CASE STUDY – SHORT VERSION

A long version with extensive image material is available upon request!

DIGITAL TRANSFORMATION WITH MITSUBISHI ELECTRIC – German Railway Washing Manufacturer positions itself for the future

Less effort for demanding projects: Digital Twin, low-code, and modern automation technology make it possible. With the support of Mitsubishi Electric and the engineering firm ATINA, the German machine manufacturer BHB Waschanlagen Vertriebs GmbH built a new tram washing system that is particularly resource-efficient for Zurich's public transport company. Thanks to digital twins and low-code programming, it was put into operation with significantly reduced costs and time.

The new tram washing system in Zurich's Oerlikon district is special in several ways. Instead of the usual two washing cars, four individually movable washing cars are used, which, thanks to automation technology from Mitsubishi Electric, enable particularly thorough cleaning results with short washing times and high energy efficiency. For BHB Waschanlagen Vertriebs GmbH, the mechanical engineering company that carried out the project and is a Mitsubishi Electric customer, this challenging project also represents a milestone in its own digital transformation. It was the first time an innovative digital twin process was used in combination with simplified low-code programming. This made it possible to plan the complex system with significantly less effort and greatly reduce commissioning times. The 20-person machine manufacturing team was supported by ATINA, a Stuttgart-based engineering firm and experienced software specialist from Mitsubishi Electric's partner network.

Low-code programming and digital twins

Increasing customer demands for flexible, networked, and resource-efficient systems—especially amid skilled labor shortages—require new digital concepts, says BHB managing director Tobias Straub. "Through Mitsubishi Electric and its Automation Network, we came into contact with the engineering firm ATINA, which has provided us with significant support in our digitalization efforts," Straub reports. "This enabled us to use a digital twin and the new low-code programming for the first time in the Zurich project."

As a pure scripting language, ATINA's low-code programming eliminates the need for hard-coded, line-by-line programming. Washing programs can be easily parameterized using Excel spreadsheets, even without in-depth programming knowledge. This saves time, reduces sources of error, and facilitates subsequent revisions. With only **200 lines of text instead of 4,000,** the programs are clearer and easier for service personnel to understand. The programs created in Excel can be transferred directly to the Mitsubishi control system via a simple CSV export.

In addition to the script language, BHB used a digital twin for the first time for the Zurich project. All mechanical and electrical components of the washing system are stored there as fully functional 3D models and can be controlled by a real Mitsubishi PLC. Since the programs can be tested very accurately at the desk, commissioning on site is greatly accelerated and virtually error-free — an enormous economic advantage for everyone involved, especially in more complex projects.

Innovation meets automation

However, digital twins and low-code programming alone would not have been enough to meet high customer requirements. That is why the software innovations are based on Mitsubishi Electric's reliable hardware. At the heart of the control system is the compact MELSEC FX5U-64MR/DS PLC. "Our hardware is exceptionally robust and backward compatible across generations," explains Michael Brandecker, a sales engineer at Mitsubishi Electric. "This enables machine builders, such as BHB, to offer their customers products whose components can be replaced after many

years without costly reprogramming."

Additionally, Mitsubishi Electric drives ensure efficiency during operation. The FR-E800 series of frequency inverters enables flexible motor control, reducing energy and water consumption and contributing to economical and resource-efficient operation of the plant.

Future-proof machine building requires digital transformation and the right partnerships

The BHB project serves as a role model, particularly for medium-sized German machine builders. Thanks to close cooperation between partners who work seamlessly together, the company successfully drove forward its digital transformation at the right time. BHB contributes its many years of experience in plant engineering, ATINA provides software expertise, and Mitsubishi Electric supplies robust automation components.
The result is a tram washing system that meets the growing demand for sustainability, quality, and efficiency while showing how medium-sized machine builders can remain competitive and attractive to skilled workers by using digital technologies.

A long version with extensive image material is available upon request at silvia.von.dahlen@meg.mee.com.

Video:
This video provides insights into the new tram washing facility of the Zurich transport company, the technology installed there, and the digital solutions used: [LINK]

Images:

Image ME_BHB_01: The tram is parked in the wash hall for washing. The four wash cars move along the right and left sides of the vehicle.

Image ME_BHB_02: Thanks to a digital twin, the washing system could be thoroughly tested at the desk. This drastically reduced the commissioning time.

