

CORNING



CASE STUDY

The ThyssenKrupp Quarter in Essen

Delivering an innovative cabling solution for automation and IT

ThyssenKrupp is a diversified industrial organisation headquartered in Germany. The company is one of the world's largest steel producers and provides components and systems for the automotive industry, elevators, escalators, material trading, and other industrial services.

Following the merger of Thyssen and Krupp in 2000, the company decided to bring its various operations, previously spread over various sites, together at one site in Essen, Germany. The new ThyssenKrupp Quarter is a campus covering an area in excess of 20 hectares (100,000 square metres) with over thirteen buildings accommodating approximately 3,500 employees. The construction plans included the new headquarters, office and administrative buildings for the Group, the ThyssenKrupp Academy (planned), a conference centre and a new data centre.

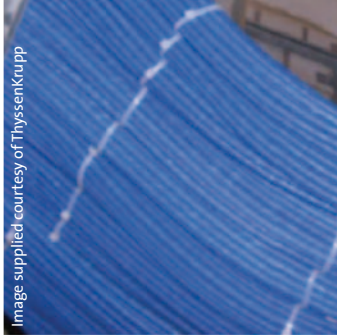


Image supplied courtesy of ThyssenKrupp

The new complex was designed to operate as a sustainable environment, utilising raw materials and resources, geothermal heating and cooling, heat recovered from waste air and rainwater collection.

The cabling project design for the campus needed to provide a strong return on investment and meet critical key success factors, including support for a sustainable environment. The project objectives were to provide an infrastructure:

- Capable of protecting investments by providing the flexibility and availability to meet the current and future needs of its business.
- To support mobility and high availability for the holding company, the operating divisions and subsidiaries by being secure, multifunctional, and device and service-neutral.
- To support IT, communications and building automation (lighting, heating, sun protection, security) requirements, across campus and within buildings – cost-effectively.
- With a fully redundant data centre capable of supporting up to 100 Gigabit Ethernet and Fibre Channel.
- Built with high-quality, high-performance components while minimising purchase and operating costs in terms of ‘total cost of ownership’ (TCO).
- Able to meet specific deadlines for the operation of the campus backbone, building LANs and data centre.

ITIMCO, an engineering company with over 20 years experience delivering IT infrastructure in data centres, office buildings and industrial environments, was commissioned to design and deliver the project.

Project Planning

The requirements of the infrastructure went beyond that of a classic voice and data communications set-up, as it needed to integrate building automation over IP communications networking.

The Cabling Solution for ThyssenKrupp Quarter, Essen

- Commitment to a stringent 12-week deadline for operation
- Deployment of a high-performance, reliable and future-ready optical fibre and copper cabling infrastructure across campus, within multiple buildings and a new data centre
- Deployment of low-loss, bend-insensitive Corning® ClearCurve® multimode OM4 in combination with single-mode fibre cables 9/125µm for the primary campus cabling providing high reliability and future higher speed operation
- Deployment of Corning’s FutureCom™ EA Copper Cabling System for tertiary cabling in buildings to provide enhanced performance over Cat.7A copper cable
- Deployment of Corning’s Pretium EDGE® high-density cable housing system with copper and fibre trunks supporting three server rooms in the data centre for future speeds up to 100GE

ThyssenKrupp’s cable infrastructure and network needed to support all of the necessary information systems, including

technical building equipment such as ELT, UPS, NEA, cooling, ventilation, security systems, communication services, IT hardware, and software. By unifying these systems across the entire property, further cost savings could be achieved in both the construction and operation of the site.

ITIMCO's planning services included all information and communication technology, as well as the coordination of all mobile building control systems together with the static systems invested in the technical building equipment. The plan included a bill of quantities, tenders, selection of products, contract negotiations, and construction supervision and inspection. Corning was chosen for the cabling infrastructure as it demonstrated best value with respect to the project requirements.

Cable Infrastructure Selection

The project envisaged all users being connected to one homogenous LAN utilising a passive cable infrastructure with network security being provided by a certificate-based authentication mechanism using IEEE 802.1x. ITIMCO carried out extensive testing of the leading cable infrastructure manufacturers at 10GE operation utilising its own laboratory in conjunction with the CISCO TAC in Brussels and the HP ProCurve Eurolab in Amsterdam. Products were evaluated on their ability to meet performance targets. The system that met (and exceeded) the performance targets, as well as demonstrating the best value with respect to the project objectives, was the solution offered by Corning.

The Campus Backbone

The campus backbone cabling needed to connect 13 buildings based on a dual-star configuration for high availability. Corning® ClearCurve® OM4 multimode cable and ClearCurve® OS2 XB single-mode optical fibre cables were used.

The main criterion for using OM4 optical fibre cable for 10 Gigabit Ethernet for campus distances of 300 to 550m was based on the savings for lower-cost active components in the attached network switches - the Gigabit Interface Converters (GBICs). Another criterion was the availability of OM4 cable, with Corning one of the first companies to be able to deliver. Finally, ITIMCO tested the Corning OM4 optical cable with CISCO and HP in their laboratories, achieving distances up to 700m at 10G without errors or loss of data packets; an attribute to maximise system reliability for a longer service life.

The Corning ClearCurve cable also makes it possible to bend cables to significantly tighter bend radii without fear of impacting the performance of the optical fibre system. The Central Tube MPC (Multipurpose Cable) design isolates the fibres from installation and environmental rigours, providing stable and highly reliable transmission parameters. The cable construction is very compact, light, and flexible and is designed for indoor and outdoor applications such as interbuilding and intrabuilding backbones in conduit, duct and riser applications. This minimises the cost of deployment as well as maximising space for office use.

