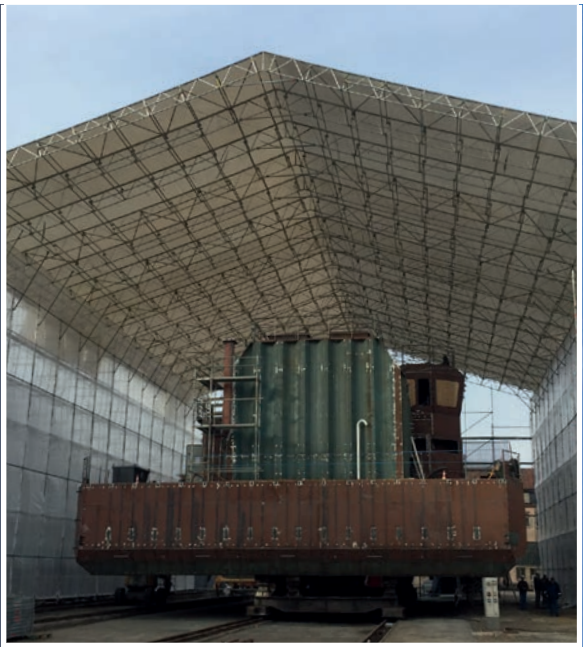
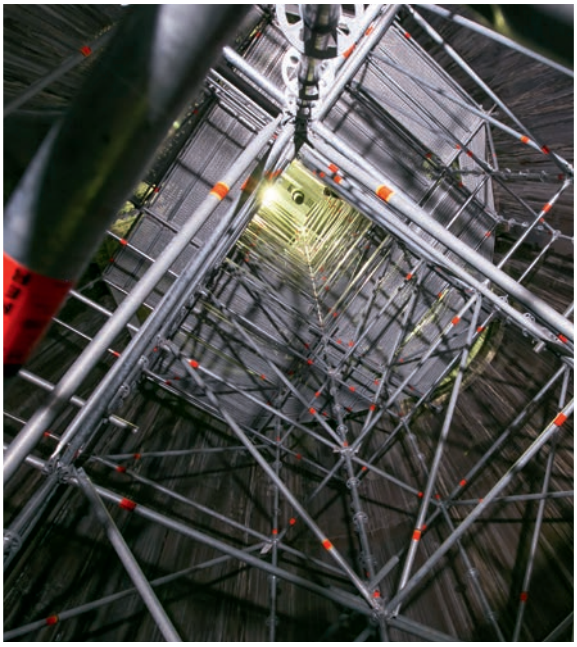
Layher®

More Possibilities. The Scaffolding System.

LAYHER SYSTEM SOLUTIONS
INDUSTRIAL SCAFFOLDING CONSTRUCTION





Edition 05.2020
Ref. No. 8116.248

Quality management
certified as per
DIN EN ISO 9001

Typical applications,
solutions and useful ideas
for Layher scaffolding systems
in industrial scaffolding
construction.

CONTENTS

1. LAYHER – THE COMPANY

Layher's main plant in Gueglingen-Eibensbach

The Layher name has been synonymous with high-quality scaffolding systems, outstanding service and dependable partnership for more than seven decades now. Even today, development, production, logistics and management are still all in one place, where the conditions are best for achieving "Quality Made By Layher": in Gueglingen-Eibensbach. At two locations, over an area of 318,000 m², we produce our pioneering system scaffolding using highly automated methods. Our deep roots in the region, and a culture of service and innovation we've lived by for generations, form the basis for our promise to customers all over the world: "More possibilities!"

1.1. 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
- Increase in assembly capacity thanks to lower weight, more ergonomic shape and reduced number of components.
- Increase in efficiency and profitability
- Complete integratability 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 made possible an increase in the assembly capacity by up to 10% and a reduction of the transport costs by up to 12%.

Continual product innovations and design improvements

1.2. ADVANCING GUARDRAIL SYSTEMS ENSURING COMPLIANCE WITH THE LATEST LAWS AND REGULATIONS

Risk assessments and the measures derived from this for protection against falls during assembly and dismantling are brought into focus more and more. For compliance with this and with further safety guidelines, Layher has devised a range of temporary and also system-integrated solutions for collective protection.

Safer assembly during scaffolding construction

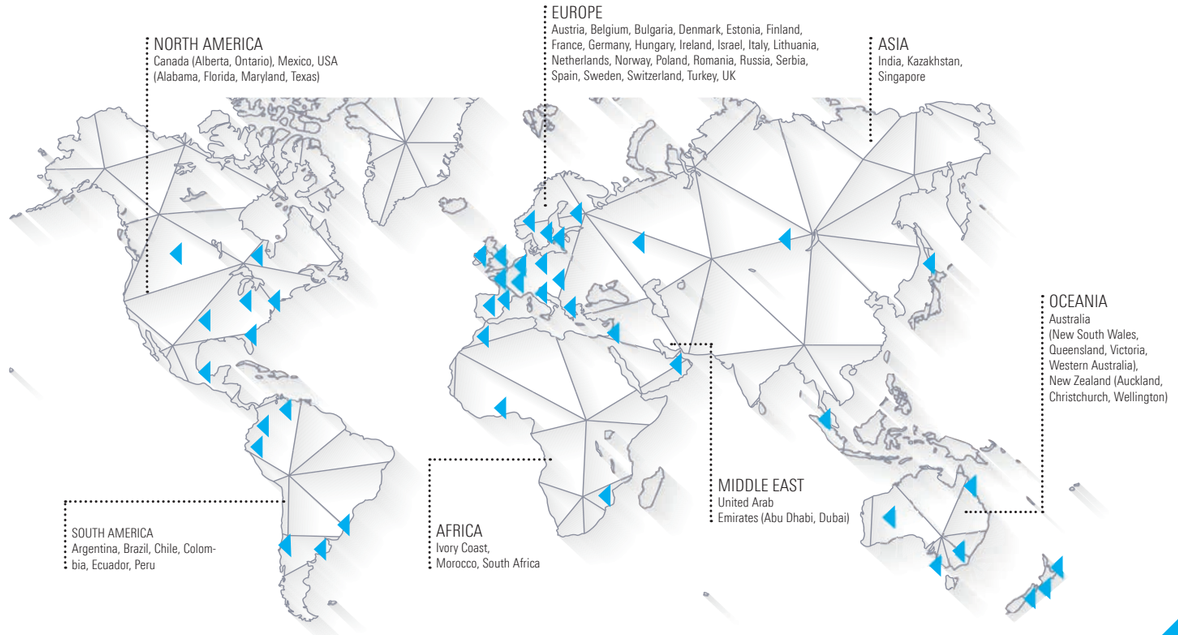
1.3. LARGE STOCKS AND RAPID MATERIAL AVAILABILITY

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 original top quality.

Shipping warehouse at the main plant

1.4. 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.



1.5. 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

1.6. EXPERT ASSEMBLERS AND TECHNICAL ASSISTANCE AT THE CONSTRUCTION SITE

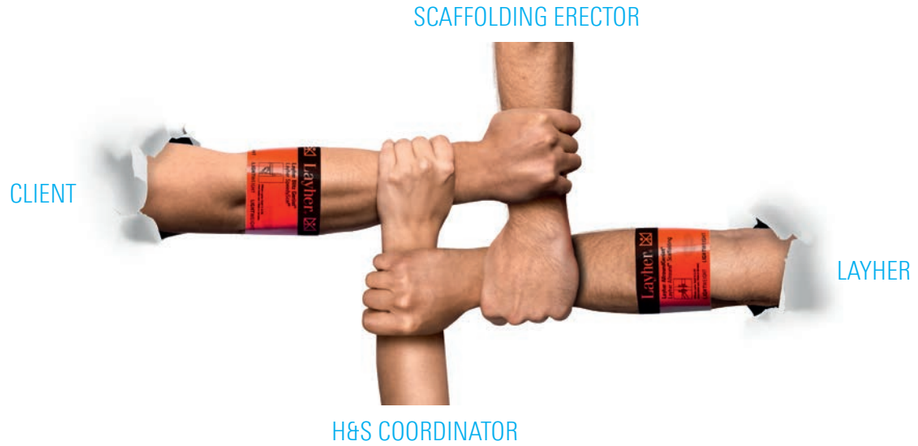
Our priority is our customers' success. This is why we believe in close cooperation, and invest in genuine and lasting partnerships at every level.

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 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

1.7. STRONG PARTNERSHIP IS IN 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 more safely. Because it's not enough to have an outstanding product for successful scaffolding construction – what's crucial is what you do with it.



1.8. TECHNICAL SEMINARS FOR REGULAR TRAINING OF EMPLOYEES

In toughly contested markets, companies need qualified employees. That's why Layher organises regular technical seminars specifically on scaffolding construction, 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 by many further offerings, such as practical product training and round-table meetings for scaffolding constructors, with interesting presentations by industry specialists and intense group discussions amongst scaffolding professionals to encourage the exchange of ideas.

