

Class NK's Course of Action to Protective Coating – Guidelines for Performance Standard for Protective Coating Contained in IMO Resolution MSC.215(82)

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1. PREFACE

IACS Common Structural Rules (hereinafter referred to “CSR”) has been effected from 1st April, 2006, and applied to a ship of which the building contract is signed on and after that date. In the section of Corrosion Protection of CSR the followings are specified for sea water ballast tanks and the void double skin spaces of bulk carriers:

“For ships contracted for construction on or after the date of IMO adoption of the amended SOLAS regulation II-1/3-2, by which an IMO “performance standard for protective coatings for ballast tanks and void spaces” will be made mandatory, the coating of internal spaces subject to the amended SOLAS regulation are to satisfy the requirements of the IMO performance standard.

Consistent with IMO Resolution A.798(19) and IACS UI SC122, the selection of the coating system, including coating selection, specification, and inspection plan, are to be agreed between the shipbuilder, coating system supplier and the owner, in conjunction with the Society, prior to commencement of construction. The specification for the coating system for the spaces is to be documented and this documentation is to be verified by the Society and is to be in full compliance with the coating performance standard.

The shipbuilder is to demonstrate that the selected coating system with associated surface preparation and application methods is compatible with manufacturing processes and methods.

The shipbuilder is to demonstrate that the coating inspectors have proper qualification as required by the IMO standard.

The attending surveyor of the Society will not verify the application of the coatings but will review the reports of the coating inspectors to verify that the specified shipyard coating procedures have been followed.

It goes without saying that protective coatings are not just for ballast tanks, they are necessary for ease of maintenance and keeping ships in good condition.

CSR having maid Society's surveyors not to verify the coatings' application but to review the coating inspector's reports, Class NK recognizes the important role of coating inspectors and therefore has decided to prepare the guidelines for them in order to clarify the methods and criterion of inspections, criteria for them.

On the other hands Class NK concerned much that there are too few coating inspectors qualified as “FROSIO Red” or NACE level 3” in this industry comparing to duly implement IMO PSPC to the rushing amount of new shipbuilding vessels.

2. GUIDELINES FOR COATING INSPECTION

2.1 For Guidelines

In order to maximize the effectiveness of protective coatings, it is especially important to improve the

quality of coating application. The IMO PSPC¹ stipulates that the following be taken into account when developing a coating design and coating work plan:

It is essential that specifications, procedures and the various different steps in the coating application process (including, but not limited to, surface preparation) are strictly applied by the shipbuilder in order to prevent premature decay and/or deterioration of the coating system. (IMO PSPC 3.3.1)

The coating performance can be improved by adopting measures at the ship design stage such as reducing scallops, using rolled profiles, avoiding complex geometric configurations and ensuring that the structural configuration permits easy access for tools and to facilitate cleaning, drainage and drying of the space to be coated. (IMO PSPC 3.3.2)

Inspections by the coating inspector during the application process are crucial in order to ensure conformance to IMO PSPC, or in other words, to ensure that the basic requirements stipulated in IMO PSPC are being followed adequately.

Class NK believes that coating inspectors need to share a common understanding of what (level of quality) is deemed acceptable in regards to protective coating for any vessel. Therefore, Class NK put together the “Guidelines for the Performance Standard for Protective Coatings” from the sources below, as a guide for shipyards and coating inspectors regarding coating inspections in accordance with IMO PSPC.

“Guidelines for Coating Inspection on PSPC,” prepared by the Japan Ship Technology Research Association (hereinafter referred to “JSTRA”) to provide guidance for coating inspection carried out by shipyards and coating inspectors in regards to Japanese and international standards, is included in the ANNEX of these guidelines for your reference. An official response is yet to come from IACS regarding the questions from Japanese industry, but any new developments will be incorporated into these guidelines promptly.

IACS established the IACS-Industry Joint Working Group on Coating (JWG/COATING) to address the problems that arise in regards to the application of IMO PSPC. These guidelines will be updated regularly with interpretations from the IACS Common Interpretation and Q&A developed by JWG/COATING to ensure that the latest information is available.

Hoping that “Guidelines for Performance Standard for Protective Coatings contained in IMO Resolution MSC.215(82) (draft)” will be of good use to you.

Generally speaking there are very many negotiations between a ship owner and a ship builder before signing a building contract. In this contract it is one of the obligations to comply with IMOPSPC. However, there seldom happens for a ship owner and a ship builder to negotiate the details of coating inspections.

¹ IMO Resolution MSC.215(82) (adopted on 8 December 2006 at MSC82) Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks in All Types of Ships and Double-Side Skin Spaces of Bulk Carriers

Classification societies are usually not involved in the negotiations at this moment.

As like class rules specifies the details of the scantlings of construction and welding, Class NK realize the necessity to give both ship owners and ship builders the guidelines of coatings for the duly compliance with IMO PSPC as one of the conditions for class registration.

Needless to say, the coating inspectors play the important role to apply IMO PSPC to a ship during construction in order to assure her coating works to be complied with the requirements of IMO PSPC.

As CSR specifies, class surveyors will only review the report of coating inspector to verify that the specified shipyard coating procedures have been followed.

