

**HLQ**

INDUCTION HEATING EQUIPMENT

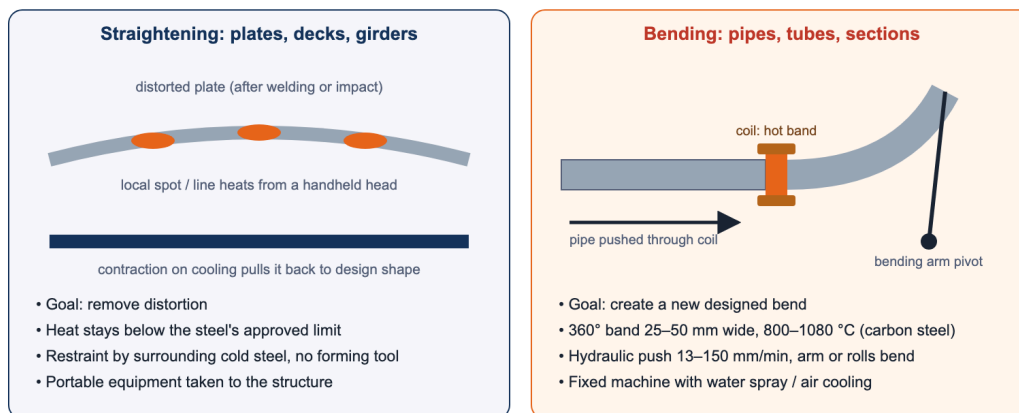
Induction Straightening vs Induction Bending

Two induction processes with opposite goals: straightening removes unwanted distortion from plates and structures; bending forms planned curves in pipes, tubes and sections. Different temperatures, forces, equipment and standards.

Induction Straightening vs Induction Bending – Working Principle

HLQ

Straightening restores a distorted shape by local heats and contraction; bending forms a new curve in a hot, moving band.



Both use induction heating, but for opposite purposes: straightening corrects unwanted shape change; bending makes a planned one.

Bending data: HLQ induction bending pipe-tube article (heated band, temperature, speed). Straightening: HLQ straightening pages; limits per FHWA guidance. Schematic, not to scale.

≤ 650 °C

bridge carbon steel
straightening limit

800–1080 °C

carbon steel pipe bending
(HLQ)

25–300 kW

HLQ straightening

60–2500 kW+

HLQ pipe bending

01 Key differences

Parameter	Induction straightening	Induction bending
Purpose	Remove distortion, restore design shape	Create a new designed bend
Workpieces	Plates, decks, bulkheads, frames, girders	Pipes, tubes, channels, W / H sections
Heating	Local spots / lines	360° band, 25–50 mm wide
Temperature	Below approved limit (bridges: 1200 °F)	800–1080 °C for carbon steel (HLQ)
Forming force	Restraint of cold steel; no forming tool	Hydraulic push; arm or rolls
Speed	Seconds to minutes per heat	13–150 mm/min
Power	25–60 kW handheld; 25–300 kW systems	60–2500 kW+
Frequency	20–50 kHz (DWS-P); 0.5–15 kHz systems	0.5–30 kHz
Standards	FHWA guidance; IACS Rec. 47	ASME B16.49; ISO 15590-1



HLQ induction straightening on a ship deck, and an HLQ induction pipe bending machine.

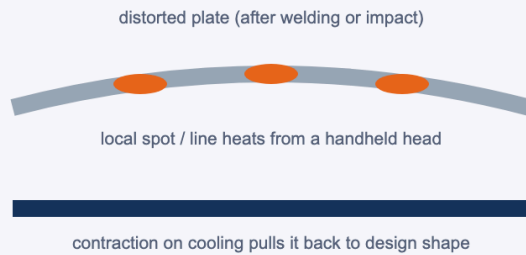
02 Opposite goals, same heat source

Induction Straightening vs Induction Bending – Working Principle

HLQ

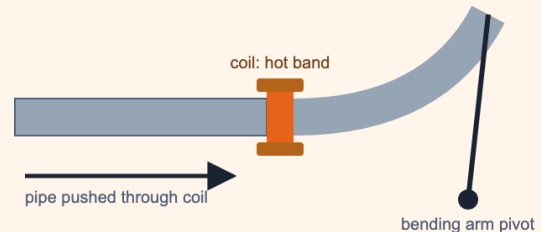
Straightening restores a distorted shape by local heats and contraction; bending forms a new curve in a hot, moving band.

