



FACTORY

TOUR

▶ The raw material for the manufacturing and power generation industry, such as copper, gold and iron ore as well as coal and industrial minerals is supplied from mining operations world-wide.

A huge portion of these deposits is exploited in open pit applications using state of the art earthmoving equipment. The shovel and truck system is a common equipment combination, due to its flexibility and productivity. O&K stands for advanced, reliable and productive excavator technology and is part of the TEREX group since 1998.



All O&K hydraulic excavators, from RH 30-F up to the RH 400, are built to a modular design in the TEREX factory in Dortmund, Germany.



Home of the 'Giants'

TEREX offers the most comprehensive product range for the construction and mining industry and is the world market leader for hydraulic shovels in the class above 200 tonnes operating weight.

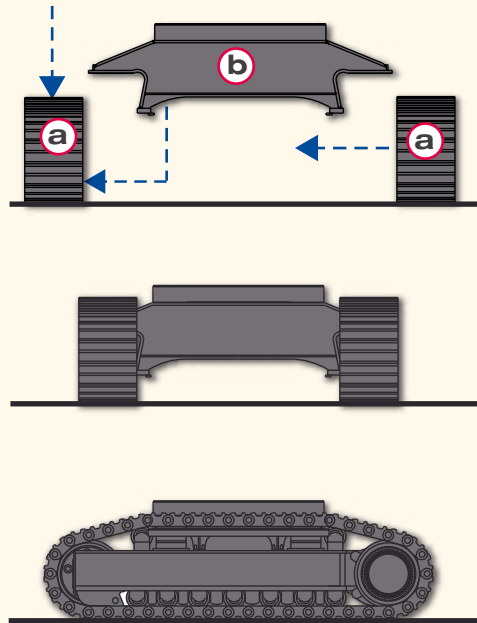
Terex Germany GmbH & Co. KG assembles in its Dortmund factory hydraulic excavators weighing 85 to 1,000 tonnes based on more than 40 years experience. 350 employees are responsible for design, manufacturing, sales and service. TEREX Germany are supported internationally by a network of TEREX branches and dealers.

Besides a huge number of unique design principles, the quality of components and the high manufacturing standards all contribute to the fact that today, TEREX is the producer of the world's largest hydraulic shovel, the RH 400.

The large units RH 90-C, RH 120-E, RH 170, RH 200, RH 340 and RH 400 are equipped with twin engine drive in the diesel version. There is an optional electric drive version available using a single motor (except RH 400: 2 motors).

Regardless of the drive system the general layout for all excavators contains the following modules:

- a** 2 x crawler frames
- b** carbody



- c** superstructure main frame
- d** engine module
- e** oil cooler module
- f** cab module
- g** cab
- h** counterweight

The attachment is available either in face shovel or backhoe configuration and encloses the following parts:

- i** boom or monoboom
- j** stick
- k** shovel or bucket
- l** hydraulic cylinders



