

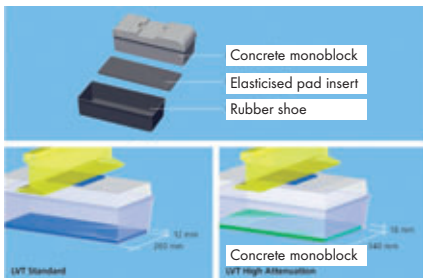
Vollert Anlagenbau GmbH + Co. KG, 74189 Weinsberg, Germany

Sleeper factory for manufacturing monoblock LVT

Tribeton® - a brand name belonging to Creabeton Materiaux AG in Switzerland – wished to change their monoblock production method from conventional to self-compacting concrete. Eltecna AG, Zürich, and Vollert Anlagenbau GmbH + Co. KG, Weinsberg, (Germany) gained the contract to develop and supply a new circulation system for manufacturing sleepers. In essence, the LVT (Low Vibration Track) monoblocks for the Gotthard base tunnel are to be manufactured with this system.

■ Lars Strobel, Steffen Schmitt,
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For Tribeton®, this major order comprehends the delivery of sleepers for a track length of 2x57km, making a total of 114km, for the Gotthard Alp Transit project. Installation work will begin on the railway track in 2010; the opening of the base tunnel is planned for 2017.



The LVT system is available in two versions to be able to fulfil even higher stipulations for protection against vibration

The LVT system is composed of reinforced concrete blocks that are separated from the concrete of the railway track baseplate by a specially developed rubber shoe. A softer pad insert is located in this shoe underneath the concrete block. This elasticised mounting for the concrete blocks makes it possible to distribute track load better. The pad's elasticity is determined individually for each project. Whatever type of fastening system may be employed, an elasticised rail pad insert will be utilised as this is one of the system's definitive characteristics – its two-stage elasticity.

The LVT system is available in two versions to be able to fulfil even higher stipulations for protection against vibration: LVT Standard and LVT High Attenuation (LVT HA). The LVT HA version differs by featuring a wider block. This system has a lower eigenfrequency due to its additional mass and softer pad insert.

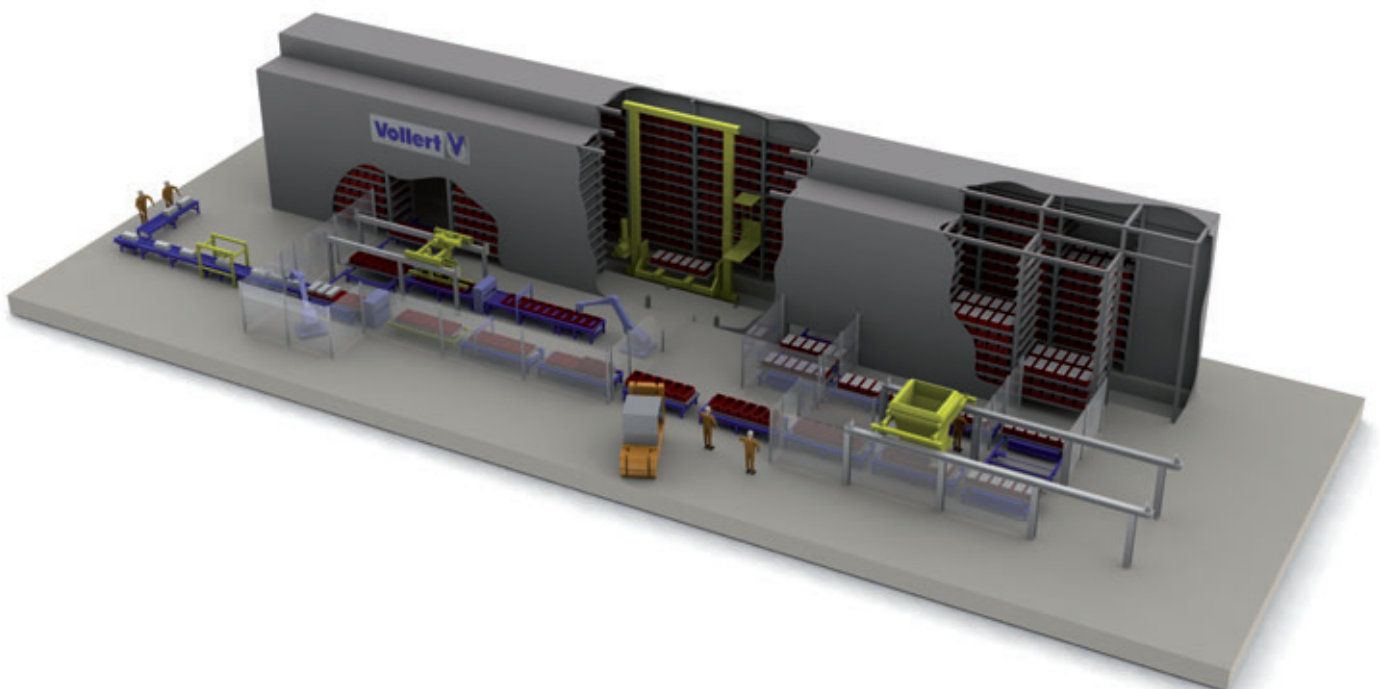
The particular challenge in terms of material flow was the integration of the entire

