



# THE LOW VIBRATION TRACK (LVT) SYSTEM

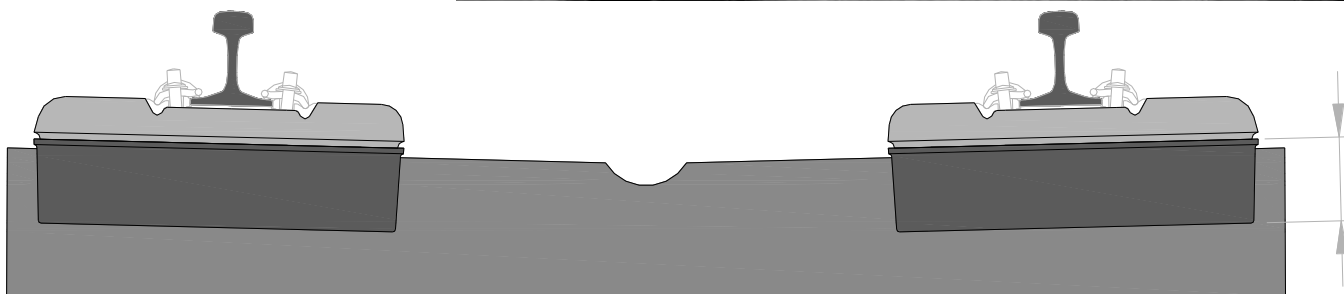
**sonneville**

**UEEIV Slab Track Forum, Napoli 6<sup>th</sup> & 7<sup>th</sup> November 2025**

# LVT SYSTEM

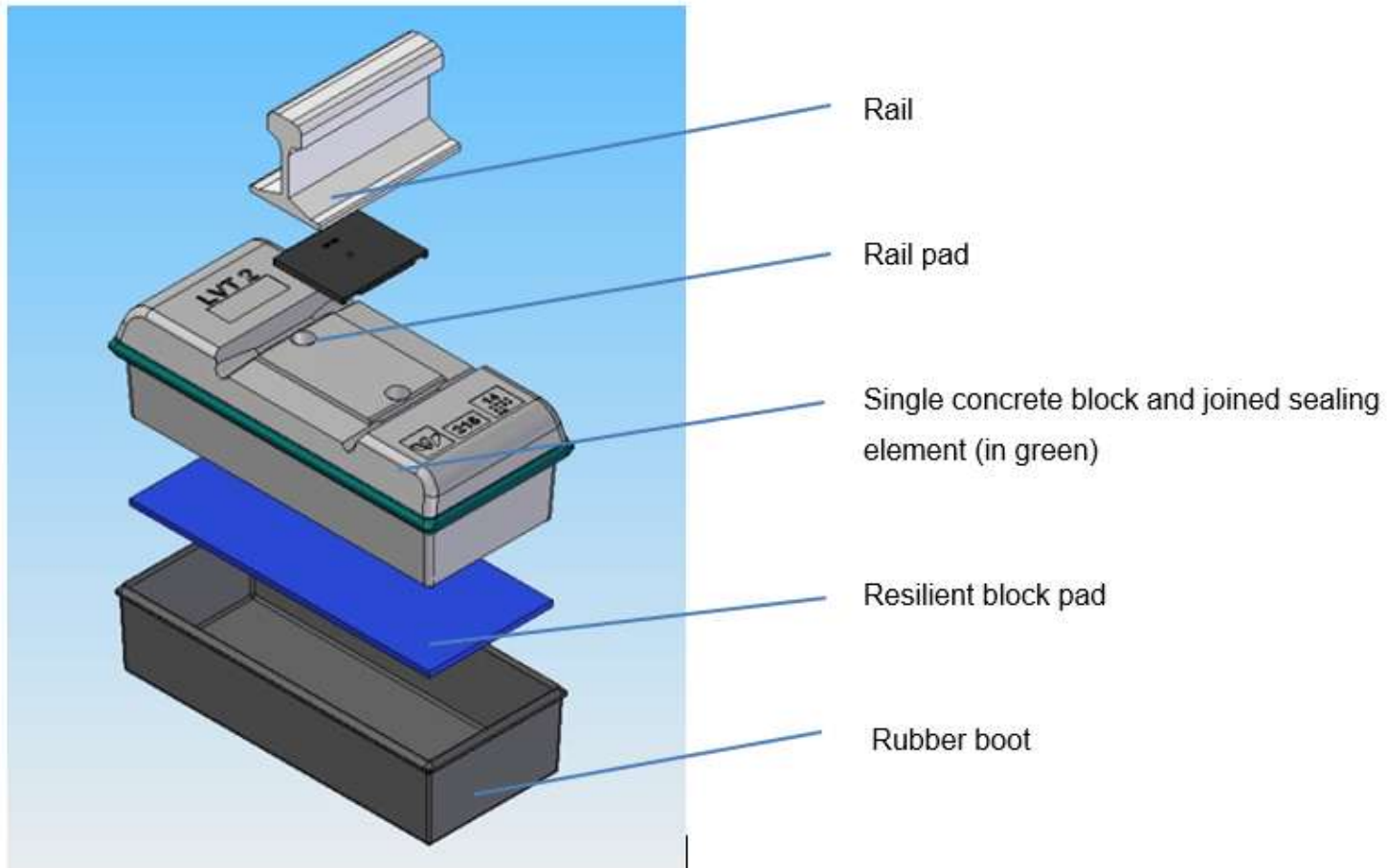
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## LVT Single Block System



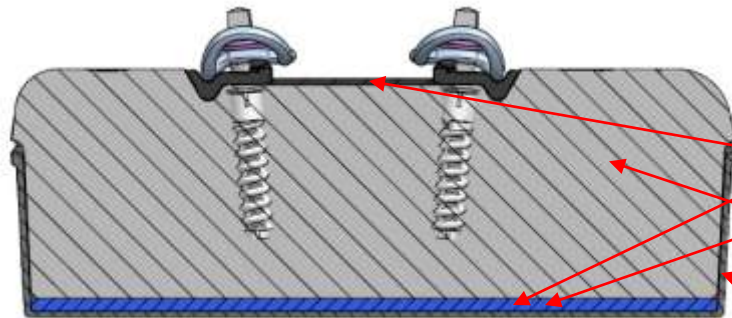
Embedment depth  
6" (150mm)