Extensive technical documentation for all products

Technical seminars on theory and practice

2. LAYHER IS ACTIVE IN YOUR INDUSTRY TOO

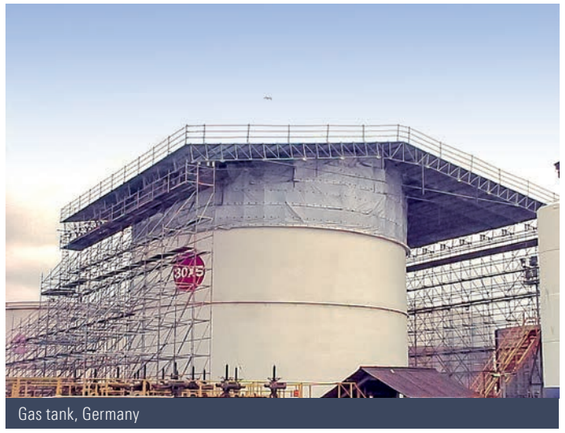
2.1. OIL AND GAS

Nitrogen factory, Poland

Refinery, Hungary

Refinery, Australia

Refinery, Germany



Gas tank, Germany

Gas flare, Algeria

Refinery, Sweden

Refinery, South Africa

2. Layher is active in your industry too

2.2. CHEMICALS AND PLANT CONSTRUCTION

Chemical park, Germany

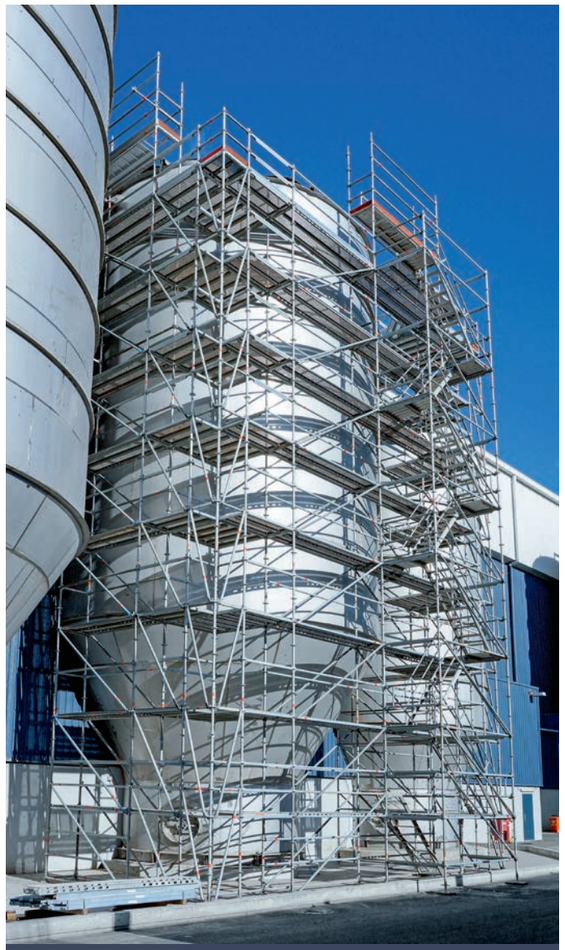
Chemical factory, Switzerland

Chemical park, Germany

Chemical factory, New Zealand

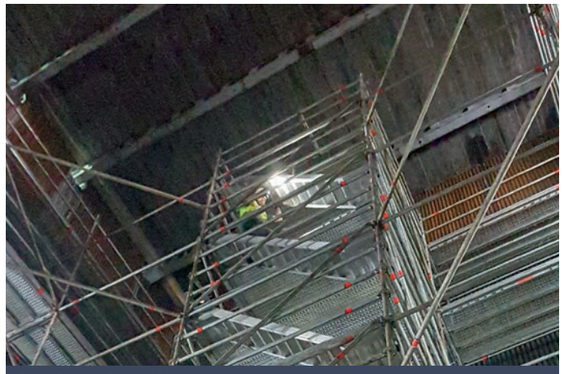
2.3. PAPER AND PULP INDUSTRY

Paper factory, Sweden



Paper mill, Australia

Paper factory, Sweden



Paper factory, South Africa

2. Layher is active in your industry too

2.4. MINING AND RAW MATERIALS

Copper mine, Peru

Coal mine, Australia

Copper mine, Chile

Copper mine, Chile

2.5. ONSHORE / OFFSHORE

Liquefied gas plant, Norway

Gas platform off the coast of New Zealand

Oil drilling rig off the coast of Ireland

Offshore wind farm off the coast of Denmark

2. Layher is active in your industry too

2.6. SHIPBUILDING


Shipyard, Germany


Shipyard, Germany


Shipyard, Russia

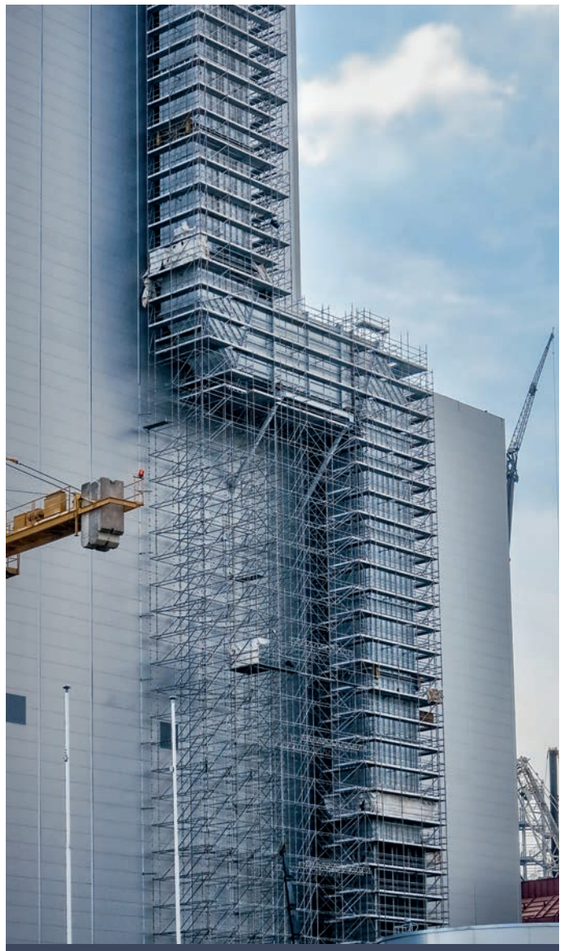

Shipyard, Russia


Shipyard, Russia


Submarine yard, Australia

2.7. ENERGY INDUSTRY


Thermal power station, Peru

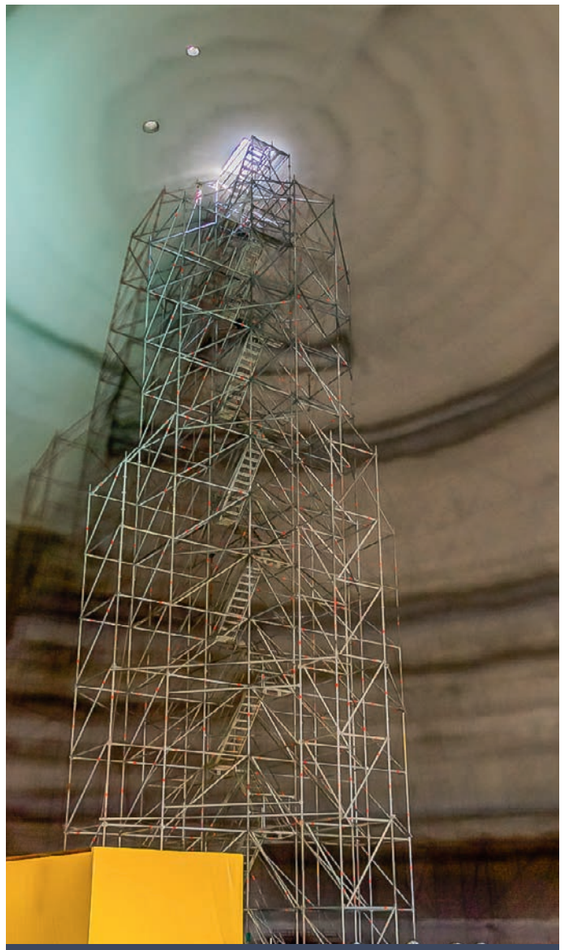

Coal-fired power station, Poland


Power station, Italy

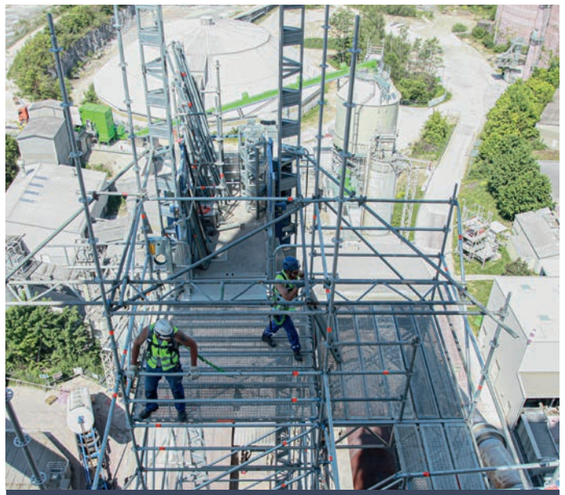

Coal-fired power station, UK

2. Layher is active in your industry too

2.8. CEMENT INDUSTRY



Cement works, Chile



Cement works, Germany

Cement works, South Africa

Cement works, Serbia

2.9. AIRCRAFT MAINTENANCE

Aircraft maintenance dock, Russia

Aircraft maintenance dock, Argentina

Aircraft maintenance dock, Russia

Aircraft maintenance dock, Philippines

Aircraft maintenance dock, Sri Lanka

3. DIGITAL PLANNING WITH LAYHER SIM®

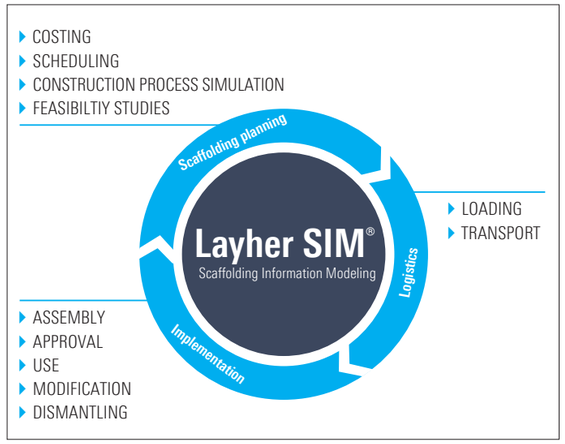
3.1. YOUR ACCESS TO BIM

LayPLAN SUITE – efficiency and transparency from planning right through to implementation

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 work to be coordinated with other trades or construction sequence simulation, 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 thanks to SIM from a high degree of planning certainty, cost control and above all completion of projects on schedule thanks to efficient and undisrupted construction processes. Delays and added costs due to inadequate planning are a thing of the past.



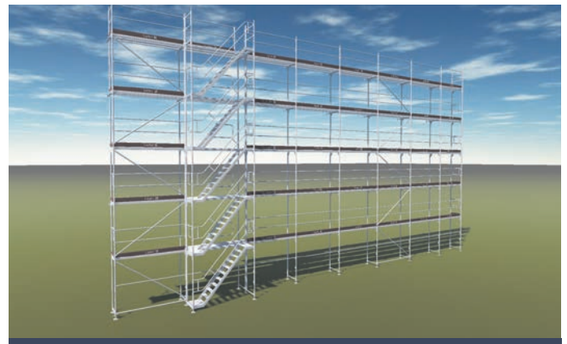
YOUR BENEFITS AT A GLANCE

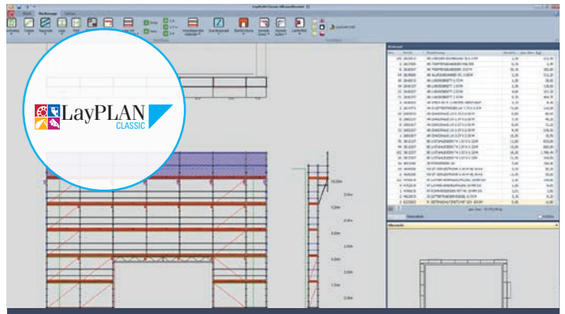
- Transparency in all work steps and cost control
- Increase in safety and profitability for every project
- Planning and scheduling certainty at every site
- Your access to BIM

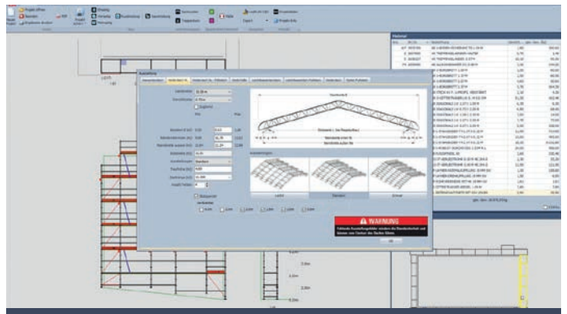
3.2. THE MODULES OF LAYPLAN SUITE

3.2.1. LayPLAN CLASSIC for SpeedyScaf and Allround Scaffolding

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

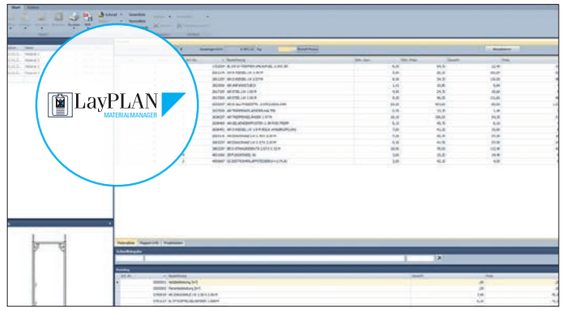

Planning of a weather protection roof with Keder Roof XL on Allround support scaffolding using LayPLAN CLASSIC

The functions of LayPLAN CLASSIC

- Automated planning of standardised scaffolding structures using SpeedyScaf, Allround Scaffolding and Layher weather protection roofs
- Export function to LayPLAN CAD
- Automatic 2D drawings
- 3D visualisation for order acquisition
- Real-time material list – for transport and assembly

3.2.2. LayPLAN MATERIAL MANAGER for LayPLAN CLASSIC and LayPLAN CAD

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.

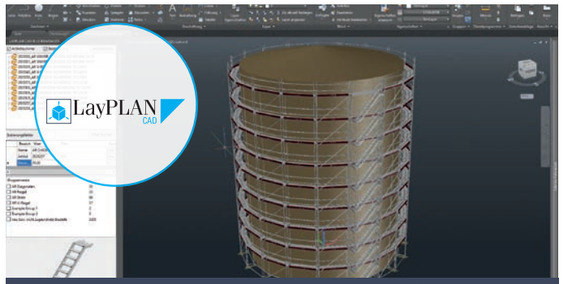


The functions of LayPLAN MATERIAL MANAGER

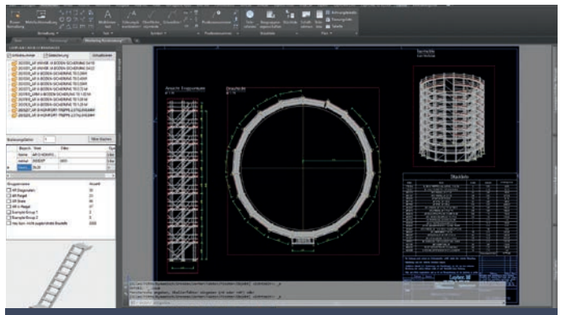
- Automatic creation of material lists from LayPLAN CLASSIC and LayPLAN CAD
- Manual editing of material lists, for example splitting them into construction sections and applications
- Detailed information on the scaffolding components including preview image
- Output as PDF and export in Excel
- Optional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

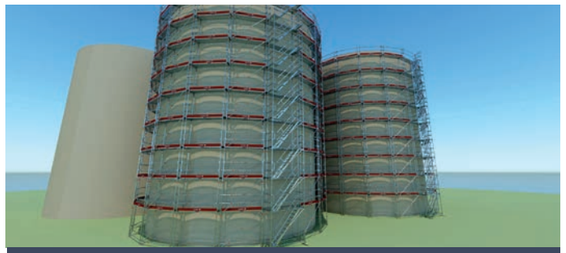
3.2.3. LayPLAN CAD for planning in 3D

For complex scaffolding structures as part of large-scale engineering scaffolding, LayPLAN CAD is available. 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

The functions of LayPLAN CAD

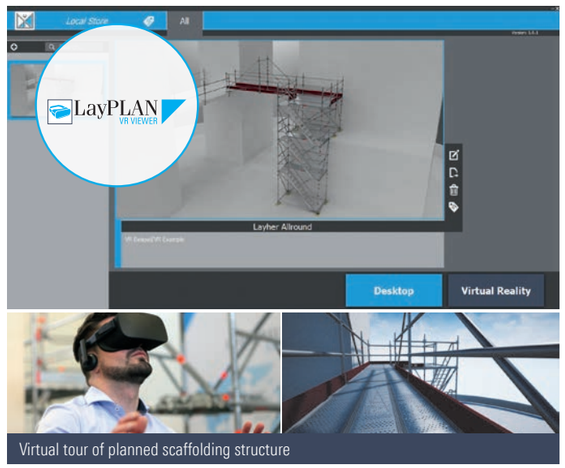
- Scaffolding planning and design in 3D
- Basic planning can be done in an automated process using the proven LayPLAN CLASSIC – that saves time
- Dependable visual collision check thanks to realistic rendering as a volume model
- Extensive component library with a convenient search function – including prefabricated assemblies and template drawings for even faster design
- Preview image of components and output as 3D models
- Automatic component labelling
- Real-time material list for transport and assembly – the required material is guaranteed to be there where it's needed
- 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
- Further editing of the model data in RSTAB for structural strength calculations as part of project-related verifications of stability. Unlike in remodeling which is otherwise necessary, this avoids error sources and saves time when planning
- Available in German, English, French and Spanish

3.2.4. 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 for you VR models for display in the LayPLAN VR VIEWER. We'd be happy to assist you on the spot with our specialists and equipment for your VR presentation.

The functions of LayPLAN VR VIEWER

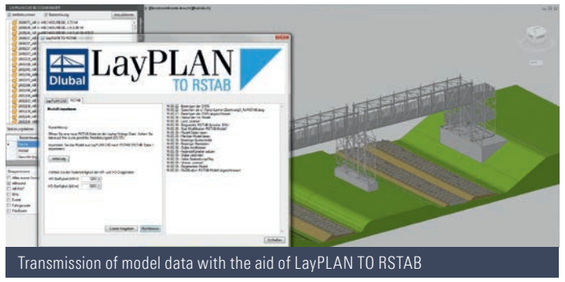
- Virtual tours of scaffolding structures with VR headset (e.g. Oculus Rift)
- Optional display of VR models in Desktop mode
- Integrated measurement and comment function
- Conveying of a realistic spatial impression of the overall situation, for order acquisition, for coordination with other trades or for construction sequence simulation



Virtual tour of planned scaffolding structure

3.2.5. LayPLAN TO RSTAB

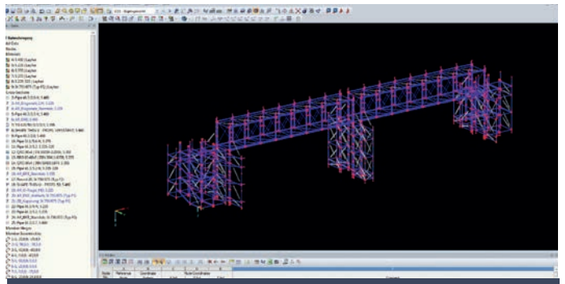
For structural strength verification of scaffolding structures, frame analysis programs are generally used. Using the LayPLAN TO RSTAB module, all modelling-relevant information about an Allround Scaffolding structure can be imported three-dimensionally into the RSTAB frame analysis program from Dlubal. 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.

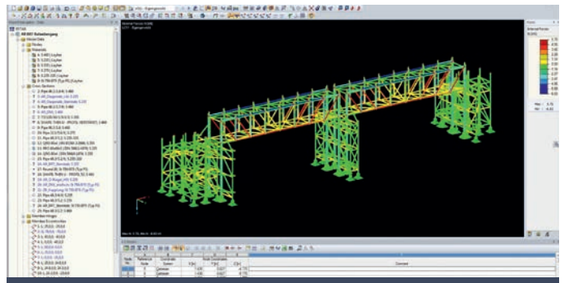


Transmission of model data with the aid of LayPLAN TO RSTAB

The functions of LayPLAN TO RSTAB

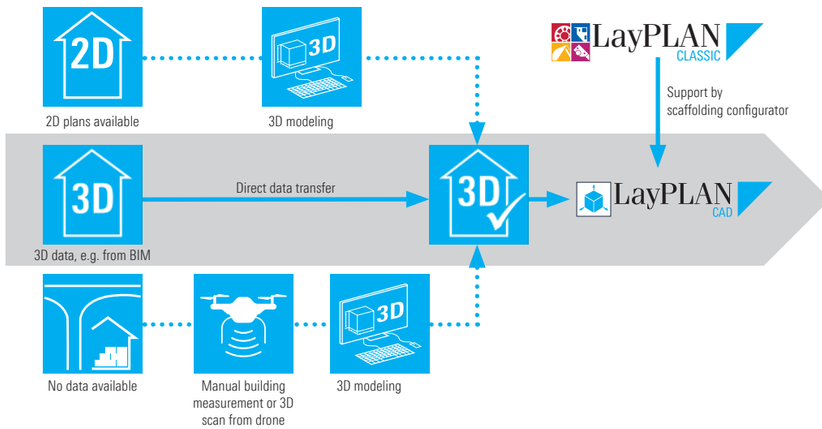
- Time saving thanks to automated 3D model transfer of Allround Scaffolding structures
- Transmission of all structurally relevant information according to the approvals (geometry, cross-sections, materials, frame types, eccentricities and non-linear connections)
- Avoidance of possible sources of errors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

3.3. PROCESSING OF THE MODEL DATA UP TO 3D USE IN SIM

Digital 3D scaffolding planning affords many advantages over planning in 2D as previously used: from a high degree of detail in planning and in drawings to the visual collision check and to professional visualisation of the scaffolding structure. The basis for scaffolding planning is 3D building model data. It is available as a rule from your customer as part of the BIM process. Alternatively, it is possible to remodel the 3D building model data on the basis of 2D plans or manual building measurements or 3D scans – stationary or using a drone. Once 3D scaffolding planning with LayPLAN CAD is finished, the data can also be used without any problem for downstream processes, for example the creation of part lists or construction sequence simulation.



