भारत सरकार / GOVERNMENT OF INDIA
पत्तन, पोत परिवहन और जलमार्ग मंत्रालय
MINISTRY OF PORTS, SHIPPING AND WATERWAYS
नौवहन महानिदेशालय, मुंबई
DIRECTORATE GENERAL OF SHIPPING, MUMBAI

DGS Engineering Circular No 09 of 2024

File No. 13-20011/5/2020-ENGG-DGS (C.No.4076)	Date: 10.04.2024
Sub: Interim Guidelines for the safe operation of Onshore Power Supply in port	

1. Recognizing that use of shore power with the aim to reduce emissions is increasing with the years passing by.
2. Noting that the "Harit Sagar' Guidelines 2023" provides a comprehensive framework for the major ports to create a comprehensive action plan aimed at achieving quantifiable reductions in carbon emissions over defined timelines".
3. Recognizing that all Major ports in India are utilizing renewable energy to meet their power requirements and all other minor ports are endeavoring their best to switch to renewable energy.
4. Noting that the DGS has issued SOP dated 27.07.2018 for shore electric power supply to ships in Indian Ports and in Phase–I, all Indian ports will be supplying shore power to as far as possible all visiting ships with a maximum on-shore power demand of 150KW at 50Hz with necessary protection at shore end The electric power will be supplied as a 3-Phase 415V and 50Hz supply.
5. Noting that DGS Circular No.2 of 2020 dated 10-Feb-2020 was issued with details of list of ports where shore power is mandatorily supplied and the said circular also states that Directorate will issue necessary guidelines for standardization of equipment on board ships.

10/4/24

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6. Recognizing that Maritime Amrit Kaal Vision 2047 has envisaged under Theme-1 "Lead the world in safe and sustainable and green maritime sector' that all ports will be transformed into carbon neutral ports and has identified strategic areas wherein shore power supply will be available between the years 2030-2035 for use to all vessels in port.
7. Noting that IMO has always focused on ship energy conservation and emission reduction. The application of onshore power supply (OPS) (alternative maritime power (AMP), cold ironing, shore-side electricity and onshore power supply, high- or low-voltage shore connection, respectively) is gradually expanding.
8. Recognizing that standard IEC/IEEE DIS 80005-3, Utility connections in port – Part 3: Low Voltage Shore Connection (LVSC) Systems – General requirements, is under development, and that operational safety for low-voltage OPS systems is equally important as for high-voltage OPS systems.
9. Recognizing that to promote shore power supply at ports and till the that standard IEC/IEEE DIS 80005-3, Utility connections in port – Part 3: Low Voltage Shore Connection (LVSC) Systems is developed there is a need to issue interim guidelines to promote safety and safe use of onshore power supply.
10. Noting that the Maritime Safety Committee, at its 107th session has approved the *Interim guidelines on safe operation of onshore power supply (OPS) service in port for ships engaged on international voyages*, (MSC.1/Circ.1675) with a view to promoting safe operation of OPS service in port on ships.
11. Now therefore, the Director General of Shipping, hereby issues this circular as an guidance and all stakeholders may be guided as set in the Annex-1.
12. This is issued with the approval of the Competent Authority.

(J Senthil Kumar)
Engineer & Ship Surveyor-cum-DDG(Tech

To,

1. The Principal Officer Mercantile Marine Department (Mumbai/Chennai/Kolkata/Kochi/ Kandla).
2. All Surveyor-in-charge, Mercantile Marine Department
3. The Indian National Ship-owners Association (INSA)

4. The Indian Coastal Conference Shipping Association (ICCSA)

5. Indian Ports Association (IPA)

6. Foreign Owners Representatives and Ship-manages Association. (FOSMA)

7. Maritime Association of Ship-owners Ship-managers and Agents (MASSA)

8. All Stakeholders/ Shipping Companies through DGS Website.

9. AD (OL) Hindi Cell with a request to translate this circular in Hindi and upload on DGS website.

10. The Computer Cell, DGS, GOI with a request to upload this circular on the official website

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MSC.1/Circ.1675
27 June 2023

INTERIM GUIDELINES ON SAFE OPERATION OF ONSHORE POWER SUPPLY (OPS) SERVICE IN PORT FOR SHIPS ENGAGED ON INTERNATIONAL VOYAGES

1 The Maritime Safety Committee, at its 107th session (31 May to 9 June 2023), having considered a proposal made by the Sub-Committee on Ship Systems and Equipment (SSE) at its ninth session (27 February to 3 March 2023), approved the *Interim guidelines on safe operation of onshore power supply (OPS) service in port for ships engaged on international voyages*, as set out in the annex, with a view to promoting safe operation of OPS service in port on ships.