# LVT COMPONENTS



# LVT SYSTEM CHARACTERISTICS

The following principles have accompanied the development of LVT:



1. Deflection underneath the block
2. Two levels of elasticity (block pad and rail pad)
3. Use of a concrete blocks for rail fixation
4. Isolation of concrete blocks from the slab through lateral elasticity – reduction of vibration transmission
5. Accurate Track geometry due to top down installation method

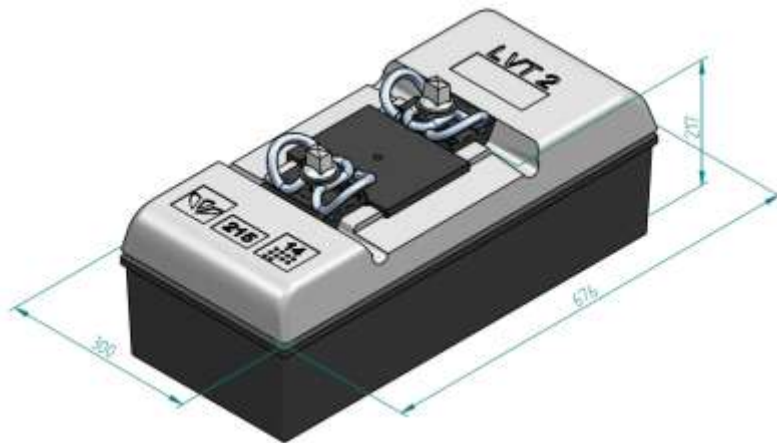




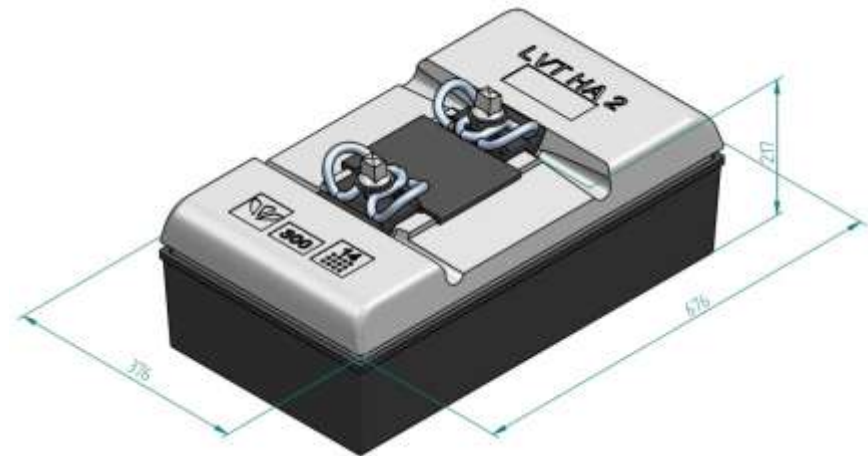
# LVT TYPE APPLICATION

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STANDARD LVT