- Realistic 3D scaffolding planning
- Visualisation of the design for professional presentation
- Collision check
- Data transfer to structural analysis programs
- Material lists for logistic planning and costing
- 2D plans for assembly
- Construction process simulation
- VR model for virtual tour
- Communication / data exchange with mobile devices

4. SOLUTIONS

4.1. FIRE SAFETY, WOOD-FREE SOLUTIONS

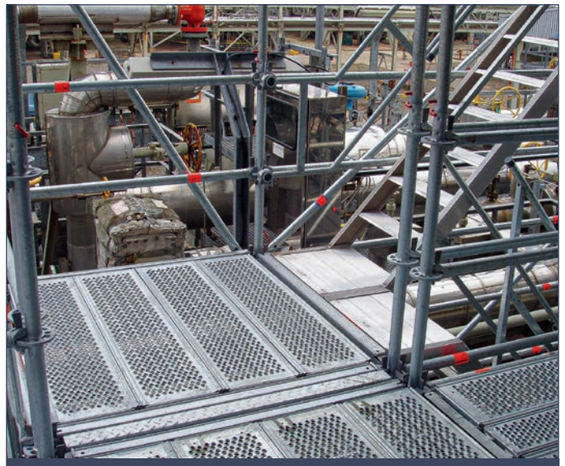
Reduction of fire risk in both simple and complex scaffolding using steel toe boards

Reduction of the fire risk is a requirement frequently expressed for scaffolding in refineries, chemical factories and other fire-sensitive industrial plant. Components made of wood can be ruled out for obvious reasons. Layher has the optimum alternatives: system decks and matching toe boards made of steel or aluminium. Gap solutions made of steel, and scaffolding coverings made of low-inflammability tarpaulins or the Protect System, round off the range.

4.1.1. Steel deck LW

- Available in the system widths 0.32 m and 0.19 m
- Strongest variant of the fire-risk-free Layher scaffolding decks – with weight reduced by 10%
- Depending on the bay length, attains up to load class 6 (up to 2.07 m)
- Even with a 3.07 m length, it still attains load class 4
- Impossible to fall through, making it usable in brick guards too

Load class EN 12811-1	Steel decks 0.32 m wide:							
	0.73	1.09	1.40	1.57	2.07	2.57	3.07	4.14
1	•	•	•	•	•	•	•	•
2	•	•	•	•	•	•	•	•
3	•	•	•	•	•	•	•	•
4	•	•	•	•	•	•	•	–
5	•	•	•	•	•	•	–	–
6	•	•	•	•	•	–	–	–



Steel decks in various lengths for every application

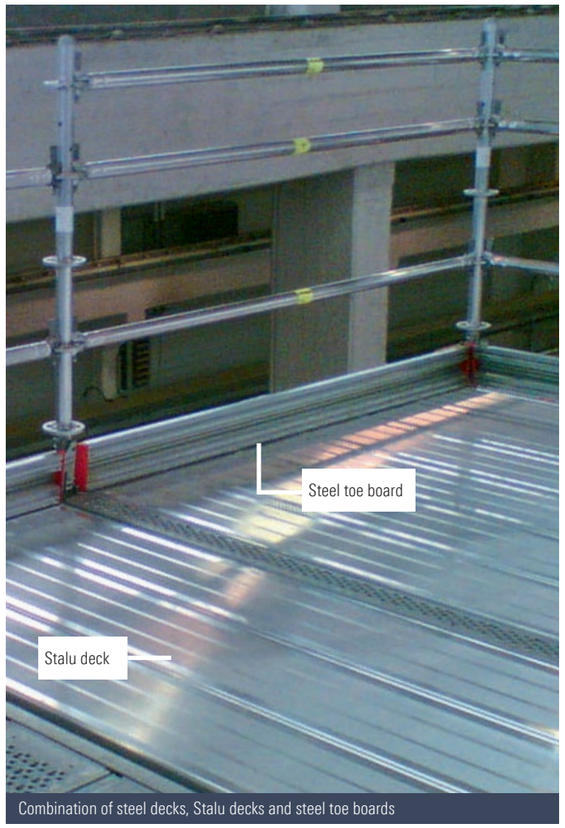
4.1.2. Stalu deck

- In addition to the usual system widths of 0.32 m and 0.19 m, also available in the system width 0.61 m
- The lightweight alternative to the steel deck
- Aluminium hollow-box section with high stiffness
- Very low weight plus a high load-bearing capacity (up to load class 4 for 3.07 m)
- Very low stacking height of just 54 mm

Load class EN 12811-1	Stalu decks 0.61 m wide			
	1.57	2.07	2.57	3.07
1	•	•	•	•
2	•	•	•	•
3	•	•	•	•
4	•	•	•	•
5	•	•	•	–
6	•	•	–	–

4.1.3. Toe boards of steel and aluminium

- To complete fire-risk-free scaffolding construction
- Quick and easy fastening by fitting to Allround wedge
- Available in all Layher system lengths



Combination of steel decks, Stalu decks and steel toe boards

4.1.4. Steel plank

- Permitting optimum decking of all bay lengths and widths
- Variety of system lengths and widths available

Load class EN 12811-1	Steel plank, 0.20 m wide				Steel plank, 0.30 m wide			
	1.0	1.5	2.0	2.5	1.0	1.5	2.0	2.5
1	–	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–	–
3	–	–	–	•	–	–	–	•
4	–	–	–	–	–	–	–	–
5	–	–	•	–	–	–	•	–
6	•	•	–	–	•	•	–	–

Adaption of work area with steel planks

4. Solutions

4.2. SAFER AND FLAT WORK AREAS – OPTIMISED FOR THE JOB TO BE DONE

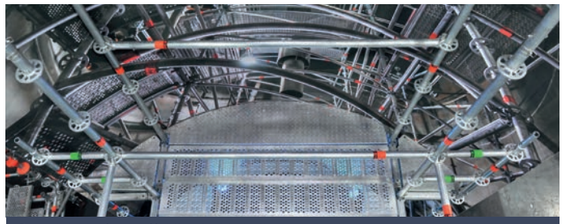
Non-trip and gap-free decking with standard steel decks

Since no plant is like another, scaffolding systems have to be flexible and adaptable. With Layher scaffolding, that's no problem: Thanks to the option of laying the decks over the rosettes, a gap-free solution can generally used without additional expense or effort. For special cases specific to the site, we offer a comprehensive portfolio of expansion parts for achieving completely closed work surfaces within the system.

4.2.1. Special decks

- Decks in triangular shape
- Round projecting decks for scaffolding inside boilers
- Trapezoidal decks for ship hulls
- One-off production of decks individually cut to shape is possible

Steel decks permit decking above the rosette



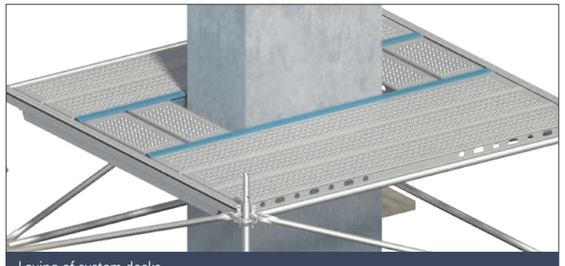
Round decks for scaffolding inside boilers

Triangular and trapezoidal decks for level decking of 45-degree inner corners

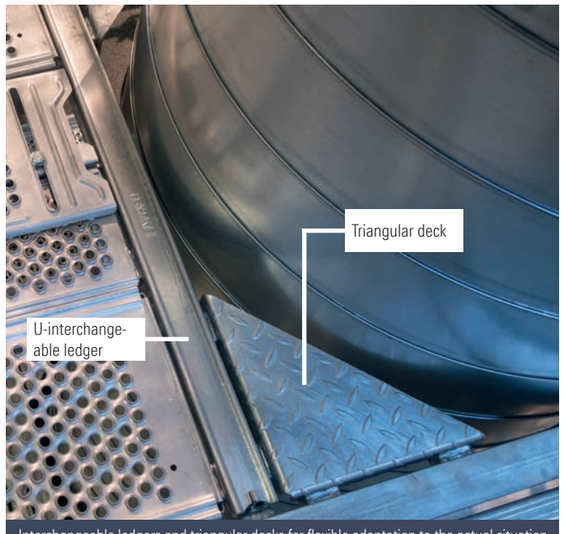
Trapezoidal decks inside a ship hull

4.2.2. Penetrations with interchangeable ledgers

- Interchangeable ledgers permit reversal of the decking direction
- Penetrations or cutouts can be created inside the system without special components
- The interchangeable ledgers are, like the scaffolding decks, provided with U-claws and are simply hooked into the U-ledgers



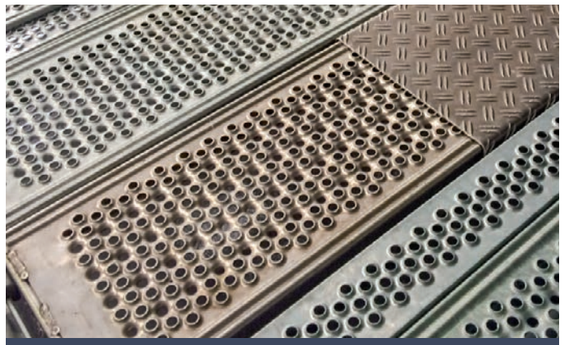
Laying of system decks



Interchangeable ledgers and triangular decks for flexible adaptation to the actual situation

4.2.3. Telescoping scaffolding decks

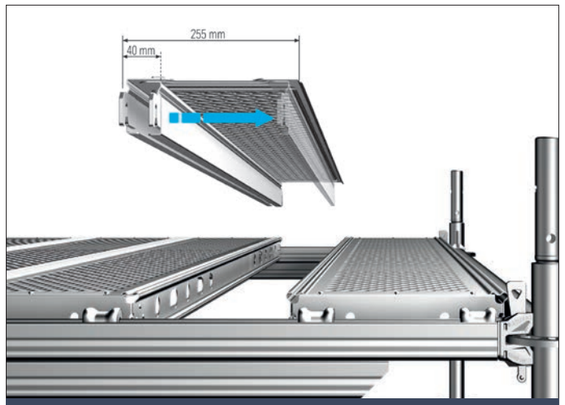
- For creating shortened scaffolding bays or manholes
- Surface as in Layher steel decks, resulting in a homogeneous and closed work area



Telescoping scaffolding deck

4.2.4. Telescopic gap deck

- Enables decking of scaffolding bays gap-free and without risk of tripping
- Depending on deck length, attains up to load class 6



Telescopic scaffolding deck infinitely adjustable from 40 to 255 mm

4. Solutions

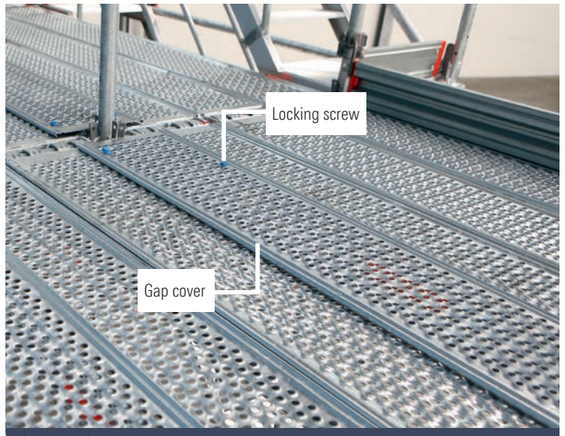
4.2.5. Gap deck

- Permits gap-free covering of the work surfaces between the U-main scaffolding decks and the U-bracket decks
- Available in a variety of lengths

System gap decks with wedge heads for closing the crossover point to bracket surfaces

4.2.6. Steel gap cover

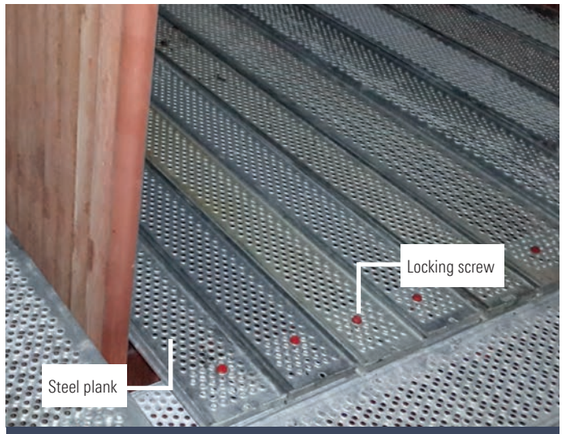
- For covering the gap between two steel decks in Allround Scaffolding
- Ensures work without tripping thanks to its low height of only 10 mm
- Quick and easy assembly with short locking screws (blue)



Gap cover for closing longitudinal gaps

4.2.7. Steel plank

- Very strong component for closing larger openings in the deck levels of all scaffolding systems
- Ideal for use in areas with stringent fire protection requirements



Steel planks, secured with long locking screws (red), on steel decks

4.3. ACCESSES

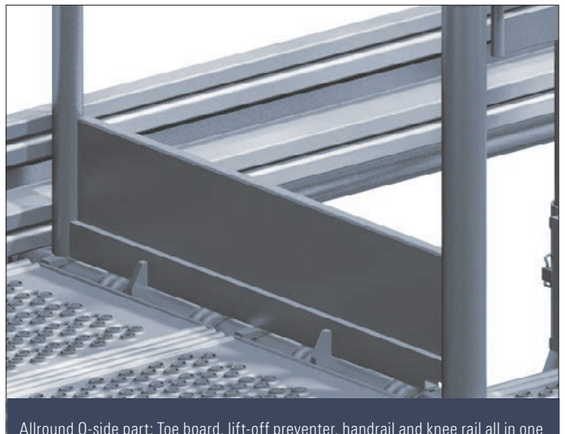
Stairtowers as efficient accesses to the workplace

Well-designed and correctly arranged accesses improve efficiency and also productivity at the site.

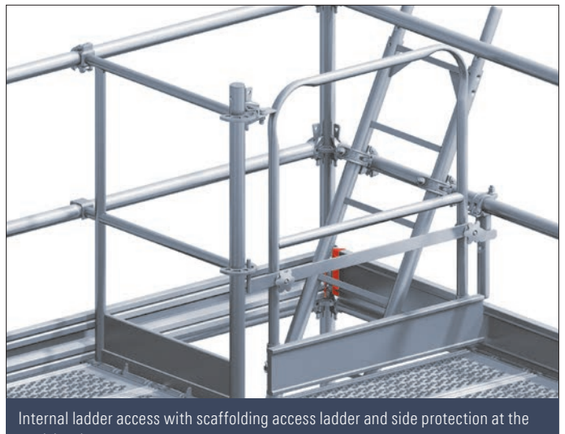
4.3.1. Internal ladder access

- Access decks with storey ladder, available in steel, aluminium or plastic/aluminium combination
- Alternatively: access through shortened bays and with side protection during ascent (for a greater degree of safety the manhole can be closed using a special side part)

Internal ladder access with access decks



Allround O-side part: Toe board, lift-off preventer, handrail and knee rail all in one

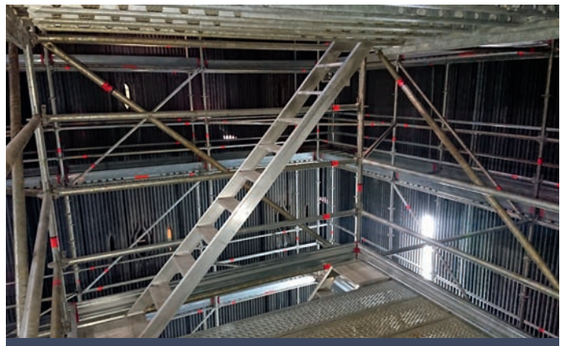


Internal ladder access with scaffolding access ladder and side protection at the work level

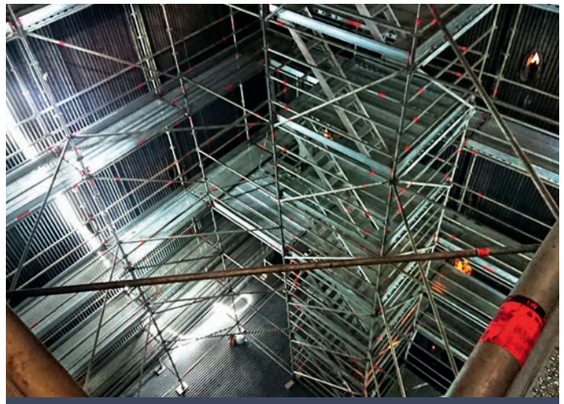
4.3.2. Platform stairs

- Most compact form of stair access
- Platform stairs can be integrated into work scaffolding or built as free-standing stairtowers
- Using a 2.21 m long Allround standard allows an Allround modular stairtower to be built, with the individual storeys being preassembled on the ground and then positioned level by level onto the finished stairtower using a crane
- A particularly compact aluminium stairtower with a width of 45 cm is available specifically for using material and transporting it through narrow manholes

Alternating Allround modular stairtower at a silo



45 cm wide platform stair especially for using and transporting material through manholes



Platform stairtower with 45 cm wide platform stair in unidirectional version

Alternating stairtower in suspended version

4.3.3. Stairtowers 200, 500 and 750

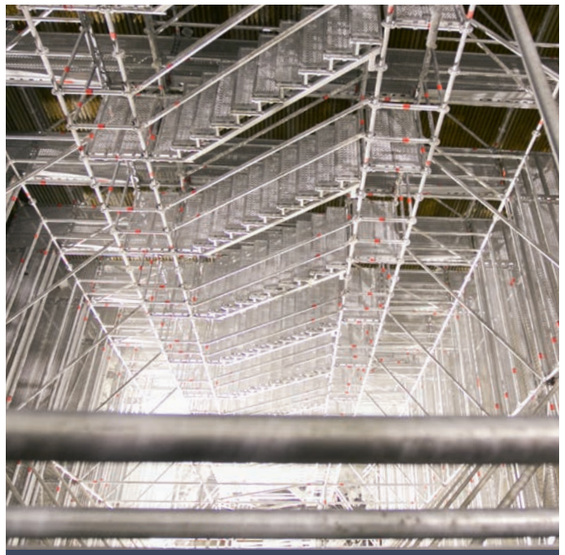
- Upward and downward accesses, for indoors and outdoors
- Thanks to their modular design, the weights and the volumes of the individual parts are low, assuring rapid and hence economical assembly and dismantling
- The high proportion of standard Layher Allround material also contributes to higher efficiency
- There is the right stairtower variant for every requirement

Stairtower 200
Permissible load capacity: 2.0 kN/m² with a stair flight width of 1.09 m or 1.29 m
Riser s = 20 cm
Tread a = 24.1 cm; undercut u = 7.9 cm
10 steps per stair flight
As guardrails only the handrail and intermediate rail are fitted.
They are constructed with Allround diagonal braces.

