Layher

More Possibilities. The Scaffolding System.

Quality management certified according to DIN EN ISO 9001

Energy management certified according to DIN EN ISO 50001

Environmental management certified according to DIN EN ISO 14001

Layher System Solutions

CIVIL ENGINEERING & BRIDGE CONSTRUCTION

- Typical applications
- Solutions
- Useful ideas

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- System Solutions for civil engineering and bridge construction

01 THE COMPANY

Quality made by Layher comes from Gueglingen-Eibensbach. Our company has set down deep local roots since it was established. Right up until today, development, production and management are all in one place. This proximity creates advantages that benefit our customers all over the world: short distances, short response times, controlled quality and production.

Layher's history began more than 75 years ago with the manufacture of ladders and other agricultural equipment. Since then, Layher has significantly influenced the market for scaffolding and access technology. Today, more than 2,700 employees create more possibilities for our customers every day with a comprehensive range of services, a sustainable training programme and customer proximity. In more than 51 countries worldwide.

Layher lives **economic and ecological sustainability** in all process steps. Social responsibility towards employees, customers and society takes centre stage.

Headquarters in Eibensbach

Plant 2 in Gueglingen

Plant 3 in Cleebronn

Discover the world of Layher in its company film.

WITH LAYHER, THERE ARE MORE POSSIBILITIES.

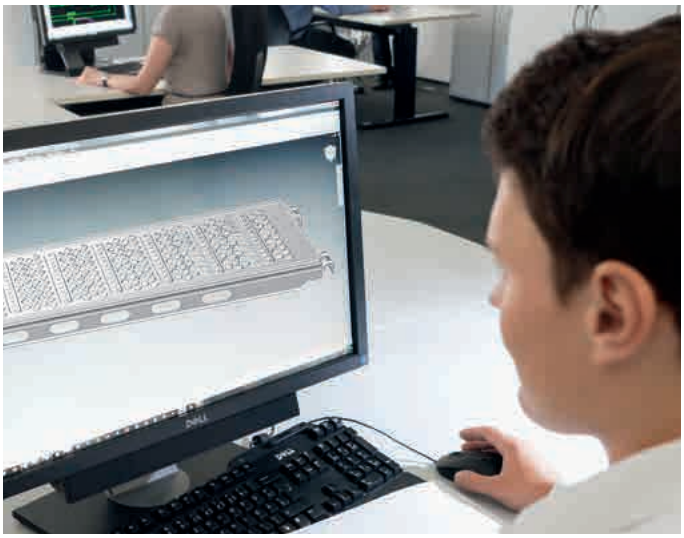
A comprehensive range of innovative products, application-orientated solutions and comprehensive services for easy, fast and safe working at height.

Continual product innovations and design improvements

As leading innovators, we work continually to make scaffolding construction even simpler, even faster and above all even safer with our products. The development work focuses on:

- Improving safety during assembly and dismantling
- Increasing assembly capacity thanks to lower weight, more ergonomic shape and reduced number of components
- Increasing efficiency and profitability
- Complete integrability of new products into existing system
- Opening up of new fields of business with new products

The Layher Lightweight philosophy embodies this innovative spirit: the use of high-tensile steels and design improvements in lightweight products allow for assembly capacity to be increased by up to 10% and transport costs to be reduced by up to 12%.



Continual product innovations and design improvements

Products for greater safety when working

Safety when working is in everyone's interest. When you use Layher products, you satisfy the statutory requirements relating to safety when working, in every respect and in their latest version, or you even set new standards for safety at the site. This includes facade scaffolding with advancing side protection, shoring and stairtowers that can be assembled safely on the ground and then moved by crane, or shoring towers that are assembled directly at the place of use with system-integrated and advancing side protection.

System-integrated advancing side protection during assembly of shoring towers TG 60

Large stocks and rapid material availability

Layher can draw on flexible production resources and significant inventories, and so can guarantee customers uniquely fast delivery at all times. We can deliver dependably and punctually for orders placed worldwide. "No time to lose" is also the motto of our logistics concept: customers can collect the materials they need from their Layher service centre, have them sent to their warehouse, or delivered just-in-time to the site. This means they can start work without delay and complete their projects efficiently while maintaining the top quality Layher has come to represent.

Shipping warehouse at the main plant

Close-knit network of service centres

A worldwide network of subsidiary companies ensures that we are always close to our customers. You can rely on our Layher standards wherever you are in the world: local warehouses, technical support, training in accordance with national regulations and safety standards. The benefits for you: We can respond optimally to market-specific needs, because we know the local conditions, cultural characteristics and of course each country's specific regulations. This makes us competent partners, for internationally operating companies too.

Digital planning with LayPLAN SUITE

Scaffolding Information Modeling – SIM for short – is an intelligent process based on 3D models. SIM not only allows scaffolding constructors to plan, assemble and manage temporary scaffolding structures more efficiently, but also affords access to BIM at the same time. With the integrated Layher software solution LayPLAN SUITE, customers are provided with a powerful tool for the SIM process.

Standard and expansion parts in the component library of LayPLAN SUITE

Expert assemblers and technical assistance at the construction site

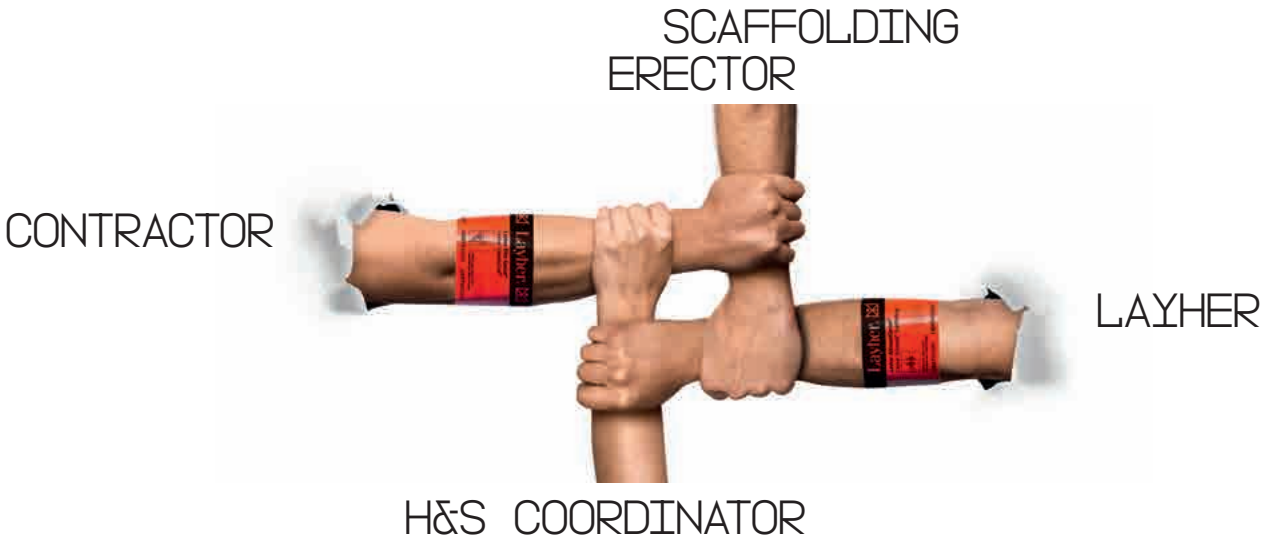
Our priority is our customers' success. This is why we believe in close cooperation, and invest in genuine and lasting partnerships at every level.

Our well-qualified engineers devote themselves to your specific requirements, finding solutions for you that deliver the right results at the right price – including directly on the site. It may be that new applications have to be tried out or that assistance is needed when assembling Layher scaffolding for the first time. Expert assemblers are there to assist you and your employees – at your site too.

Technical advice from expert assemblers on the spot

Strong partnership is part of our DNA

At Layher we're convinced that close and trusting cooperation between manufacturer, scaffolding company and end customer is the right model to ensure success when working on construction sites and projects. Only with this strategic partnership can jointly defined objectives be achieved economically and safely. Because it's not enough to have an outstanding product for successful scaffolding construction – what's crucial is what you do with it.



Technical seminars for regular training of employees

In toughly contested markets, companies need qualified employees. That's why Layher organises regular technical seminars specifically for scaffolding construction and building companies, preparing you for current and future challenges in scaffolding, and giving you more confidence and knowhow to make the most of Layher products.

We supplement our seminars with many further offerings, such as practical product training and open days for construction companies, with interesting presentations by industry specialists and intense group discussions amongst scaffolding professionals to encourage the exchange of ideas.

Technical seminars on theory and practice

02

AT EVERY SITE

- Civil engineering and industrial construction
- Civil engineering, below ground
- Bridge construction

2.1 Civil and industrial engineering

Large bakery / logistics centre in Schafisheim, Switzerland

Office building in Oehringen, Germany

High-bay warehouse in Nufringen, Germany

Industrial plant construction in Brake, Germany

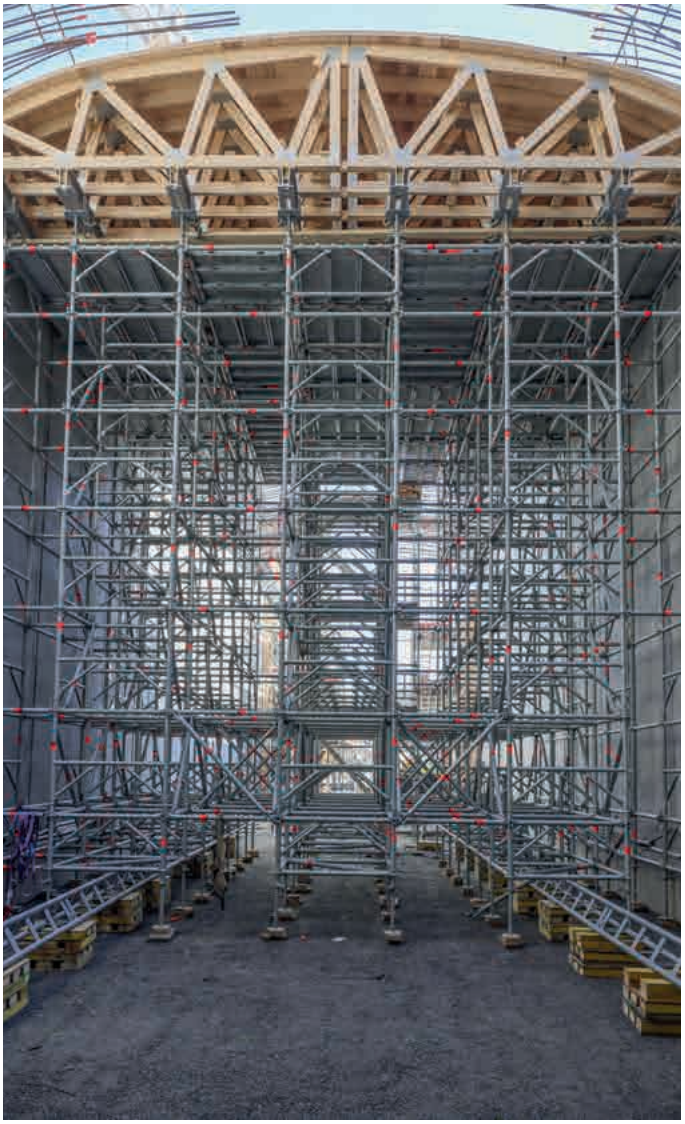
Business building, Stavanger, Norway

Office building, Freiburg, Germany

Waste-to-energy plant, Stapelfeld, Germany

Community hall, Kirchheim a. N., Germany

2.2 Civil engineering, below ground



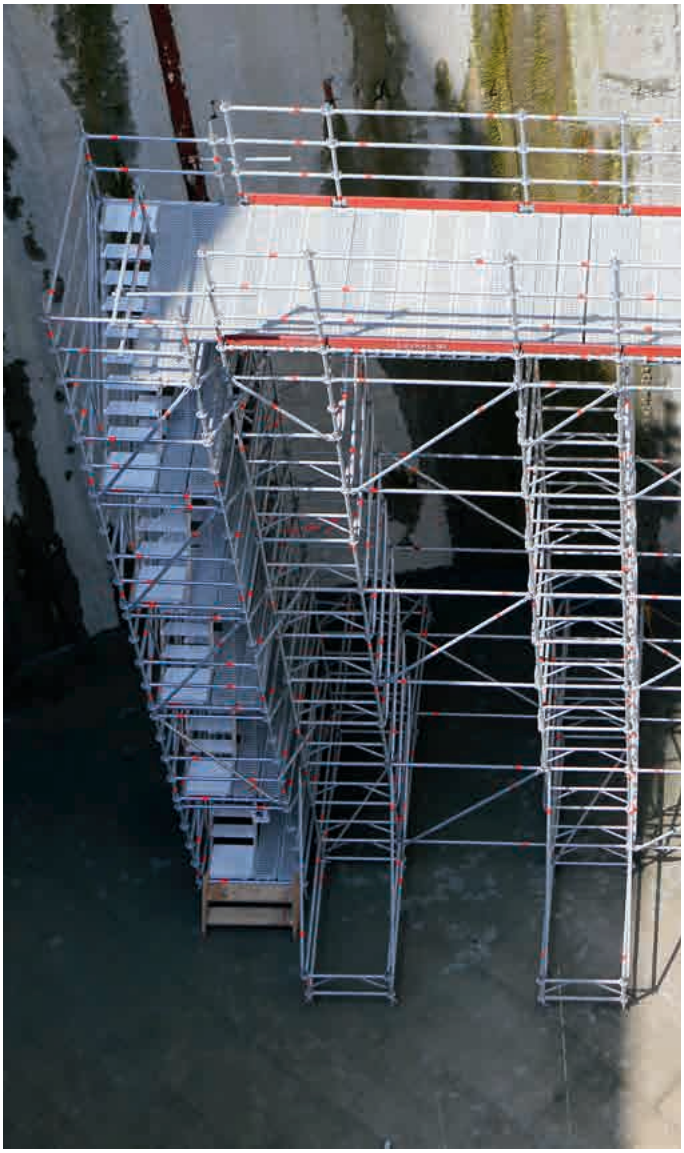
Tunnel formwork, Sweden

Tunnel construction in Erfurt, Germany

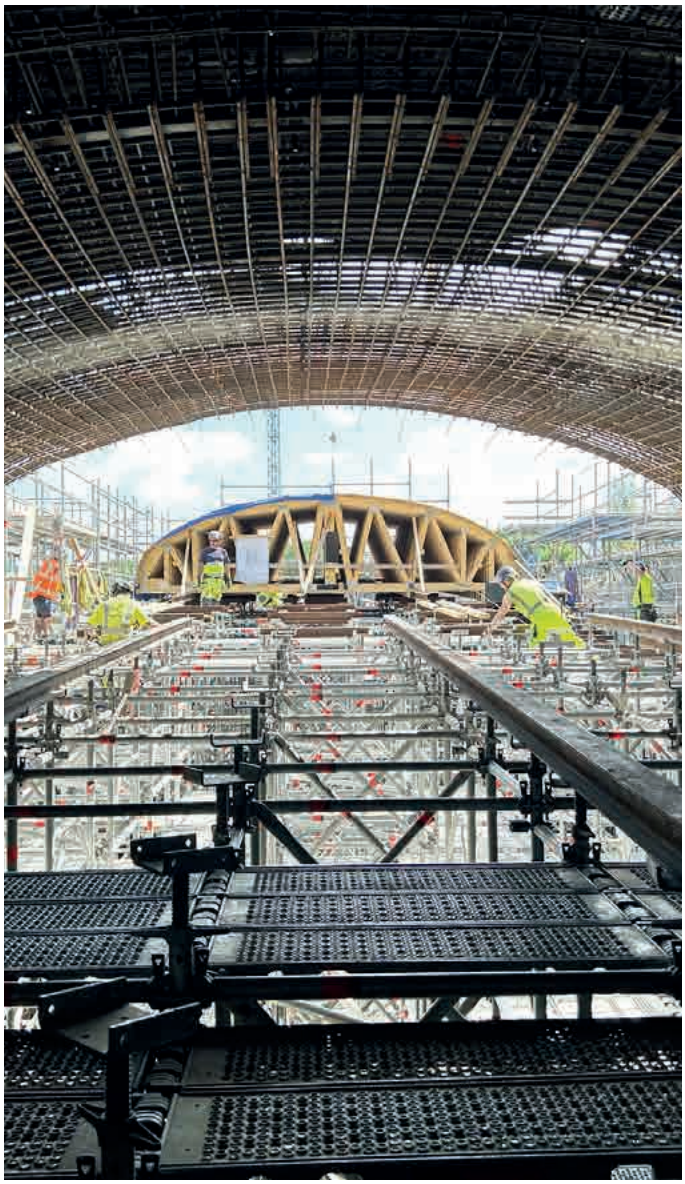
Pumped storage power station in Limmern, Switzerland

Light rail station in Sydney, Australia

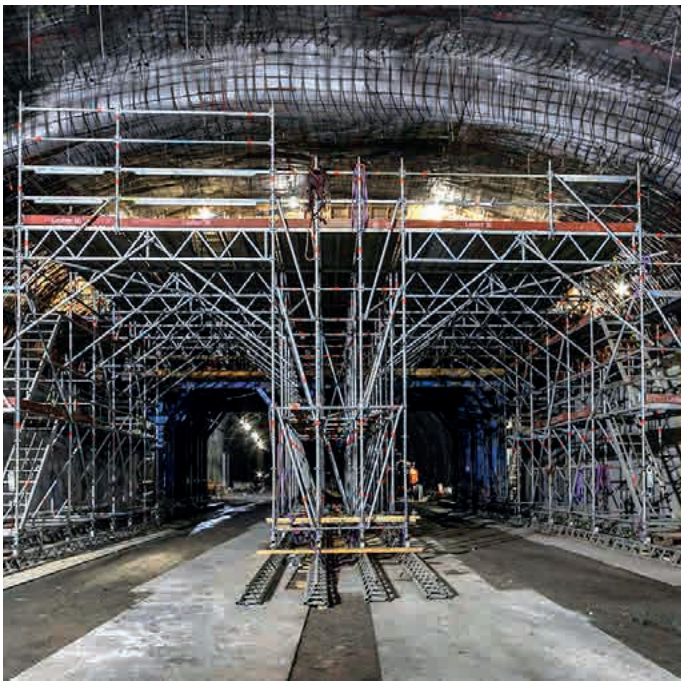
Mobile tunnel drilling podest, Australia



Sewer laying in Bottrop, Germany

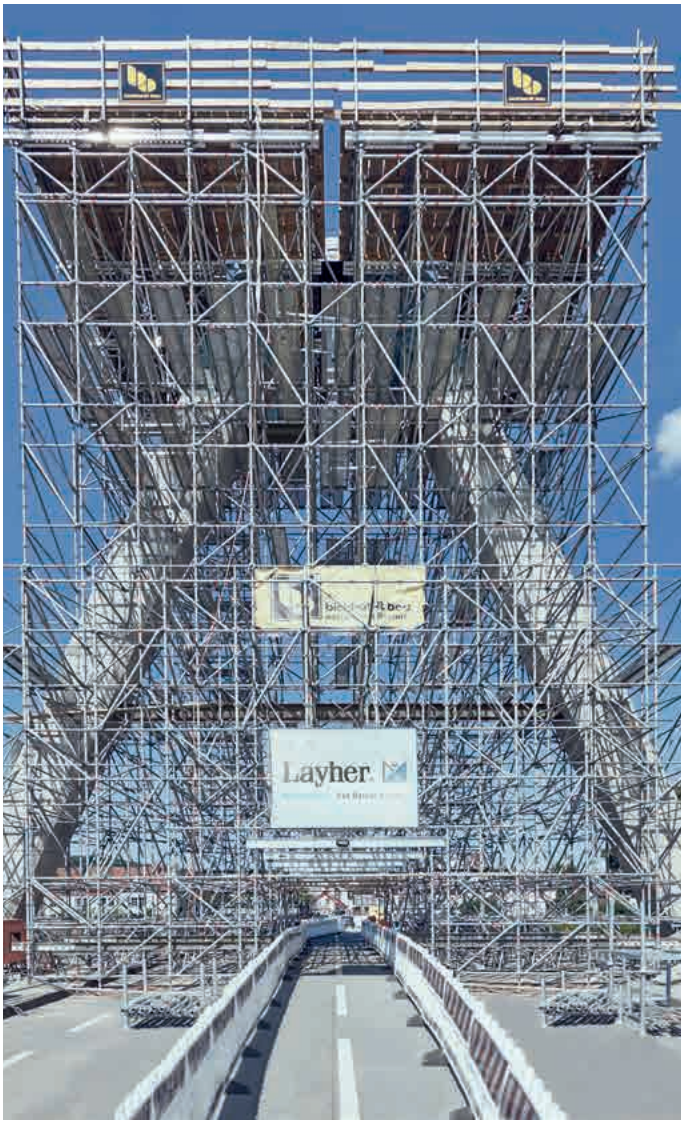


Tunnel formwork, Sweden



Mobile tunnel scaffolding, Stockholm, Sweden

2.3 Bridge construction



Building of new bridge in Hoexter, Germany

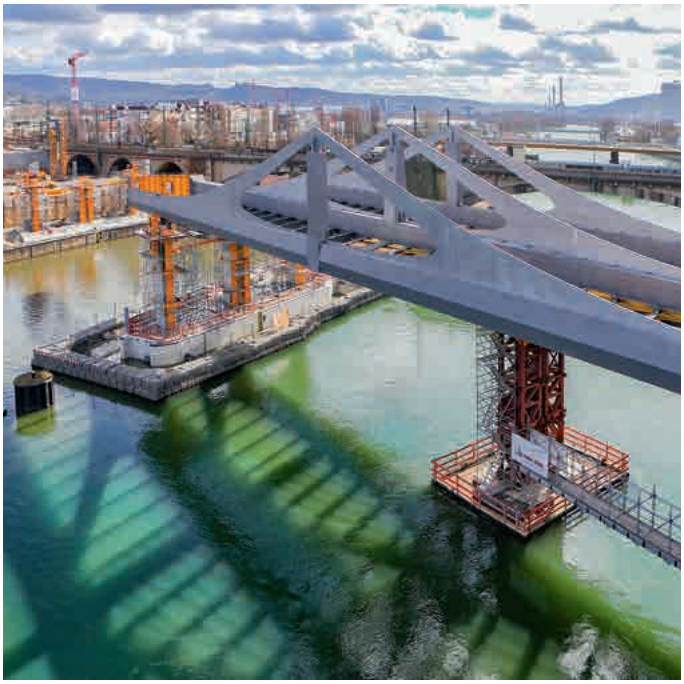
Building of new bridge in Pforzheim, Germany

