MEVA
Guide to Safety
Judith Hackitt CBE is chairperson of the Health and Safety Executive, Great Britain’s regulatory body for, among others, the construction industry.

A clean health and safety record has become a key performance indicator for all top contractors across the world. This series in FormworkPress addresses the framework in various national and global construction contexts.

The Health and Safety Executive (HSE) is Great Britain’s regulatory body with a mission to prevent death, serious injury and harm to health of workers and of others who may be exposed to risks from work activities.

HSE chair Judith Hackitt explains:
“HSE provides information and advice, raises awareness, promotes training, conducts and sponsors research, proposes new laws and standards and enforces the law as Great Britain’s workplace regulator. We have a dedicated construction division, with a substantial number of its field force dedicated to construction inspection. We are simplifying and improving health and safety legislation and information. Guidance and toolkits on our website are helpful for contractors to see what is required step-by-step.”

New CDM regulations
The new construction design and management regulations 2015 (CDM 2015) came into force on 6 April 2015. They ensure that working conditions are safe before work begins and the proposed work will not put others at risks. The new CDM regulations replace the old CDM dating from 2007.

Judith Hackitt was appointed chairperson of the Health and Safety Executive in 2007 after serving as a Commissioner between 2002 and 2005. She was awarded her CBE for services to health and safety in 2006.

Judith Hackitt is a chemical engineer and graduated from Imperial College in 1975. She worked in the chemicals industry for 23 years before joining the Chemical Industries Association (CIA) in 1998. She became Director General of CIA (from 2002-2005) and worked in Brussels for the European Chemical Industry Association (CEFIC).

She was elected as a Fellow of the Royal Academy of Engineering in July 2010. Judith is also a senior non-executive director and trustee of the Energy Saving Trust and a non-Exec director of the High Value Manufacturing Catapult.

Find out more here:
www.hse.gov.uk/construction

Judith Hackitt on what’s changed:
“The regulations are simpler, easier to understand and follow, without watering down standards of health and safety on site. HSE has published guidance and worked with the industry to produce guidance to assist small businesses. Also, the CDMC has been replaced by the principal designer, responsible for planning, managing, co-ordinating and monitoring the preconstruction phase within the project team. Coordination is now an integral business function rather than an external add-on.”
# Preface

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Starts in the mind and during planning: MEVA services in designing and project planning, on site and during pours and after
Safety: The Contractor’s Duty and Responsibility

There is a trend in the global building industry and it points in one direction: The demands on worker safety, health and accident prevention on construction sites are growing. Governments, health and safety authorities, employer insurances and construction industry associations, but even developers and owners are asking: What is the safety concept on this project?

The intention is, universally, the same: “to achieve a marked improvement in the protection of workers from safety and health risks, preventing injuries, deaths and bodily harm. A library of laws, regulations and standards, both national and international in scope have an impact on planning projects and managing construction sites, wherever they may be.

The common denominator is that unprotected work is not permissible, comprehensive and all-round worker protection is mandatory, especially, but not only, when working at height.

Potential dangers must be assessed during the design phase, protective measures have to be an integral part of the planning progress and must be implemented and monitored on site. The responsibility lies with the contracting company or consortium.
Under EU directives, employers are responsible for the safety and health of their workers.

- Directive 89/391 provides the framework for health and safety management and risk assessment. Employers are required to assess risks and take practical measures to protect the safety and health of their workers, keep accident records, provide information and training, consult employees and co-operate and co-ordinate measures with contractors.

- Council Directive 92/57/EEC sets minimum safety and health requirements at temporary or mobile construction sites. It highlights the coordination required by the various parties before and during construction:
  - clients/project supervisors have to appoint one or more safety and health coordinators
  - clients/project supervisors have to ensure that a safety and health plan is prepared before the construction phase starts
  - clients/project supervisors have to take safety and health into account when designing the project
  - in the construction phase coordinators have to ensure that risks are adequately managed and that the health and safety plan is taken into account
  - cooperation between employers in matters of safety and health has to be implemented and procedures monitored.