Straightening: plates, decks, girders



- Goal: remove distortion
- Heat stays below the steel's approved limit
- Restraint by surrounding cold steel, no forming tool
- Portable equipment taken to the structure

Bending: pipes, tubes, sections



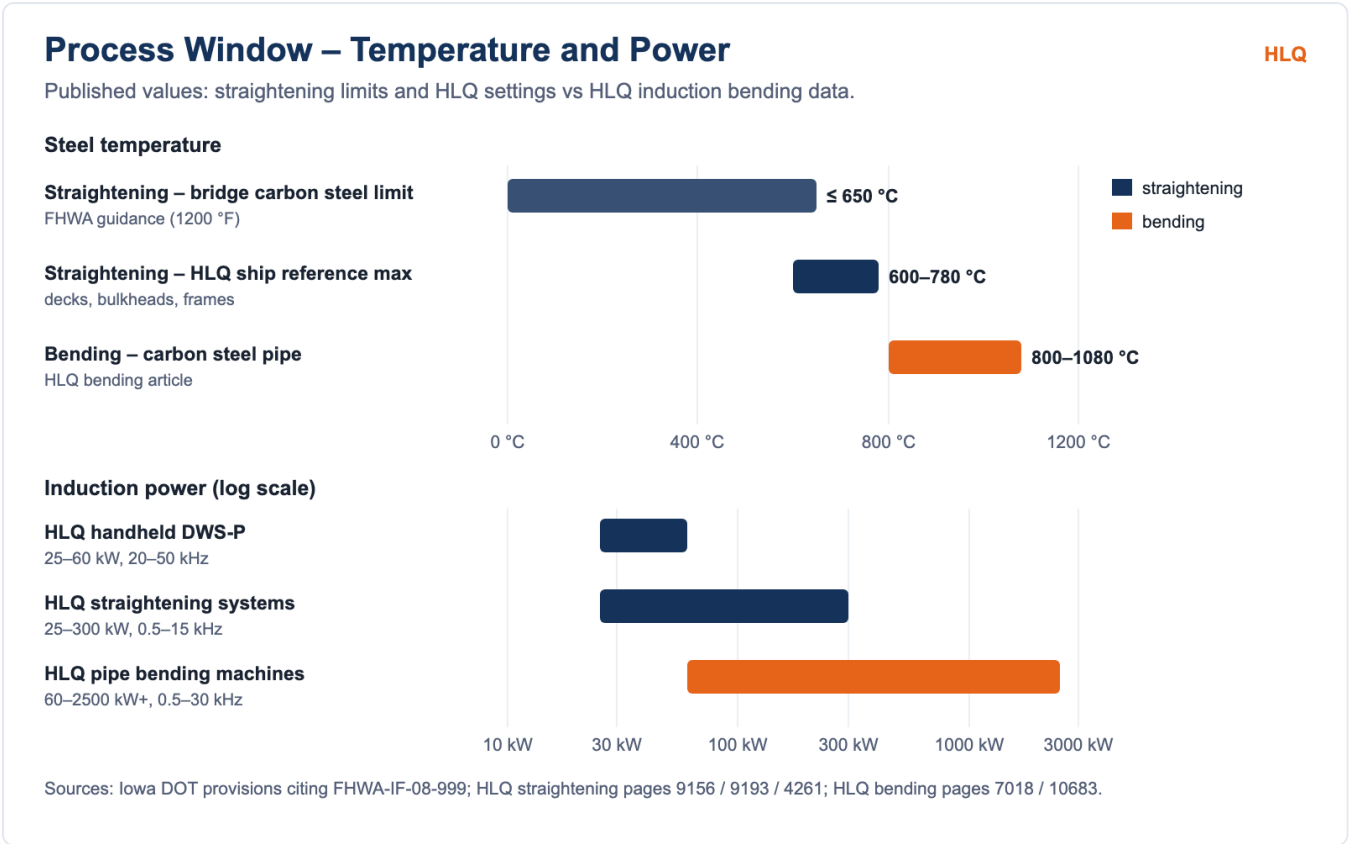
- Goal: create a new designed bend
- 360° band 25–50 mm wide, 800–1080 °C (carbon steel)
- Hydraulic push 13–150 mm/min, arm or rolls bend
- Fixed machine with water spray / air cooling

Both use induction heating, but for opposite purposes: straightening corrects unwanted shape change; bending makes a planned one.