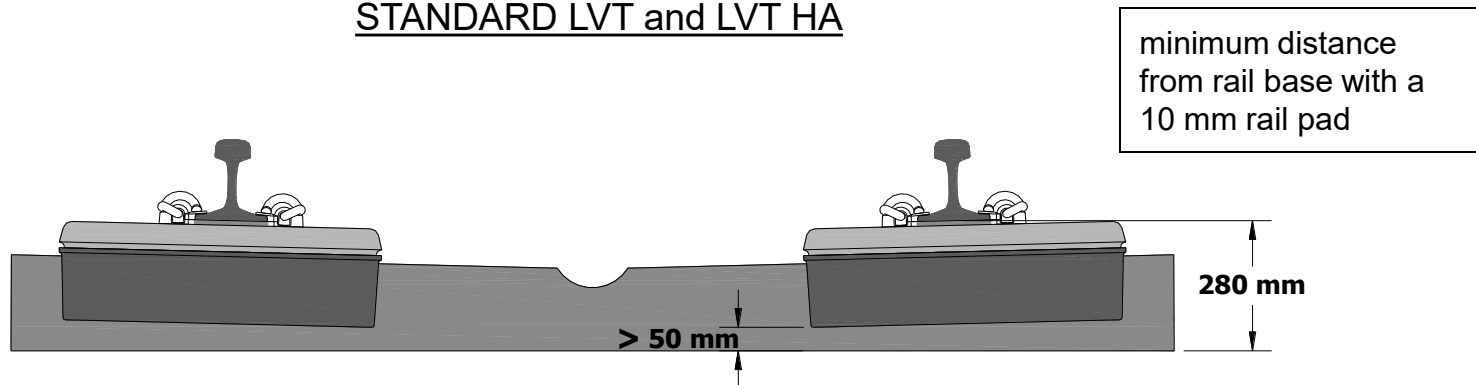


HIGH ATTENUATION LVT

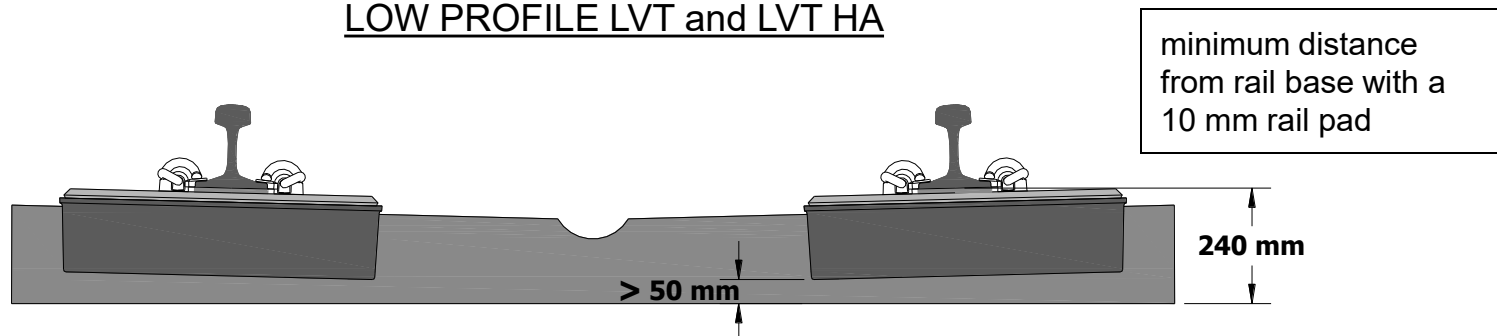


# LVT TYPICAL CROSS SECTIONS

STANDARD LVT and LVT HA

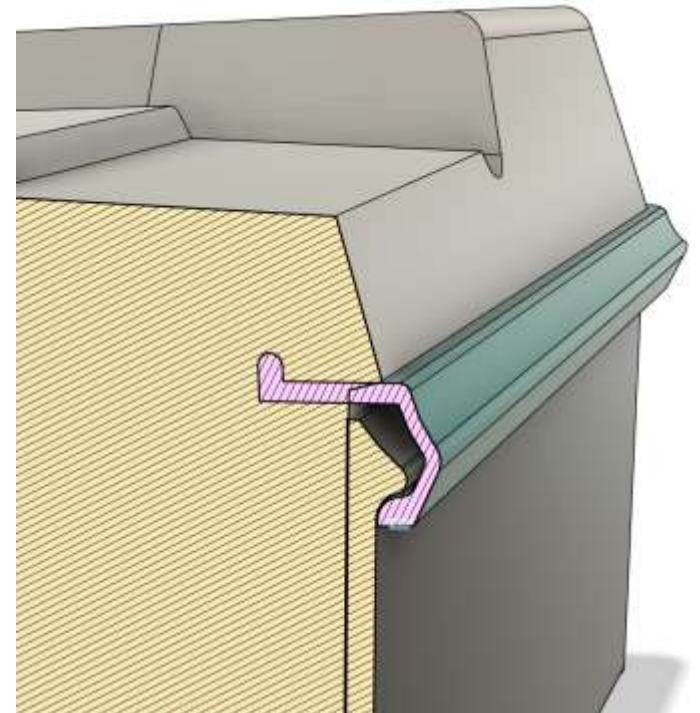


LOW PROFILE LVT and LVT HA



# LVT LATEST DEVELOPMENT

## LVT with Sealing Element (SE)



The sealing element is cast-in the LVT concrete block to prevent any ingress of debris

# LVT LATEST DEVELOPMENT

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## LVT with Sealing Element



Lötschberg Crest Tunnel, Switzerland

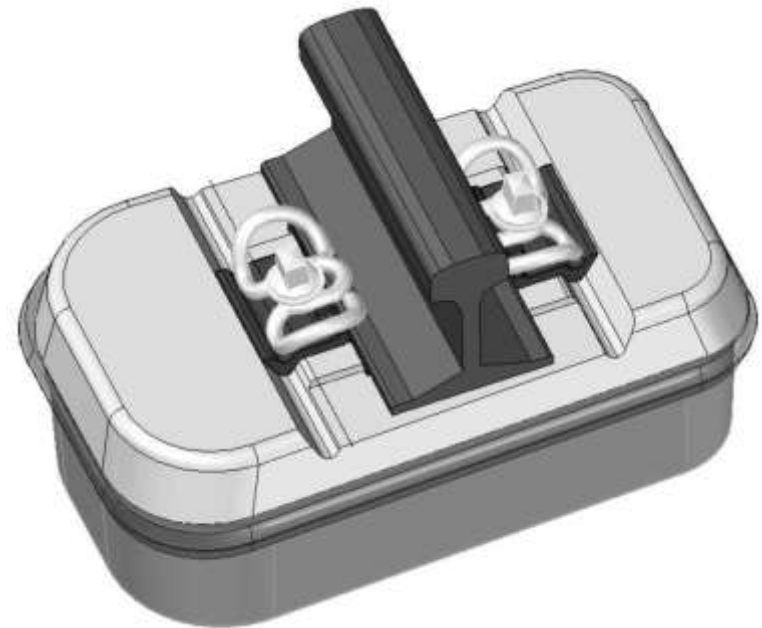
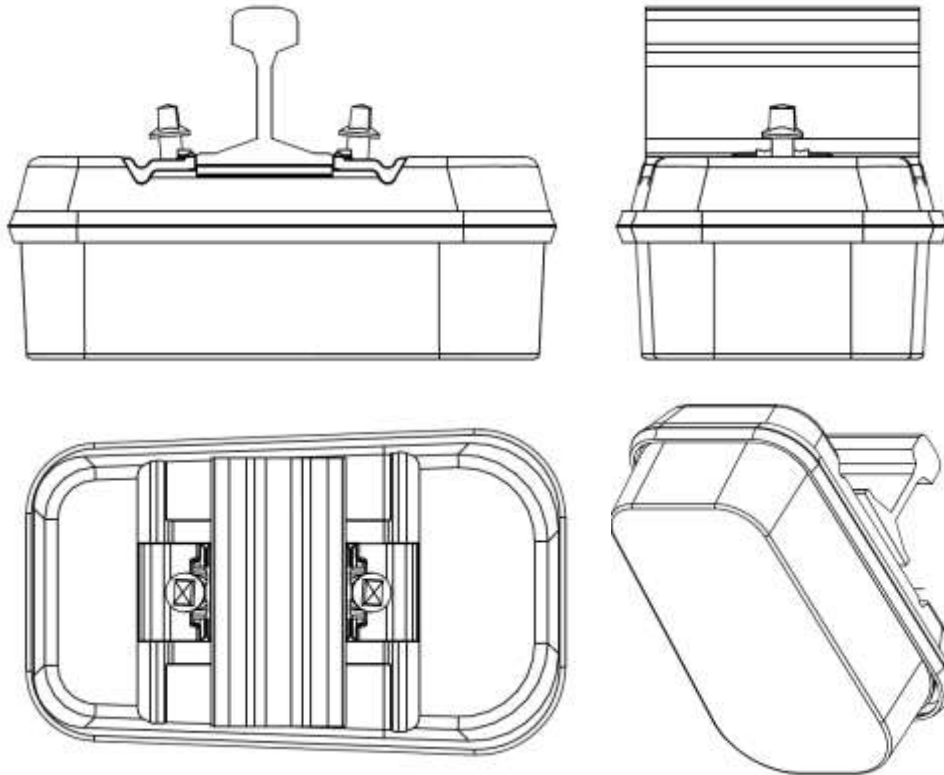