Bridge construction, motorway junction, Hamburg, Germany

Building of new bridge in Bad Wuennenberg, Germany

Pylon repair in Speyer, Germany

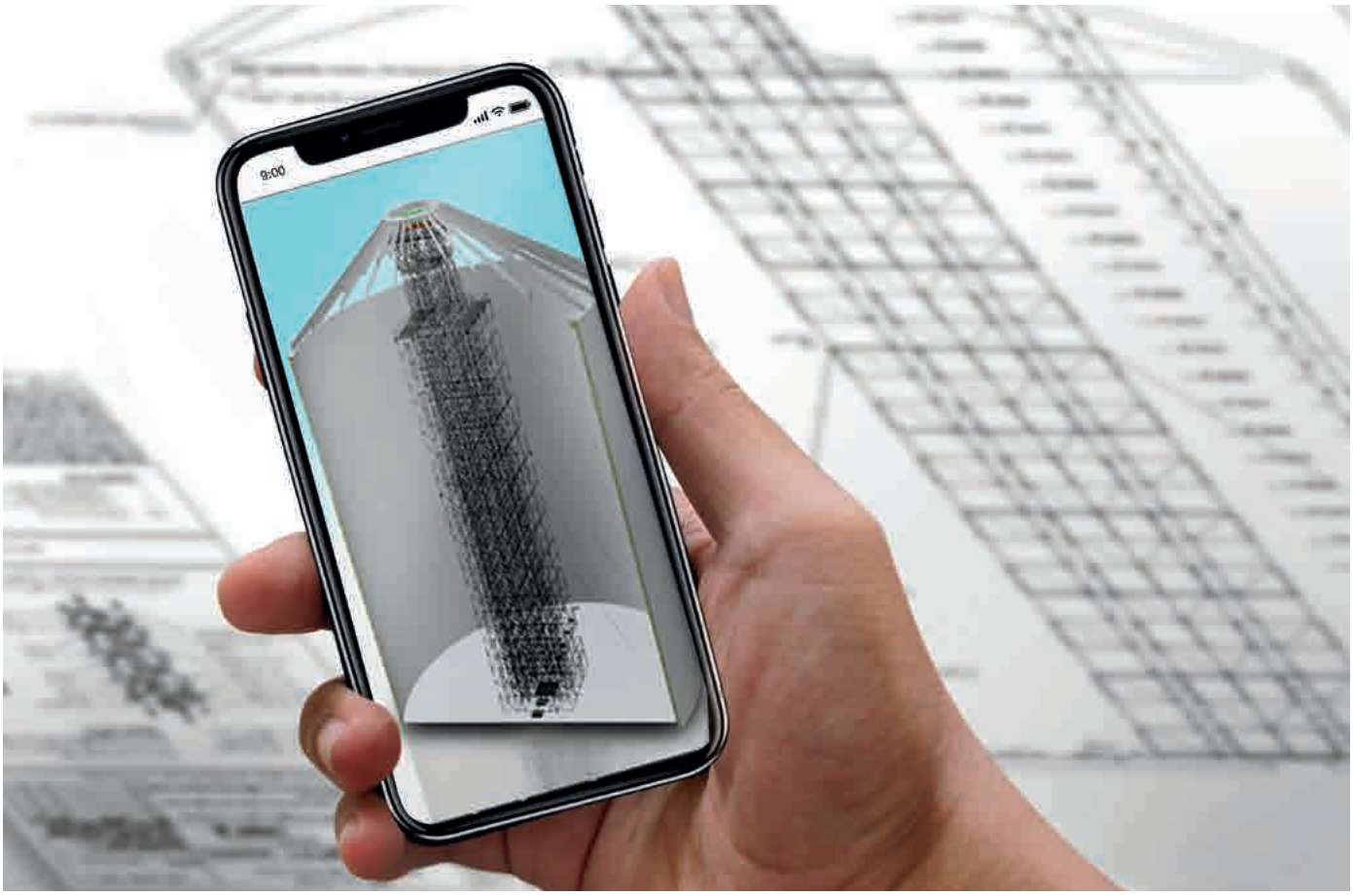
Repair of bridge in Sydney, Australia



Building of new bridge in Stuttgart, Germany

03 DIGITALISATION

- Your access to BIM
- LayPLAN CLASSIC
- LayPLAN MATERIALMANAGER
- LayPLAN CAD
- LayPLAN VR VIEWER
- LayPLAN TO RSTAB
- Project workflow

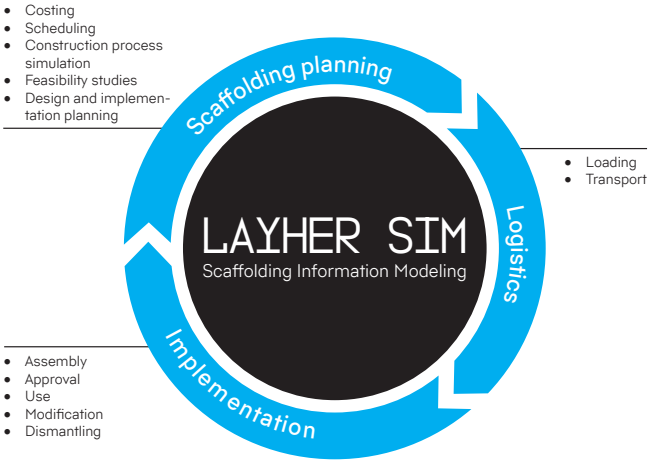


3.1 Your access to BIM

Digitalisation is affecting every industry. That includes scaffolding construction. And rightly so, because nothing else optimises project planning so effectively, while opening up for you enormous potential for both transparency and cost savings. Layher therefore asked itself the question of how the BIM concept – Building Information Modeling – originating in civil engineering could be adapted to scaffolding as temporary structures. Because the proven Layher systems permit faster and safer upward access, yet are not part of the actual structure. Furthermore, scaffolding can also be used independently of civil engineering projects, for example as stand-alone structures like temporary bridges. The result is SIM: Scaffolding Information Modeling.

Scaffolding Information Modeling – SIM for short – is a process based on 3D models and designed by Layher to meet the specific requirements of scaffolding construction. SIM not only allows you to plan, assemble and manage temporary scaffolding structures more efficiently, but also affords access to BIM at the same time. With the integrated Layher software solution LayPLAN SUITE, you have a powerful tool for the SIM process: LayPLAN CLASSIC facilitates a start in digital planning by allowing automated planning of predefined scaffolding applications – and if required even with temporary roof structures. For complex scaffolding structures as part of large-scale engineering scaffolding, there is LayPLAN CAD. Detailed information on the modules of LayPLAN SUITE can be found on the following pages.

Dependable 3D planning of scaffolding structures without collisions is just one of many benefits. Added to that are the realistic visualisation of scaffolding, allowing for coordination of work with other trades or simulation of the construction sequence; transfer of the scaffolding planning to structural analysis programs; and output of material lists and assembly plans. Transparency at every step results in a reduction in costs and an increase in safety and profitability. When they work with Layher's scaffolding construction customers, both building contractors and end customers in industry benefit from the many advantages SIM has to offer: a high degree of planning certainty, cost control and, above all, the ability to complete projects on schedule thanks to efficient and undisrupted construction processes. Delays and added costs due to inadequate planning are a thing of the past.

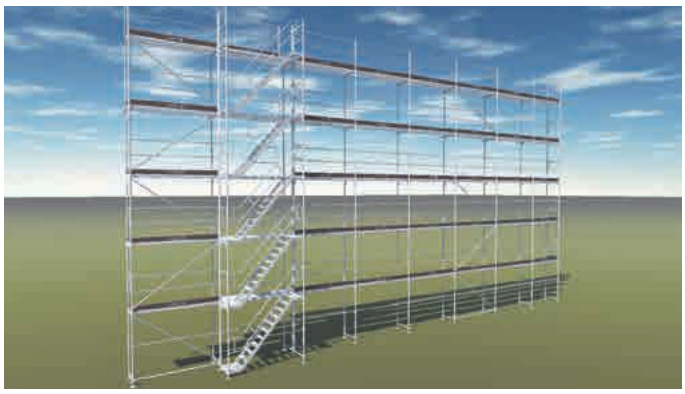


Your Benefits at a Glance

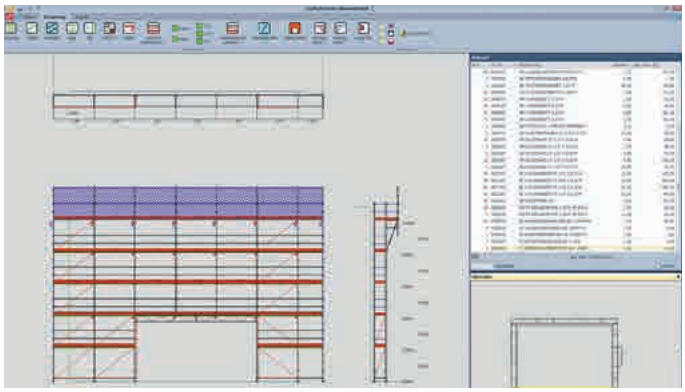
- Transparency in all work steps and cost control
- Increase in safety and profitability for every project
- Planning and scheduling certainty at every site
- Your access to BIM

3.2 LayPLAN CLASSIC

LayPLAN CLASSIC facilitates a start in digital planning by allowing automated planning of predefined scaffolding applications: whether they're for circular or facade scaffolding made from SpeedyScaf, for birdcage scaffolding and free-standing towers made from Allround Scaffolding, or for structures with temporary roofs. Once the key data has been entered, scaffolding erectors receive in seconds a scaffolding proposal that includes anchoring, bracing and side protection. During the design phase, the overall length, standing heights and areas are continuously calculated and displayed to reflect the latest plan. A materials list can also be easily created at the push of a button. Scaffolding erectors benefit from more certainty when planning the commercial and technical details; from optimised use of their stocks; and from full cost transparency at every stage of the project.



3D visualisation in LayPLAN CLASSIC



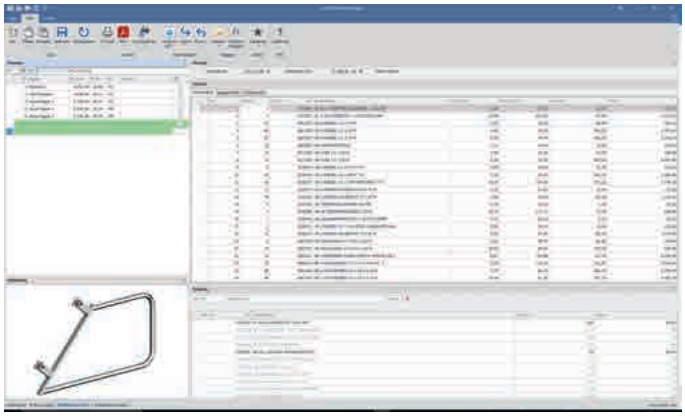
Facade scaffolding with brick guard level and vehicle access using LayPLAN CLASSIC SpeedyScaf

Added value of LayPLAN CLASSIC

- Automated planning of standardised scaffolding structures using SpeedyScaf, Allround Scaffolding and Layher weather protection roofs
- Automatic 2D drawings
- Integrated 3D viewer for detailed visualisation and persuasive order acquisition
- Real-time material list – for transport and assembly
- Export function to LayPLAN CAD and material manager
- No CAD knowledge necessary

3.3 LayPLAN MATERIALMANAGER

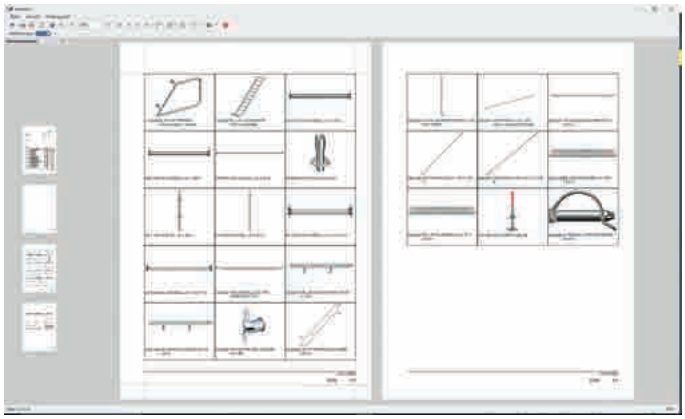
The LayPLAN MATERIAL MANAGER allows material lists to be created and edited – for example splitting into different construction sections to permit prices and weights to be considered separately.



Program interface

Added value LayPLAN MATERIALMANAGER

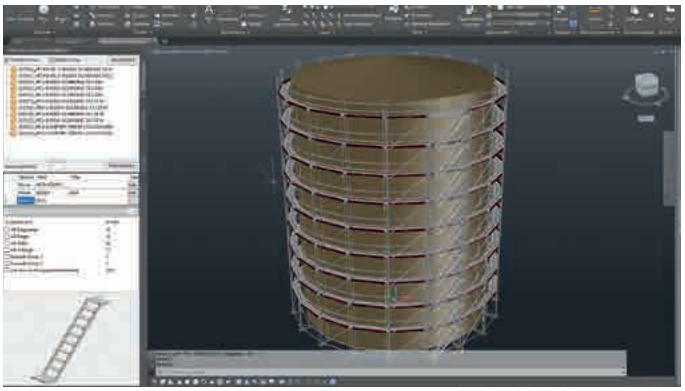
- Automatic creation of material lists from LayPLAN CLASSIC and LayPLAN CAD
- Manual editing of material lists, for example splitting them into construction sections and applications
- Detailed information on the scaffolding components including preview image
- Formula functionality as in Microsoft Excel®
- Output as PDF and export in Excel (incl. linked formulae)
- Optional component images on the material lists in the printout – this makes it easier to identify components during loading and assembly



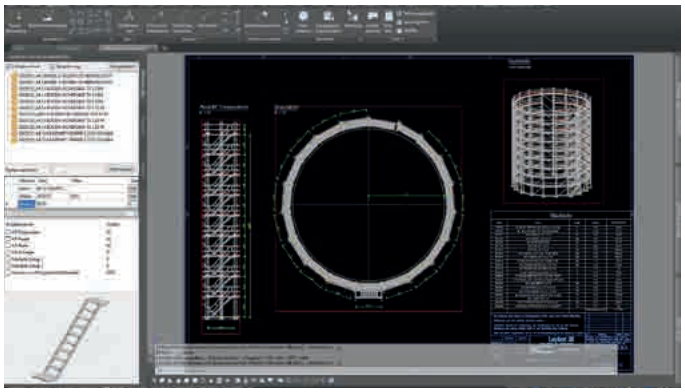
Exported material list with product images

3.4 LayPLAN CAD

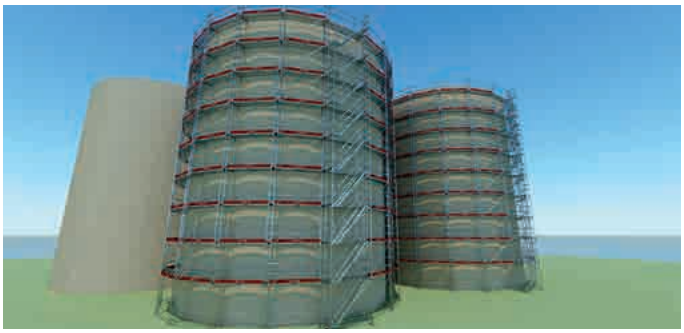
When it comes to complex scaffolding structures as part of large-scale engineering scaffolding, look no further than LayPLAN CAD. This is a plug-in for Autodesk AutoCAD. It permits 3-dimensional planning of scaffolding structures of all types.



Planning of individualised scaffolding structures in LayPLAN CAD



Creation of planning documents with integrated material lists in LayPLAN CAD



Professional 3D rendering of the LayPLAN CAD models

Added value of LayPLAN CAD

- Scaffolding planning and design in 3D
- Basic planning optional automated in LayPLAN CLASSIC – that saves time
- Visual collision check thanks to realistic rendering.
- Extensive component library with a convenient search function – including prefabricated assemblies and template drawings for even faster design
- Preview image of components und automated component labelling
- Real-time material list for transport and assembly
- Further editing of the model data in visualisation software (e.g. rendering, VR) for order acquisition and for coordination with other trades or for construction sequence simulation
- With the funktion 'Structural model' the further editing of the model data RSTAB for structural strength calculations as part of project-related verifications of stability is possible. Unlike in remodeling which is otherwise necessary, this avoids error sources and saves time when planning. LayPLAN TO RSTAB also provides a convenient interface for data transfer in combination with LayPLAN CAD and AutoCAD. For further information, see LayPLAN TO RSTAB

3.5 LayPLAN VR VIEWER

The free-of-charge LayPLAN VR VIEWER enables virtual tours of scaffolding structures, to convey a realistic spatial impression of the overall situation. Based on the data from LayPLAN CAD, Layher can create VR models for display in the LayPLAN VR VIEWER for you. We'd be happy to assist you on the spot with our specialists and equipment for your VR presentation.

Added value of LayPLAN CAD

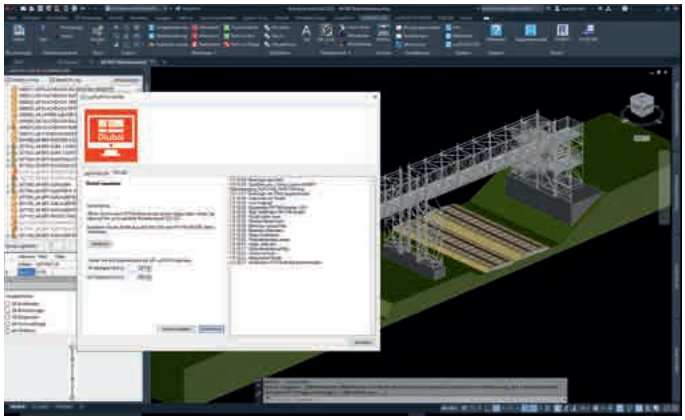
- Virtual tours of scaffolding structures with VR headset and optional display of VR models in Desktop mode
- Integrated measurement and comment function
- Conveying of a realistic spatial impression of the overall situation, for order acquisition and for coordination with other trades or for construction sequence simulation
- Verification of occupational health and safety through the involvement of health and safety coordinators

Virtual tour of planned scaffolding structure

Tour of a VR models

3.6 LayPLAN TO RSTAB

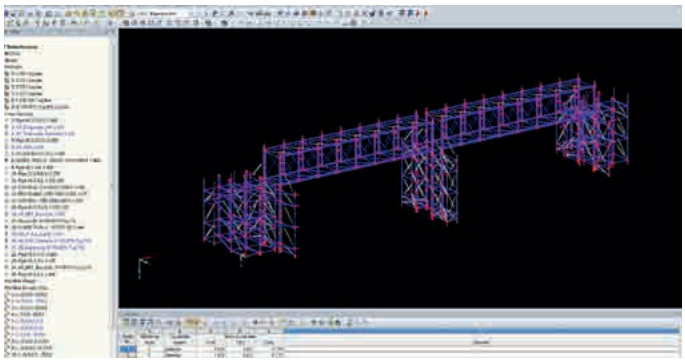
For structural strength verification of scaffolding structures, frame analysis programs are generally used. Using the LayPLAN TO RSTAB module, all modelling-relevant information about an Allround Scaffolding structure can be imported from AutoCAD three-dimensionally into the RSTAB frame analysis program from Dlubal. Automated transmission of the information means that re-entering the model data is not needed. This means that the user will benefit from an enormous time saving, and also avoid a possible source of errors during modelling.



