GUIDANCE NOTES
GD015-2025

INTERNATIONAL SHIP CLASSIFICATION

GUIDELINES FOR SAFETY OF LOCATIONS UNDER SURVEY

2025

Effective from 1 July 2025

CONTENTS

CHAPTER 1 GENERAL

1.1 Occupational health and safety policy of ISC

ISC practices the concept of life first and green development, and abides by the laws and regulations of occupational health & safety and environment. Precautions will be taken against risks on occupational health & safety. Consultation and participation of staff will be encouraged and ensured. Environmental factors are to be managed to achieve sustainable development. ISC continuously improves the operation of the occupational health & safety and environmental management system, and thus exerts a positive influence on the maritime industry in continuously improving the occupational health & safety management and the ability to protect the environment.

1.2 Occupational health and safety objectives of ISC

1.2.1 The occupational health and safety objectives for field survey conducted by ISC Surveyors are as follows:

1) Paying attention to the laws and regulations related to occupational health & safety and environmental management, and ensuring that the relevant ISC regulations and measures meet the requirements;

2) Assessing occupational health and safety risks, providing sufficient resources for ISC staff so as to ensure safe conduct of service;

3) Managing and controlling important environmental factors, focusing on and responding to the requirements or expectations of interested parties for environmental protection;

4) Pushing to achieve occupational health & safety and environment protection policies by setting annual management objectives and key performance indicators.

1.3 Purpose and application of the Guidelines

1.3.1 The Guidelines provide shipyards, shipowners and manufacturers with guidance on providing conditions for safety of survey to ISC Surveyors, the purpose of which is to promote compliance of control of occupational health and safety in locations of survey with relevant national laws and regulations.

1.3.2 The Guidelines are applicable to survey activities conducted on ships and offshore installations, in shipyards and ship repair yards, at manufacturers of marine products and workplaces of suppliers.

1.3.3 In addition to the requirements of the Guidelines, clients applying for ISC survey/audit services are to abide by laws and regulations or other relevant requirements of the State, the Administration and the place of survey. In case of conflict, the laws, regulations or other relevant provisions of the inspection location shall prevail.

1.4 Terms

1.4.1 The terms in rules and guidelines issued by ISC apply to the Guidelines.

1.4.2 For the purpose of the Guidelines, the following terms apply:

1.4.2.1 Surveyor means a person carrying out survey and audit on behalf of International Ship Classificatione.

1.4.2.2 Location under survey means a location where a surveyor carries out survey or audit in accordance with the contract of or the application for survey or audit submitted to ISC by the applicant, e.g. relevant locations of shipyards, ships, offshore installations and manufacturers.

1.4.2.3 Party under survey means a unit which is fully responsible for work safety of the location under survey, e.g. shipyards, ships, offshore installations and manufacturers.

1.4.2.4 Crossover operation means any construction work, operation of equipment or crack detection, etc. still being carried out above and near the means of access adjacent to the location under survey, or above, inside or near such location when the survey or audit is carried out by a Surveyor at the location, covering three/two-dimensional crossover operations.

1.4.2.5 Confined space means a space that has any of the following characteristics:

（1） limited openings for entry and exit;

（2） unfavourable natural ventilation;

（3） not designed for continuous worker occupancy.

It includes, but is not limited to, boilers, pressure vessels, cargo spaces (cargo holds or cargo tanks), confined cargo spaces, ballast tanks, double bottom tanks, double hull spaces, fuel oil tanks, lube oil tanks, sewage tanks, pump rooms, compressor rooms, cofferdams, chain lockers, void spaces, duct keels, inter barrier spaces (e.g. in liquefied gas carries), engine crankcases, engine scavenging boxes, caves and pits.

1.4.2.6 Confined space entry (CSE) means personnel entering, leaving and working in the confined space.

1.4.2.7 Competent person for confined space means a person with sufficient theoretical knowledge and

practical experience, trained in the risks of the confined space and the use of gas measurement instruments and appropriately qualified to make an informal assessment of the change of oxygen concentration in the space and the likelihood of a dangerous atmosphere being present or subsequently arising in the space.

1.4.2.8 Responsible person means a person authorized to permit entry to a confined space and having sufficient knowledge of the procedure to be followed and other measures to be taken in cases where the safety of the confined space might be affected.

1.4.2.9 Standby person means a person appropriately trained to be responsible for remaining on the outside of the confined space in constant communication with the survey team inside and initiating emergency procedures in case of accidents.

1.4.2.10 A marine chemist is a person who possesses a current Marine Chemist Certificate or equivalent.

1.4.2.11 Adjacent spaces mean a space that shares a common boundary with a compartment that contains a hazardous atmosphere. Such a space has no opening or connections into the hazardous compartment whatsoever and is a contiguous barrier. Such a space may only contain a hazardous atmosphere in the event of the failure of that barrier.

1.4.2.12 Connected space means a space that is connected, by either permanent or intermittent means to a source space that may contain a hazardous atmosphere. A space separated by a door shall be considered 'connected' as it is impossible to tell from outside the space whether it is open or not. A connected space shall be seen as containing a hazardous atmosphere until testing proves otherwise as that atmosphere could be trapped.

1.4.2.13 Hazardous environment means a hazardous environment in a confined spaces is an environment that may expose personnel to the risk of death, incapacitation, injury, acute illness, toxicity or an inability to self-rescue. This type of environment can arise due to all or any combination of following conditions:

(1) Lack of natural air movement
(2) Oxygen-deficient environment
(3) Flammable environment including oxygen enrichment
(4) Toxic environment, and/or
(5) Any other hazardous atmospheric condition .

1.4.2.14 Permit to enter or permit to work is a written authorization issued by a responsible person with date and time being indicated, which states that the confined space has been tested by a competent person and that the space is safe for entry, what precautions, equipment, etc., are required, period of validity and which type of operation is allowed. The validity of the permit is not to exceed 8 hours.

1.4.2.15 Narrow space means a small-sized space limited by enclosure, decks, floors, equipment and stiffening structures. For the target of survey in such space, the Surveyor cannot stretch and move as usual and sometimes even has to bend down or crawl adequately in order to complete the survey. Surrounded by steel or hard materials possibly with many edges and corners, especially during the survey between hull structures, the head, hands, feet and other body parts of the Surveyor are susceptible to injuries upon impact, so that appropriate measure must be taken.

1.4.2.16 Location liable to cause fall from high means a location where the Surveyor, during the survey of a ship, an offshore installation or a large piece of equipment, must reach a certain high position to inspect the inside and outside of an area and if not protected, he would easily fall off to be injured in doing so. Working on or below the ground is also included and injuries may occur if falling off from edges or falling into openings. Operation in locations liable to cause fall from high is also called high-place operation.

1.4.2.17 Competent person for location liable to cause fall from high means a person designated by the management level of facilities (ship/shipyard/workshop/factory) with sufficient theoretical knowledge and practical experience needed for assessment of risks related to high-place operation and responsible for approving access arrangement in locations liable to cause fall from high.

1.4.2.18 Responsible person for location liable to cause fall from high means a person authorized by shipowner/ship manager or management level of facilities to permit entry for high-place operation.

1.4.2.19 Operation limiting equipment means a system preventing personnel from accessing location liable to cause fall from high, such as barrier, staging, tower-type staging, vehicle-mounted lift and scissor lift.

1.4.2.20 Operation fixing equipment

(1) Operation fixing means the system where the personnel permitted entry for high-place operation fixes himself/herself so that he or she can work without risk of falling down;

(2) Operation fixing system means personal protection system from falling down where the Surveyor can get support under tightening or hanging condition to prevent from or limiting falling down, such as thwart in high-place operation.

1.4.2.21 Fall-protection equipment: Fall-protection equipment is used when the possibility of falling down cannot be avoided. The equipment used can not only prevent falling down but also absorb some falling energy, such as traditional suspenders with energy-absorbing lanyard, safety net and gasbag.

1.4.2.22 Electrical burns mean injuries caused by the thermal effect of electric current, divided into current burns and arc burns. A current burn occurs when the human body touches a live part and it is an injury caused by the thermal energy converted from the electric energy as a result of an electric current passing through the human body. Arc burns are injuries caused by arc discharge, divided into direct and indirect burns. The former is an injury as a result of an electric current passing through the human body due to an arc between the live part and the human body while the latter is an injury of the human body due to a nearby arc, including scalds caused by the splashing of hot molten metal. An arc with a temperature of 8,900℃or above may cause large and deep burns and can even scorch and burn off limbs and other body parts. A large current passing through the human body may also dry and scorch body tissues.
1.4.2.23 Accidental release of pressure means an accidental release of energy in pressure equipment or system, a pressure accumulator or a device in tension, which might cause the risk of injuries to personnel.
1.4.2.24 Dust means production-caused dust, i.e. solid particles resulting from a production process and capable of floating in the atmosphere for a long time. The degree of its hazard to the human body is mainly indicated by the content of free silicon dioxide contained in it. In general, dust is classified into 4 categories according to the content of such dioxide. The maximum hazard is indicated by the content of 70%. Asbestos dust and cast iron dust fall into this category.
1.4.2.25 Settled cast iron dust means the dust floating again in the atmosphere due to the effect of vibration or air flow, arising from powdered substances used in operations such as mixing, screening, packing and handling during casting process, sand cleaning or production as well as settled dust. The concentration of free silicon dioxide in such dust is greater than 25%.
1.4.2.26 Asbestos means the fibrous form of mineral silicates belonging to rock-forming minerals of the serpentine group, i.e. actinolite, amosite (brown asbestos, cummingtonite-grunerite), anthophyllite, crocidolite (blue asbestos), tremolite, chrysotile (white asbestos) or any mixture containing one or more of these, please refer to appendix 8 of the 2011 Guidelines for the development of the inventory of hazardous materials (resolution MEPC.197(62).
1.4.2.27 Moving object means an object moving in a horizontal or close to a horizontal direction, which might cause injuries to personnel upon contact due to the effect of its kinetic energy and sharp shape.
1.4.2.28 Falling object means an object falling in vertical direction, or rolling or sliding down a steep slope, which might cause injuries to personnel upon contact due to the effect of its kinetic energy and sharp shape.
1.4.2.29 Collapse of staging means the hazard caused by collapse and fall of a staging due to unsatisfactory erection of the staging, removal of it without following safety requirements, heavy impact and severe weather, etc. during survey activities.
1.4.2.30 Dangerous parts of running equipment mean various moving parts and components or machining areas of mechanical processing equipment which are easily accessible to operators. Common dangerous parts are as follows:
(1) rotating shaft;
(2) relative transmission parts, e.g. meshing gears not covered;
(3) rotating crankshaft and crank;
(4) noncontinuous rotating parts, e.g. fan blade, toothed drums in pairs;
(5) belt and belt pulley, chain and gypsy;
(6) rotating abrasive wheel;
(7) clamping plate between the portable plate and backing strap;
(8) reciprocating punching tools, e.g. punch and die;
(9) band cutting tools, e.g. band saw;
(10) wormwheel and worm;
(11) surface of high-speed rotating components, e.g. rotor drum of a centrifuge;
(12) clamp between coupling bar and chain ring;
(13) rotating cutting tools;
(14) projection of rotating components, e.g. key, setscrew;
(15) rotating stirring machine and stirring wing;
(16) rotating cylinder with dangerous surface;
(17) metallic connection on the moving belt (belt clamp);
(18) flywheel;
(19) locking screw on the shaft coupling.
1.4.2.31 Danger from running equipment means the danger of the body or clothes of a person being caught by a rotating mechanical component, or the danger of injuries to personnel caused by possibly accidental splatters from mechanical components in rotation. Common dangers are as follows:
(1) being caught by a single mechanical component in rotary motion, e.g. main shaft, chuck, feed screw, as well as abrasive wheel and various cutting tools, e.g. milling cutter and saw blade;