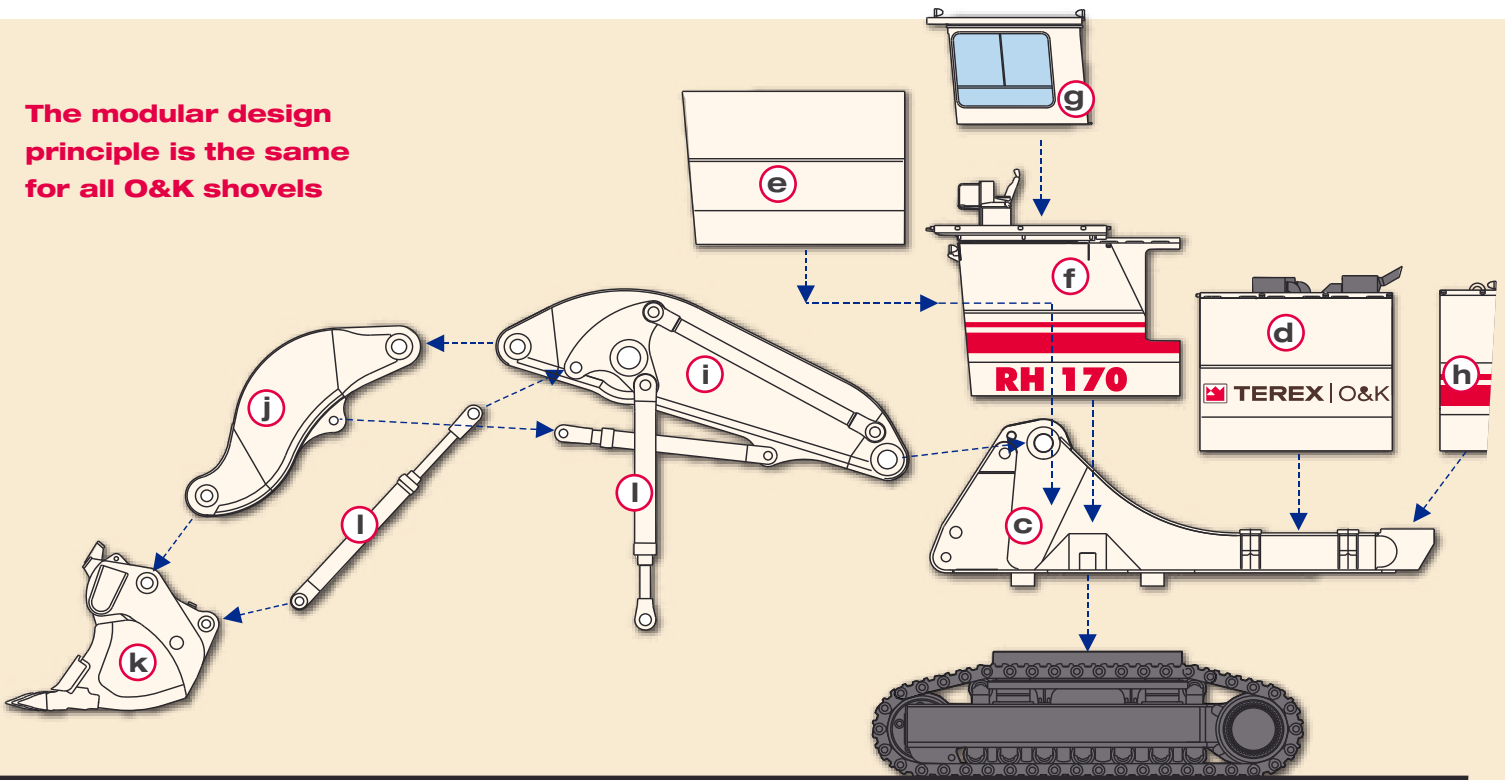
Quality no compromise



▶ Terex Germany GmbH & Co. KG was the first manufacturer of hydraulic mining shovels to be certified according to DIN EN ISO 9001. Thus the entire manufacturing process from the delivery of raw materials and components up to the shipment of the finished excavators is continuously monitored by a quality control system.

The framework, being fabricated in the steel construction sector, constitutes the basis, from which a complete excavator will be produced. In this part of the factory steel plates up to a thickness of 250 mm and castings weighing more than 10 tonnes are welded. CNC-controlled cutting robots form the individual parts out of the sandblasted steel plates. Steel plates for different parts are bent on a 800 tonnes press. This kind of manufacturing prevents

The modular design principle is the same for all O&K shovels



welding seams, which are produced when plates are formed to a curved shape.

Due to severe mine and operation conditions tremendous stress is transmitted through the steel components. Therefore the factory is certified to the highest industrial qualification for welding techniques. As well as precise preheating and manufacturing procedures this license requires regular examination of the welders every second year. The majority of all welding seams are inspected by ultra-sonic-testing methods. Finished steel components are processed in various CNC-machining centres after welding. The main drilling and milling centre in the Dortmund factory is one of the largest and most modern in Europe. This is mainly due to the machining travel length and load capabilities. The two rotary tables can handle components of 65 and 100 metric tonnes in weight. At this stage of manufacturing process all rough bores are machined to their final specification. The design criteria of certain structures requires that they are firstly stress relieved prior to the machining process.