Stairtower 500
Permissible load capacity: 5.0 kN/m² with a stair flight width of 2.07 m
Riser s = 20 cm
Tread a = 27.5 cm; undercut u = 4.5 cm
9 steps per stair flight
Special stair guardrails with child-safety vertical sections are used as guardrails.

Stairtower 750
Permissible load capacity: 7.5 kN/m² with a stair flight width of 2.07 m
Riser s = 16.6 cm
Tread a = 31.0 cm; undercut u = 1.0 cm
8 steps per stair flight
Special stair guardrails with child-safety vertical sections are used as guardrails.

- The compact standard parts are a major advantage. They permit **transport of material through narrow manholes**.



Stairtower 200 for scaffolding inside a boiler

Compact and lightweight parts permit transport of material through narrow manholes

4. Solutions

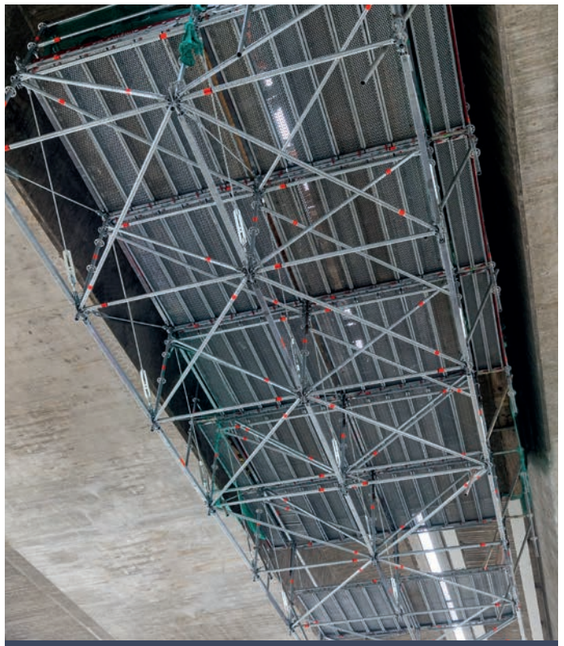
4.4. SUSPENDED SCAFFOLDING SOLUTIONS

4.4.1. Layher Lightweight

- **Considerable weight reduction** compared with earlier generations
- The integrally cast spigot permits the transmission of tensile forces and hence **use in standard and suspended scaffolding**
- Since a special standard is not needed for suspended scaffolding, component variety is reduced and there is **no risk of mix-ups at the site.** This also improves economic efficiency.

Allround Standard LW with integrally cast spigot

Suspended scaffolding on steel beams of an industrial installation



Mobile suspended scaffolding using Allround lattice beams

Suspended scaffolding on pipeline – attached using chains with suspended scaffolding adapters

Suspended scaffolding structure on pipeline

Assembly of mobile suspended scaffolding on rails

Suspended scaffolding adapter on pipeline

4.4.2. Suspended scaffolding structures

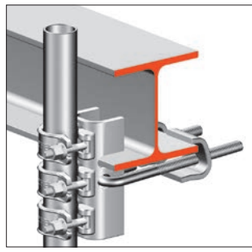
When the work areas are very high up, standard scaffolding structures can often be uneconomical due to high material and labour costs. With Allround Scaffolding, suspended solutions can be achieved without any problem in such cases. Pull-resistant securing of the standards with hinged pins or by bolting them together allows forces to be optimally transmitted.

- Suspended work scaffolding can also be designed mobile – enabling it to be moved to keep pace with building progress
- Mobile scaffolding can be mounted both on ballasted structures with wheels and on rails
- Material savings, fewer restrictions on operation of the equipment plus reduced downtimes considerably increase efficiency

4. Solutions

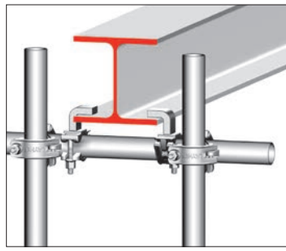
4.4.3. Suspended scaffolding accessories

A comprehensive product range of accessory parts is available for suspension of the scaffolding structures.



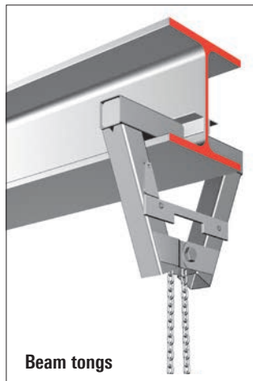
Suspended scaffolding coupler

- For scaffolding tubes of 48.3 mm
- Three riveted-on half-couplers ensure a permissible load of 15 kN



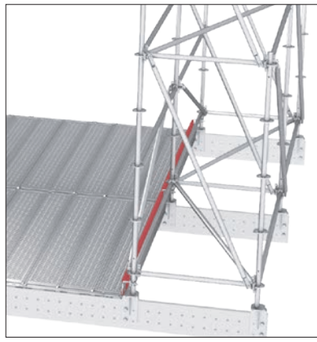
Clamping coupler

- For scaffolding tubes of 48.3 mm
- Permissible load 9 kN per coupler



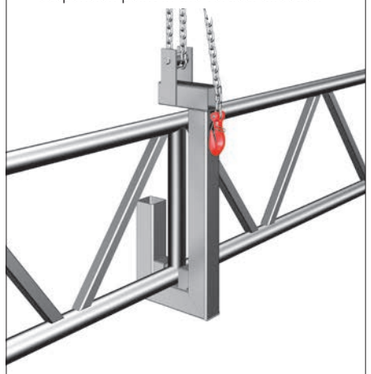
Beam tongs

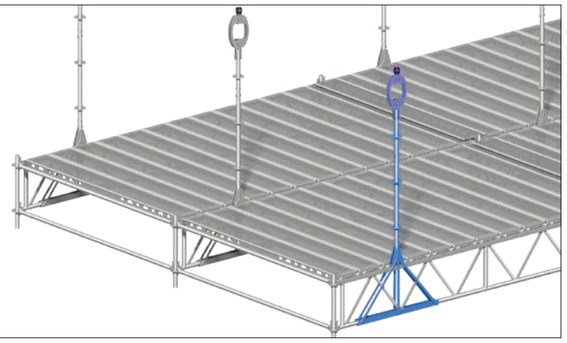
- For fastening to I-beam
- The suspended structure with load hook can be subjected to a load of max. 15 kN per suspension point in the vertical direction



Aluminium FlexBeam

- Alternative to structures made from lattice beams, particularly where the vehicle headroom is restricted
- Has a bending load capacity about 40% higher when compared with the Steel Lattice Beam 450 often used, permitting larger support and suspension configurations



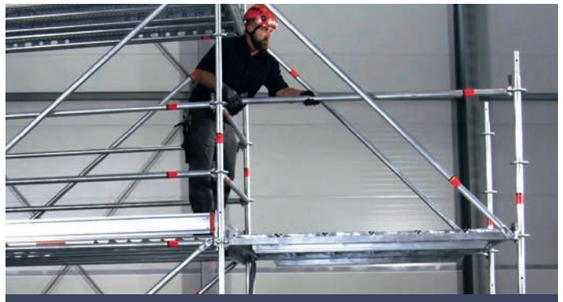


Lattice beam shoe

- Special suspension option for the use of birdcage scaffolding made from lattice beams in conjunction with standard decks
- Suspension on the structure is achieved with coarse-threaded rods

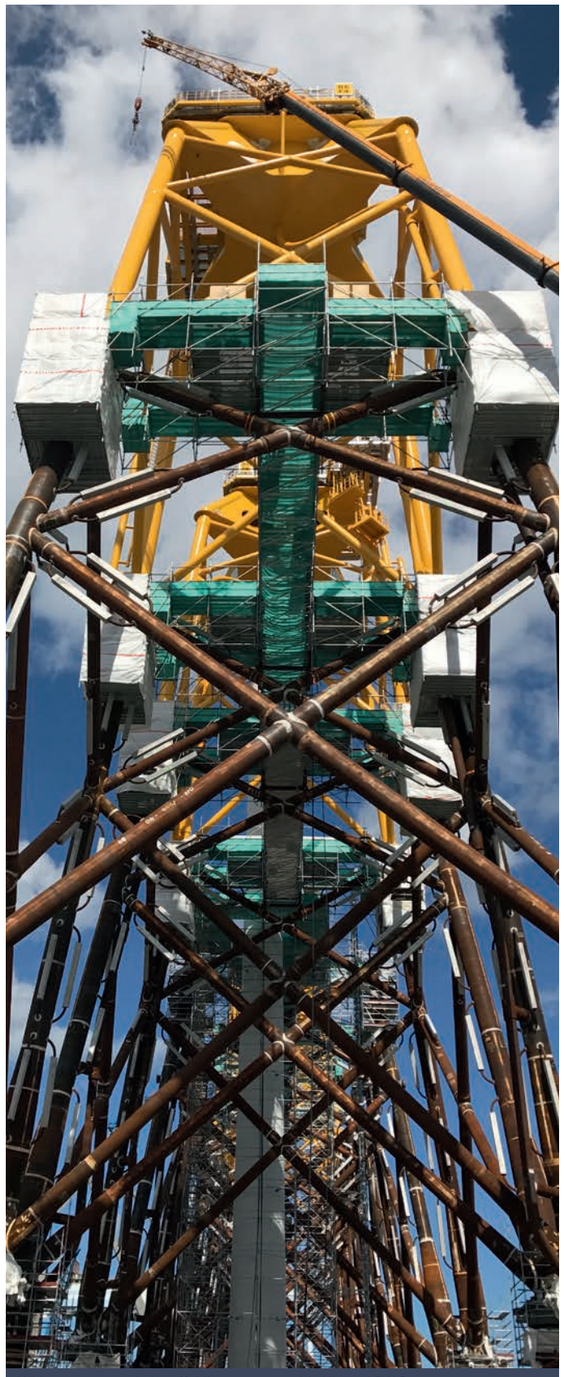
4.4.4. Cantilevering and crane movability

- Allround Scaffolding and the Allround FW System can be assembled using the cantilever method
- To achieve large spans while ensuring high load capacities, suspended scaffolding solutions can be supplemented with the FW System
- System fully integratable into Allround Scaffolding
- Alternatively, preassembly on the ground is possible, with the structure then being lifted into place by crane on the spot



Allround Scaffolding using the cantilever method

Crane movement of a suspended FW System structure



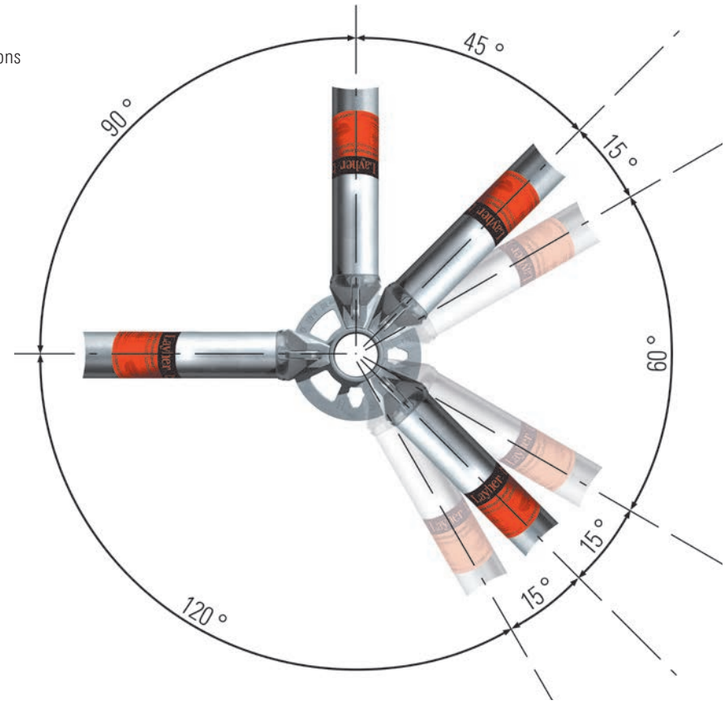
Wide-span suspended scaffolding structure with Allround FW System

4. Solutions

4.5. CIRCULAR SCAFFOLDING

4.5.1. Flexible angle selection of Allround rosette

- The four narrow openings in the rosette automatically centre the ledgers in the correct dimensions and at right angles
- The four wide openings permit alignment of ledgers and diagonal braces with the angle required
- This allows even circular scaffolding to be assembled flexibly and quickly within the system
- The design of the Layher Allround wedge head permits central load introduction into the standard



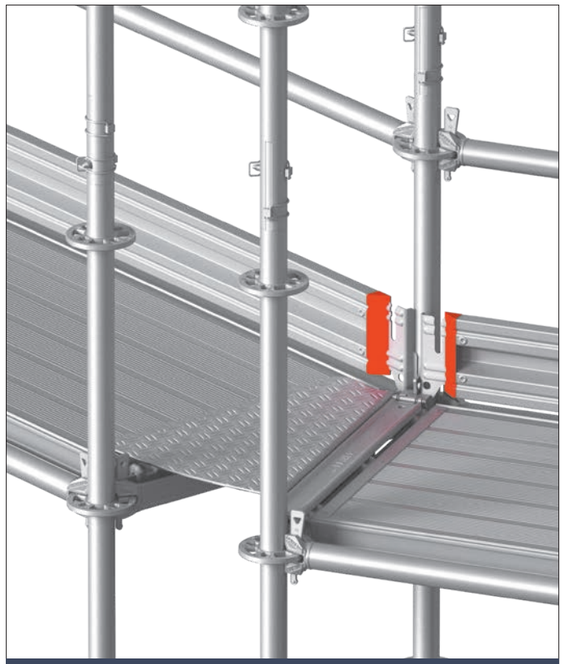
4.5.2. Work surface adaptation for circular scaffolding

In circular scaffolding, closing the gaps often presents a challenge. Decking with steel or wooden planks can, depending on the requirements placed on the surface, be classed as a tripping hazard. What's more, they have to be safeguarded against unintentional lift-out and slippage, which can be a problem depending on the type of deck used. Layher has the solution:

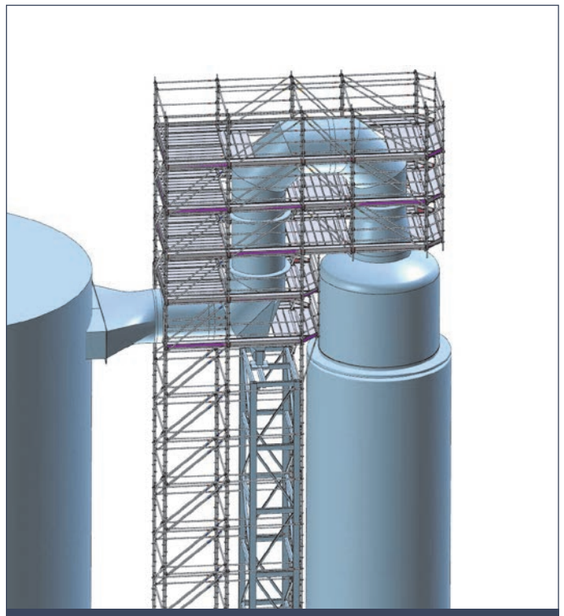
- Variable corner deck made of steel for up to 30° circular scaffolding with a bay width of 0.73 m and 1.09 m
- The level is secured in the standard version by the Allround lift-off preventer
- For implementation with a single inner standard, the U-ledger LW 0.73 m, 15° – 44°, is available

As an alternative to the U-corner deck, circular scaffolding can also be constructed conventionally by laying steel planks.

