

SPEC. F5-2337

Date: December, 1999

SPECIFICATIONS

OF

“NISSHA”

Crawler mounted **Hydraulic pile driving rig**

Model : DH308-85M, M65C

Quantity: _____ unit

Two-drum of main and auxiliary drums & single guide leader version
(With no third drum & leader revolver equipped)

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1. GENERAL CONDITIONS

1) This specifications shall cover the standard specification of NIPPON SHARYO Hydraulic Pile Driving Rig; Model DH308-85M (here-in-after called "The machine") manufactured by NIPPON SHARYO, LTD.

The general arrangement and principal dimensions of the machine are shown in the drawing attached.

2) Design and workmanship

The machine shall be designed to perform the maximum efficiency with the least fuel consumption and the lowest maintenance costs.

The workmanship shall be of the first class in all respects.

The machine shall be built for simple mechanical arrangement and easy in inspection and maintenance.

3) Materials

The materials used in the manufacture of the machine shall be of the highest quality, free from defects and imperfections.

Principal materials such as bolts, nuts, seals and steel plates used in the machine confirm to the Japanese Industrial Standards. (Almost equal to ISO)

4) Test and inspection

Routine test and inspection in our factory shall be final.

5) Painting and lettering

Under-coating by anti-rust paint and enamel finishing shall be performed in accordance with manufacturer's standard practice.

Main parts of the equipment shall be painted in NIPPON SHARYO Green and other equipment in manufacturer's standard.

6) Language and unit of measurement

All documentation, such as specifications, manuals, etc. shall be written in English and all of equipment shall be designed in metric system.

7) Service conditions

The equipment shall meet the following service conditions.

Ambient temperature: -10 deg. C or higher and 40 deg. C or lower.

8) Warranty

All the machine specified herein shall be warranted by us for a period of twelve (12) calendar months after the date of being to put into operation, or fourteen (14) months after the date of shipment at a Japanese port, or one thousand engine operation hours according to the service hourmeter, whichever is soonest.

The warranty shall cover defects in design, materials and workmanship only, shall not applicable to damage sustained mishandling of the machine or normal wear and tear.

The warranty shall not be applicable to the parts and materials mentioned below.

- 1) Linings as brake/clutch bands and disc.
- 2) Wear plates
- 3) Wire ropes
- 4) Rubber made parts
- 5) Seals as o-rings, seal rings, back-up rings, etc.
- 6) Gaskets and sheet packings
- 7) Filter elements
- 8) Batteries
- 9) Electric wiring
- 10) Glasses
- 11) Other quick moving parts
- 12) Lubricants

NIPPON SHARYO, LTD.

.....**Concluded**

2. FEATURES

- 1) High performance in hydraulic pile hammer work**
The machine is specially designed for heavy duty pile driving work by equipping with suitable hydraulic pile hammers.
- 2) Durable and stable pile driving work**
A durable cylindrical leader with two back-stays mechanism give a high degree of durability and stability of the machine.
- 3) Excellent maneuverability**
The maximum allowable operating weight of 88,000kgf (863kN) assures smooth maneuverability in the site.
L.H. and R.H. Independent traveling mechanism enables the machine to make both pivot and spin turns, and to steer the crawlers continuously.
- 4) Smooth swing**
The swing mechanism with NIPPON SHARYO original reaction device makes operator easy to control sensitive swing motion and accurate positioning of the superstructure.
- 5) Comfortable operator's room**
Well insulated operator room with five (5) wide wind-shields assures bright and quiet operation circumference with minimum fatigue.
- 6) Easy operation**
Hydraulic actuated control levers are easy to operate, and high/low winch speeds and winging-stop-rewinding actions can be done by one control lever.
- 7) Easy maintenance**
Adopting floating ring seals in drive tumblers, take-up tumblers and lower track rollers, and sealed bearings to every sheaves requires minimum daily maintenance service. A grease-bath type swing pinion gear prolongs its service interval.
- 8) Low fuel consumption**
The machine is powered by a direct fuel injection type diesel engine with variable displacement type plunger pumps of efficient performance, accordingly economical operation can be assured.