Bending data: HLQ induction bending pipe-tube article (heated band, temperature, speed). Straightening: HLQ straightening pages; limits per FHWA guidance. Schematic, not to scale.

Straightening heats local zones that upset and then contract, pulling distorted steel back to shape. Bending heats a narrow ring of the pipe to forming temperature and pushes it through the coil while an arm or rolls bend the hot band.

03 Temperature and power

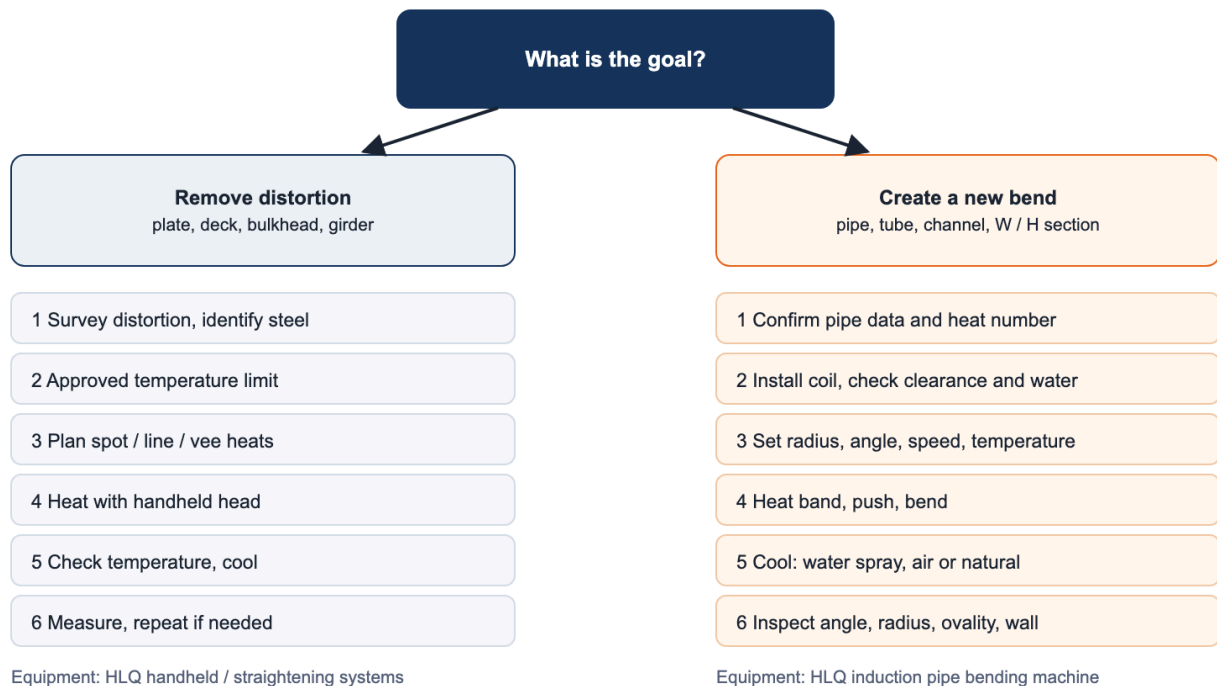


04 Decision flow and equipment layout

Straightening or Bending? – Decision and Process Flow

HLQ

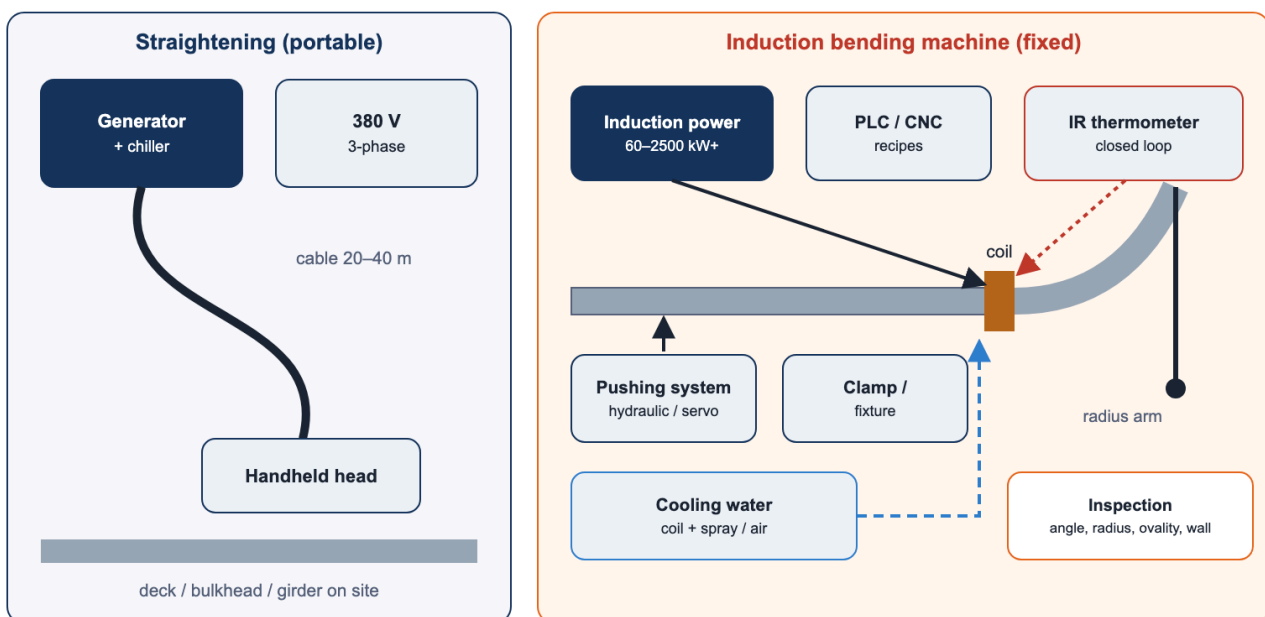
Choose by purpose first, then follow the process steps HLQ publishes for each method.



Equipment Layout – Straightening Site vs Bending Machine

HLQ

Schematic, not to scale. Straightening equipment goes to the structure; pipes come to the bending machine.



Straightening data: HLQ DWS-P handheld page. Bending data: HLQ induction pipe bending machine page (OD 21–1620 mm, wall 2–120 mm, 1.5D–20D, 0–180°).

05 HLQ equipment for each process

Straightening system	Small	Medium	Large
Power	25–50 kW	50–100 kW	100–300 kW
Frequency	5–15 kHz	2–8 kHz	0.5–5 kHz
Steel thickness	up to 15 mm	up to 30 mm	up to 60 mm
Mobility	portable / cart	semi-portable	fixed / crane assisted

Pipe bending machine	Specification
Pipe OD	21–1620 mm or customized
Wall thickness	2–120 mm or customized
Bend radius / angle	1.5D–20D; 0–180°
Power / frequency	60–2500 kW+; 0.5–30 kHz typical
Pushing / control	Hydraulic or servo hydraulic; PLC or CNC
Temperature	Infrared thermometer, closed loop
