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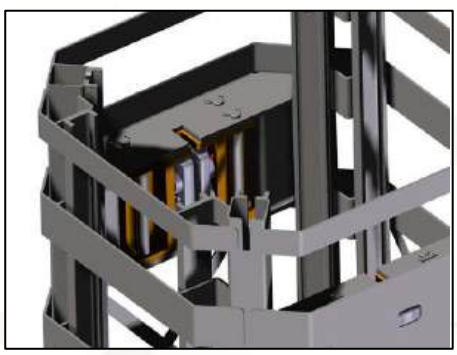
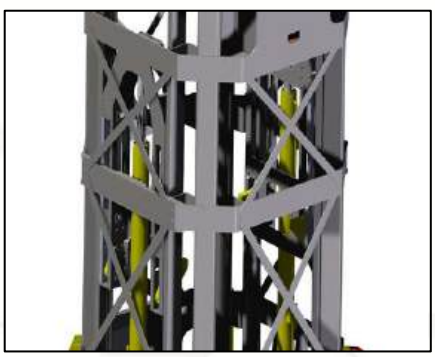
StatRapid, a new Rapid Load Testing Application

StatRapid device on site

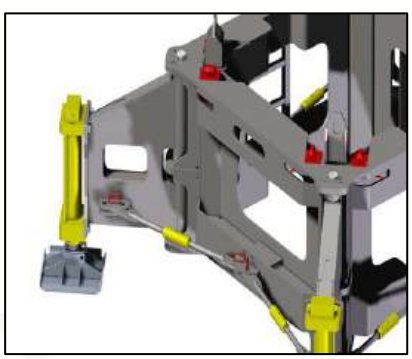
Rapid Load Testing (RLT) is an alternative for Static Load Testing (SLT) of foundation piles. The StatRapid (STR) device has been designed to perform Rapid Load Testing in a safe, reliable and cost effective way. During Rapid Load Testing the load duration is such that pile and soil behaviour are quasi static



Hydraulic brakes for catching and releasing the drop mass



Hydraulic operated drop mass lifting frame.



Bottom frame with hydraulically extendable legs.

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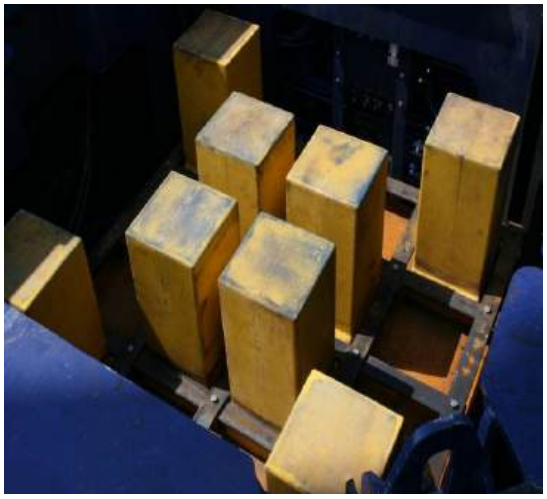
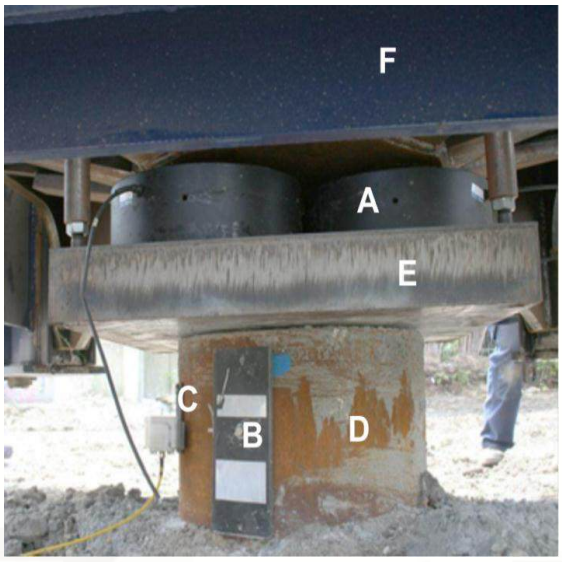
Modular drop mass placed in container