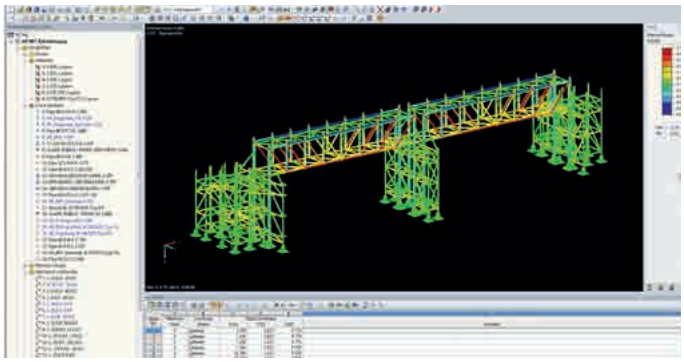
Transmission of model data with the aid of LayPLAN TO RSTAB

Added value of LayPLAN TO RSTAB

- Time saving thanks to automated 3D model transfer of All-round Scaffolding structures
- Transmission of all structurally relevant information according to the approvals (geometry, cross-sections, materials, frame types, eccentricities and non-linear connections)
- Avoidance of possible sources of errors during modelling in the frame analysis program



Imported RSTAB model, prepared for structural strength computations



Structural strength computations based on definition of nodal supports and loads

3.7 Projectworkflow

The underlying task of Layher SIM is to perform the scaffolding planning that provides the basis and the digital twin for all subsequent process steps. One of the required inputs is the geometry data of the object at which the scaffolding is to be erected. This can be provided in the form of existing 3D models, the results of a 3D laser scan or remodelling based on 2D plans. Based on the digital twin, it is possible to obtain further information as output that can be used directly for subsequent process steps. Layher SIM focuses on the end-to-end use of data and the elimination of digital barriers in order to ensure loss-free data exchange.

FROM THE REALITY INTO THE DIGITAL PLANNING →→→

3D model available?
If a 3D model of the building project is available, this data is used

No 3D model available?
Capturing the reality of existing buildings using the 3D laser scan digital service

→→ →

Digital planning with **LayPLAN SUITE:**

- LayPLAN CLASSIC
- LayPLAN CAD
- LayPLAN MATERIALMANAGER
- LayPLAN TO RSTAB
- LayPLAN VR VIEWER

→→→ FROM THE DIGITAL PLANNING INTO THE REALITY

Measuring on the construction site for precise positioning of the scaffolding using the **SIM-2Field** digital service

Virtual installation support with the **SIM2Field XR app**

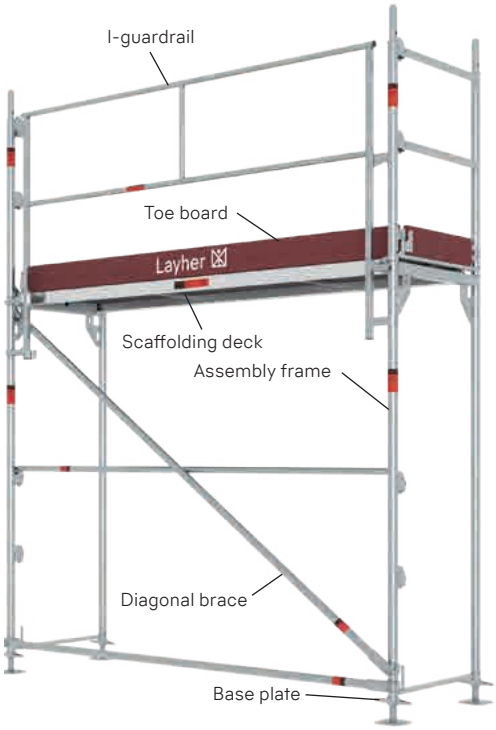
04 PRODUCTS

- SpeedyScaf
- Allround Scaffolding
- AGS System
- Allround Shoring TG 60
- Protective systems

4.1 SpeedyScaf

For decades now, Layher SpeedyScaf equipment has been the recognized leader in insertion-frame systems with the Speedy frame. Modern, fast and robust making it ideal for work on facades. Layher SpeedyScaf is, thanks to its versatile and well thought-out range of parts, equally economical to use in scaffolding construction and in professional trades.

With just six basic elements and a few manual operations, this logically and safely erected scaffolding is very quick because it is assembled without bolts. Numerous expansion parts permit optimum adaptation to existing building geometries – without much extra effort during assembly. SpeedyScaf is available in different scaffolding widths, made of hot-dip galvanized steel or lightweight aluminium, for every application.



Well-thought-out connection possibilities for brackets and numerous anchoring points directly on the corner plate.

Easy installation of internal guardrails by insertion of guardrail wedge housings.

Effortless installation of scaffolding decks.

Fast and perpendicular assembly thanks to identification on the frame.

The SpeedyScaf is subdivided in following scaffolding systems:

- **SpeedyScaf 0.73 m wide, hot-dip galvanized steel**
  up to load class 4 as per DIN EN 12811
- **SpeedyScaf 0.73 m wide, aluminium**
  up to load class 3 as per DIN EN 12811
- **SpeedyScaf 1.09 m wide, hot-dip galvanized steel**
  for load classes 6 as per DIN EN 12811
  (depending on deck design and bay length)

The various scaffolding systems of Layher SpeedyScaf are approved with various general building authority approvals:
Z.8.1-16.2 Layher Speedy 70 Steel, Z-8.1-840 Layher Speedy 100 Steel, Z-8.1-844 Layher Speedy 70 Aluminium. Each of these general building authority approvals has its own approval object. The scaffolding components for use in each of the scaffolding systems are derived from the respective general building authority approval.

In addition, there is a type testing for the Layher SpeedyScaf 70 Steel by the test authority of the German Building Authority. This includes 7 assembly variants with platform heights up to 100 m.

The Benefits for You:

- Ergonomically comfortable and safer handling plus high assembly capacity
- Flexible in use: suitable for all trades, combinable with other Layher systems and products
- Extensive and complete range of parts in structure-based standard lengths for 0.73 m and 1.09 m widths
- Comprehensive approvals for steel and aluminium to ensure more safety during use

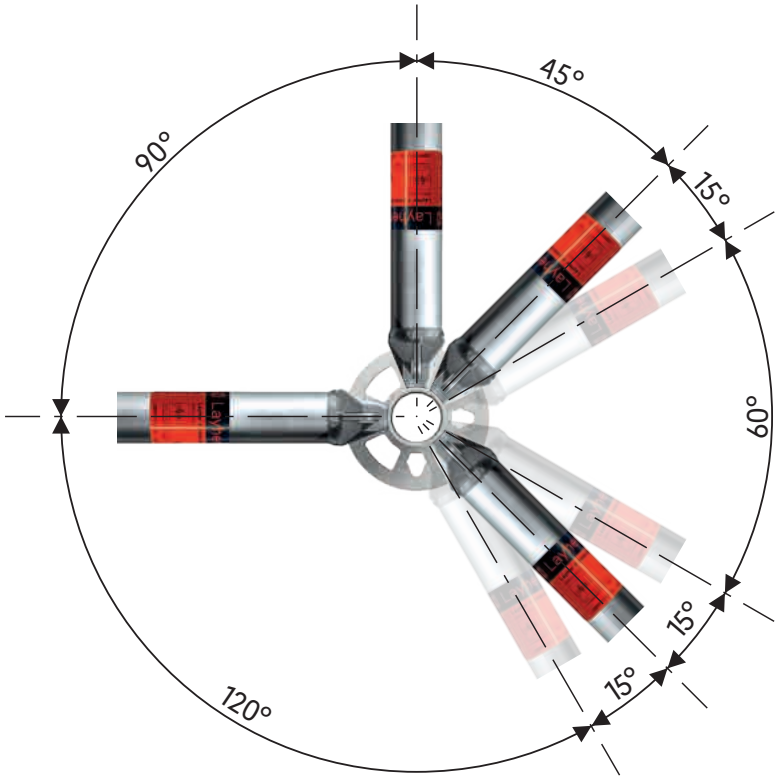
4.2 Allround Scaffolding

The Allround Scaffolding Lightweight from Layher with its proven wedge connection technology is in use all over the world. The original offers impressive versatility, especially for the most difficult geometries and anchoring conditions. Whether as work scaffolding, safety scaffolding or shoring, as internal scaffolding, mobile scaffolding or deck scaffolding: There is nothing that you cannot solve quickly, cost-effectively and safely with the Layher Allround system.

Allround equipment features a simple, unique and bolt-free connection technology. When the wedge head is pushed over the rosette, the wedge drops automatically into the recess thanks to the innovative AutoLock function and is **immediately secured against being moved or falling out.**

A hammer blow on the wedge transforms the positive connection into a superbly strong non-positive one. (Use 500 g metal hammer until the blow bounces off). The end face of the wedge head is now positioned precisely at the standard.

The result of superior engineering.
Up to eight connections can be made in the structurally ideal Allround connector, on one level and at various angles. Attachment is possible at the standard dimension intervals of 50 cm on all Allround standards. The flat rosette prevents clogging by dirt of any type.



High and ideal power transmission with low weight. The wedge head and standard are matched to each other in such a way that the ledger loads to be transmitted are transferred directly to the centre of the standard.

The Layher Allround Scaffolding has the following approvals:
Z-8.22-64, Z-8.22-64.1, Z-8.22-939, Z-8.22-949, Z-8.1-919, Z-8.1-969 and other international approvals. Standard designs for the AGS System are regulated by type test TP-21-012. This type test currently contains 20 statically proven assembly variants.

Ingenious connection technology.
The four small punched-out openings in the rosette automatically centre the ledger at right angles – the four large openings permit alignment with free selection of the angle.

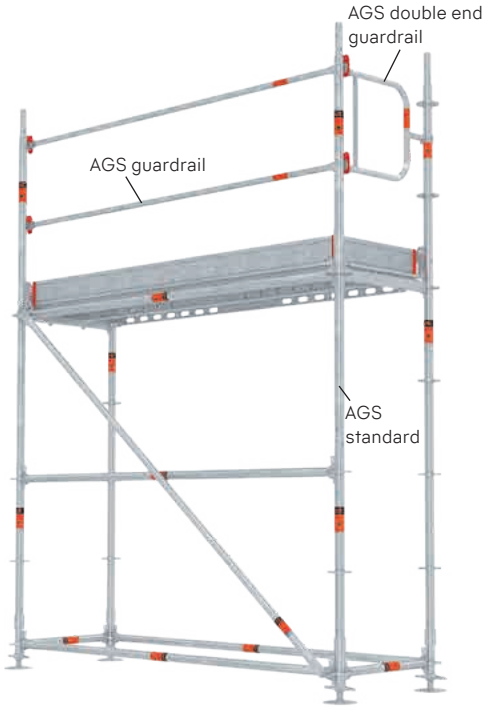
The robust and inexpensive Allround Scaffolding made of steel (hot-dip galvanised) is primarily used in structural and demanding scaffolding construction.

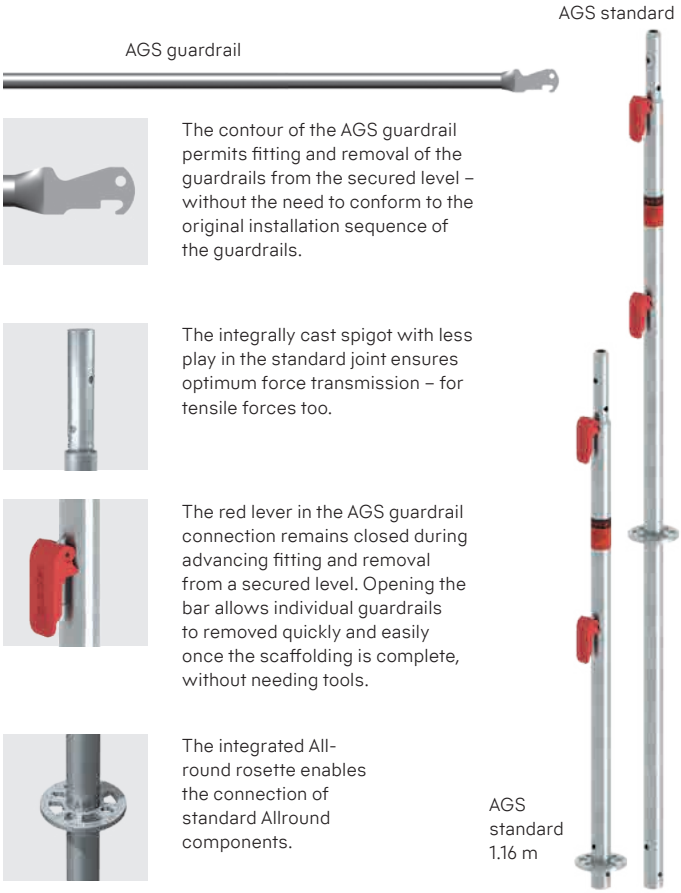
The Benefits for You:

- Time-saving assembly and disassembly thanks to screwless connection technology
- No parts to lose
- Low material usage
- Maintenance-free, always ready for use and durable hot-dip galvanised components
- Low weight of the individual parts
- Sophisticated parts programme
- Impressive cost-effectiveness and flexibility

4.3 AGS System

The modular access system AGS from Layher combines the benefits of a facade scaffolding system with the flexibility of modular scaffolding. The AGS standard meets the same high loading capacity requirements as a normal Allround standard LW. Complete integration into Allround Scaffolding means that all expansion parts from the extensive parts kit can be re-used.





Learn more on YouTube

The AGS System from Layher
yt-ags-en.layher.tv

The lightweight AGS guardrails are fastened without using any tools, thanks to the red safety lever, allowing construction of a system-integrated advancing side protection. Adherence to a defined assembly direction is not needed, and the guardrails can be removed at any time as required.

All further components, such as scaffolding decks, ledgers and diagonal braces, are taken from the extensive Allround Scaffolding construction kit.

With building authority approval
The use of Layher AGS components as a modular access system is governed by the General Building Authority Approval Z-8.22-949 in terms of building law.

- Furthermore, the following approvals
- Z-8.22-939
- Z-8.1-919 und Z-8.1-969

regulate the manufacture and identification of Layher AGS components.

Standard versions for the modular access system AGS are governed by the Type Testing TP-21-012. This type testing currently contains 20 structurally verified assembly variants. An expansion of the range of assembly variants is in progress.

The Benefits for You

- An ingenious and future-proof system: one standard for every eventuality – no retrofitting, for any permissible height, fully system-integrated, with Allround Power Connector
- Rapid and automatically advancing assembly and dismantling, inside and outside, system-integrated and in any direction for handrail and intermediate guardrail
- Easy assembly and dismantling thanks to the unique AGS guardrail connection, with strong and practical safety lever
- Choice between removable AGS guardrail and permanent AGS guardrail Fixx – and in combination too and without retrofitting the standards
- Ready for use – thanks to approval and verified structural analysis
- Wide range of applications and solutions thanks to the Integrated Layher System – ensuring rapid amortisation

4.4 Allround Shoring TG 60

For economical, flexible and safer shoring construction, we offer Allround Shoring TG 60. They are centred on the prefabricated TG 60 shoring frames with integrated rosettes and bolt-free wedge head connection.

Shoring Frames TG 60 – even more possibilities for Allround Scaffolding.

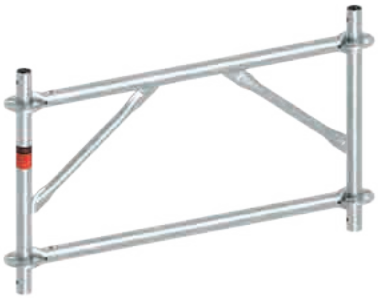
The Shoring Frames TG 60 were developed on the basis of Allround Scaffolding. With just three additional parts, they can be used to create higher and more stable shoring structures even more quickly. The Shoring Frames TG 60 are available in the sizes 1.00 x 1.09 m, 0.50 x 1.09 m and 0.71 x 1.09 m.

The initial frame H = 0.71 m is equipped with rosettes at the top and bottom and does not have any spigots. The Shoring Frames TG 60 with H = 1.00 m and H = 0.50 m are only equipped with Allround rosettes at the top ends of the standards. They are connected using the integrated spigots at the bottom.

Allround Shoring Frames TG 60 are manufactured from high-tensile steel scaffolding tube and stiffened using two struts. Each standard can be loaded with up to six tonnes. The welded-in ledgers are crimped at the ends to provide seven connecting points at the Allround rosette. The Shoring Frames TG 60 replace the standards, ledgers and diagonal braces, meaning that assembly and dismantling can be performed 30% faster and with fewer components.
The individual shoring frames are secured using hinged pins at the joint for transmission of any tensile forces that occur. It is therefore possible to assemble a structure horizontally at ground level before moving it into position by crane. The Shoring Frames TG 60 have a symmetrical design, with the result that no diagonal guidance has to be taken into account during assembly.

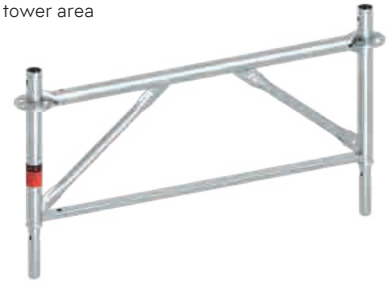
Learn more on YouTube

The Shoring Frame TG 60 from Layher
yt-tg60-en.layher.tv



Shoring Frame TG 60
H = 0.50 m
as end frame or equalising frame

Shoring Frame TG 60
H = 1.00 m
as frame in central tower area



Shoring Frame TG 60
H = 0.71 m
as initial frame

Costing, work preparation, planning and project handling

- Approval Z-8.22-64 regulates the manufacture and marking of Shoring Frames TG 60.
- Instructions for assembly and use and DIBt-approved load-bearing capacity tables for the individual towers based on DIN EN 12812. The TP-11-017 type test contains calculations for tower variants with different ground plans and support heights.
- Material requirements tables and costing aids incl. cost / effort values for estimating assembly times and costs.
- Excel tools for determining the ideal basic dimensions and cost calculations.
- Comprehensive seminar programme in theory and practice.
- Support with planning from Layher application engineers

Allround Shoring TG 60 – the Benefits for You:

- Lightweight components with high load-bearing capacity.
- Faster and safer assembly and dismantling.
- Variably adaptable to loads and building geometries.
- Type tests for the individual towers of types A to E.

Assembly of shoring towers

- Safer assembly thanks to innovative assembly sequence, integrated access aid and automatically integrated side protection.
- Assembly at the site either upright or, thanks to high fitting precision, lying on the ground, for subsequent crane movement.
- Alternatively, assembled TG 60 towers can also be moved using attached wheels.

Preassembly of TG 60 Shoring Tower on the ground

Crane movement of towers preassembled on the ground

Safer upright assembly thanks to integrated and advancing side protection

Integrated deck levels for safer access to slab formwork

- Allround Shoring TG 60 permits the laying of a deck level for safer working on the slab formwork.
- Perforated steel decks with maximum load capacity create a gap-free and non-slip work surface.
- Easy integration of accesses, such as access bays or platform stairs.
- Combination of shoring and work scaffolding with one system for uncomplicated implementation of all the latest safety-related requirements.

