

InnovaRig

an Innovative Drill Rig for Science and Exploration

InnovaRig is a new drill rig with innovative characteristics for scientific drilling and industrial applications. Designed by GFZ Potsdam, Germany's national research centre for geosciences, in cooperation with the industrial partners Herrenknecht-Vertical and H. Angers Söhne, it will exceed the modern requirements of scientific drilling. With a small en-

vironmental footprint it also reduces manpower and operational costs to a minimum.

*Photo: A. Jurczyk,
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InnovaRig Basic Features

- Mast and Hoist System is hydraulically driven with a double cylinder system. The nominal hook load is 4100 kN. InnovaRig offers a ~ 5500 m depth capacity.
- The Pipe Handling System comprises semi-automatic hands-off-technology. A combined pipe make-up bridge, pipe handler and iron rough-neck technology puts strenuous physical human labor on the drill platform to an end, the rigfloor is today an unmanned robotic work space. A derrick man workplace is no longer needed.
- Four Drilling Techniques are integrated in the operating infrastructure: rotary drilling, standard coring, wireline coring and underbalanced air-lift drilling. A new high performance top drive systems (rotary drilling & wireline coring) give maximum drilling performance.
- Mud Conditioning System, Pumps and Tanks are modularly adjustable to the four drilling techniques mentioned above.

InnovaRig for Science

InnovaRig is developed specifically for scientific drilling. Compared to standard drilling platforms it offers many innovative solutions, e.g.:

- Core drilling is facilitated by a novel hydraulic top drive system adjustable to all kinds of coring. An integrated wireline winch & wireline pump and a modified mud tank system enable a fast change to the wireline coring technique.
- Fast Logging Data Recovery is a central feature of InnovaRig. A pre-installed storage unit for logging sondes cable guidance allow for quick logging.
- Scientific Sampling with a special collector for cutting characterization and a new mud gas analysis apparatus based on mass spectrometry is routinely installed. A science container for field lab investigations can be installed and integrated into the drill rig's data network at the location at any times.
- Data Management takes place via on site, online data acquisition. InnovaRig's Drilling Information System (DIS) is integrated in to the ICDP Drilling Information System (International Continental Scientific Drilling Program).





Photos:
L. Wohlgemuth, GFZ

InnovaRig Innovations

- Special rig design and equipment for scientific drilling
- Variable application of Rotary Drilling, Standard Coring & Wireline Coring and Air-Lift Drilling
- Modular rig design and high safety standard due to high degree of automation
- Integrated energy concept (Electric power and Diesel)
- Hydraulic hoist and feed system. No drilling line
- Hookload directly supported by substructure (box-on-box), no loading of the mast structure
- Hoist constructed to handle doubles and singles
- Integration of all proven drilling technologies from oil and gas drilling
- Least possible emissions to the environment
- Design-integrated noise attenuation
- Reduced areal foot print

Technical Data and Specifications

- Drilling depth up to 5500 m
- Regular Hookload 4100 kN
- Nominal rotary speed 220 rpm
- Rotary torque 40 – 75 kNm
- Tripping speed more than 500 m/hr
- Hoist cylinder stroke 22 m
- Drive power up to 4000 kW
- Rig weight approx. 3700 kN
- Mud pumps 3 x 1000 kW
- Wireline coring mud pump 1 x 600 kW
- Pump pressure max. 350 bar
- Mud tank system 240 m³
- Generator set 3 x 1540 kVA
- Max. Drill pipe Racking capacity 7000 m
- Wireline coring winch 7500 m, d=12.7 mm
- Height = 51,8 m
- Core drill pad = 3000 m²

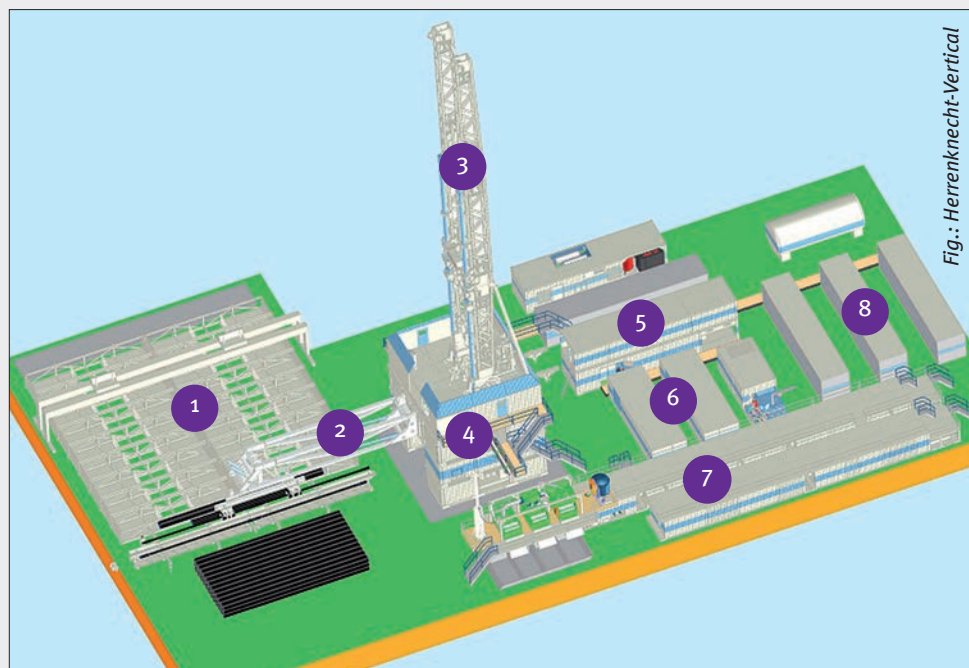


Fig.: Herrenknecht-Vertical

Sketch of the InnovaRig

- 1 Pipe rack
- 2 Pipe handling system
- 3 Derrick with hydraulic hoist cylinders
- 4 Substructure with working platform and blow out preventer system
- 5 Electric Power Control Unit
- 6 Mud pumps
- 7 Mud conditioning system with mud tanks, shale shakers, centrifuges, desanders and desilters
- 8 Diesel power engines



Photo: L. Wohlgemuth, GFZ



Photo: Herrenknecht-Vertical

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