3. SPECIFICATIONS OF PILE DRIVING RIG

3.1 Model of basic machine..... NIPPON SHARYO DH308-85M

3.2 Nominal dimensions

- 1)Overall width in transportation (without outrigger cylinders).....: 3,200mm
- 2)Overall width in working (Outrigger cylinder): 5,616mm
- 3)Crawler overall width in working: 4,010mm
- 4)Crawler overall width in transportation: 3,200mm
- 5)Crawler center to center distance in transportation: 2,440mm
- 6)Crawler center to center distance in working: 3,250mm
- 7)Crawler shoe width: 760mm
- 8)Crawler overall length: 5,120mm
- 9)Tumblers center to center distance: 4,260mm
- 10)Ground clearance: 359mm
- 11)Cab width: 3,000mm
- 12)Cab height: 2,895mm
- 13)Gantry height (Working): 5,056mm
- 14)Overall height (Transportation): 3,250mm
- 15)Distance from swing center to rear end (Transportation): 4,336mm
- 16)Rear end radius (Outrigger beam): 4,966mm
- 17)Rear end ground clearance (Outrigger cylinder): 400mm

3.3 Operation speed

- 1)Main, auxiliary drum, winding speed (Low) * 34m/min.
- 2)Main, auxiliary drum, winding speed (High)* 68m/min.
- 3)Main, auxiliary drum, re-winding speed (Low)* 34m/min.
- 4)Main, auxiliary drum, re-winding speed (High)* 68m/min.
- 5)Leader drum, winding speed* 50m/min.
- 6)Leader drum, re-winding speed* 50m/min.
- 7)Swing speed 3.5 rpm
- 8)Travel speed 1.4km/hr.