2 The Committee agreed to keep the Interim Guidelines under review and to amend them in view of the experience gained with their application and/or as and when the circumstances so warranted.

3 Member States are invited to bring the Interim Guidelines to the attention of all parties concerned.

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ANNEX

INTERIM GUIDELINES ON SAFE OPERATION OF ONSHORE POWER SUPPLY (OPS) SERVICE IN PORT FOR SHIPS ENGAGED ON INTERNATIONAL VOYAGES

INTRODUCTION

With increasing requirements on marine environmental protection, the application of onboard clean energy solutions has been continuously promoted. The Paris Agreement has set arrangements for a global response to climate change after 2020, in line with which many States have developed specific implementation plans.

IMO has always focused on ship energy conservation and emission reduction. The application of onshore power supply (OPS) (alternative maritime power (AMP), cold ironing, shore-side electricity and onshore power supply, high- or low-voltage shore connection, respectively) is gradually expanding. These Interim Guidelines have been developed to promote safe operation of OPS service in port on ships.

Taking into account that OPS systems in port for ships are installed and applied internationally and recognizing that safe operation of the OPS system requires special consideration, these Interim Guidelines have been developed to facilitate both ship- and shore-side.

Recognizing that standard IEC/IEEE DIS 80005-3, Utility connections in port – Part 3: Low Voltage Shore Connection (LVSC) Systems – General requirements, is under development, and that operational safety for low-voltage OPS systems is equally important as for high-voltage OPS systems, the procedures for low voltage should be revised when an international standard for low-voltage OPS systems has been published.

These Interim Guidelines are not intended to prohibit other measures of onboard clean energy application.

1 GENERAL

1.1 Application

1.1.1 This document is intended to provide Interim Guidelines for the safe operation of OPS service in port on ships engaged on international voyage. For tankers, the provisions in these Interim Guidelines may be specially considered. These Interim Guidelines do not apply to the electrical power supply during docking periods, e.g. dry docking and other out-of-service maintenance and repair.

1.1.2 The application of these Interim Guidelines to semi-automatic and fully automatic OPS processes is subject to further consideration.

1.2 Terms and definitions

1.2.1 *Onshore power supply (OPS) system* is the equipment that supplies onshore power to ships berthing in port, including ship-side installations and shore installations.

1.2.2 *Ship-side installations* are those onboard systems that are designed to accept shore power, typically involving incoming power receptacles and plugs, shore connection switchgear and protections, transformer (if applicable), incoming switchgear and protections at the main switchboard, power cables (hereinafter referred to as cables), automation, cable monitoring system and associated instrumentation.

1.2.3 *Shore installations* are the equipment that is installed at quay or port for OPS, typically involving switchgear and protections, transformers, frequency convertors (if applicable), output power receptacles and plugs, cable management and associated instrumentation.

1.2.4 *Cable management system* is all the equipment designed to control, monitor and handle the flexible power and control cables and their connection devices.

1.2.5 *Emergency shutdown* is manual and/or automatic shutdown in critical situations.

1.2.6 *The first connection* refers to the OPS connection on ship's first call at a shore power supply point.

1.2.7 *Operation* includes all activities necessary to permit the electrical installation to function. These activities include matters such as switching, controlling, monitoring and maintenance, as well as both electrical and non-electrical work.

1.2.8 *Shore-side circuit breaker* is the dedicated switching and protection device on the shore-side which connects and disconnects shore-side power to the ship.

1.2.9 *Ship-side circuit breaker* is the dedicated switching and protection device on the ship-side which connects and disconnects shore-side power on the ship.

1.3 General

1.3.1 Technical design, installation and testing requirements for the OPS system are provided by the standard: IEC/IEEE 80005-1:2019: Utility connections in port – Part 1: High Voltage Shore Connection (HVSC) Systems – General requirements or other equivalent standards.

1.3.2 The safety of ships, personnel and power supply systems should be ensured by the shore- and ship-side during the establishment of a connection of the shore power, during all operations, in the event of a failure, during disconnection and when the systems are not in use.

1.3.3 A compatibility assessment (for high voltage, see standard IEC/IEEE 80005-1:2019) or technical analysis (for low voltage) of the OPS system should be available to verify the possibility of connecting the ship electrical system to the shore installations.