manufacturing process. This includes inserting reinforcing, concreting and curing, stripping and cleaning the formwork in sequences that were to be extensively automated.

The formwork for manufacturing the blocks consists of the following parts:

- Board – metal carrier sheet of model + frame
- Model – composite formwork permanently fastened to the board.
- Frame bearer – steel frame fastened to the model by magnets. Removed from board during stripping.

The board with model and frame is brought to the employees at both manual workstations for inserting the reinforcement. Once this has been set in and been approved by the employee, the formwork is sent fully automatically to the next stage in the cycle, the concreting station, via a roller conveyor. Concreting takes place with self-compacting concrete using a concrete spreader at



The new circulation system for sleeper production



Concreting takes place with self-compacting concrete using a spreader at the concreting station



The board with model and frame is brought to the employee at both manual workstations for inserting the reinforcement



The high-rack unit is completely encapsulated and shut by high-speed doors at the inward and outward transfer stations



The concreted blocks are brought via roller conveyors to an adjacent high-rack storage area for curing



After the specified hardening period, the blocks are automatically removed from storage by a storage and retrieval system and conducted to the stripping manipulator

this station. The roller bed at the concreting station is fitted with a weight measurement system that guarantees a precise degree of filling for each individual formwork. This means that filling can, for the most part, be carried on automatically. The employee only has to intercede in the concreting process for minor corrections which are unavoidable due to flow behaviour and the content level in the concrete spreader. Very short production cycle times can be attained because of this automation.

FURTHER INFORMATION



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After a final visual inspection, the concreted blocks are brought via roller conveyors to an adjacent high-rack storage area for curing. This high-rack unit is completely encapsulated and shut by high-speed doors at the inward and outward transfer stations. All this makes it possible to utilise the storage area as a curing chamber. After the specified hardening period, the blocks are automatically removed from storage by a storage and retrieval system and conducted to the stripping manipulator. At this point, a maximum of six frames will be lifted off the blocks in one go and transferred to frame cleaning station. Here, they are cleaned and oiled to be subsequently joined with the model on the board with the aid of an industrial robot.

The board with the blocks continues to the next stage in the cycle, a block robot, to be inspected, approved and separated. The blocks are removed from the board and turned by means of an industrial robot and then travel individually to final assembly and packaging. Once the blocks have been removed, the empty boards travel through the cleaning station where they are brushed off. A turning station ensures that no concrete residue remains on the boards. Afterwards, they are automatically sprayed with release agent and prepared for the next concreting cycle.

At the completion station, the cleaned, oiled frames are once again positioned on the boards with the models using another industrial robot. The formwork is now ready for another production cycle.

Those engaged on this project have succeeded in automating the manufacture of these monoblocks to the greatest extent. Not only has an extremely high standard of quality been attained but also a very short cycle time per block.



The blocks are removed from the board with the aid of an industrial robot



At the completion station, the cleaned, oiled frames are once again positioned on the boards with the models by means of an industrial robot