edilon)(sedra USTS
(Urban Slab Track System)

Always a step ahead in rail systems!

www.edilonsedra.com
Two unique systems

edilon|sedra USTS (Urban Slab Track System) is a unique combination of two proven technologies: the edilon|sedra LCS-L (Level Crossing System) and the edilon|sedra ERS (Embedded Rail System). As the system consists of prefab slabs, USTS is installed in extremely short track possession times, beneficial to rail and road traffic and to the neighbourhood of the track. Continuous elastic rail support embedded in prefab concrete slabs means that the horizontal and vertical forces are more evenly distributed into and under the slab. Furthermore, the chance of rail breaks compared to traditional systems based on ballasted track, is significantly reduced and rail corrugation is effectively eliminated. By using USTS, the track, the slab and the rails are installed in an extremely durable way.

a multifunctional concept!

edilon|sedra LCS-L prefab slabs have given assurance and comfort for more than 30 years to both rail and road traffic. The weight of the LCS-L prefab slab and the distribution of forces are a guarantee for both a stable and a durable performance. In addition, ERS provides stray current protection and significant noise and vibration reduction, which has become an important issue in densely populated areas.

| BENEFITS |
|-----------------|-----------------|-----------------|
| Continuous elastic rail and slab support | Rail life cycle over 30 years | Slab life cycle over 50 years |
| Minimized life cycle costs | Fast and efficient installation | Virtually no maintenance on rail and slab |
| Track support stiffness in 3 categories | Adaptable to all rail profiles | Various slab dimensions |
| Various slab covering materials | Material saving items | Resilient ERS Strip |

edilon|sedra Corkelast®

Concrete or steel channel
In urban environments, the costs associated with installation or replacement of track rise due to the time that either track, roads or both are closed and not in operation. Reduced construction times and minimum track possession times have taken a more prominent place in modern planning of works. In this complex area of competing between local authorities, residents and rail operators, edilon)(sedra USTS offers clear advantages. Possession times are minimized and construction times are predictable. An additional property of edilon)(sedra USTS is the wide variety of surfacing that can be incorporated. So-called green tracks (lawn or vegetation) have started to gain interest.

Edilon)(sedra USTS allow various types of surfacing between the two rails while maintaining optimal electrical insulation. Tarmac, asphalt, imprinted concrete and cobble stones can be laid between the tracks maintaining (or even adding to) the local architectural heritage. Prefab slabs are delivered on lorries and laid one-by-one on a levelled base. Installation of 200m of track per day have already been achieved.

The technologies of edilon)(sedra ERS also offer important engineering advantages. Freedom to use all rail profiles and to choose the most advantageous vertical track stiffness category, integration of safety and signalling systems and drainage systems, all these contribute to make edilon)(sedra USTS ideal for urban tracks.
Unique flexibility

**RAILS FLUSH WITH SURROUNDING SURFACES**
- Paved-in like in level crossings
- Effective for busses and heavy road vehicles
- Paving of concrete, tarmac, asphalt or cobble stones
- Reduction of structure-borne noise
- Reduction of airborne noise
- Noise reduction also effective for road traffic
- Mass-spring system (optional)

**GRASS TRACKS**
- Appealing design
- Effective stray-current protection
- Reduction of structure-borne noise
- Reduction of airborne noise
- Mass-spring system (optional)

**LEVEL CROSSINGS**
- Crossing tracks anywhere
- Durable track and road alignment
- Any surfacing possible

**CURVES**
- Track cant up to 170 mm (normal gauge)
- Curve radius down to 15 m
- Track gauge widening (optional)
- Installation of guard rail (optional)

**SWITCHES AND CROSSINGS**
- In-situ or prefab concrete slabs
- Hybrid solutions and work methods (optional)
- Integration of steering equipment
- Durable track alignment
- Mass-spring system (optional)

The flexibility of edilon|sedra ERS is evident in all feasible types of edilon|sedra LCS-L designs. It will suit any environment: e.g. grass tracks, pavements, roads, and even bridges, tunnels. The edilon|sedra USTS allows implementation of any track gauge and any type of track geometry, and integration of all safety and signalling systems.
edilon)sedra also offers many solutions in the Embedded Rail System, as well as other ballastless track systems, level-crossing and bridge systems. For more information, please visit www.edilonsedra.com.
Bearing capacity and strength of slab and ground
Supporting the loads from rail and road traffic means a good balance between the elastic deflection and the strength of the entire edilon|sedra USTS design. The bearing capacity of the base layers plays an important role here. The allowable internal stresses in the slab as well as what the ground can support effectively are restricted by material characteristics. This is to be taken into consideration when analysing the chance of crack formation in the slab and track settlement. The slabs are therefore laid on a stabilized layer. The level of stabilization required is naturally dependant on the application. Laying slabs directly on a split bed or injection grouting under the slabs are two of the most commonly used techniques.

Connecting slabs together reduces the forces acting on the layer directly under the slab, and spreads the forces over a greater area. This technology is offered as an option, depending on the application.

Design on rail and channel
The forces arising from rail and road traffic on the slab are most critical around the rail and in the corners. To understand this, extensive modelling and laboratory testing are done to analyze and further optimize the system. Rail profile, mechanical material properties, channel and slab dimensions and construction tolerances are all included in the process of finding the most durable and suitable system.

FEATURES:
Suitable for rail and road traffic
Suitable for any level crossing
Ideal for curves and gradients
Quick installation

SLAB CHARACTERISTICS:
Available in various slab lengths
Available in any curve radius
Highly durable surfacing
Surfacing with various materials
No rutting and sufficient skid resistance
Increased safety for cyclists, motorists and disabled people
Connection method to form longer track sections
Watertight joints between (and along) slabs
Mass-spring system (optional)

EMBEDDED RAIL CHARACTERISTICS:
Continuous rail support
Alignment of rails after slab installation
Available in various gauge widths
Track support stiffness in 3 categories
High electrical insulation and stray current protection

edilon|sedra ERS is offered in 3 support stiffness categories, which relate to rail deflection and vibration insulation. In the figure the rail deflection is illustrated for 2 axles of a tram of 10 tonnes each. The 3 stiffness categories (SS, MS and LS) generate different rail deflection curves.
edilon)(sedra USTS is a quick installable system. The prefab slabs are placed on the supporting layer, or on foam profiles for grout injection. In the latter case slabs are jacketed to the correct level and grouted, optionally connected. Embedded rail installation completes the installation works.

**Installation**

edilon)(sedra USTS is designed to work exactly as the client wants it. Should, for whatever reason, the track no longer meet his expectations, either maintenance or replacement may be necessary. The system offers the important advantage that should maintenance or replacement be necessary, it can be done in tight possession times.

**Health, Safety and Environment**

All products and systems produced at edilon)(sedra adhere to the rules and prescriptions regarding Health, Safety and Environment. The installation of edilon)(sedra USTS can be performed by edilon)(sedra staff or certified companies. edilon) (sedra produces extensive documentation about its products, their use, effects and disposal. Finally, there are clear and comprehensive documentation and user instructions for installation of the system available.

**ADVANTAGES**

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<th>Benefits</th>
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<td>Virtually no maintenance</td>
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<td>Optimal ride comfort over decades</td>
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<td>Reduced rail corrugation</td>
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<td>Reduced wear on the rail head</td>
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**CONVENTIONAL MAINTENANCE WORK**

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<th>Maintenance Activities</th>
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<tr>
<td>Cleaning of flangeways (e.g. crossings)</td>
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<td>Rail grinding or re-profiling</td>
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<td>Surface welding</td>
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<td>Joint inspection and replacement</td>
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