

Fixed carriageway for rail vehicles

The invention relates to a fixed carriageway for rail vehicles which is mounted on resilient elements.

When rail vehicles pass over carriageways, vibrations are generated which are transmitted through the subsoil and can thus be noticed even in adjacent buildings. In order to reduce or completely eliminate such unwanted vibrations, it is already known to configure the carriageway as a sprung-mass system. The carriageway is in this case formed as a separate vibratable mass, which is mounted movably with respect to the subsoil via a resilient element acting as a spring. The resilient element, which is disposed between the vibratable carriageway and the subsoil, e.g. a tunnel structure, in this case effects decoupling of the vibrations, so that the size of the vibrations transferred to the subsoil does not exceed a certain level.

The assembly of a carriageway by the in-situ method of construction with pre-placed resilient elements is however relatively expensive in practice, since an expensive casing has to be produced around the area to be filled with the fluid in-situ concrete in order that, when the in-situ concrete is cast, no rigid connections form between the substructure and the concrete support panel which may act as sound-transmission bridges. The assembly of a carriageway by the in-situ method of construction with subsequently placed resilient elements is also relatively expensive in practice since the concrete support panel is conventionally hydraulically lifted in sections and then the resilient elements are positioned under the concrete support panel. Both methods are time-consuming and lead to considerable cost.

The object of the invention is therefore to indicate a fixed carriageway for rail vehicles whose manufacture can be made simpler and more cost-effective.

To achieve this object, in a fixed carriageway of the type mentioned in the introduction it is proposed that the concrete support panel consists of prefabricated panels and a layer of in-situ concrete resting thereon, the prefabricated panels resting on the resilient elements and forming a monolithic bond with the in-situ concrete.

The invention is based on the knowledge that prefabricated panels can be used which form the bottom-most layer of the vibratable sprung-mass system and simultaneously form a casing for the concreting of the concrete support panel. The prefabricated panel is in this case placed on the resilient elements, and then the concrete support panel is concreted. Thus the stage necessary hitherto of forming casing for the concrete support panel becomes superfluous. In the same way, the subsequent lifting of the concreted concrete support panel becomes superfluous, since the resilient elements have already been positioned in the right place in advance.

The prefabricated panel may have its own reinforcement, in particular it may have a connecting reinforcement, which in the installed state forms a bond with the concrete support panel. If necessary, further reinforcement inserts can be laid on the prefabricated panel, which after concreting of the concrete support panel are located in its lower region. By the connecting reinforcement mentioned, a bond is created between the prefabricated panel and the concrete support panel.

In order to achieve good force-transmission in the region of mutually abutting prefabricated panels, at the butt joints an additional reinforcement can be disposed. This reinforcement can be formed as a reinforcement mesh, whose reinforcement rods disposed in the longitudinal direction respectively cover the butt joints.

The resilient elements of the fixed carriageway according to the invention can form an all-over support, or alternatively they can be formed as strip bearings,

which are preferably disposed under sleeper blocks. In most cases, strip-like resilient elements suffice and are generally advantageous.

As a further alternative, in the fixed carriageway according to the invention, resilient elements in the form of springs may be considered, in particular these may take the form of spiral springs.

A particularly good vibration damping effect can be achieved if the concrete support panel is mounted resiliently in a trough. On the base of the trough are the resilient elements, on which the concrete support panel is laid. Since the concrete support panel can move relative to the trough, the desired technological decoupling of vibration is achieved. By the controlled selection of the mass of the concrete support panel and of the properties of the resilient elements, vibrations of a certain frequency range can be suppressed in a controlled manner.

Further advantages and details of the invention will be explained with the aid of an embodiment and with reference to the drawings, which are schematic representations and show:

Fig. 1 a perspective diagram partially in section of a fixed carriageway according to the invention; and

Fig. 2 a section through the fixed carriageway shown in Fig. 1 transverse to the direction of travel.

The fixed carriageway shown in Fig. 1 is used in a tunnel and comprises a trough 2, in which a concrete support panel 3 is resiliently mounted. At the same time, reference is made to Fig. 2, which shows a section through the fixed carriageway 1 shown in Fig. 1 transverse to the direction of travel.

In manufacturing the fixed carriageway 1, resilient elements formed as strip bearings 5 and consisting of elastomer material are laid on the base face 4 of the trough 2.

On the resilient elements, a prefabricated panel 6 is laid, which has on its upper face 7 a projecting connecting reinforcement 8. Additionally laid and aligned on the prefabricated panel 6 are longitudinal reinforcements 9 and optionally transverse reinforcements (not shown) as well as sleepers 10, which are assembled to form a track grid with rail fixings 19, rails 18 and longitudinal reinforcements 9. In the example shown, dual-block sleepers are used, whose sleeper blocks 11, 12 are respectively connected together via a grid support 13. In the region of the butt joints of mutually abutting prefabricated panels 6, an additional reinforcement 17 overlapping the butt joint is laid.

On the side walls 14 of the trough 2, resilient elements 15 acting as side casings are mounted, which prevent the penetration of concrete into cavities 16 below the prefabricated panel 6.

By concreting, the concrete panel 3 is formed, a bond of the concrete support panel 3 with the prefabricated panel 6 being produced by the connecting reinforcement 8 on the upper face 7 of the prefabricated panel 6. By the penetration of the fluid in-situ concrete, the sleepers 10 are embedded in the concrete support panel 3, so that only the upper region of the sleeper blocks 11, 12 projects from the concrete support panel 3.

The concrete support panel 3 forms a vibratable mass with respect to the trough 2, whose vibration behaviour can be adapted over a wide range by the mass of the concrete support panel 3 and the properties of the strip bearings 5. To this end, the width, thickness or material of the strip bearings 5 can be varied accordingly, as well as the mass of the concrete support panel 3. Thus the desired advantageous vibration behaviour can be achieved, so that when a rail

vehicle passes over the fixed carriageway 1, the vibrations caused thereby are barely, if at all, transmitted to the trough 2 and the surroundings.

Claims

1. Fixed carriageway for rail vehicles, with a trough (2), in which a concrete support panel (3) is mounted on resilient elements, characterised in that the concrete support panel (3) in the installed state consists of prefabricated panels (6) having a connecting reinforcement (8) on the upper face (7) and a layer of in-situ concrete applied on top, wherein the prefabricated panels (6) rest on the resilient elements and form a monolithic bond with the in-situ concrete.
2. Fixed carriageway according to claim 1, characterised in that on top of the prefabricated panel (6) additional reinforcements, in particular a longitudinal reinforcement (9) and optionally transverse reinforcements, are provided.
3. Fixed carriageway according to claim 1 or 2, characterised in that the monolithic bond is generated by adhesion and/or profiling of the surfaces of the prefabricated panel (6) and/or mechanical connections.
4. Fixed carriageway according to one of the preceding claims, characterised in that at the butt joints of mutually adjacent prefabricated panels (6) an additional reinforcement (17) is provided.
5. Fixed carriageway according to one of the preceding claims, characterised in that the resilient elements form an all-over support or strip bearings (5) or individual bearings preferably disposed under sleeper blocks.
6. Fixed carriageway according to one of claims 1 to 4, characterised in that the resilient elements are formed as springs, in particular spiral springs.