(2) being caught between two mechanical components in rotary motion, e.g. between two rollers rotating in opposite directions and between meshing gears;
(3) being caught between a mechanical component in rotary motion and a stationary one, e.g. between an abrasive wheel and its support or between the spoke hand wheel of a machine and its body;
(4) being caught between a mechanical component in rotary motion and one in linear motion, e.g. between belt and belt pulley, chain and gypsy, rack and gear, pulley and line, or a windlass's winch spool and capstan;
(5) being struck or rolled by a work piece in rotary motion, e.g. a slim work piece extending from a machine tool;
(6) being struck by the projection of a component in rotary motion, e.g. metallic belt clamps, keys on a rotating shaft, setscrews and coupling screws;
(7) some components in rotary motion posing a greater danger due to their openings, e.g. fans, blades, spoke pulleys, gears and flywheels;
(8) composite motion due to rotary motion and linear motion, e.g. cam drivers, connecting rods and crankshafts;
(9) cutting tools or mechanical components which are flying off, e.g. blades or joints not securely clamped or fastened, or broken pieces of an abrasive wheel;
(10) chippings or work pieces which are flying off, e.g. continuously outgoing or broken and scattered chippings, and work pieces flying off during forging.
1.4.2.32 Location containing hot temperature substances or facilities means a location where the Surveyor may approach or touch substances or facilities which are liable to cause burn or scalding during survey activities. Hot temperature substances causing burns are hot temperature gases, solids and liquids.
1.4.2.33 Location containing cold temperature substances or facilities means a location where the Surveyor may touch substances or facilities which are liable to cause frostbite during survey activities. Cold temperature substances causing frostbite are cold temperature gases, solids and liquids.
1.4.2.34 Hot temperature substance means a substance with surface temperature of 45℃or above.
1.4.2.35 Hot temperature location means a location with an ambient temperature exceeding 35℃.
1.4.2.36 Cold temperature substance means a substance with surface temperature of 0℃or below.
1.4.2.37 Cold temperature location means a location with an ambient temperature below 5℃.
1.4.2.38 Injury caused by intense light radiation and by heat radiation means an injury which might, during inspections of marine products, be caused by such radiation from metal liquid, hot temperature metal and flaming during the process of smelting, moulding, rolling or heat treatment.
1.4.2.39 Traffic boat means the traffic boat to pick up surveyors, including pilot boat, supply ship, speed boat, work boat, crew traffic boat and other ships and boats for picking up personnel.

1.5 References

The paragraphs of the following laws, regulations, conventions, guidelines, standards and technical information contain provisions, which are referred to in the Guidelines, constitute paragraphs of the Guidelines. All the documents may be revised and their latest versions are to be used in so far as practicable when applying the Guidelines.
(1) Law of the People's Republic of China on Work Safety;
(2) Regulations of the People's Republic of China on the Prevention and Control of Pneumoconiosis;
(3) International Convention for the Safety of Life at Sea, 1974;
(4) Convention concerning Safety in the Use of Asbestos of International Labour Organization;
(5) IACS REC 72–Confined Space Safe Practice;
(6) IACS PR 37 – Procedural Requirements for Safe Entry of Confined Spaces;
(7) GB 16993 《防止船舶封闭处所缺氧危险作业安全规程》
(8) IACSREC 74–A Guide to Managing Maintenance in accordance with the Requirements of the ISM Code;
(9) IACS REC 78–Safe Use of Portable Ladders for Close-up Surveys;
(10) IACS REC 134– Safe Practice of Boat Transfer ;
(11) IACS REC 136– Guidelines for Working at Height;
(12) IACS REC 140– Recommendation for Safe Precautions during Survey and Testing of Pressurized Systems;
(13) IACS REC 141– Guidelines for the Assessment of Safety Aspects at Workplace;
(14) IACS REC184 – Guidelines for Work Safety Standard;
(15) GB8958-2006–Safety rules for hazardous work in oxygen deficiency atmosphere;
(16) GB/T12301– Detection methods for harmful gas evolved from non-dangerous cargo in holds;

(17) GB/T 20098 General technical requirements for protective boot use at low temperature workplace;
(18) GB/T14440 Classified standard of working in the cold environment;
(19) GB5083 General rules for designing the production facilities in accordance with safety and health requirements;
(20) GB2894 Safety signs and guideline for the use;
(21) GBZ158 Warning signs for occupational hazards in the workplace;
(22) GB/T 15236 Occupational safety and health glossary;
(23) GB/T 12801 General principles for the requirements of safety and health in production process;
(24) GB/T 11651 Code of practice for selection of personal protective equipment;
(25) GB/T 13861 Classification and code for the hazardous and harmful factors in process;
(26) GB/T20801.6 Pressure piping code–Industrial piping–Part 6: Safeguarding;
(27) GB6067 Safety rules for lifting appliances;
(28) GB 6441 The classification for casualty accidents of enterprise staff and workers;
(29) GB 50058 Electrical installations design code for explosive atmospheres and fire hazard;
(30) GB/T 50065 Code for earthing design of AC electrical installations;
(31) GB/T 50064 Code for design of overvoltage protection and insulation coordination for AC electrical installations;
(32) GB 2893 Safety colors;
(33) GB 50054 Code for design of low voltage distribution;
(34) GB/T 3787 Technical safety code for management, operation, inspection and maintenance of hand-held motor-operated electric tools;
(35) GB 50056 Code for design of electrical installations of electrical heating equipment;
(36) GBZ/T192.1 Method for determination of dust in the air of workplace;
(37) GB 4053.1～.3– Safety requirements for fixed steel ladders and platforms;
(38) GB50254 Code for construction and acceptance of low-voltage apparatus - Electrical equipment installation engineering;
(39) GB50255 Code for construction and acceptance of power conversion equipment - Electrical equipment installation engineering;
(40) GB50256 Code for construction and acceptance of electrical device of crane - Electrical equipment installation engineering;
(41) GB50257 Code for construction and acceptance of electrical equipment on fire and explosion hazard - Electrical equipment installation engineering;
(42) CB 4204–Technical requirements for safety of marine staging;
(43) CB 3785 Safety procedures for height operation in shipbuilding enterprise;
(44) CB 3787–Safety procedures for transportation operation in shipyard;
(45) CB 3660 Safety requirements for lifting operation in shipyard;
(46) LD48 Lifting appliances–Load handing devices and Slings–Safety rules;
(47) JBJ 6 Code for electric design of machine factory;
(48) LD84 Classification of hazard of production-caused dust for operations;
(49) General rules of the industry in relation to locations containing hot or cold temperature substances or facilities, e.g. General rules for work safety of casting shops, General rules for work safety of forging shops, Safety rules for steelmaking, etc.;
(50) General rules of the industry in relation to locations with a risk of accidental release of pressure, e.g. Safe operating procedures for hydraulic test, Safe operating procedures for lifting appliances, etc.;
(51) Procedures for management of electrical safety ([86] Jishengzi No.76).

CHAPTER 2 GENERAL REQUIREMENTS

2.1 General requirements

2.1.1 It is the full responsibility of the party under survey to ensure that the space is safe to enter. The Surveyor has the right to refuse to enter an unsafe and/or unknown space until all safety requirements are met, if he/she is not confident that the space is safe.

2.1.2 The location under survey is to establish relevant provisions for the management of work safety and relevant personnel are to be familiar with rules for safe operation in order to guarantee the basic safety of operators and surveyors.

2.1.3 A responsible person familiar with the location under survey is to be assigned to accompany the Surveyor at all times.

2.1.4 Personnel who operate equipment independently must be trained in rules for operation and safety with qualified results. The examination, maintenance and operation of equipment are to comply with provisions, and the records of personnel training and examination and maintenance of equipment are to be kept.

2.1.5 Where applicable, good natural ventilation is to be provided in indoor work areas. Ventilators, fans or other equipment of sufficient ventilation capacity are to be provided in places where smoke, vapour and any other gas or dust harmful to the human body cannot be removed by the natural circulation of air.

2.1.6 The work area of the location under survey is to be so arranged as to guarantee an adequate safe space for activities of personnel. Safe access is to be provided in order to ensure that production personnel and surveyors will be safely protected and evacuated timely and effectively in a dangerous situation. For the erection of a staging, a notice board is to be placed at the entrance and exit of the means of access after safety is fully confirmed. Effective guardrails or safety nets are to be provided for means of access from which fall would easily occur.

2.1.7 Sufficient lighting is to be provided for survey at night or in spaces so as to ensure adequate inspection of the target of survey and means of access to ensure safe operation.

2.1.8 Isolation of the location under survey is to comply with the following requirements:

2.1.8.1 It is to ensure that mechanical equipment which might cause falling or moving of any object and/or moving objects are isolated or effectively controlled.

2.1.8.2 A notice board is to be placed near the isolated equipment concerned.

2.1.8.3 Unless agreed beforehand, crossover operations such as welding, painting, grinding, sand blasting, hydro blasting, NDT using X-ray or chemicals, which might cause any hazard or damage, are to be adequately isolated.

2.1.8.4 It is to ensure that electrical equipment in the space under survey is appropriate and in an acceptable condition.

2.1.9 When the survey requires entry into locations of highly hazardous operations with special risks, such as those of hot work operation and confined space operation, the validity of the permit to work/safety confirmation document on site is to be confirmed, and it is to ensure that the approval/safety confirmation procedures have been strictly implemented. The permit to work includes analysis of hazardous factors and safety measures (where applicable).

2.1.10 The party under survey shall ensure that all personnel, including female surveyors, have equal access to basic facilities (including toilets, sanitary disposal facilities, shower and changing facilities).

2.1.11 When the surveyor carries out a trial voyage inspection with the ship, the party under survey shall ensure that they have obtained a sea trial permit/certificate, implemented the trial voyage restrictions, trial voyage plan and schedule, and have knowledge of the trial voyage of sister ships (if any). Before departure, the party under survey shall conduct a safety inspection of the trial ship to ensure that the critical fire safety and life-saving equipment have been tested and remain available at all times, to ensure that the crew's qualifications are suitable for safe sea trials, and to ensure that emergency medical assistance can be provided on board.

2.2 Requirements for occupational health and safety and environment management system for the party under survey

The party under survey is encouraged to establish occupational health and safety and environment management system. No matter the certification is approved or not, the party under survey is to fully identify the sources of danger against occupational health and safety in the location under survey, carry out safety risk assessment and take risk control and relevant prevention measures to offer a safe survey and audit environment.