3.4 Gradeability (Basic machine) 40%

3.5 Weight of basic machine28,000kgf
(274 kN)

3.6 Counterweight (8,500kgf + 5,000kgf) 13,500kgf
(83.3 kN + 49 kN) (132 kN)

3.7 Standard leader length 24m

3.8 Maximum allowable operating weight88,000kgf
(863 kN)

3.9 Ground contacting area64,752cm²

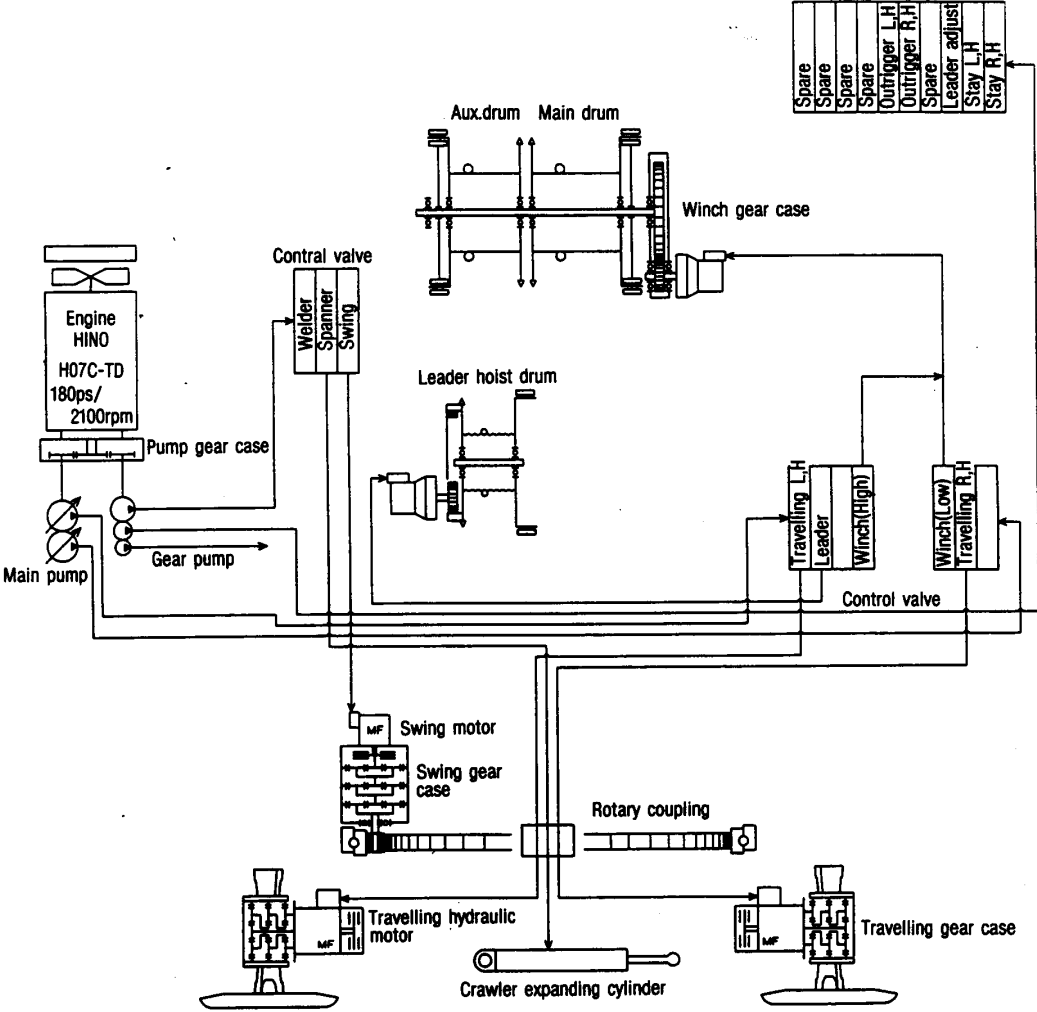
3.10 Ground pressure (at the maximum operating weight of 88,000kg)
..... 1.27kgf/cm²
(1.24 bar)

3.11 Diesel engine

1) Maker	HINO MOTOR LTD.
2) Model	H07C-TD diesel engine
3) Type	Water cooled, 4-cycle, Overhead valve, in-line 6-cylinder, direct fuel injection, turbo-charged.
4) No. of cylinder x bore x stroke	6 x 110mm x 118mm
5) Total displacement	6728 cc
6) Compression ratio	17.5 : 1
7) Rated output	180PS/2000rpm (132.7 kW/2000rpm)
8) Maximum torque	67kgf-m/1600rpm (656N-m/1600rpm)
9) Fuel consumption rate	174 g/ps · hr 235g/kW · hr
10) Battery	24V-120AH x 2 pc.

3.12 Fuel tank capacity**250 liters**

4. POWER TRAIN DIAGRAM



5. STRUCTURE AND FUNCTIONS

5.1 Upper revolving superstructure

All welded, stress relieved and precision machined unit, specially designed for rigidity and durability.

5.2 Winch drums

- 1) Main, auxiliary and leader winch drums are of special alloy cast iron.**
- 2) Grooved leader drum is mounted on a drum shaft and driven independently by a hydraulic motor.**
- 3) Main, auxiliary drum are mounted opposite each other on anti-friction bearings on single drum shaft and driven by one hydraulic motor.**
- 4) Drum clutch system**
Main and auxiliary drums are equipped with internal expanding friction clutch bands powered by respective hydraulic clutch cylinders and ensure both of power controlled lowering and free-fall lowering action.
- 5) Drum brake system**
Main and auxiliary drums are equipped with external contracting friction bands powered by treading respective brake pedals.
- 7) Leader hoisting/lowering mechanism**
Completely independent operation from other winch functions.
Both of hydraulic brake and spring-loaded/hydraulic released band brake offer positive and safe stopping of leader action.
- 8) Drum pawl lock**
Main, auxiliary and leader drums are equipped with pawl locks for safe operation.

5.3 Swing mechanism

- 1) Swing motor**
Axial piston motor with built-in planetary reduction gear.
- 2) Swing bearing**
Sealed ball race bearing with heat treated internal gear.