In other words coating inspectors shall share with the allowable standards of coating work performances and also the unified understanding of quality of coating works. Class NK has worked from the scratch for preparing the “Guidelines for Performance Standard for Protective Coatings contained in IMO Resolution MSC.215(82)” (hereinafter “Class NK Guidelines”) for coating inspectors.

2.2 JSTRA’s “GUIDELINE FOR COATING INSPECTION ON PSPC”

The working group for PSPC has been set out by JSTRA for duly implementation of IMO PSPC. The members of this working group are from shipyards, manufacturers, ship owners, institutes and class society.

Under the above working group two sub-working groups were also set. One is for the approval test and certification of coating system and the other one is for drafting guidelines for coating inspectors. ClassNK chaired the sub-working group for guidelines for coating inspectors and also took part in the other sub-working group.

The sub-working group for guidelines extensively worked to draft the “GUIDELINE FOR COATING INSPECTION ON PSPC” (hereinafter referred to JSTRA Guideline) around year end of 2006.

JSTRA Guideline has been developed on the principles of coating inspection as follows:-

The objective of the coating inspection is to ensure that the required minimum level and quality of protective coatings by PSPC is adequately applied.

Coating inspector should understand that perfect execution of coating application and inspection, throughout the entire surface without any small imperfectness is hardly achievable and all inspectors should have unified understanding as to what extent is acceptable as the required minimum level and quality of the protective coatings for any ship built in any shipyard.

For example, the check points for DFT measurements for the judgment of 90/10 rule are clearly indicated in the annex 3 of PSPC, but this cannot guarantee that 90/10 rule is perfectly achieved for the entire surface. The common understanding is that such sampling methods is practically enough for making the judgment, and if the sample measurements do not satisfy the criteria, additional spot checks should be taken for any area considered necessary by the coating inspector.

Unless expressly provided otherwise in PSPC and this Guideline, inspection by sampling and statistical method should be adopted to the extent necessary for making practical judgment. This means that the extent of inspection depends on the quality control of shipyards and should be allowed to vary better shipyards to ensure that the required minimum level and quality is achieved.

The sub-working group drafted the JSTRA Guidelines taking into consideration that it will be not only domestic but also global guidelines. Its final draft was proposed to IACS by Shipbuilding Association of Japan with the cooperation (SAJ) of Korean Shipbuilders Association (KOSHIPA), and IACS Joint Working Group/Coating used it as one of the key materials for "GUIDELINE FOR IMPLEMENTATION OF MSC.215(82) PERFORMANCE STANDARD OF PROTECTIVE COATINGS" (hereinafter referred to IACS Guidelines) in its meeting at Pusan, Korea in May, 2007.

IACS has established its internal expert group and joint working group with industries concerned to develop practical approaches to implement IMO PSPC, and the meeting were held in last May and August. The IACS common understandings being developed by the working groups will be timely incorporated into Class NK Guidelines.

3. COATING INSPECTION

As for coating inspection, a superintendent with a shipyard inspector daily inspect the surface preparation such as edge preparation, blasting, salt content check, dust, and coating application such as coating, drying, recoating, dry film thickness measurement.

IMO PSPC requires those inspections, such as work log and measurements to be documented and also to be filed in the Coating Technical File.

In case of VLCC the amount of dry film thickness measurements is reported 80,000 to 100,000 if measured in accordance with IMO PSPC.

It is questionable that dry film thickness shall be measured by qualified coating inspectors even though you can easily measure it by the device.

During drafting JSTRA Guidelines this issue was disputed very much, and eventually assistants may be used into coating inspections under the coating inspector's supervision. These assistants shall complete the due training course. These assistants may mitigate the lack of qualified coating inspectors in the marine industry.

IACS defines the coating inspectors' qualification in the Procedural Requirement No.34 taking into consideration the current small number of qualified inspectors in the marine industry even though IACS is of the opinion that all inspections are to be executed by qualified inspectors and/or inspector with equivalent qualification.

As for qualification of coating inspectors, the scheme of assistant coating inspectors has been adopted by the attendants from the all industries but IACS at Joint Working Group/Coating in Pusan in May, 2007. It may help for lack of qualified coating inspectors. IACS may develop the qualification of the assistant and the

scope of his duties.

4. CLASS NK's ACTION

4.1 Rules

As you know well, the amendment of regulation 3-2, Ch. II-1, SOLAS has been adopted by MSC82 on 8th December, 2006 and will be effective from 1st July, 2007.

Simultaneously IMO PSPC is to be applied to a ship under IACS CSR of which the building contract is signed on and after 8th December, 2006. IACS Procedural Requirement No. 34 has been also implemented for the smooth application of IMO PSPC.

The amendments of Class NK rules have been approved by the Technical Committee in March, and by Council and Japanese Administration in April, 2007.

The amendments of Class NK rules are only the requirements as class related of IMO PSPC and IACS PR34, such as Type Approval of Coating System, Approval procedures of manufacturers, qualification of coating inspectors, monitoring the coating inspectors and approval of CTF..

4.2 Class NK Guidelines

Class NK has developed both Class NK Guidelines for coating inspectors and NK instructions for Society surveyors.