Integrated deck levels inside the shoring

Integration of stair accesses into shoring structures

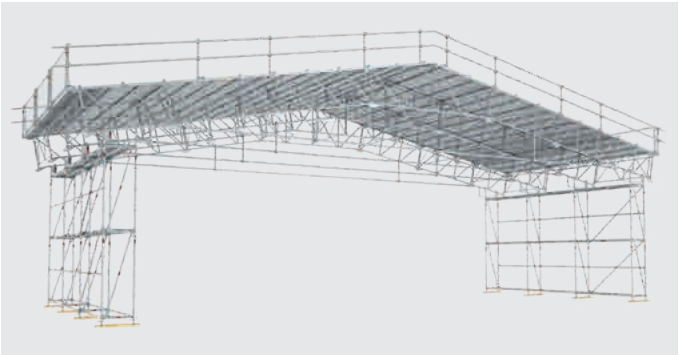
Integration of bracket-mounted walkways

- The brackets from our extensive expansion part range permit faster and safer assembly of access to formwork with the required side protection.
- Brackets are also suitable for even better utilisation of the high load-bearing capacity of Allround Scaffolding – for example in projecting shoring structures.

Integration of bracket-mounted walkways in shoring

4.5 Protective Systems

Layher cassette roofs have established themselves as a firm favourite at construction sites for conversion, renovation and restoration. The structure itself and all the equipment is protected during the conversion or roof refurbishment and normal business operations can continue under a wheather protection proof roof.

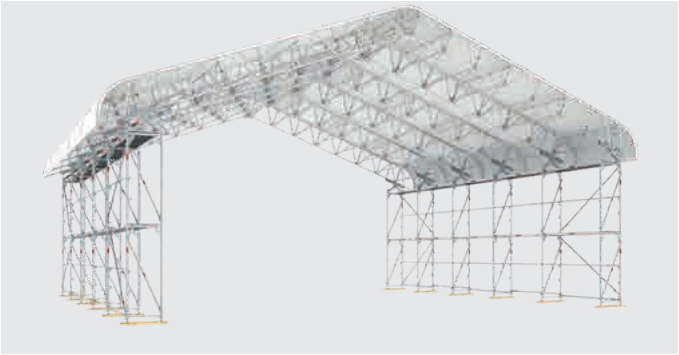


The Layher cassette roof is almost indestructible. Its practical design coupled with the chosen materials are key reasons making it an investment that will retain its value over many years. The use of cassette roof girders ensures rapid assembly. The roof trusses are assembled astonishingly quickly at ground level, then mounted on the supporting structure using a crane. The roof cassettes for the intermediate bays are inserted into the channel section and locked in place with clamping plates and wedges. That's all there is to it! No tensioning or tying is required. The cassettes act as bracing elements. Only every second bay is assembled as a so-called truss bay, and there are no doubled roof trusses. This represents an additional saving of material and, consequently, also of money and assembly time.

The Benefits for You:

- Economical thanks to well-thought-out and durable components and time-saving assembly
- Investment protection thanks to long, useful service life and high-quality components, specially equipped for recurrent, changing assembly and dismantling operations
- Application as temporary storehouse, the repair of timber roofs and coverings, refurbishment work on motorways or over bridges and applications for events
- No interruption of working due to weather influence
- Fully combinable to Layher Allround Scaffolding and Layher SpeedyScaf

The Layher Keder Roof XL is a lightweight and sustainable weather protection roof. According to the normal climatic conditions spans of up to 30 m are possible. Used in conjunction with Keder rails for wall cladding, it means that the entire construction can be designed to form a lightweight hall. The Layher Keder Roof XL is based on aluminium lattice beams 750 with integrated Keder section in the top chord.



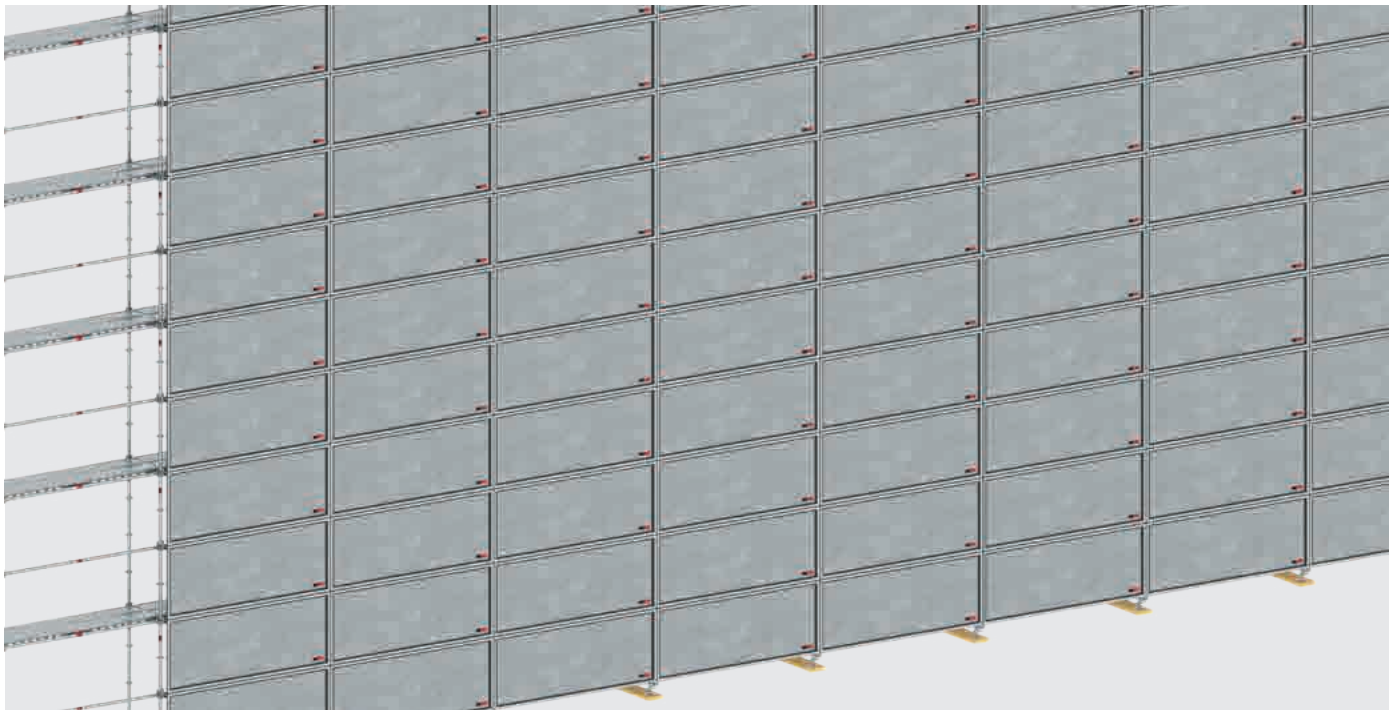
The Layher Keder Roof has many areas of application, ranging from the roofing during the addition of storeys, the repair of timber roofs and coverings, weather protection for new structures, refurbishment work on motorways and bridges, and numerous applications for events and normal work.

It is a non-insulated cover, rainproof covering under normal conditions, under which condensation may form and drip uncontrolled, depending on the weather.

The Benefits for You:

- Span up to 30 m and inclinations of 18° are possible
- High snow loads (up to 1.0 kN / m²) on intermediate spans
- Adaptation to all conditions thanks to roof widths and different designs as double-pitch, mono-pitch and polygonal barrel roof
- Economical use thanks to flexible, well-thought-out and durable components, lightweight aluminium components and time-saving assembly (e.g. faster and easier fitting of Keder tarpaulins)
- Material and load bearing-capactity tables are available to ease the planning
- No interruption of working due to weather influence

With the Protect System, Layher can supply a cassette enclosure system which is compatible with the Layher Allround Scaffolding and SpeedyScaf systems and which meets requirements concerning environmental protection and insulation from noise and weather. It is an exceptionally economical solution which boasts Layher's renowned quality.



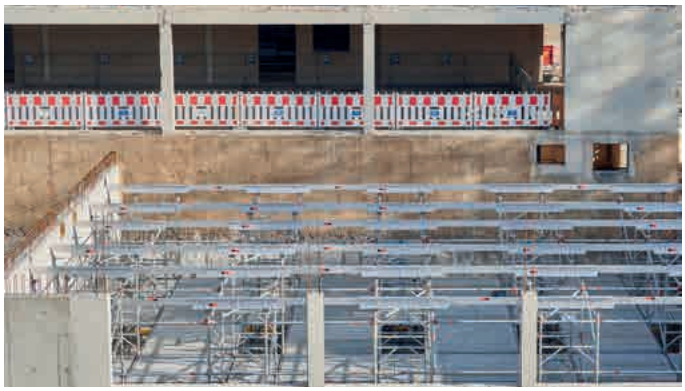
- **Only a small number of individual parts, designed for frequent, changing applications.**
- **Rapid, easy assembly in a simple, logical sequence.**
- The cassettes are designed for Layher axis dimensions (max. width: 3.07 m) and, with a height of 1.00 m, are very simple to assemble and move into the scaffolding.
- The surrounding rubber seal makes the cassette elements almost dustproof **(facade coating)**, vacuum-compatible **(removal of asbestos)**, waterproof **(sandblasting work)**.
- Electrostatically inert and therefore easy to clean.
- The wall cassettes can be used with a dimension of airborne **sound insulation** of Rw'=26 dB.
- **Light cassettes** permit work in daylight conditions within the enclosure.
- Cassette elements exist for **external and internal corners**.
- A specially developed **connection rail** is used to establish a connection with the existing building or the ground.
- Practical solutions for horizontal and vertical dimension compensation are available.
- The anchoring layout corresponds to that of scaffolding which is clad with tarpaulins.
- **Access elements** compatible with system and individual requirements are available

The Benefits for You:

- Requirements of environmental, sound and weather protection are fulfilled
- Rapid, easy assembly in a simple, logical sequence
- The all-round rubber seal makes the cassette elements almost dustproof (facade coating), vacuum-compatible (removal of asbestos), waterproof (sandblasting work)
- Only few and optical attractive components, designed for frequently changing applications
- Fully combinable to Layher Allround Scaffolding, Layher-SpeedyScaf and Layher AGS System

05 SOLUTIONS

- Site accesses
- Reinforcing, concreting and work scaffolding
- Shoring
- Site protection
- Site equipment
- Accessories and logistics



5.1 Site accesses

Allround Platform stairtower

Layher platform stairs for sure footing and an agreeable feeling during ascent.

- Four-standard stairtower for integration into work / protective scaffolding or shoring.
- Can be constructed as a free-standing access structure anchored on the building.
- Thanks to pull-resistant pinning of the standard joints, platform stairtowers can also be assembled suspended and from the top downwards, e.g. using the cut-and-cover method.
- Parallel and alternating stairs are possible.
- As an alternative to the platform stair, the tower can also be built with the easy-access comfort stair. The comfort stair ensures additional safety thanks to its wider steps, and a more agreeable feeling during ascent – particularly for great heights.

Platform stair: Stair class A as per DIN EN 12811-1
Comfort stair: Stair class B as per DIN EN 12811-1

Permissible load for platform stairtowers: 2.0 kN / m²

Unidirectional platform stairtower

Alternating and suspended platform stairtower

Alternating and suspended platform stairtower

Allround Modular stairtower

Suitable as a free-standing or anchored and compact access to high-level workplaces or excavations.

- Ingenious design with 2.21 m long Allround standards plus standard components from the Allround construction kit with more headroom.
- Storey-by-storey preassembly on the ground and emplacement using a crane. That means more safety when working and no risk of falls.
- Stair components identical with the stairs of the platform stairtower or of an external stairtower for facade scaffolding.

Platform stair:
Stair class A as per DIN EN 12811-1

Comfort stair:
Stair class B as per DIN EN 12811-1

Type test for assembly heights of up to 115 m without further verification of structural strength.

Permissible load capacity: 2.0 kN/m²

Alternating modular stairtower

Crane movement of a modular stairtower

Access to bridge piers with Allround modular stairtower

Crane movement of a stair module

Access to bridge piers with Allround modular stairtower

Compact stairtower

- The safer stair solution for the building shell.
- Fits into many stairwells in both single-family houses and residential blocks.
- Short assembly times with prefabricated and lightweight individual parts.
- High variability in the heights for entry and exit options in the standard 25 cm grid.
- Use as work scaffolding for work on the stairwell walls thanks to connection of brackets.
- Adapter plates permit laying of the screed without having to dismantle the stairtower.

Surface area without brackets:
1.57 x 1.40 m (axis dimension).
1.70 x 1.53 m (outer dimension).
Exit clearances: 2.50 or 2.75 or 3.00 m.
Permissible load capacity: 2.5 kN/m².

Compact stairtower in a residential block

Site stairtower 200

- Stair constructed from two separate U-stairway stringers 200, with standard decks used as steps.
- Low weight with wide range of variants.
- Ideal for use as a convenient access to high-level work-places and to containers, or as an escape route.

Stairway stringer 200, 10 steps, L = 2.57 m, H = 2.00 m
Permissible load 2.0 kN / m2 with a stair flight width of 1.29 m.
Stair dimensions: Riser s = 20 cm.
Step width 32 cm (tread a = 24 cm; undercut u = 8 cm).

Site stairtower 200

Site stairtower 200 for access to road surface

Site stairtower 200 for access to road surface, box girders and bridge bearings

Stairtower 500 and 750

- Approved for temporary and permanent stair structures in publicly accessible areas thanks to their permissible load capacities.
- Typical applications are road crossings, site stairs, escape stairtowers or site stairtowers.
- Child safety guardrail.
- Optional continuous handrail and step covers.

Continuous system handrail

Step covers

Stairway stringer 500, 9 steps, L = 2.57 m, H = 2.00 m.
Permissible load 5.0 kN / m² with a stair flight width of 2.07 m.
Stair dimensions: Riser s = 20.0 cm.
Step width 32 cm (tread a = 27.5 cm; undercut u = 4.5 cm).

Stairway stringer 750, 8 steps, L = 2.57 m, H = 1.50 m.
Permissible load 7.5 kN / m2 with a stair flight width of 2.07 m.
Stair dimensions: Riser s = 16.7 cm.
Step width 32 cm (tread a = 31 cm; undercut u = 1 cm).

Stairtower 750 for container access

Temporary bridges / bridging small spans

- Temporary connections using Allround standard parts and steel decks.
- Used, for example, for accessing the building shell above the excavation or as an emergency bridge over streams and rivers.
- Quick to assemble and swing into place by crane.
- Determination of the span by bay length and number of bays.
- Standard versions for load class 3 (2.00 kN / m2) with optional 3-part side protection.
- In certain conditions, the free cantilevered method can be used for assembly.

Trench bridge of two Allround Scaffolding bays

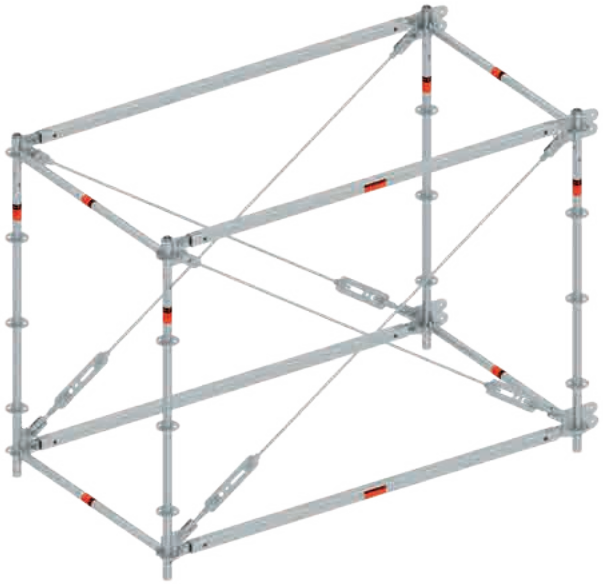
Trench bridge of two Allround Scaffolding bays

Temporary bridges / bridging medium spans

The modular Allround FW System was designed for bridging with spans of up to 20 m or to support heavier loads economically. Thanks to uniform system dimensions, it can be completely integrated into the Allround construction kit.

- Only three supplementary components to the Allround construction kit: FW post, FW chord and FW diagonal brace.
- High load-bearing capacity thanks to great static height and sturdy parts made of high-tensile steel.
- Rapid assembly with pin connections.
- Easy handling thanks to lightweight components of 19 kg maximum.
- Preassembly on the ground is possible, as is lifting into place using a crane or using the cantilever method from a secured level.
- Seamless integration into Allround structures is possible, since the components are in the system axes in all three spatial directions.
- For material-saving scaffolding.

Self-supporting birdcage scaffolding in a shopping centre



Crane movement of an FW System bridging structure

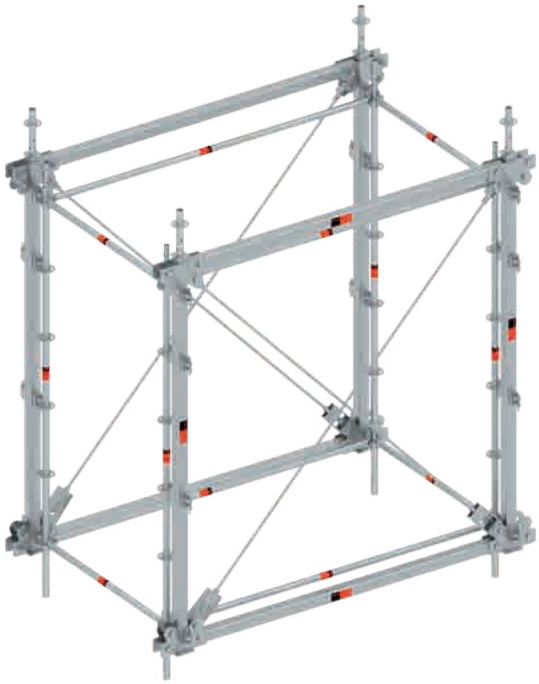
Bridging / supporting of work scaffolding using an external and non-loadable roof

Temporary bridges – bridging large spans

Large spans of up to about 30 m can be bridged using the Allround Bridging System. This modular lattice system is fully combinable with Layher Allround Scaffolding thanks to the attached wedge heads, and increases its load-bearing capacity.

- Only a few additional components are needed.
- Preassembly of the bridge on the ground with simple pin connection technology and lifting into place by crane.
- Can be combined with a protective systems for roofing and enclosures.
- Unrestricted combinability with the Allround Scaffolding range.
- To reduce deformations in the case of wide spans, the beam can be pre-assembled with a deliberate camber.

Temporary bridge with approx. 18 metre span



Bridging / supporting of work scaffolding using an external and non-loadable roof

Temporary bridge over site with approx. 18 metre span to assist site logistics

Temporary footbridge with a 2 x 34 metre span and an intermediate section with Allround Bridging System

Preassembled bridges for subsequent lifting into place by crane

Lifting the temporary bridge into place using a floating crane

Work scaffolding covered using the Protect System on a pipeline bridge for fire damage repair

Temporary footbridge with Protect enclosure and cassette roof

Temporary footbridge using Allround Bridging System with a span of 2 x 31 metres

Temporary footbridge using Allround Bridging System with roofing and Protect enclosure

Temporary footbridge using Allround Bridging System with Stairtower 750 to assist site logistics

Temporary footbridge using Allround Bridging System on railway platform with Stairtowers 750 and internal Protect enclosure

5.2 Reinforcing, concreting and work scaffolding

Reinforcing and concreting scaffolding

- Unhindered access to the wall and beam reinforcements without anchoring.
- Stability is assured by simple bracing and, where applicable, by widening the base.
- Accesses to all relevant components can be constructed with matching bay lengths.
- Inner guardrails and brackets provide safety even at a large distance from the wall.
- Attachment of the advance guardrail system on both sides of the scaffolding ensures a high degree of safety during assembly itself.
- It can be moved by crane at any time thanks to pull-resistant pinning of the standard joints.

1.40 m wide reinforcing scaffolding with bracing

0.73 m wide reinforcing scaffolding with bracing during crane movement

Work scaffolding

SpeedyScaf provides, with a few basic elements, a stable base for all work on the facade.

- Recommended in particular for length-oriented facade scaffolding.
- Rapid assembly.
- The I-Guardrail permits assembly with integrated and advancing side protection.
- A wide and well thought-out range of parts makes countless applications and expansions possible.
- Easy assembly of integrated platform stairs.

SpeedyScaf facade scaffolding with I-Guardrail

0.73 m wide Speedy work scaffolding with external platform stairway

Speedy facade scaffolding with I-guardrails and integrated roof edge protection layer

Facade work scaffolding of Layher SpeedyScaf resting on a projecting beam system to ensure continued vehicle access

The AGS System combines the benefits of a facade scaffolding system with the flexibility of modular scaffolding with different extension possibilities, with permanent guardrails and protection wall solutions.