Other directives are also relevant to the construction sector. Directives set minimum health and safety standards and are translated to law in Member States. National legislation may require higher standards, so check with your enforcing authority. Find out more on these national laws: osha.europa.eu

Sources on international occupational safety and health are:
- global issues: iolo.org
- for the USA: osha.gov
- on the joint US-EU Wiki: useuosh.org
- the ACI: concrete.org, with chapters in 120 countries across the globe
Safety is Worth it. Always.
Its Unsafe Work that No One Can

Safety equipment that is system compatible
and fits the formwork design, complies with
all safety regulations and is easy and fast to
assemble are mandatory to ensure worker
safety when planning a concrete project.
More importantly, they contribute to cost-
effectiveness, reducing labour and costs, as
site research shows.

Does the use of system compatible safety
equipment on the formwork pay off in terms
of cost-effectiveness?

The University College of Darmstadt's Institute
for Building Management, conducted a scientific
investigation to generate real-life performance
values for a standardised formwork set up,
comparing the assembly, ganging and cycling of
conventional safety equipment on a wall form-
work unit with system compatible equipment.
Layout and conditions were identical. The results are astonishing: Using system compatible safety significantly speeds up set up times and achieves performance values that are, at least, superior to those using conventional walkway brackets and loose planking.

The equation is simple: spend a little more on the right equipment saves significantly on time and labour. Improvements in work flow were not measured.

Sven Schoch, product manager with MEVA formwork systems and safety project manager took part in the test series and reports: “What impressed me when working on system compatible safety systems is a simple, but very convincing logic I would call subjective safety.

Comparing performance factors, system compatible safety system like SecuritBasic win the contest with conventional walkway brackets and planking hands down.

If you look at your own moves and steps, you will notice that you work smoothly, more safely, without a hitch when protected all around. Feeling safer means you work faster and make fewer mistakes. It is a difference climbing up a fixed, integrated ladder with hatch access and stepping out onto a slip-protected working platform rather than balancing up a rickety ladder and creeping forward on wobbly planking.”

Conclusion: The reduced time and labour effort is potentised by the personal, subjective “felt” safety factor. This, in turn, further speeds up work and avoids errors through every step from assembly to the pour. These benefits go beyond the performance factors measured, but prove no less valuable on site.

Sven Schoch, product manager with MEVA Formwork Systems since 2004, is the company’s safety commissioner.
The original safety feature for fast, safe panel connections: the MEVA clamp
Clamp it. Hit it. Done. The MEVA clamp connects and aligns the panels with just a few hammer blows, has no losable parts and is the lightest of its kind. To this day. A five point clamp effect is achieved anywhere on the frame, even when panels are offset on uneven ground.

The welded-in Dywidag nut in the multi-function profile
The Dywidag nut in the multi-function profile is welded in on both sides, so is the conical anchor sleeve. This ensures the safe, error-free and fast attachment of all accessory parts such as walkway brackets. Being welded in means: no slipping away.

Push-pull props are attached with a flange screw to the multi-function profile. Safe and fast.

Only Simple Work is Safe Work.

The walkway bracket is inserted into the welded-in Dywidag nut and

Identical with all MEVA wall formwork: the same, uniform attachment of all accessory parts with the flange nut and to the welded-in Dywidag nut

Only Simple Work is Safe Work.

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Push-pull props are attached with a flange screw to the multi-function profile. Safe and fast.
Only Safe Work is Fast Work.

Uniform attachment with the flange screw. Fewer parts, less inventory
The attachment of accessories is standard and uniform throughout all MEVA wall formwork systems. All you need is a standard flange nut. It attaches safely to the welded-in Dywidag nut. No hooks, clips, nuts or bolts are needed. Fewer parts means less storage, less searching and transport.

Nothing to hang loose or slip away: safety snap in of the walkway bracket on the multi-function profile.
Easy Handling.
Safety at its Best.

Safety in handling formwork panels thanks to ergonomic design
MEVA's aluminium hand-set formwork systems (AluFix, MevaDec) have an ergonomic grip profile which makes it easier to handle the panels even when wet. Safe, fast work often relies on details in design.