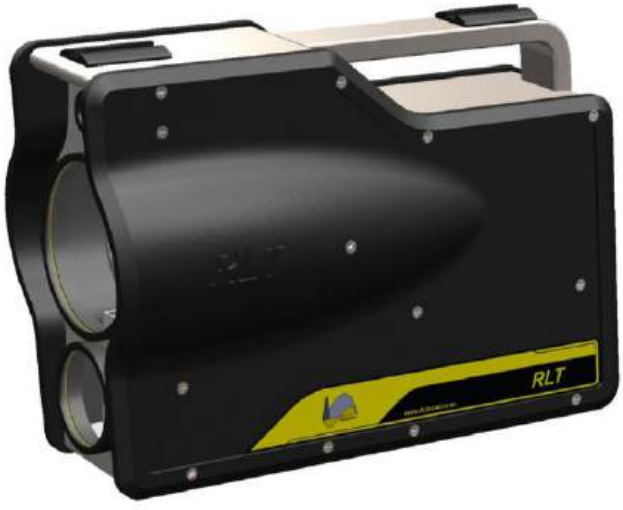


Modular rubber spring system

A StatRapid device consists of a lifting and guidance frame, a modular drop mass, a catch mechanism and a modular soft spring system. The size and duration of the load can be adjusted by varying the drop mass weight, the spring stiffness and the lifting height. The system is hydraulically operated and has sensors for a proper vertical and stable position. It should be noted that the dead weight of the drop mass can also be used for the first (static) loading cycle. StatRapid devices are manufactured by Cape-Holland (www.cape-holland.com)



Measurement set up on pile



Reyca- optical system for measuring dynamic structural displacements.

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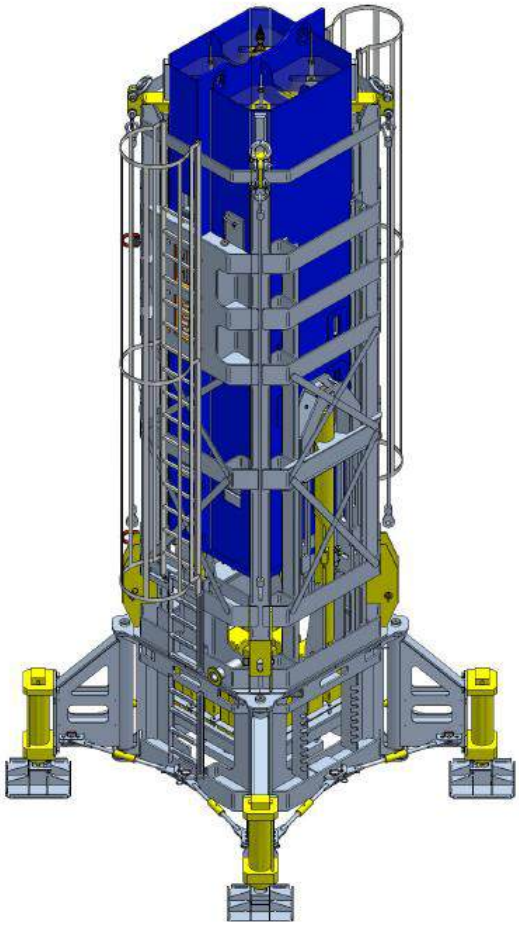
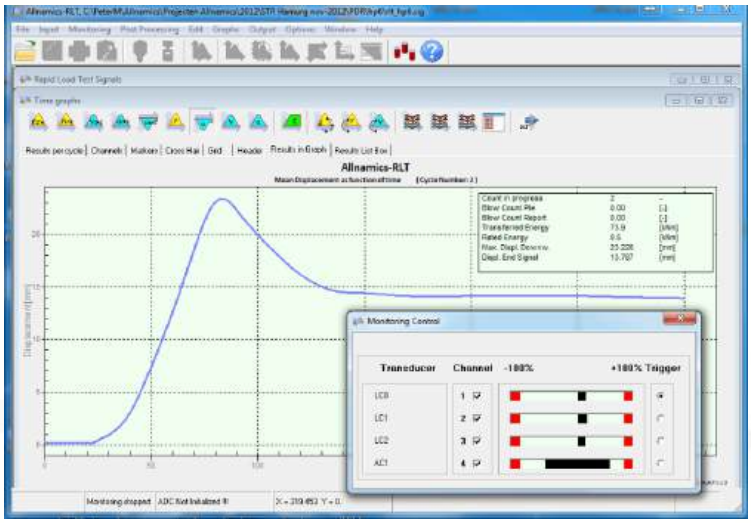


4-16MN StatRapid Device

The catch mechanism catches the drop mass after bouncing up from the springs. This prevents unwanted rebounds and allows for successive cyclic testing with increasing loads similar to static load cycling testing. In accordance with the CUR and ASTM standards the load, displacement and acceleration are measured near the pile top [D] and then recorded. The load is measured with load cells(s)[A], the displacement with an optical system (Reyca) [B] and the acceleration with a servo accelerometer[C]. The load cells are placed on a load transfer steel plate (E)

The required load duration for Rapid Load Testing depends on the pile length. The modular set up allows for the tuning of the StatRapid system for piles with different lengths before going to site. With the AllWave-RLT simulation program the set-up can be checked to satisfy the RLT condition.