- An ingenious and future-proof system: one standard for every eventuality – no retrofitting, for any permissible height, fully system-integrated, with Allround Power Connector.
- Rapid and automatically advancing assembly and dismantling, inside and outside, system-integrated and in any direction for handrail and intermediate guardrail.
- Easy assembly and dismantling thanks to the unique AGS guardrail connection, with strong and practical safety lever.
- Choice between removable AGS guardrail and permanent AGS guardrail Fixx – and in combination too and without retrofitting the standards.
- Ready for use – thanks to approval and verified structural analysis
- Wide range of applications and solutions thanks to the Integrated Layher System – ensuring rapid amortisation.

Allround Scaffolding, with its high adaptability, is ideal for very irregular structures.

- Persuasive advantages, particularly for projections and recesses, protrusions and niches.
- Economical and material-saving.
- Meets a wide variety of requirements for work and protective scaffolding.
- Integrated stair accesses for non-fatiguing ascent and easier transport of materials and tools.

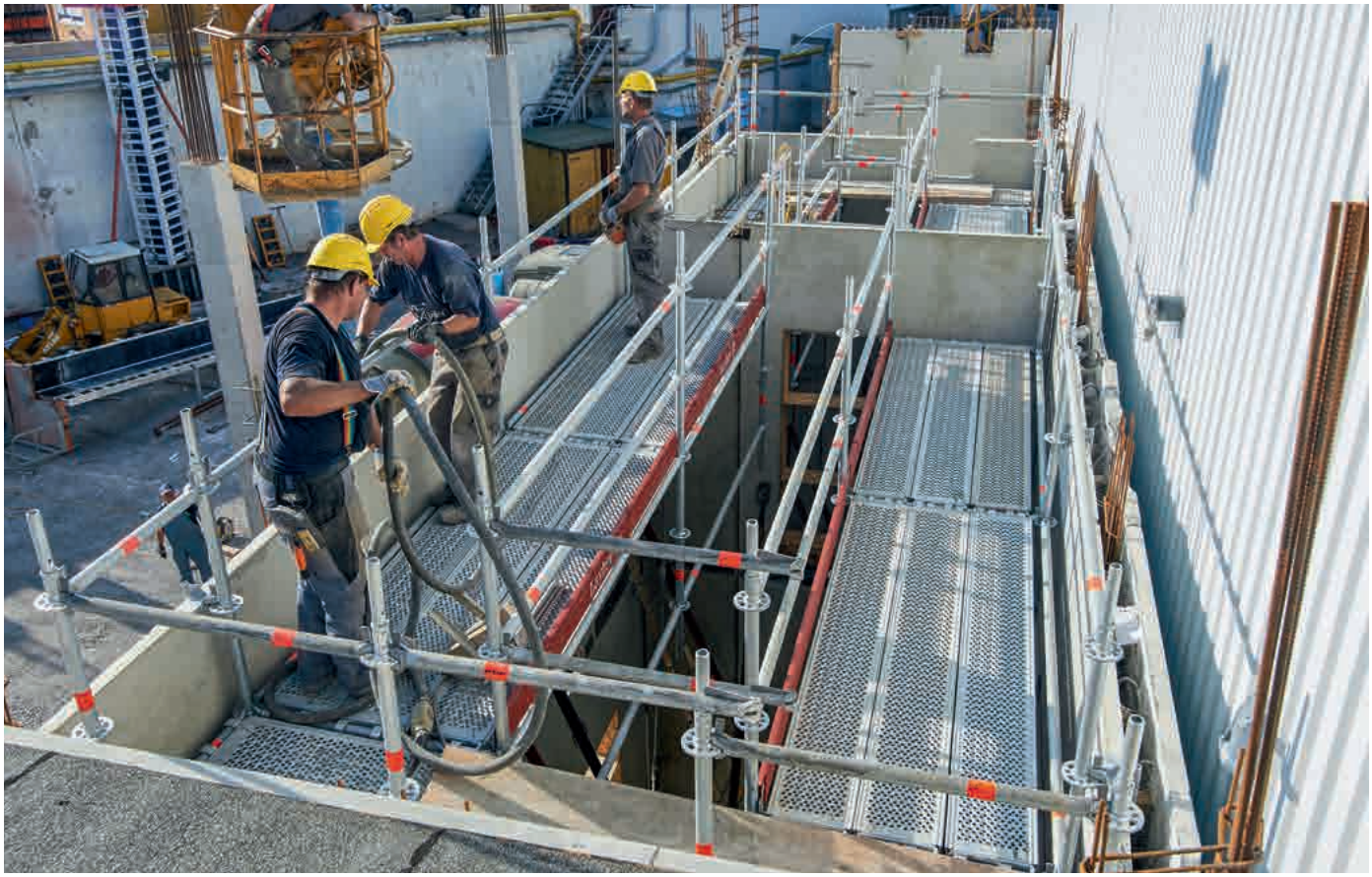
Concreting scaffolding with cavity wall brackets

Concreting work on cavity walls requires access to the walls from above. Due to the push-pull props needed, it is often not feasible to work with conventional standard scaffolding here. Thanks to the cavity wall bracket adapter, bracket-mounted walkways made of standard Allround Scaffolding material can be constructed.

- Variably adaptable in height and bay length, so that the space needed for the angled props can be kept clear.
- Non-slip steel decks.
- 3-part side protection (also possible all around the circumference of the wall).
- Rapid assembly thanks to the proven Allround wedge connection technology.
- Countless application and expansion possibilities.

1.09 m wide concreting scaffolding with cavity wall bracket adapter

The space underneath the scaffolding remains free for the push-pull props.



1.09 m wide concreting scaffolding with cavity wall bracket adapter

Work scaffolding, free-standing and suspended for complex geometries

Work platforms at piers, bridge caps and on the underside of bridges can be provided with free-standing or suspended scaffolding. This ensures that every point on the bridge can be reached. The modular Allround construction kit permits adaptation of work scaffolding to any geometry – regardless of projections, protrusions or supports. Allround Scaffolding is also ideally suited as an access to the formwork carriage.

Free-standing work scaffolding on stone arched bridge

Suspended bridge underside scaffolding of lattice beams

Suspended bridge underside scaffolding with protective wall on aluminium FlexBeam

Work scaffolding inside box girders of bridge structure

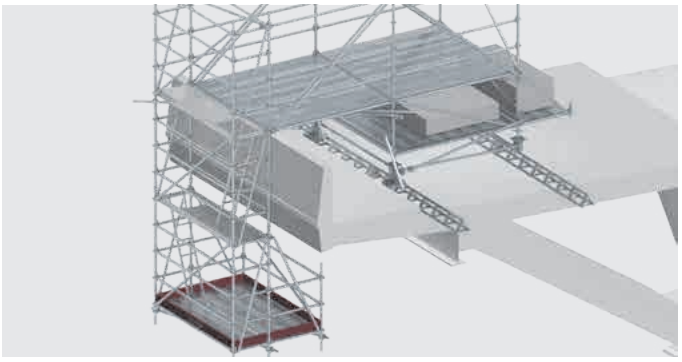
Work scaffolding inside box girders of bridge structure

Enclosure of bridge piers as access to the formwork carriage

Mobile bridge cap scaffolding

For an extremely economical solution for work scaffolding at bridge caps, the suspended work scaffolding can also be designed mobile. In this case, they rest on rails provided on the bridge surface.

- The scaffolding structure can always be moved to wherever it is currently needed.



Mobile bridge underside scaffolding made of Allround system components

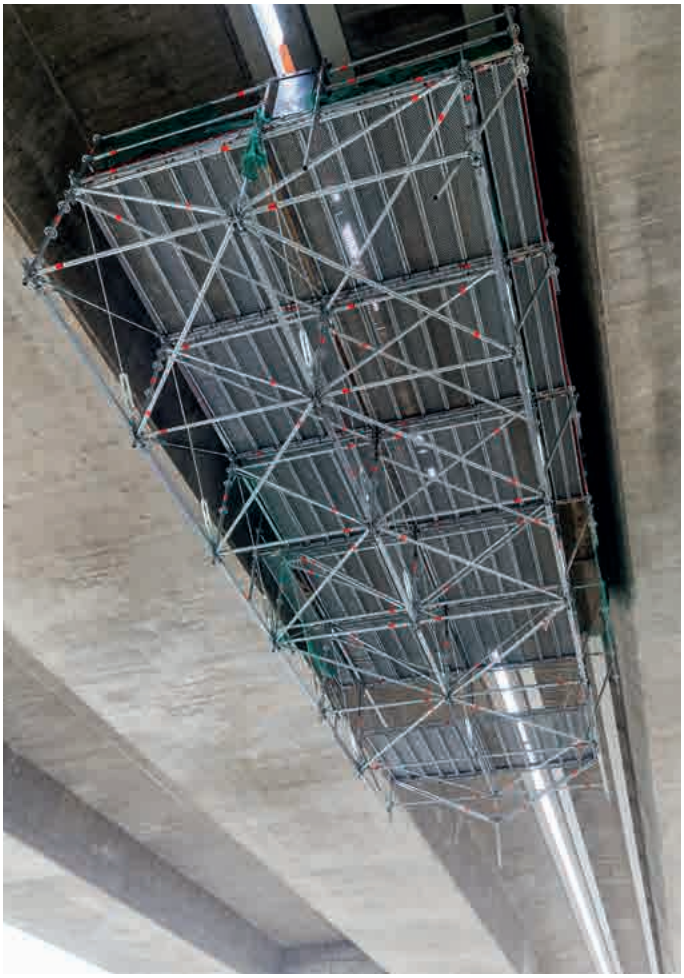
With the **Allround Bridging System or the Allround FW System** work scaffolding can also span even large distances in a self-supporting manner, without the need for intermediate support for the scaffolding. As a result, the scaffolding does not have to be completely resting on the ground, which is often not possible for topographical reasons.

Free-standing work scaffolding on a stone arched bridge with Allround Bridging System for support

Self-supporting work scaffolding between the arches of an arched bridge with Allround FW System

As underside scaffolding on bridges, it is also possible with the **Allround FW System** to construct closed work platforms which are fastened to the bridge with only a few individual suspension points.

- The structure shown adjacently is connected only by two threaded rods to a traction vehicle on the upper side of the bridge which moves the work platform to the place required.



Mobile bridge underside scaffolding using Allround FW System and system decks

For large-area and suspended bridge substructures with high load-bearing capacities, the **Aluminium FlexBeam** is the ideal solution. The U-shaped upper side of the section permits direct suspension of standard U-decks.

- The hole configuration permits problem-free further construction using Allround Scaffolding material.
- Bending load capacity is up to 2.5 times as the Steel Lattice Beam 450 LW, permitting larger support and suspension configurations.
- Only 280 mm structural height, about 40% less than with the Steel Lattice Beam 450 LW.
- The headroom for trucks is retained at motorway bridges.

Bridge underside scaffolding with protective wall made from Aluminium FlexBeam

Bridge underside scaffolding with two levels made from Aluminium FlexBeam at a viaduct

Work scaffolding with pedestrian tunnel with FlexBeam and Protect enclosure

Approx. 7000 m²-sized bridge underside scaffolding with FlexBeam at a steel composite bridge

Mobile tunnel scaffolding running on rails

Tunnel scaffolding for reinforcing work and further treatment

Work on tunnel ceilings for reinforcement or other treatments require a work platform that adapts to the curving tunnel ceiling. No problem at all with flexible Allround Scaffolding.

- Moving to keep pace with the building progress, reducing the use of material to what is necessary for structural strength and design reasons.
- Wheels of differing load capacity, including rail-mounted flanged wheels, ensure a mobile scaffolding structure for a wide range of applications.
- The lightweight parts enable the structures to be transported even to places of use with difficult access and assembled there without problem.
- Preassembly of complete scaffolding units and subsequent crane movement to where they are used is possible even with large scaffolding.

Previous emplacement of a preassembled mobile tunnel scaffolding by crane

Mobile work scaffolding adapted to the tunnel geometry, with vehicle passage opening

Mobile tunnel scaffolding running on rails with work platforms for safer working

Work scaffolding with Allround wall brackets

The Allround wall bracket – consisting of the wall connection unit and pressure support – is by contrast lightweight, small and handy. That makes it ideal for quick attachment to the facade. In combination with the components from the Allround construction kit, they enable a wide range of possible configurations to be created. Building of the facade scaffolding can continue using both Allround components and the modular access system AGS for facades. To reduce the fixation points on the facade, the Allround wall bracket can be assembled with the Aluminium FlexBeam.

- The wall bracket is combined with standard Allround components and does not require any further special or supplementary components.
- Supplementary components with low dead weight and low transport volume – a logistical advantage.
- Height adjustment can be set very flexibly thanks to the holes provided in the three parts of the connection unit.
- Load capacity of up to 4 tonnes (working load) depending on the design.

Suspended work scaffolding above a staircase with Allround wall bracket

Work scaffolding on bridge pier with FlexBeam on Allround wall bracket

Work scaffolding with wall brackets made from TwixBeam aluminium beams

If the ground is not sufficiently stable or to create particularly material-saving scaffolding structures, TwixBeam allows the assembly of elevated or suspended scaffolding structures.

- Elevated structures can be erected using inserted Allround uprights or the swivelling TwixBeam spindle.
- Cantilevered structures on building shells can be constructed in two ways: anchored to the ceiling or floor, or supported against the ceiling.
- TwixBeam can be stacked on top of each other to create beam grid structures. The connection is made using beam clamps.
- To increase the load capacity, the beams can also be stacked on top of each other in the same direction. They can be secured using beam clamps or by arranging the spacers in a staggered pattern.

Suspended work scaffolding on a bridge pier of a stone bridge

Suspended work scaffolding on TwixBeam consoles

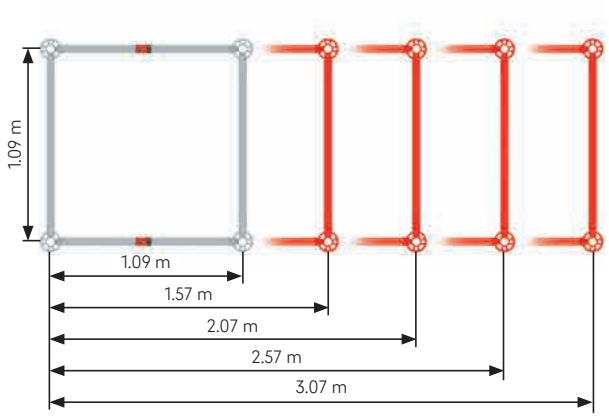
5.3 Shoring

Allround Shoring TG 60

Together with Layher Allround equipment, the TG 60 shoring frames create even more possibilities. With Shoring TG 60, shoring can be built more than 30% faster, higher, more stable and safer. The Shoring Frames TG 60, available in three sizes, are made from extra-strength steel tubing and provided with Allround rosettes. The TG 60 frames are an integral part of Allround Scaffolding and can be integrated without problem into any birdcage scaffolding. **Each standard of a TG 60 shoring tower can be subjected to a load of up to 6 tonnes.** Connecting up the shoring towers TG 60 using Allround ledgers makes time-consuming measurement unnecessary. The towers are automatically at right angles to one another, further reducing the risk of tipping over.

Connected shoring towers TG 60 during construction of a sewage plant – concrete pillars can simply be integrated into the shoring.

- Different Allround ledgers and diagonal braces can be used to flexibly adapt the shoring tower to geometrical and load requirements.
- TP-11-017 type test covers various individual towers with different assembly heights.



- Assembly with the innovative assembly sequence and the integrated access aid can be performed free-standing directly at the place of use. During assembly, you are always surrounded by an automatically integrated side protection – without any further safety equipment.
- Fully assembled towers can be moved using easy-to-fit wheels.
- Alternatively, TG 60 shoring towers can also be assembled lying on the ground, thanks to their high fitting precision, for subsequent crane movement.

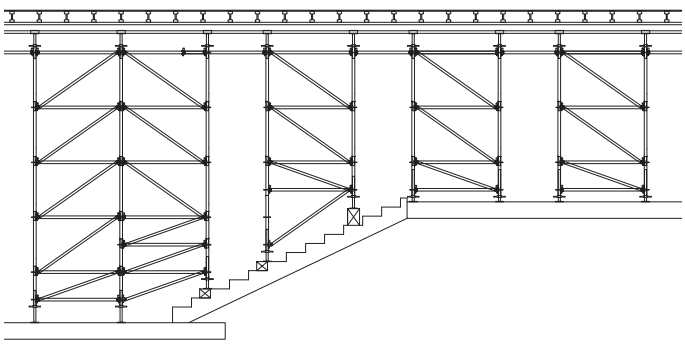
Safer upright assembly thanks to integrated and advancing side protection

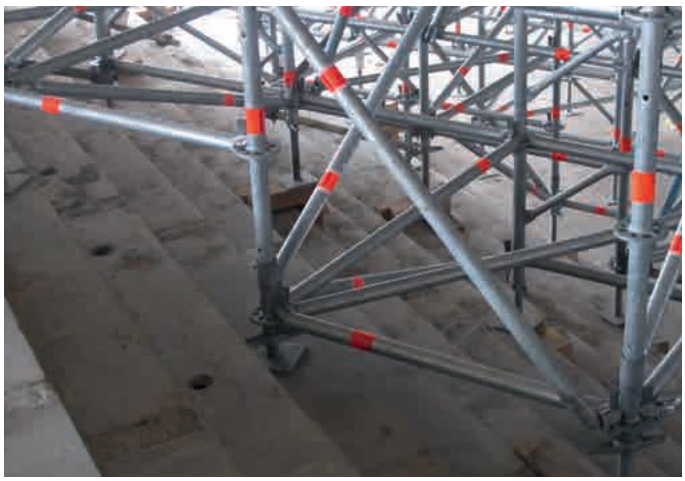
Wheel adapters for moving the shoring towers

Assembly of a TG 60 Shoring Tower on the ground

Crane movement of towers preassembled on the ground

- Height adjustment at the top and bottom, and geometry adaptations at the edge, can easily be done using the Allround construction kit.



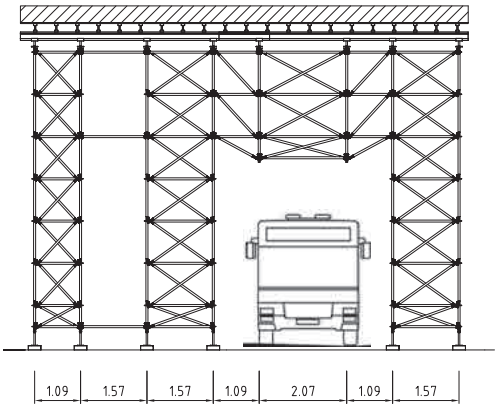


Adaptation of the shoring to stair flights with standard Allround material

- Allround TG 60 Shoring permits the laying of a deck level for safer working on the slab formwork.
- Practical and non-slip work surface thanks to perforated steel decks with maximum load-bearing capacity.
- Easy integration of accesses in the form of access bays or platform stairs.
- Combination of shoring and work scaffolding with one system for uncomplicated implementation of all the latest safety-related requirements.

Integrated deck levels inside the shoring, and shoring adapted to the slope of the ground using equalising plates

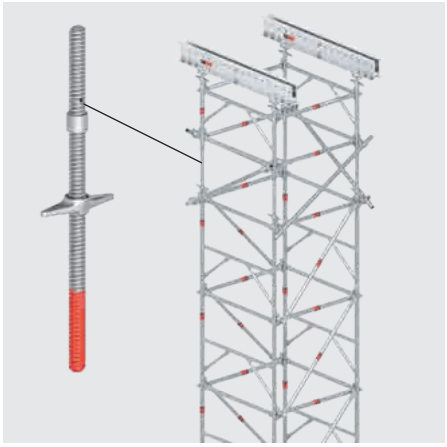
- Shoring with truck access is possible even without the use of bridging structures with heavy steel beams. Simple lattice structures can bridge the usual access widths of around 4 – 5 m.



Vehicle passage opening thanks to the use of Allround standard material

- For very heavy loads, the shoring towers can be reinforced by additional frames. Combining frames allows the load capacity to be increased to almost any level. The picture shows shoring for absorbing a line load of 250 kN/m.

- The 0.80 m intermediate spindle thus increases the total spindle travel from 26 cm to 64 cm at the top of the tower.



- Concreting of building projections is not a problem, even at great heights, thanks to the modular Allround system.
- The towers are braced using system components, i.e. without time-consuming constructions made of pipes and couplers.
- Bracket-mounted walkways with side protection at their edges are quick to assemble.