Integrated safety indicator shows safe shore position at a glance
When MEP shoring towers are assembled with reinforcement frames, the clearly visible setting of the red quick-lock lever shows, whether they have been safely connected. At a glance, site supervision can confirm the safety of the setup.

Easy handling thanks to the ergonomic grip profile on aluminium hand-set panel systems.

MevaDec safety from A – Z
The slab formwork system MevaDec features a range of special safety advantages that facilitate a quick, error-free assembly. Here are some examples:

When placing the primary beam into the drop-head, it latches into position. The safety latch prevents it from slipping out.
When placing the primary beam into the drop-head, it latches into position. The safety latch prevents it from slipping out.

The grid-free, slide-in assembly of the slab panels and the flexibility in forming direction minimises filler areas and reduces effort.

The number and position of the props is dictated by the system: zero-error assembly.

Safe work thanks to better technology
The sum of MEVA system features show: safe work begins with the selection and use of the most suitable system, product and technical feature. Following rules and regulations alone do not make for a safe and efficient workflow on site.

Only simple work is safe work. Only safe work can be fast. And, this is where the logic closes full circle: Working safely means working efficiently, saving time and money.

The red lever on the quick lock shows at a glance, that the frame on the MEP shoring tower is fitted correctly.

Adjustable guide shoes on the MEVA guided screen system MGS allows the guide rails to be slid in easily and with mm-accuracy.
Basic Safety for Wall Pours

The setup of MEVA formwork is the same throughout all systems and uses identical attachments and accessories throughout. This minimises the risk of assembly error, makes handling easier and work safer from the start.

Using identical parts for all pours, whether a foundation or a 12 m wall, simplifies logistics, makes assembly easier and safer. In addition, all attachments follow the screw-in principle which, itself pays into the safety account. The walkway bracket is not simply hooked in, it is attached securely, cannot slip away when you lay the panel down.

Double sided, working platform on both sides.


**EA, AF, AS/ST, Mammut, Mammut 350**

**Safety Equipment for Wall Formwork**

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<th>Safety equipment and accessories for MEVA wall formwork</th>
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<th>FormSet safety mesh</th>
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<th>Wooden planking</th>
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All attachments use the same flange screw, again reducing the risk of error and shortening the learning process. MEVA offers a broad range of standard safety accessories for every job, from walkway brackets to pre-assembled working platforms (refer also to page 20).

**Double sided, working platform on one side**

*Double-sided wall formwork assembly with walkway bracket and working platform on one side only. Fall protection is guaranteed both front and back.*

The special MEVA adapter 800 takes up the guard railing post at a slant, allowing the safety mesh to be tilted in order to leave enough space for large concrete buckets.

**For details of safe use and assembly of MEVA wall systems please consult these technical instruction manuals, available online at meva-international.com**

<table>
<thead>
<tr>
<th>EcoAs</th>
<th>AluFix</th>
<th>AluStar/StarTec</th>
<th>Mammut</th>
<th>Mammut 350</th>
<th>STB 450</th>
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The foldable working platform BKB 125 is simply swung into position on the AluStar/StarTec and Mammut/Mammut 350 wall formwork panels (or on other brands). Its benefits:

- Quick and easy assembly
- Self-securing foldable guard railing
- Comfortable 125 cm working platform
- Only 17 cm high when folded

The self-securing working platform BKB 125 comes equipped with a foldable safety railing, wooden planking (48 mm) and carries a load of 2 kN/m².
Flexible, Fast, Efficient

Light-weight Working platform LAB 130
Working and safety platform with complete range of safety features. Attachment shoe for MEVA wall formwork panels, for masonry walls or with an adapter for prefabricated parts.
- Pre-assembled, ready to use: Fold up the guard railing, lift by crane, attach to the formwork panel – ready for work.
- Sturdy steel safety mesh
- Comfortable 130 cm working space
- Platform lengths 240 and 340 cm

A special FT adapter allows the working platform LAB 130 to be fitted to prefabricated walls.