2.2.1 The sources of danger faced by the location under survey include but are not limited to:
2.2.1.1 physical factors: noise, thermal stress/high temperature, low temperature, thermal burn, electric shock, electrical explosion, liquid or free-flowing solid absorption, etc.;
2.2.1.2 confined locations and chemical factors: anoxia, oxygen-rich toxic chemical substances (carbon monoxide, hydrogen sulfide, asbestos, benzene, hexavalent chromium compound, ozone, nitrogen dioxide, etc.), explosive gas and combustibles (e.g. hydrocarbon gas, paint mist, solid combustibles, ammonia, etc.);
2.2.1.3 human engineering factors: slip/stumble/fall off, entrance and exit, high-place operation, wading operation, movement of ordinary and heavy lifting appliances, heavy equipment/structure and its supporting system, geographical distribution of location under survey (long-distance walk and climb), sanitation (biohazard);
2.2.1.4 production characteristics of workplace: welding (discomfort to eyes, heat), cutting and polishing (oxygen-rich, energy, explosive gas), hull structure pressure test, nondestructive test (ray), in-dock operation, trial, etc.;
2.2.1.5 air-related factors: abrasive blasting, dust, high pressure water wash, paint and solvent, fiber (asbestos, mineral wool, ceramic), lead, etc.;
2.2.1.6 factors of surroundings: inappropriate cleaning, lifting appliance/lifting goods, object falling from high altitudes, high-place operation, etc.;
2.2.1.7 use of machinery, equipment and tools: crane, pressure system and its test, machinery and system operation test, fishing machinery operation and test of ocean-going fishing vessels, getting in and out of dock, trial, nondestructive test (such as X ray), etc.;
2.2.2 Risk factors probably faced by the location under survey include but are not limited to:
2.2.2.1 sources of danger are not fully recognized to assess relevant risks for risk control;
2.2.2.2 safe workflow is not provided;
2.2.2.3 safe workflow is not followed;
2.2.2.4 safe machinery, equipment and tools are not provided;
2.2.2.5 safety protection is not provided;
2.2.2.6 notification, guidance, training and monitoring are missing;
2.2.2.7 applicable procedures or instructions are not followed, especially those provided by equipment manufacturers/suppliers;
2.2.2.8 situations needing attention or prohibition are not avoided (e.g. lack of attention due to the use of cell phone, exhaustion, poor mental state , medicine-taking or loss of temper);
2.2.2.9 inappropriate use of safety equipment, including personal protection equipment (PPE) (if applicable);
2.2.2.10 smooth communication is not ensured.
2.2.3 Factors of the occupational health and safety management system requiring key management by the party under survey include but are not limited to:
2.2.3.1 applicable training for use of machinery, equipment and tools;
2.2.3.2 where the running machinery or equipment may hurt people nearby or beneath in the working/test area, guardrails or other equivalent facilities need to be set to avoid falling off or flyout of objects;
2.2.3.3 appropriate marks are used around the dangerous zone for caution (e.g. lifting/carrying heavy objects, temporary unprotected opening, ray (during nondestructive testing)) or safety officer on-site duty;
2.2.3.4 isolation/marking procedure;
2.2.3.5 isolation and marking for pedestrian routes and moving path for equipment and machines (e.g. speed limit, height limit, priority in traversing path, ongoing construction work);
2.2.3.6 materials, machinery, equipment, garbage and tools are not to be piled up in the access;
2.2.3.7 rescue facilities, equipment, procedure and trained aid workers can be readily accessible for impending dangers or emergencies;
2.2.3.8 impact of extreme ambient temperature (high or low temperature);
2.2.3.9 protection of openings to prevent people from falling off due to negligence (e.g. opened manhole, floor or bilge getting rid of grating, protective device, anti-skid plate and marks);
2.2.3.10 measures to avoid falling of objects;
2.2.3.11 the access way and arrangement of exit are to be safe without any barrier;
2.2.3.12 sufficient ventilation and illumination and measures for emergencies for safe entry and work;
2.2.3.13 the location under survey is to be clean enough for safe entry and departure;
2.2.3.14 operational procedures for welding, cutting/polishing tools, equipment and hose needing special attention within confined locations;
2.2.3.15 management procedure for liquid hose (especially when the hose is broken);
2.2.3.16 air detection procedure within confined locations, including providing sufficient ventilation, permission for safe entry and permission for thermal operation;

2.2.3.17 the equipment is to be operated by qualified personnel and correctly maintained and inspected with timely calibration prior to every use. The equipment is to be subject to regular maintenance and inspection, and examination again after major repair and maintenance.
2.2.3.18 the party under survey is to establish and keep records of training, inspection, calibration and maintenance.

2.3 Requirements for emergency response

2.3.1 The party under survey is to be encouraged to make an emergency plan based on the actual condition of location under survey to cope with possible risks. The emergency plan is to include as many dangerous situations as possible, especially operation within confined spaces, high-place operation, wading operation and system pressure test.
2.3.2 The emergency plan is to include regular emergency drills, personnel evacuation and escape routes, etc..
2.3.3 The party under survey is not to invite surveyors for any rescue team. Members of rescue team are to be trained and familiar with situations such as emergency procedure and arrangement, liaison, escape route and backup preparation.

2.4 Safety assessment for shipyard

2.4.1 ISC will assess safety arrangements of shipyards on a regular basis. Where contract is not signed with the shipyard or no contact is made within 12 months, safety assessment is to be carried out prior to any new survey in the shipyard. Where ISC has been carrying out surveys in this shipyard, the interval of safety assessment is not to exceed 3 years. For shipyards that are considered to have higher risks after evaluation, the interval of periodic evaluation shall be shortened.
2.4.2 In case of major occupational health and safety problems or changes of relevant survey safety risks within the shipyard, ISC is to carry out safety assessment to the shipyard again.

2.5 Safety assessment for marine product manufacturers

2.5.1 ISC will assess safety arrangements of marine product manufacturers on a regular basis. Before conducting the first product inspection, an on-site assessment of the marine product manufacturers will be carried out. If subsequent inspections reveal changes in safety risks, a re-evaluation shall be conducted.

CHAPTER 3 SAFETY REQUIREMENTS FOR SPECIFIC LOCATIONS UNDER SURVEY

3.1 Confined space

3.1.1 Operation management

3.1.1.1 Clients are to establish approval procedures for operations in confined spaces so as to guarantee the safety and health of operators and surveyors entering confined spaces.

3.1.1.2 For the survey and audit of ships in operation, the ship's ISM or NSM system generally requires a permit to enter/permit to work to be issued for entry into a confined space in accordance with relevant procedures (e.g. permit to enter, safe operation certificate of personnel, safe hot work operation certificate, etc.). Non-convention ships, shipyards and repair yards not covered by ISM Code may have a similar permit-to-work system.

3.1.1.3 Entry into a confined space is only to be allowed when a separate permit to enter has been issued. This permit is only to be issued after tests have taken place to ensure that the atmosphere is safe to breathe.

3.1.2 Prior to entry into a confined space, the location under survey is to adequately assess and confirm following safety measures (if applicable):

3.1.2.1 In order to be able to identify the hazards in the space to be surveyed and assess the risks, it is the responsibility of the party under survey to provide the following information to the Surveyor:

(1) latest condition of the spaces to be surveyed is to be identified;

(2) the content in spaces adjacent to them;

(3) for gas carriers: a data sheet for the last cargo is to be presented;

(4) for chemical tankers: a data sheet for the previous three cargoes is to be presented.

If there are hazardous gas in spaces adjacent or connected to confined spaces, before the Surveyor enters the confined space, the ship/facility management party has completed risk assessment, the risk has been reduced and controlled, and all the control measures established have been confirmed in place.

3.1.2.2 Relevant documents are to be checked to confirm that the confined space is sufficiently clean and provided with adequate means of ventilation operating in good order so that the safety of operation is ensured.

3.1.2.3 Confirm that the procedures for safe entry are implemented, with relevant permits or certificates (e.g. permit to enter, safe operation certificate of personnel, safe hot work operation certificate) being issued and kept correctly in relevant places and being valid.

3.1.2.4 Relevant arrangements for entering, leaving and remaining in confined spaces are to ensure safety. Means of access are to be opened for entry and exit as much as possible.

3.1.2.5 Evaluate and confirm the ventilation of the space:

(1) Ventilation is to be continuous whenever possible because in many confined spaces, the hazardous atmosphere will form again when the flow of air is stopped. All openings are to be opened for ventilation, including emergency exit;

(2) The air intake for the ventilation system is to be located in an area that fresh air can only be inhaled and is free of combustible dusts, vapors and toxic product source;

(3) For tankers, the inert gas fans are not to be used to provide fresh air ventilation because contaminants from the inert gas lines could be introduced into the tanks;

(4) When other tanks in an inert condition are either adjacent or interconnected (e.g. pipeline) to the space to be entered, the Surveyor is to be alert to the possibility of inert gas leaking into that space through, for example, bulkhead fractures or defective valves. The risk of this occurring can be minimized by maintaining a small but positive pressure in the space to be entered relative to the inert gas pressure. At all times, the procedures on the ship are to be followed.

3.1.2.6 Evaluate and confirm the isolation of relevant risks:

(1) When the Surveyor enters the ballast tank and cargo hold, ballast and cargo operations are to be stopped;

(2) The Surveyor is to confirm that the party under survey has considered and isolated the confined spaces when applicable. Confirm that the confined space is adequately isolated from other compartments, cargo spaces and pipelines. Inert gas, exhaust, vapour, liquid cargo or pressure pipelines which pass through or are led into the space to be surveyed are to be adequately isolated and blanked off, and related systems are to be stopped;

(3) Confirm that mechanical equipment which might cause falling or moving of any object and/or moving objects are isolated or effectively controlled;

(4) A notice board is to be placed near the isolated equipment concerned;

(5) Unless agreed beforehand, operations such as welding, painting, grinding, sand blasting, hydro blasting, NDT using X-ray or chemicals, which might cause any hazard or damage, are to be adequately isolated;

(6) Attention is to be paid to the fact that toxic substances caused by some operations (such as painting, sand blasting and hydraulic blasting) in confined spaces enter confined spaces and accumulate, and these operations are to be fully isolated;
(7) Confirm that electrical equipment in the confined space is appropriate and in an acceptable condition.
3.1.2.7 It is to ensure that the openings flush with decks or platforms are adequately protected or isolated.
3.1.2.8 Where it is necessary for survey in the confined space, confirm the appropriate erection and arrangement of staging and ladders. Equipment accessible at high altitude is to be operated by trained personnel.
3.1.2.9 The factors of extremely hot or cold temperature are to be considered.When working at extreme temperatures the working hours are to be adjusted to avoid the most extreme temperatures during the day. Never take any chances and pay careful attention when performing work in extreme temperature environment. Working speed and rest schedule are to be adjusted according to the temperature.
3.1.2.10 Arrangement of responsible person and competent person:
(1) The person carrying out gas measurement within a tank (hold) is the competent person.
(2) The party under survey is to arrange a responsible person to accompany the Surveyor during survey.
3.1.2.11 Ensure that a watchman and/or rescue team is in place:
(1) A dedicated watchman is to be assigned by the location under survey to remain on the outside of the confined space when the Surveyor carries out survey inside and be in constant contact (visual or two-way voice communication, e.g. walkie-talkie) with the survey team inside. Routines for communication intervals between the watchman and the responsible person accompanying the Surveyor are to be established.Smooth communication between watch personnel (bridge, cargo control room or engine control room) and the standby person is to be maintained;
(2) The watchman is to have appropriate means to initiate emergency response. The emergency response arrangements of the party under survey are to be readily available.
3.1.2.12 Check and evaluate gas measurements
(1) Shipyards shall be equipped with oxygen meters.As a minimum, oxygen measurements are carried out before entry into the confined space. When found necessary, the measurements may be required to be taken under the supervision of the Surveyor;
(2) Initial measurement is to be carried out by a certified marine chemist or a competent person or a similar accredited person. In no case is the Surveyor to be considered to be a competent person – even if he is equipped with his own personal measuring equipment. The Surveyor is always to use personal gas measuring equipment for measurement during survey, but this is not a substitution for measurement taken by or on behalf of the party under survey;
(3) Ventilation is to be stopped about 10 minutes before tests are made and not restarted until the tests are completed.
Measurement is to be taken immediately before entry into the confined space and in the following sequence:

