



**HERRENKNECHT FORMWORK:
ALL AROUND THE PRODUCTION OF HIGH-PRECISION SEGMENTS.**



Formwork systems from Herrenknecht Formwork are used on tunnel jobsites around the world.

YOUR KEYSTONE TO PERFECTION.

Absolute reliability – until the final breakthrough. Advanced machine technologies and suitable experience are required for lining mechanically excavated tunnels under inner-cities, mountains and rivers to ensure the absolute safety and long life of the finished tunnel. As a producer of top-quality high-precision segment moulds Herrenknecht Formwork Technology knows exactly what it takes to ensure a smooth production process: perfectly shaped segments must be supplied just in time and withstand up to a hundred years of demanding use when installed in the tunnel.

Experience – from tunnelling projects around the world. Our eye for the big picture and our involvement in projects around the world are of major benefit to our customers. Herrenknecht AG is the technology and market leader in the field of mechanized tunnelling. Under the Herrenknecht corporate umbrella a team of innovative specialists offers integrated solutions for the entire process of tunnel construction. This includes special equipment for the production of high-precision segments. Herrenknecht Formwork offers the full range of products in this area: from formwork systems for the production of segments and the necessary handling and transport equipment to turnkey segment production plants, including crane systems, concrete batching plants and equipment for reinforcement fabrication.