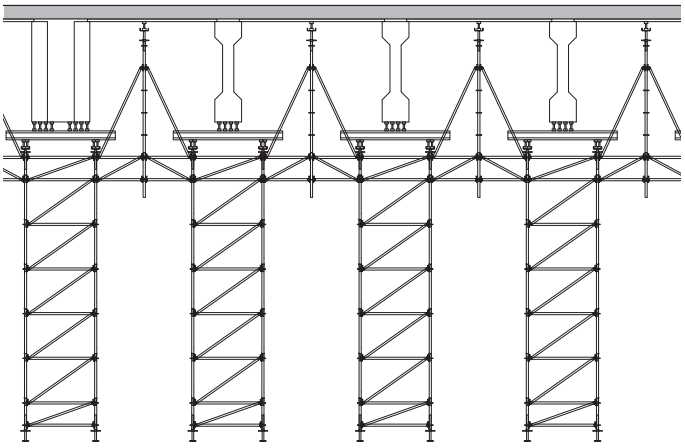
Projecting Allround Shoring Towers TG 60

Stretched shoring tower TG 60 for supporting a balcony slab

High support towers made from Allround Shoring TG 60 with system-integrated bracket-mounted walkways

- When the prefabricated ceiling slabs (e.g. for balconies or arcades) are lifted into place, the TG 60 shoring towers ensure the necessary stability instead of single supports.
- Shoring towers that are connected to one another are per se non-positively connected, allowing the prefabricated slabs to be shifted into their exact position.

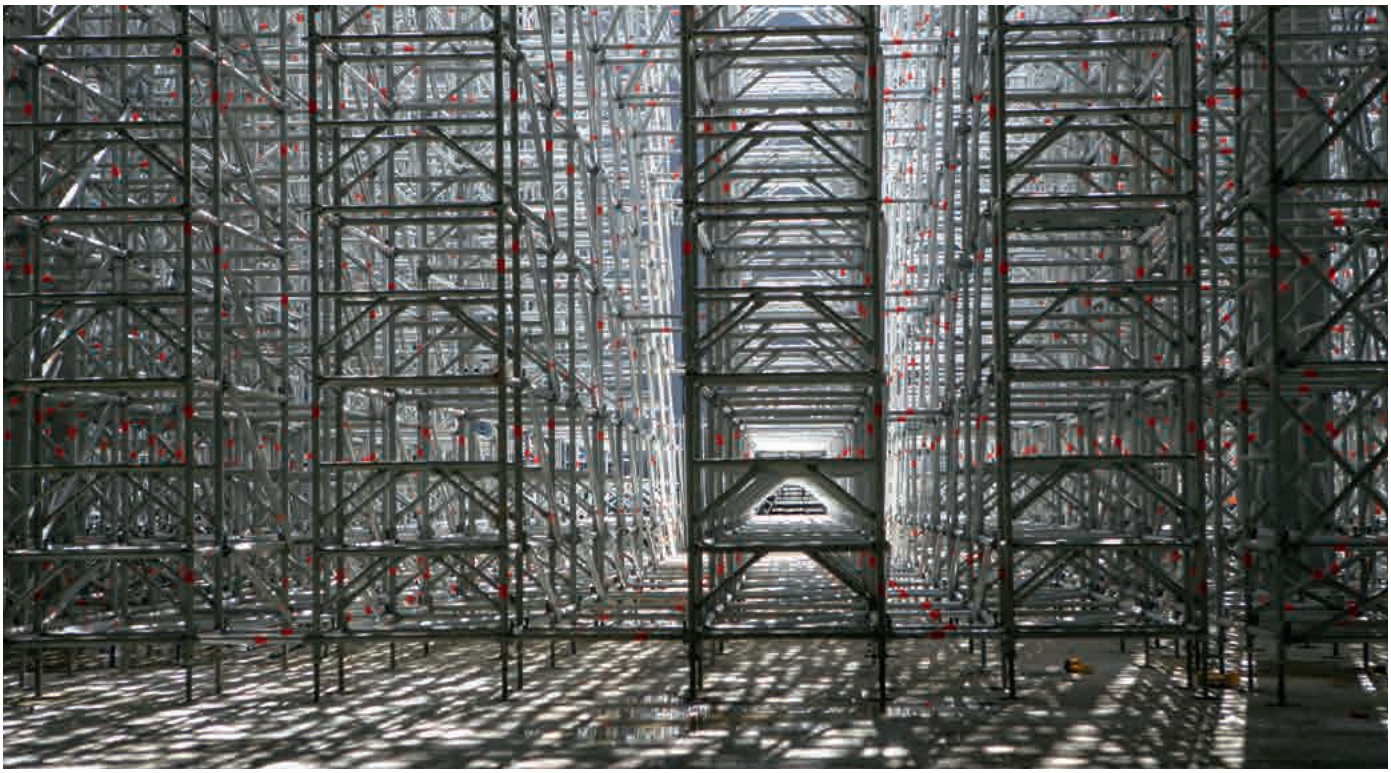
The variable system also permits support in the manufacture of tall and wall-like concrete beams cast in-situ, with semifinished ceiling slabs laid between them. Material optimisation by absorbing the ceiling loads using a latticework of Allround standard components between the shoring towers. No need for additional towers in the intermediate spaces.



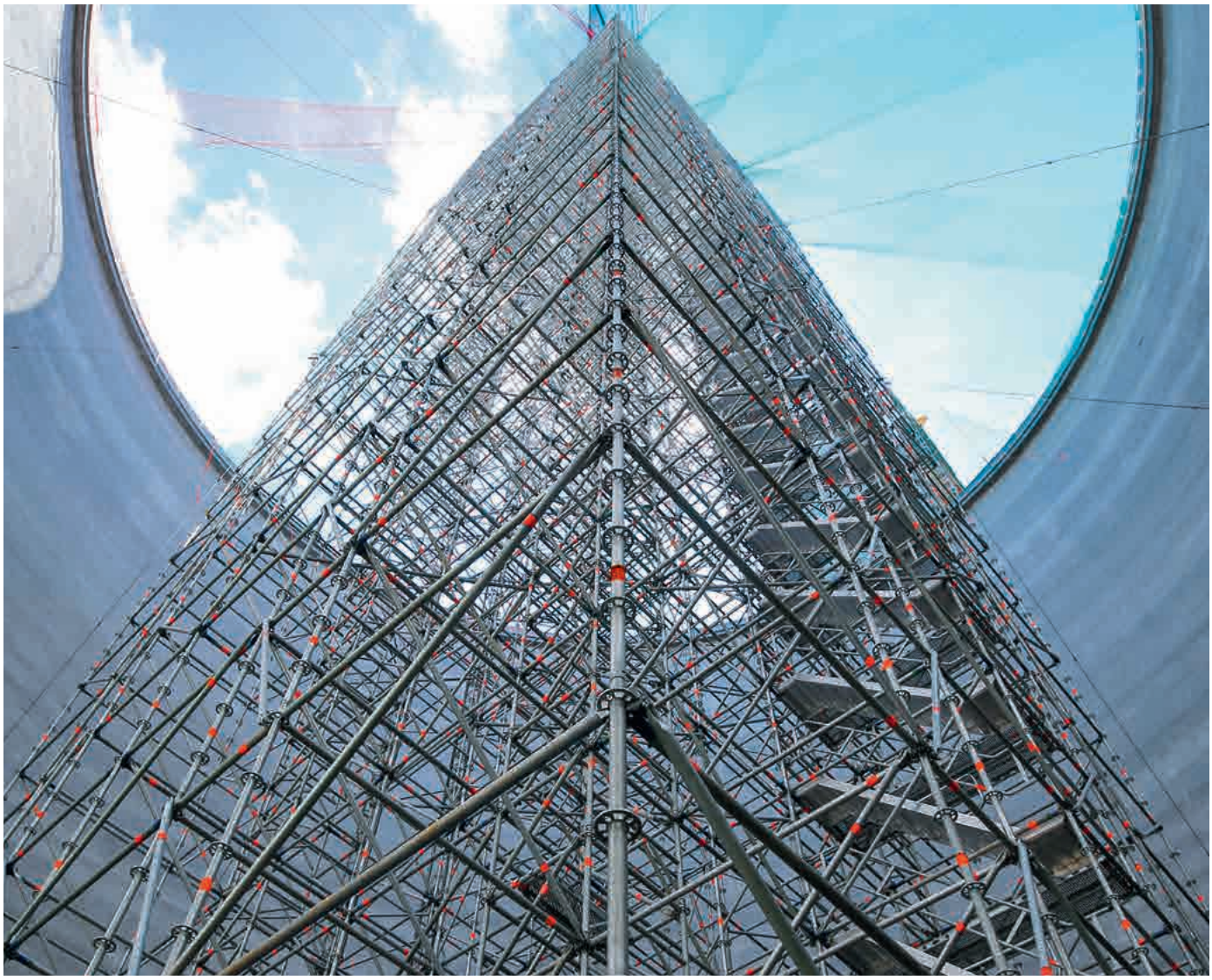
- Shoring TG 60 can be used as a substructure for pre-assembled slab tables.
- Time-saving movement of complete units by crane thanks to a pull-resistant connection of the head jacks to the slabs. Solution shown on request.
- With attached wheels, the slabs can be moved horizontally inside a storey level.

Shoring TG 60 as a slab table with pull-resistant connection of the formwork to the shoring towers

The challenge with this shoring structure was a crosswise-pretensioned slab structure for supporting a high-bay warehouse.



- With the modular and flexible construction kit system of Allround Shoring TG 60, it can be used for several building phases without extensive modification work. In this example, the binding beams are concreted in a first step, and the ceiling resting on them in a second step.
- Integrated decks reduce the risk of falls.
- Assembly in the system grid using Allround standard parts enables alignments to be perfectly maintained without time-consuming measurement.
- Absolute fitting precision ensures a smooth implementation of planning work at the construction site.



Allround Shoring Frame TG 60 with integrated platform stair accesses during construction of a new sugar silo

Combination of Allround Shoring Towers TG 60 for concreting of a projection — fast and convenient site access with Allround modular stairtower

With Allround Shoring TG 60, supporting structures for concreting work on massive floors can be constructed easily, quickly and safely. Combining shoring frames enables the load capacity to be multiplied many times over. Large support heights can be managed without problem.

Frame combination for absorbing high loads of 22 tonnes per metre

Allround Shoring Frame TG 60 with integrated FW System for vehicle passage opening

- The use of the Allround FW System enables vehicle passage openings to be constructed at all structurally relevant positions.
- No restriction of the supporting structure.

Shoring TG 60 for tunnel concreting work

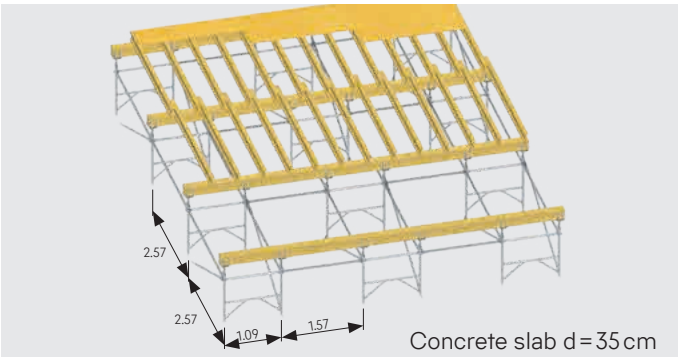
Allround Shoring TG 60 with TwixBeam aluminium beam as a system main beam

In shoring construction, the TwixBeam from Layher can be used as a system main beam, offering enormous advantages over conventional timber beam formwork. When combined with Shoring TG 60, the shoring structures can be considerably optimised in their load absorption, use of material and assembly effort. This is because the standard load is frequently limited by the H-20 main beam, meaning that the full load-bearing capacity of Shoring TG 60 cannot be used to the full. The considerably higher load-bearing capacity of the TwixBeam now means that heavier loads can be transmitted into the scaffolding, and the high load-bearing capacity of TG 60 optimally used.

TwixBeam aluminium beam as a system main beam – the insertion beam serves as a connection between the TwixBeam beams and for adaptation to the edge area of the ceiling formwork.

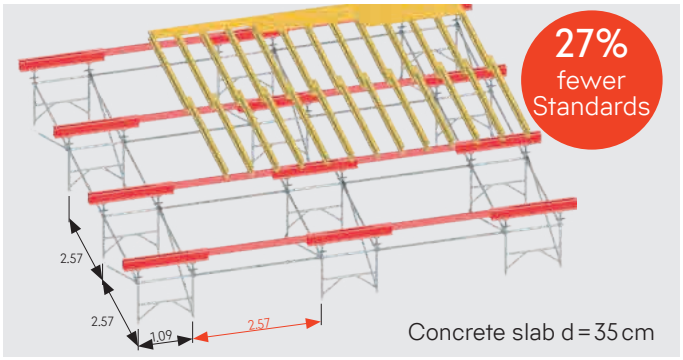
Comparison of H-20 double main beam and TwixBeam in slab formwork
Use in base area Sloping slab formwork Integrated side protection

Viewing an ideal and regular area



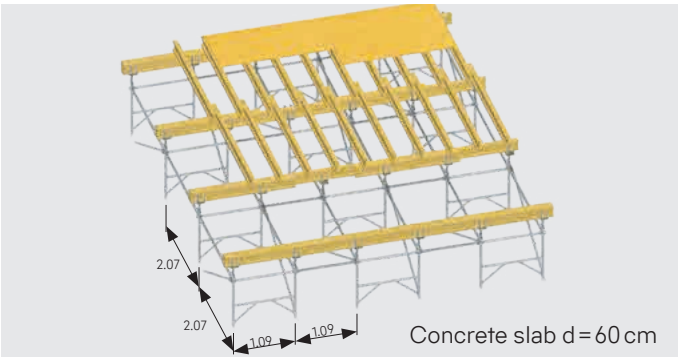
H-20 double main beam

Compact grid | Covered area per shoring tower 13.7 m²
Standard load approx. 37 kN



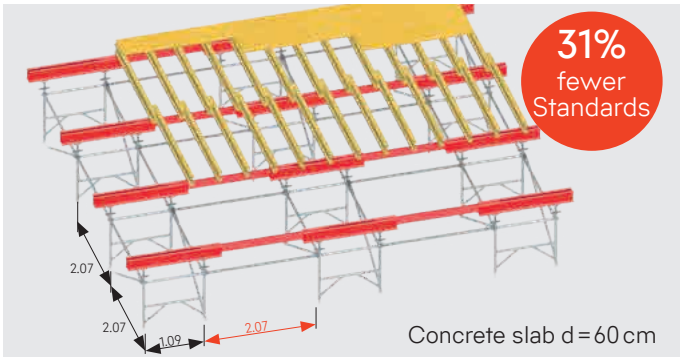
TwixBeam

Elongated grid | Covered area per shoring tower 18.8 m²
Standard load approx. 51 kN → Less scaffolding material
(number of standards approx. – 27%)



H-20 double main beam

Compact grid | Covered area per shoring tower 9.0 m²
Standard load approx. 40 kN

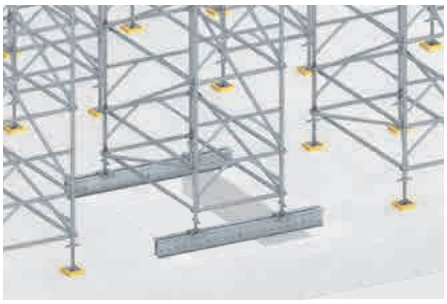


TwixBeam

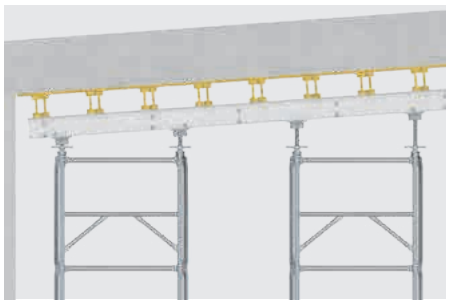
Elongated grid | Covered area per shoring tower 13.1 m²
Standard load approx. 58 kN → Less scaffolding material
(number of standards approx. – 31%)

The Aluminium TwixBeam allows more interesting applications in shoring construction

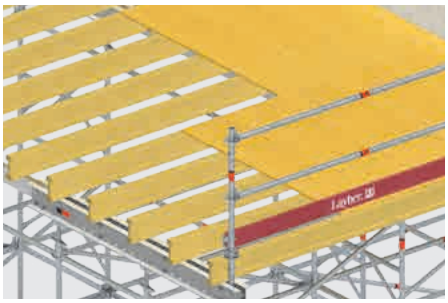
- The TwixBeam can also be used in the base area for bridging of openings inconcrete slabs. The TwixBeam spindle is used here as a base plate, or alternatively a head jack is positioned above the TwixBeam.
- The swivelling TwixBeam spindle permits the positioning of sloping slab formwork without complex adjustments using wooden wedges. The TwixBeam spindle is simply pinned in the aluminium TwixBeam to do so.
- Using the TwixBeam standard connection allows three-part side protection to be constructed at the formwork level using standard Allround components.
- Trussed-beam frameworks are constructed using the insertion beam and the TwixBeam spindle struts.



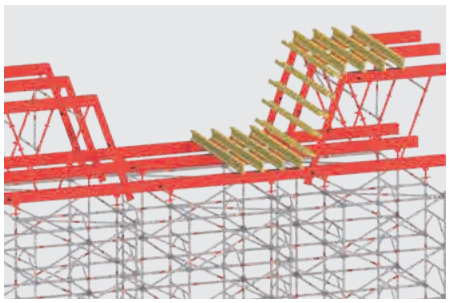
Briding in the base area



Use for sloping slab formwork



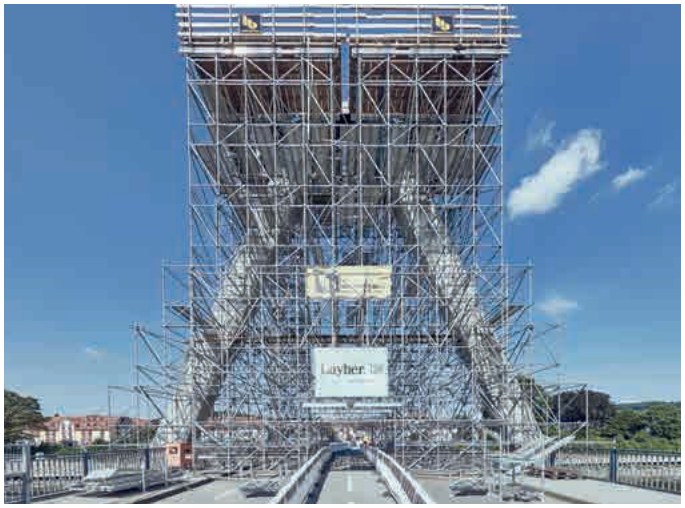
Integrated side protection with the TwixBeam standard connection



Trussed-beam framework made of TwixBeam, insertion beam and TwixBeam struts – mounted on Shoring TG 60

Large-area supporting structure for the construction of a motorway junction using TwixBeam as a system main beam

Connection of the Shoring with the aluminium TwixBeam by using the swivelling TwixBeam spindle



Use of the TwixBeam as system main beam and for bridgings in the lower scaffolding part

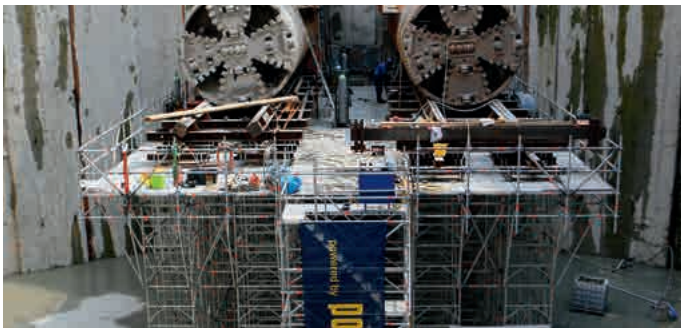
Combination of Allround Scaffolding and Shoring TG 60

Allround Scaffolding with its extensive range of standard parts can, depending on requirements, also be used for shoring. The Lightweight variant in particular, approved according to Z-8.22-939, is notable for its high load-bearing capacity.