- 3) **Swing brake**
Spring loaded and hydraulic released negative brake is installed.
- 4) **Swing lock**
Manually operated mechanical lock with a rod tip which is engaged in the hole of track frame during transportation and assembling, whenever needed.

5.4 Operator room

- 1) **Roomy, completely independent operator's room has safety glass windshields giving super blighting and excellent all-round visibility.**
- 2) **Control levers and instruments are arranged in convenient trouping, reducing unnecessary moves for operator.**
- 3) **Comfortable reclining seat is adjustable.**

5.5 Undercarriage

- 1) **Track frame**
All welded, stress relieved, precision machined unit, especially designed for rigidity and durability.
- 2) **Side frame**
Side frame of all-welded construction can be expanded for better stability of the machine during working and retracted for transportation by hydraulic cylinders equipped as standard.
- 3) **Track shoes**
Shoes are cast, heat-treated steel, flat and tapered surfaces and are connected by heat-treated steel pins.
- 4) **Rollers**
Life-lubricated lower rollers, upper rollers and drive tumblers.
8 lower rollers in each side frame, with double rolling surfaces.

5.6 Hydraulic system

A semi-closed circuit hydraulic system with double-plunger pump plus 3-gear pump assures both independent and simultaneous operations of all functions.

5.6.1 Main pump (Double-plunger pump)

1) Type	Plunger pump 1 Variable displacement Total power control	Plunger pump 2 Variable displacement Total power control
2) Setting pressure	285 kgf/cm² (279 MPa)	285 kgf/cm² (279Mpa)
3) Oil flow	234 lit./min.	234lit./min.
4) Applications	Travel (L.H.) Leader drum Main/Aux. drum(high)	Travel (R.H.) Main/Aux. drum (low)

5.6.2 Gear pump

1) Type	Gear pump 1	Gear pump 2	Gear pump 3
2) Setting pressure	210kgf/cm² (20.6 MPa)	120kgf/cm² (11.8 MPa)	
3) Oil flow	130 lit./min.	79 lit./min.	
4) Applications	Swing Expansion of crawlers	Front-end attachments	Pilot circuit

5.6.3 Hydraulic motor

1) Swing motor	1-fixed volume axial piston motor with brake.
2) Winch(Main/aux.)	1-fixed volume axial piston motor with counter balance valve
3) Winch (Leader)	1-fixed volume axial piston motor with counter balance valve
4) Travel	2-fixed volume axial piston motor with spring loaded/ hydraulic released negative brakes and relief valves.

5.6.4 Hydraulic oil tank capacity : 280 liters

5.7 Leader and back stays

1) Leader

M65C leader is supported at its middle portion with a pair of back stays and cylinders and at the lower end with a leader bracket.

A pairs of guide pipes (ϕ 70 x 330mm pitch) are provided along with whole length of the leader which enable to equip a hammer or an earth auger drive.

2) Top sheave assembly

A top sheave assembly provided at the top of the leader has two sheaves for reeving of main and auxiliary drum ropes.

Working capacity table (DH308-85M, M65C)

