How to achieve maximum performance of an end-of-line logistics system and full industry 4.0 functionality?

PALLETISING
END OF LINE AUTOMATION
An Mpac Group Company

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SUMMARY

We understand that the focus of plant management is to have products delivered in time, being of good quality and against the lowest costs. At that moment, operators need a user-friendly tool to control the logistics equipment.

How can a PC-based software tool help you to achieve the maximum performance of the logistics system through operator efficiency and data insight? How can you make steps to implement industry 4.0 functionality?

There are hardly any tools on the market, so this White Paper is about one specific commercial product: the MOre i4.0 SCADA and i4.0 Systems Intelligence software suite. We would like to show you what state-of-the-art tools can do for you.

CONTENT

Introduction

Implementing a fully automated palletising and logistics system offers clear operational benefits. However, managing, maintaining, and fully understanding such a system can present challenges — particularly in complex production environments. A critical success factor lies in the level of integration with existing business systems such as ERP, MES, or MOM platforms. The tighter this integration, the better the opportunity to streamline logistics, reduce error rates, and minimise customer complaints and financial risks.

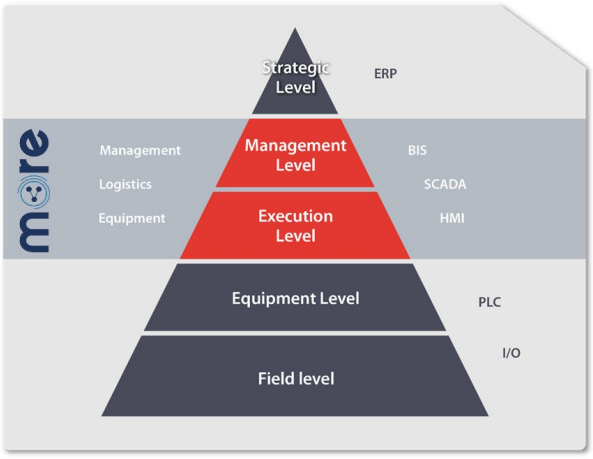
In today's supply chain, the objective is clear: deliver high-quality products safely, sustainably, and at the lowest possible cost. The MOre software suite supports this goal by delivering the right data, at the right time, in the right format — empowering users to make informed, real-time decisions.

MOre offers a wide range of capabilities. In fact, its functionality is so extensive that covering everything would turn this white paper into a white book. Therefore, we will focus on the key features that demonstrate how MOre bridges the gap between high-level IT systems and the operational layer of the factory floor — ensuring full transparency and control from end to end.

The MOre suite

The automation pyramid

To better understand the functional role of the MOre software suite, we refer to the commonly used automation pyramid — a well-established model in industrial automation.



At the foundation of this pyramid are the actuators and sensors — the essential components that form the physical layer of any automated system. Just above them sits the Programmable Logic Controller (PLC), which interprets sensor data and controls devices such as motors. While modern PLCs are far more powerful and capable than those of a decade ago, it remains important to distinguish between responsibilities within the automation hierarchy.

A helpful rule of thumb: if a function involves data handling and is not directly tied to real-time control of sensors and actuators, then it should not reside in the PLC. This clear separation of concerns supports better system maintainability, scalability, and transparency.

At the top of the pyramid, most companies rely on an ERP system to manage business operations. ERP platforms handle information related to raw material inventories, finished goods, and production planning — making them the central nervous system of a manufacturing operation.

However, the effectiveness of an ERP system depends entirely on the accuracy and consistency of the data it receives. To enable this, ERP systems are typically connected to a variety of other platforms and control systems. This is precisely where MOre plays a crucial role — by bridging the gap between factory floor operations and enterprise-level systems through reliable, real-time data exchange.

Integration

Integration with the existing IT infrastructure serves as the foundation. The MOre software suite acts as the critical bridge between the physical installation on the factory floor and the facility's existing IT landscape and operational process flows.

The MOre software suite relies on the MOre Connect building block to integrate with ERP systems. This component is abstract by design, meaning it does not include a user interface. Its primary role is to enable seamless communication between MOre and a wide range of external systems.

While MOre Connect is typically used to interface with ERP platforms, it is equally capable of connecting to middleware systems such as MES (Manufacturing Execution Systems) and MOM (Manufacturing Operations Management) systems. Additionally, it supports integration with other key systems used in the logistics process, such as Warehouse Management Systems (WMS).

In situations where ERP integration is not possible, or no ERP system is in place, a user interface is always available within the MOre suite to complete or manually create the necessary data. This interface allows users to manage (product) master data and generate internal process orders, ensuring the continuity of operations and allowing operators to start assignments with ease.

