatly facilitates the cleaning of the drain 301, thereby reducing the occurrence of blockage of the drain 301 during the application process of the ballastless track structure. In an embodiment of the present invention, a cover plate is provided for a corresponding lightening hole 301 and can be covered on the corresponding lightening hole 301 to form a smooth evacuation passage, so as to facilitate walking on the ballastless track structure. In an embodiment of the present invention, notches are provided on matching and connecting sides of the slab bodies 101. In an embodiment of the present invention, the notches are semi-annular to reduce the weight of the prefabricated sleeper slabs 1. Moreover, after two prefabricated sleeper slabs 1 are aligned and matchingly connected with each other at their sides, two notches on two facing sides can be aligned with each other to form an annular notch, as shown in FIG. 1. Then, a corresponding cover plate is provided on the formed annular notch, so that the region between two steel rails 5 on the ballastless track structure is horizontal,

which facilitates walking and preventing the garbage on the sleeper surface from falling into the drain 301.

[0074] In an embodiment of the present invention, a middle portion of each of end surfaces of two sides for matching connection of each of the prefabricated sleeper slabs 1 is provided with a semi-annular notch. The arrangement of the notch enables both ends of each end surface to form convex structures respectively. The longitudinal steel bars 102 can be correspondingly arranged on the end surfaces of two convex structures. That is, when the two prefabricated sleeper slabs 1 are correspondingly connected with each other, the convex structures at the ends of one prefabricated sleeper slab 1 can correspondingly be aligned with the convex structures at the ends of the other prefabricated sleeper slab 1, and thus the longitudinal steel bars 102 correspondingly arranged on the convex structures can be aligned with each other, so that the prefabricated sleeper slabs 1 can be correspondingly connected with each other by the longitudinal steel bars 102.

[0075] In the above embodiment, the connection between the two prefabricated sleeper slabs 1 adjacent to each other is achieved by pre-embedding the longitudinal steel bars 1 into the end surfaces of each prefabricated sleeper slab 1. This is one arrangement method in the embodiment of the present invention, but not the only arrangement method. For example, in another embodiment, sleeves are provided on the corresponding end surfaces of each prefabricated sleeper slab 1, so that after the two prefabricated sleeper slabs 1 are correspondingly arranged on the foundation under the track 3, the sleeves arranged on the facing sides of the two prefabricated sleeper slabs 1 are aligned with each other. And then longitudinal steel bars are correspondingly provided in each set of sleeves aligned with each other, so that one end of each longitudinal steel bar is connected to the corresponding sleeve on the side of one of the two prefabricated sleeper slab 1, and another end of the longitudinal steel bar is connected to the corresponding sleeve on the side of the other one of the two prefabricated sleeper slabs 1. Therefore, the two prefabricated sleeper slabs 1 can be correspondingly connected with each other by matching a plurality set of sleeves with the corresponding longitudinal steel bars, in which each set of the sleeves is connected with the corresponding longitudinal steel bars.

[0076] Of course, the longitudinal steel bars or sleeves on the end surfaces of the prefabricated sleeper slabs 1 can be pre-embedded or arranged in other forms. For

which facilitates walking and preventing the garbage on the sleeper surface from falling slabs 1, and then an end of each longitudinal steel bar or each sleeve is correspondingly welded to one of the connecting plates to achieve positioning.

[0077] In an embodiment of the present invention, the assembly method for an assembled sleeper slab-type or track slab-type ballastless track structure described above can be performed by the following steps. In an embodiment of the present invention, taking the prefabricated sleeper slabs 1 as an example, the assembly of the prefabricated track slabs can be performed by the same steps as follows.

[0078] In S1, a foundation under the track 3 is formed and poured in a corresponding tunnel, such as a subway tunnel. Then the prefabricated sleeper slabs 1 manufactured in the factory are transported to the construction site. The prefabricated sleeper slabs 1 are successively placed, at intervals, on the foundation under the track 3 along a running direction of a track, in which a certain space is reserved between each prefabricated sleeper slab 1 and the foundation under the track 3 to perform initial adjustment and positioning of each prefabricated sleeper slab 1.

[0079] In S2, the prefabricated sleeper slabs 1 are correspondingly and matchingly connected with each other through a plurality of longitudinal connecting structures, such as longitudinal steel bars 102 and extrusion sleeves 104 described in one embodiment of the present invention, so as to form one or more long slab units. And then each long slab unit is correspondingly set into a ballastless track structure, and each prefabricated sleeper slab 1 is finely adjusted and positioned to make steel rails 5 of the ballastless track structure overall horizontal, so as to guarantee flatness or levelness of the steel rails 5.