# LVT LATEST DEVELOPMENT

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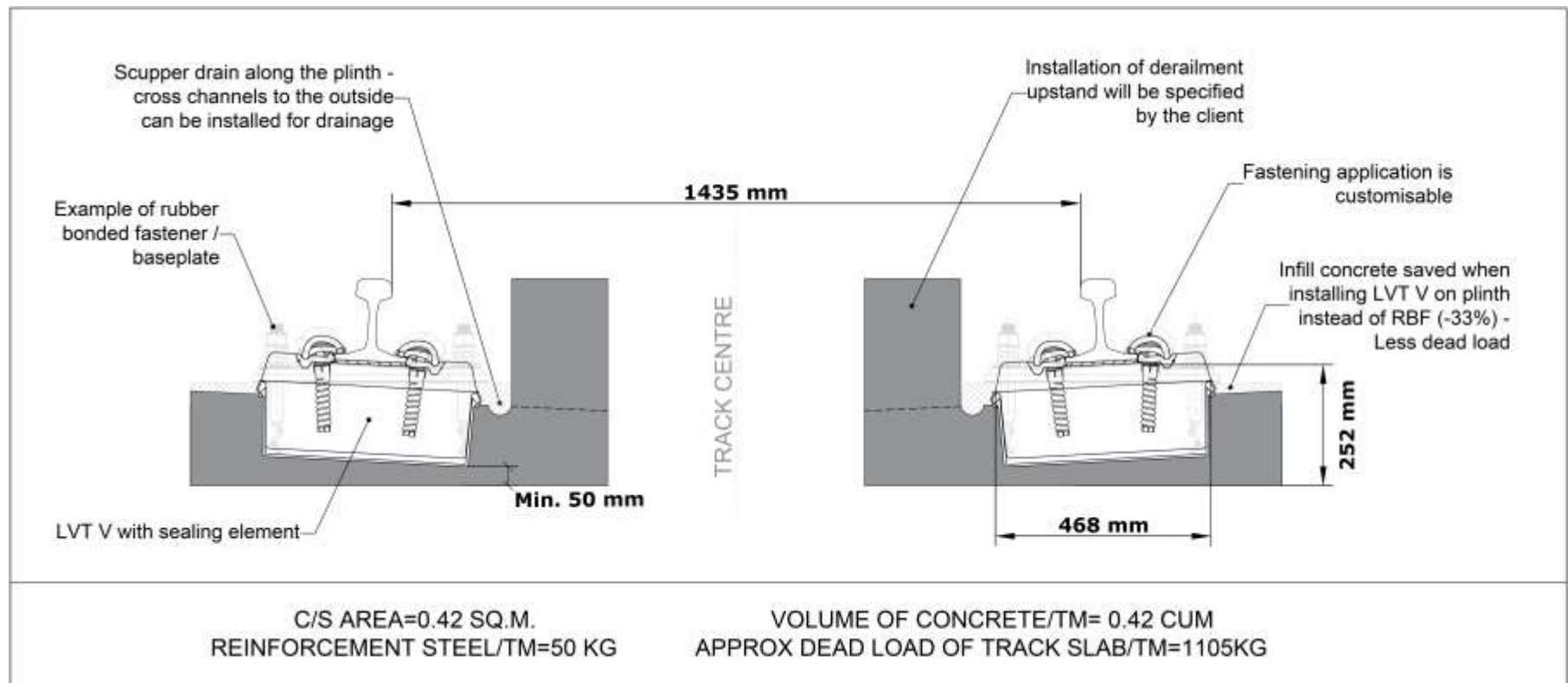
LVT V



Round-shaped concrete block with reduced dimensions and weight. Embedding in the filling concrete is also reduced.

# LVT LATEST DEVELOPMENT

LVT V allows to reduce the dead load on bridges and viaducts significantly.



# LVT FASTENING APPLICATION

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LVT is proven in revenue service with **SKL fastening systems**

# LVT FASTENING APPLICATION

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LVT System with **e-clip fastening system**