- Lift-out and slippage prevented by use of the Layher locking screw
- In connection with integrated accesses, special access decks with off-centre hatches are available, allowing steel planks to be laid without blocking them



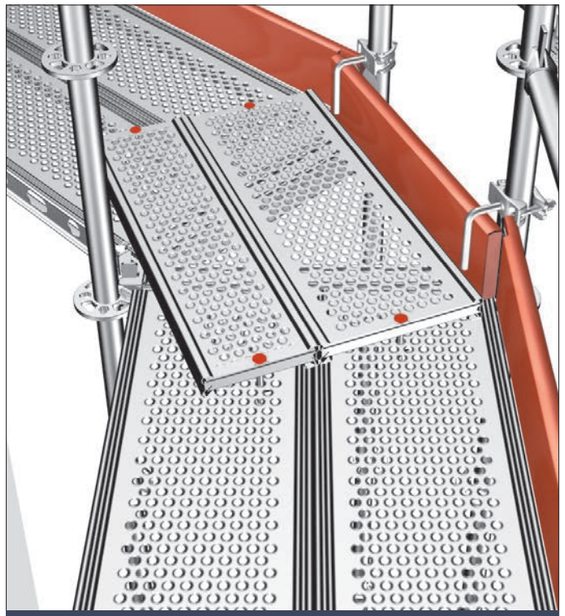
Circular scaffolding with two inner standards and one outer standard – decking with the U-corner deck for circular scaffolding



From digital planning ...

... to the finished project

Circular scaffolding with Allround Scaffolding on a refinery column



Inexpensive circular scaffolding solution with decking using steel planks

4. Solutions

4.6. BRIDGING

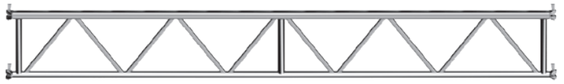
Bridging using Allround standard parts

4.6.1. Allround Scaffolding standard parts

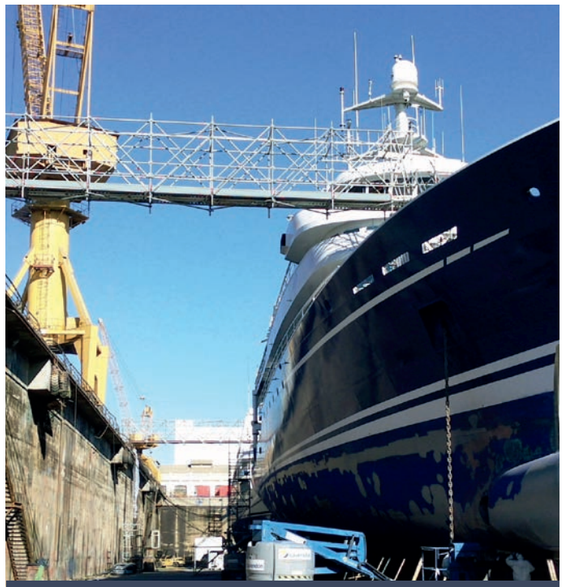
- Small spans are possible with Allround Scaffolding without the use of additional components, using standards, ledgers and diagonal braces as a lattice structure

4.6.2. Lattice beams

- Comprehensive range of type-tested lattice beams for bridging with small to medium loads
- Designed for connection using scaffolding couplers
- Alternatively, Allround system lattice beams are available
- The integrated U-sections on the top chord permit decking using standard scaffolding decks within the system



Bridging using Allround system lattice beams



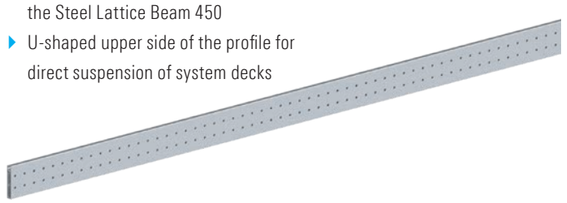
Bridging using Allround standard parts

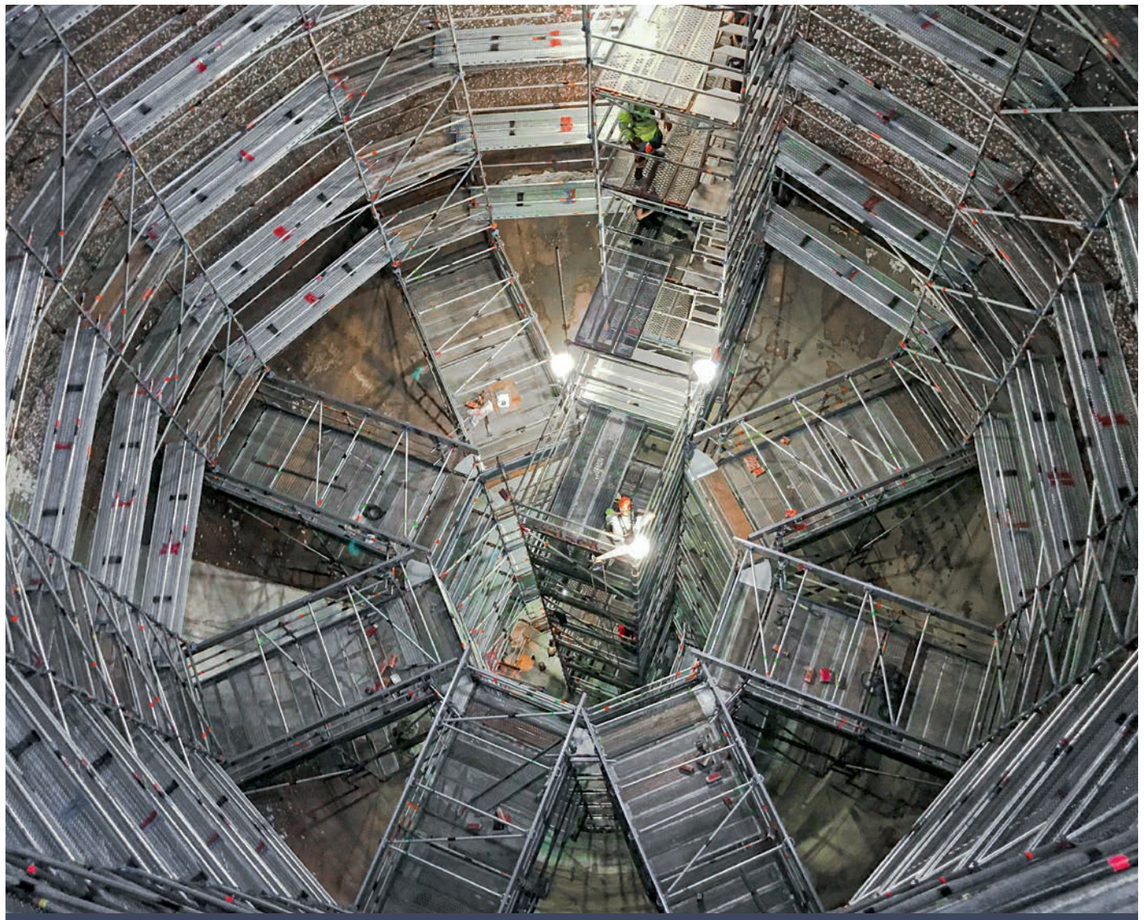
Bridging with Steel System Lattice Beams 450 LW from the Layher accessories range

Bridging with Aluminium FlexBeam for scaffolding inside a boiler

4.6.3. Aluminium FlexBeam

- Alternative to lattice beam structures
- Can be used as suspended structure or standard
- Full system integration
- Low height
- About 2.5 times higher bending load capacity than with the Steel Lattice Beam 450
- Shear load capacity up to 7 times higher than with the Steel Lattice Beam 450
- U-shaped upper side of the profile for direct suspension of system decks





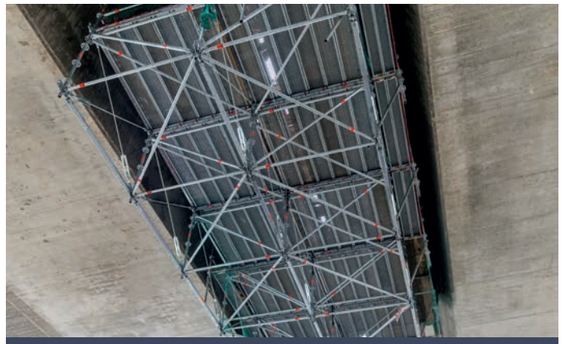
Full view of scaffolding inside boiler with the Aluminium FlexBeam

4. Solutions

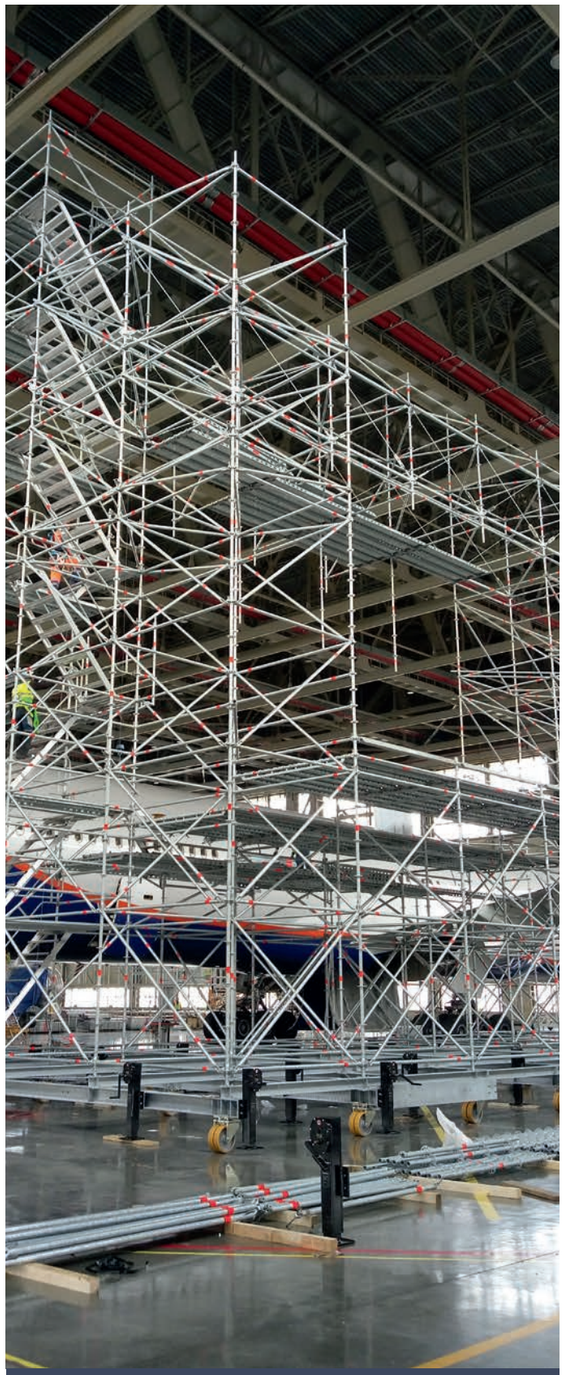
4.6.4. Allround FW System

- For bridging larger spans or for bracing of higher loads
- Structurally and dimensionally integrated into Allround Scaffolding
- Modular design ensures efficiency in both transport and assembly
- Bolt-free connection technologies and low weight of individual parts of max. 19 kilograms
- Can be assembled using cantilever method
- Wide variety of applications: wide-span work platforms, bridging and projections in work scaffolding, support beams, projecting arms, suspended structures

Birdcage scaffolding with Allround FW System inside a building – the floor area remains free, allowing normal work to continue



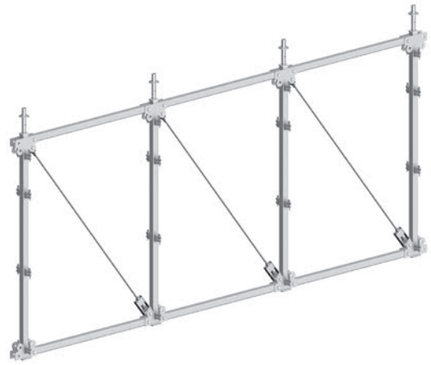
Mobile suspended work platform with Allround FW System

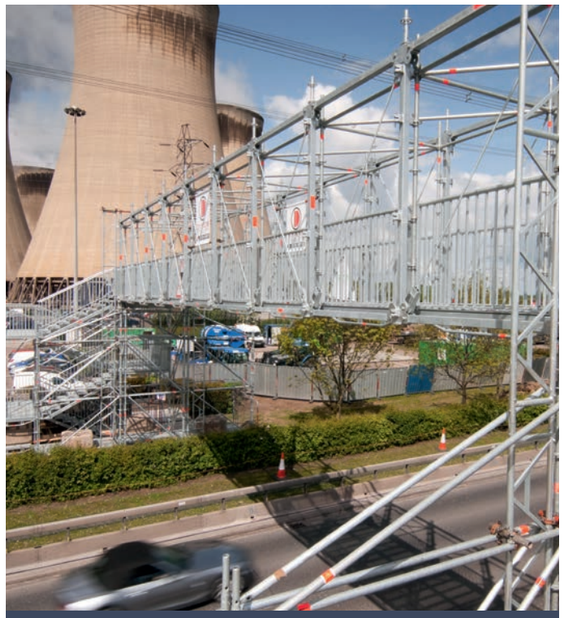


FW System bridging at an aircraft maintenance dock for a Boeing 777

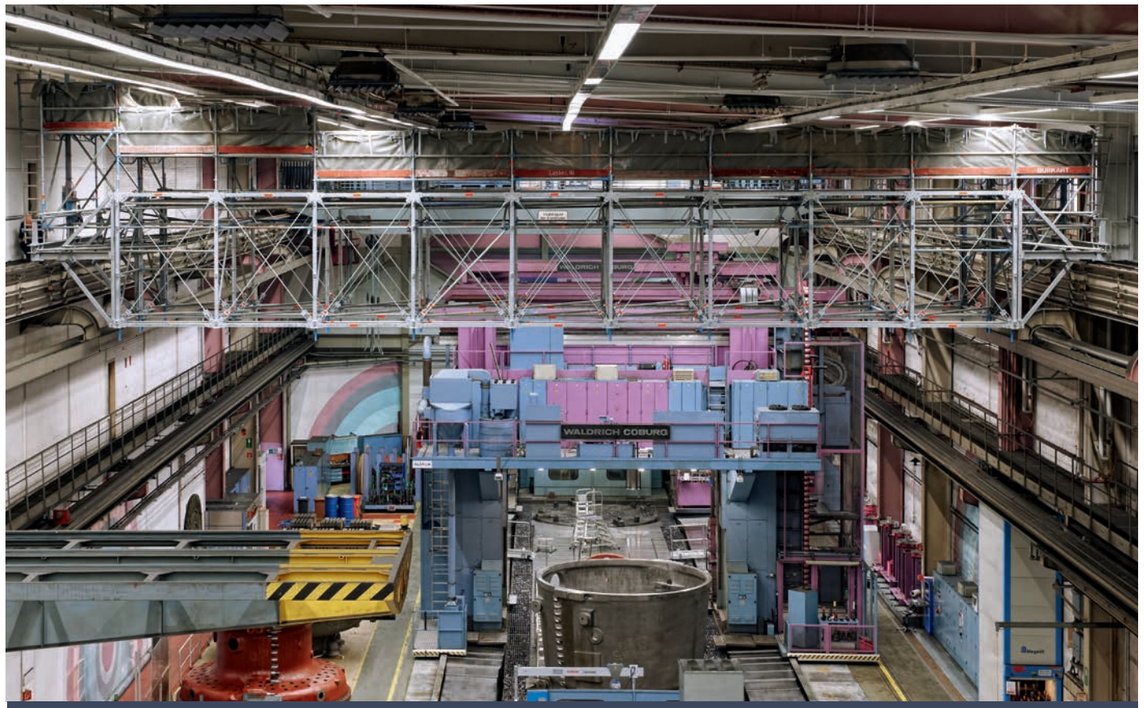
4.6.5. Allround Bridging System

- With Allround Scaffolding and the Allround Bridging System, self-supporting work scaffolding can be built to span a production hall, for example
- Mobile mounting on rails with flanged wheels can be provided
- Preassembly of complete bridge structures on the ground is possible, followed by lifting into place using a crane
- Ideal for temporary bridging too