[0080] In S3, a limiting member, such as a limiting steel bar 401 described in one embodiment of the present invention, is provided on the foundation under the track in each of some or all of the intervals. A filler, which can be concrete or organic vibration damping materials in an embodiment of the present invention, is on-site poured at each of two transverse ends of each of the intervals each provided with both the longitudinal connecting structures and the limiting member, to wrap and cover the longitudinal connecting structures and the limiting member, and the filler forms a connecting filling portion after curing, in which the longitudinal connecting structures, the limiting member

and the connecting filling portion are integrally formed to simultaneously achieve limitation and connection. A filler is on-site poured at each of the two transverse ends of each of some or all of the intervals in which no limiting member is provided, to wrap and cover the longitudinal connecting structures. The integration and the transverse and longitudinal limitations are simultaneously achieved by one-time casting in place, so that several prefabricated sleeper slabs are assembled to form a long slab unit of a predetermined length and form a united stressed structure.

[0081] In the assembled sleeper slab-type or track slab-type ballastless track structure and the assembly method thereof in the embodiments of the present invention, the ballastless track has a simple configuration, and the assembly method thereof is simple. By providing the ballastless track structure in the form of assembly of a plurality of sleeper slabs with each other, the ballastless track structure can be obtained by rapidly assembling the plurality of sleeper slabs, which is effectively suitable for the application environment of subway. In an embodiment of the present application, the sleeper slabs are prefabricated, and the assembly of the ballastless track structure is completed by assembling the sleeper slabs. The assembly form is simple and the assembly efficiency is high, which can significantly improve the assembly efficiency of the ballastless track structure and shorten the assembly period. By correspondingly providing longitudinal connecting structures on the end surfaces of two sides of each prefabricated sleeper slab, the two sleeper slabs can be correspondingly connected with each other through the longitudinal connecting structures, so as to effectively achieve the connecting of the sleeper slabs. By correspondingly providing a limiting member in a position where the two sleeper slabs are connected with each other, the longitudinal positions of the sleeper slabs are limited, so that the operation stability of the track is effectively ensured and the operation accuracy of the track is guaranteed. Furthermore, the limiting member and the longitudinal connecting structures can be integrally formed, which can simultaneously achieve limitation and connection of the sleeper slabs, significantly shorten the arrangement period of the sleeper slabs, and improve the arrangement efficiency of the ballastless track. Moreover, a middle portion of each of the sleeper slabs is provided with a lightening hole, which can effectively reduce the weight of the sleeper slabs, improve the transportation convenience of the sleeper slabs, save materials, and reduce the production cost of the sleeper slabs. Therefore, it has important popularization and application value.

[0082] It can be easily appreciated by those skilled in the art that, the embodiments described above are merely preferred embodiments of the embodiments of the present invention, and are not intended to limit the present invention. Any modification, equivalent and improvement within the spirit and principles of the embodiments of the present invention shall be included in the scope of protection of the embodiments of the present invention.

CLAIMS

1. A longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure, longitudinal steel bars being pre-embedded in two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other and protruding from end surfaces of the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other, one of the longitudinal steel bars being spaced from another longitudinal steel bar matched with said one of the longitudinal steel bars, and two longitudinal steel bars being longitudinally connected with each other through an extrusion sleeve;

wherein an inner diameter of the extrusion sleeve is greater than an outer diameter of the longitudinal steel bar, coupling ends of the two longitudinal steel bars are respectively inserted into two ends of the extrusion sleeve, and the extrusion sleeve is deformed and performs a locking action under extrusion of a portable extruder.

2. The longitudinal connecting structure of the assembled sleeper slab-type or track slab-type ballastless track structure of claim 1, wherein a portion of each of the coupling ends of the longitudinal steel bars, which is inserted into the extrusion sleeve, at least comprises three thread turns.

3. The longitudinal connecting structure of the assembled sleeper slab-type or track slab-type ballastless track structure of claim 1, wherein the longitudinal connecting structure is provided with a hoop stirrup in a cross section plane.

4. A longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure, longitudinal steel bars being pre-embedded in two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other and protruding from end surfaces of the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each

other, the longitudinal steel bars in the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other being spaced from each other, the longitudinal steel bars spaced from each other being longitudinally connected with each other through an extrusion sleeve;

wherein an inner diameter of the extrusion sleeve is greater than an outer diameter of the longitudinal steel bar, coupling ends of the longitudinal steel bars spaced from each other are respectively inserted into the extrusion sleeve, and the extrusion sleeve is extruded and deformed to lock the longitudinal steel bars which are inserted into the extrusion sleeve.

5. A longitudinal connecting structure of an assembled sleeper slab-type or track slab-type ballastless track structure, connecting plates being pre-embedded in two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other and protruding from end surfaces of the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other, the connecting plates in the two prefabricated sleeper slabs or prefabricated track slabs adjacent to each other being connected with each other.