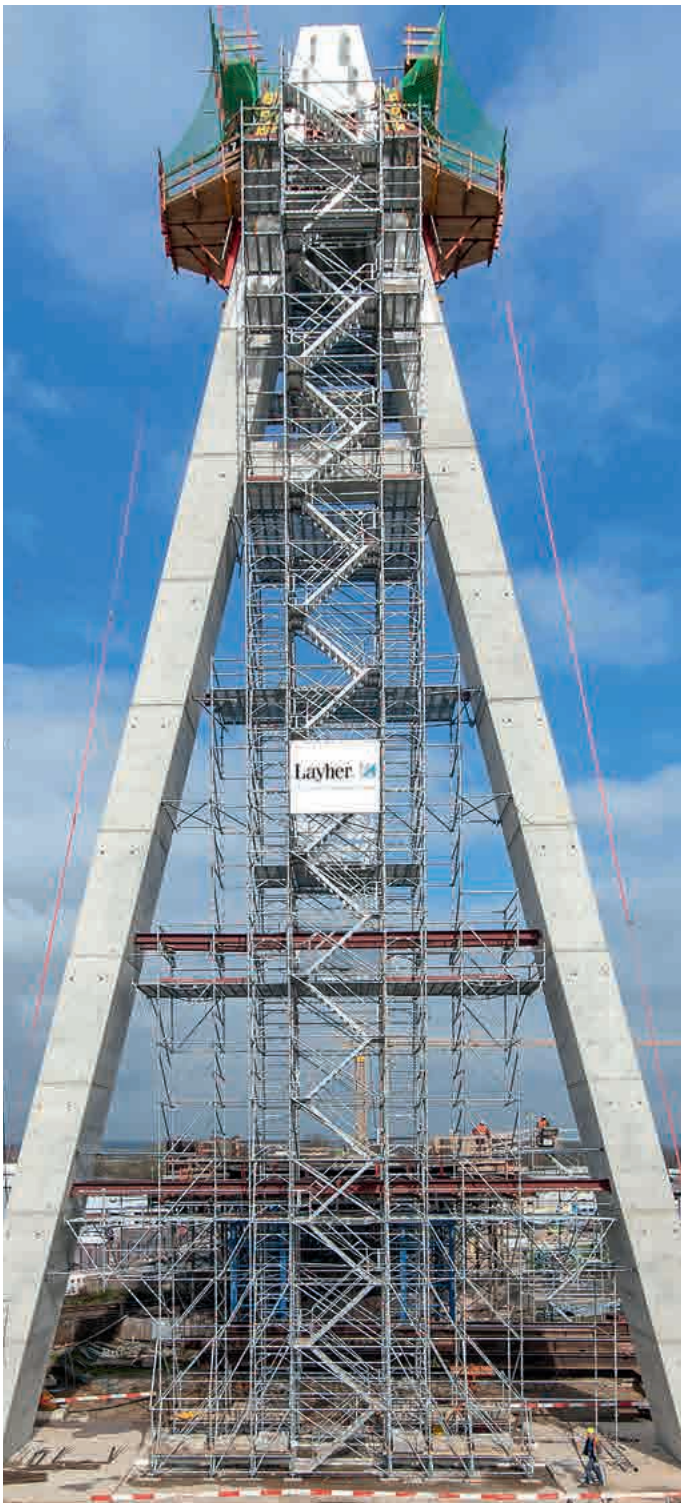
- With Allround Shoring TG 60, support structures for concreting work on bridge superstructures can be constructed easily, quickly and more safely.
- The TG 60 frames can be integrated into any Allround birdcage scaffolding to increase its loading capacity.
- The birdcage scaffolding is braced using system ledgers and diagonal braces, instead of time-consuming tube and coupler connections.
- Integrated stair accesses or all-round bracket-mounted walkways are quick and easy to assemble.
- The easy combination enables adaptation to the most difficult geometries while absorbing very high loads.

Combination of upright and on-the-ground assembly of individual Shoring Towers TG 60 to save time during assembly

Shoring TG 60 with bracket-mounted walkways during construction of a road bridge

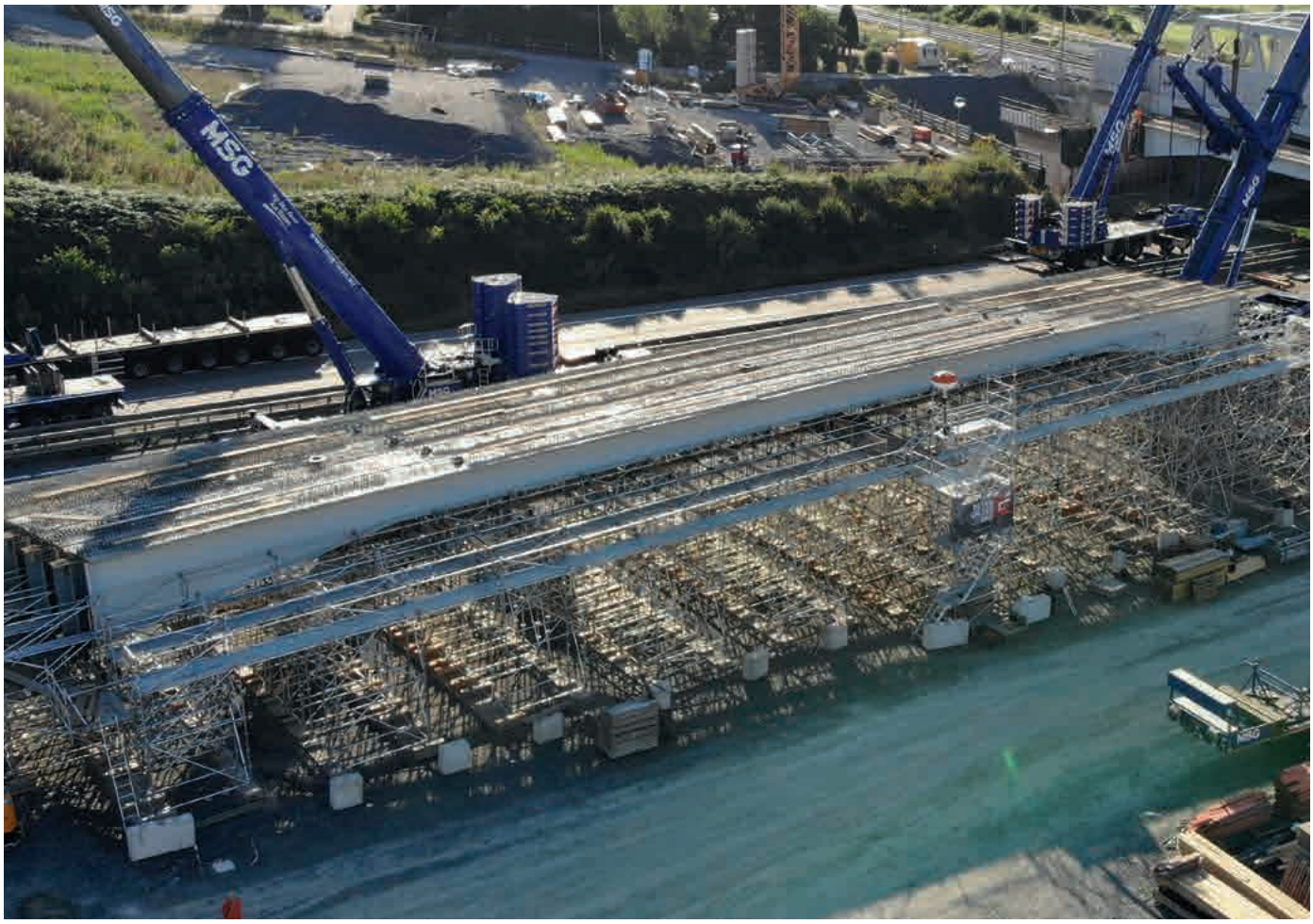


Drilling head support (shield cradle) on Allround Shoring TG 60 with integrated stairtower

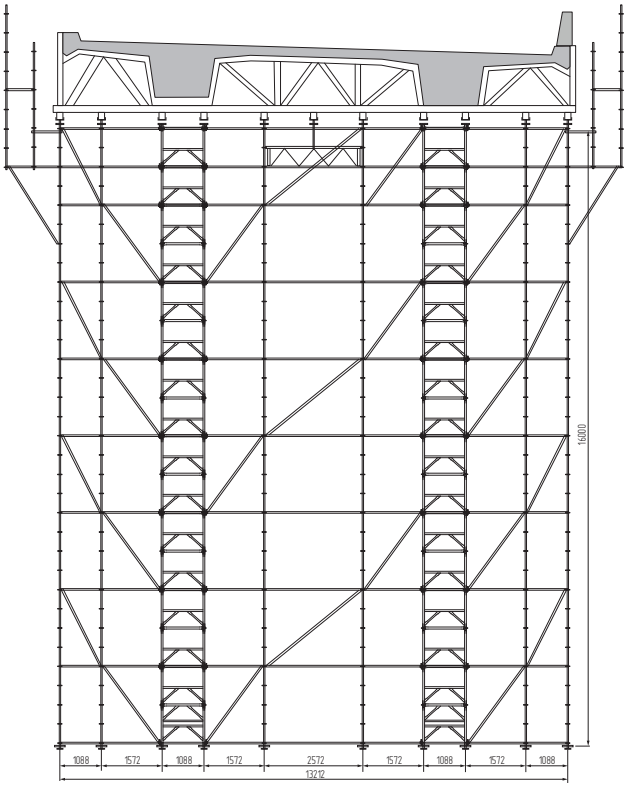


Shoring TG 60 and platform stairtower at the pylon of a cable-stayed bridge

From planning to implementation



Shoring made from standard Allround components during construction of a new motorway bridge



Shoring made from Allround Shoring TG 60 and Allround Scaffolding during construction of a road bridge

Allround heavy-duty column

Combining four Allround standards using twin edge couplers allows very high point loads of up to around 200 kN (20 t) to be absorbed by the birdcage scaffolding. The individual support can be used vertically, horizontally or inclined.

Heavy-duty support during bridge construction

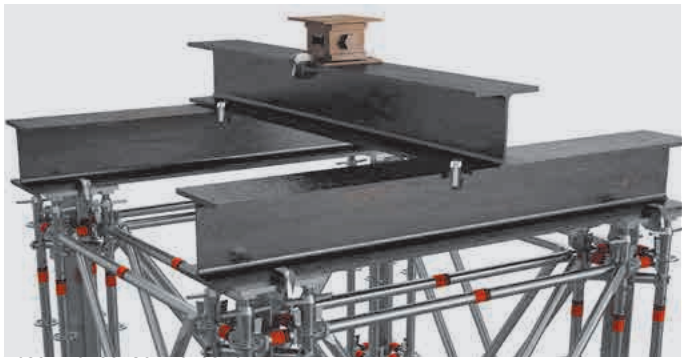
Allround heavy-duty column as a support for a temporary weather protection roof

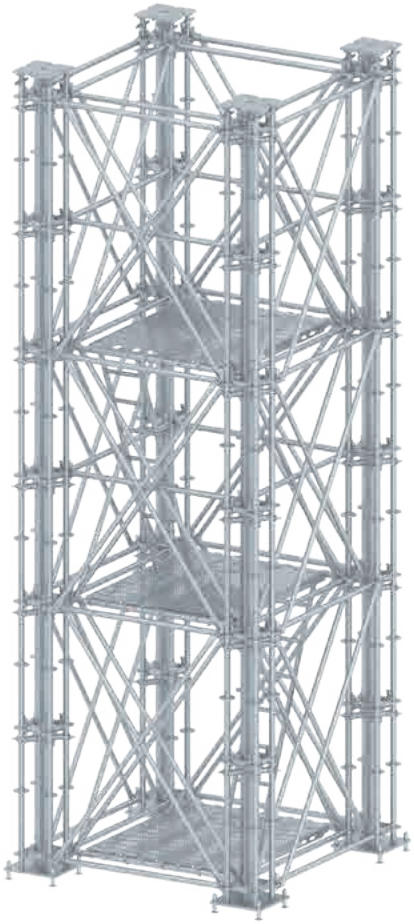
Shoring made of several combined heavy-duty columns in bridge construction

Allround Heavy-Duty Tower XL

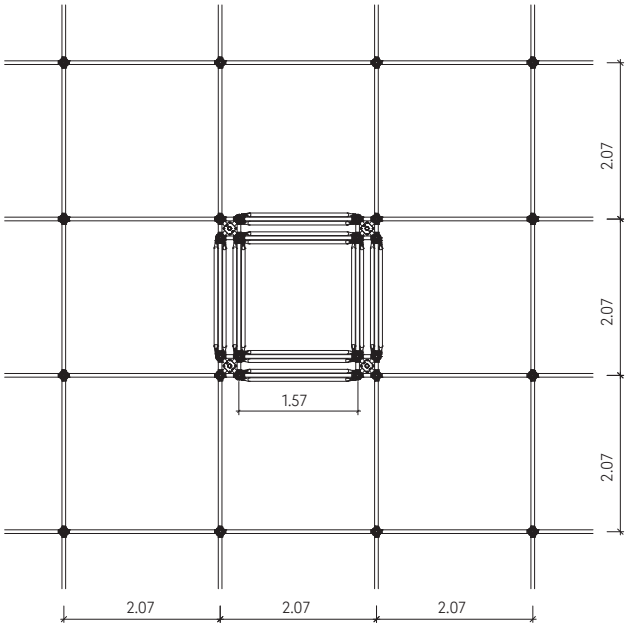
For some construction projects, shoring of particularly high load capacity is needed, as very high loads have to be absorbed at some points – for example in bridge construction. Here, the Allround Heavy-Duty Tower XL is the persuasive alternative to the usual heavy shoring structures made from steel sections.

- Modular assembly, based on standard Allround Scaffolding parts.
- Load absorption of up to 200 tonnes depending on the conditions of its use.
- A few lightweight supplementary parts enable load-bearing capacities in the Meganewton class to be attained.
- Advantages when dismantling without a crane, since the compact components can be individually removed and transported.
- Repositioning of integrated work platforms and accesses is possible.
- Usable in upright or inclined position.





- The load is introduced at the top via a solid steel plate. The top plate can be easily connected to the steel beams using beam clamps. The load on the tower is relieved using lowering wedges or a hydraulic press, provided by others.



Dimensionally integrated into the Allround System

The standard assembly version has the following axis dimensions:
Inside: 1.57 m x 1.57 m.
Outside: 2.07 m x 2.07 m.
The respective version must be structurally verified in each individual case

Supporting the parabolic girder of an arch bridge

Inclined support during renovation work on an industrial tower

5.4 Site protection

Protect System

With the Protect System, Layher can supply a reusable cassette enclosure system that is compatible with Allround Scaffolding and SpeedyScaf and that meets requirements relating to environmental protection and insulation from noise and weather; an exceptionally economical solution in Layher's proverbial high quality.

- Enclosing work scaffolding with the Protect System provides protection against dropped work materials or against blasting materials during corrosion prevention work.
- Traffic can continue to flow despite repair work to bridge piers, pylons or supporting cables.

Bridge work scaffolding enclosed with cassette roof and Protect System

Temporary hall using Allround Scaffolding, Protect System and cassette roof

Modernising measures while clinic is still operating

Noise control wall for reducing traffic noise

The modular **Protect System** consists of cassette elements which are easily fitted to the scaffolding and optionally provided with a galvanised steel sheet or a translucent plastic ribbed panel.

- Dustproof, weatherproof and noise-reducing partition wall between the site and the environment.
- All-round rubber seal for a neat and precisely fitting connection to the adjacent elements.
- Protects passers-by from dust, noise and harmful substances.
- Thermal insulation of light cassette: 3.3 W W/m² K.
- Airborne sound insulation of wall cassette: R'w= 26 dB.

Noise control / dustproof wall during demolition work

Scaffolding tarpaulins and nets

Layher offers an extensive range of scaffolding tarpaulins and nets, which can be fitted quickly and easily thanks to non-system accessory parts.

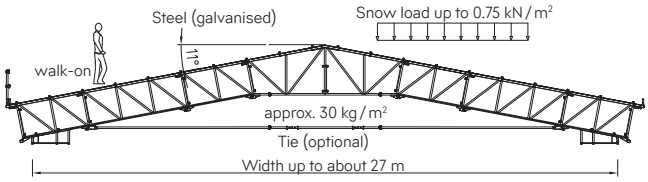
Cable-stayed bridge pylon covered by tarpaulins

Stone-arched viaduct covered by tarpaulins

Weather protection roof during construction of an animal enclosure

The **Layher cassette roof** has established itself as a firm favourite at construction sites for conversion, added storeys, renovation and restoration.

- The structure itself and all the equipment is protected during conversion or roof repair work, and normal business operations can continue under a secure roof.
- Wide spans, walk-on roof surfaces and the option of opening the roof at any point are further crucial advantages.



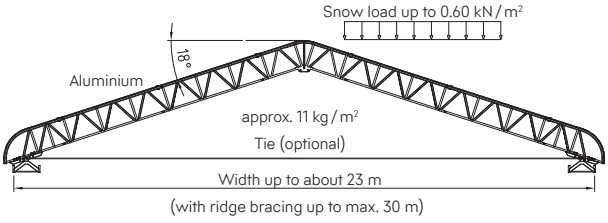
Keder Roof XL on SpeedyScaf for wintertime road construction work

Keder Roof XL for wintertime foundation concreting work

Keder Roof XL for wintertime timber construction work

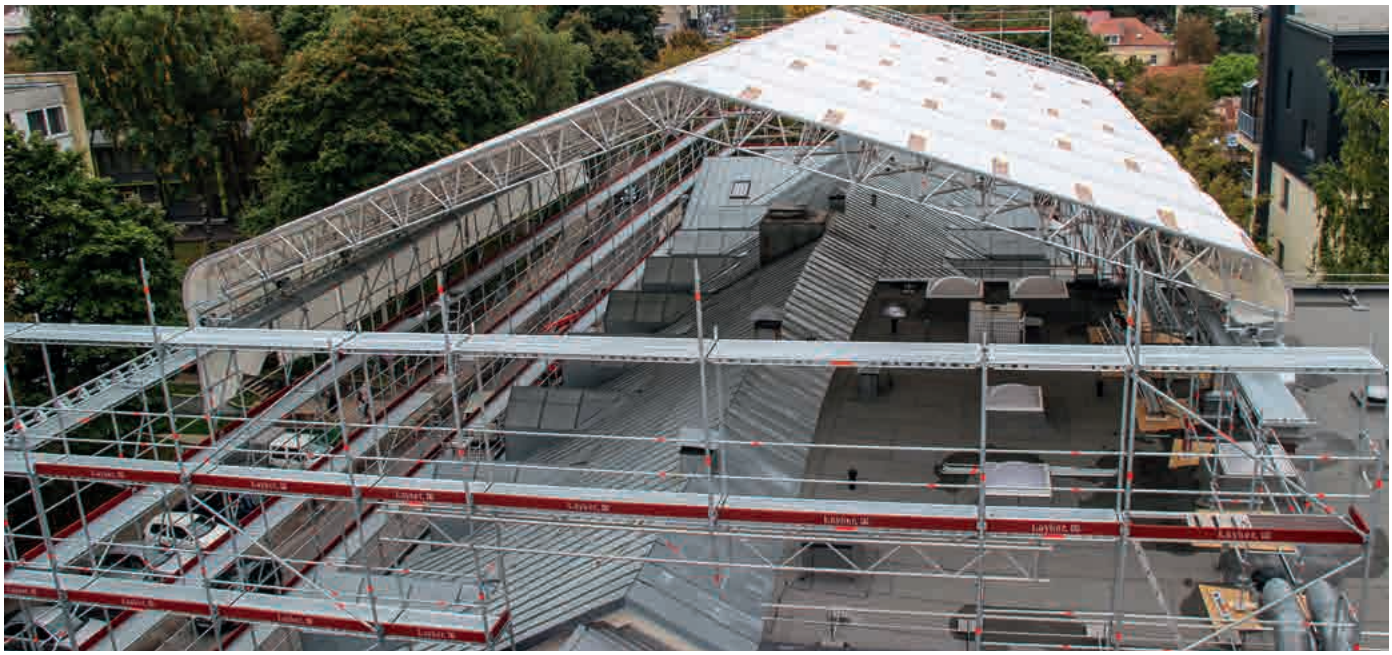
The range of the **Layher Keder Roof XL** extends, taking into account local weather conditions, to a span of up to 30 m. For low roof widths, assembly can be completely manual. In combination with gable and wall tarpaulins, completely closed enclosures can be made – the optimum solution for wintertime construction sites. The applications vary widely:

- Roofs over work on additional storeys, repairs to timber roof frames and coverings.
- Weather protection during new building work.
- Repair sites on motorways and above bridges.



Mobile Keder Roof XL during roof work at a shopping centre

Interlocking Keder Halls for the production of concrete parts



Mobile Keder Roof XL on SpeedyScaf during roof work on an office building

The Keder Roof XL can be made mobile using a small number of additional components. That makes this roof system even more economical, when for example only single building phases have to be roofed. Further advantages are:

- Roofs over work on additional storeys, repairs to timber roof frames and coverings.
- Weather protection during new building work.
- Repair sites on motorways and above bridges.
- By removing the Keder roof ledgers, the weather protection roof can be folded like an accordion

Accordion-like folded Keder roof XL for insertion of a funnel structure

5.5 Site equipment

Cable and pipeline bridges

Construction work involves numerous tasks that can be completed very quickly using Allround Scaffolding. More and more frequently, these include building cable or pipeline bridges across traffic routes. Various solutions are available depending on requirements.