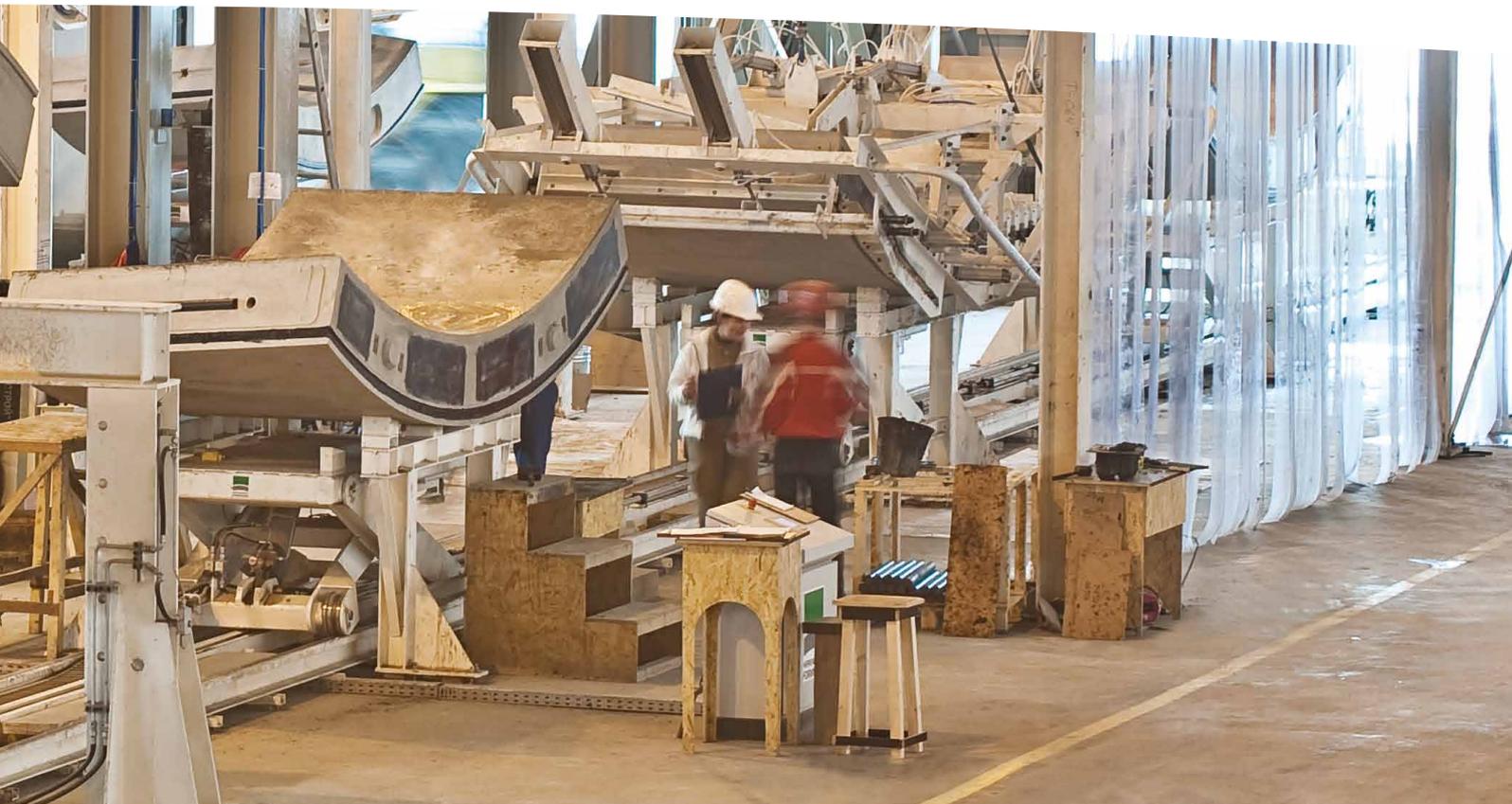
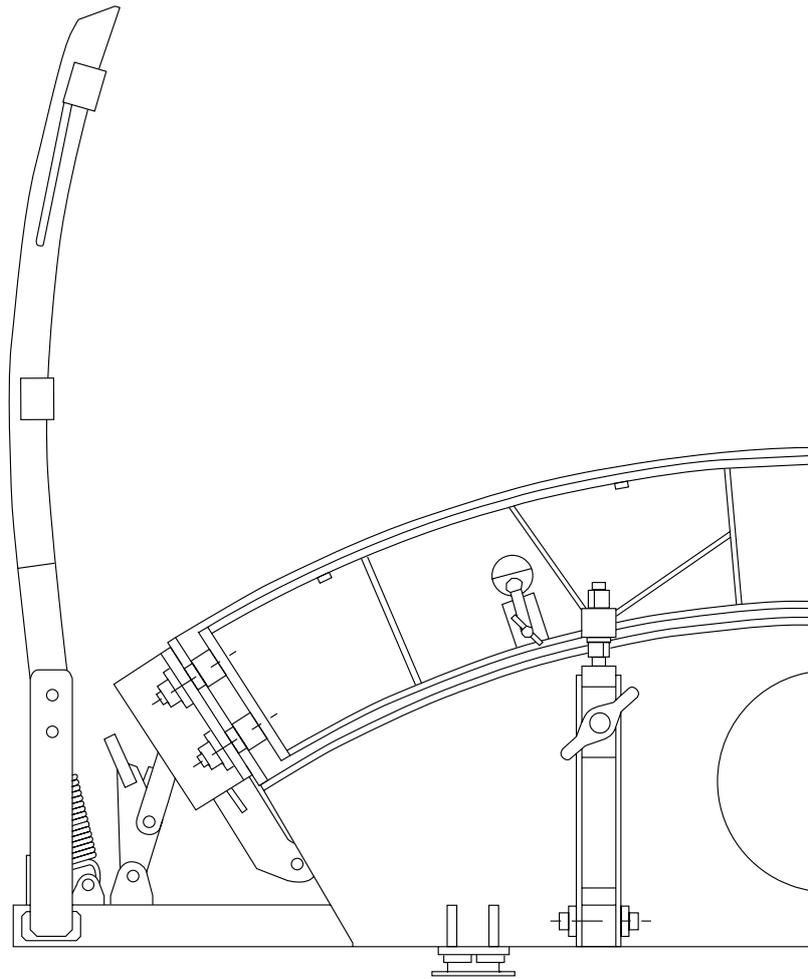
Short delivery time: segment production started on the jobsite in Sochi, Russia only nine months after order placement.

