SSW-1 • SHIPBUILDING & MARINE INDUSTRY



Textbook

SSW "Shipbuilding & Marine Industry" Textbook and 120 Practice Questions

Safety, ship basics, welding, painting and ironwork

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> This material is translated from the Japanese original. If anything differs, the Japanese version is correct. The real test is in Japanese (with furigana).

00 How to use this material and how the test works

This textbook is a basic text for people aiming for the **shipbuilding category** of SSW (i) "Shipbuilding & Marine Industry". It covers "General safety and health" and "Welding, painting and ironwork", which appear in the test. Use it together with the question book.

Study order

01 Everyone reads Chapter 1 (Safety). It appears in every job type.

02 Learn the words and the building process in Chapter 2 (Ship basics).

03 Read the chapter for your job (welding, painting or ironwork).

04 Solve the question book. For wrong answers, go back and reread this textbook.

Test format (as of November 2026)

Item	Details
Organizer	ClassNK (Nippon Kaiji Kyokai)
Test language	Japanese (kanji with furigana)
Written test	30 questions, 60 minutes, answer ○ or × (true/false)
Written test content	10 safety and health questions + job knowledge (10 text questions and 10 diagram questions)
Pass mark (written)	60% or more (18 or more of 30)
Practical test	A work test for each job type (welding, painting, ironwork, etc.)
Level	About 70% of people with around 2 years of work experience would pass without preparation

The test is planned to change from April 2027

- Until March 2027, the test is held as an "on-site test" where the examiner comes to the company, by job type (welding, painting, ironwork, etc.).
- From April 2027, the test is planned to become **CBT**, taken on a computer at a test center. The categories will change to "Shipbuilding, Marine Machinery, Marine Electrical and Electronic Equipment". The planned fee for SSW (i) is 6,500 yen (before tax).
- Shipbuilding category work includes welding, painting, ironwork, scaffolding, piping and ship processing. The detailed scope of the new test has not been announced yet. We will update this material when it is.

About "past exam questions"

The real test questions are not published. They are kept secret, and if you get the content from people involved in the test, your pass will be cancelled. Only ClassNK's **sample questions (a few per job type)** are published.

So the question book contains **original practice questions** made in the same format as the samples (◯×, safety / text / diagram). They are not real past exam questions.

01 General safety and health (all job types)

The most important thing in a shipyard is "do not get hurt, and do not hurt others". 10 of the 30 test questions come from this area. If you are unsure, think "the safer answer is correct".

1-1 Basic attitude

- **If you feel unwell, do not hold it in — tell your supervisor.** Do not force yourself to work.
- **If you do not understand, ask.** Do not decide by yourself. "Report, contact, consult (Ho-Ren-So / ほうれんそう)" is the basic rule.
- **Follow the rules and procedures.** Never remove a safety device to finish faster.
- **Do not enter no-entry areas (立入禁止).** You cannot enter areas with ropes or signs without permission.

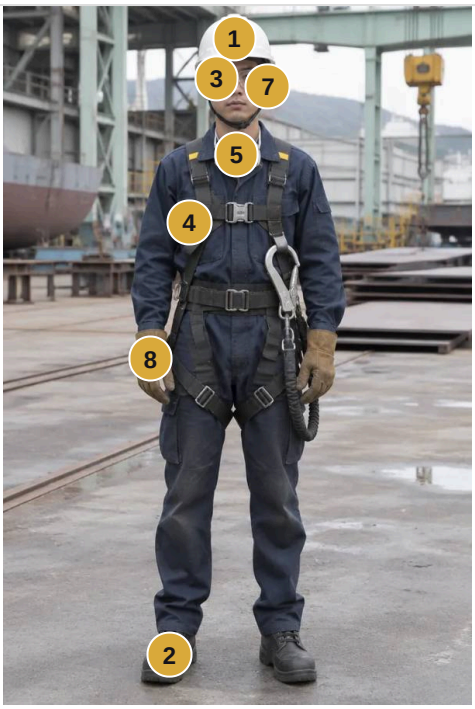
1-2 Safety activities

Activity	Meaning
KY activity / hazard prediction (KY活動・危険予知)	Before work, everyone discusses "what dangers are there" and decides countermeasures
Pointing and calling (指差呼称)	Point with your finger and say "○○ OK!" out loud to check. It reduces mistakes
Near miss (ヒヤリハット)	An event that did not cause injury but gave you a scare. Always report it to prevent accidents
Toolbox meeting (TBM / ツールボックスミーティング)	A short meeting before work to check the work and its dangers
5S	Sort, set in order, shine, standardize, sustain (整理・整頓・清掃・清潔・しつけ). Do not leave things in passages. Return tools to their place

1-3 Protective equipment

Equipment	What it protects / key point
Safety helmet (保護帽・ヘルメット)	Head. Always fasten the chin strap
Safety shoes (安全靴)	Feet. Protects your toes if something heavy falls
Safety glasses (保護めがね)	Eyes. Protects from chips, sparks and paint
Full-body harness (墜落制止用器具)	Prevents falling from high places. As a rule, use it at 2 m or higher
Dust mask (防じんマスク)	So you do not breathe dust or welding fumes
Gas mask (防毒マスク)	So you do not breathe organic solvent (thinner, etc.) gas. Check the canister type and expiry date
Earplugs / earmuffs (耳栓・イヤーマフ)	Protect your ears from loud noise
Gloves (手袋)	Protect your hands. But **do not wear gloves with rotating machines such as drilling machines (ボール盤), because they can get caught**

Check protective equipment for damage before work. Do not use damaged equipment.



