junttan
respecting ground

Piling equipment and solutions for driving large diameter steel tubes

Junttan Oy in brief

- A Finnish company, founded 1976. Located in Kuopio
- Leading manufacturer of hydraulic pile driving equipment
- Global operations:
  - Distribution in more than 20 countries on all continents
  - Equipment working in more than 45 countries around the world
  - Main market areas:
    - Northern Europe
    - North and South America
    - Russia
    - Oceania
- More than 95% of production exported outside Finland

Products and Services

Pile Driving Rigs

Multipurpose Piling Rigs

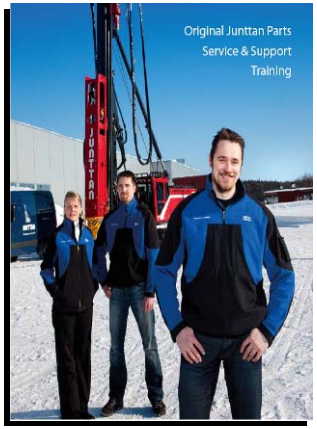
Deep Stabilization Rigs

Hydraulic Hammers

Hydraulic Power Packs

ExcaDrill

Rock Drill Units



Customer Care

Parts
Service
Training

Junttan Hydraulic hammers

HHK-A

- Stroke 1200 mm
- Double acting
- Acceleration 1G (“assisted free fall”)
- Standard model range from 3 ton up to 16 ton
- Energy 35-188 kNm
- Adjustable blow rate 40-100 bpm
- Primary applications:
  - Leader applications
  - Junttan or other base rigs
  - For conrete, steel and timber piles

HHK-S

- Stroke 1500 mm
- Double acting
- Accelrated 1G (“assisted free fall’)
- Standard model range from 5 ton up to 28 ton
- Energy 74-412 kNm (Boost: 450 kNm)
- Adjustable blow rate 30-100 bpm
- Primary applications
  - Leader or free hanging applications
  - Junttan or other base rigs, cranes
  - Hydraulics usually from separate hydraulic powerpack (Junttan)
  - Piles: steel tubes, beams

SHK

- Max . stroke 12) mm
- Double acting
- Accelerated 1,1G
- Standard model range 3-9 ton
- Energy 36-129 kNm
- Adjustable blow rate 50-140 bpm
- Primary applications
  - Junttan rigs

Piles; Conrete and Steel piles

Why Junttan?

- Efficiency: approx. 97 % of impact energy transfers to the pile, thanks to optimized, accelerated and adjustable blows
- Junttan hydraulic pile driving equipment is optimized for high performance piledriving in the most difficult soil conditions, with no compromizes in ensuring the pile integrity
- Accurate and stepless adjust for blow rate and drop height
- Environmentally friendly
- Top quality and easy service

CASE 1 – HYDRAULICALLY OPERATED RAILROAD HOIST – PILING FOUNDATIONS FOR THE STEEL LATTICE BRIDGE

Project description;
A total of 26 bridges to be repaired or constructed along with a service road of 7 kilometers, 1.5 kilometers of new railroads plus 3 interchanges.

Contarctor joint venture ”Kalsium”: Niska & Nyyssönen Oy, Insinööritoimisto Seppo Rantala Oy ja Skanska Infra Oy.

•Costs >90Meur in total, completed 2014

Driven pile foundations for 4 underwater reinforced coffer

- 14-16 pcs battered piles (1:3.5) per each coffer
- Piles mostly rock-shoe equipped L16m, D610/S12,5 Rautaruukki steel tubes, total L 24-33 m, the pile extensions were made by welding. The welds were inspected with ultrasonic testing.
- Requested bearing capacity 3 MN per pile, whole pile group approx. 50 MN.*
- Soil conditions: soft clay, sand, moraine, lot of rocks, bolders etc.
- Pile driving were made on temporary working bridge, depth of water approx. 10 m

*The bearing capacity is secured with PDA measurements (4 per coffer). The Junttan HHK 4SL hydraulic hammer that is used for the pile driving is equipped with a three-ton extension for the PDA measurements in order to achieve the energy required for the measurements with the existing equipment. If necessary, the machine that is used in the pile driving operations can be equipped with a special Junttan gear to accomplish the final blows. In this case, the mass of the free falling, hydraulically released load is 10,000 kg. The piles processed with the Junttan PM23 are 16 meters tall at most."