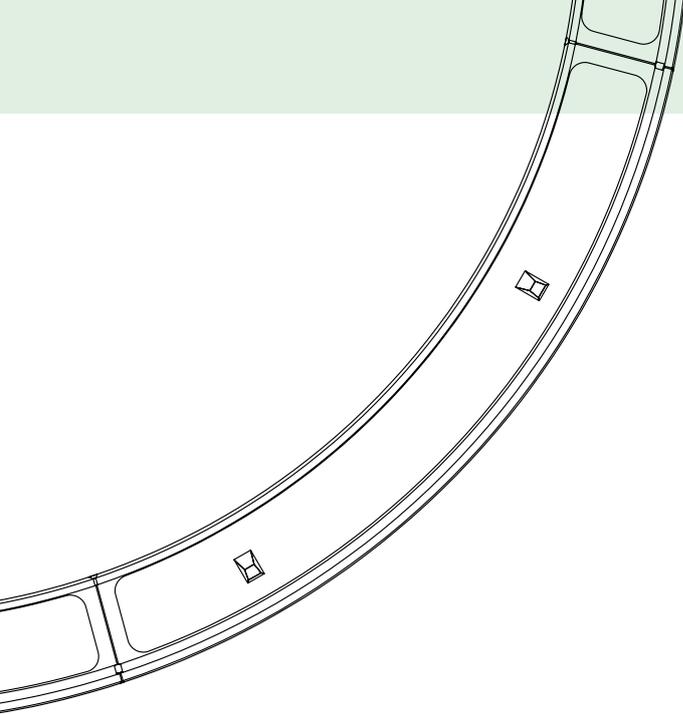




**Herrenknecht Formwork offers
the complete solution:**

- coordinated solutions for all aspects of segment production
- schedule reliability and worldwide availability
- precision and quality manufacturing
- worldwide references in all areas of mechanized tunnelling
- comprehensive service during the entire project lifecycle – from concreting to installation of the segments in the tunnel





DILIGENCE – TO THE SMALLEST WELD SEAM.

Perfectly harmonized teamwork – ring by ring. The design of segmental rings and tunnel segments involves a complex planning process that includes a number of factors such as the route alignment with its straights and three-dimensional curves, compliance with structural calculations and the tunnel overburden. On request we help our customers with this and maintain close contact with the responsible structural engineers and planners during the entire planning process. The result is a lining design which is divided into easily demouldable segments whilst also meeting the high demands regarding structural analysis and sealing.

Accuracy – segment by segment. When producing segment moulds and the equipment necessary for production of the segments there are no compromises with regard to precision, tolerances, quality and strength. The mould experts from Herrenknecht Formwork have proven experience with all types of formwork design and always have the entire process in mind. When designing the moulds they consider both the forces acting on the ring and the geomechanical stresses in the ground as well as the enormous stresses at work during the manufacturing process. These include constant mixing and vibration processes as well as heat and vapour development during the setting and curing of the concrete segments.

Herrenknecht Formwork offers comprehensive service:

- segment and ring design (trapezoidal, universal, etc.)
- selection of the required sealing gaskets and fixing components (bolts, dowels, injection nozzles, packings, etc.)
- design and manufacture of precision moulds for various kinds of segments
- design and manufacture of moulds for Combisegments®
- design and manufacture of moulds for rail slab tracks

For the perfect segment – precision moulds accurate to tenths of a millimeter.





Mould production at the factory in Schwanau, Germany.



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| ① Precision engineered side shutters | ⑦ Centering cones for the accurate fixing of the corners |
| ② Mould bottom with external vibrators | ⑧ External vibrator connection |
| ③ Precision engineered front shutters | ⑨ Lever mechanism to open/close the front shutters |
| ④ Top covers | ⑩ Base frame |
| ⑤ Articulated arms with adjusting mechanism to open/close the side shutters | ⑪ Locking screws for securely closing the covers |
| ⑥ Spring counterbalanced cover linkage | ⑫ Manual fixing side shutters |
| | ⑬ Central spindle for opening and closing the side shutters |



Concrete batching plant



Reinforcement fabrication



Surface finish

A ONE-STOP SHOP FOR SEGMENT PRODUCTION.