1 Safety helmet (保護帽・ヘルメット)

2 Safety shoes (安全靴)

3 Safety glasses (保護めがね)

4 Full-body harness (墜落制止用器具)

5 Dust mask (防じんマスク)

7 Earplugs / earmuffs (耳栓・イヤーマフ)

8 Gloves (手袋)

Protective equipment

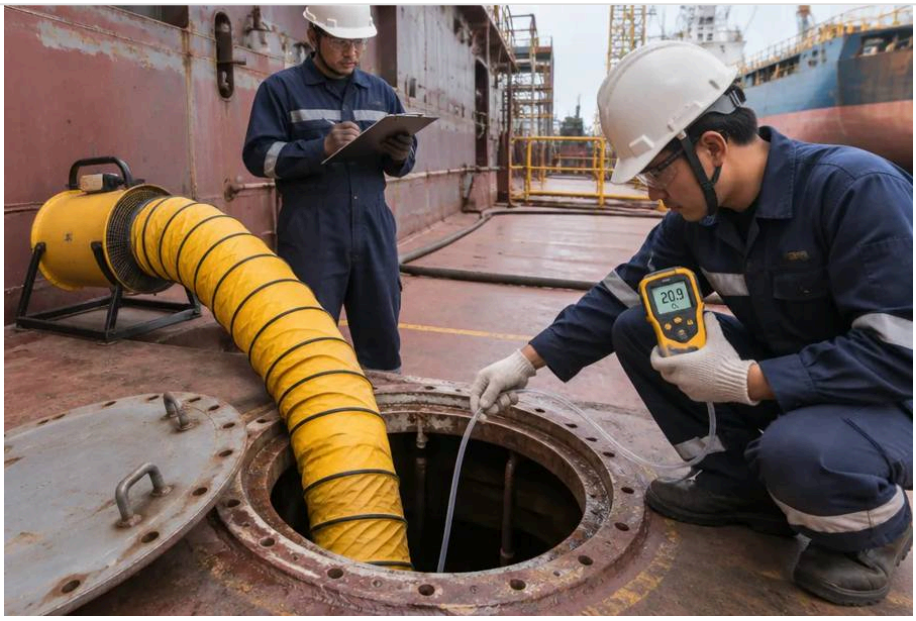
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1-4 Cranes and slinging

- **Never go under a suspended load.** When a crane comes near, move away.
- Slinging work (玉掛け, attaching wire to a load) is done by people with qualifications (skills training or special education).
- Decide on **one person** to give signals. Signals are given in the agreed way.
- Check wire ropes before use. Do not use ropes with broken wires, crushed parts or kinks (twists).

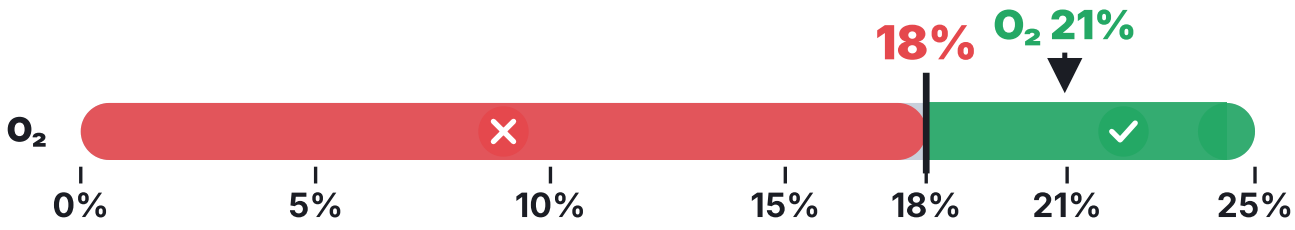
1-5 High places and confined spaces

- Edges and openings of work floors 2 m or higher need handrails or fences.
- Do not leave things on scaffolding. Do not throw things to hand them over.
- Places where air does not change easily, such as inside tanks or double bottoms, have a danger of **oxygen deficiency (酸素欠乏・酸欠)**. Oxygen deficiency means oxygen in the air is **less than 18%**.
- Where oxygen deficiency is possible, measure the oxygen level and ventilate before entering. Place a **watchperson (監視人)** outside.
- Even if someone has collapsed inside, do not rush in to help. You will collapse too. First shout for help; a person wearing breathing protection does the rescue.



High places and confined spaces

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High places and confined spaces

1-6 Fire and explosion

- Sparks from welding and gas cutting fly far. Remove flammable things nearby and prepare a fire extinguisher.
- Near paint and thinner, **no open flames (火気厳禁)**.
- After work, check that no fire remains (check for embers).

1-7 Electricity

- Do not touch electrical equipment with wet hands.
- Do not use cables with damaged insulation.
- When repairing or inspecting a machine, turn off the power and put up a "Do not operate (操作禁止)" tag.
- Ground (earth / アース) machines.

1-8 Hand tools and grinders

- Check that the hammer head is not loose.
- Only people who received special education change grinder wheels (砥石).
- Test-run the wheel for **1 minute or more** before starting work, and **3 minutes or more** after changing it.
- Do not stand in front of the wheel. Do not use it with the cover removed.

1-9 Health

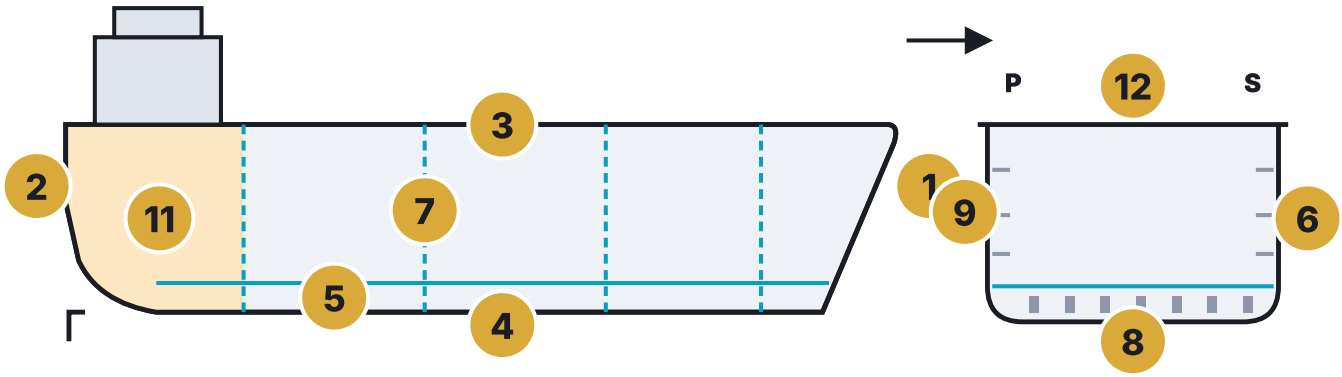
- In summer, be careful of **heatstroke (熱中症)**. Drink water and take salt before you feel thirsty, and rest.
- Protect your ears in noisy places.
- Take the required health checkups.
- If you get hurt, always report it, even a small injury.

02 Ship and shipyard basics

Large ships in Japan are built with the **block construction method (ブロック建造法)**: the hull is divided into "blocks" that are joined at the end. To understand instructions at work, learn the names of ship parts and the order of the process.

