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FACTORY AUTOMATION

Customer Reference

BHB Waschanlagen Vertriebs GmbH | ATINA Engineering Office

Simulation instead of lengthy test runs

State-of-the-art rail washing system with a digital twin, low-code technology, and precise automation

With its new tram washing system for Zurich's public transportation company, the German machine manufacturer BHB Waschanlagen Vertriebs GmbH has impressively demonstrated that modern automation technology and digitalization are key technologies for business success today. In collaboration with the engineering company ATINA and Mitsubishi Electric, they developed a resource-efficient system that delivers the highest cleaning quality in a short washing time. Thanks to low-code programming and a Digital Twin, development and commissioning times were significantly reduced.

In a nutshell

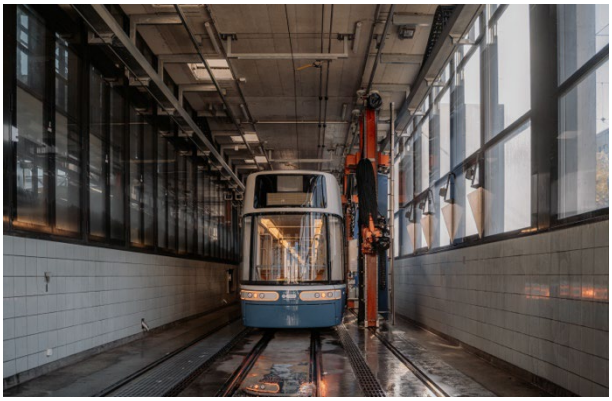
- The energy-efficient washing system uses automation components from Mitsubishi Electric
- Low-code scripting language speeds up programming and reduces sources of error
- The Digital Twin reduces commissioning to a few days

The Challenge

High customer requirements and accelerated project execution

The development, construction, and commissioning of the new tram washing system in Zurich demonstrate how medium-sized machine manufacturers can succeed even under today's market conditions. BHB had to overcome two significant challenges: First, the Swiss client required a highly efficient system that would consistently always deliver cleaning results with the shortest possible washing and preparation times.

Second, it was also clear that the 20-person company based in Holzmaden, Baden-Württemberg, would have to digitally transform its operations. This was the only way to meet the high customer requirements cost-effectively. Significantly reducing the time and cost involved was particularly necessary in the areas of programming and commissioning.



Four independently movable washing trolleys enable thorough and very fast washing.

The Solution:

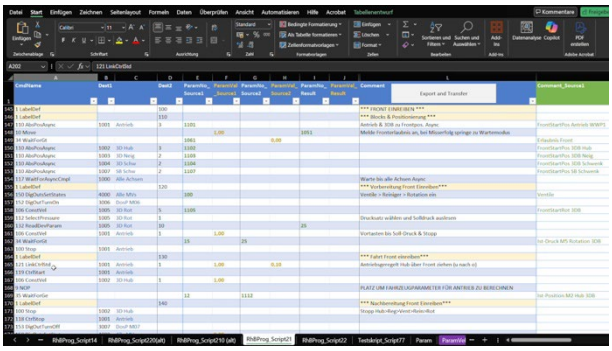
Automation and drive technology combined with low-code programming and Digital Twins

The BHB tram washing system's high level of efficiency, sustainability, and cleaning quality is largely due to Mitsubishi Electric's modern automation components. The MELSEC FX5U-64MR/DS compact controller coordinates all operating sequences with precision and is at the heart of the system. Frequency inverters from the FR-E800 series complement this, enabling flexible and energy-efficient control of the brushes and nozzles. These components allow for consistently high cleaning quality with low energy and water consumption.

Additionally, the cleaning results and speed are optimized using four washing cars instead of two, as is customary. The cars move up and down on the right and left sides of the parked tram during cleaning.

The BHB washing system is particularly energy-efficient with frequency inverters from Mitsubishi Electric.

The increased technical complexity would have significantly increased the programming and commissioning effort. To counteract this, BHB boss Tobias Straub decided to introduce a digital twin in combination with low-code programming. He was supported in this by ATINA, a Stuttgart-based engineering company and long-standing Mitsubishi Electric partner.



No more complex code needs to be written to create the washing programs. All you have to do is fill out an Excel spreadsheet.

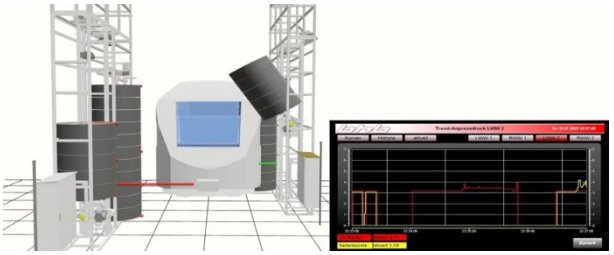
With ATINA's scripting language, washing programs no longer need to be hard-coded: they can be easily parameterized using an Excel spreadsheet. This can be done even without in-depth programming knowledge, which significantly reduces the time required. In addition, the programs now have only 200 lines of code instead of 4,000. This improvement makes the programs clearer and more comprehensible, which benefits maintenance personnel on site. Programs written in the scripting language can be transferred directly from Excel to the Mitsubishi control system via a simple CSV export.

Video and further information

https://youtu.be/P70tSme4pYs

Partnership for success: Nawid Zarrabi from the engineering company ATINA, Tobias Straub from BHB, and Michael Brandecker from Mitsubishi Electric (from left to right).

In addition to the new script language, BHB has also used a digital twin for the first time, which was also developed by ATINA. It shows all the mechanical and electrical components of the washing system as fully functional 3D models. A real Mitsubishi PLC controls these models, enabling comprehensive testing of the programs at the desk. This significantly reduces on-site commissioning time and prevents errors early on – a huge economic advantage for BHB and its customers.



With the help of the digital twin, everything can be tested in the office. Commissioning is thus reduced to a few days.

The Result:

Digital solutions and strong partnerships are the key to success

The new tram washing system shows how digital technologies and networked automation solutions can meet growing customer demands. Using modern drive and control technology combined with low-code programming and a digital twin, has significantly reduced resource consumption, development, maintenance and commissioning costs – while maintaining the highest cleaning quality.

Close cooperation between all those involved was a key factor in the project's success, as expertise was pooled and innovations were quickly implemented. This combination of technology, experience, and collaboration makes the project a prime example of how medium-sized companies can remain competitive and attractive to future engineers.