▶ Meeting points have been introduced at various locations within the factory to maintain the flow of information and therefore speed up the manufacturing process. Representatives of all departments involved, such as design, planning, purchasing and production discuss the reasons for any delay to find immediate solutions. The working progress for each individual unit of production is clearly displayed on large diagrams including time schedules and controlling.

An expert team for a tough job

A decisive aspect for a trouble-free sequence of the specific assembly steps within production is the in-plant transportation. Only scheduled deliveries of the single sections allow best utilization of all manufacturing capacities.



RH 30-F and RH 40-E are completely built up, including undercarriage and attachment. Special equipment such as hydraulic hammers are also tested if required.



Larger machines starting with the 170 tonnes RH 90-C can't be shipped in one piece. Therefore only the complete uppercarriage is assembled in the factory. The pre-assembled modules are fitted to the superstructure main frame in the final-assembly area, then connected hydraulically and electrically.



In the pre-assembly area the oil cooler, cabin and engine modules are equipped with various components such as diesel engines or electric motors, pumps, electrics and electronic devices. The installation of hoses and cables is also part of this stage in the manufacturing process.



Hydraulic pumps are fitted to a RH 200 module

In the final assembly area the crawler frames are equipped with top and bottom rollers, sprocket and idler, travel gearboxes and motors and tracks. The travel gearboxes of the RH 400 are the largest planetary gears for mobile applications world-wide.



The twin engine units of the RH 90-C up to RH 400 contain the same electrical system



► The assembled superstructure is ready for operation to carry out all necessary adjustments and tests. However, due to decisive modifications some machines are assembled completely from top to the bottom for comprehensive checks.

