Slab Track IVES

// Intelligent, Versatile, Efficient and Solid

RHOMBERG SERSA RAIL GROUP

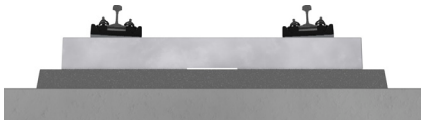
IVES – synthesis of design and construction experience

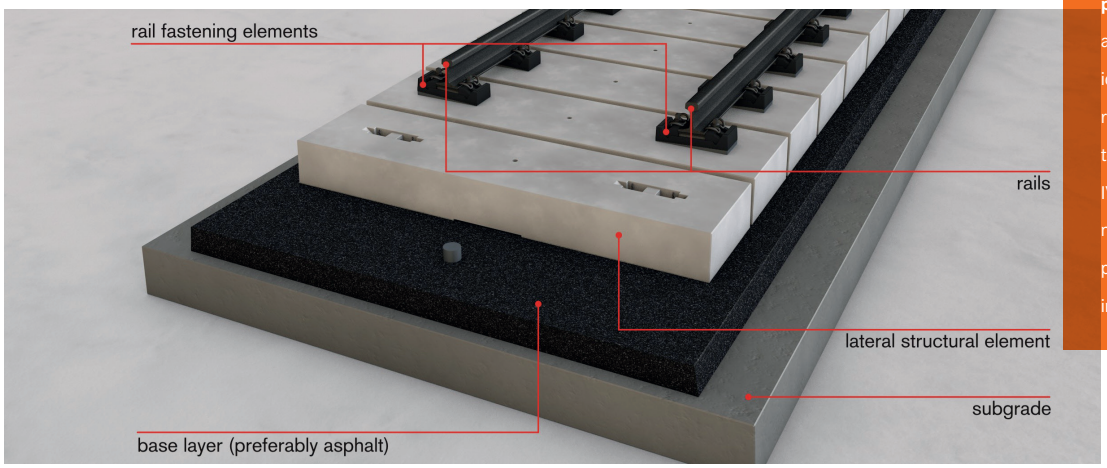
// Rhomberg Rail can call on years of theoretical and practical know-how in the various types of slab track construction. And the result is IVES, the latest development in ballastless track construction.

IVES stands for intelligent, versatile, efficient, solid. All these characteristics are embodied in this integrated concept, which is based on an analysis of the advantages and disadvantages of various long-term tested slab track techniques.

Philosophy and construction

During the development of IVES, the various possible components, materials and working processes were investigated and matched to one another to combine the simplicity and robustness of the bottom-up systems with the high precision of the top-down systems. The result is a technically and economically optimised type of superstructure that reduces not only costs in ordinary fields of application of slab track (high-speed track in built-up areas), but also allows a considerably wider range of uses of this technology as an alternative to ballast roadbed.





The IVES efficiency principle: Load capacity, accuracy and amount of work are ideally matched to the respective requirements. In terms of cost and effort, IVES involves as much as necessary and as little as possible of these resources in all areas of construction.

Load capacity

The load capacity requirement decreases as the stresses from the railway loads decrease from the top downwards.

Accuracy

The influence of manufacturing accuracy on vehicle track guidance decreases from top downwards.

Amount of work

The amount of work involved in building the track decreases from the bottom upwards.

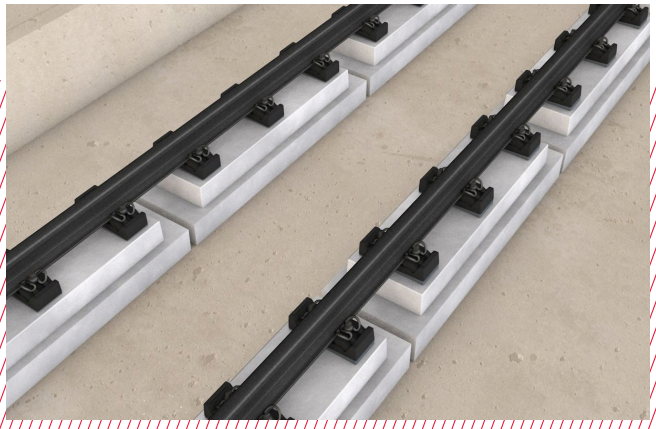
Overall quality

The requirements for overall quality are consistently fulfilled.

Universal application

Different railway types – same track system:
The IVES slab track system can be used for almost any type of permanent way (standard gauge, rapid transit, low- or high-speed railway). Because of its simple form of construction, any required modifications can be made quickly and easily.

Changes to the track configuration – easily done by sticking to the basic principles
The simple design of the prefabricated concrete units, in particular their shape and precise dimensions, allows each component to be specifically adjusted to suit any track configuration.



The IVES system at a glance

Intelligent:

- Flexibility of adaptation to suit the state of technology available at the installation site through its relatively simple and functional construction: structural layers and elements can be generally constructed on site, wherever run-of-the-mill road-building and manufacture of simple prefabricated units can take place.
- Flexibility of tailoring the amount of work involved to suit project resources through a simple step-by-step approach to installation: can be constructed equally well using low-tech equipment or highly mechanised plant.