① oxygen atmospheres;
② flammable atmospheres;
③ toxic atmospheres when considered necessary;

(4) Testing for oxygen
Before entering enclosed spaces, the party under survey shall ensure that the oxygen content is between 20.6% and 22% (inclusive). Any atmosphere with the range of 20.6% to 22% oxygen by volume is not to be entered;
(5) Testing for flammable atmosphere
Under no circumstances is the Surveyor to enter a space with an atmosphere with more than 1% of the "Lower Flammable Limit" (LFL) or "Lower Explosive Limit" (LEL), on a combustible gas indicator. The flammability indicator shows the percent within a safety range of 0-10% of the Lower Explosive Limit (LEL) and, ideally, is to read 0%;
(6) Testing for toxic atmospheres
Toxins are measured in parts per million (PPM). The Surveyor is not allowed to enter a confined space exceeding the limits specified below (different test facilities may have different safety limits);

Gas	Limit of 8 Hour work shift [ppm]	Limit of 15 minute working [ppm]
Benzene (C_6H_6)	1	5
Hydrogen Sulphide (H_2S)	5	10
Carbon Monoxide (CO)*	16	24
* GB/T50493 Standard for Detection and Alarm Design for Petrochemical Combustible Gases and Toxic Gases and GBZ2.1 Standards of Occupational Exposure Limit for Hazardous Factors in Work		

Spaces and Chemical Hazardous Factors are adopted for the limit, and local standards or REC72 requirements may be adopted by overseas organizations, i.e. 35ppm for limit of 8 hour work shift and 50ppm for limit of 15 minute working.

(7) If it takes a long time to carry out survey in a confined space, the testing for gases is to be carried out periodically during stay in the confined space. The competent person is to take initial measurement for gases in confined space according to the requirements and carry out overall assessment for air in confined spaces after relevant data is recorded. Air in confined spaces are to be measured periodically, with particular attention to measuring air in the working part and the part that cannot be detected from the entrance;
(8) The confined spaces adjacent to loading spaces (such as isolated void space and double bottom tank) may contain accumulated residues of previous cargo, and information relating to such cargo is required to determine appropriate method for testing air in confined space adjacent to loading space;
(9) Discharging ballast water from tank cannot guarantee safety of air, and gas measurement is still necessary.
3.1.2.13 Testing is to be carried out to demonstrate the safe condition of gases in the space (safety limit: oxygen by volume is within the range of 20.6% to 21%, combustible gas is less than 1% of LEL, and toxic substances are within an acceptable range).
3.1.2.14 Evaluate and confirm the lighting arrangement
The lighting in confined spaces is to be sufficient so as to ensure safe entry and exit and operation. Whenever possible, natural lighting is to be provided in the tank during inspection by opening all tank hatches. Lighting in confined spaces may be temporary arrangements cabled into the space. An electric torch is always to be carried by the Surveyor.
3.1.2.15 Evaluate if special clothing and/or equipment are required.
3.1.2.16 It is strongly recommended that the party under survey place the emergency escape breathing device (EEBD) at the entrance of space for use in an emergency or for evacuation of surveyor from the space.
3.1.3 Control of oxygen content
3.1.3.1 Clients are to take ventilation measures in accordance with GB8958 Safety rules for hazardous work in oxygen deficiency atmosphere, in order to control the oxygen content in the atmosphere of confined spaces and prevent asphyxiation.
3.1.4 Control of flammable and toxic gases
3.1.4.1 Clients are to control the contents of flammable and toxic gases in the atmosphere of confined spaces and prevent explosion and poisoning in accordance with GB/T 50493 – Standard for the design of combustible gas and toxic gas detection and alarm for petrochemical industry. Prior to entry into a confined space, the Surveyor is to be provided with appropriate detection instruments and conduct satisfactory detection in accordance with GB 12358 – Gas monitors and alarms for workplace–General technical requirements. Such detection instruments are to be calibrated in accordance with Metrology Law of the People's Republic of China.
3.1.4.2 Personnel carrying out oxygen and explosion measurements are to be appropriately qualified.
3.1.5 Ammonia content control
3.1.5.1 Ammonia is a gas with a special odor. When its content exceeds 40PPM, it can cause irritation to the eyes and respiratory tract. Special attention shall be paid to the safety risks of ammonia.
3.1.5.2 For ships using ammonia fuel, when survey is carried out in a confined space with risk of ammonia leakage, the party under survey shall provide ammonia content testing. The ammonia content shall be as low as possible, but shall not exceed 26PPM in any case.
3.1.6 Measures for operations high above ground
If the Surveyor needs to conduct survey high above ground within a confined space, it is to ensure that various measures for this meet corresponding national or shipyard standards. For example:
CB 4204 – Technical requirements for safety of marine staging.
GB 4053– Safety requirements for fixed steel ladders and platforms - part 3: industrial guardrails and personal rails on steel platforms.
GB 4053.3 – Safety requirements for fixed industrial guardrails.
GB/T 19155–Suspended platforms and GB 10055 – Safety code for builders' hoist are to be complied with.
3.1. Use of special equipment
3.1.7.1 Where special equipment such as overhead trolley and hoist is used by the shipyard to assist the Surveyor, such equipment is to be regularly inspected in accordance with Regulations on Safety Supervision of Special Equipment to ensure its satisfactory condition. Related operators are to be appropriately qualified according to the provisions of Management of Training and Assessment of Special

Operation Personnel in Safety Technologies.

3.2 Narrow space

3.2.1 The location under survey is to establish relevant provisions for the management of work safety and relevant personnel are to be familiar with rules for safe operation in order to guarantee the basic safety of operators and surveyors.

3.2.2 A responsible person familiar with the location under survey is to be assigned to accompany the Surveyor at all times.

3.2.3 Personnel who operate equipment independently must be trained in rules for operation and safety.

3.2.4 Sufficient lighting is to be provided for survey at night or in spaces so as to ensure adequate inspection of the target of survey and means of access.

3.2.5 Areas adjacent to the structure or equipment under survey are to be clean and free from sundries. The floor of means of access /the positions of standing at and climbing onto the structure are not to be wet and slippery.

3.3 Location liable to cause fall from high

3.3.1 The location under survey is to establish relevant provisions for the management of work safety and necessary height operation procedures, and relevant personnel are to be familiar with and implement rules for safe operation, provide safe condition for height operation and consider the effects of extreme temperature on height operation in order to guarantee the basic safety of operators and surveyors.

3.3.2 A responsible person familiar with the location under survey is to be assigned to accompany the Surveyor or Auditor at all times and provide appropriate communication arrangement.

3.3.3 Height operation is only to be carried out under weather conditions that will not affect personnel safety and healthy. Weather conditions will affect height operation not only on open deck but also within tank due to ship movement caused by wind and wave.

3.3.4 Measures are to be taken at spaces under survey to protect safety of height operation. Following factors are to be considered when determining which protective equipment is suitable for a particular height operation task:

3.3.4.1 Poor slope or ground condition;

3.3.4.2 An obstruction, such as steel frame or suspension;

3.3.4.3 Fragile surface;

3.3.4.4 Bottom plate load;

3.3.4.5 Duration of work;

3.3.4.6 Weather condition.

3.3.5 Fencing or equivalent measures are to be provided at the worksite to prevent falling objects in the working area from causing injury to nearby personnel. Areas adjacent to the structure or equipment under survey are to be clean and free from sundries. The floor of means of access is to be free from oily dirt. The positions of standing at and climbing onto the structure are not to be wet and slippery.

3.3.6 Staging, stairways and handrails are to be of adequate strength and well secured. Any suspended passage is to be provided with handrails and external safety net. Clear notice boards are to be placed at openings for entry and exit.

3.3.7 The robustness of means of access and stairways used for survey as well as their handrails and guardrails is to be ensured. The space edges are to be protected or isolated. The openings flush with decks or platforms are to be protected or isolated by means of covers or guardrails. All kinds of guardrails and handrails are to comply with recognized standards, such as GB4053.3 Safety Requirements for fixed steel ladders and platforms - part 3: industrial guardrails and personal rails on steel platforms.

3.3.8 When the personnel are working in the vicinity of decks, platforms or similar surfaces with edges that are not enclosed and which are more than 1.5m from solid surfaces, open hatches or other openings that are not protected by hatch coaming, and manholes or similar small openings at other operation surfaces, these openings are to be properly covered or enclosed, unless enclosing is impossible due to the work in progress. In this case, appropriate warning signs are to be considered.

3.3.9 The part of bilge where bottom plates or grilles have been removed is to be protected by guardrails, unless guardrails will affect the work in progress. If these open parts are located in walkways, suitable plates are to be placed side by side over the openings or equivalents are to be laid across the openings to provide safe walking surface.

3.3.10 Grilles, walkways and narrow passage with partly or completely removed ladders are to be provided with proper guardrails.

3.3.11 Appropriate and sufficient steps are to be taken to ensure, as far as practicable, that the fall protection equipment or arrangement itself will not cause injury to any person in case of fall.

3.3.12 Sufficient lighting is to be provided for survey at night or in spaces so as to ensure adequate inspection of the target of survey and means of access as well as safe operation. The lighting in the operation area may be temporary arrangement, and the wires connected to the area are to have additional protection to prevent possible fall due to tripping. Natural lighting is to be provided in the operation area as far as possible during survey. Where the hatch cover of cargo hold 'tween deck is to be used as the means of access during survey, sufficient light is to be provided by opening the hatch cover of upper deck.

3.3.13 Equipment associated with height operation at spaces under survey is to meet the requirements of applicable standards. All equipment is to be operated by qualified personnel. Evidence is to be provided that the equipment has been properly maintained and inspected prior to each use. Routine inspection is to be carried out at least once a year, and equipment is to be reinspected after any modification. It is also to be demonstrated that equipment inspection, maintenance and operation are completed by trained and qualified personnel, and the evidence is to be submitted to the Surveyor in the form of applicable documents prior to the use of equipment. When applicable, ship safety management system or facility quality management system/safety management system is to specify recording requirements for training, inspection and maintenance. The responsible personnel is to reach an agreement with the operator on the scope of use of equipment before using the equipment, which is not to exceed permissible load and scope limit.

3.3.14 Emergency deployment

3.3.14.1 For height operation on board, according to the requirements of ISM Code, emergency deployment is part of ship operation risk assessment and is to be specified in Ship Safety Management Manual;

3.3.14.2 For height operation at shipyard/factory, if the shipyard/factory has obtained ISO 45001Occupational Health and Safety Certification, emergency deployment is to be part of emergency preparation plan of the company;

3.3.14.3 If above requirements cannot be met, emergency deployment at operation site is to the satisfaction of the competent Surveyor;

3.3.14.4 Rescue facilities and procedures as well as supporting personnel are to be in place at all times so as to enable evacuation and/or emergency response in the event of imminent danger.