2-1 Names of ship parts

Name	Meaning
Bow (船首)	Front part of the ship
Stern (船尾)	Back part of the ship
Deck (甲板・デッキ)	Floor of the ship. The top one is the upper deck (上甲板)
Bottom (船底)	Bottom of the ship
Double bottom (二重底)	A bottom made in two layers. The space between becomes tanks
Shell plating (外板)	Steel plates on the outside of the ship
Bulkhead (隔壁)	Walls that divide the inside of the ship
Longitudinal (ロンジ・縦通材)	Frames running along the length of the ship
Frame (フレーム・肋骨)	Frames running across the width of the ship
Outfitting (艤装)	Installing engines, piping, electrical systems, equipment, etc.
Engine room (機関室)	Room where the engine is
Starboard / port (右舷／左舷)	Right side / left side when facing forward



1 Bow (船首)
2 Stern (船尾)
3 Deck (甲板・デッキ)
4 Bottom (船底)
5 Double bottom (二重底)
6 Shell plating (外板)
7 Bulkhead (隔壁)
8 Longitudinal (ロンジ・縦通材)
9 Frame (フレーム・肋骨)
11 Engine room (機関室)
12 Starboard / port (右舷／左舷)

Names of ship parts

2-2 How a ship is built

01 **Design (設計)** — make drawings.

02 **Steel processing (鋼材の加工)** — marking, cutting and bending of steel plates.

03 **Sub-assembly (小組立)** — weld members into small parts.

04 **Assembly (中組立・大組立)** — join parts into **blocks**. Painting and outfitting also progress at the block stage (pre-outfitting / 先行艤装).

05 **Erection (搭載)** — carry blocks by crane to the dock or building berth and weld them together.

06 **Launching (進水)** — float the ship on the water.

07 **Outfitting (艤装)** — install the remaining equipment.

08 **Sea trial (試運転)** — check performance at sea.

09 **Delivery (引渡し)** — hand over to the shipowner who ordered it.



How a ship is built

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2-3 Work in the shipbuilding category

In the SSW **shipbuilding category (造船区分)**, you can do welding, painting, ironwork, scaffolding, piping and ship processing. Of these, welding, painting and ironwork are the current test job types.

2-4 Drawings and units

- On drawings, length is usually in mm (millimeters). 1 m = 1,000 mm.
- Steel plate thickness is shown with "t". Example: t=12 means 12 mm thick.
- Dimensions have an allowed error (**tolerance / 公差**). Outside the tolerance is a defect.
- If the drawing and the actual site do not match, do not decide yourself — ask your supervisor.

03 Welding

Welding joins metal by melting it with heat. In shipbuilding, **arc welding (アーク溶接)** — welding with the heat of an electric arc — is the main method.

3-1 Types of welding

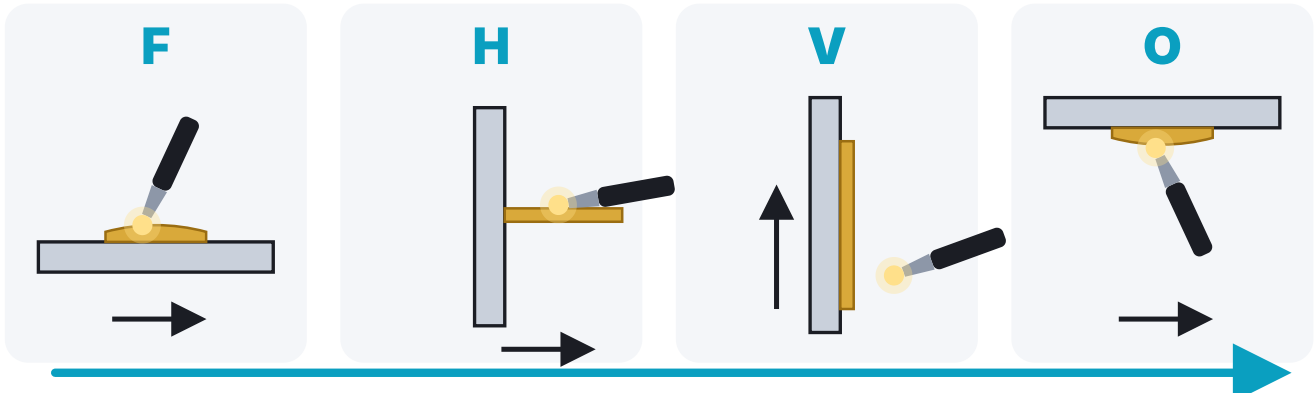
Type	Features
Shielded metal arc welding / manual welding (被覆アーク溶接・手溶接)	Move the electrode by hand. The coating (flux) around the rod melts and protects the weld from the air. Strong against wind
Semi-automatic arc welding (CO2 / MAG welding / 半自動アーク溶接)	**The wire is fed automatically.** The torch is moved by hand. Shielding gas (CO2, etc.) protects the weld. Weak against wind, so use wind screens. Most common in shipbuilding
TIG welding (ティグ溶接)	Uses a non-melting **tungsten electrode**. Protected by argon gas. Clean finish. Good for stainless steel and aluminum
Submerged arc welding (サブマージアーク溶接)	Automatic welding under granular flux. Good for long straight welds. The arc cannot be seen



Types of welding
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3-2 Welding positions