The Office Cabling

The office wiring was designed as a collapsed backbone within each of the buildings, which enables concentration points to be provided for each of the technologies used (e.g. LAN switches, ELT/UPS etc.). Again, this approach reduced the amount of technology

space required, providing more space for office use, as well as supporting the need for operating and energy cost savings. All the copper cable connections are wired from IT rooms at the lower levels to the upper levels, with wire lengths reaching up to a maximum distance of 120 metres.



By deciding to make the copper cabling a collapsed backbone, ThyssenKrupp did not need data distribution rooms on the office floors. As such ThyssenKrupp was able to provide 80 additional workplaces in the same buildings, which meant that the cabling saved investment in construction cost amounting to 6 million Euros. ITIMCO reached the ROI for ThyssenKrupp on the first day.

A Corning FutureCom™ EA Copper Cabling System was deployed using high-end components such as S500 RJ-45 copper jacks and S/FTP 1200/22 Cat.7A cable. By using these components together, the system provided high-performance margins for the complete link and exceeded Category 7 specifications. This ensured the cabling system was suitable for Gigabit Ethernet and future applications up to 10 Gigabit Ethernet. The office cabling investment was also protected through Corning's 25-year EWP warranty.

The FutureCom EA System has been specifically designed to deliver high-performance copper cabling solution for Ethernet, VoIP, telephone, IPTV, and other services such as automation. The cabling system also supports POE+, which enables power to be provided for IP telephones, wireless access points and security system devices, saving on additional power distribution.

The LAN deployment covers approximately 25,000 copper connectors and an active network of approximately 22,000 connections with over 1000km of copper cable and over 35km of optical fibre cable.

Data Centre Design

The new data centre needed to be designed for high availability and energy efficiency. Three separate server rooms covering 350 square metres of space were built with the capacity to support up to 120 server racks.

In order to meet the flexibility, scalability, cost-effectiveness, and reliability requirements, ITIMCO deployed a structured cabling infrastructure based on the Corning Pretium EDGE® Solution utilising OM4 fibre and S500 copper trunks.

The modular high-density Pretium EDGE cabling solution supports flexible provisioning of copper and fibre trunks throughout the data centre, enabling the IT team to respond quickly to ThyssenKrupp's changing business needs and rapid provision of additional servers. For instance, new cabling trunks can be quickly added, interconnected and easily routed to the new IT equipment racks without any disruption to existing operations - helping ThyssenKrupp reduce costs and minimise risk.

The data centre network architecture to support the servers, storage, backup and redundancy was designed around the deployment of core, distribution and server access layer switches.



Image supplied courtesy of ThyssenKrupp

To reduce the costs of the 10 Gigabit Ethernet (GE) server deployments the access layer switches were deployed as top-of-the-rack (TOR) switches, so that copper cable could be deployed to the 10GE servers with lengths less than seven metres. By doing this, ITIMCO reduced the costs for the GBICS by up to 70 percent.

In addition, the data transfer rates between core, distribution,

and server access layer switches needed to support speeds of 10GE, and should be able to cover 40GE and 100GE in the future. Corning® ClearCurve® OM4 cable was deployed in order to support the necessary performance at these speeds for distances in excess of seven metres.

The solution provides capacity to meet data growth over the next decade, and offers the simplest and most cost-effective upgrade path for future 40G and 100G operation using existing infrastructure. ThyssenKrupp can simply swap out modules, leaving trunk cables in place while maintaining 100 percent fibre utilisation and protecting the existing investment.

Improving energy efficiency was also integral to the design of the data centre. ITIMCO designed the cold aisle containment system, sealing unnecessary openings in the floor and within racks, and implemented intelligent physical cooling in order to maximise airflows and efficiency. The optical cable infrastructure design also contributed to this increased energy efficiency as optical switches and server adapter cards require less power to operate than copper equivalents – typically 0.5W per port versus 15W per port for 10G connectivity. In addition the high-fibre-counts and low profile of Corning cable resulted in a reduction in physical cable space, which helped keep ductwork and void space clear to improve the cooling efficiency.

Fast Deployment

The innovative design system of the Corning FutureCom™ (deployed in buildings) and the Pretium EDGE® solution (deployed in the data centre) made terminations faster, easier and more cost-effective to deploy.

This helped ITIMCO meet tight deadlines with the passive network deployed 12 weeks before first time use, and all the patching rolled out and tested within six weeks of first-time use.

Summary

The ThyssenKrupp Quarter in Essen has become a symbol for the forward-looking, sustainable development of the company. The IT infrastructure underpins this with a homogenous cable platform for IT and building automation that protects investments, provides flexibility and scalability for changing needs along with smaller footprints, and speed of installation that reduces space and minimises costs.

Corning's reputation for innovation and quality has delivered real value-for-money across the campus, within the buildings and inside the Data centre. The enhanced performance, extra functionality, flexibility, and capability built into the Corning cable infrastructure solutions meant that all of the infrastructure objectives were met by ITIMCO, and the project delivered on-time.

The high-density cable housings embodied state-of-the-art modularity and plug-and-play simplicity, providing a scalable and homogeneous IT, communications, and building automation network that minimises operating and energy costs and will meet their future business needs.

The smaller footprint and overall technical space saved through the design was equivalent to an additional 80 workplaces equating to a savings of Euros 6 million in extra office space, realising a return of investment on day one.



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