Temporary pedestrian bridge as personnel entrance to a power station



Mobile work platform at a corner of a hall – the floor area remains free, allowing operation to continue. Crane movability reduces the use of materials

4. Solutions

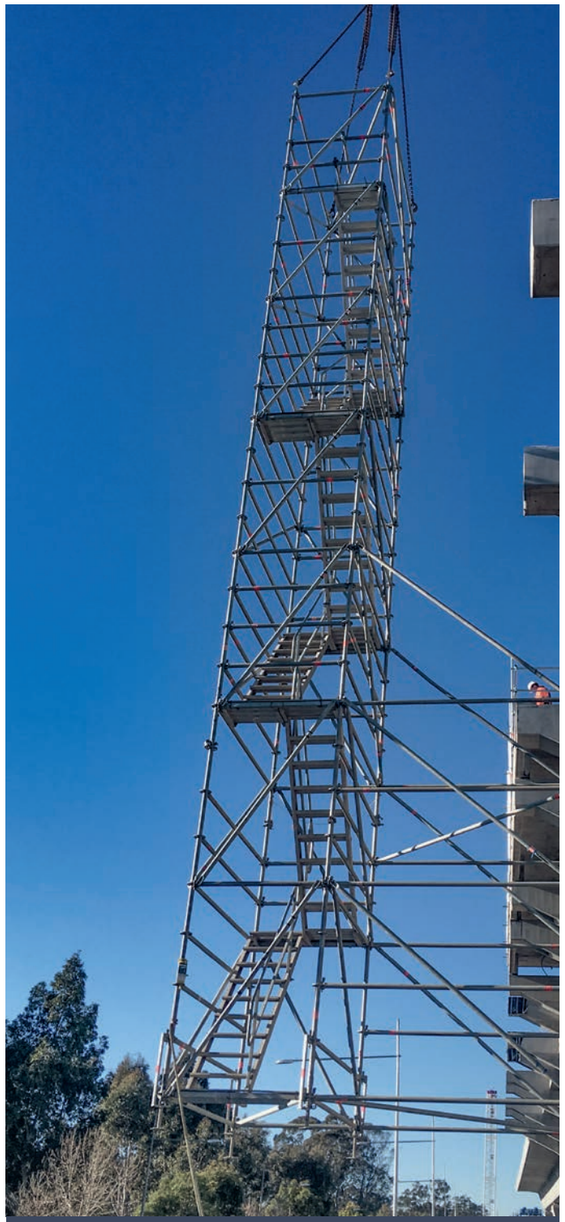
4.7. CRANE MOVABILITY

The high fitting precision in the Layher system enables scaffolding structures to be preassembled on the ground, complete or in individual segments. Thanks to pull-resistant connection of all individual parts, they can be moved quickly and easily into position using a crane. This is a major advantage when it comes to efficiency and profitability. At the same time, safety during assembly increases many times over. Because the best fall protection is when there is no risk of falls in the first place.

4.7.1. Stairtowers

- Stair accesses such as the Allround modular stairtower can be moved by crane, either complete or level by level
- This is made possible by pull-resistant pinning of the standard joints
- The result is maximum safety and profitability

Unidirectional Allround modular stairtower during crane emplacement



Alternating Allround platform stairtower with supporting bay

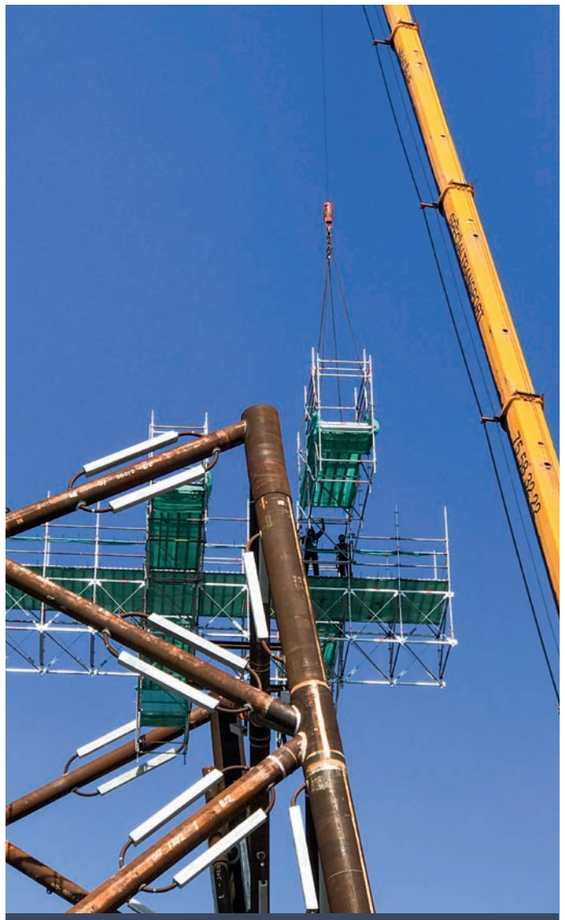
4.7.2. Work Scaffolding

- Both complete scaffolding structures and segments of work scaffolding can be moved by crane

Rail-mounted mobile work scaffolding during crane movement

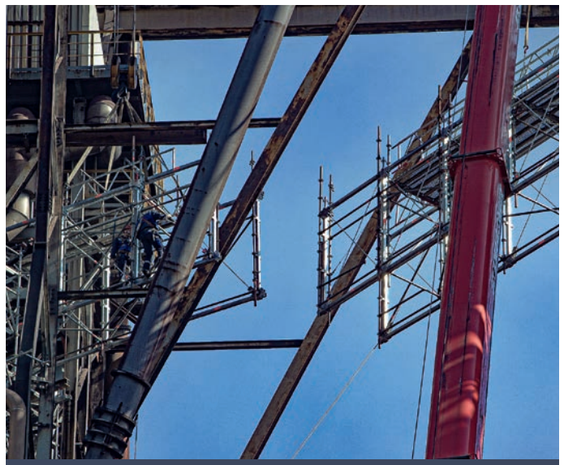
4.7.3 Bridging

- Bridging for footpaths and pipelines can be lifted into place by crane, either complete or in segments
- The same applies for bridging used for bracing work scaffolding built using the Allround FW System or for very large spans and loads using the Allround Bridging System



Self-supporting suspended scaffolding preassembled on the ground with the Allround FW System

Footbridge preassembled on the ground with Allround Bridging System during crane positioning



Bracing for a wide-span work scaffolding at an industrial plant

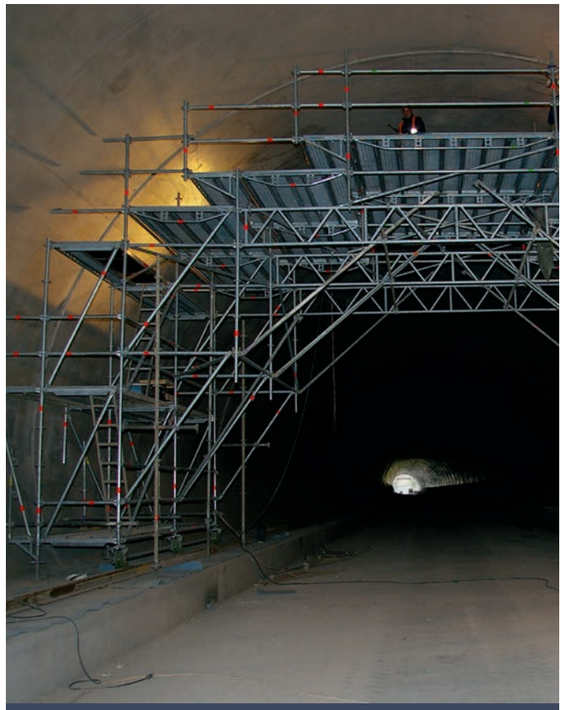
4. Solutions

4.8. ROLLING TOWERS

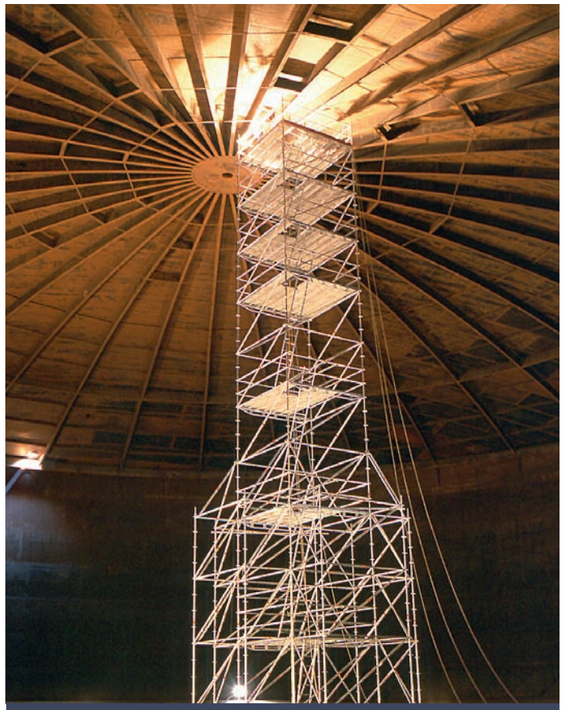
4.8.1. Allround Scaffolding

- Permits the building of complex rolling structures
- Adaptable to any geometry
- Combination option with aluminium platform stairs for more ergonomic access

Mobile aircraft maintenance scaffolding with integrated platform stair



Rolling tower made with Allround Scaffolding for work on walls and ceilings



Mobile internal scaffolding inside an oil tank

4.8.2. Uni Rolling Towers / SoloTower

- A few parts for many assembly variants (modular principle)
- Lightweight and handy system components made of aluminium, quick and easy to fit
- High stability up to a working height of nearly 14 metres
- Assembly and dismantling from a secured level thanks to Safety Assembly P2
- SoloTower can be assembled by just one person
- High degree of safety is assured by the 3T method (Through The Trapdoor)

Uni Wide P2 for work on overhead lines in the rail industry

SoloTower

Uni Light P2

Assembly of SoloTower using 3T method

4.9. ROOFS AND WALL SYSTEMS

The extensive Layher range of protective systems extends from compact weather protection roofs to wide-span roof solutions and enclosure systems which can be kept at a lower pressure.

4.9.1. Roof systems

Catering for all the usual requirements, Layher has various systems in its range.

Keder Roof XL

- Lightweight aluminium components with integrated Keder rails
- Can be assembled without a crane
- For spans up to about 30 m

Layher Cassette Roof System

- Roof trusses made from hot-dip-galvanised steel, covered with corrugated-sheet cassettes
- Walk-on system
- Rapid opening of the roof by removing single cassettes to allow supply of material to the site using a crane
- Preassembly on the ground, emplacement by crane
- For spans up to about 30 m

The Layher Weather protection roofs can be designed movable if required. This offers a major advantage particularly when it is sufficient to roof only some sections of the site.

Mobile Keder Roof XL at a food processing plant

Cassette Roof for temporary shipyard hall

Keder Roof during maintenance of an oil tanker

4.9.2. Wall systems

- Inexpensive scaffolding tarpaulins, fastenable with tarpaulin ties or T-ties
- Alternatively, Keder rails can be fitted to the work scaffolding in order to provide it with Keder tarpaulins

Protect System

- Reusable and effective enclosure system
- Full system integration
- Thanks to rubber sealing sections it can maintain a low pressure, preventing blasting material from getting out

In conjunction with Layher weather protection roofs, temporary halls can also be put up in a short time. The major advantage: the building characteristics mean that lengthy approval procedures are not needed as a rule.

Protect System for maintenance work in a power station

Temporary hall with Cassette Roof and Protect System

Temporary hall with Cassette Roof and Protect System

Temporary ferry terminal gangway

4. Solutions

4.10. SHORING

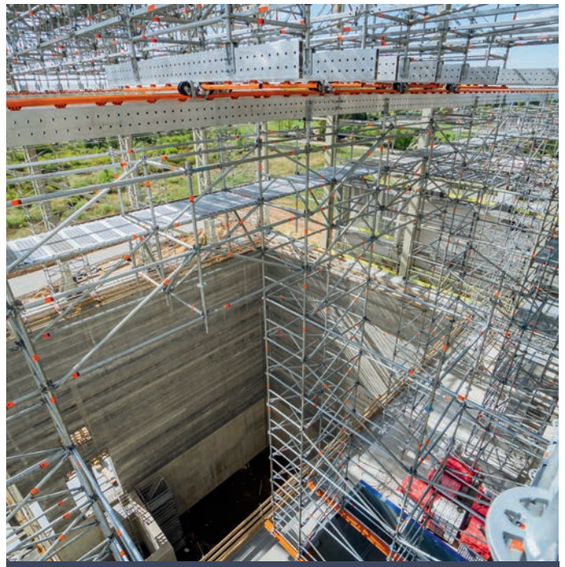
Shoring TG 60 at an outflow funnel of a pumped storage power station

Shoring structures are an important factor in ensuring more safety and efficiency for in-situ concreting work, particularly when building new plant.