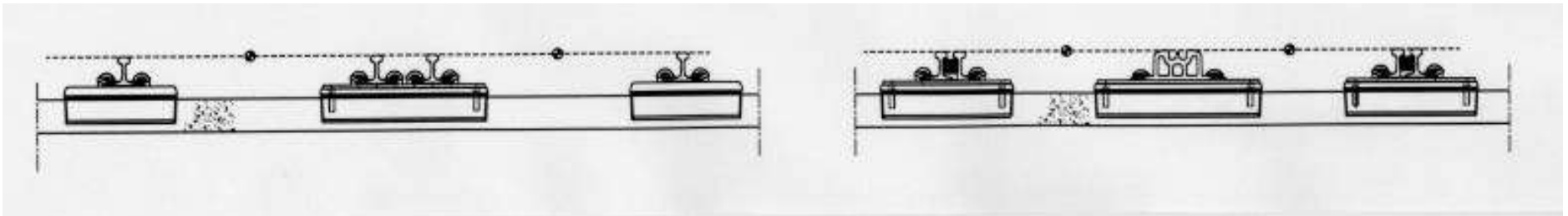


LVT System with **Fastclip fastening system**

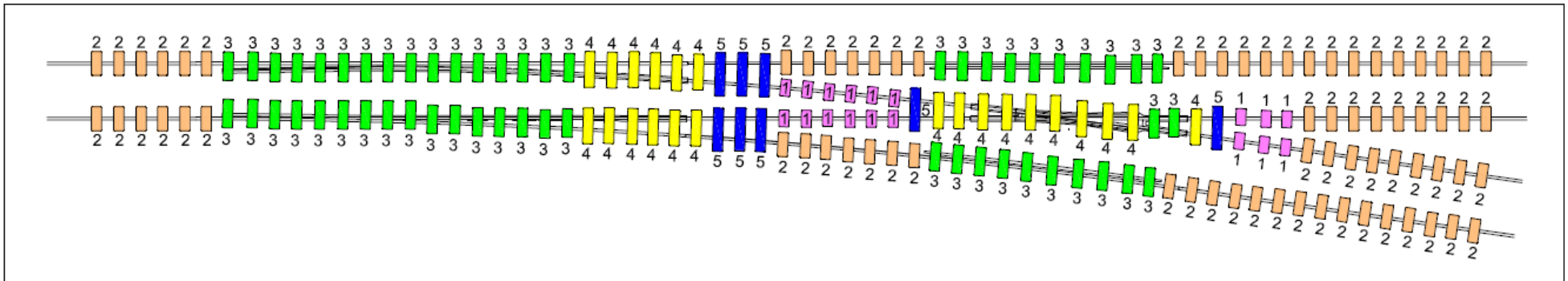


# LVT SPECIAL TRACKWORK

LVT provides solutions for Switches and Crossings (LVT S & C).



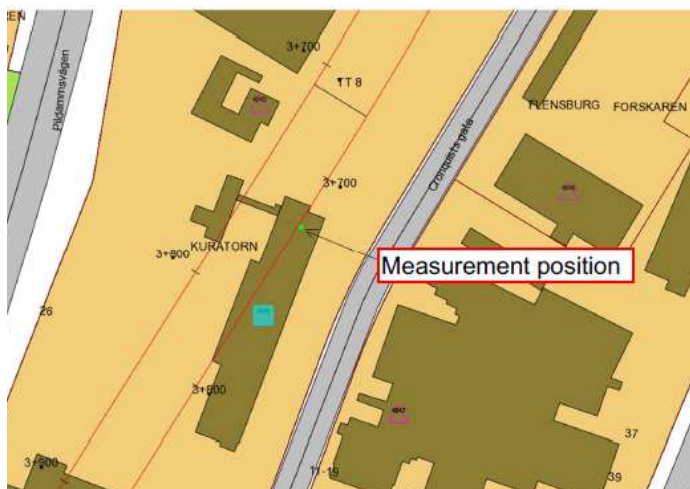
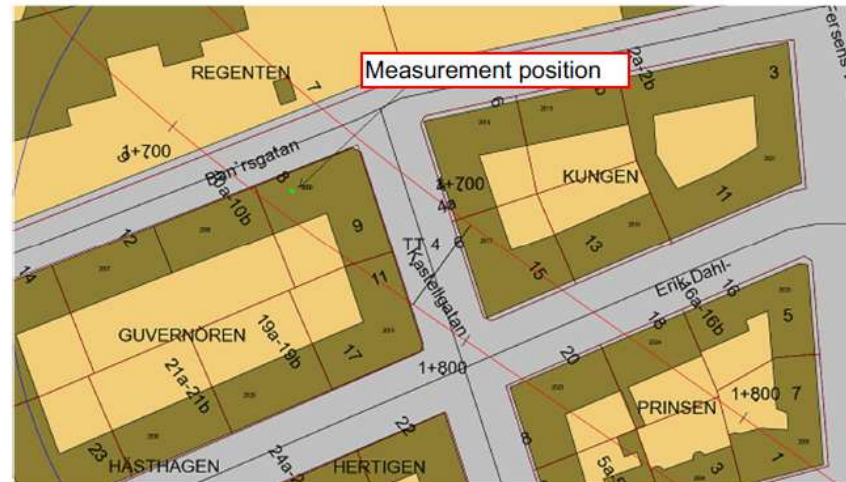
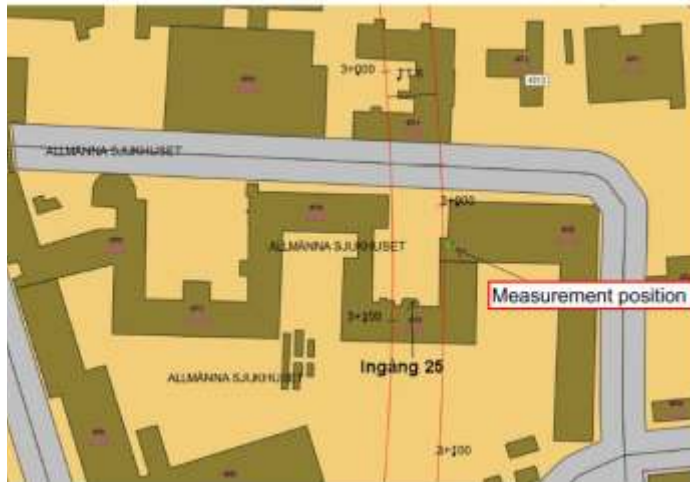
# LVT SPECIAL TRACKWORK



LVT S & C permits to achieve:

