MULTIFUNCTIONAL BENDING AND STRAIGHTENING MACHINES

JOINT STOCK CORPORATION
SHIPBUILDING & SHIPREPAIR
TECHNOLOGY CENTER

JSC “Shipbuilding & Shiprepair Technology Center” (JSC SSTC) develops and manufactures state-of-art bending and straightening equipment, purposed for shaping hull parts.

Manually controlled multifunctional bending and straightening machines (MGPS) were initially developed for shipbuilding and ship repair, but they also can be successfully used in automotive industry, rail carriages engineering and aircraft industry, as well as in construction of equipment for chemical, oil industries and in other areas of machinery industry.

Bending is executed by means of rotary-local shaping (RLS), by bending or rolling of plates on rollers. Longitudinal bending of plates in rollers, transverse bending of plates by rolling the rollers along the plate fixed in matrix or bending in small-sized die tooling can be executed.

Machines provide shaping of plate parts with single or double surface curvature. If manufacturing sail- or saddle-shaped plate parts in such bending machines, no local heating or hot bending is required.

Machines can be also used for bending stripes and parts from profiled iron (bulb and t-shaped steel) with outboard wall by rolling-off profile wall, as well as for flattening of welding and cutting thermal deformations.

Machines are equipped with multipurpose bending and technological tools.

JSC SSTC manufactures and supplies two types of machines: MGPS-25 with bending force of 250 kN (25 tf) and MGPS-100 with bending force of 1000 kN (100 tf). A bended plate is supported by crane equipment or by gantry cranes, and also by special support structures, which are parts of machine. Bending is executed using lines, marked on the plate. Plates shape check is made with patterns and frames. Bending rollers, dies, matrixes, loading and support structures are supplied along with the machine.

Advantages of RLS bending:

- 15 to 25 times reduction of bending force in comparison with ordinary die pressing and processing in roll mills;
- Hot bending or local heating bending are not required;
- Special dies are not required;
- Reduction of work preparation period and cost;
- Reduction of bending power consumption.

Advantages of straightening and bending equipment for RLS bending in comparison with forming machines, used in shipbuilding:

- 3 to 5 times reduction of equipment purchase and installation costs as buried foundations are not required;
- Several times reduction of installed power and steel consumption, as well as energy consumption;
- Operational costs reduction;
- More than 10 times reduction of oil working volume in press hydraulic system;
- Several times reduction of bending tools weight;
- No expenses for development and manufacture of special die tooling;
- Increase in manufacturing process mechanization level, decrease in manual labour share;
- Improvement of plate parts bending accuracy;
- Decrease of labour intensity and processing duration for most parts under bending.

EQUIPMENT SPECIFICATIONS:

	MGPS-25	MGPS-100
Maximum bending force, kN (tf)	250 (25)	1000 (100)
Maximum thickness of single (double) curved plate, mm	20 (16)	40 (30)
Maximum width of processed plate, mm	2500	3200
Maximum length of processed plate, mm	8000	12000
Vertical travel of upper bending roll, mm	350	550
Advance speed / upper bending roll pressing speed, mm/sec	15/5	20/4
Maximum speed of power rack, m/min	6	9
Maximum speed of plate rolling in rolls, m/min	8	9
Total capacity, kW	11	45
Equipment weight, ton	12	33
Equipment dimensions (LBH), m	5,0×2,1×3,1	6,2×2,5×4,4
Gantry crane dimensions (LBH), m	10,7×3,1×4,0	13,8×4,0×5,8
Number of gantry cranes, pc	1	2
Gantry crane base, mm	2500	3500
Gantry rail width (Gantry crane passage), mm	10000	12000
Crane rails length, m	16 (24)	24
Number of hoists on gantry crane, pc	2	2
Gantry crane’s electrical hoists lifting capacity, ton	1	2