The MOre Pallet Finishing building block ensures seamless integration of all equipment required to complete a stacked pallet — such as strapping machines and stretch wrappers. Meanwhile, the MOre Pallet Labeling building block is specifically designed to automatically generate and apply the correct labels to each pallet, ensuring traceability and compliance with customer or regulatory requirements.

Together, these building blocks close the loop between product handling, packaging, and outbound logistics — making full automation a reality.

Shop floor

During the development of the MOre software suite, particular emphasis was placed on the shop floor environment and the needs of the operators who run the system and resolve minor disruptions. The primary goal was to maximise operator effectiveness — ensuring that operators are empowered to perform their tasks accurately, efficiently, and with confidence.

It is well known that errors on the shop floor can lead to production downtime or quality issues. Too often, these are simply attributed to operator error. But the real question is: what tools and support do we provide to enable operators to do their jobs effectively and comfortably?

Traditional operator training can be difficult to schedule, time-consuming, and costly. Moreover, with high turnover rates in many facilities, investing heavily in classroom-style training often yields limited long-term value. The MOre suite addresses these challenges by providing intuitive, role-based interfaces and clear visual guidance — reducing the need for extensive training while improving daily usability.

This is why significant attention has been given to the design of the graphical user interfaces presented to operators on the shop floor. To ensure usability and clarity, modern user-centered design techniques were applied — including use case analysis, card sorting, mock-ups, and real user testing.

While such methods are common in commercial software and everyday digital applications, they are still relatively uncommon in the world of industrial automation. By adopting this approach, the MOre user interfaces feel intuitive and familiar — resembling the smart devices and apps people use daily. This results in a short learning curve, reduced training time and cost, and fewer user errors.

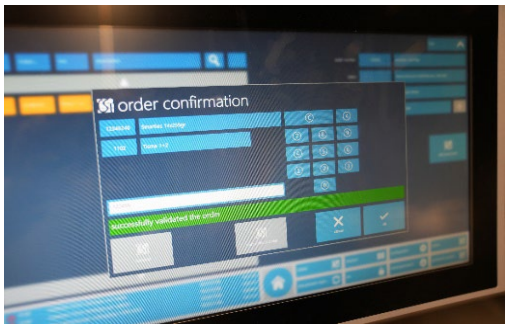
A strong example of operator effectiveness in action, this design philosophy not only enhances usability but also contributes to smoother operations on the factory floor.

At the end of this white paper, you'll find a link to a short video that gives a behind-the-scenes look at the MOre user interface design process.

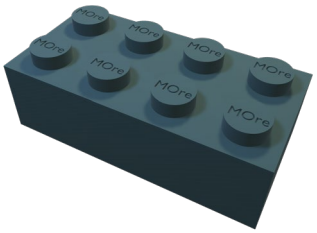
The HMI (Human–Machine Interface) component of the MOre software suite is mounted on an industrial pole topped with a solid-state industrial PC. It features an 18.5-inch widescreen multi-display for operator interaction.

The Shop floor client offers a user-friendly graphical interface for fault diagnosis, equipment status monitoring, viewing current and historical alarm messages, manual control, and all typical SCADA or HMI functionalities.

On the Shop floor client, the MOre software suite presents itself with an easy-to-use graphical interface for fault finding, status of the equipment, (historical) alarm messages, manual control and all the typical controls normally found on a SCADA station or HMI.