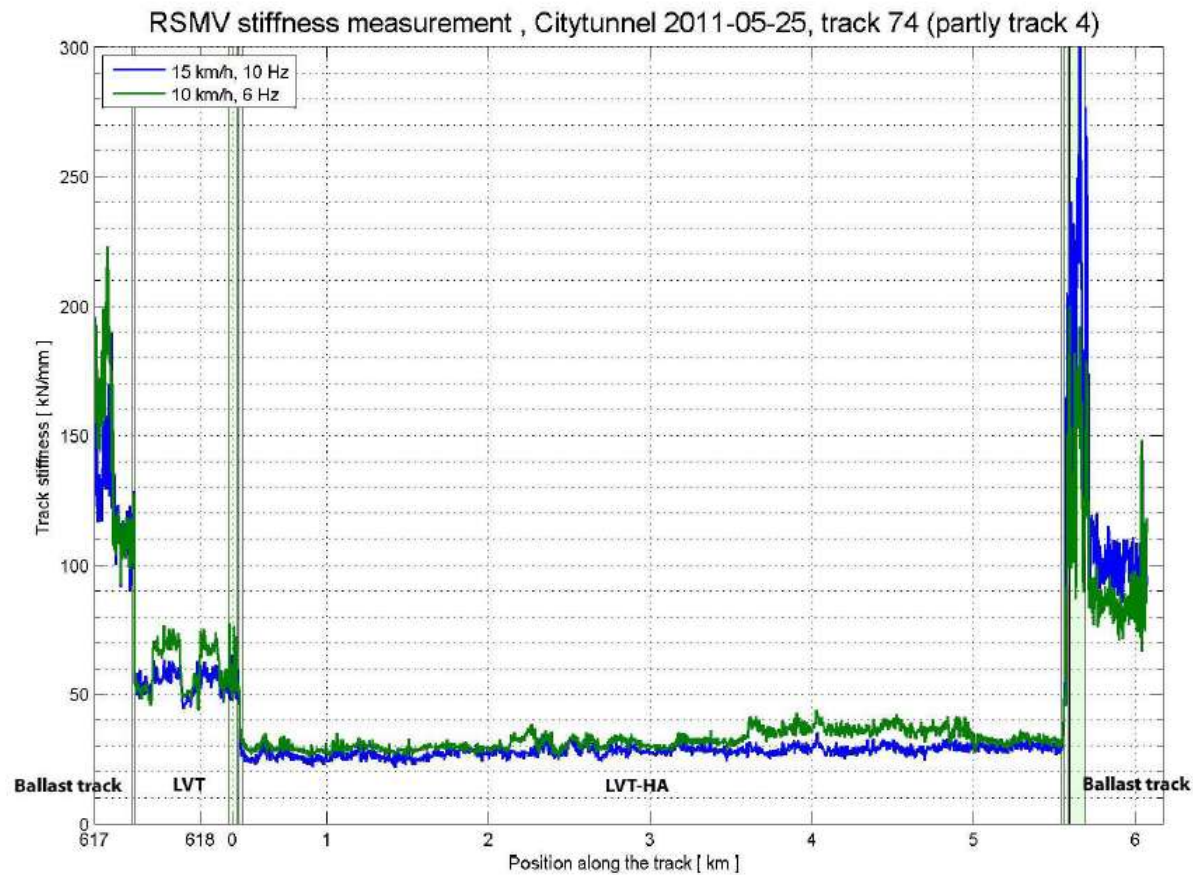
- Standardisation
- Precise top-down construction
- Long term stability
- Consistent track modulus
- Effective surface drainage

# CITYTUNNELN MALMO





## In-Situ Measurement



Vibration measurements after start of service: (**Project requirements  $v < 0.4$  mm/s and 30 dBA**)

## Results from measurements

| Real estate / measurement location                            | Structure-borne sound, $L_{\max}$ Slow | Vibration $V_{\text{RMS}}$   | Comments                                                                                               |
|---------------------------------------------------------------|----------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------|
| UMAS Entrance 25<br>Reuma ward 11, hospital room hall 6.      | $< 25$ dBA*                            | $< 0,1$ mm/s                 | Measured at ward on bottom floor, no audible sound from the trains according to measurement personnel. |
| Kv Munken 7,<br>Munkgatan 5                                   | $< 27$ dBA*                            | $< 0,1$ mm/s                 | Measured in basement, some train passages were just audible according to measurement personnel.        |
| Kv Guvernören 4,<br>Banérsgatan 8                             | $< 25$ dBA*                            | $< 0,1$ mm/s                 | Measured in basement, some train passages were just audible according to measurement personnel.        |
| Kv Kuratorn 3, Sommarstadens studenthem,<br>Cronqvist gata 10 | 28 dBA* (X61)<br>27 dBA* (X31)         | $< 0,1$ mm/s<br>$< 0,1$ mm/s | Measured in basement, some train passages were just audible according to measurement personnel.        |



- **High adaptability** in design for different railway systems, operational and climatic conditions with effective vibration mitigation
- **High accuracy** in **track geometry** through top-down installation method (+/- 0.5mm)
- **Design and engineering flexibility** with regard to the LVT system and rail fastening used
- High degree of **controlled industrial manufacturing** and **pre-assembly** providing a ready-for-installation system
- Proven **maintenance free operation** except for standard rail maintenance
- **Absence** of any **direct electrical conductivity** between opposite blocks - no **stray current issues**
- **No exposed steel components** that may corrode over time
- **Exceptional lateral resistance** and **dynamic gauge control** resulting from the deep embedment of the LVT concrete block assembly in the track concrete
- **Unobstructed track center** providing a better aerodynamic track, safe walkway for maintenance workers or passengers (in case of an emergency) and easy access for cleaning

# INNOVATION IN SLAB TRACK (cont'd.)

- **Free access to all components**, without the need to cut the rail or to dismantle the track, ...