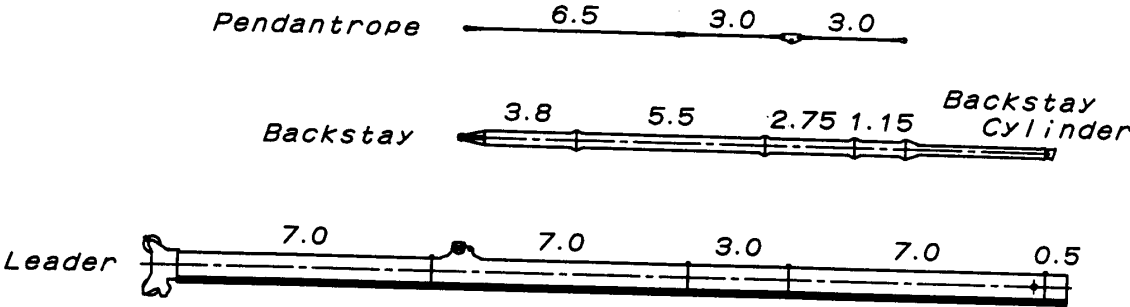
Hammer Make/Model	Hammer weight (ton)	Cap Weight (ton)	Leader		Pile		Vertical drive Stability (with pile) (Degree)		Backward inclination (degree)			Total operating weight (ton)	Average ground pressure (kg/cm ²)
			Length (m)	Weight (ton)	Length (m)	Weight (ton)	Angle	Stability					
								For/aft	Side				
KB60	15.0	3.0	24	5.8	16	9.0	5.1	12.5	15	5.4	3.0	71.4	1.10
#45	11.0	1.5	24	5.8	16	10.0	7.5	14.1	16	5.1	5.1	65.9	1.02
NH70	14.3	1.0	24	5.8	16	10.0	5.9	13.2	-	-	-	68.7	1.06
*NH70	14.3	1.0	24	5.8	16	10.0	6.7	13.2	-	-	-	70.0	1.08

Note:

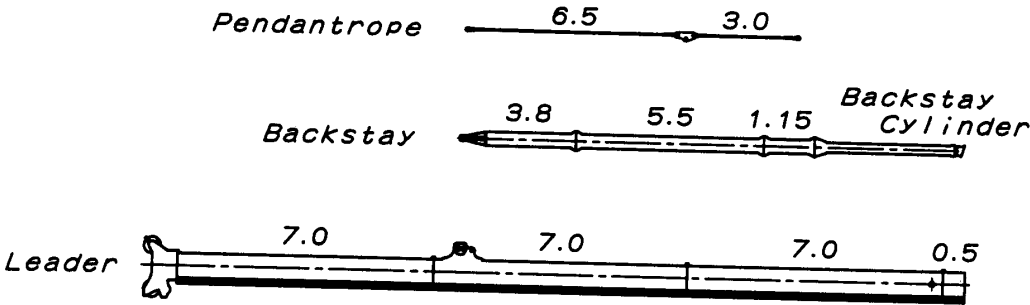
1. The table above shows based on NIPPON SHARYO standard specifications. Consult us when special specifications are required.
The weights of front jacks, outrigger jacks and back tensioner are included in the total operation weight shown in the table.
2. The maximum leader length of self-erection is limited to 24m with the self-erection jacks provided.
3. The permissible lifting load of the pile suspension rope of $\phi 20$ is 5 tons with single-part line and 10 tons with two-part line. Never allow to exceed the permissible lifting load. Consult us when using ropes having other specifications and 3 to 4-part line.
4. Take the safety factor of 6 and more for the auger suspension rope.
5. Guide pipe of the leader is $\phi 70 \times 330$.
6. Use outrigger jacks when any backward batter pile driving is carried out. The maximum backward batter angle is up to 20 degrees.
Consult us if any different condition than the above is required.
7. The maximum permissible operation weight is up to 88 tons.
8. NH70 with * shows when the hydraulic power pack model:NHP-150 of NH-70 hammer is mounted at the back of the DH308-85M pile driving rig and the counterweight is reduced to 8.5 ton (5ton counterweight is dismantled).