The PDR, a pile testing monitoring system and the associated monitoring and analysis software developed by Allnamics (www.allnamics.eu), enable the user to report the Rapid Load Test results in accordance with the ASTM D7383-10 standard and CUR 230 Guideline.



Allnamics-RLT Monitoring/Analysis/, Reporting Program

PDR for Rapid Load Testing Data Acquisition

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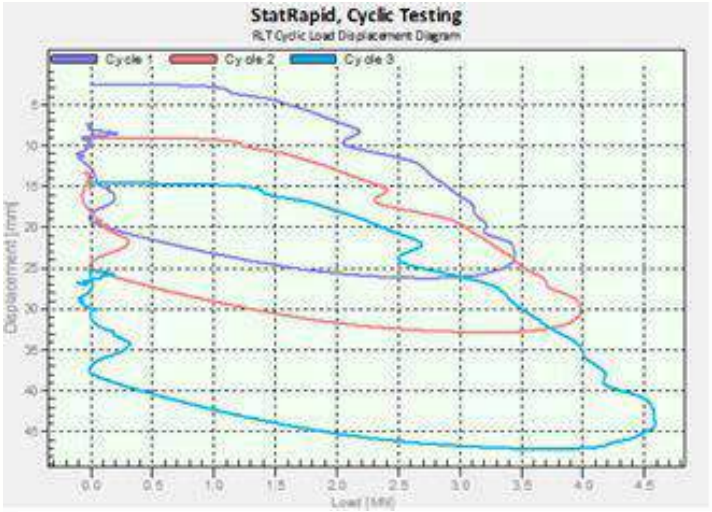
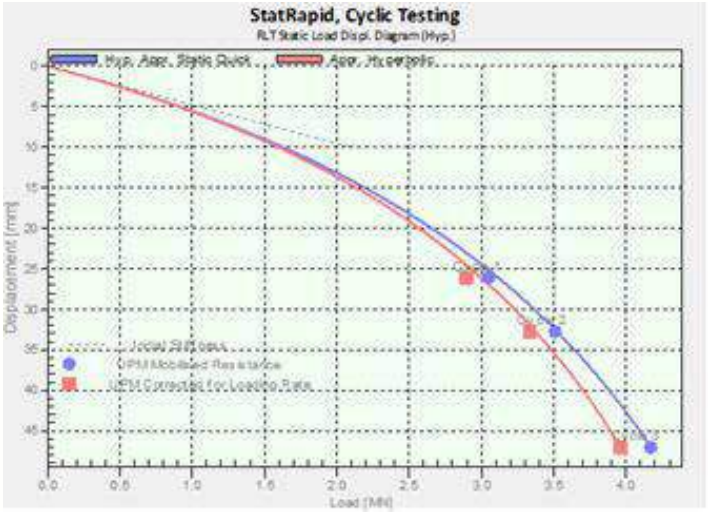


StatRapid Cycling Testing Load Displacement Results



StatRapid Static Load Test Results according CUR-230

The following are key features of the StatRapid device.

- System designed for safe and reliable operation. The StatRapid frame consists of a bottom frame and a top frame
- Site assembling using a crane
- Swing frame for extra precise handling and lifting of the top frame
- Modular drop mass so the mass can be adjusted to achieve the required load
- Internal hydraulic lifting system for adjustable drop height up to 4m.
- Mechanism for catching the drop mass after rebounding from the springs.
- Modular and adjustable rubber spring system
- Hydraulic power unit and generator
- Electronic control of the frame inclination by joystick and hydraulic presses
- Prediction software (AllWave-RLT) to determine the required spring stiffness, drop mass and drop height.
- Multi-cycle test, with several loading cycles. The first load cycle is performed with the static weight of the drop mass on the pile head. The next loading cycle is applied with a small drop height to minimize the loading rate and damping effects with the pile stiffness very close to the stiffness during a static load test. Afterwards the load is gradually increased to determine the load bearing capacity of the pile.
- Instruments consist of load cells, a servo-accelerometer (s) and an optical measuring system.

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- For a simple calibration three (smaller) load cells are used instead of one large load cell.
- Data Acquisition System (Allnamics-PDR) with optional Wi-Fi data transmission.
- Monitoring and reporting software (Allnamics-RLT).
- Measurement and test procedure in accordance with ASTM D7383-10, and the latest draft for the Euro code (EN_ISO_-22477-X_ (e)).
- Test data analysis based on user-independent principles (CUR-230).
- Test data analysis in accordance with the Dutch CUR recommendations, taking into account loading rate dependencies of the soil.

Transport of StatRapid Device

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