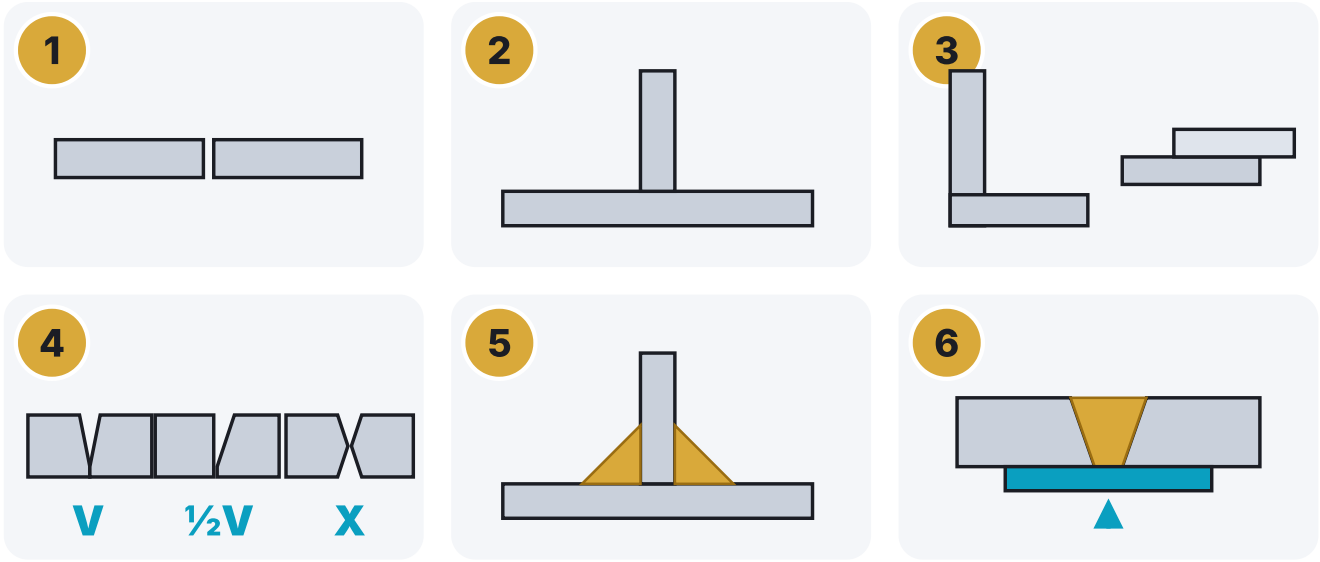
Position	Symbol	Description
Flat (下向)	F	Weld facing downward. The easiest
Horizontal (横向)	H	Weld sideways on a standing plate
Vertical (立向)	V	Weld from bottom to top (upward) or top to bottom (downward)
Overhead (上向)	O	Weld above your head. The most difficult



Welding positions

3-3 Joints and weld shapes

- **Butt joint (突合せ継手)**: the ends of two plates meet.
- **T-joint (T継手)**: one plate stands on another in a "T" shape.
- **Corner joint / lap joint (かど継手・重ね継手)**: plates meet at a corner / overlap.
- **Butt weld (突合せ溶接)**: make a **groove (開先)** (V, single-bevel, X shape, etc.) at the plate edges and weld.
- **Fillet weld (すみ肉溶接)**: weld the corner of a T-joint, etc. with a triangular cross-section.
- **Backing (裏当て)**: material placed on the back of a butt weld, so the weld melts through to the back even when welding from one side.



1 Butt joint (突合せ継手)

2 T-joint (T継手)

3 Corner joint / lap joint (かど継手・重ね継手)

4 Butt weld (突合せ溶接)

5 Fillet weld (すみ肉溶接)

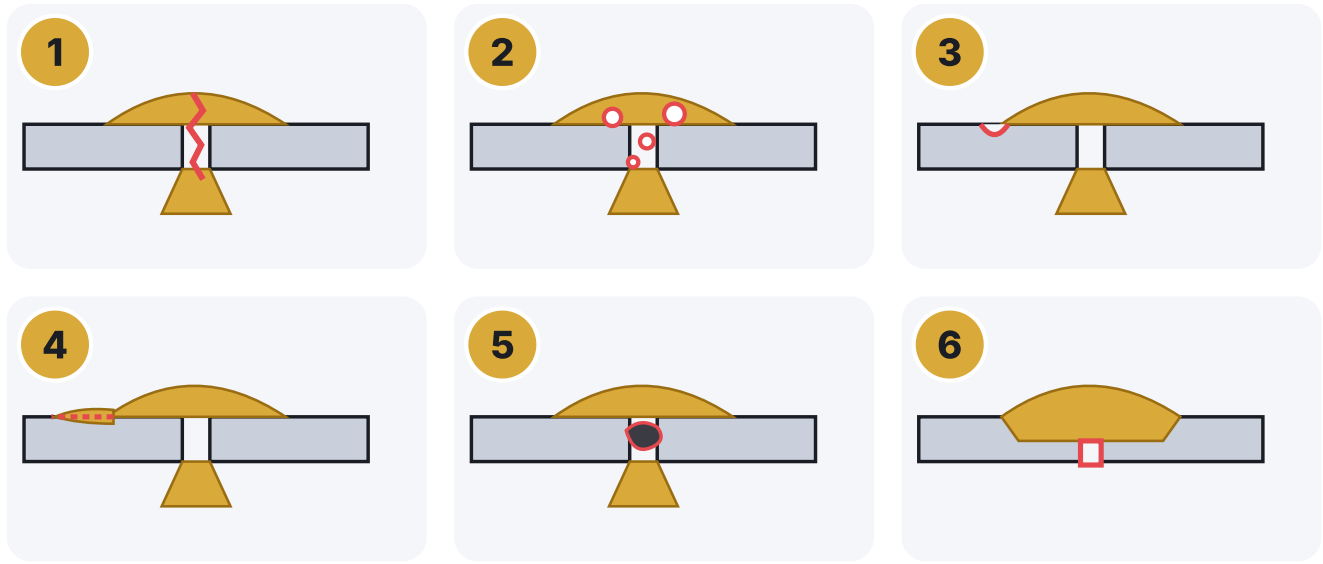
6 Backing (裏当て)

Joints and weld shapes

3-4 Welding defects

Defect	What it is	Main causes
Crack (割れ)	A crack in the weld. The most dangerous	Rapid cooling, moisture, material properties
Blowhole / porosity (ブローホール・気孔)	Small holes inside the weld	Damp electrodes, not enough shielding gas, wind, rust or oil
Pit (ピット)	Holes open at the surface	Same as blowholes
Undercut (アンダーカット)	The edge of the weld cuts into the base metal and makes a groove	Current too high, speed too fast
Overlap (オーバーラップ)	Molten metal flows over the base metal	Current too low, speed too slow
Slag inclusion (スラグ巻込み)	Slag stays inside the weld	Slag between layers was not removed
Incomplete penetration (溶込み不良)	Not melted all the way to the root	Current too low, groove too narrow
Lack of fusion (融合不良)	Base metal and weld metal are not fused well	Wrong current, angle or speed

Fume (ヒューム, smoke from welding) and spatter (スパッタ, flying drops) are not welding defects. But fume is bad for your body, so a dust mask and ventilation are needed.