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<tr>
<th>Working platforms for MEVA wall formwork</th>
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<th>Foldable working platform BKB</th>
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<td>EcoAs</td>
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SecuritBasic: Modular Safety from A to Z

Comprehensive, modular safety system for MEVA wall formwork systems Mammut 350 and StarTec. Provides the complete worker safety set-up, put together according to the site’s requirements. Easy, standard attachment to the multi-function profile. The programme includes:

- Walkway bracket
- Telescopic access ladder
- Side railing foldable
- Back fall protection
- Ladder support
- Brace bracket 250
- Back fall protection guard rail
- Aluminium platform with access hatch
- Lifting fork SB

For details of all safety application and assembly of MEVA wall formwork systems please consult these technical instruction manuals, available online at meva-international.com

SecuritBasic
StarTecSecurit
Securit stands for a comprehensive range of safety equipment for wall formwork. It comes as a modular kit (SecuritBasic) or as a complete, pre-assembled, all-in-one system (StarTec Securit). StarTec Securit is delivered to the site ready for use and fitted with complete safety gear. No additional assembly is necessary, significantly speeding up work flow while providing optimum worker protection.

StarTec-Securit: Safety Integrated All-in-One

StarTec-Securit is a pre-assembled, all-in-one, ready to use safety system for the StarTec wall formwork system, including safety platform, guard railing and access. Folded, it takes less than 30 cm of space.

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<th>Back guard railing post</th>
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<th>Aluminium slip protection platform</th>
<th>Wooden planking</th>
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<th>Integrated/pre-assembled</th>
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<td>StarTec-Securit</td>
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Safety at Great Heights

The support frame STB 450 and its 1.50 m extensions allows single-sided concrete pours to heights up to 13.50 m. The system features safety equipment for safe access and working at great heights.

The top level is equipped with planking, guard railing post, safety mesh or protective planking to provide a cost-effective working platform for safe work even at great heights.

Both the basic STB 450 unit and the 1.50 m extensions are equipped with fixtures to attach the guard railing post and fasten the wooden planking without much effort. The ladder access is fixed and equipped with a safety cage.

Mammut 350 column panels with access ladder with safety cage and an all-round safety platform.

Planking fitted to the top working level on the support frame STB 450 or its 150 cm extensions serve as a working platform. A guard railing post is fitted to take up the safety mesh or wooden planks for fall protection. The access hatch and ladder with safety cage provide safe access even at great heights.
Comprehensive safety equipment is offered for all single-sided applications, columns and circular columns. The safety features are fully integrated and comply with strict international safety requirements.

**Circo circular column formwork with a fixed access ladder, safety cage, working platform with all-round fall protection.**

**CaroFalt column formwork, also with fixed access ladder, safety cage and working platform with all-round fall protection.**

The safety design with fixed safety cage, fixed ladder access and working platform with all-round worker protection was developed in cooperation with and approved by leading health and safety authorities.

**STB 450, Mammut 350, Circo, CaroFalt**

**Safety: Single-Sided Formwork & Columns**

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<tr>
<th>Safety features for single-sided and column formwork systems</th>
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<th>Side railing</th>
<th>Back fall protection</th>
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<th>Push-pull prop/brace bracket</th>
<th>Front railing</th>
<th>Aluminium slip protection platform + access hatch</th>
<th>Aluminium slip protection platform, no access hatch</th>
<th>Wooden planking with and without access hatch</th>
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Developed in cooperation with occupational safety and health authorities in Europe: the mobile column formwork system CaroFalt with integrated access ladder, safety cage, working platform plus front, back and side fall protection.

For details of all safety application and assembly of MEVA systems consult the technical instruction manuals, available online at meva-international.com

STB 450

Mammut 350

Circo

CaroFalt
Today’s safety standards place high demands not only on the working platform and working conditions themselves, but also on getting there: safe access is an important part of planning and implementation, especially when pouring high structures. In addition to the integrated access with safety cage and fall protection outlined for wall and column formwork (see p. 10), MEVA offers three independent systems for safe access.

The MEVA stair tower MTT is set up entirely independent of the formwork. Its predominant features are flexibility and easy assembly. Every 6 m rising, the tower is fixed to the building structure and can be employed up to a height of 50 m without additional verification by the structural engineer.