- Small non-system triangular supports.
- Allround Scaffolding lattice beam structures.
- Very strong pipeline bridges made of steel trusses / Allround FW System or Allround Bridging System for large spans and high load-bearing capacities.

Cable bridge made of lattice beams and triangular supports including concrete ballast

Cable and pipeline bridges made using the Allround Bridging System

Pipeline bridge using steel trusses

Cable bridge of lattice girders and tri-struts including concrete ballasting

Cable bridge of FlexBeams on Allround support towers

Advertising signs

Ingenious system solutions using Layher Allround Scaffolding enhance the appearance of the site or storage area.
For advertising signs, structures can be quickly assembled to match various requirements using Layher's Allround Scaffolding.

- Quick to assemble and economical in the long term.
- Problem-free adjustment to the terrain.
- The structure can be stabilised using ballast or anchored directly in the foundation.
- Both temporary and permanent structures can be built.

5.6 Accessories and logistics

Flat roof guardrail

The rules of the professional association (BGV) regarding health and safety when working (C22 "Construction work") require a fall protection system at workplaces and walkways on roofs where the fall height is more than 2 m.

- The GS-tested flat roof guardrail meets this requirement.
- With a few additional components for the Allround system, the flat roof side protection can be assembled easily, quickly and safely.
- This and many other products from Layher Bautechnik GmbH can be found at **www.layher-bautechnik.de.**

Flat roof side protection on a hall roof

Balustrade clamp

The accident prevention regulations of the professional associations are also met with the Layher balustrade clamp. It can be used for concrete floors and fascias between 16 and 33 cm in height and for flat roofs.

- The guardrail is constructed with Allround Scaffolding or SpeedyScaf guardrails.

Use of a balustrade clamp on a flat roof with high fascia

Logistics / material flow / storage

Sound logistics are essential for successful work at the site, which is why Layher has also put some thought into storage and safe transportation. For some system components, special system pallets are available.

For all other components, an extensive range of non-system pallets and skeleton boxes is available:

- System pallets.
- Sturdy design made from steel for safer transport and long life.
- Corrosion prevention by hot-dip galvanisation.
- For rapid transport of material to the right place.
- Space-saving storage.
- Movement by crane or fork-lift truck.

Modular skeleton boxes in Euro Pallet dimensions

Filled pallets are lifted from the truck directly by a crane at the place of use.

Filled TG 60 frame pallets can simply be moved on the construction site by a pallet truck.

Filled and stacked TG 60 frame pallets for transport using a fork-lift truck

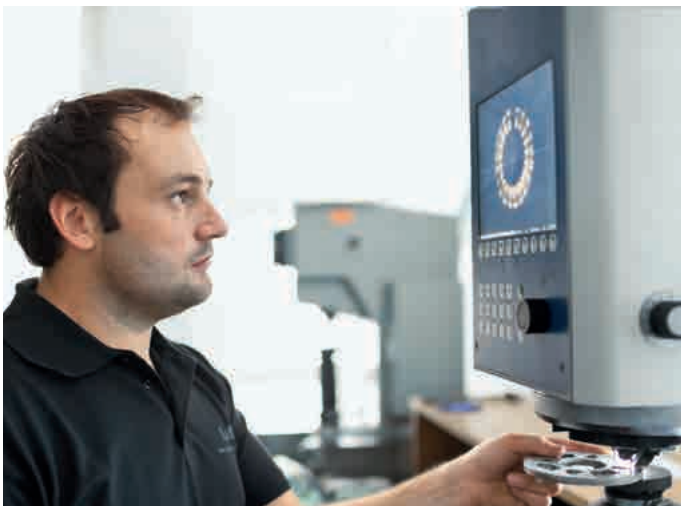
Layher logistic solutions for safe transport and storage of scaffolding material

06 SAFETY DOCUMENTATION

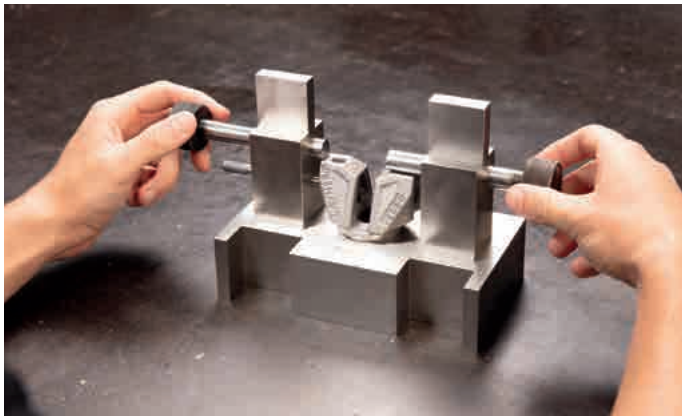
6.1 Layher quality management

Layher processes some 30,000 kilometres of steel tube every year – and we take responsibility for the safety of our customers with every single metre. This is why one of Layher's core tasks is quality management.

- Our products possess DIN/ISO certifications, German TÜV approvals plus many other German and international seals attesting their excellent quality.
- We have been DIN EN ISO 9001-certified since 1994.
- Uncompromising commitment to quality, from incoming-goods inspection to every production area.
- The manufacturing methods are precisely defined for every component and backed up by clear instructions for work and inspection.



Hardness test during the incoming-goods inspection



Dimensional and function test of the semi-finished parts

Product identification to permit tracking of its manufacture

6.2 Internal and external monitoring

At Layher, rigorous checks at every stage of production are equally important and routine as identification and documentation of all components. For example, every Layher deck is stamped at the end of the production process with information on the machine, the date of manufacture and various production parameters.

To comply with the quality requirements and the legal basis for high-grade Layher products, they are routinely monitored with both in-house and external inspection measures.

Internal monitoring
- 100-percent inspections of dimensional accuracy.
- 2 Destructive random checks in all production areas.

External monitoring
- Commissioning of independent test institutes with certification.

Monitoring by external test institutes

Laser-assisted dimensional testing

6.3 Approvals

Layher scaffolding systems have national approvals in a variety of countries – for maximum safety at work and safety under the law.

Approval for the Allround modular system in steel: Z-8.22-64, Z-8.22-939, Z-8.22-949

Approval for the Allround Connector in aluminium: Z-8.22-64.1

Certificate for the All-round modular system in steel

Certificate for the Allround modular system in steel

Certificate for the Allround modular system in steel

Certificate for the Allround modular system in steel

Approval for the Allround modular system in steel and aluminium

Approval for the Allround modular system in steel

Certificate for the Allround modular system in steel and aluminium

Certificate for the Allround modular system in steel and aluminium

Certificate for the Allround modular system in steel

Further approvals and certificates worldwide. In a number of countries, the listed approvals or certificates are also accepted.

6.4 Trial and test stand

Before they come onto the market, all products are thoroughly tested on Layher's up-to-date test stand. This can involve the simulation of thousands of load cycles, and drop tests are conducted too. These drop tests have to be passed by all scaffolding decks before they can be used in brick guards.

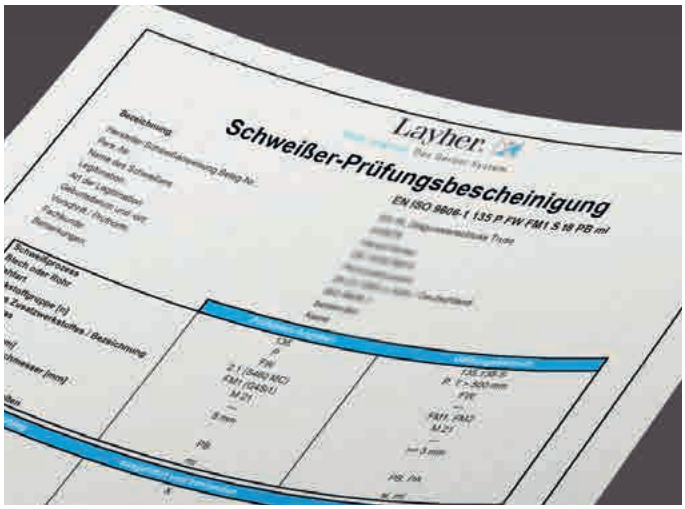
The ball drop test conducted in accordance with EN 12810-2 is strictly regulated. It is conducted with a steel ball with a weight of 100 kg and a diameter of 0.5 metres, impacting the scaffolding deck from a drop height of 2.5 metres. To simulate the impact of a human body, a cushioning pad with precisely defined properties is positioned at the point of impact. The deck may be deformed, but must not fail.

Continuous stress tests

Ball drop test

6.5 Welding technology

Layher is a certified company for welding technology.
We process our products on the latest welding equipment and with welding robots.



Certificate of examination for steel and aluminium welders

Robot and automatic production

6.6 Technical documentation

For planning certainty, extensive technical documentation is available for Layher scaffolding systems:

- Approvals.
- Type tests for lattice beams.
- Instructions for assembly and use.
- Structural data sheets.
- Comprehensive technical brochures with load capacity tables.

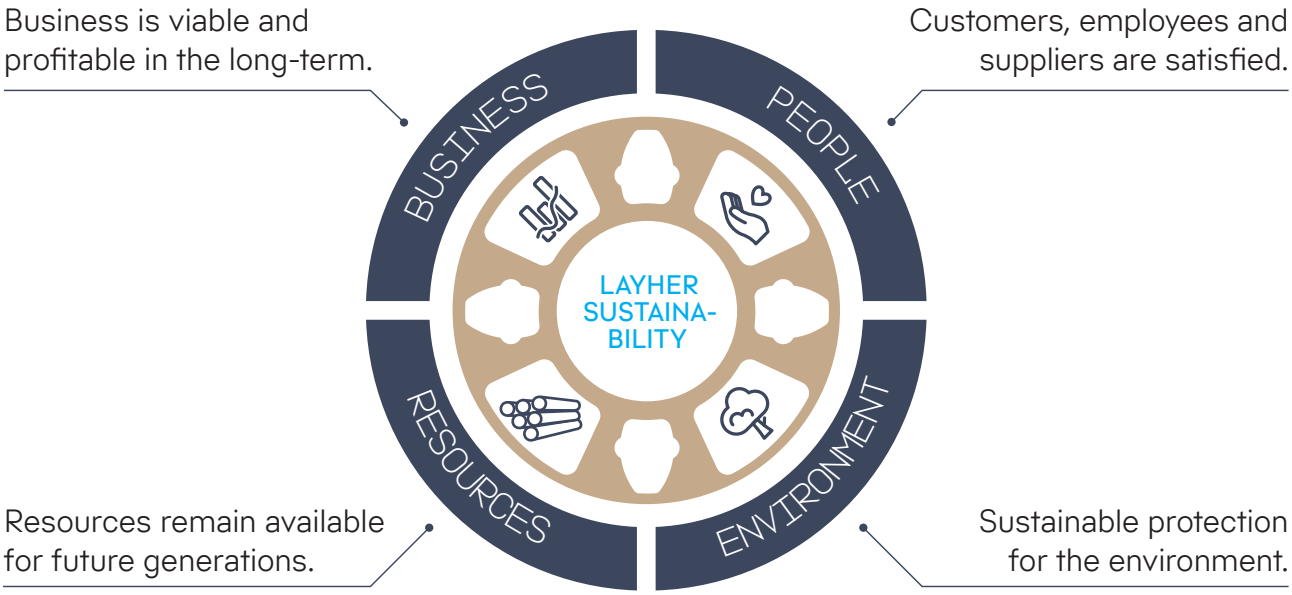
6.7 Catalogues and price lists

Layher customers can find extensive information material for downloading at **downloads.layher.com** or they can request it in printed form free of charge.

- Layher Product Range.
- Layher Guideline for Professional Users.
- Layher Infos with useful information for the scaffolding user, plus information on new products and on their possible uses and applications.

07 SUSTAINABILITY

Layher is geared towards sustainable business practices.
People, the environment and the use of resources play a central role here.



Building and maintaining properties is unthinkable without scaffolding. Layher scaffolding is essential for the construction of many central components of our infrastructure for living and working. The sustainable transformation of our economy and society also needs these products. With scaffolding, Layher offers tools for change. They provide support, for example, in transformation areas such as the energy sector, building refurbishment or new technologies.

Layher lays the **foundation for sustainability** with a well thought-out product design:
- Very long service life and value retention
- Products can be used and combined across generations
- Layher Lightweight: efficiency use of resources and improved material handling
- Using recyclable materials like steel and aluminium

Practising sustainability

Using resources responsibly
- Use of photovoltaic systems
- Operational energy management in according with international standard
- Energy generation by using wood chips
- Energy efficient lighting
- Using electric forklift trucks
- Durable products made from recyclable materials

Protecting the environment
- Exhaust air, wastewater and noise emissions well below legal limits
- Certified environmental management
- Renaturing a section of the Zaber river (Local tributary of the Neckar)

Bearing social responsibility
- High safety standards
- Ongoing improvement of occupational health and safety
- Promotion of young talents
- Comprehensive training concept
- Close ties with charity organisations
- Reducing physical strain in production by automation
- In-depth training for customers

08 SUCCESS STORIES

The following success stories, and many others too, can be found in various issues of our "Success stories" magazine.

Request it free of charge at:
brochurerequest.layher.com

All success stories can be watched as videos at
success-stories.layher.com

8.1 New multi-storey car park

As Managing Director Horst Köhler walks through his new company headquarters in Besigheim, Germany, a certain building material is omnipresent at every step. The winner of an architecture competition, this new building was envisaged as a kind of calling card for the company as a whole. This involved the creative use of concrete, one of the pet projects of the company. The newly built multi-storey car park for the company Heilbronner Versorgungs GmbH also employed concrete, albeit much less creatively. To provide both economical and dependable formwork for the car park decks, Köhler unerringly chose Shoring TG 60 from Layher.

The TG 60 system replaces frames, standards, ledgers and diagonal braces, meaning that fewer individual parts have to be assembled. As a result, assembly and dismantling are particularly fast. And can always be carried out from a secure position thanks to the integrated and all-round side protection. The towers can be assembled both upright and lying on their sides. To support the base plates on the sloped access, adjustable equalising plates are used which can compensate steplessly for inclines of up to 16% and thus ensure sure footing. A work level integrated into the system underneath the car park deck enables the concrete workers to work quickly, more safely and untiringly. Allround Scaffolding can display its advantages to the full during work on the access ramps. With a loading capacity of up to six tonnes per standard.

Learn more at: **success-story-koehler.layher.com**

8.2 New office building, Berlin, Germany

If you walk with Dieter Gescher (structural design expert at Teupe & Söhne Gerüstbau GmbH, Technical Director of Teupe GmbH Stahl- und Maschinenbau and head of the Technical Office with 14 employees) through the new and breathtaking Axel Springer building, you will soon find his delight in the technical details of this construction project infectious.

Ever since the order was placed with the Teupe Group by Züblin, the main contractor responsible for the building, in November 2016, it has had a small army of structural engineers and technicians working on this major and ambitious project. The entire structural analysis for the scaffolding needed, the engineering work and job preparation was done by the company itself. The modular Layher Allround system considerably facilitated planning of the scaffolding. Starting in March 2017, the scaffolding construction specialists from Teupe have been represented continuously by up to 20 employees working not only on the large birdcage scaffolding and shoring, but also on facade and protective scaffolding, stairtowers and various one-off structures for the project. For the birdcage scaffolding, up to 40 m tall Layher Allround Scaffolding was used for shoring to absorb loads from 12 kN/m² to 40 kN/m², in addition to Teupe's heavy-duty towers. "Shifting the load to the deck structure and a step-by-step dismantling of the birdcage scaffolding was scheduled for the period from October 2018 to April 2019, which will be another highlight at this site for us", says Dieter Gescher. "Apart from the structural aspects, the logistics of this inner-city project were another challenge that couldn't be underestimated, since the entire material used couldn't be put into interim storage at the site, and more than 100 truckloads of material had to be delivered just in time instead. Something like that can only work with perfected planning for both the scaffolding and its assembly", adds Ludger Schroer.

Learn more at: **success-story-teupe.layher.com**

8.3 Bridge renovation

When it was built nearly 60 years ago, the suspension bridge across the Firth of Forth – an estuary on the north-western outskirts of Edinburgh, capital of Scotland – was the longest of its kind anywhere in Europe. With a total length of 2.5 km and a clear height of 44 m above sea level, it remains an imposing structure to this day and one of the region's most iconic architectural landmarks. When a 120 m long and 36 m wide section of the maintenance facilities underneath the bridge was due for refurbishment, the specialists at I-Scaff Access Solutions Ltd. opted for a solution using Layher Allround Scaffolding and the aluminium FlexBeam. Apart from requiring significantly less equipment, this also halved the assembly time compared to the scaffolding material used so far.

Ever since the eighties, a series of maintenance bridges totalling some 10 km in length has existed underneath the road deck, enabling easy and safer access to the bridge itself for ongoing maintenance and inspection activities. Another temporary access level now had to be created, so that these maintenance facilities could undergo their own programme of maintenance. Conventional tube and coupler scaffolding of the kind that is still commonplace in the UK was used for the first five phases due to it's flexibility. However, we were able to convince the specialists at I-Scaff Access Solutions Ltd., the British firm responsible for installing it, of the Layher Allround System's manifold benefits in combination with the aluminium FlexBeam for the sixth phase.

Learn more at: **success-story-iscaff.layher.com**

8.4 New residential and office buildings

A fantastic challenge for the senior site engineer Horst Zimmermann and all his team. Placing this major project with AMOS was no coincidence: it's a construction company with a long tradition and 80 years of experience in civil engineering and road construction, and it also handles the entire value chain, from project planning to completion. "With our well-trained employees and an extensive fleet of our own machinery and equipment, we are extremely flexible and well prepared to take on out-of-the-ordinary jobs too", emphasises Klaus Wenninger. And that's in the truest sense of the word, because there is enough Layher Allround Scaffolding material on his premises that he no longer has to hire any additional scaffolding for projects. "That gives us enormous flexibility and saves a lot of time too", adds Horst Zimmermann.

Senior site engineer Zimmermann appreciates not only the economic benefits of this system, but also – and above all – its quality and its compatibility, in particular for buildings that have to meet exacting standards. "We use our Layher Allround material in the building process above all to provide flexible and safer access to work areas that are not easily reached." Horst Zimmermann is well aware of the heavy responsibility for his employees, which is precisely why he relies on Layher material. "The uncomplicated assembly of the scaffolding elements saves time and can also be used for unusual building geometries." When it comes to fitting the Layher stop-end brackets at a section of the construction, AMOS uses its Allround material to build a free-standing tower about four metres in height, for example, which can be transported in a very uncomplicated way to the right place by crane. "That allows our employees to work with a secure feeling even at great heights, and concentrate fully on the quality of their work – tiresome assembly and dismantling is not needed."

Learn more at: **success-story-amos.layher.com**

8.5 New residential building

North West England, where Manchester can be found, is one of the United Kingdom's strongest economic regions. Many people are familiar with the city's name because of its two premiere league football clubs, Manchester City and Manchester United – and the latter's famous Old Trafford stadium has featured in a football thriller or two. A lesser known fact about Manchester is that the city has two universities and a shortage of living space. That's the reason why a new multiple apartment blockis being built on Burlington Square, close to the university and several schools, with 273 residential units. The main contractor chose Rose System Scaffolding as its facade scaffolding provider over tube and fitting because it was looking for a company that used Layher Allround Scaffolding.

"The building design features a series of 10 stepped roof areas that had to be matched by the scaffolding design," explained James Brierley, Director of Rose System Scaffolding. "It was also important to allow for the free movement of men and materials. The use of Layher Allround Scaffolding enabled us to meet this requirement very quickly and flexibly. It's this safety, flexibility, efficiency and speed that favours Layher scaffolding products."

The experienced scaffolding expert also appreciates the light weight of the Layher equipment because it simplifies storage, handing and erection. He also emphasised that one of the many advantages of the Layher Allround Scaffolding is the system's unique basic principle, which makes it possible to make up to eight connections in various angles at the statically ideal All-round connector. The AutoLock function also enables fast and secure assembly. The friction locks are easily released with a hammer blow if it is necessary to change or supplement the scaffolding.

Learn more at: **success-story-rose.layher.com**

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Layher

More Possibilities. The Scaffolding System.

Customer proximity is a key success factor for Layher – also in a geographical sense. That is why we are present with ideas and solutions wherever our customers need us.

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