... if an **accidentally damaged component** must be replaced or

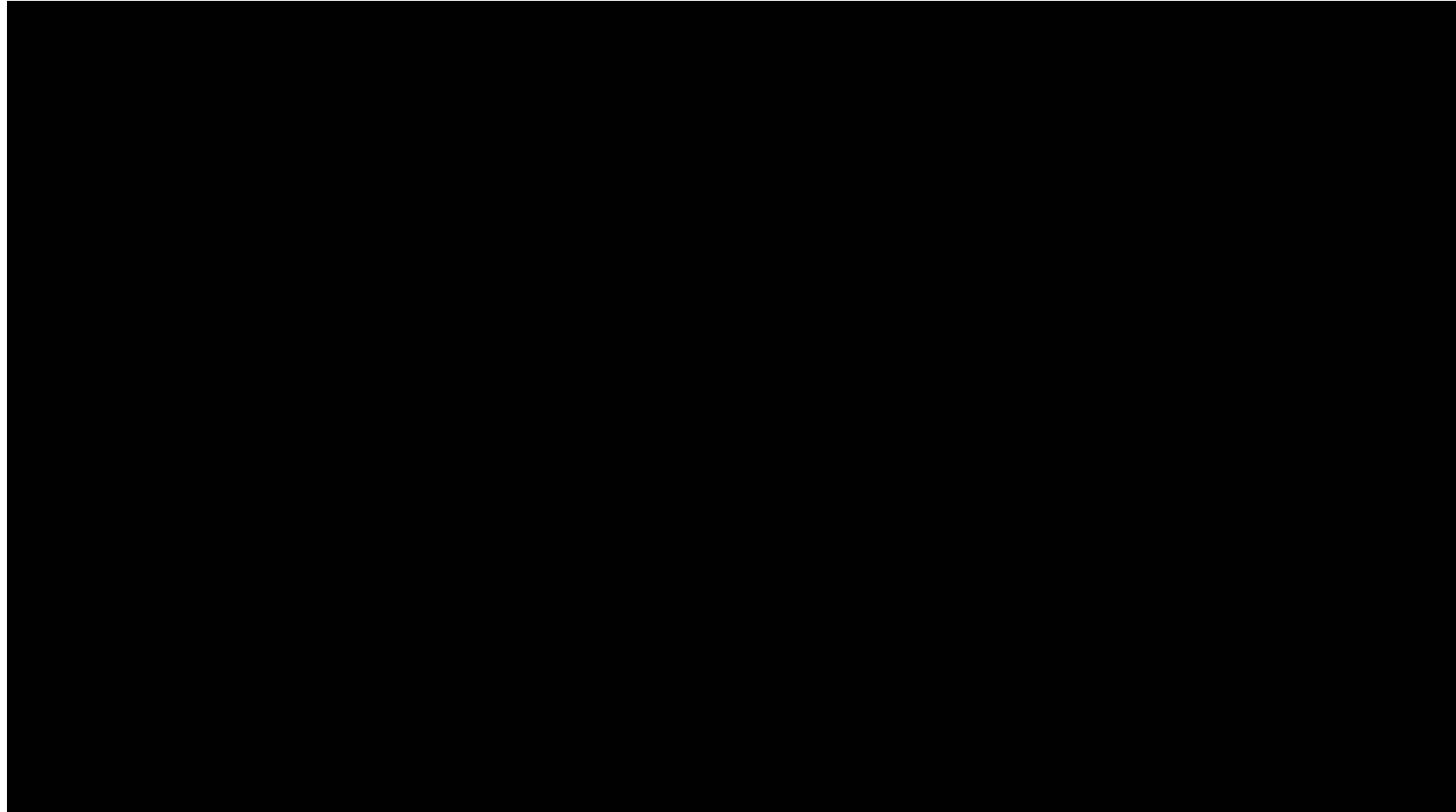
... if **differential settlement of the civil works** requires to **re-adjust the rail level (TOR)**, which is achieved by placing shims inside the rubber boots **up to 25mm**



- Except in particular circumstances, **absence of stirrups or reinforcement** in the track concrete (2<sup>nd</sup> stage embedment concrete)
- **No expensive formwork** required
- **High installation rates** [up to 300 meters on certain projects, on average 200 meters per 10-hour shift have consistently been achieved], minimizing construction time and the risk for costly schedule overruns
- Possibility to **operate work trains** on the track as soon as LVT has been assembled on the tunnel invert, base slab or viaduct deck, allowing E&M and other works to proceed simultaneously with the trackwork
- **Low life cycle costs** due to **maintenance free operation**, except for standard rail maintenance
- **Local manufacturing** of the concrete blocks resulting in **competitive component costs**