3.3.15 Operation on water surface

3.3.15.1 If the ship is not under way and the weather and sea conditions permit operation on water surface, following requirements may be used as a guide:

(1) Weather and sea conditions do not exceed Beaufort scale 3, i.e. corresponding wind speed of 17-21 knot, medium wave of about 2 m, crest white wave may have spray;

(2) Deck watch measures are in place;

(3) One rescue boat is ready for landing and recovery in case of falling into water;

(4) Good vision enough to carry out height operation and rescue personnel overboard;

3.3.15.2 When the Surveyor is operating on water surface, there is to be one site person responsible for safety watch and whole monitoring of Surveyor's work site. Personnel responsible for safety watch is to be familiar with and able to perform safety duties relating to operation on water surface;

3.3.15.3 A lifebuoy with lifeline and light is to be provided on site;

3.3.15.4 Everyone operating on water surface is to wear a life jacket or life buoy;

3.3.15.5 Operations such as overboard discharge are to be provided with safe protection.

3.3.16 Anti-fall equipment and system

3.3.16.1 The anti-fall system is to have sufficient space arrangement and be able to prevent person from hitting obstruction or ground before fall stops;

3.3.16.2 Rails, safety net or personal anti-fall equipment are to be used when the person is located at an unprotected edge of 1.8m and more.;

3.3.16.3 The anti-fall procedures are to include the condition that the rescue person is suspended in the work area;

3.3.16.4 Safety nets or airbags are to be as close to the work areas as possible so as to function effectively;

3.3.16.5 Safety nets are to be located under personnel walking and working surface as far as possible and:

(1) not more than 9.1m from working surface;

(2) The maximum size of mesh is not to exceed 230 cm^2, and any side of mesh is not to exceed 0.15m;

(3) The distance between mesh center and center as well as the distance between mesh side rope and frame are not to exceed 0.15m;

(4) The mesh is to be weaved firm to prevent expansion;

(5) Each safety net or some safety nets are to have side rope. The safety nets are to be installed with enough space under it to prevent contact with objects or surface below;

3.3.16.5 According to practical experience, if condition permits, the safety net installation requirements are recommended as follows:

Vertical distance from work plane to safety net	Minimum horizontal distance from outer edge of safety net to work

	surface edge
Not more than 1.5m	2.4m
More than 1.5m but not more than 3m	3m
More than 3m	3.9m

3.3.16.6 Anti-fall system is to include impact energy absorption equipment to reduce the impact of fall on human body;
3.3.16.7 Anti-fall system is not to be used under following conditions:
(1) The lashing line is in danger of being cut;
(2) Large space is needed due to pendulum effect;
(3) Other conditions that restrict or affect safe use;
3.3.16.8 Neither life line nor securing point can be shared. Based on experience, it is better to use a safety belt with two safety lines;
3.3.16.9 All anti-fall equipment, personal safety belt and safety net are to be secured independently and not to be attached to stagings;
3.3.16.10 When anti-fall equipment is used, at least one person is to be nearby to alert and initiate assistance to fall;
3.3.16.11 A practical and safe rescue plan is to be in place prior to the commencement of height operation and consider the actual rescue time so that the injured person can be rescued as quickly as possible and subsequent injuries (such as excessive blood loss) can be avoided;
3.3.16.12 There is to be clear instructions at construction site on how to organize qualified personnel (e.g. rescue team);
3.3.16.13 Securing point is safe connection point of lifeline or safety rope, in the form of :
(1) equipment dedicated to supporting anti-fall system;
(2) specific structures such as beams, columns or similar parts are selected as securing point when special securing equipment is not available.
Above securing points usually require additional equipment such as rings so that personal anti-fall system can be connected through securing point connector. The securing points are to be so arranged that the lifeline to which they are attached does not cross rails or other parts of structures that are not strong enough to support the load of fall. The Surveyor may refuse to use the equipment if there is any doubt about the securing point
3.3.17 Staging
3.3.17.1 Stagings are to be properly designed, erected, inspected and maintained by competent personnel.;
3.3.17.2 Stagings are to be constructed according to recognized standards and shall be verified and approved by the party under survey's safety personnel. such as CB 4204 Technical Requirements for Safety of Marine Staging, or at least meet following requirements:
(1) The design meets expected work and load;
(2) They are to be made of metal rods and the steel pipes are to be connected by rigid fasteners;
(3) They are to be built on a solid foundation;
(4) There is to be stable structure and good stability, and diagonal braces are used at certain interval for stability;
(5) There is a platform large enough for laying baseboards, with guardrails at opening ends;
(6) Walkway is to be strong enough, continuous, clean and non-slip;
(7) Loose material/tool is not included;
(8) Suspended stagings/platforms are to have at least six evenly distributed hanging points made of wire rope or chain along vertical direction as far as possible;
(9) The hanging points are to be made of wire rope or chain and along vertical direction as far as possible;
(10) Safe access arrangement is to be provided.
3.3.17.3 The use of stagings is to be approved by competent personnel;
3.3.17.4 There is to be a sign on site or equivalent method indicating availability of stagings;
3.3.17.5 Barrels, boxes, containers, bricks or other unstable objects cannot be used as supporting planks for work platform or staging/work platform;3.3.17.6 Stagings are to be of sufficient size to allow safe passage, and wide enough for easy passage by adult shoulder width, which is at least 0.6m;
3.3.17.7 The staging platform is to be provided with anti-fall equipment such as rail:
(1) fixed or rigid connection; The distance between top rail and walkway or platform is at least 0.95m;
(2) The intermediate rail is not to be more than 0.47m above platform;
(3) The rails are to be able to prevent person from being stabbed or scratched as well as hanging and pulling clothes;
(4) The height of baseboard is to be at least 0.15m;

3.3.17.8 The arrangement of staging platform is to:
(1) be without gap to prevent person from falling or tripping;
(2) be anti-slip or anti-trip;
(3) prevent person from getting stuck between platform and adjacent structures;
(4) prevent inadvertent movement during work.
3.3.18 Portable ladder and straight ladder
3.3.18.1 Portable ladders can be used as supplementary or additional measures to access structures in addition to fixed means of access;
3.3.18.2 Portable ladders are to be designed based on national or international standards. For example, steel straight ladders, inclined ladders are to comply with GB/T 17889 Ladders. The rungs and steps of portable ladder is to be at least designed to be non-slip, e.g. the surface is grooved, embossed, pitted or coated with non-slip material, etc.;
3.3.18.3 The minimum distance between handrails on both sides of the portable ladder is to meet the requirements of approved standards (e.g. ANSI A 14.2 Metal Portable Ladder; BS EN131 Ladder (Terms, forms, functional dimensions; Requirements, tests, marking specifications; User Guidance; Single or multi-section loose-leaf ladder)) ;
3.3.18.4 Portable ladders are to be:
(1) designed to meet the demands of use;
(2) with length not more than 5m;
(3) standing on a stable, solid and suitable foundation for use;
(4) standing at proper angle (about 75^{o});
(5) with good maintenance, free of oil, grease and other sliding factors;
(6) with sufficient length to extend from departure platform to destination exit/entrance;
(7) Ladder feet anti-slip device is to be installed during use, which can be achieved by using anti-slip device to fix upper and lower ends or adjacent handrails at both sides or other equivalent arrangements;
(8) Anti-slip feet are not a substitute for prudent steps to place, tie, or fasten a ladder on a slippery surface;
(9) Holding a ladder by hand is not an effective way to secure a ladder unless other means of securing are not practicable;
(10) Portable ladders are to be used above inner bottom or on deep longitudinal platforms to ensure that free fall height does not exceed 6m. If the fall height is greater than 6m, there is to be at least 3m of water above the top of inner bottom to act as a fall cushion or a harness is to be used. The free fall height above the water is not to exceed 6m;
3.3.18.5 Personnel is to use anti-fall equipment when climbing over 4m with straight ladder;
3.3.18.6 Upper and lower ends of straight ladder are to be fixed;
3.3.18.7 The ladder is to be fixed to avoid shifting or swaying when suspended;
3.3.18.8 The feet of the portable ladder at both ends are to have rubber caps and the ladder is not to be visually deformed;
3.3.18.9 Hanging ladders and ladders with length more than 5m can only be used when the top is mechanically fixed;
3.3.18.10 Ladders with interlocking or extended connections are not to be used unless their connecting parts are prevented from relative moving during use;
3.318.11 Aluminum alloy ladders can be used in the cargo tank, but cannot be stored in the cargo area or other dangerous environment spaces;
3.3.18.12 As a guide, the use of portable ladder and straight ladder is to be:
(1) short duration of work - ladders are not to be used in workplaces where they are used in one position for more than 30 minutes; For a long time or frequent use, a more standard approach is to be adopted (e.g. staging, step ladder or aerial vehicle);
(2) at height with low risk, for example, when the work nature determines that falls are less likely or if they do occur, injuries are less likely;
(3) suitable for “light” work - ladders are not suitable for strenuous or heavy work;
(4) suitable for the work that does not require carrying heavy or difficult-to-carry tools or equipment;
(5) suitable for those who can climb and work while holding the ladder by hand;
(6) suitable for jobs in which a three-point grip (hands and foot) is maintained in the working position and where a person cannot hold on to a ladder, unless time is short, other measures are to be taken to prevent fall or mitigate the consequences of fall;
3.3.18.13 New ladders are to be marked according to the conditions and levels of use.
3.3.19 Mobile lifting platform (aerial vehicle, etc.)
3.3.19.1 Mobile lifting platform is to be:
(1) available and applicable loads are to be certified;

(2) the control device at bottom can override basket end;
(3) safety devices and limiting devices are to be provided when applicable;
(4) without loose parts and the tools are fastened;
(5) inspection and control as well as testing of safety devices are to be carried out before each use;
(6) maintenance according to the recommended requirements of the manufacturer and in good condition;
3.3.19.2 Mobile lifting platforms are to be thoroughly inspected at least every 6 months;
3.3.19.3 Lifting platforms are to be inspected and certified every year;
3.3.19.4 Mobile lifting platforms are to be operated by trained personnel in top end basket:
(1) The operator of mobile lifting platform is to attend an approved operation training course and obtain a certificate, work permit or "driver license" indicating the type of operation for which the holder is trained;
(2) The training licence or work permit is to be valid;
(3) In addition to formal training of the specific type of lifting platform, the operator is to be subject to familiarization training on the control and operation of lifting platform to be operated;
3.3.19.5 During operation, the mobile lifting platforms are to be:
(1) place on a solid and flat surface;
(2) Lifting platform at lower position can be moved for repositioning;
3.3.19.6 The passengers are to wear anti-fall equipment and fasten it in the platform;
3.3.19.7 The passengers are to wear Lifejacket instead of safety belts when operating on water surface.
3.3.19.8 Aerial vehicle may be used to inspect the structure of bulk cargo hold that cannot be reached by fixed ladders:
(1) The aerial vehicle can be used to inspect structures not more than 17 m above the roof;
(2) The standing platform is to be clean and have fixed points for connecting personal anti-fall devices;
(3) The working platform is to be provided with rails and baseboards;
3.3.19.9 When the equipment is provided with a self-adjusting platform, special attention is to be paid to the effective locking device after completion of manipulation to ensure safe fixing of the platform;
3.3.19.10 Lift control devices (including safety devices) are to be enclosed, and operational tests are to be conducted at full lift before use;
3.3.19.11 Potential collision risks such as hitting the top plate of the structure and squeezing the structure are to be considered;
3.3.19.12 Cranes, winches and other devices used to lift and land moving platforms are to:
(1) operate the platform as slowly as possible under supporting condition;
(2) for power operation, the platform land is also to be of power operation;
(3) Free derrick or lifting winches controlled only by brakes cannot be used;
3.3.19.13 If the mobile platform is suspended above the structure by a crane, winch or other device and the structure cannot support its weight, or there are other risks (such as deep water that can cause drowning) below the platform, low limit devices compatible with the lifting system are to be installed to ensure that the platform will not fall below safe low level;
3.3.19.14 If above low limit device is not practicable, the responsible person is to ensure that work procedures are in place to mitigate the risk of the work platform falling below a safe low level;
3.3.19.15 Lifting test is to be be carried out at all intended working locations on working platforms which are lifted or suspended by cranes, winches or crane vehicles before personnel are mounted on them;
3.3.19.16 The crane cannot be moved from one position to another with the Surveyor on the work platform. Slight horizontal movement of the work platform is to be carried out at the request of the Surveyor;
3.3.19.17 Anti-fall measures such as rails or safety belts, safety ropes and other fastening measures are to be adopted for working platforms with lifting height of more than 1.2m:
(1) Rails can be hinged, detachable or chained;
(2) Anti-fall measures are to be selected and implemented according to the condition that fall is likely to occur;
(3) Personal anti-fall equipment is to be used.
3.3.20 Suspended platform
Suspended platform, as a special lifting platform, in addition to meeting applicable requirements of above 3.3.19, is to:
3.3.20.1 suspended platform and crane are to be certified to meet applicable requirements for safe load and manning. Crane used for personnel transfer to and from offshore installations shall comply with the applicable personal buoyancy aids (e.g. API Spec 2C; EN13852-1, etc.) And approved by the competent authority;
3.3.20.2 A safety pin is to be provided for hook and an additional safe wire rope connection is to be between the hook and the suspended platform;
3.3.20.3 The lifting equipment is not to be used under severe weather condition;

