

CC-Link IE TSN delivers precise, synchronised control for Hambi's automated steel mesh handling system

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Automation specialist Hambi Maschinenbau, part of Terhoeven GmbH & Co. KG, has developed a world-first system that automates the cutting, handling, and stacking of heavy reinforcing steel mesh – a task that previously required up to six human operators. By integrating Mitsubishi Electric's drive and control technologies connected via CC-Link IE TSN, Hambi has achieved millimetre-level precision and seamless synchronisation across motion, safety, and vision systems in a single, unified network.

Tackling a demanding manual process

In the production of reinforcing steel mesh, long lengths of wire are welded into large mats, which must then be cut to size and stacked for transport. This was a labour-intensive process involving multiple workers to lift, align, cut, and stack the heavy meshes. It was also considered a difficult task to automate, as weight and flexibility of the mats means that even small deviations in alignment can cause major issues.

However, Van Merksteijn International B.V., a leading steel processor, was determined to overcome these challenges. It reached out to Hambi to develop an automated solution that could detect and compensate for any alignment variations in real time.

The result was the ASA (Automatic Cutting System) – a six-metre-high, 40-metre-long machine that automates every stage of the process, from lifting the top mat in a stack to cutting and turning sections for compact stacking.

Precision through synchronisation

The system uses six grippers, each capable of independent three-axis movement. As the mesh bends under its own weight during lifting, the grippers must dynamically adjust their positions to maintain even tension and prevent deformation.

In total, 18 servo drives coordinate this movement, with additional drives handling transportation, turning, and stacking. Synchronisation between these drives, as well as with the image processing system and safety controls, is critical to ensure stability and precision.

That's why Hambi decided to link every part of the system – including servo drives, safety PLCs, frequency inverters, and controllers – via CC-Link IE TSN. The high-speed, deterministic communication provided by the open Ethernet standard allowed the team to achieve millimetre-level precision when gripping and positioning the steel mesh, even as it naturally bends and shifts during lifting.

The technology's gigabit bandwidth also allows all system components to share a single unified network.

“Communication via CC-Link IE TSN is particularly important,” explains Marc Orgassa, Managing Director of Orgassa GmbH, Hambi's long-term automation partner. “It allows us to ensure that the various system components and controllers are synchronised with the drives. This is an important prerequisite, as image processing naturally requires the exact position of the grippers.”

A world-first in mesh handling

Following two years of development, the ASA system was commissioned at Van Merksteijn's site in spring 2024. The solution achieves the precision, reliability, and productivity needed for large-scale reinforcing steel production.

"It's inspiring to see machine builders like Hambi using CC-Link IE TSN to solve such complex motion control challenges," says John Browett, General Manager of the CC-Link Partner Association – Europe. "The ability to combine different tasks on the high-speed, open network demonstrates how this technology helps companies push automation performance further while keeping system design simple."

If you'd like to learn more about the project, you can watch a full overview of Mitsubishi Electric's work to deploy the world's first fully automated line for reinforcing steel mesh [here](#).

Image captions:



Image 1: Hambi has developed a world-first system that automates the cutting, handling, and stacking of heavy reinforcing steel mesh – a task that previously required up to six human operators.



Image 2: CC-Link IE TSN's high-speed, deterministic communication allowed Hambi to achieve millimetre-level precision when gripping and positioning the steel mesh, even as it naturally bends and shifts during lifting.

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About The CC-Link Partner Association (CLPA)

The CLPA is an international organisation founded in 2000 for the technical development and promotion of the CC-Link family of open automation networks. The CLPA's key technology is CC-Link IE TSN, the world's first open industrial Ethernet to combine gigabit bandwidth with Time Sensitive Networking (TSN), making it the leading solution for the digitalisation of manufacturing. Currently the CLPA has 4,400 member companies worldwide and 3,300 compatible products available from over 400 manufacturers. 43 million devices using CLPA technology are in use globally.

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