1.3.4 An equipotential bonding between the ship hull and shore grounding electrode should be established.

1.3.5 Both shore- and ship-sides should specify responsibilities and assignments, including the person in charge (PIC) of the operation.

1.3.6 Both shore- and ship-sides should complete a pre-connection checklist (see paragraph 5.2.9) prior to the ship's arrival and connection at a shore supply point.

1.3.7 The PIC should confirm that there are no safety-critical operations on the ship prior to connecting to the shore power supply.

1.3.8 For reliable communication, the following provisions apply:

.1 a voice communication link, e.g. communication devices or other equivalents should be provided to facilitate the communication between the operational personnel from both shore- and ship-side;

.2 equipment for voice communication should be functional;

.3 in case of any VHF or UHF voice communications, the ITU Maritime Mobile Services frequencies should be used;

.4 voice communications should be carried out in the common working language of the terminal and the ship or in English; and

.5 the ship should make a public address announcement advising the crew prior to OPS connection or disconnection.

2 VERIFICATION AND TESTING

2.1 Tests at the first call at a shore supply point

2.1.1 Prior to conducting the test referred to in this paragraph, the compatibility assessment or technical analysis, as appropriate, should be performed. Both shore- and ship-sides should cross-review the initial test reports before the tests at the first call at a shore supply point. The initial tests for high voltage should meet standard IEC/IEEE 80005-1:2019 requirements.

2.1.2 The following should be performed as an integration test by both shore- and ship-sides before the OPS connection:

.1 visual inspection;

.2 power frequency test for switchgear assemblies and voltage test for cable;

.3 insulation resistance measurement;

.4 measurement of the earthing resistance;

.5 function test of the protection devices;

.6 function test of the interlocking system;

.7 function test of the control equipment;

.8 equipotential bond monitoring test or equivalent;

.9 phase-sequence test;

.10 function test of the cable management system;

.11 integration tests to demonstrate that the shore- and ship-side installations work properly together; and

.12 function test of the emergency stops.

2.1.3 The tests in paragraphs 2.1.2.2 to 2.1.2.4 should be performed only if either of the installations, shore- or ship-side, has been out of service or not in use for more than 30 months.

2.1.4 There should be a suitable cross-boundary safety system, consisting of physical, operational and communications procedures, that is jointly controlled by both ship- and shore-side PICs. This should include appropriate procedures for ensuring the integrity of any isolations, such as a "lock out/tag out" system.

2.2 Tests at repeated calls of a shore supply point

2.2.1 The tests referred to in this paragraph should meet standard IEC/IEEE 80005-1:2019 requirements.

2.2.2 If the time between port calls (the same shore supply point) does not exceed 12 months and if no modifications have been performed either on the shore- or ship-side installations, the following verification should be conducted:

.1 visual inspection;

.2 confirmation that no earth fault is present;

.3 statement of voltage and frequency;

.4 an authorized switching and connection procedure; and

.5 function test of the emergency stops.

2.2.3 There should be a suitable cross-boundary safety system, consisting of physical, operational and communications procedures, that is jointly controlled by both ship- and shore-side PICs. This should include appropriate procedures for ensuring the integrity of any isolations, such as a "lock out/tag out" system.

2.2.4 Taking into account paragraph 2.1.3, if the time between port calls (the same shore supply point) exceeds 12 months, then the tests in paragraphs 2.1.2.1 to 2.1.2.12 should be conducted.

3 OPERATION

3.1 Personal protective equipment

Personnel working on handling, connection and operation of OPS systems should wear the personal protective equipment (PPE) as required by national regulations (shore-side) or as specified in the ship safety management system (ship-side).

3.2 High voltage (HV)

3.2.1 Pre-connection and connection

The detailed procedures for shore power transfer should include:

.1 a pre-connection safety inspection, which in turn should include:

.1 a visual inspection;

.2 the definition of restricted access areas on both ship- and shore-side connection;

.3 verification of the locations of the communication devices, i.e. walkie-talkie and telephone, fire-fighting equipment and first aid devices;

.4 verification of the PPE of the personnel involved; and

.5 confirmation that both shore- and ship-side circuit breakers are open and isolated, and circuits are earthed;

.2 cross-check of the communication equipment;

.3 confirmation that there are no safety-critical operations on the ship, prior to connecting to the shore power supply (see paragraph 1.3.7);

.4 operation of the cable management system:

.1 ensure the power cables are de-energized;

.2 turn on the cable management system and deploy the cable(s);

.3 connect the cable and secure the connection; and

.4 activate the cable monitor systems to automatically observe the cable tension and length, and adjust, as necessary; and

.5 simulation of the "safety circuit pilot loop operation" by both shore- and ship-sides to confirm the appropriate breakers will trip.

