

Industrial Applications of Digital Twin Virtual Factories

The much-discussed "digital twin", also known as digital mapping or digital mirroring, is developed to map reality in a digital manner based on real data and via software technology and other means, and furthermore builds up and optimizes reality through virtual practice.

With many companies' continuous in-depth exploration in the field of digital twin technology in recent years, Morimatsu, as a benchmark enterprise providing overall engineering solutions for the industry, has first introduced digital twin virtual factories in the industry, thanks to powerful digital model library and professional design software. The virtual factory coexists with the real one from multiple dimensions of model, data, connection, services and functions so as to simulate, monitor, evaluate, predict, optimize and control the physical entity.



Given that, we are about to show a couple of successful applications of Morimatsu's double twin factories in pharmaceutical and daily chemicals-related projects.

01 Design audit to create immersive experience

All parts are modeled according to physical objects during design, and in the design audit process, clients can roam their future factory in an immersive way via virtual reality technology, even if the factory is not yet built. Such a more immersive and more realistic experience can help identify problems and space for improvement in the design so as to reduce the modifications and reorganization of the physical system in the subsequent production and execution links.

02 Efficient and convenient VR training

At the training stage, operators can be trained using VR according to practical requirements since the virtual world is the mirroring of the real one. That is to say, operators can manipulate machines in the real world as soon as possible after mastering all operation procedures through virtual reality. In this way, the operation rehearsal and training can be less dependent on physical facilities, thereby reducing training costs as well as risks and mistakes in operation with the aim of more efficient communication and coordination. What's more, we are trying to record the content and process of VR training and give a training report so as to have enterprises better informed of their employees' qualifications.

03 Digitalized operation and maintenance enables global control

The virtual factory coexists with the physical factory from multiple dimensions of model, data, connection, services and functions. For example, we can imagine that in the future, if people want to know the operation status of the factory, they do not need to conduct on-site inspection. Instead, they can turn on the computer and wear VR glasses anytime and anywhere to view the operation of the factory in an immersive fashion. Similarly, it's easier to identify defects and locate faults, and it's possible for people to make real-time responses remotely and collaboratively. Meanwhile, the operation data collected by the twin factory can be used to predict the life of the equipment, make forecasts, optimize decision-making, shorten downtime and avoid catastrophic damage. Besides, the data can also be used to perform a further analysis of the production process so as to provide bases for decisions concerning the upgrading and transformation of the factory. Thus, a sustainable and shared three-dimensional virtual space comes into being.



Second, we continue to strengthen the application of existing technologies, and continue to design and develop new application scenarios. The future virtual factory can integrate many elements to achieve collaborative work and interoperability. For example, in the future virtual factory, people can organize various meetings and invite clients to pay a virtual visit and get information about their products, and VR training and courses are available for employees. Moreover, the virtual factory can simulate the entire production process based on different input operating parameters, and realize the operation simulation of the system in the virtual world, so as to obtain valuable real data and apply it to the adjustment and control of real equipment, thereby further improving the overall operation efficiency and reducing costs.

The connection between the virtual world and the real world has become more and more close, and whether it is from the virtual to the real, or from the real to the virtual, all efforts are to bring a more realistic experience to users. Technology is constantly upgrading, and opportunities are endless. Morimatsu seizes the opportunity, formulates in-depth layout, and continues to explore the application of digital twin technology to meet the ever-changing market demand and help clients achieve leaner factory construction, operation and maintenance, and management.