3.3.20.4 The crane operators are to be trained and qualified, and competent for personnel lifting operations;
3.3.20.5 The wire rope connecting the suspended platform and lifting mechanism is to be able to brake completely, and the free fall mechanism cannot be used. The hydraulic crane is to be able to perform "hydraulic lift" and "hydraulic drop";
3.3.20.6 The Surveyor is to be provided with a brief explanation on how to use the suspended platform properly before entering the platform.
3.3.21 When using aerial vehicles or suspended platforms and other equipment to assist inspection, "single" riding equipment is not accepted, qualified personnel is to be designated to operate, and equipment is to be effectively maintained. Relevant operators are to obtain corresponding qualifications according to requirement (if applicable).

3.4 Location liable to cause fall into water

3.4.1 The location under survey is to establish relevant provisions for the management of work safety and relevant personnel are to be familiar with rules for safe operation in order to guarantee the basic safety of operators and surveyors.
3.4.2 A responsible person familiar with the location under survey is to be assigned to accompany the Surveyor or Auditor at all times.
3.4.3 Sufficient lighting is to be provided for survey at night or in spaces so as to ensure adequate inspection of the target of survey and means of access.
3.4.4 Staging, stairways and handrails are to be of adequate strength and well secured. Any suspended passage is to be provided with handrails and external safety net. Clear notice boards are to be placed at openings for entry and exit.
3.4.5 The overhead trolley or suspended platform used to assist the Surveyor is to be operated by a designated and qualified person and maintained effectively.
3.4.6 A safety net is to be provided when the survey is carried out overboard.
3.4.7 When the survey of a ship is carried out using a boat or raft, attention is to be given to compliance with the relevant requirements of paragraph 5.1.6 “Preparations for survey” of Chapter 5, PART ONE of ISC Rules for Classification of Sea-going Steel Ships and IACS REC 39–Safe use of rafts or boats for survey. Such boats or rafts are to be maintained in a satisfactory condition. Sufficient life jackets are to be available and kept in a satisfactory condition.
3.4.8 A back-up team is to continuously observe the work and keep smooth communication with the survey team. There shall be one personal lifebuoy with personal buoyancy aid and light.
3.4.9 When vessels are moored alongside each other, and it is necessary to cross from one vessel to another, the passageway shall be free from obstacles and oil stains to prevent tripping or slipping. It is advisable to arrange for crossing at the point where the vessels are touching to prevent falls.

3.5 Location containing flammable and explosive substances

3.5.1 The location under survey is to establish relevant provisions for the management of work safety (including provisions for the management of flammable and explosive substances) and relevant personnel are to be familiar with rules for safe operation in order to guarantee the basic safety of operators and surveyors.
3.5.2 A sign of no open flame is to be placed in the location and a regular patrol is to be conducted.
3.5.3 The electrical equipment in a location where flammable and explosive substances may be present is to be intrinsically safe and maintained effectively.
3.5.4 Effective ventilation is to be maintained throughout the location where flammable and explosive substances may be present, in order to prevent the accumulation of flammable gases in dead corners. The air inlet and outlet are to be arranged far from any source of ignition. The air intake for the ventilation system is to be located as far as practicable from any combustible dust,vapour or toxic product.
3.5.5 A responsible person familiar with the location under survey is to be assigned to accompany the Surveyor or Auditor at all times.
3.5.6 Sufficient lighting is to be provided for survey at night or in spaces so as to ensure adequate inspection of the target of survey and means of access.
3.5.7 Control of oxygen content
Clients are to use ventilation in accordance with GB8958 –Safety rules for hazardous work in oxygen deficiency atmosphere, in order to control the oxygen content in the atmosphere of confined spaces and prevent asphyxiation.
3.5.8 Control of flammable and toxic gases
Clients are to control the contents of flammable and toxic gases in the atmosphere of confined spaces and prevent explosion and poisoning in accordance with GB/T 50493 – Standard for the design of combustible

gas and toxic gas detection and alarm for petrochemical industry. Prior to entry into a confined space, the Surveyor is to be provided with appropriate detection instruments and conduct satisfactory detection in accordance with GB 12358 – Gas monitors and alarms for workplace – General technical requirements. Such detection instruments are to be calibrated in accordance with reqirements.
Personnel carrying out oxygen and explosion measurements are to be appropriately qualified according to requirements.

3.6 Location containing hot or cold temperature substances or facilities

3.6.1 When the temperature of the location exceeds 35℃ in summer, effective cooling measures are to be taken. A local supply fan needs to be fitted in hot temperature work areas and harmful substances in such areas are not to be blown to the human body.
3.6.2 Where any hot or cold part of the equipment might be hazardous, it is to be appropriately isolated.
3.6.3 A safety warning sign is to be placed in areas where personnel are susceptible to burn, scalding or frostbite.

3.7 Location with a risk of accidental release of pressure

3.7.1 General requirements
3.7.1.1 Necessary isolation measures are to be taken for the source of hazard (e.g. the part under high pressure), and necessary protective devices are to be provided in order to prevent personnel from coming into contact with the source of hazard. If proper barrier protection is not performed, the party under survey is to confirm whether the test procedure is followed, whether the test equipment is in good condition, whether the isolation valve is sealed, whether the test pressure gauges (at least 2) have been calibrated and have a proper range for the test pressure and are not isolated or bypassed, and whether the pressure relief mechanism or relief valve is of adequate size/grade and properly set. Test medium transmission lines (especially flexible piping) are to be free of broken or leaking joints, and inlet to outlet and release devices from the test item are to be properly assembled and supported.
3.7.1.2 Lifting appliances and their parts and components (e.g. cable wire) are to be inspected and maintained in accordance with relevant survey requirements, in order to prevent the accidental release of energy due to accidental fracture.
3.7.1.3 Testing/pressure test equipment is to be reasonably selected according to the pressure of the product under survey. Testing equipment is to be certified according to relevant requirements, and temperature of the test medium is not to be lower than the specified temperature to avoid the possibility of brittle fracture.
3.7.1.4 Test pressure is to be applied gradually to avoid impact loading of test items. When multiple items are tested together, the test pressure is not to exceed the pressure required to prove the weakest part, but it must meet the pressure of all test parts.
3.7.1.5 It is to ensure that all pressure equipment or systems and related pipes and equipment under inspection are operated by competent personnel and provide evidence, if necessary, that the equipment has been properly maintained and inspected in accordance with relevant requirements.
3.7.1.6 Before test of any pressure equipment and system, the party under survey is to confirm that the materials, construction and installation of the equipment and piping comply with applicable rules and/or approved design, and that the functions, operation, alarm, safety protection and other aspects of the equipment and system have been inspected in satisfactory condition, and that protective measures such as overvoltage protection and pressure relief devices are available at any time.
(1) Overpressure protection device: e.g. pressure relief valves meeting the requirements of applicable rules (e.g. ASME code, Classification Society Rules), or other overpressure protection devices accepted by the Administration/Classification Society, the protection devices are required to open before the equipment pressure exceeds the maximum allowable working pressure, and it is to ensure that the maximum pressure of the equipment does not exceed the maximum pressure allowed in the applicable rules/standards;
(2) Pressure relief device: The adjustable parts are to be sealed during maintenance and kept sealed during operation. The sealing device is to be able to ensure that the pressure relief device setting cannot be changed under the condition that it is not opened. Pressure relief device is to be overhauled regularly and tested, overhauled, repaired, set up and sealed only by qualified personnel on a controlled basis, with the Surveyor having access to these records when necessary.
3.7.1.7 Where tests are performed using parameters of another accepted test method (e.g. pressure, test medium) instead of tests (e.g. "pneumatic test instead of hydrostatic pressure test"), the party under survey is to pay special attention to the possibility of additional or undefined hazards and require reapproving test procedure and/or adding additional precautions if necessary.
3.7.1.8 A close inspection of the equipment is to be carried out only when the test pressure does not

exceed the design pressure level, and when necessary, the pressure is to be reduced to the leakage test pressure level.

3.7.1.9 If leakage is found at a joint or attachment, whether on the test item or on the test equipment, the pressure is to be reduced to atmospheric pressure before corrective action is taken. The specimen cannot be subject to a "hammer test" under pressure, which includes hammering the weld to prevent leakage. Attempts to correct leakage under pressure by other means, especially by welding, are be avoided.

3.7.1.10 When the safety valve is tested, the pressure relief device is to be connected to the outside of the work/test area. When setting the boiler safety valve, special attention is to be paid to checking relevant draining device and venting pipe for blockage, lack of proper support and breakage.

3.7.1.11 For special high pressure tests, if the Surveyor needs to witness the tests from a distance, the party under survey is to provide pressurization, depressurization and appropriate time recording instruments for remote witness by the field surveyor.

3.7.1.12 When necessary, precautions are to be taken during the test to prevent the danger of possible expansion of the test medium. If it is required to maintain the pressure test for a period of time, preventive measures are to be taken to avoid overpressure if the test medium in the system is heated and expanded during this period, such as necessary additional pressure relief device, etc..

3.7.1.13 If water is used as the test medium, the test temperature is not to be lower than 7 ℃ to avoid the possibility of ice damage. If water is subject to pressure test at ambient temperature below 0 °C, it must be confirmed that the test medium, test instrument and connection line will not freeze. If a liquid other than water (e.g. kerosene) is used as the test medium, the specific risk of that medium is also to be considered.

3.7.1.14 The test item is to be fully filled with the liquid used as the test medium, and the closed system is to be properly vented. If it is not possible to eliminate all gases due to design of the test item, additional precautions for pneumatic testing are to be considered.