3.2.2 Supply of power

3.2.2.1 Where the shipboard generator is intended to run in parallel with the shore power for a period of time specified in the compatibility assessment, the operation procedure may include, but not be limited to, the following:

.1 confirmation of the sequence of all switching operations;

.2 both parties should confirm that the connection has been completed, the connection area made safe and earthing circuits have been removed;

.3 the ship-side should communicate with the PIC indicating that it is safe to close the shore-side circuit breaker; and

.4 the shore power transfer by the ship-side should be, as follows:

.1 ship's generator should synchronize with the shore-side grid;

.2 following synchronization, the load should be transferred between the shore supply and the ship source(s) of electrical power;

.3 the ship-side should gradually reduce the load for the ship's generators and transfer the load to the shore system; and

.4 once the ship's generators have reduced the load sufficiently, the generator breaker should be opened and the generator engine can then be shut down.

3.2.2.2 Where the load transfer is executed via blackout, the operation should follow the procedures in paragraph 3.2.2.1.1 to 3.2.2.1.3.

3.2.3 Disconnection

3.2.3.1 Shore power disconnection via parallel connection from the OPS should include the following detailed procedures:

.1 a safety inspection, which in turn should include:

.1 verification of the locations of communication devices, i.e. walkie-talkie and telephone, fire-fighting equipment and first aid devices; and

.2 verification of the PPE of the personnel involved;

.2 the PIC should confirm that there are no safety-critical operations on the ship prior to disconnecting from the shore power supply (see paragraph 1.3.7);

.3 the shore power transfer by the ship-side, which should be as follows:

.1 the ship-side should start ship generator(s);

.2 ship's generator should synchronize with the shore-side grid;

.3 following synchronization, the load should be transferred between the shore supply and the ship source(s) of electrical power; and

.4 the ship-side should gradually increase the load for the ship's generators;

.4 the ship-side requires disconnection from the OPS;

.5 the ship-side may open the ship-side circuit breaker;

.6 the ship-side should communicate with the PIC indicating that it is safe to open the shore-side circuit breaker;

.7 both parties should confirm that both ship- and shore-side circuit breakers are isolated, connection area made safe and earthing circuits are completed;

.8 the power and control cable (if applicable) should be disconnected; and

.9 when the cable management system is installed on board, it should be operated to collect and store the shore cable as per the applicable procedures.

3.2.3.2 Shore power disconnection via a blackout connection should be in accordance with paragraph 3.2.3.1, except for paragraphs 3.2.3.1.3.2 to 3.2.3.1.3.4.

3.3 Low voltage (LV)

3.3.1 Technical analysis

A technical analysis should be conducted to confirm the suitability of both ship- and shore-side OPS arrangements.

3.3.2 Pre-connection and connection

Shore power transfer via parallel and via a blackout connection should include the following detailed procedures:

.1 a pre-connection safety inspection, which in turn should include:

.1 a visual inspection;

.2 the definition of restricted access areas on both ship-side and shore-side connection;

.3 verification of the locations of the communication devices, i.e. walkie-talkie and telephone, fire-fighting equipment and first aid devices;

.4 verification of the PPE of the personnel involved; and

.5 confirmation that both shore- and ship-side circuit breakers are open and power circuits are de-energized;

.2 cross-check of the communication equipment;

.3 the PIC should confirm that there are no safety-critical operations on the ship prior to connecting to the shore power supply (see paragraph 1.3.7);

.4 operation of the cable management system fit for the intended purpose; and

.5 simulation of the "safety circuit pilot loop operation" by both shore- and ship-sides to confirm the appropriate breakers will trip.

3.3.3 Supply of power

3.3.3.1 Where the shipboard generator is intended to run in parallel with the shore power for a period of time specified in the technical analysis (see paragraph 3.3.1.1), the operation procedure may include, but not be limited to, the following:

.1 confirmation of the sequence of all switching operations;

.2 both parties should confirm that the connection has been completed, connection area made safe and, if applicable, earthing circuits have been removed;

.3 the ship-side should communicate with the PIC indicating that it is safe to close the shore-side circuit breaker; and

.4 the shore power transfer by the ship-side should be as follows:

.1 ship's generator should synchronize with the shore-side grid;

.2 following synchronization, the load should be transferred between the shore supply and the ship source(s) of electrical power;

.3 the ship-side should gradually reduce the load for the ship's generators and transfer the load to the shore system; and

.4 once the ship's generators have reduced the load sufficiently, the generator breaker should be opened and the generator engine can then be shut down.

