

The top half of the page features a background image of a construction site at sunset or sunrise, with several tower cranes silhouetted against a warm, orange sky. Overlaid on this image is a large, stylized yellow graphic consisting of a hexagonal shape on the left and a circuit-like path on the right, ending in three circular nodes. This graphic symbolizes the intersection of construction and technology.

FAB CONSTRUCTION: MORE LOGISTICS, LESS COMPLEXITY

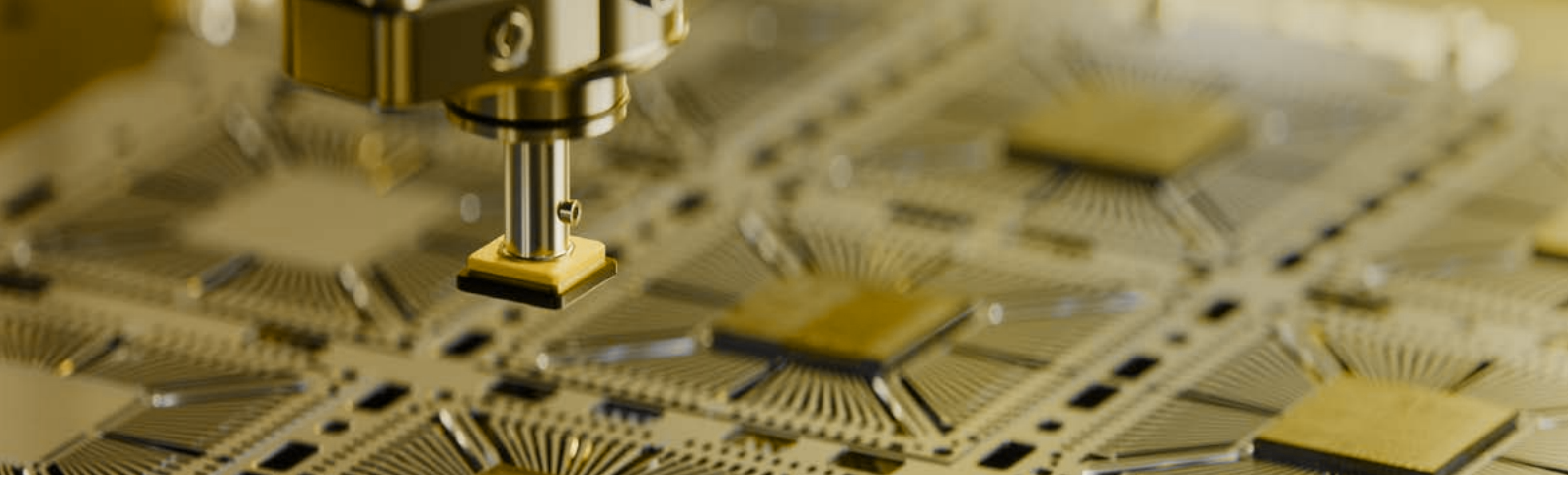
It's hard to imagine anything more complex than the construction of a semiconductor fabrication plant (fab). This capital-intensive task involves colossal investment decisions and risks, uncertainty in cash flow control, and knife-edge supply and demand balancing to avoid chip shortages down the road. There may also be unpredictable, unavoidable delays in construction exacerbated by labor and material shortages, limits on the availability of construction talent, and the extreme price volatility of raw-material commodities.

Fab construction is the very definition of a complex challenge, containing “many interdependent elements, some of which may be unknown and may change over time in unpredictable ways. In addition, an action or change in one dimension can result in disproportionate and unforeseen outcomes” (Harvard Business Review).

Every fab construction project must be completed on time and on budget, even when multiple facilities are being created in parallel and when site locations have no established ecosystem for semiconductor manufacturing. Despite all this, investment in new facilities is climbing steadily around the world. Across central-eastern Europe, for example, developers rolled out 3.8 million square meters of industrial space in the first six months of 2023, with another 5 million now under construction.

Fortunately, logistics can help.

Efficient and well-coordinated logistics will ensure timely transportation and delivery of commodity items such as concrete and steel beams, as well as general industrial products such as chillers, storage tanks, and gas handling equipment. The combined capabilities of DHL's global, regional, and local transportation networks enable optimized transport engineering, route planning, and licensing and permit services. For large, out-of-gauge items, we provide specialist transportation as well as cranes and other handling equipment. Properly coordinated, these logistics services help avoid bottlenecks and project disruptions, taking last-minute changes in their stride and bringing materials and equipment to the right place, at the right time, and without any damage.



This zero-defect mindset is essential when transporting the highly specialized equipment used to make semiconductors. These delicate, high-value items require extremely careful handling by certified logistics experts. For these and all other fab assets, DHL uses state-of-the-art visibility tools to provide the highest levels of transportation and inventory visibility.

Early stakeholder engagement pays dividends, especially at greenfield sites and for fab extension projects. In close collaboration with semiconductor customers and EPC contractors, we establish sufficient logistics capacity to support construction activities, including air, ocean, rail, and road freight capabilities and adequate warehousing space to store and prepare equipment before installation. Often, we need to think big, really big. One mega-fab project involved almost 28,000 square meters of dedicated warehouse space and an additional 60,000 square meters of yard space.

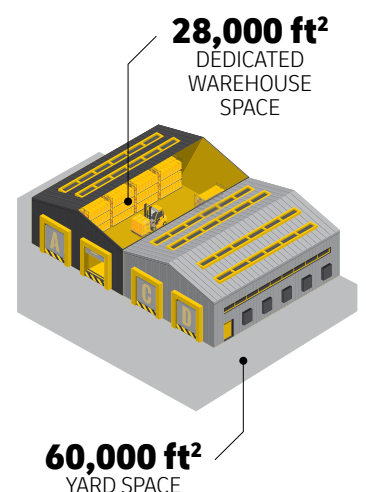
As well as supporting the construction site, chip makers depend on specialist logistics services for the delivery of capital equipment and spare parts. Again, think big. For example, the largest manufacturing systems require 3 Boeing 747 cargo aircraft and arrive on site in 40 shipping containers placed on 20 separate trucks. Managing this is no small task. Once this equipment is in place, the process of assembly, test, and setup begins, taking several months. Then there's a ramp-up period with close collaboration between the fab operator and suppliers, supported by logistics for the dependable, local supply of spare parts and other equipment.

Initial tooling and service logistics extend beyond fab startup and are essential to production. DHL provides supplier and carrier management expertise, and offers dedicated control tower coordination services, with data analytics and third-party performance reporting. We also support suppliers with access to forward stocking locations and warehousing close to the fab.

For all the above, we're using our core competencies, which means we're likely to deliver the most cost-effective solution for fab construction projects, and we offer a range of engagement models to suit different needs. We also provide transparency to the project owner to keep everything on track – from logistics planning and coordination right through to final execution. And we reduce complexity by managing multiple logistics service vendors.

If you'd like to know more about DHL Construction Logistics for the Semiconductor Industry, please check out our [brochure and website](#)

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