3.7.1.15 Special attention is to be taken to the effect of the test medium weight on the test item and the bearing capacity of any supporting structure or base.

3.7.1.16 Due to the potential of high storage energy, any item in which pneumatic tests are carried out is to maintain its internal volume to a minimum by isolating certain parts or testing components separately. As an alternative, incompressible materials are to be considered.

3.7.1.17 For large volume items requiring pneumatic testing, the effects of explosion waves and blasting debris in the event of catastrophic failure need to be taken into account, and an appropriately sized limit area is to be specified in the test procedure to protect life and property in such cases.

3.7.1.18 Local cooling due to filling and emptying test items is to be controlled during pneumatic tests to avoid the possibility of local brittle fracture by maintaining a constant flow rate through the inlet or outlet nozzles. The internal pressure of the test medium is also to be controlled by using pressure-reducing and flow-control valves of appropriate size to avoid any impact loading.

3.7.1.19 When conducting leakage tests in structural compartments and spaces, if pressure relief devices such as safety valves are used instead of U-shaped tubes, the party under survey is to be aware that in some cases, such method may lead to catastrophic failure in the test spaces. The safety precautions used in the test are to be carefully reviewed and the risks are to be assessed, considering the necessary precautions and whether the release mechanism design is similar to the U-tube principle (i.e. suitable for lifting through preset overpressure and not limited to any type of spring or limiting device).

3.7.1.20 When a mixture of liquid and gas (usually water and air) is used as test medium for test, additional precautions applicable to each test medium are to be considered.

3.7.1.21 The pressure pipe leakage test is to be carried out by hydrostatic method, and prior to the test, the party under survey is to verify that the piping materials, construction and installation comply with applicable rules and/or approved design, and the pressure piping is not to be tested below its minimum design temperature, considering the ductile transition temperature and the possibility of brittle fracture.

3.7.1.22 Prior to maintenance and modification of pressure systems, the party under survey is to conduct an appropriate assessment to confirm that all technical and safety changes have been considered, and the modification drawings are to be approved by the Classification Society if applicable. Relevant parts are to be securely isolated during maintenance and modification, and precautions are to be taken to prevent accidental restart of the system before all safety equipment or systems are restored. After maintenance and modification, written information of relevant work and instructions to safe operation of system are to be updated in time, including any new instructions.

3.7.2 Pressure test procedure

3.7.2.1 The party under survey is usually to prepare test procedures and work in accordance with test procedures. The procedures are to be prepared by competent personnel based on a risk assessment of the proposed operation, considering relevant hazards, dangers and any local/national health and safety laws regarding workplace safety. Where applicable, test procedures are to be approved by the Surveyor.

3.7.2.2 Test procedures vary in complexity. Typical procedures are to include following applicable contents:

(1) Purpose;

(2) Scope;

(3) Responsibility and qualification of key personnel:

① test supervisor;

② test operator;

③ surveyor of Classification Society;

④ personnel responsible for safety;

⑤ Others.

(4) Danger and control of pressure test

① list;

② accessories;

③ pressure source;

④ test area;

⑤ barricades, cordons and marking of the test area and other appropriate means to restrict access during pressurization and during test and depressurization;

(5) Test procedure

① flow chart and test equipment;

② location and specification of test instruments, safety valves and other pressure relief devices, such as U-shaped tubes used in some leakage tests;

③ location of isolation valves and test medium supply lines;

④ sequence of opening and closing exhaust valves (if several valves are provided);

⑤ test pressure, medium and time for gradual pressurization/depressurization (if applicable);

⑥ instruments for recording timing, pressurization and depressurization necessary for the Surveyor to conduct remote test;

⑦ pass/fail standards;

⑧ report;

⑨ References.

3.7.3 Written inspection plan for pressure system

3.7.3.1 The party under survey is to implement written inspection plan for high pressure, complex (such as compressed air bottles with the product of pressure (bar) and gas cylinder internal volume (litre) equal to or greater than 250 bar litres and related delivery pipelines, fixed high-pressure fire extinguishing systems, steam boilers, related delivery pipelines and protection devices, inflatable hydraulic accumulators, steam compression refrigeration systems with installation power more than 25 kW, components of self-contained breathing apparatus groups (excluding gas cylinders, fixed liquefied petroleum gas (LPG) storage systems used for workplace heating) or industry-mandated pressure systems, and the written inspection plan is to contain information on pressure system composition, pressure operation, inspection scope, items and frequency, the purpose of which is to ensure the safety of pressure system through systematic inspection.

3.7.3.2 The written inspection plan usually covers all protective devices and is to include each pressure device as well as parts of the pipeline and delivery line that may be upgraded to a hazard in the event of failure. The written plan is to specify the nature and frequency of inspection and include any special measures necessary to establish a safe inspection system. The party under survey is responsible for ensuring that the scope of the written plan is suitable and the plan covers all pressure vessels, protective devices and delivery lines. For oil (heating) pressure systems, such as steam boilers, the written plan is to include an inspection of the system as it is cooled, disassembled and operated in normal condition.

3.7.3.3 The party under survey is to ensure that the inspection is carried out by competent personnel in accordance with the written inspection plan, through which the design, installation, maintenance and periodic inspection of the pressure system meet relevant requirements, and records of inspection, repair and test are kept as evidence of compliance with the written inspection plan. Records relating to written inspection plan are to be provided for information when requested by the Surveyor.

3.8 Location containing running equipment

3.8.1 Specific operation requirements

3.8.1.1 It is to ensure that each component of the running equipment is secure without loosening and swinging.

3.8.1.2 Prior to operation of the equipment, it is to ensure that the equipment is free of sundries, scraps or other debris, in order to prevent injuries to personnel due to accidental spatter.

3.8.1.3 It is to ensure that areas adjacent to the running equipment is clean and free of oil and water stains.
3.8.2 Requirements for protective devices
3.8.2.1 Protective devices (e.g. coupling shield, protective cover of belt, damper, protective screening) are to be fitted by clients in accordance with relevant provisions, in order to prevent injuries to personnel due to the exposure of rotating components or being close to high speed rotating components.
3.8.2.2 A conspicuous safety sign is to be placed near the running equipment.

3.9 Location liable to cause electric shock
3.9.1 The location under survey is to establish relevant provisions for the management of work safety and relevant personnel are to be familiar with rules for safe operation in order to guarantee the basic safety of operators and surveyors.
3.9.2 The electrical connection points on electrical installations and lines are to have good contact and reliable connection.
3.9.3 The high voltage testing station (room) is to be provided with a shielding system. The shielding connection to doors and windows is to be reliable.
3.9.4 During the on-site test of electrical appliances and the test of products of large capacity, the electric test and discharge of the tested product are to be carried out before and after the test, measure the insulation resistance to check for the risk of electric leakage from the equipment.
3.9.5 A notice board is to be placed at the relevant equipment or facilities which might cause electric shock.

3.10 Location containing toxic and harmful substances
3.10.1 Operation management
3.10.1.1 The party under survey is to establish procedures for control of toxic and harmful substances, including project management measures, operation methods and health requirements for workplaces, and control the dust hazard of spaces which the Surveyor will enter, so as to guarantee the health and safety of operators and surveyors.
3.10.1.2 All locations under survey where the hazard due to toxic and harmful dust may be present are to be isolated or effectively controlled by the party under survey.
3.10.1.3 A notice board is to be placed by the party under survey in locations possibly containing excessive toxic and harmful dust.
3.10.1.4 The party under survey is to inform the Surveyor of any hazard due to toxic and harmful dust that may be present in the location under survey, especially 4 types of dust such as cast iron dust, asbestos dust, and stop the activities of requesting survey in case of excessive dust or any uncontrollable hazard.
3.10.2 Operation measures
Control of cast iron dust
3.10.2.1 The party under survey is to stop operations such as sandcasting and grinding during survey of castings and forgings by the Surveyor, otherwise special measures are to be taken to control the dust in order to reduce the hazard to an acceptable level.

3.11 Location with a risk of being struck by moving or falling objects
3.11.1 Operation management
3.11.1.1 The location under survey is to establish relevant provisions for the management of work safety and carry out effective control of falling objects or moving objects which might cause injuries, scraps shall be timely cleared and put back in their place, and warning lines shall be properly set up at the work site, so as to guarantee the safety of operators and surveyors in the related locations or their adjacent areas.
3.11.2 Operation measures
3.11.2.1 It is to be ensured that various measures which may be used by the location under survey meet relevant national or industry standards. For example:
(1) Staging is to comply with CB 4204 – Requirements for safety of marine staging.
(2) Vertical and inclined steel ladders and platforms are to comply with GB 4053 –Safety requirements for fixed steel ladders and platforms.
(3) Guardrails and handrails are to comply with GB 4053.3 – Safety requirements for fixed steel ladders and platforms - part 3: industrial guardrails and personal steel platforms.
(4) Operations at heights are to comply with CB 3785– Safety procedures for height operation in ship repairing enterprise.
(5) Transportation within shipyards is to comply with CB 3787 – Safety procedures for transportation operation in shipyard.

(6) Lifting operations in shipyards are to comply with CB 3660 – Safety requirements for lifting operation in shipyard.
(7) Relevant operations on ships and at docks are to meet the requirements of relevant safety regulations and standards.
(8) Manufacturing and testing operations of manufacturers of marine rolled steel, steel forgings and anchor chains are to meet the requirements of relevant safety regulations and standards.

3.12 Location with a risk of structural collapse

3.12.1 Operation management

3.12.1.1 The party under survey is to establish control procedures to regulate the erection and removal of staging so as to guarantee the safe use of staging.

3.12.1.2 The facilities and locations, for which it is confirmed that the risk of structural collapse may be present, are to be isolated or effectively controlled. Pay special attention to the excessive corrosion of passage structures/steps/grate plates in vessels/platforms that have been idle for a long time or are old, and the risk of collapse due to improper storage of shipbuilding materials.

3.12.1.3 A notice board is to be placed at the related facilities or locations of which the risk of structural collapse may be present.

3.12.2 Operation measure

3.12.2.1 The party under survey is to ensure that the erection of staging complies with the following requirements:
(1) Staging is to comply with CB 4204 – Requirements for safety of marine staging.
(2) Vertical and inclined steel ladders and platforms are to comply with GB 4053 – Safety requirements for fixed steel ladders and platforms - part 3: industrial guardrails and personal steel platforms.
(3) Guardrails and handrails are to comply with GB 4053.3 –Safety requirements for fixed industrial guardrails.

3.12.2.2 The party under survey is to guarantee that the staging used by the Surveyor in the location under survey has been satisfactorily inspected by its security department and marked accordingly in a conspicuous position.

3.12.2.3 The party under survey is to guarantee that the safety of the Surveyor is not impaired by the following factors during survey:
(1) use of a staging which is still under erection or removal of a staging in use, especially prohibited operations not following safety requirements;
(2) accidental impact on the staging by a lifted structure or object due to an incorrect operation, etc.;
(3) severe weather and other adverse effects.

3.13 Location with radiation

3.13.1 Operation management

3.13.1.1 The location under survey is to establish relevant provisions for the management of work safety, control the temperature of the location and prevent the injuries caused by intense light radiation and by heat radiation insofar as practicable.

3.13.1.2 The locations, for which it is confirmed that the risk of radiation may be present, are to be isolated or effectively controlled.