Safety access can be built into existing shoring towers, such as with the shoring tower Space or the shoring system MEP.

The shoring tower Space fulfills three functions in one: safe access, safe working platform and load-bearing platform for the formwork.

Right: Load-bearing platform for the formwork, safe working environment and integrated safety access in one system distinguish the shoring tower Space.

Left: The MEVA stair tower MTT is a flexible, easy to assemble access system up to heights of 50 m.
The shoring system MEP can be equipped with planking, access hatches and ladders to provide a safe working environment. In addition, the towers take up the load of the formwork up to a height of 21 m. This makes additional scaffolding redundant, since the MEP system offers sufficient all-round safety and complies with strict international standards on fall protection and safe access.

The climbing systems KLK 230, MAC, MGC all feature integrated safety access systems as part of the system and are not shown here.

For details of all safety application and assembly of MEVA systems please consult the technical instruction manuals. Find them at meva-international.com.

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<tr>
<th>Safety features of MEVA access systems</th>
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Safety at Slab Edges

Safety requirements at the slab edge range from simple, effective fall protection during slab works all the way to complete climbing units with protective all-round enclosures used in today's high rise construction (see also p. 24).

Worker safety at the edge of the slab is achieved by using stop-end rails for flush slab edges and brackets for cantilevering slabs. Rails and brackets take up guard railing posts for holding MFS safety mesh. It is certified according to the German standard DIN 13374 with an impact resistance of up to 500 kg. Using edge protection, beam trestles and safety fixtures to prevent lifting, the MevaDec slab system provides cost-effective and comprehensive worker protection whenever cantilevering slabs are being poured.

Stop ends achieved with MEVA FormSet: innovative, corrosion-proof anchor sleeves for safe anchoring, stop-end bracket and stop-end rail with plug-on guard railing post for the MEVA safety mesh with 500 kg impact resistance.

Stop-end bracket MFS

Stop-end rail MFS

MEVA Guard railing post in plug-in shoe at the slab edge, equipped with safety mesh
An example for effective edge protection using the MevaDec slab formwork. Guard railing posts are fixed to the panel and equipped with planking or FormSet safety mesh. The stop end of the slab is formed using a beam trestle UZ 30/40. The panel is secured against accidental lifting to the slab below by safety chain.

The adapter shoe allows guard railing posts to be attached to the MevaDec primary beam (left) or the secondary beam (right). Only a few steps are needed for edge protection with the sturdy MFS safety mesh.

Standard edge protection with guard railing post on MevaDec slab formwork panels.
Stringent safety standards in international high-rise construction call for all-in-one slab edge safety solutions with minimum on-site effort and maximum worker protection. Requirements go beyond fall protection and include protection from weather and wind, worker comfort with no sight contact to the ground at great heights. The rail-guided climbing system MGS provides a complete, all-round safety enclosure and can be lifted by hydraulic jack or by crane. It provides safety for all slab and other works for the entire building level.
The guided screens system MGS is rail-bound and remains fixed to the building throughout the climbing process. It provides a safe, completely enclosed working environment and can be lifted by crane or hydraulic jack.

The MGS units are lifted by crane in a single lift or by using two hydraulic jacks (see photo below). The hydraulic cylinders lift each MGS individually. They are attached and disengaged within seconds before the hydraulic kit is moved to the next unit for the next lift.

The guide shoes are adjustable, allowing the climbing rails to slide in from one level to the next with a minimum of effort. The position of the guide shoes is adjusted to the millimetre and can be fine-tuned as the climb progresses.
Safe Climbing

MEVA’s climbing systems KLK 230, MGC and MAC cover a wide range of technical options from conventional climbing platforms all the way to fully automatic self-climbers.

KLK 230 is a multi-functional climbing platform with a comfortable 230 cm working space and all-round fall protection, proven in bridge, infrastructure and commercial construction. The climbing platform carries the formwork and can be lifted as one complete unit. It can be equipped with a carriage, enabling the panels to be drawn by 70 cm.
The climbing system MGC is mostly used for walls in high-rise construction. Its major advantages are ground assembly in safe conditions and the completely enclosed and comfortable working environment. The working platform and the formwork are one unit and are lifted by crane.