Class NK Guidelines explains the Society surveyors' review of inspection records and the inspections of coating inspectors. Class NK Guidelines consists of PR 34, IMO PSPC and JSTRA Guidelines.

As IACS has established JWG/Coatings for drafting IACS Guidelines, IACS Guidelines will timely be incorporated into Class NK Guidelines.

4.3 Class NK Instructions for the Society surveyors

Class surveyor need not be qualified as FROSIO Red or NACE Level III for the review of inspection records. However Class NK gets Society surveyors to have training course of FROSIO or NACE not only in Japan but also China and Korea.

Society surveyors qualified by FROSIO or NACE will give other surveyors the lectures of coating works in order to duly review the inspection records.

NK instructions are being prepared for Society surveyors as follows:-

4.3.1 Type Approval of Coating System

-1 Statement of Compliance issued by MARINTEK or Research Institute of Marine Engineering, Japan Ship-Machinery Quality Control Association.

-2 Approval certificate issued in accordance with the Society's "Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use".

-3 Where the shop primer is not removed, either one of the followings is to be confirmed:-

(1) Statement of Compliance or Type Approval Certificate for the coating system consisting of epoxy-base paint and shop primer.

(2) Where neither the statement of compliance nor type approval certificate is available, followings are to be confirmed:-

- statement of compliance nor type approval certificate of the shop primer

- statement of compliance nor type approval certificate for coating system consisting of the said shop primer and other main coating than the intended one

- statement of compatibility between the intended coating system issued by the manufacturer

4.3.2 Approved Course for Coating Inspector's Equivalent Qualification (program, materials & etc.)

-1. A course may be established by either shipyards, paint manufacturers or any third party, and should be approved by the Society.

-2. A course is to have those syllabus specified by IACS PR 34.

-3. The qualification of course tutor is to follow IACS PR 34.

-4. The Society shall confirm the followings for approval of the course:-

(1) A course tutor: qualification and experience.

(2) List and maintenance instructions of devices and/or equipments for the course.

(3) Syllabus

(4) Test procedures and its criterion.

(5) Procedures of certification for course and tests .

4.3.3 Kick-off meeting on coating (coating system, surface preparation, inspection, recording and etc.)

Shipyards strongly request class to take part in the Kick-off meeting. The Society acknowledge that it is important for the Society to participate in the tripartite kick-off meeting by a shipyard, a ship owner and manufacturer. Therefore the Society surveyor will attend the kick-off meeting as an observer.

Followings are the key agenda of the kick-off meeting:-

-1 Technical Data Sheet of Coating System.

-2 Statement of Compliance or Type Approval Certificate of coating system.

- 3 Qualification of coating inspectors
- 4 Procedures of surface preparation and coating application

4.3.4 Verification of the coating works(Monitoring the coating inspectors, sampling check of reports &etc.)

- 1 Correspondence of paints
- 2 Monitoring coating inspectors' performance
 - (1) Primary surface preparation
 - (2) Block assembly
 - (3) Erection of blocks
- 3 Coating Log/Reports
 - (1) Each report of surface preparation and each stage of coating works.
 - (2) Above reports shall be signed by a coating inspector.

4.3.5 Approval of CTF (Coating Technical File)

Followings are to be included in CTF:-

- 1 Shipyard work records of coating application, including:
 - applied actual space and area (in square meters) of each compartment
 - applied coating system
 - time of coating, thickness, number of layers, etc.;
 - method of surface preparation;
- 2 Procedures for inspection and repair of coating system during ship construction;
- 3 Coating log issued by the coating inspector – stating that the coating was applied in accordance with the specification of the coating supplier representative and specifying deviations from the specifications
- 4 Shipyard's verified inspection report, including:
 - completion date of inspection;
 - result of inspection;
 - remarks (if given); and
 - inspector signature.

- 5 Procedures for in-service maintenance and repair of coating system
- 6 Approved CTF placed on board.

4 REFERENCE

IMO PSPC:

IMO Resolution MSC.215(82) (adopted on 8 December 2006 at MSC82) Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks in All Types of Ships and Double-Side Skin Spaces of Bulk Carriers

IACS PR No.34:

IACS Procedural Requirement (adopted on 8 December 2006 at IACS Council) Applied until the date of application referred to in para.1 of SOLAS Chapter II-1, Part A-1, Reg.3-2, as adopted by resolution MSC.216(82) for the purpose of flexible enforcement of IMO PSPC requirements related to classification in order to solve the difficulties with regard to approved coating systems and coating inspectors.

NK sources:

“Rules for the Survey and Construction of Steel Ships,” Part B, Part CSR-B, and Part CSR-T; and related sections from “Guidance for the Survey and Construction of Steel Ships” and “Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use”

5 CURRENT ACTIVITIES

As every class society develop its own rules and/or guidelines, Class NK Guidelines is continuously updated every time when IMO PSPC, IACS Guidelines and relevant standards are amended.

Class NK joins in the working group with Japan Ship Technology and Research Association and the Japan Society of Naval Architects and Ocean Engineers for improving and/or developing coating guidelines, coating maintenance & etc.