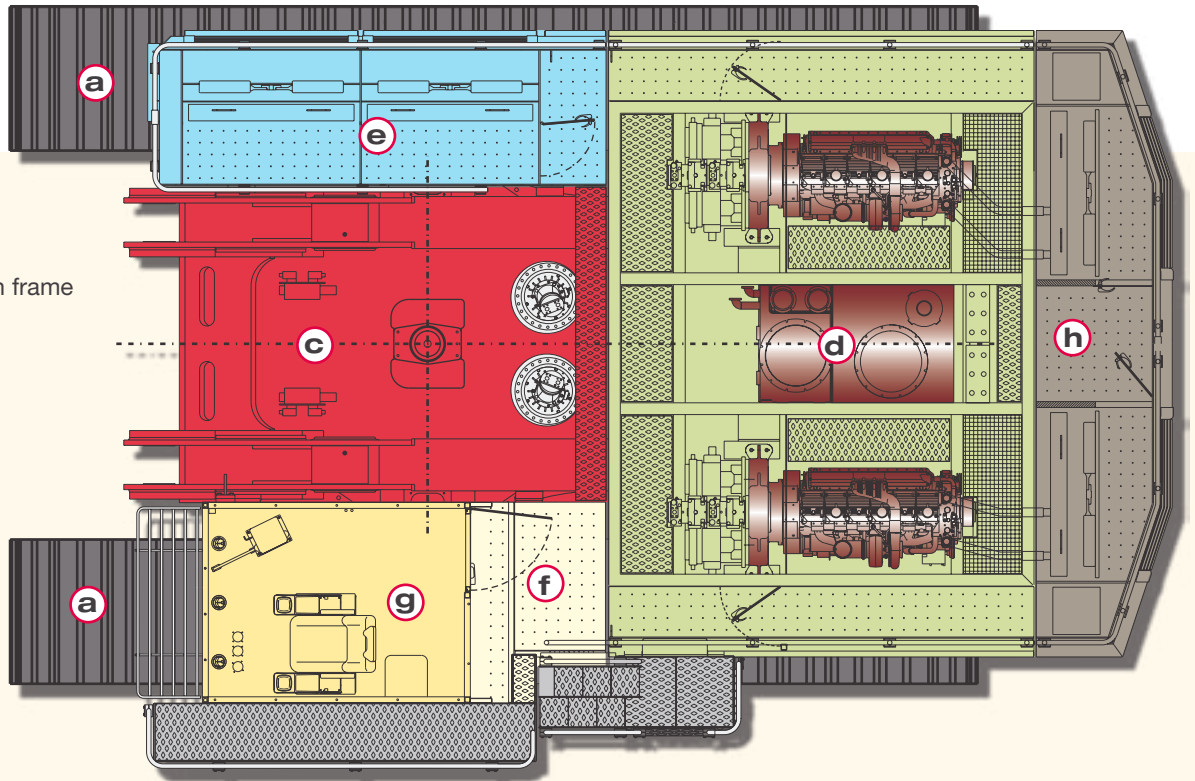


Tested reliability

To ensure best accessibility to the superstructure components, the main hydraulic valve block of all TEREX O&K hydraulic excavators is situated on top of the boom. For the commissioning job including testing of the hydraulic functions, adjusting of the engines and configuration of the electronic systems, the boom or a hydraulic test stand is positioned in front of the superstructure. Either can be connected with hoses to simulate the individual functions. RH 30-F and RH 40-E run completely assembled through the test program.

The on-board computer systems of all shovels had been programmed with the specific software for communication between engines and pumps.

- a** 2 x crawler frames
- c** superstructure main frame
- d** engine module
- e** oil cooler module
- f** cab module
- g** cab
- h** cab



The layout of a large mining excavator showing the RH 120-E as a sample.



When all testing procedures are accomplished the excavators are disassembled to modules again and get their final finish in the paint shop.



► After all adjustments are done and the test run is finished, the machines are dismantled down to the individual modules, which then will be prepared for transport.

All modules and structures are loaded onto flat bed trucks or special carriers then are transported accordingly. Therefore certain modules must be packed seaworthy, which means all bearings, electric and hydraulic components must be protected. Typical ports are Bremerhaven, Hamburg, Bremen and Antwerpen.



This main frame of a RH 200 superstructure is shipped to South Africa

Ex sea port to the typical mining countries such as South Africa or Australia it takes four and six weeks respectively. The last stage from the port of destination to the mine is often the most difficult one, as the majority of the sites are located in remote areas, such as jungle or desert regions. Other open pits in Indonesia or Chile can be found at an elevation of more than 4,000 m above sea level.



Two heavy trucks were necessary to relocate this RH 200 in Australia

Moving around the world

TEREX O&K hydraulic excavators are operated world-wide under each and every condition imaginable. Smaller units such as RH30-F and RH40-E can be found in heavy earthmoving and quarrying applications as well as in the extraction industry, the large machines starting with the RH90-C normally work in open pit mining operations. The hydraulic shovel constitutes the first stage in the sequence of material handling. Hauling, crushing and processing - all depend on the excavators productivity at the mining face.



RH 400

on-site assembly



Positioning of the crawler frames



Connecting crawler frames and carbody



Linkage of superstructure & carbody



Engine module is fitted after one week



RH 400 boom: weight approx. 74 tonnes



Assembly of the counterweight



The cab module: the base for the cab



Oil cooler module is mounted on frame



Connection of boom and stick



Deluxe cab with separate rest room & kitchen



The basic assembly crew: 11 engineers



Almost complete: winding up the tracks

► The period for on-site assembly of an O&K hydraulic excavator varies from three days to three weeks depending on the model. Apart from an appropriate assembly area sufficient crane capacity must be provided. The entire job is performed by experienced fitters and

engineers from the factory and is supported by a TEREX branch or dealer. The assembly work takes place under all conditions, no matter where and when. The photo layout above describes the assembly of an RH 400 in Canada with temperatures as low as - 30 °C.



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