Image ME_BHB_03: Mitsubishi Electric's FR-E800 series frequency inverters enable energy-efficient control of brushes and pumps.

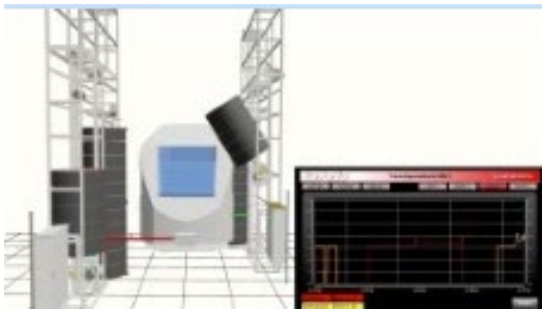

Image ME_BHB_04_Digital Twin: The washing system and vehicles are precisely replicated in the digital twin. The virtual model is controlled by a real Mitsubishi Electric PLC to ensure realistic simulation.

Image ME_BHB_07_Low Code: Excel instead of code: 200 lines instead of 4,000. Thanks to low-code programming, washing programs no longer need to be hard-coded. All you need to do is fill in an Excel spreadsheet.

Image ME_BHB_11: Partnership for success: Nawid Zarrabi from engineering firm ATINA, Tobias Straub from BHB, and Michael Brandecker from Mitsubishi Electric (from left to right).

About BHB

BHB Waschanlagen Vertriebs GmbH is a family-run company that has specialized in the manufacture and sale of washing systems and water treatment systems for rail vehicles (trains and trams) and commercial vehicles (buses and trucks) since 1983.
They offer high-quality system solutions, including washing chemicals and comprehensive after-sales service, worldwide.
https://www.bhbwash.com/

About ATINA Engineering

ATINA Ingenieurbüro in Stuttgart has existed in its current form since 2010. With a focus on software and digital twins for the world of automation, the second generation of the company is responding to the growing importance of this topic in mechanical and plant engineering. The origins of the engineering office date back to 1982, when Reza Zarrabi founded ATINA Ingenieurbüro.
https://atina.de/de/unternehmen

About Mitsubishi Electric Corporation

With more than 100 years of experience in providing reliable and high-quality products, Mitsubishi Electric is a globally recognized leader in the manufacture, marketing, and sale of electrical and electronic equipment for information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, mobility and building technology, and heating, cooling, and air conditioning technology. Based on its motto "Changes for the Better," Mitsubishi Electric strives to enrich society with technology. At the end of the fiscal year on March 31, 2025, the company achieved consolidated sales of US$36.8 billion*. It has sales offices, research companies, development centers, and manufacturing facilities in over 30 countries. Mitsubishi Electric has been represented in Germany since 1978 as a subsidiary of Mitsubishi Electric Europe. Mitsubishi Electric Europe is a wholly owned subsidiary of Mitsubishi Electric Corporation in Tokyo.

Further information is available at www.MitsubishiElectric.com

**Amounts in US dollars are converted from yen at the rate of ¥150 = US$1, the approximate rate on the Tokyo foreign exchange market on March 31, 2025.*

About the Mitsubishi Electric Factory Automation Business Group

Mitsubishi Electric offers a wide range of automation and processing technologies, including control systems, drive products, power distribution and control products, spark erosion machines, electron beam machines, laser processing machines, numerical computer controls, and industrial robots, contributing to higher productivity and quality in manufacturing. In addition, extensive service networks around the globe provide direct communication and comprehensive support for customers. The global slogan "Automating the World" clearly expresses the company's approach of using automation for the benefit of society through the use of advanced technologies, the transfer of know-how, and support for customers as a trusted partner.

For more information about the history of "Automating the World," please visit:

www.MitsubishiElectric.com/fa/about-us/automating-the-world

Mitsubishi Electric Industrial Automation

Mitsubishi Electric Europe B.V., Industrial Automation, is headquartered in Ratingen near Düsseldorf. It is part of Mitsubishi Electric Europe B.V., which has been represented in Germany since 1978 and is a wholly owned subsidiary of Mitsubishi Electric Corporation, Japan. Its task is to manage sales, service, and support for the Industrial Automation division throughout the DACH region and Benelux.

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