8. LEADER COMPOSITION

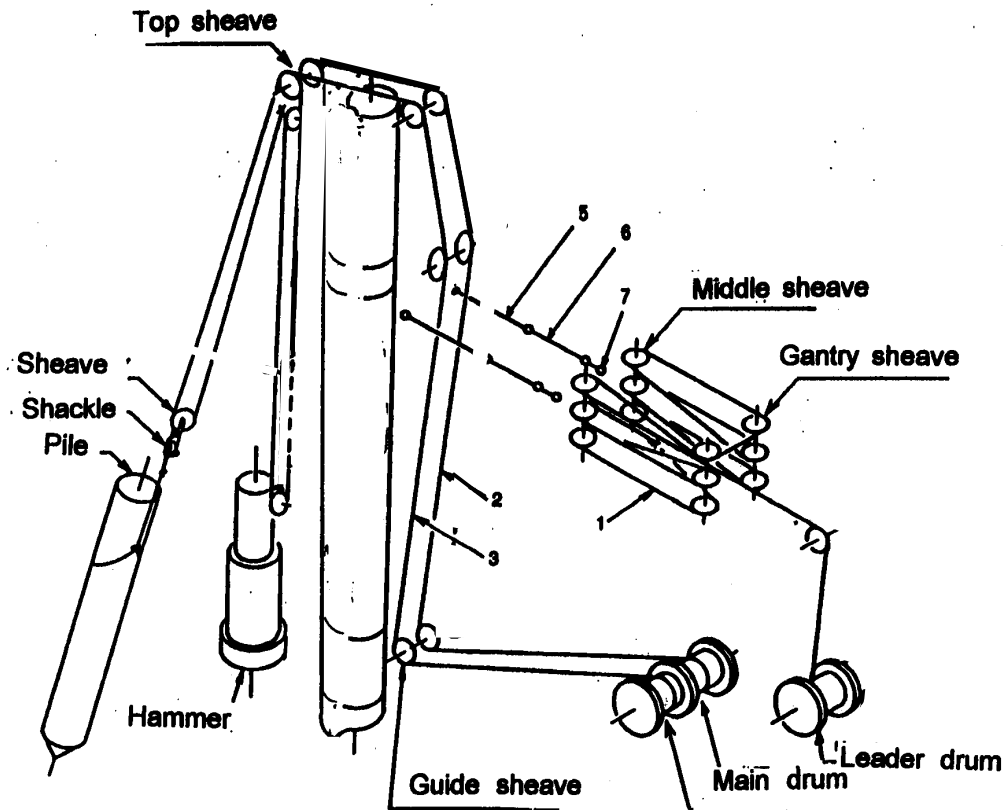
Leader length
24M



Leader length
21M



9. Rope reeving chart



No.	Rope name	Rope specifications	Rope dia. (Braking force)	Rope length
1	Leader	XP7 x7 6WS(31) Ordinary Z-twist	φ 14	130m
2	Hammer	IWRC 6 x Fi(29) Ordinary Z-twist	φ 20 294kN(30t)	170m
3	Pile	IWRC 6 x Fi(29) Ordinary Z-twist	φ 18 238kN(24.3t)	90m
4,5	Pendant	7 x 7 + 6 x Fi(29) ordinary Z-twist	φ 32	3.0, 6.5m

This table shows with 24m leader equipped.

10. SCOPE OF SUPPLY

- 1) **Basic machine : model DH308-85M 1 unit**
equipped with
- 13.5ton counter weight
 - Three drums of main, auxiliary and leader
 - Leader bracket
 - A pair of outrigger jack
 - A pair of self-erecting jack
- 2) **Pile driving front-end attachments 1 set**
- Leader, Model: M65C 24m long**
Single guide pipe (ϕ 70 x pitch 330)
Composed of
- 0.5m lower leader 1pc.
 - 7m Lower leader 1pc.
 - 3m middle leader 1pc.
 - 7m middle leader 1pc.
 - 7m upper leader 1pc.
 - Top sheave block assembly... 1set
with a hammer suspension
sheave block (Double sheaves)
- 3) **Standard accessories**
- Electric fan in operator room 1pc.
 - Radio in operator room 1pc.
 - Rear end radius alarm (Buzzer/flasher lamp)..... 1pc.
 - Leader stand 2pcs.
(Supporting leader section when assembling)
 - Electric fuel pump 1pc.
 - Wire ropes for Main, aux. and leader drums.... **Maker standard size**
 - Backstay supporting pole 2pcs.
(Used for assembling backstay)
 - OK monitor in instrument panel 1pc
 - Roof guard in operator room 1set
 - Ash tray and level gauge with bubble 1pc.
- 4) **Standard tool set 1 set**

11. OPTIONAL EXTRA

- Cooler in operator room 1 set
- Inclinometer 1 set
(Basic machine and leader)

.....**CONCLUDED**