6. An assembled sleeper slab-type or track slab-type ballastless track structure, comprising prefabricated sleeper slabs or prefabricated track slabs, a cast-in place layer, a foundation under a track, connecting filling portions and longitudinal connecting structures of an assembled sleeper slab-type or track slab-type ballastless track structure of any one of claims 1, 2, 4 or 5;

wherein a plurality of prefabricated sleeper slabs or prefabricated track slabs are longitudinally arranged at intervals, the prefabricated sleeper slabs or the prefabricated track slabs are assembled and connected, at two transverse ends, to each other in the intervals through the longitudinal connecting structures; in some or all of the intervals, the connecting filling portions are formed by reinforced concrete structures, to allow the connecting filling portions to form an assembled integrated structure with the prefabricated sleeper slabs or the prefabricated track slabs, and the prefabricated track slabs form a united stressed structure in the shape of a long slab unit.

7. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 6, wherein the connecting filling portions are provided at two transverse ends of each of at least some of the intervals, and a limiting member is provided on the foundation under the track in each of at least some of the intervals; in the intervals each provided with both the connecting filling portion and the limiting member, the longitudinal connecting structures and the limiting member are embedded in the same connecting filling portion and formed integrally with the connecting filling portion to simultaneously achieve limitation and connection, such that the plurality of the prefabricated sleeper slabs or the prefabricated track slabs are assembled to form a track unit with a predefined length and form a united stressed structure.

8. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 6, wherein the connecting filling portions are provided at the two transverse ends of each of at least some of the intervals, and a limiting member is provided on the foundation under the track in each of at least some of the intervals; in the intervals each provided with both the longitudinal connecting structures and the limiting member, the longitudinal connecting structures and the limiting member are embedded in the same connecting filling portion and formed integrally with the connecting filling portion to simultaneously achieve limitation and connection, such that the plurality of the prefabricated sleeper slabs or the prefabricated track slabs are assembled to form a track unit with a predefined length and form a united stressed structure.

9. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 7 or 8, wherein the limiting member is configured as a planted bar, a pre-embedded member for a sleeve of a steel bar, a limiting boss or a preset steel bar on an upper surface of the foundation under the track.

10. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 9, wherein the limiting member is configured as:

a limiting steel bar, one end of the limiting steel bar being fixedly arranged on the

foundation under the track, and another end of the limiting steel bar being vertically arranged between two prefabricated sleeper slabs or track slabs; or

a pre-embedded member for a sleeve of a steel bar, which is arranged on the foundation under the track; or

a limiting boss, which is arranged within the intervals.

11. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 9, wherein the longitudinal connecting structures are provided with a hoop stirrup in a cross section plane, the hoop stirrup being connected with the limiting member.

12. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 7 or 8, wherein a middle portion of each of the prefabricated sleeper slabs or the prefabricated track slabs is provided with a lightening hole, and each of two longitudinal ends of each of the prefabricated sleeper slabs or the prefabricated track slabs is provided with a notch.

13. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 12, wherein a cover plate is placed on each of the lightening hole and the notch to form a smooth evacuation passage.

14. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 12, wherein the foundation under the track is equipped with a drain along its longitudinal direction.

15. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 7 or 8, wherein first limiting structures are arranged on both sides of the long slab unit, or a second limiting structure is arranged in the long slab unit.

16. The assembled sleeper slab-type or track slab-type ballastless track structure of claim 7 or 8, wherein there are slab gaps between a plurality of track units adjacent to each other, and third limiting structures are arranged in some or all of the slab gaps.

17. An assembly method for an assembled sleeper slab-type or track slab-type ballastless track structure of any one of claims 6-16, comprising the following steps:

S1: pouring a foundation under a track, successively placing prefabricated sleeper slabs at intervals on the foundation under the track along a running direction of the track, wherein a certain space is reserved between each prefabricated sleeper slab and the foundation under the track to perform initial adjustment and positioning of each prefabricated sleeper slab;

S2: correspondingly and matchingly connecting prefabricated sleeper slabs with each other through a plurality of longitudinal connecting structures to form one or more long slab units, then correspondingly setting each long slab unit into a ballastless track structure, and positioning each prefabricated sleeper slab to make steel rails of the ballastless track structure overall horizontal;

S3: providing a limiting member on the foundation under the track in each of some or all of the intervals; on-site pouring a filler at each of two transverse ends of each of the intervals provided with both the longitudinal connecting structures and the limiting member, to wrap and cover the longitudinal connecting structures and the limiting member, and the filler forming a connecting filling portion after curing, wherein the longitudinal connecting structures, the limiting member and the connecting filling portion are integrally formed to simultaneously achieve limitation and connection; and on-site pouring a filler at each of two transverse ends of each of some or all of the intervals in which no limiting member is provided, to wrap and cover the longitudinal connecting structures.