3.3.3.2 Where the load transfer is executed via blackout, operation procedure should be in accordance with paragraphs 3.3.3.1.1 to 3.3.3.1.3.

3.3.4 Disconnection

3.3.4.1 Shore power disconnection via parallel connection from the OPS should include the following detailed procedure:

.1 a safety inspection, which in turn should include:

.1 verification of the locations of communication devices, i.e. walkie-talkie and telephone, fire-fighting equipment and first aid devices; and

.2 verification of the PPE of the personnel involved;

.2 the PIC should confirm that there are no safety-critical operations on the ship prior to disconnecting from the shore power supply (see paragraph 1.3.7);

.3 the shore power transfer by the ship-side, which should be as follows:

.1 the ship-side should start ship generator(s);

.2 ship's generator should synchronize with the shore-side grid;

.3 following synchronization, the load should be transferred between the shore supply and the ship source(s) of electrical power; and

.4 the ship-side should gradually increase the load for the ship's generators;

.4 the ship-side requires disconnection from OPS;

.5 the ship-side may open the ship-side circuit breaker;

.6 the ship-side should communicate with PIC indicating that it is safe to open the shore-side circuit breaker;

.7 to ensure that the power circuit is de-energized, both parties should confirm that both ship- and shore-side circuit breakers are open, circuits are isolated, and, if applicable, earthed;

.8 the power and control cable (if applicable) should be disconnected; and

.9 when the cable management system is installed on board, it should be operated to collect and store the OPS cable as per the applicable procedures.

3.3.4.2 Shore power disconnection via a blackout connection should be in accordance with paragraph 3.3.4.1, except for paragraphs 3.3.4.1.3.2 to 3.2.3.1.3.4.

4 SAFETY PRECAUTIONS BEFORE MAINTENANCE

The planned maintenance programme for OPS systems should include the following "lock out/tag out" and equipment grounding procedures to ensure personnel safety:

.1 switch off the circuit breaker;

.2 lock against reclosure;

.3 confirm that lines and equipment are de-energized;

.4 ground and short circuit the phases; and

.5 cover, partition or screen of adjacent line sections.

5 DOCUMENTATION

5.1 OPS operation procedures should be included in the ship safety management system.

5.2 The following information should also be available on board:

.1 a complete system description, including circuit diagrams, operation instructions and specification of set points of protection, monitoring and alarming devices of the ship installations;

.2 records of completed compatibility assessments, including port-specific information, such as agreed joint switching procedures;

.3 step-by-step instructions for OPS connection and disconnection, including equipotential bonding and load transfer;

.4 means to inhibit the starting of equipment which would result in failure, overloading or activation of automatic load reduction (if any) measures when a supply system is connected;

.5 procedures for setting the transfer time limit, which may be adjustable in order to match the ability for an external source of electrical power to accept and transfer load, if applicable;

.6 emergency shutdown and ship power restoration procedures;

.7 appropriate provisions for the storage of OPS equipment when not in use;

.8 a maintenance plan to establish periodic tests and maintenance procedures for the system; and

.9 a pre-connection checklist, to include but not limited to berth, OPS supply point, communication method, operational limitations during berthing, contact information for PICs, estimated power consumption and agreed switching procedures.

6 PERSONNEL FAMILIARIZATION

6.1 The company, as defined in SOLAS regulation IX/1.2, should ensure that onboard personnel involved in OPS operation are familiarized with the onboard OPS system for safe operation in accordance with STCW regulation I/14, paragraph 1.5.

6.2 A PIC on board should be in charge of the ship-side installations in service. Only competent personnel who have received familiarization in accordance with paragraph 6.1 above and authorized by the PIC should be involved with the physical connection, power transfer and OPS disconnection procedures.

6.3 PICs of high or low-voltage OPS systems should be:

.1 electrotechnical officers holding a certificate of competency in accordance with the requirements of regulation III/6 of the 1978 STCW Convention; or

.2 chief engineer officers and second engineer officers holding a certificate of competency in accordance with the requirements of regulations III/2 or III/3 of the 1978 STCW Convention.

6.4 A PIC or personnel designated by a PIC should be on duty during the OPS service following connection and power transfer.