4.10.1. New plant construction with Allround Shoring TG 60

- Permits the absorption of heavy loads – particularly high loads can be handled by combining standards or frames
- Flexible bay lengths ensure a more economical use of material and a match to any local conditions
- Supporting structures for concreting work on massive floors can be constructed easily, quickly and safely

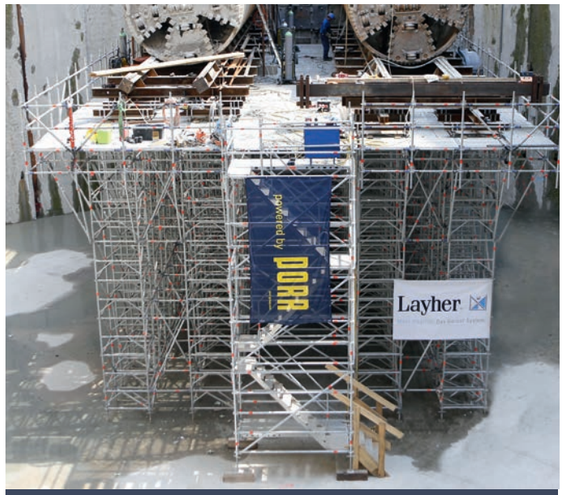
Shoring TG 60 for building of a new sewage treatment plant



Shoring TG 60 in combination with the Aluminium FlexBeam and the Allround FW System when building a new industrial plant

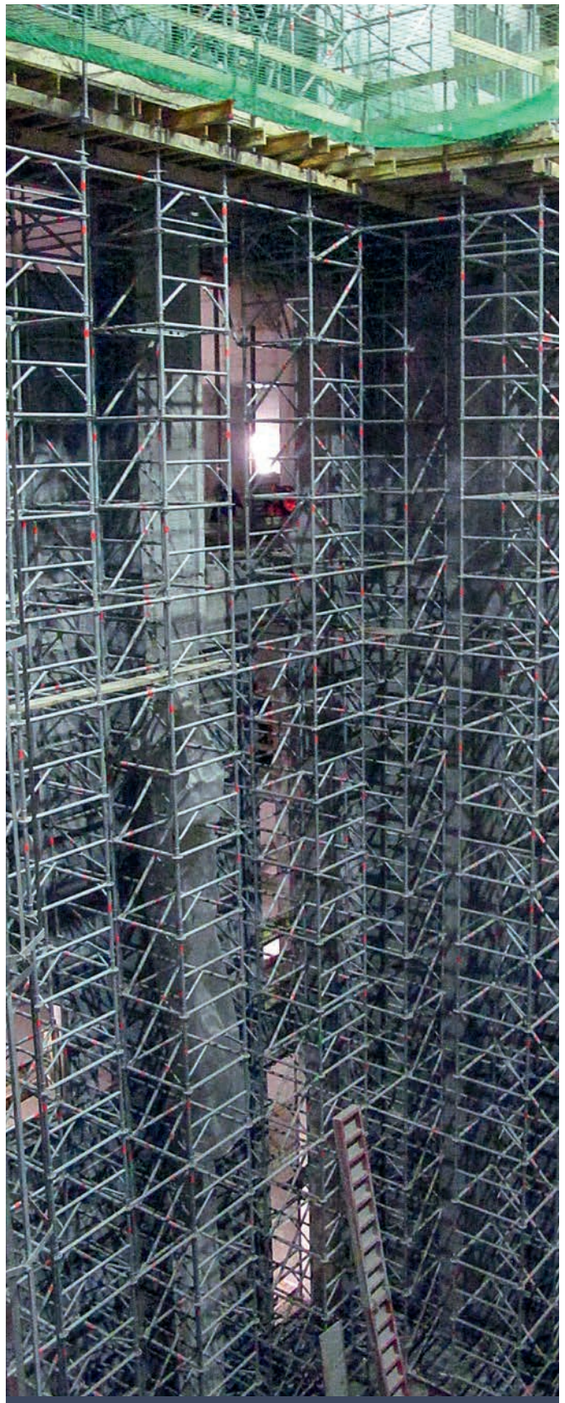
4.10.2. New plant construction with Allround Scaffolding

- As an alternative to Shoring TG 60, shoring can also be flexibly adapted using Allround Scaffolding to any local conditions
- The load-bearing capacity can be increased by combining standards



Load platform made of Allround Shoring TG 60 with integrated platform stairtower for setting down the drill heads

Shoring made using Allround Scaffolding with combined standards and a passage opening for vehicles



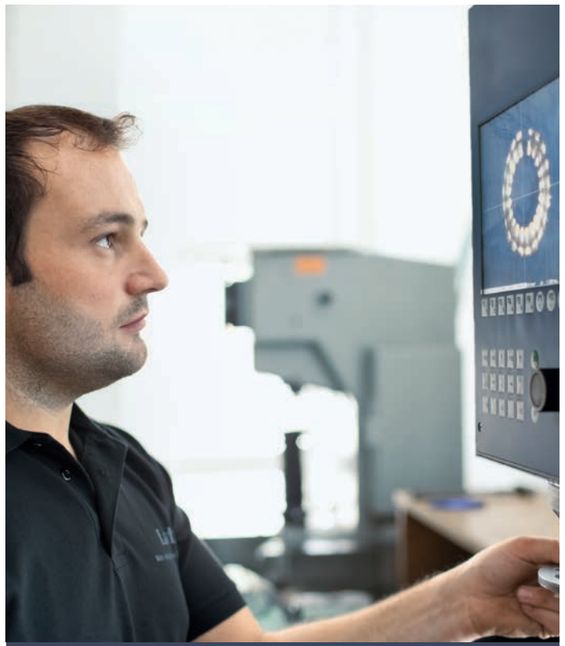
Shoring TG 60 during construction of a pumped storage power station

5. SAFETY AND DOCUMENTATION

5.1. 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

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.

5.2. INTERNAL AND EXTERNAL MONITORING

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
- 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

5.3. 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 Allround 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

Certificate 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 and aluminium

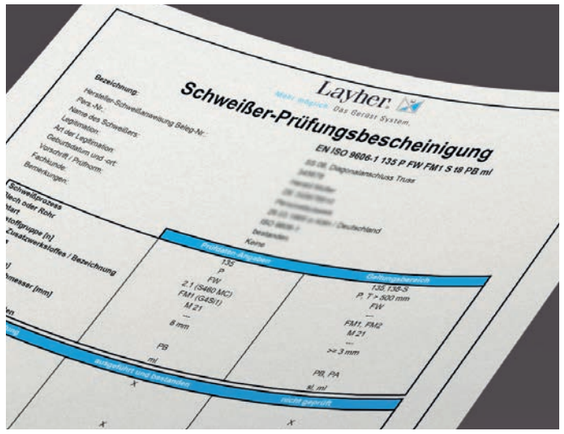
Certificate for the Allround modular system in steel

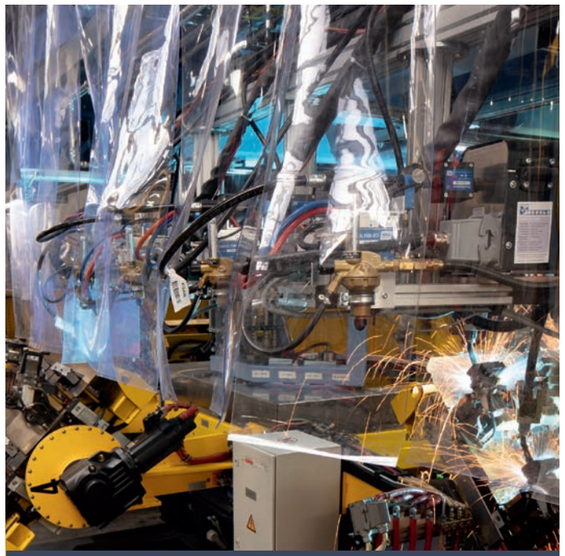
Further approvals and certificates worldwide.
In a number of countries the listed approvals or certificates are also accepted.

5. Safety and documentation

5.4. WELDING TECHNOLOGY

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



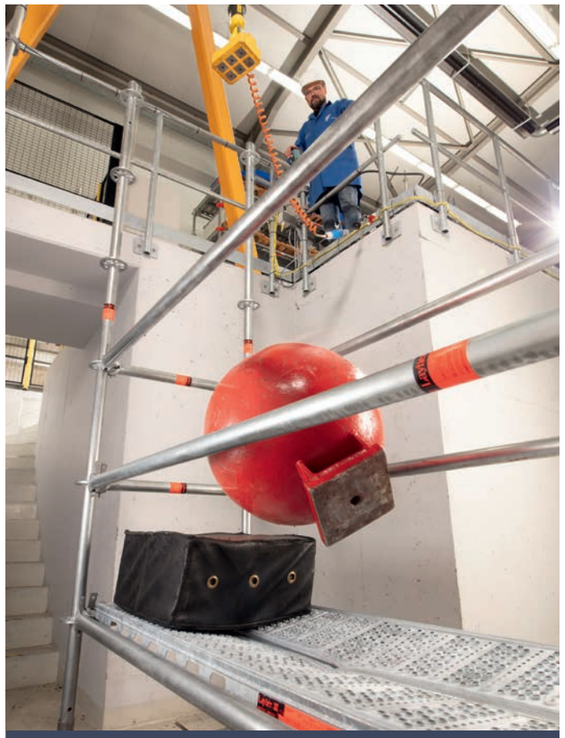

Robot and automatic production

5.5. 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

5.6. TECHNICAL DOCUMENTATION

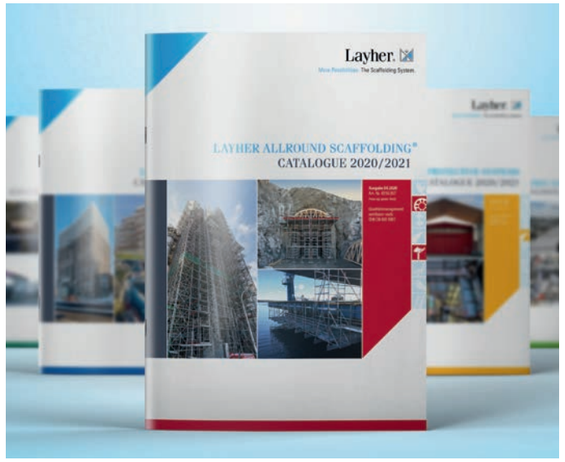
For planning certainty, extensive technical documentation is available for Layher scaffolding systems:

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

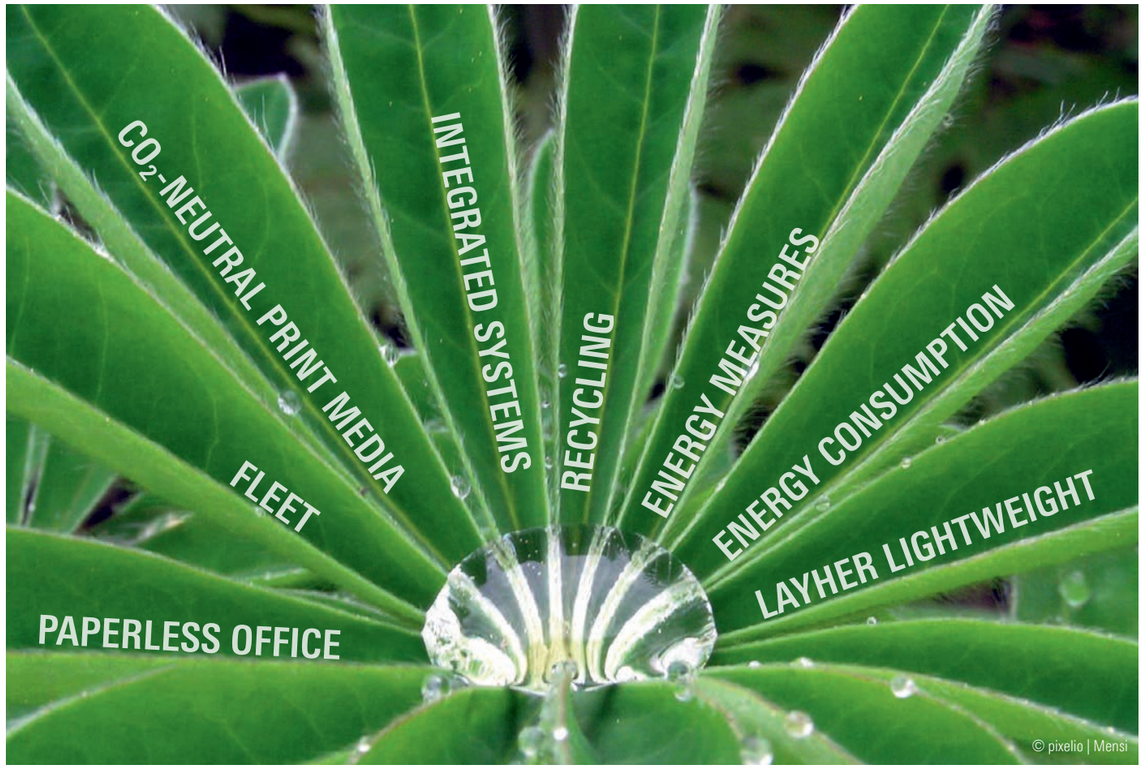
5.7. CATALOGUES AND PRICE LISTS

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



6. SUSTAINABILITY AT LAYHER



We have always acted with great awareness and attention to economic and ecological sustainability, both in our products and in our processes.
We are also focused on our social responsibility towards employees, clients and society as a whole.

As dependable employers, the economical use of production equipment and resource-preserving production processes forms the basis of our thinking, with the goal being sustainable action. This means that we ensure our production facilities are built sustainably, using roof greening and photovoltaic systems. Thanks to production of Layher products exclusively at its sites in Gueglingen-Eibensbach, there are no long transport routes for its goods, considerably reducing CO_2 emissions.

The topic of sustainability is embedded in the entire company organisation with the Layher Energy Management Team. The basis for all measures is the German standard DIN EN ISO 50001. This standard stipulates the requirements relating to the use and consumption of energy. The main factors here are the areas:

PROCESSES

MEASURES

PRODUCTS

SUSTAINABILITY IN PROCESSES

Energy efficiency 10-year goal
- 10% lower energy consumption per unit produced.

Selected location and production facilities
- Short distances between the locations plus selective planning in production reduce CO_2 emissions.

Suppliers
- The selection and acquisition of raw materials are also ecologically sustainable at Layher. Only those suppliers also having ISO certificates are carefully selected.
- Machinery is selected that has the highest energy efficiency class.

Production
- New technologies and efficient processes in production ensure preservation of resources plus top product quality.
- The standard for new buildings is energy efficiency class KfW 55.
- Innovative heating systems, a combined heat and power plant and heat recovery of an air compressor ensure sustainable regulation of the room temperature in various building parts.

SUSTAINABILITY BY MEASURES

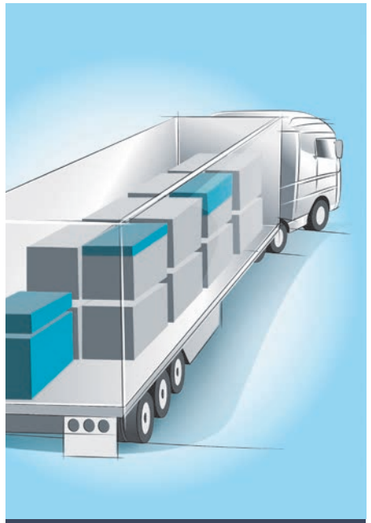
Reduction of energy consumption
- Targeted building refurbishment measures, including regular roof repairs or the replacement of roll-up doors with faster and more innovative products, mean that unnecessary heat losses can be prevented.
- In the long term, lower energy consumption will be achieved by replacing the bulbs in LED lights and by regular adaptation of IT.

Fleet
- Diesel-powered fork-lift trucks are being replaced by electric ones.

Energy measures and renewable energies
- Photovoltaic systems and green spaces are included in new building plans.

Recycling
- Wood waste generated during the manufacture of toe boards is used as an energy source in the drying chamber in the same manufacturing process.

Deliberately paperless / paper-saving office and CO_2-neutral production of all print media, brochures and price lists.


Better use of capacity – fewer transport trips

SUSTAINABILITY IN PRODUCTS

Integrated systems
- Newly purchased components can be combined and used with existing material stocks.
- Lasting value thanks to long life of the products.
- Approvals cover different system generations.

Layher Lightweight
- Using high-tensile steel grades enabled us to reduce the weight of the scaffolding components considerably. Up to 15% lower transport weight.
- This allows better use of truck capacities – reducing CO_2 emissions.

Solution-oriented products
- The reusable Layher protection systems for enclosures and site security.
- Use of tarpaulins and their disposal can be dispensed with.

Food factory, Kilkenny, Ireland

Cement works, Germany

Paper factory, Ilim, Russia

Power station, Duvha, South Africa

IDEAS. SOLUTIONS. POSSIBILITIES.

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 **www.scaffoldingstories.com**

7.1. FOOD FACTORY, KILKENNY, IRELAND

Whenever the name Kilkenny is heard outside Ireland, regular pubgoers at least will first think of the beer of the same name. Kilkenny is however also a city and county in the south-east of Ireland, and famous to insiders for its dairy production. In Waterford – about 50 kilometres south of Kilkenny – the nutrition company Glanbia is building a new dairy, which presented the scaffolding professionals at Skyline Scaffolding Ltd. with an unusual challenge. For welding the big new tanks on site, a free-standing temporary hall of 1,645 m² in size, including a movable roof with a free span of 26 metres, was to be built for protection against the weather. The Irish scaffolding experts were able to meet these requirements more economically and more safely with a combination of Allround support scaffolding and the Keder Roof XL.