1 Crack (割れ)

2 Blowhole / porosity (ブローホール・気孔)

3 Undercut (アンダーカット)

4 Overlap (オーバーラップ)

5 Slag inclusion (スラグ巻込み)

6 Incomplete penetration (溶込み不良)

Welding defects

3-5 Preparation and points to watch

- Remove **rust, oil, moisture and paint** from the base metal before welding (they cause blowholes).
- Shielded arc electrodes cause defects if they absorb moisture, so use them **dried** (store in a drying oven).
- Thick plates and high-strength steel may be **preheated (予熱)** to prevent cracks.
- In multi-layer welding, remove the slag after each layer.
- Before welding, fix members with **tack welds (仮付け溶接 / タック)**.

3-6 Welding safety

- Arc light (ultraviolet) damages the eyes and skin. Always use a **welding face shield (溶接用保護面・遮光面)**. Looking directly causes "arc eye (電気性眼炎)".
- Use a **darker shade number** of filter glass for higher current.
- Prevent sparks and burns with leather gloves, apron and arm covers.
- AC arc welding machines must have an **automatic electric shock prevention device (自動電撃防止装置)**. Do not hold the electrode with wet gloves.
- Ground (**earth / アース**) the welding machine.
- In narrow places, ventilate and use protective equipment against fumes.
- Stand gas cylinders upright and fix them so they do not fall.

3-7 Weld inspection

Inspection	Method
Visual inspection (外観検査)	Check cracks, undercut, etc. with your eyes
Bend test (曲げ試験)	Bend a test piece and check for cracks
Radiographic testing (RT / 放射線透過試験)	Record internal defects on film with X-rays, etc.
Ultrasonic testing (UT / 超音波探傷試験)	Check internal defects with ultrasound
Magnetic particle testing (MT / 磁粉探傷試験)	Find cracks near the surface with magnets and iron powder
Penetrant testing (PT / 浸透探傷試験)	Find surface cracks by letting red liquid soak in

3-8 Practical test (reference)

In the SSW (i) welding practical test, you weld a plate 9 mm or thicker in the **flat position, butt weld, one-side weld with backing**. Examiners check for cracks, blowholes, undercut, etc. with a visual test and a bend test or radiographic test.

04 Painting

The main purpose of ship painting is to **prevent rust (corrosion) from seawater**. Paint quality is decided largely by "surface preparation (素地調整)".

4-1 Purpose of painting

- **Anti-corrosion (防食)**: keep steel plates from rusting.
- **Anti-fouling (防汚)**: keep shellfish and seaweed off the ship bottom (anti-fouling paint).
- **Appearance and identification (美観・識別)**: make it look good and tell pipes and tanks apart by color.

4-2 Surface preparation

Before painting, remove rust, oil, moisture, dust and old paint from the surface. If surface preparation is poor, the paint soon peels off.

Method	Description
Blasting (ブラスト)	Shoot abrasive (grit, etc.) at high speed to remove rust. The cleanest result
Power tools (動力工具)	Remove rust with disc sanders, wire brushes, etc.
Hand tools (手工具)	Remove with scrapers and wire brushes. For partial repairs
Degreasing (脱脂)	Remove oil with thinner, etc.

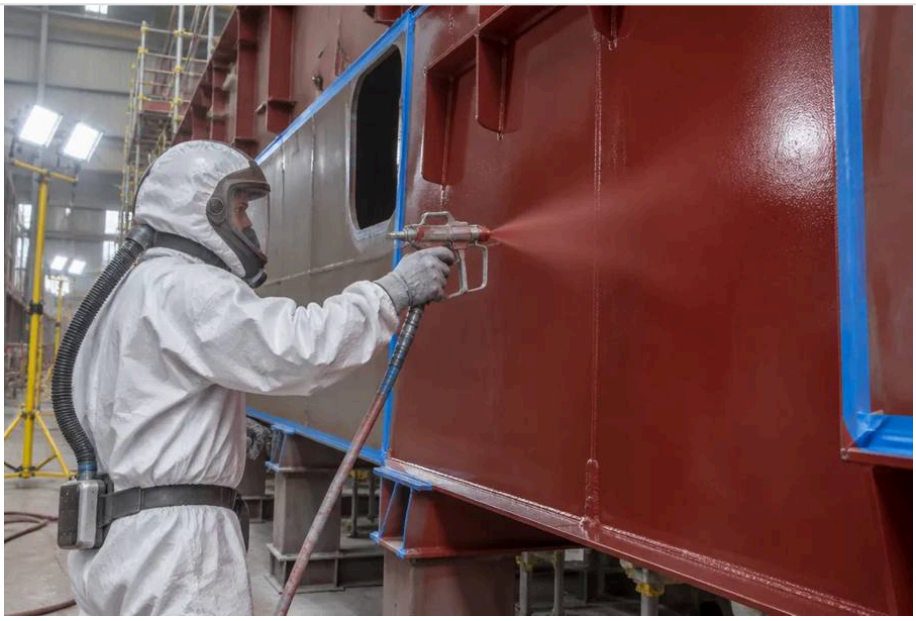
4-3 Paint basics

- Paint is made of **resin (樹脂)** (forms the film), **pigment (顔料)** (color, rust prevention), **solvent (溶剤)** (thins the paint) and additives.
- **Two-component paint (二液形塗料)** (base + hardener) is mixed well in the specified ratio. Do not use it after the usable time (**pot life / 可使時間**) after mixing.
- Thinning paint too much causes sagging and too-thin films.
- Keep the time before painting the next coat (**recoat interval / 塗装間隔**).