The MGC is rail-bound and has an integrated access system with hatches and safety cages. The working platform itself is completely enclosed. Formwork panels for inside walls are placed on shaft climbing platforms that are also lifted by crane.
The automatic hydraulic climbing system MAC was developed for today’s high-rise construction and fulfills with the most stringent safety requirements. Its complete protective housing offers all-round worker protection at great height. Its safety features include an inside access system and a hydraulic jacking beam that rests in concrete that has already set.

The hydraulic cylinders are each equipped with a non-return safety ratchet for 100% safety. The protective enclosure can be made from corrugated sheeting, perforated sheeting or gauze (textile).

MEVA wall formwork panels or project-built facing are used as suspended shutters.
MEVA Automatic Climbing MAC: hydraulic, fully automatic climbing technology with complete protective enclosure for optimum worker safety at great heights and high wind velocity.

Safety in Automatic Climbing

<table>
<thead>
<tr>
<th>Safety features of MEVA climbing systems</th>
<th>Autonomic MAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic jack independent of crane time</td>
<td>✔️</td>
</tr>
<tr>
<td>All-round protective enclosure</td>
<td>✔️</td>
</tr>
<tr>
<td>Multi-functional working platform with safety access</td>
<td>✔️</td>
</tr>
<tr>
<td>Secondary platform</td>
<td>✔️</td>
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<tr>
<td>Jacking beams in re-usable safety pockets</td>
<td>✔️</td>
</tr>
<tr>
<td>Non-return safety ratchets on each hydraulic cylinder</td>
<td>✔️</td>
</tr>
<tr>
<td>3-way adjustment of shutters/panels</td>
<td>✔️</td>
</tr>
<tr>
<td>Safe climbing in any weather and wind velocity</td>
<td>✔️</td>
</tr>
<tr>
<td>Secondary access system for subsequent works</td>
<td>✔️</td>
</tr>
<tr>
<td>Ground assembly</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Benefit from the experience and expertise of MEVA engineers when planning site safety from early on in the project. Our customer service, business support, engineering and design teams have a well-tuned ear for the needs of the project. We assist you in developing and successfully implementing cost-effective safety solutions on site.

On-site support and training, supervision and consultation on safety issues includes:

- Project consultation
- Work flow planning
- Consultation on job preparation scheduling, planning, supervision, project management
- Consultation with safety authorities
- On site support and training

The Safety Mind-Set:

Gabor Fejér, Formwork engineering
Botond Lachmann, Design and engineering
Bernd Schuon, Formwork engineering
Steffen Pippig, Project management
Sabrina Vargas Colina, Formwork engineering
MEVA Services for Safer Work

- MEVA concrete pressure and pour speed calculator (online and app) for safe concrete pours on high structures
- MEVA re-shoring calculator for safe work and reshoring on concrete slabs
- SolidCheck measuring device for concrete setting time on site
- Pressure gauges for monitoring concrete pressing during critical pours
- Structural engineering
- Training and supervision of formwork teams

Safety goes beyond worker protection during concrete pours on site – it includes the safety of each concrete pour itself and extends all the way to safe work flow processes, logistics and safe handling throughout the construction period and beyond.

Concrete Pressure and Pour Speed Calculator

Please observe conditions of use for the fresh concrete pressure and pour speed calculator:

<table>
<thead>
<tr>
<th>Influence area 1.87 m²/prop</th>
<th>Load utilisation of D1 96.92%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required reshoring of slab D1</td>
<td>0.36 Props/m²</td>
</tr>
<tr>
<td>Influence area 2.81 m²/prop</td>
<td>Load utilisation D2 96.92%</td>
</tr>
<tr>
<td>Required props below slab D2</td>
<td>0.18 Props/m²</td>
</tr>
<tr>
<td>Influence area 5.62 m²/prop</td>
<td>Load utilisation D3 96.92%</td>
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</tbody>
</table>
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