Junttan PM23 long reach piling rig equipped with Junttan HHK4/7SL hydraulic hammer.
Kantolan PAALUTUS OY
www.kantolanpaalutus.fi
JUNTTAN

Results:

- Despite of hard soil conditions, piling job was compeleted on schedule.
- All measured piles achieved a requested bearing capacities.
- ”PM23 is just a right machine (in good hands) for this kind of project; long reach, ease of pile handling and high efficient hammer”. –Harri Inget, the operator. Kantolan Paalutus Oy

CASE 2 – Cape Lambert Port B, Australia

Project description

- Part of large expansion project of Cape Lambert industrial area
- Extension of harbour capacity from 85 million ton up to 130 million ton per year.
- Contractor; John Holland Group, AUSTRALIA

Project description

- 920 m long dock for 4 vessel
- Piles: 300 pcs L42-55 m steel tubes
  - 102 pcs D1400/S25 vertical and battered (1:3.6), RUG: 3,8 MN-10,6 MN
  - 108 pcs D1700/S25 vertical
    RUG: 5,5 MN-7 MN
  - 16 pcs D1000/S25 vertical
    RUG: 3MN
  - 74 pcs D1500/S25 vertical- and battered (1:4)
    RUG: 8,2 MN-15,3 MN
- Pile driving made on barge and upon the dock

CASE 2 – Cape Lambert Port B, Australia

- Pile driving equipments:
  - 2 set of Junttan HHK25S (Boost) + 30CCU
  - 2 set of Junttan HHK28S (Boost) + 30CCU
  - Max impact energies 400 kNm and 450 kNm
  - Pile sleeves custom designed according to pile diameters. Sleeve L 2250 mm

- Crane lifting application;
  - 2 pcs Liebherr LR1400/2 (400 ton)
  - 2 pcs Marr M1680D (400 ton)


15
13


MARRS
MARRS

CASE 2 – Cape Lambert Port B, Australia

Some notes

• While driving battered piles, the difference between impact energy measured transferred energy (by PDA analysis) was big. Transferred energy was only approx.half of impact energy.

•Requested energy for final blows was not achieved

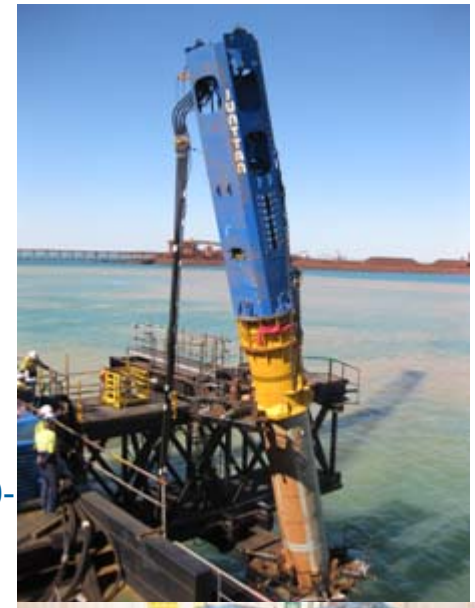
•Top of the piles were damaged

•There was unusual swaying detected on the hammer during driving

• There was a clear sign of unilaterally impacts on the top of the pile

•There was a cracks detected on hammer frame after 15 driven piles (1500-2000 blows per pile).

→ Something was definitely wrong!



CASE 2 – Cape Lambert Port B, Australia

Action!

- The alignment between hammer and pile was wrong.
    - checked and adjusted. Space between pile and sleeve was almost zero.
- PDA-measuring sensors were mounted different way, for both side and for battered way, to confirm correct energy transfer.
- More training for operators to get a full and designed capacity from hammer.

Results;

- Hammer was stable while driving battered piles
- The impact on top of pile was correct; hit reached the pile correctly and piles were not damaged
- The measured impact energy match to the PDA measured, transferred energy
- The requested bearing capacity achieved easily

General notes for installation of large diameter driven steeltubes

- The piling plan itself, but also a choise of equipments need to be done by simulation.

- The criteria for final blows for Junttan hammers are generally 10 blows / penetration 25 mm, within max. 6 series of 10 blows (=60 blows / 150 mm penetration)
- In very challenged conditions, limits can be extended 100 blows / 100 mm, max. 5 series within 100 blows (=500 blows / 500 mm)

- The piling process need to be constantly monitored to avoid possible faults before a bigger damages
  - Energy measuring
  - Monitoring of transferred energy by PDA-measuring
  - Alignment between pile and hammer
  - Monitoring cushion material on drive cap (between pile and ram weight)
  - Monitoring the hammer action generally (exceptional noise, movements etc.)
  - A proper maintenance and service actions

- The final results have to be verified by dynamic or static tests

Your local representative in Denmark

Tak for jeres interesse!