4-4 Painting methods

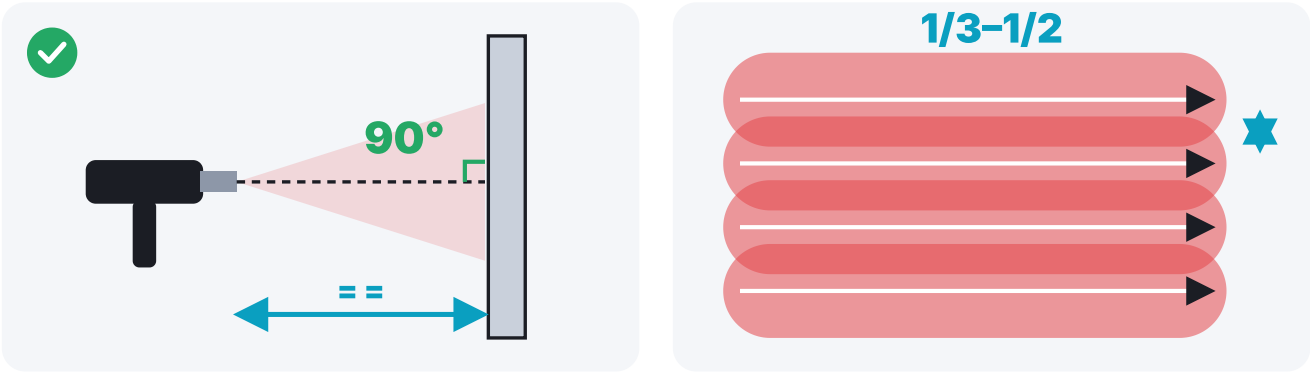
Method	Features
Airless spray (エアレススプレー)	Puts high pressure on paint to make a mist. Paints thick and fast. Mainly used in shipbuilding
Air spray (エアスプレー)	Mists paint with compressed air. Beautiful finish but much overspray
Brush (はけ塗り)	For corners, welds, around bolts and other detailed parts
Roller (ローラー塗り)	For wide flat surfaces

Spray tips: hold the gun at a **right angle** to the surface and move it at a **constant distance and speed**. Overlap each pass a little (about 1/3 to 1/2) to prevent uneven coating. Paint edges, corners and welds first with a "stripe coat (先行塗り / ストライプコート)".



Painting methods

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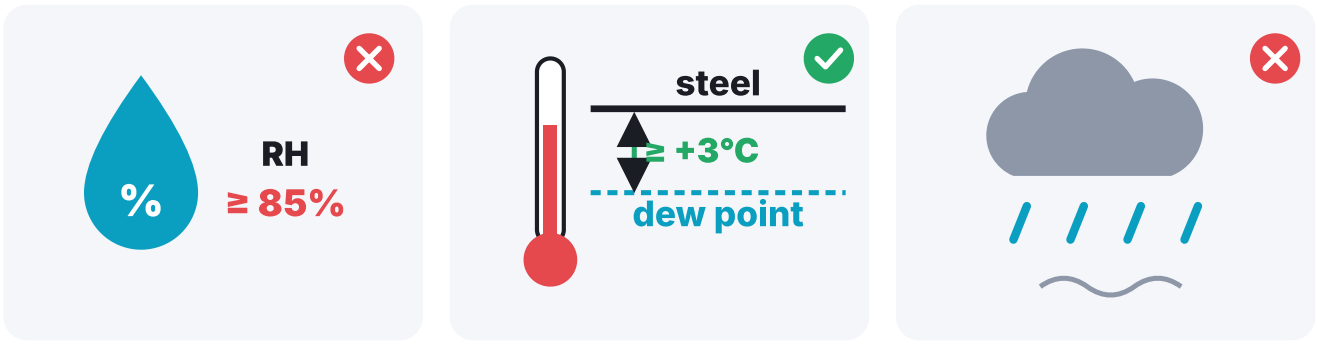
Painting methods

4-5 Film thickness control

- **Wet film thickness gauge (ウェット膜厚計)**: measures the wet paint film just after painting.
- **Electromagnetic thickness gauge (電磁膜厚計)**: measures the dry film thickness.
- Film thickness must be "the specified thickness **or more**". Too thin causes rust; too thick causes sagging and cracking.
- Cover places that must not be painted with **masking (マスキング)** (tape, etc.).

4-6 When not to paint

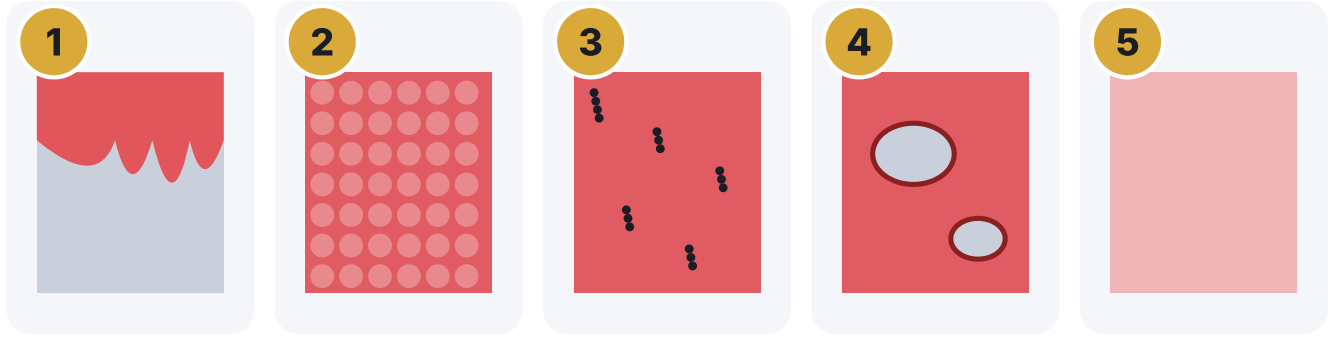
- When it is raining, foggy or there is condensation.
- **When humidity is high** (guide: relative humidity 85% or more).
- **When the steel temperature is close to the dew point** (guide: do not paint unless it is at least 3°C above the dew point). Condensation stops paint from sticking.
- When the temperature is too low (drying and hardening are delayed).



When not to paint

4-7 Painting defects

Defect	What it is	Main causes
Sagging (たれ)	Paint runs down	Too thick, thinned too much
Orange peel (ゆず肌)	Bumpy like orange skin	Poor atomizing, gun too far, paint too thick
Pinhole (ピンホール)	Small holes	Solvent bubbles, holes in the surface
Cissing (はじき)	Paint is repelled and does not stick	Oil or moisture remains
Blushing (白化・かぶり)	The film turns cloudy white	High humidity
Uneven coating (塗りむら)	Uneven thickness or color	Gun distance and speed not constant
Peeling (はがれ)	The film peels off	Poor surface preparation, wrong recoat interval



1 Sagging (たれ)
2 Orange peel (ゆず肌)
3 Pinhole (ピンホール)
4 Cissing (はじき)
5 Blushing (白化・かぶり)

Painting defects

4-8 Painting safety

- **Organic solvents (有機溶剤)** such as thinner cause poisoning if breathed and catch fire easily. Keep **ventilation** and **no open flames**.
- Use a **gas mask (防毒マスク)** for organic gases. In narrow places such as inside tanks, use an **air-supplied mask (送気マスク)**.
- Airless spray pressure is very high. **Never point the gun at people or your own hand.** Paint can be injected under the skin — a serious accident.
- When you take a break, lock the gun's safety device.
- Ground the painting machine to prevent static sparks.
- Throw empty paint cans and rags in the designated place (risk of spontaneous combustion).