Cooling	Water spray, air or natural



Induction bending of pipe (original HLQ image).

06 Frequently asked questions

Can a straightening system bend pipes?

No. Bending needs a 360° coil, a pushing system and a bending arm or rolls; handheld straightening heads do not form bends.

Can bending temperatures be used for straightening?

No. Straightening must stay below the approved steel limit, e.g. 1200 °F for bridge carbon steels; bending runs at 800–1080 °C.

Which standards cover induction bends?

ASME B16.49 and ISO 15590-1 for pipeline induction bends.

What is inspected after bending?

Angle, radius, ovality, wall thinning, surface cracks, hardness and properties if required.

What is inspected after straightening?

Flatness or alignment against tolerance, and the temperature records.

Does a shipyard need both?

Often: straightening for decks and bulkheads, bending for marine pipe systems.

Why choose HLQ

Both processes

Straightening and bending.

Handheld

DWS-P 25–60 kW.

Bending lines

OD 21–1620 mm.

Closed loop

IR temperature control.

PLC / CNC

Repeatable bends.

Honest advice

Purpose first.

Straightening or bending – let us check

Send us the workpiece, steel grade, dimensions and the shape you need to correct or create. We will recommend the process and equipment.

Email

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Dongguan City, Guangdong Province, China
523859

Please include in your inquiry

- Workpiece type and dimensions
- Steel grade
- Distortion or bend radius / angle
- Quality standard
- Site power and water