3.13.1.3 A notice board is to be placed in related locations in which the risk of radiation may be present.

3.13.1.4 The party under survey is to provide the Surveyor with special protective clothing and devices required for work in the location under survey.

3.13.1.5 The party under survey shall be aware of the impact of natural radioactive substances (Norms), ensure that the radiation level in the surveyor's work area is within a safe range, and prohibit any operations involving the generation of radiation during the surveyor's inspection period.

3.14 Pick-up by traffic boat

3.14.1 Picking up surveyors by traffic boat includes pick-up from shore to ships/offshore installations at anchor or at sea (hereinafter referred to as ships/offshore installations served) and vice versa, and also involves embarkation between traffic boats and ships/offshore installations by means of ladders or suspended platforms.

3.14.2 Traffic boats used for pick-up, including pilot craft, speedboat (carried by the vessel), supply boat, work boat, crew traffic boat and other boats used for picking up personnel, are to meet following requirements:
Any traffic boat used for picking up surveyors is to comply with applicable national regulatory requirements and port State requirements for the purpose and/or personnel pick-up, have a corresponding

valid ship certificate, be suitably constructed and properly equipped (including equipment designed to quickly retrieve persons in water), and be properly maintained and manned.

3.14.3 Requirements for the traffic boat before leaving berth

3.14.3.1 The type, size, equipment and crew manning of traffic boat as well as its operating restrictions (if any) are to be appropriate to the voyage, sea condition, weather condition, number of people on board and method of pick-up from the traffic boat to the target vessel or facility involved in scheduled pick-up.

3.14.3.2 The traffic boat is to be provided with the equipment to respond to human overboard. The crew of a traffic boat is to be trained on dealing with personnel overboard and alerting the competent authorities.

3.14.3.3 The traffic boat is to be properly manned according to boat size, intended voyage and duties during the pick-up operation. For pick-up operation under rough weather conditions, in addition to the helmsman, at least one crew member who is specifically responsible for assisting in pick-up throughout the operation is to be included.

3.14.3.4 Pick-up by traffic boat is to be planned to avoid picking up surveyors at night as far as possible and, if unavoidable, be provided with suitable equipment including an appropriate searchlight system to provide sufficient lighting for boarding decks and surrounding waters. Special protective equipment is also to be provided for operation in cold waters.

3.14.3.5 Prior to the commencement of any voyage, the master of a traffic boat is to ensure that at least a brief introduction has been made to all persons on board regarding the storage space and usage of personal safety equipment such as life jackets, thermal appliances and lifebuoys, as well as sailing conditions of the voyage, the embarkation/disembarkation plans, the officers in command and the procedures to be followed in case of emergency. In traffic boats and ships, the lifebuoys are to be placed in an easily accessible position at the pick-up place.

3.14.3.6 All unnecessary obstructions are to be removed from the shuttle deck and its access to ensure smooth passage and movement of the Surveyor. The shuttle deck and its access are to be anti-slip, free of ice and snow accumulation.

3.14.3.7 Equipment and procedures are to be in place to enable the establishment of radio communication between the traffic boat and the vessel or maritime installations being served.

3.14.3.8 Procedures for safe pick-up and emergency recovery (including alerting shore-based authorities) agreed by the vessel/maritime installations being served are to be available on board the traffic boat. The Surveyor is to be immediately familiar with the equipment and procedures.

3.14.3.9 When considering the arrangement of the work boat, pick-up conditions as well as weather and wind conditions, the master is also to consider whether safety ropes are to be used to protect the crew assisting in the pick-up.

3.14.3.10 The traffic boats used for picking up surveyors are to give priority to picking up surveyors over other work tasks that may be assigned.

3.14.3.11 Regardless of any condition, the Surveyor has the final decision on embarkation and disembarkation of ships/offshore installations at anchor or at sea. The Surveyor has the right to refuse embarkation until safety conditions are met; If the Surveyor determines that the site wind and wave as well as relevant safety measures do not meet the requirements, the ship is to be arranged to return in time as required by the Surveyor.

3.14.4 Requirements for approaching ship/offshore installations

3.14.4.1 The master of the traffic boat is to determine the position of ship/offshore installations being served.

3.14.4.2 The master of the traffic boat is to contact the officer on duty of the ship/offshore installations being served and consult with him on which side of the ship the pilot's ladder and/or accommodation ladder is to be erected so as to create the best leeward condition for incoming traffic boat. Due consideration is to be given to the proximity of other ships or offshore installations, their intentions and expected wake effects. The decision on which side to embark is to be informed to the Surveyor as early as possible.

3.14.4.3 The distance between the lowest step of the pilot ladder or accommodation ladder and the water surface must be communicated to the ship being served together with the desired operating speed requirements.

3.14.4.4 Attention is to be paid to ensure that the wake generated by the boat will not interfere with safe embarkation or landing operations, and a distance is kept between the traffic boat and the pilot ladder or accommodation ladder when applicable until the wake is eliminated over the ship side. For the purpose of caution, searchlights can be used at night to check for wakes.

3.14.4.5 Special attention is to be taken, especially at flat tide, when the berthing ship or offshore installations being serviced is not capable of maneuvering to create a leeward side. Before the surveyor embarks/disembarks the ship, the ship may need to navigate and keep clear to provide a good enough shelter environment.

3.4.14.6 During approach to the ship, the Surveyor is to be in the traffic boat cabin until the boat slows down, reaches the ship lee of the vessel and stops. The Surveyor is not to leave the cabin without the permission of the master of the traffic boat.
3.14.4.7 Though traffic boat operations in the dark are to be discouraged, if deemed necessary, the deck of a traffic boat is to be adequately lit before any person steps onto it.
3.14.4.8 During final approach operation at night, it is to turn on the searchlight of the traffic boat to illuminate the pilot ladder or accommodation ladder and the forward deck of the traffic boat. Attention is to be taken not to dazzle person on the deck or adversely affect the night vision of person on the bridge or deck of the ship being served.
3.14.4.9 Under adverse weather conditions, the risk to person and traffic boat may be great, and the decision on whether to berth the traffic boat alongside the ship being served is ultimately the right of the master of the traffic boat. However, the Surveyor has the final say on whether it is safe to board the ship.
3.14.5 Requirements for boarding arrangements
3.14.5.1 After establishing contact with the traffic boat, the ships/offshore installations being served are to erect pilot ladder or accommodation ladder or a combination thereof on the agreed side or location. Boarding arrangements are to comply with relevant requirements of SOLAS Reg.V/23 and Reg.II-1/3-9 or applicable regulations.
3.14.5.2 If the accommodation ladder is located in an area where the receiving ship's profile changes (e.g. accommodation space at ship stern), in particular when the traffic boat is operating under the condition that the receiving ship is of light ballast, the ladder erection may not be able to avoid axial displacement and the party under survey is to cooperate if the Surveyor requests an alternative access.
3.14.5.3 The pilot ladder is to be erected and fixed at the appropriate pilot boarding position at the ship side. For a ship, this may be at the gunwale (if any) and is to be as close to the midship as possible, on parallel body of the ship and away from all drainage holes which may cause water intake.
3.14.5.4 During surveyor pick-up, the supervising officers of the ship/offshore installations being served are to be able to communicate directly with the ship bridge from the embarkation position.
3.14.5.5 If a combination of pilot ladder and accommodation ladder is used for boarding, the accommodation ladder is to be erected at a height sufficient to enable the traffic boat to berth alongside the pilot ladder, and sufficient consideration is to be given to the effects of surges so that no part of the hull above the waterline of the traffic boat will touch the accommodation ladder. It is recommended that the height be more than 2.5 meters above the dynamic traffic boat deck to prevent personnel on the boat from being hit by the gangway. This distance may be prescribed by the master of the traffic boat.
3.14.6 Requirements for pick-up by crane or suspended platform
In some cases, pick-up by suspended platform may be the only viable means of personnel pick-up at sea, such as when the respective deck heights of the traffic boat and the ship/offshore installations being served differ greatly. Different devices such as the Billy Pugh pick-up cage, Esvagt device or personnel pick-up cabin can be used for picking up personnel to or from a ship/offshore installations by means of a manned suspended platform. Pick-up by suspended platform is to be at all times considered as a high risk operation and only be used when pick-up must be performed and no other means can be employed.
3.14.6.1 Prior to pick-up by suspended platform, the master or the manager of offshore installations is to confirm with the Surveyor that:
(1) Crane operators are competent for manned operation;
(2) The crane is in normal operation, properly maintained and certified, and the current required inspections are in compliance with requirements;
(3) The suspended platform has been visually inspected for defects prior to the commencement of pick-up;
(4) It has been confirmed that equipment for communication among the crane operation signal man, the master of the receiving ship or the manager of the offshore installations and the traffic boat is ready for work;
(5) The environment and movement condition of ships or offshore installations are considered acceptable by all parties concerned;
(6) Relevant crane operator and signal operator have confirmed that the pick-up and landing areas have good visibility;
(7) Cranes used for pick-up for offshore installations are to comply with applicable requirements for manned operation (e.g. API Spec 2C; EN13852-1, etc.). For cranes that meet our company's lifting specifications and regulatory requirements, personnel hoisting can be carried out if the following conditions are met, as determined by the ship inspector:
① The crane's product certificate specifies a load capacity for carrying personnel; or
② The actual load of personnel being hoisted is less than one-third of the crane's Safe Working Load (SWL), and the basket used for hoisting personnel meets the specified safety requirements for personnel

protection.

In addition to the above conditions ① or ②, the ship inspector shall also check the crane equipment certificate book to verify that the crane is within its valid inspection period and is functioning normally.

3.14.6.2 Cranes used for pick-up operation are to be suitable for lifting personnel and be certified for carrying persons in accordance with applicable rules (e.g. for carrying persons).

3.14.6.3 The suspended platform for pick-up is to be correctly installed on the lifting device of the crane prior to pick-up, and the crane hooks are to be long enough to be away from the person to be picked up.

3.14.6.4 The suspended platform is to be marked with its safe working load. The suspended platform is to be certified accordingly and the ships or offshore installations being serviced are to have corresponding test and/or inspection certificate.

3.14.6.5 The master of the ship being serviced or the manager of the offshore installations is to confirm the certification, safety and integrity of the entire lifting system, including wire rope, rigging, shackles, safety slings and hooks, in accordance with the specific manning condition.

3.14.7 Requirements for Surveyor embarkation/disembarkation

3.14.7.1 In any cases, it is to be the right of the Surveyor concerned to decide whether to board a ship or offshore installations.

3.14.7.2 The deckhand of a traffic boat is to ensure at the bottom of the ladder that the ladder is erected at the correct height and away from the water surface and any obstacles.

3.14.7.3 When necessary, the pick-up of Surveyor's equipment and baggage is to be operated separately.

3.14.7.4 It is to turn on the searchlights of the traffic boat at night to illuminate the pilot ladder or accommodation ladder and the forward deck of the traffic boat. Care is to be taken not to dazzle personnel on deck or adversely affect the night vision of personnel on the bridge or deck of the ship being served.

3.14.7.5 When the Surveyor steps down from the ladder, the deckhand is to give a warning of the steps to be taken down to the deck of the traffic boat and give timely warning of the dangers. When necessary, the Surveyor is to be assisted by the deckhand.

3.14.7.6 The master of the traffic boat is not to move the boat out of the ship lee until the Surveyor is safely inside.