4-9 Practical test (reference)

In the SSW (i) painting practical test, you do **surface preparation, masking and painting** (airless / air / roller / brush) on a metal plate. Examiners check for no unevenness or orange peel, film thickness at or above the instruction, and no paint on masked areas.

05 Ironwork

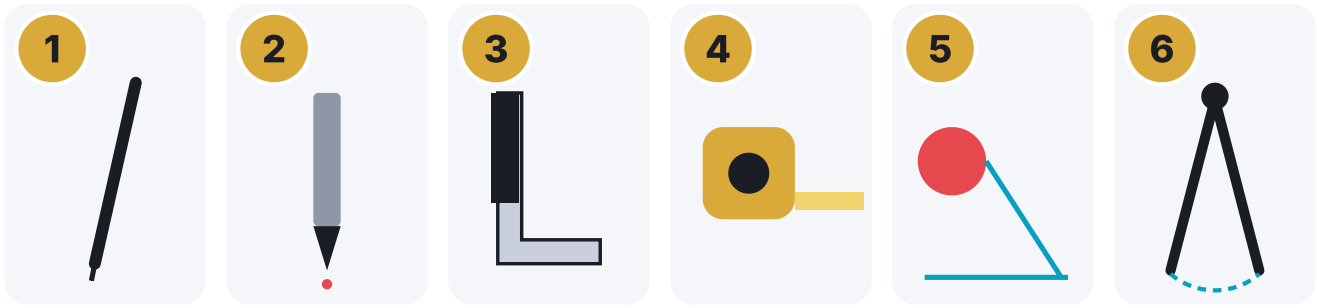
Ironwork means making ship members and blocks by **marking, cutting, bending and assembling** steel plates and sections. Making the exact dimensions shown on the drawing is the most important thing.

5-1 Marking

Marking (けがき) means drawing lines and marks on the steel surface to show where to cut and assemble.

Tool	How to use
Scriber (けがき針)	Draws thin lines on the steel surface
Center punch (センターポンチ)	Makes a small dent (mark) at the center of a hole or on a line
Square (スコヤ・直角定規)	Checks right angles and marks them
Steel tape measure / steel rule (鋼製巻尺・直尺)	Measures length
Ink line / chalk line (墨つぼ・チョークライン)	Draws long straight lines
Dividers (けがきコンパス・デバイダ)	Draws circles and copies the same length

Check dimensions on the drawing and measure from the **reference line (基準線)**. Measurements shift a little each time, so always measure from the reference, not from a different place each time.



1. Scriber (けがき針)
2. Center punch (センターポンチ)
3. Square (スコヤ・直角定規)
4. Steel tape measure / steel rule (鋼製巻尺・直尺)
5. Ink line / chalk line (墨つぼ・チョークライン)
6. Dividers (けがきコンパス・デバイダ)

Marking

5-2 Gas cutting

Gas cutting heats steel to its ignition temperature with a **preheating flame (予熱炎)**, then blows **high-purity oxygen** onto it to burn and cut the steel.

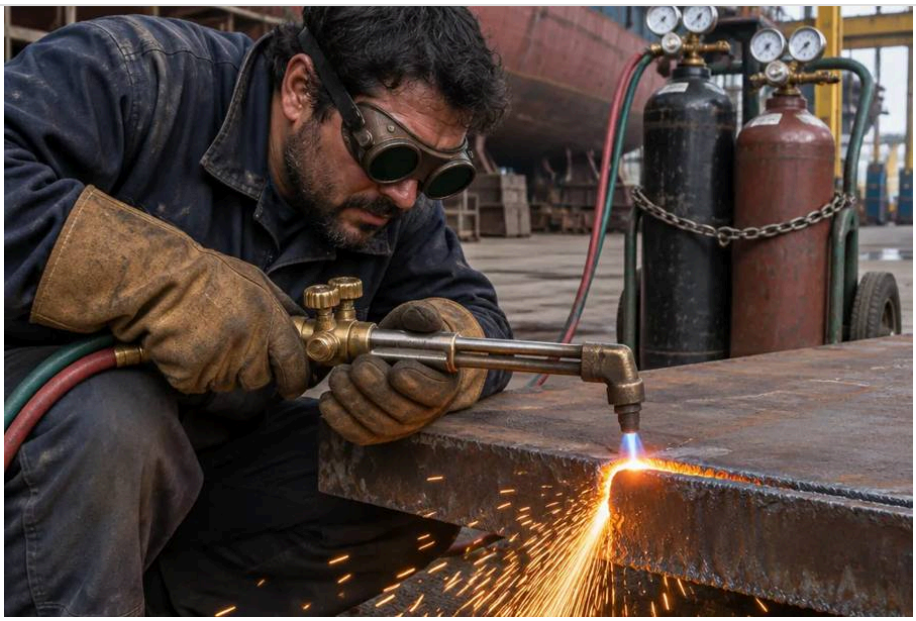
- Fuel gases include **acetylene (アセチレン)** and **propane (プロパン)**.
- If cutting is too fast, uncut parts remain; if too slow, the cut surface melts and sags.
- The cut surface must not have big waves or notches (切り欠き).
- Stainless steel and aluminum cannot be cut well by normal gas cutting (use plasma cutting, etc.).