# LVT TRACK INSTALLATION

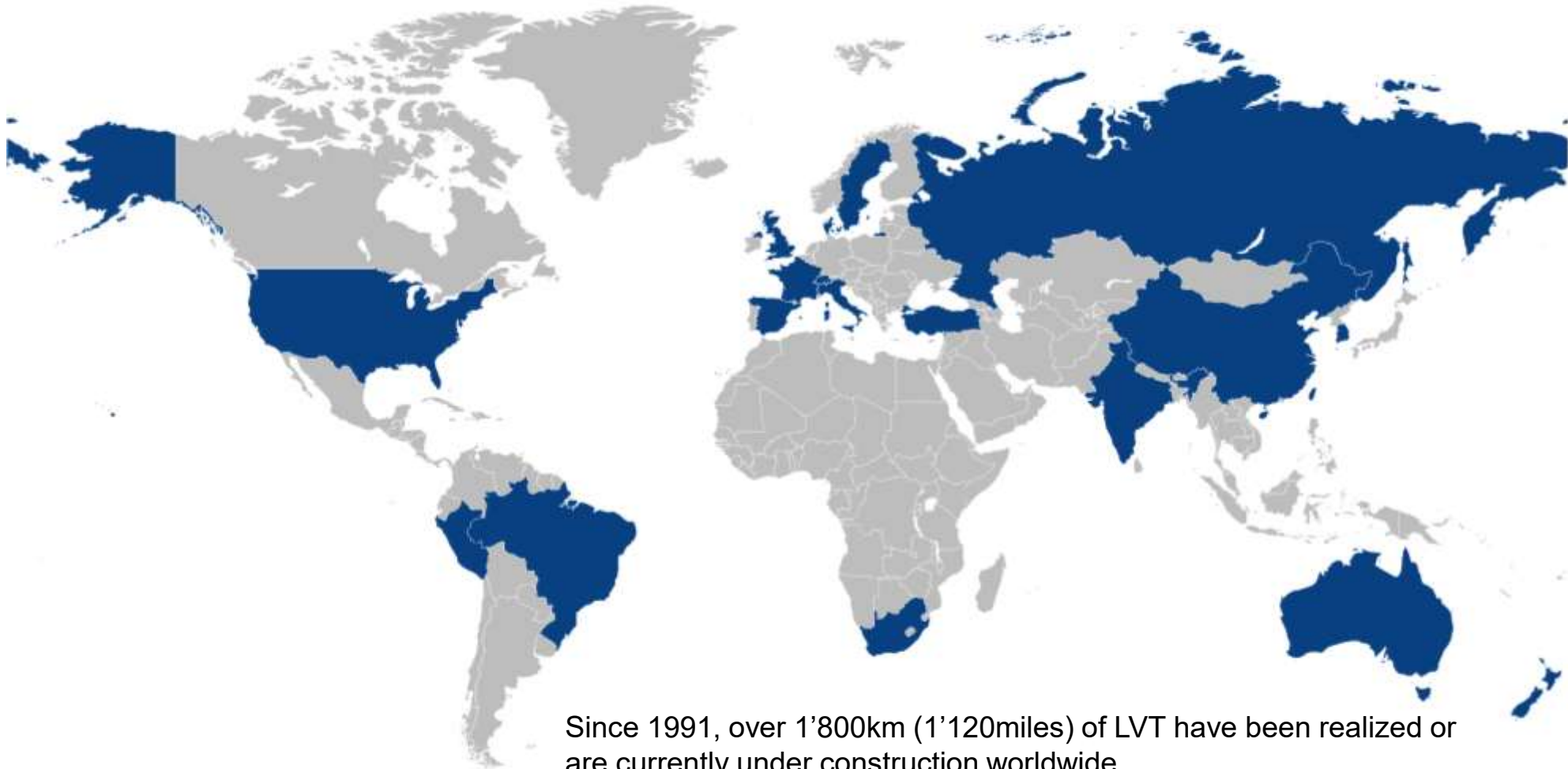
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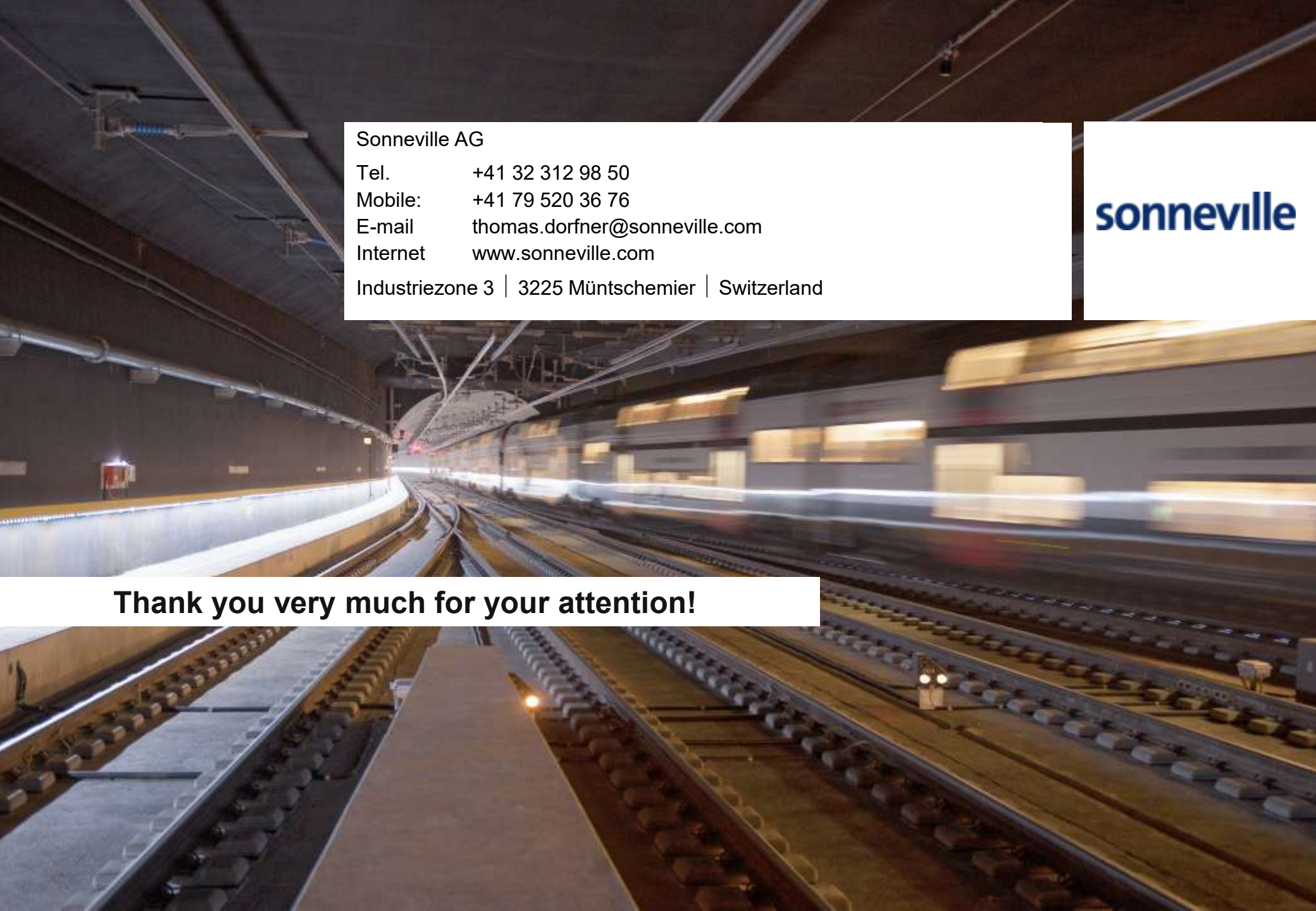


# LVT'S WORLD PRESENCE

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Since 1991, over 1'800km (1'120miles) of LVT have been realized or are currently under construction worldwide



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**Thank you very much for your attention!**