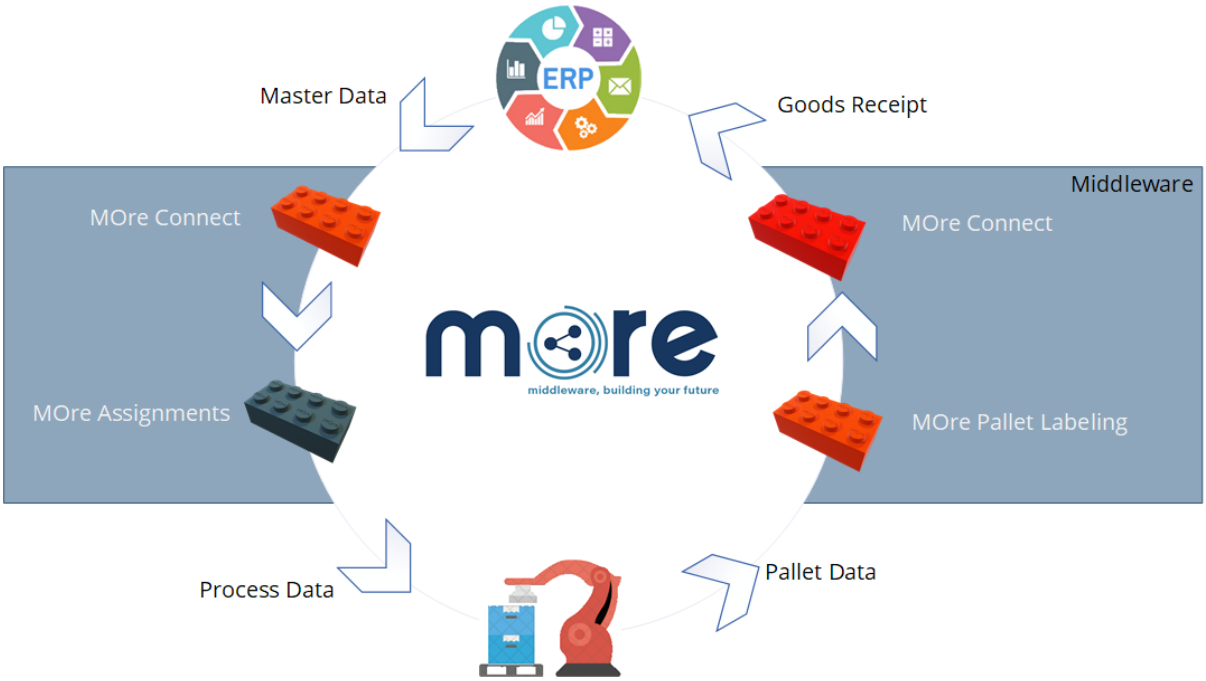


Additional building blocks can be made available on the Shop floor client, such as the MOre Assignment building block, which allows the operator to assign a production order to the installation at the touch of a button. All equipment is automatically set up to process the selected process order. The result is stacked pallets provided with the correct pallet label and delivered to the correct location. It goes without saying that this significantly reduces the risk of errors, since the operator does not have to set up different devices, each with its own user interface. With MOre Assignment we remove the complexity from the operator. All data obtained from the ERP system is also used, so there is only a single point of data, making an incorrect entry of, for example, a stacking pattern a thing of the past.



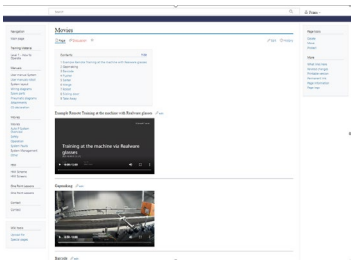
Closed Loop

The process is completed when the MOre system registers the stacked pallets, identified by their pallet labels, within the ERP system through the MOre Connect module. Since the source data is retrieved from the same system, pallets are consistently assigned to the correct process order, significantly simplifying administrative tasks. Furthermore, this approach ensures accurate recording in the ERP system, enabling subsequent processes—such as the correct depreciation of raw materials—to be carried out reliably.



(Operator) information

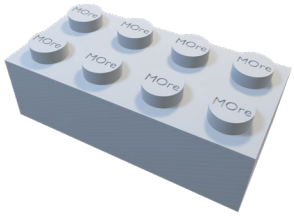
Another source of information for operators are the MOre large screen displays. The goal is to deliver the right information when it is needed and where it is needed. That is exactly what the MOre large screen display building block does, providing easy-to-read information (using clear icons) about where the information is to be consumed. This could include a display above a transport case or pallet reject station, providing all the information needed and even get a suggestion as to what task to perform.



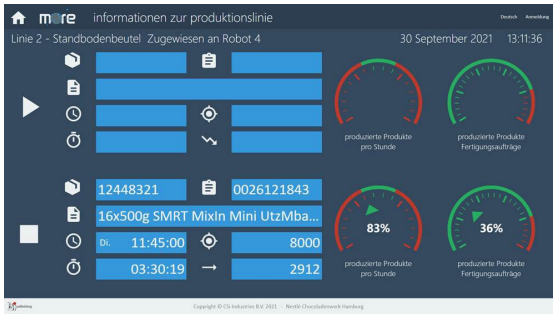
The MOre Wiki building block is an easily accessible intranet web application that brings together all available information. All project documentation, such as user manuals and electrical / mechanical drawings, are available in the MOre Wiki, making the MOre Wiki a single point of information. Another functionality of the MOre Wiki building block that we would like to highlight is that the user can add content themselves. Think of one-point lessons or experiences related to solving a malfunction.

This makes the MOre Wiki the central point where the operator and technical personnel can consult information about the installation.

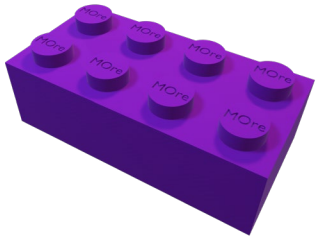
Top floor



Knowledge is power, the most imaginative block is the MOre Management Reporting. Management reporting is always tailor-made. Collected data from the system, combined with the data from the ERP and/or MES system, provide detailed information. The functional block Data Collect has been designed to extract data from the system. Data collect retrieves data, event driven and time based, from the system and stores it in the open-access database, so that everyone can use their own reporting tools, such as Microsoft Power BI or others. This allows real-time insight into the progress of production orders and the output capacities of the production lines. The MOre suite supports standards such as PackML and QCDM, and brings the OEE standard to the logistics installation. The collected data can be displayed on the large TV screens, but also in web reports, accessible on your own computer with any compatible browser. Exporting to Microsoft Excel, for example, is of course also possible.