Versatile:

- Can be used for virtually all types of permanent way (standard gauge, rapid transit, low- and high-speed railways).
- The simple design of the structural elements allows individual components to be specifically modified to suit the track configuration.

Efficient:

- Greater availability of components thanks to the simple, standardised design of the structural elements.
- Universal component design (or any necessary adjustments can be done at relatively little cost).
- High degree of mechanisation is possible due to simple step-by-step installation.
- Interruption of construction is no problem, as the installation steps are not time-dependent.
- Short waiting times between each installation step
- Track under construction can be used for transport purposes at almost every stage of installation
- Early defined point in time when the finished track is capable of supporting loads

Solid:

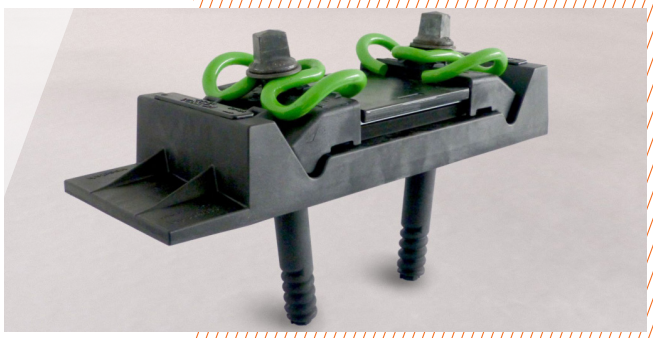
- Consistently high quality
- Efficient high-grade materials
- Proven materials and components

Efficient use of components and materials

// One of the key ideas in the development of IVES was the efficient and deliberate use of components and materials with qualities that match their respective requirements. Likewise, manufacturing methods and transport and construction processes take into account the objective of increasing efficiency. The results are constituent parts that are quick and easy to produce, transport, handle and install.

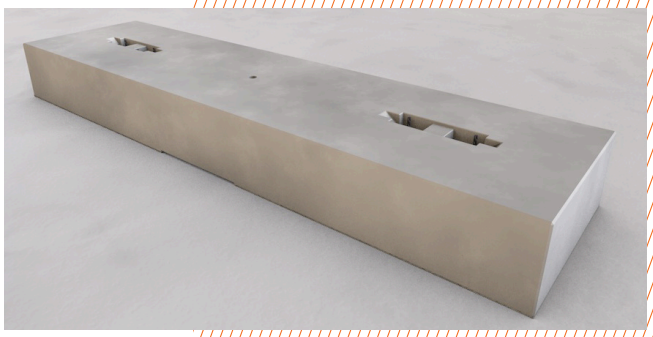
Rail fastening system

The DFF 304 system is based on proven and approved components. The support points were modified so that they provide a form of direct fastening (grouted into the precast element) to fulfil the highest demands for long-term pull-out resistance and convenience of installation.



Structural elements

These components carry the grouted-in rail fastenings and transfer the vehicle load into the base layer. As they do not directly determine the rail geometry, they can be manufactured in the appropriate quality without adopting too high a technical standard so that costs can be kept relatively low.



Grouting in the rail fastenings

A high-strength, rapid-hardening grouting mortar is used so
that grouting the rail fastenings into the precast concrete units
is an easy, quick and reliable on-site process that achieves a high-quality result.

Base layer

The base layer is preferably constructed of road asphalt using conventional methods. As a rule, the base layer should have dowels inserted to create a connection capable of transferring shear from the structural elements into the base layer.

The success of the IVES installation concept is based on the following:

- Efficient combination of bottom-up and top-down installation principles
- Efficient distribution of the accuracy and amount of work involved
- Efficient use of material and component qualities

Construction of base layer

The base layer, preferably consisting of asphalt, is normally laid with a road finisher in accordance with the bottom-up principle. The accuracy requirements are lower than most road construction projects and should be quite easy to achieve.

Placing the structural elements

The position and depth of the structural elements are roughly defined by the preinserted dowels and the properties of the base layer. Their uniformly level surface allows a wide variety of vehicles to run on them directly after placing.

Asphalt base layer with dowels

**Installation technique:
Simple, reliable,
quick, flexible**

Formation of the track panel

The track panel, consisting of rails and track fastenings, is formed using proven techniques. The plastic dowel bolts of the rail fasteners project into the recesses in the top of the transverse structural elements.

Fine adjustment of the track panel

The track panel is brought to its precise position and level. The top-down principle allows all the inaccuracies from the previous steps to be compensated for later, even at a very late stage in the work. The recesses in the top of the transverse structural elements allow relatively large ranges of horizontal and vertical corrective adjustments.

Fixing the rail support points

The voids between the rail fastenings and the structural elements are filled with high-strength mortar. The intention here is to permanently fix the track panel exactly in the desired position.

Placed structural elements

Structural elements with track grid

Rhomberg Sersa UK Limited
Unit 2 Sarah Court
Yorkshire Way
Doncaster DN3 3FD

Blackthorn House
Skull House Lane
Appley Bridge, Wigan WN6 9DB

Tapton Park Innovation Centre
Brimington Road
Chesterfield, Derbyshire S41 0TZ

T +44 300 3030 230
enquiries@rsrg.com
www.rhomberg-sersa.com/en

RHOMBERG SERSA RAIL GROUP