MULTIFUNCTIONAL BENDING AND STRAIGHTENING MACHINE MGPS-25

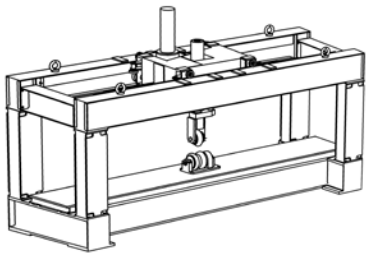
Machine MGPS-25 with bending force of 250 kN (25 tf) was designed for shipyards, constructing small and medium-sized ships as well as for ship repair. Given its technological capabilities, MGPS-25 substitutes hydraulic press with force up to 4000 kN (400 tf).

Machine provides bending of plates of normal and advanced strength with thickness up to 16–20 mm. Maximum thickness of bended plates depends on strength properties of steel, bending radius, plate part shape and dimensions.

Width of bended plate depends on bending angle; when bending along long side of plate, maximum plate width is 2.5 m. The length of plate is limited with capabilities of crane equipment for holding the plate during bending process; maximum length of bended plate is 8.0 m.

In order to support plate while bending, machine can be equipped with gantry crane with two electrical hoists with lifting capacity of 1 ton each.

Sizes of bending section are determined by width and length of gantry rails (10000×16000 mm).



MULTIFUNCTIONAL BENDING AND STRAIGHTENING MACHINE MGPS-100

Machine MGPS-100 with bending force of 1000 kN (100 tf) was designed for shipyards, constructing medium and large-sized ships as well as for ship repair. Given its technological capabilities, MGPS-100 substitutes hydraulic press with force up to 8000 kN (800 tf).

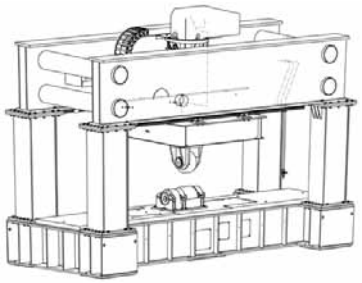
Machine provides bending of plates of normal and advanced strength with thickness up to 30–40 mm. Maximum thickness of bended plates depends on strength properties of steel, bending radius, plate part shape and dimensions.

Width of bended plate depends on bending angle; when bending along long side of plate, maximum plate width is 3.2 m. The length of plate is limited with capabilities of crane equipment for holding the plate during bending process; maximum length of bended plate is 12.0 m.

In order to support plate when bending, machine can be equipped with crane system (two synchronized gantry cranes), integrated in machine operating cycle: cranes motions are synchronized with lower bending roller rotation speed; press and cranes are controlled from one console. Gantry crane is equipped with two electrical hoists with lifting capacity of 2 ton each.

Machine is equipped with loading device, purposed for bending tools replacement. In order to check shape of pre-set plate profile, laser system, which is an “electronic pattern”, can be applied.

Sizes of bending section are determined by width and length of gantry rails (12000×24000 mm).



Advantages of MGPS machines design:

- Scaled-up gantry passage sizes
- Movable carriage, carrying upper bending roller or die
- Large-scaled working table
- Machine motor-reducers are located out of working area
- Two bending modes can be used: pre-set pattern bending or bending with pre-set force
- Speed of vertical movement of rod with bending roller and pressure in hydraulic cylinder can be changed smoothly
- Control console is equipped with digital indicators, showing vertical movement of upper bending roller and bending force
- Manometer is located on the carriage
- Frequency controlled electric drives are applied in order to move carriage with bending roller along the portal and for lower bending roller rotation
- All bending operations, including cranes control, can be controlled from one console;
- Machine is equipped with various bending and technological tools
- Easy-adjustable bending tools, such as rollers, dies and matrixes, with improved geometry of hardened working surfaces
- Support structures are provided to support plates
- Local lighting of working table and equipment

JSC SSTC provides:

- Technical experts in areas of bending and straightening of plates and profiled details
- Commission on Customer's site
- Consultations during Customer's specialists training
- Warranty and post-warranty service

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