Production office / technical staff



While operators often perform their duties on the shop floor, line managers, shift leaders and technical personal often have access to a computer in an office space. For example, the aforementioned MOre Data Entry building block is designed for use in an office environment. But there are more MOre building blocks for the office environment, all intranet web based, so no installation on local machines is required. For the technical staff, the MOre Technical Support Interfacing building block is a no-brainer. This intranet web page provides insight into the IT components of the installation and the connections to third party systems. Services can also be restarted from this intranet web application. A function that has more than proven its usefulness in practice is the ability to secure and download the log files for transmission to technical personnel so that they can make a proper analysis. Of course, the log files can also be viewed via the web application for an initial analysis by remote technical staff or external experts.

The MOre suite is constantly evolving to stay ahead when it comes to Middleware systems in industrial automation. A new development is the ordering process for spare parts. With a MOre rugged mobile device it is possible to scan 2D Matrix barcodes that are applied to every unit, such as a conveyor, with each new installation. After the scan, a freely rotatable 3D model of the scanned unit will be visible on the MOre mobile panel, along with a parts list. Touching a part within the 3D model displays the correct item number and order information. If desired, the part can then be ordered with just one push of a button.

Cybersecurity

Cybersecurity is not only becoming increasingly important, it is also essential for the continuity of modern manufacturing facilities. That is why a lot of attention is paid to cybersecurity. First of all, the supplier is ISO 27001 certified, which guarantees that data is treated confidentially and securely.

The MOre software suite is programmed with the latest developments, programming languages and methodologies from Microsoft. All sensitive information such as passwords are always encrypted. In addition, active directory integration is standard with the MOre Software Suite. This is recorded in the Software Quality Assurance plan. This plan has already become part of the Business Continuity Plan of large international companies.

Future developments

MOre's modular design allows further extension of the software suite with full industry 4.0 functionality. It 'simply' means adding the right module to the platform.

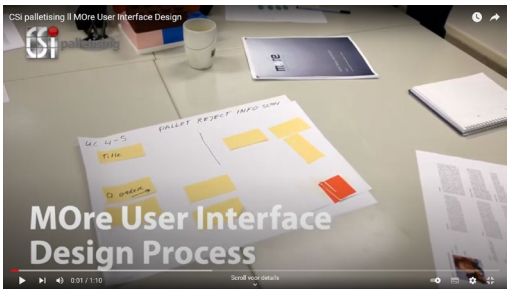
And it also makes it possible to grow beyond the boundaries of end-of-line logistics. With MOre the entire process from primary packaging to the distribution process can be monitored and managed.

Showcases video’s

YouTube

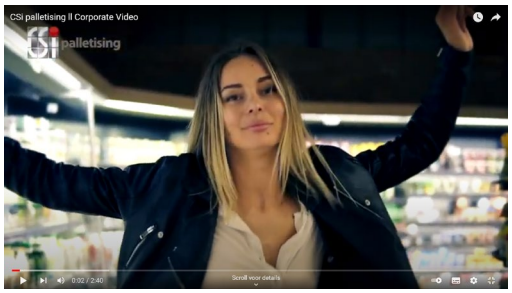
[CSi's MOre SCADA I4.0 software suite]

2:23 English



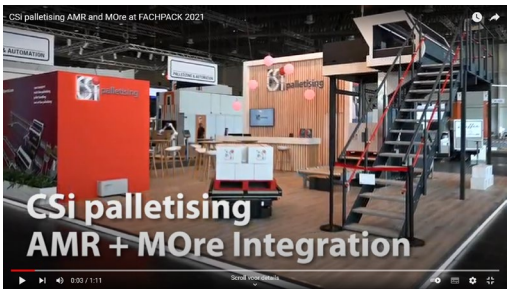
[CSi's User Interface Design Process]

1:10 English



[CSi palletising II Corporate Video]

2:40 English



[CSi Palletising AMR + MOre Integration]

1:11 English

References

As a world leader in palletising, CSi works closely with leading multinationals in the **F**ast **M**oving **C**onsumer **G**oods market/**C**onsumer **P**ackaged **G**oods market.

We are therefore very proud that the MOre software suite is an indispensable link in the daily operation of the logistics process for many of our customers.

Conclusion

The MOre software suite integrates the entire logistics process into the implemented (IT) infrastructure, where information is the key to preventing downtime and better managing the logistics process. Partly due to the great ease of use, the operator is better able to fulfill his daily task.

If you would like to receive more information, please feel free to contact us.

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