Learn more at: **www.scaffoldingstories.com/Skyline**

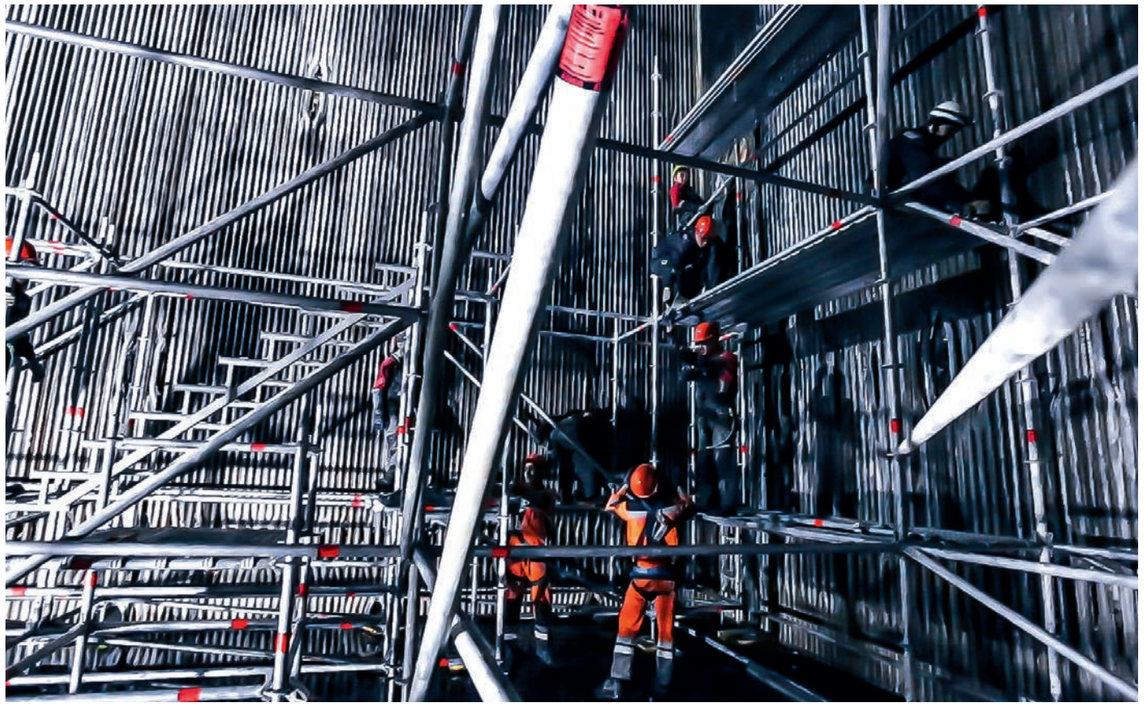
The roof of a temporary hall for assembling tanks independently of the weather was built using the Keder Roof XL from Layher in the reinforced bracing variant with a free span of 26 metres – and without a tie. This secured the clear height needed by the tanks. The substructure made from Layher's flexible Allround Scaffolding ensured an economical implementation of the site requirements, such as a walkway at the eaves level for moving the roof trusses – using standard components.

7.2. PAPER FACTORY, ILIM, RUSSIA

With professional planning software, and with material logistics planned out to the last detail, the scaffolding was assembled efficiently on a surface area of 80 m² with a work platform 40 metres up for repair work on the inner wall of the boiler.

The challenge was to have precisely the right parts available at precisely the right time inside the boiler, allowing the tight schedule to be met and work to be done economically. Standard by standard, ledger by ledger and deck by deck, the required Allround material was passed up by hand through the narrow openings. It was very helpful – not just for that reason – that the Allround Lightweight parts used are considerably lower in weight compared to other products. The assembly of safer Layher stairtowers was also possible with markedly more efficiency. Even the particularly narrow parts of the installation, at the top end of the silo, were quickly and safely provided with scaffolding using standard components and a few expansion parts. Layher's customers find that even difficult ground plans can be provided with scaffolding of the standard type using the Layher modular system.

Learn more at: **www.scaffoldingstories.com/Industry01**

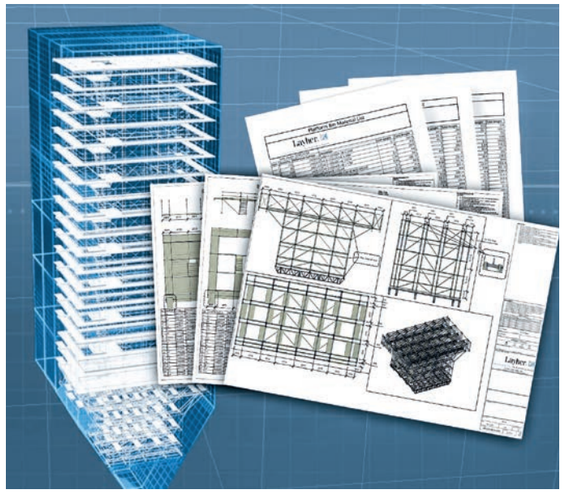


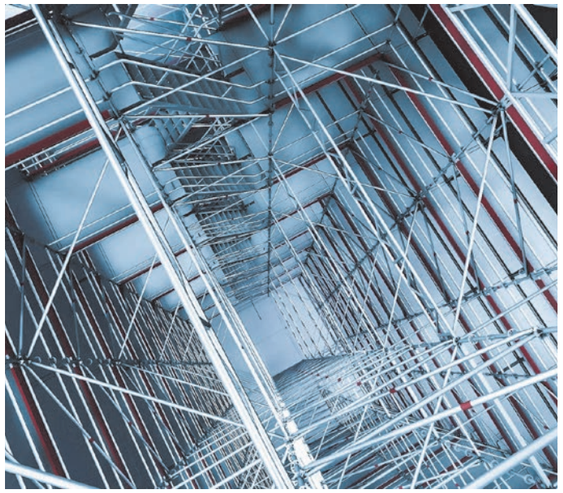
7.3. POWER STATION, DUVHA, SOUTH AFRICA

Digital planning of scaffolding projects provides transparency in all working steps and helps to improve both safety and profitability in every project. Digitalisation of process steps, using Layher SIM specifically designed for the requirements of scaffolding construction, also makes costing and implementation even more efficient and also more transparent for all the trades involved. There are multiple benefits of Layher Allround Scaffolding in its Lightweight generation for flexible and individualised scaffolding construction in industry. What this means in practice in the case of the boiler is that meaningful 3D models of the planned scaffolding were created beforehand, discussed in detail with the customer and the safety officers, and checked for potential structural challenges.

Although the company was using the Layher Allround system for the first time, the employees of Southey Contracting learned, on the spot and in a short time, to work very effectively thanks to advice and instruction from Layher South Africa's experts, meeting all the set deadlines without problem. At 94 metres high and 17 metres wide, the boiler in Duvha is a pretty imposing structure, the inner walls of which were made accessible using a total of 170 tonnes of Allround material and an aluminium stairtower. In close cooperation with Layher South Africa, the 40 metre-high scaffolding was built with 22 levels. Detailed planning using Allround Lightweight material permitted a weight reduction in the structure of 50% while increasing its load capacity. In addition, use of the Allround FW System for building over the lower and conically tapering part of the boiler enabled the creation of a material-saving yet strong base for the scaffolding structure, which also enabled work on the walls to be carried out at the same time. This allowed efficient working plus rapid assembly and dismantling, with the result that the entire maintenance phase, and hence the downtime for the facility, was reduced by 21 days, permitting considerable cost reductions for the client.

Learn more at: **www.scaffoldingstories.com/Southey**



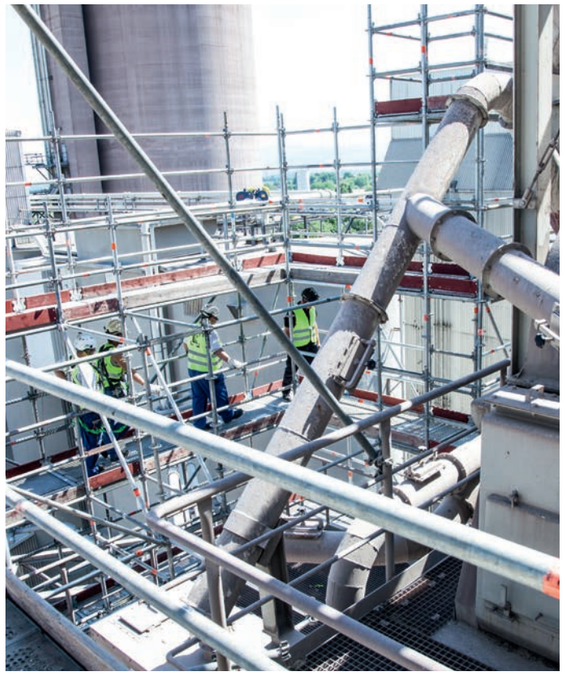


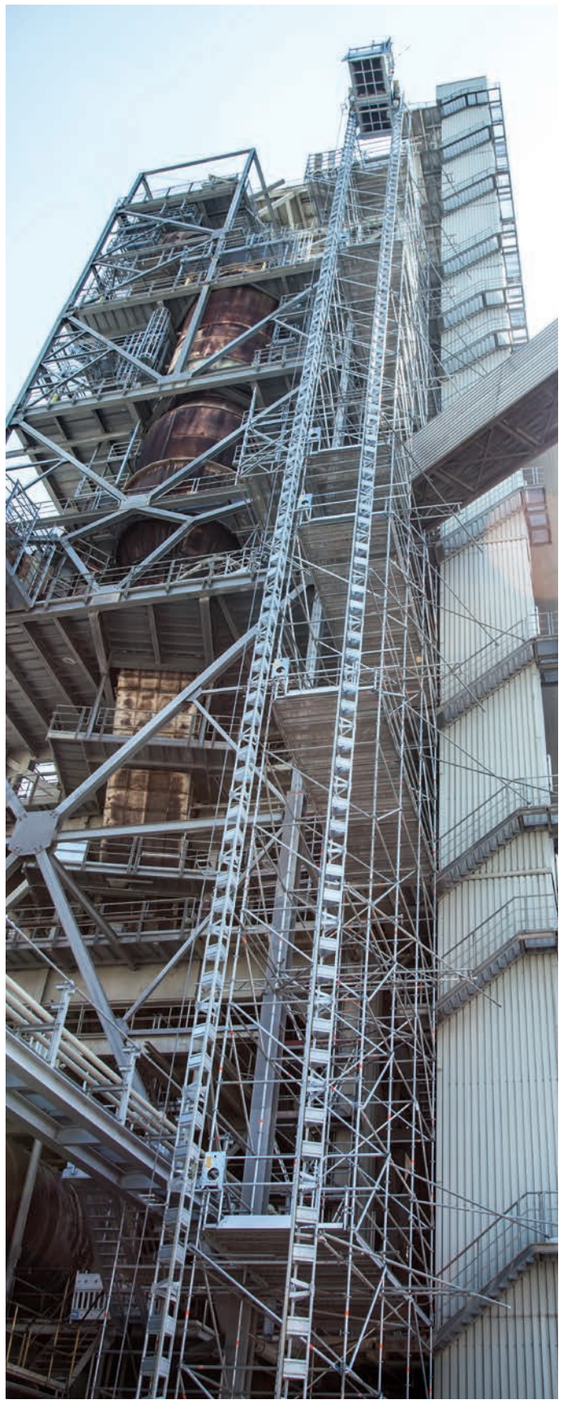
7.4. CEMENT WORKS, GERMANY

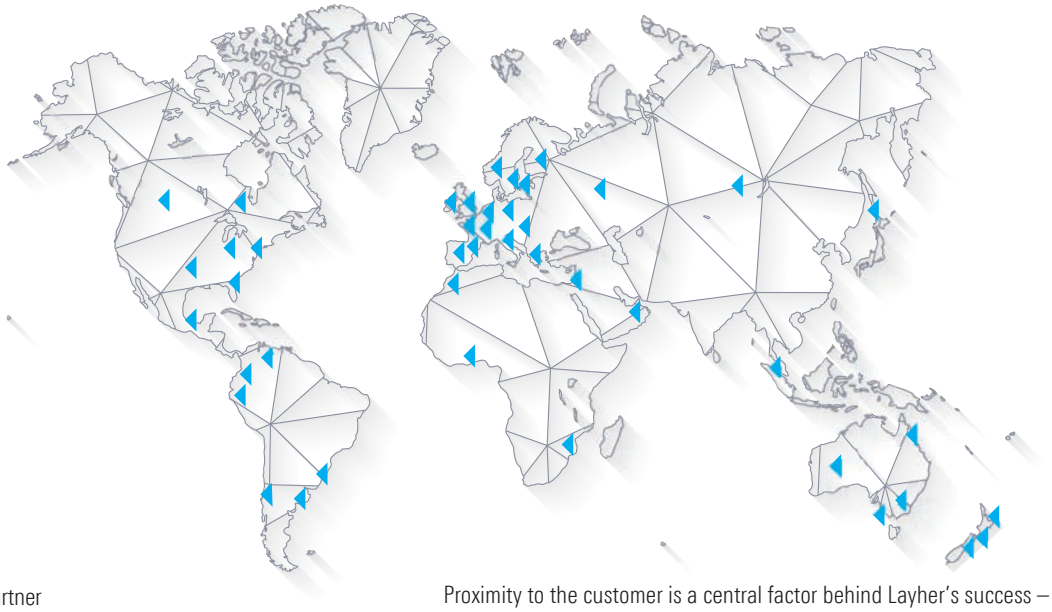
Project 1 at the site was the partial scaffolding around a material mill up to a height of about 40 metres, for inspection and later construction of an enclosure. To do so, the specialists from QuadreX had to plan and build a bridging structure using Layher's Allround Scaffolding material and lattice beams. An Allround tower was provided as a shoring structure for support. "There are a lot of trucks moving around the installation, so we have to take up as little space as possible on the ground. With our Allround material, we managed the whole thing in a very short time, saving both work time and labour costs in the end", explains the scaffolding erector. Layher Allround Scaffolding offers, with a proven combination of positive and non-positive connections and simple assembly thanks to the AutoLock function, the best starting conditions.

Project 2 was a tower for inspection of a cyclone heater and rotary kiln. "That was a real challenge for us", reports the scaffolding erector. "First we put up 90 metre-high scaffolding for the material hoist, so we could then build the scaffolding for all the pipes from the inside. We were able, thanks to the different lengths of the ledgers and decks in Allround, to work quickly and flexibly even in cramped conditions." The facility is currently back in use and the men from QuadreX are at the same time dismantling the hoist scaffolding again. The fact that temperatures of nearly 1400 °C prevail inside and directly at the kiln doesn't make this job any easier.

Learn more at: **www.scaffoldingstories.com/Industry02**







Layher is your dependable partner with more than 75 years of experience. "Made by Layher" always means "Made in Germany" too – and that goes for the entire product range. Superb quality – and all from one source.

Proximity to the customer is a central factor behind Layher's success – geographically speaking too. Wherever our customers need us, we will be there – with our advice, assistance and solutions.

- **SpeedyScaf**
- **Allround Scaffolding**
- **System-free Accessories**
- **Protective Systems**
- **Shoring**
- **Event Systems**
- **Rolling Towers**
- **Ladders**
- **Software**

Headquarters in Eibensbach

Plant 2 in Gueglingen

Layher®

More Possibilities. The Scaffolding System.

Wilhelm Layher GmbH & Co KG
Scaffolding Grandstands Ladders

Ochsenbacher Strasse 56
74363 Gueglingen-Eibensbach
Germany

Post Box 40
74361 Gueglingen-Eibensbach
Germany
Telephone +49 (0) 71 35 70-0
Telefax +49 (0) 71 35 70-2 65
E-mail export@layher.com
www.layher.com

climate neutral print
www.klima-druck.de
ID-No. 2091459
bvdm.

FSC www.fsc.org
MIX
Paper from responsible sources
FSC® C002010

Edition 05.2020

Ref. No. 8116.248