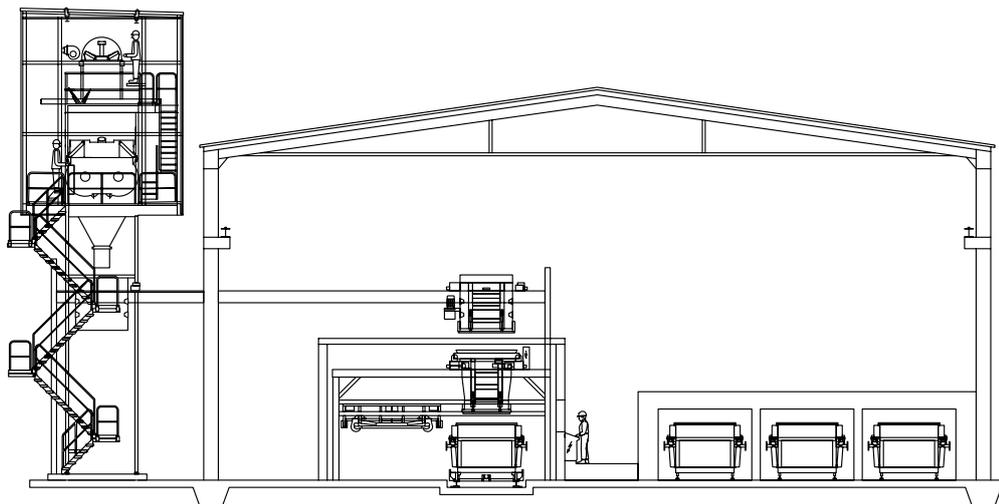
Intelligent logistics – perfectly coordinated. Consistent high performance can only be achieved in mechanized tunnelling if the various systems forming the entire process chain are integrated and matched to each other as smoothly as possible. Just-in-time supply of tunnel segments is a crucial prerequisite. Experts get an accurate picture of the starting situation and the project requirements. They calculate production cycles, develop optimal production concepts and set up a reliable logistics system. Ultimately this influences not only the overall quality of a construction project but also the speed and efficiency of its realization. To ensure lining of the tunnel progresses smoothly, Herrenknecht Formwork works closely with its customers on all matters of segment production. Our specialists design and build fully equipped segment production plants whose workflow is perfectly integrated into the overall jobsite.

The whole range – from reinforcement fabrication to laser target point. In addition to the project-specific layout of the segmental lining production plant, Herrenknecht Formwork supplies and installs all the necessary resources and equipment. In doing this we take account of the size of the production shop and also of the number of moulds in addition to the handling and storage requirements for the segments. But also machines to apply the sealing gaskets and surface finish to the segments. And of course all commonly used transportation systems for delivery of the linings to the tunnel production site – always just in time.

Turnkey solutions from Herrenknecht Formwork:

- conceptual advice on all aspects of segment production
- production concepts optimally tailored to the tunnelling site (stationary/carousel production lines, field production facilities, etc.)
- planning, production, assembly and commissioning of the entire segment production plant
- additional equipment and facilities: including concrete batching plants, reinforcement fabrication, vibration systems, curing tunnel, heating systems, handling equipment, crane systems, etc.
- technical service: provision of skilled personnel and training of personnel on site through to production support
- after-sales service including spare parts support
- refurbishment of used equipment and adaptation of external systems to meet new needs