Gas cylinder colors (Japan)

Gas	Cylinder color
Oxygen (酸素)	Black
Acetylene (アセチレン)	Brown
Hydrogen (水素)	Red
Liquefied carbon dioxide (液化炭酸ガス)	Green
Others (argon, propane, etc.)	Gray

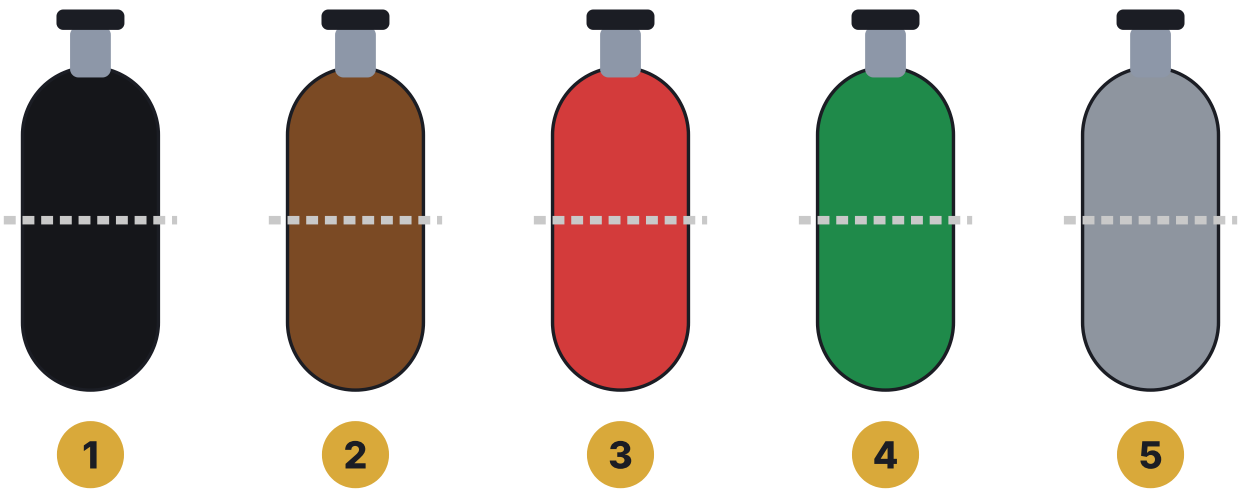
Gas cutting safety

- Keep cylinders **upright** and **fixed with a chain so they do not fall**. Avoid direct sunlight and store at **40°C or below**.
- Always use acetylene cylinders upright (never lying down).
- Check hoses and connections for gas leaks with **soapy water**. Never check with fire.
- Fit a **flashback arrestor (逆火防止器・乾式安全器)** to prevent flashback (the flame going back into the hose).
- If oil or grease touches oxygen equipment, it burns violently. Do not touch oxygen equipment with oily gloves.
- Check that no flammable things or people are in the direction sparks fly.



Gas cutting

AI-generated image



1 Oxygen (酸素)

2 Acetylene (アセチレン)

3 Hydrogen (水素)

4 Liquefied carbon dioxide (液化炭酸ガス)

5 Others (argon, propane, etc.)

Gas cutting

5-3 Bending

- Bend steel plates with a **press (プレス)** or **bending rolls (ベンディングロール)**.
- **Line heating (線状加熱・ぎょう鉄)**: heat the plate in lines with a gas burner and cool it to bend it or correct distortion. A technique unique to shipbuilding.
- After bending, place a **template (型板・木型・曲型)** to check the shape.

5-4 Assembly

- Place members in the right position according to the drawing and fix them with **tack welds (仮付け溶接)**.
- Tack welds are made at the specified positions and number. They must not come off.
- Check right angles and verticality of standing plates with a **square or plumb bob (スコヤ・さげ振り)**.
- Welding heat causes **distortion (ひずみ・変形)**. Prevent it with jigs and restraint, and correct it by line heating, etc.
- After assembly, measure and check that dimensions are **within tolerance (公差)**.

5-5 Ironwork safety

- Do not force yourself to carry heavy steel by hand. Use a crane or carrying equipment.
- Steel edges are sharp, so wear gloves.
- Before hammer work, check that no one is around you.
- Steel just after cutting is very hot. Do not touch it with bare hands.

5-6 Practical test (reference)

The SSW (i) ironwork practical test is an assembly task including **marking, gas cutting, bending and tack welding**. Examiners check that the cut surface has no big waves, dimensions are within tolerance, tack welds do not come off, and no work was done other than instructed.

+ Key terms

Safety and health (安全衛生)	Preventing injury and illness
Protective equipment (保護具)	Tools that protect the body (helmet, mask, etc.)
Hazard prediction (危険予知)	Predicting dangers before work (KY)
Pointing and calling (指差呼称)	Pointing and saying out loud to check
Oxygen deficiency (酸素欠乏)	Oxygen in the air below 18%
Ventilation (換気)	Changing the air
Slinging (玉掛け)	Attaching wire to a crane load
Fall (墜落)	Falling from a high place
No open flames (火気厳禁)	Fire must not be used
Base metal (母材)	The metal being welded
Electrode (溶接棒)	Rod used in shielded arc welding
Groove (開先)	Channel made at plate edges for welding
Joint (継手)	Part that connects members
Fillet weld (すみ肉溶接)	Welding a corner in a triangular shape
Backing (裏当て)	Material on the back of a butt weld
Defect (欠陥)	A bad part (crack, blowhole, etc.)
Shading (遮光)	Blocking strong light
Preheating (予熱)	Warming before welding or cutting
Surface preparation (素地調整)	Removing rust and oil before painting
Film thickness (膜厚)	Thickness of the paint film
Hardener (硬化剤)	Liquid mixed with the base in two-component paint
Pot life (可使時間)	Time mixed paint can be used
Organic solvent (有機溶剤)	Thinner, etc. Causes poisoning and burns easily
Dew point (露点)	Temperature at which moisture in the air becomes water drops
Marking (けがき)	Drawing cutting and assembly lines on steel

Tack weld (仮付け溶接)	Short weld that fixes members before main welding
Flashback (逆火)	Dangerous return of the flame into the hose
Distortion (ひずみ)	Steel deforming from heat
Line heating (線状加熱)	Heating in lines to bend or straighten
Tolerance (公差)	Allowed dimensional error

※ Sources

- **Implementation guidelines for the SSW (i) test in shipbuilding and marine industry (MLIT)** — Written test: 30 questions, 60 min, ○×, 60% to pass; practical test content and criteria
- **SSW tests for shipbuilding and marine industry (ClassNK)** — CBT from April 2027, 3 categories, fees (planned)
- **SSW (i) test (welding) (ClassNK)** — Test guide and sample questions
- **Welding written test samples (ClassNK)** — Question format (safety / text / diagram)
- **Ironwork test guide (ClassNK)** — Scope of the written test
- **Reorganization of job categories in shipbuilding and marine industry (MLIT)** — Scope of the shipbuilding category

The technical explanations in each chapter (welding, painting, ironwork, safety) were written for this material based on general work knowledge. If your company or site has different rules, follow the site rules.