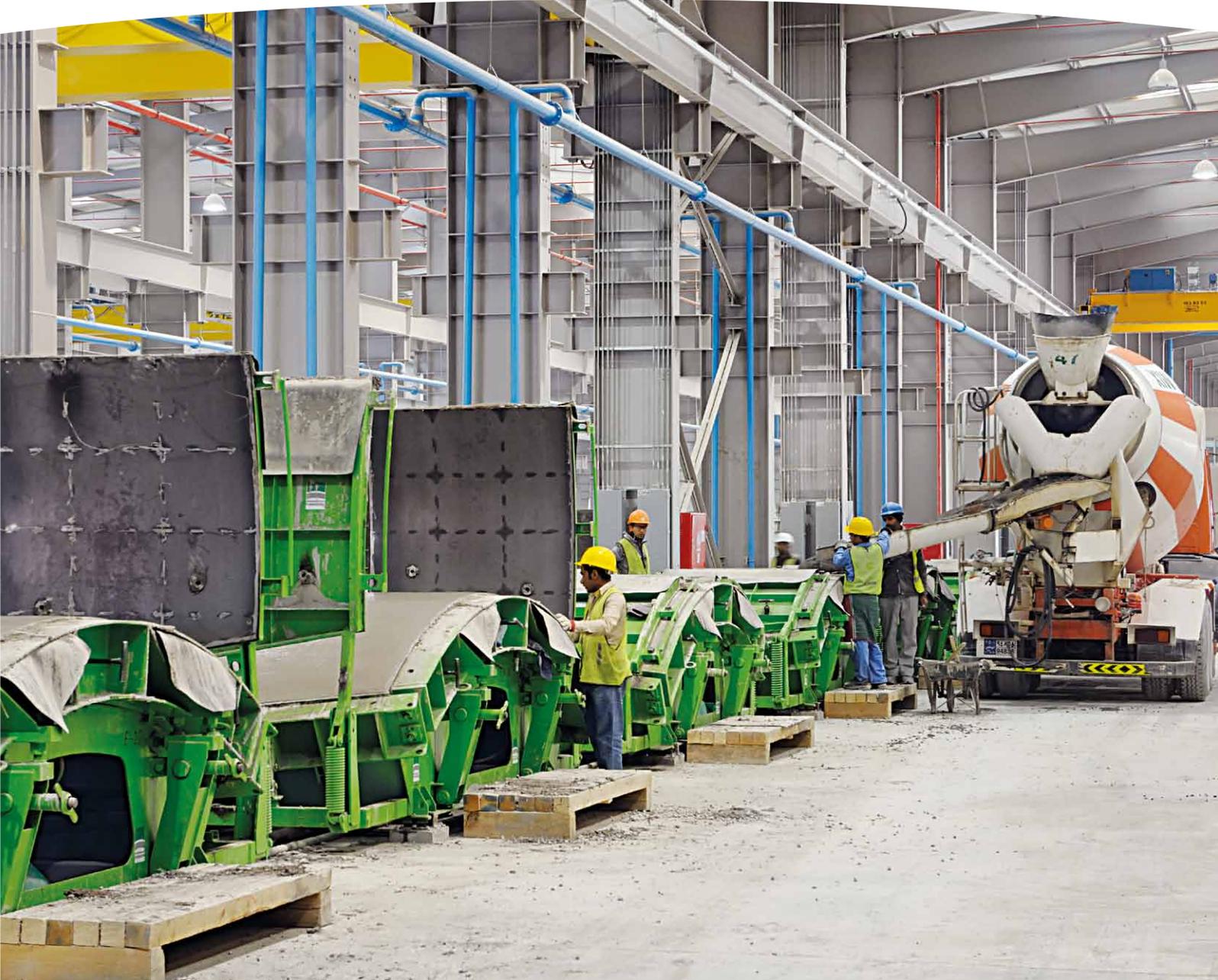
Tailored solutions for smooth segment production.





Handling equipment from Herrenknecht Formwork moves segments weighing several tonnes.

Production of segments in Abu Dhabi, United Arab Emirates.





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Herrenknecht Formwork Technology GmbH is an independent subsidiary of Herrenknecht AG. With a workforce of about 50 employees, Herrenknecht Formwork develops, manufactures and sells high-quality mould systems for mechanized tunnelling worldwide. From mould systems for segment casting and production to the necessary handling and transportation equipment to turnkey segment plants, Herrenknecht Formwork offers everything from a single source. As an ISO 9001:2000 certified company Herrenknecht Formwork provides its customers worldwide proven quality and reliable service.

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