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NVIC 15-91

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO.

16 OCT 1991
15-91

Subj: Critical Areas Inspection Plans (CAIP's)

1. **PURPOSE.** The purpose of this Circular is to provide guidance to the marine industry for the development, use, and implementation of CAIP's. This Circular is intended to be applied to any vessel service or class where CAIP's may be required by proper Coast Guard authority. It is intended to provide a performance standard for CAIP's rather than detailed instructions for the development of these plans. The performance standard outlines the essential elements that should be included in each CAIP.
2. **BACKGROUND.**
 - a. A CAIP is a management tool that serves to track the historical performance of a vessel, identify problem areas, and provide greater focus to periodic structural examinations. The use of a CAIP is an application of the philosophy in International Maritime Organization (IMO) Resolution A.647(16), "IMO Guidelines on Management for the Safe Operation of Ships and for Pollution Prevention." Since the CAIP is a management tool, its preparation is the primary responsibility of the vessel owner or operator. Once developed, it becomes part of an integrated management plan for achieving an adequate level of structural monitoring, maintenance, and repair.

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2. b. The decision to require a CAIP on a single vessel or on an entire class of vessels may be based on the vessel's history, its service, or even the climatology of the trade route. This requirement is in keeping with the intent of Title 46, United States Code 3703 and 3714, and Title 46, Code of Federal Regulations, which give the Coast Guard the authority to require the necessary inspections and documents to ensure vessel and environmental safety.
- c. Requiring a vessel to develop and maintain a CAIP results in the vessel's management becoming more closely involved in the process of finding a solution to identified structural and/or maintenance problems. The ultimate goal of a CAIP is to address the cause of problems, not merely the symptoms. Several companies have been successfully using structural performance tracking methods similar to CAIP's for some time. The benefits of using these methods accrue not only to the company, but also to classification society surveyors, structural engineers, and Coast Guard inspectors.
- d. For consistency, certain terms used in CAIP's are defined as follows:
 - (1) Active repair areas - areas that continue to experience active or recurring cracking in the oil/watertight envelope or that affect the structural integrity of the vessel.
 - (2) Critical inspection areas - areas that incorporate all present and previous active repair areas including past active areas that require continued monitoring. Other areas may be deemed critical based on class problems or assessment of the structure through appropriate calculations and analysis.

3. DISCUSSION.

- a. The Coast Guard and the U.S. public expect vessel owners and operators to exercise extreme diligence in maintaining safety standards and keeping the environment clean. The cause of all structural failures must be addressed. Determining the causes of Class 1 structural failures, and other structural failures as defined in enclosure (1), is critical to the correct selection of an appropriate repair methodology.

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3. b. CAIP's are intended to be the method used by vessel companies to document and track structural failures. In this capacity, CAIP's will assist surveyors, inspectors and the vessel's crew in ensuring the vessel is properly inspected and maintained. CAIP's will be used in those instances where the Officer in Charge, Marine Inspection (OCMI), district commander, or Commandant determines that a structural problem exists which must be closely monitored. Within the CAIP, the surveyor, inspector, or crew will be able to find detailed information on the vessel's fracture history, corrosion control systems, and previous repairs. The CAIP will also contain a record and evaluation of repairs to the vessel's fractures. It is critical to know what temporary or permanent repairs have been successful in the past. Previously completed repairs that result in recurring fractures should not be reused. The evaluation of "permanent" repairs and/or design modifications is important to the vessel's overall fitness.
- c. Enclosure (2) outlines the information which should be part of a CAIP. The CAIP format presentation is at the discretion of the company's management. The information in the CAIP should be clear, up-to-date, and easy for someone not familiar with the vessel to understand.
- d. CAIP Development.
 - (1) CAIP's will be developed by the vessel's owner or operator when required in writing by the appropriate Coast Guard authority as designated in paragraph 4 of this Circular. The designated authority will outline the existing or potential problem that necessitates a CAIP being developed. If further guidance is required to implement a CAIP, an appropriate policy letter will be promulgated. Enclosure (3) outlines the recommended information to be contained in the implementing letter.
 - (2) CAIP's should be reviewed when they are initially developed. While developing this Circular, the Coast Guard received many comments from the marine industry concerning this topic. There is a need for initial screening of these plans that can only be accomplished through a review process. CAIP's will be reviewed as specified in the implementing letter.

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3. d. (3) CAIP's are intended to be living documents. They should be updated whenever the status of the vessel changes. The plan should be updated anytime the vessel experiences a new Class 1 or 2 fracture, a recurrence of the original problem, a modification, or a survey. Whenever the vessel undergoes a credit drydock examination by a local Coast Guard Marine Safety Office, the attending inspector will review the CAIP to ensure it contains the latest survey, fracture records and modifications made to the vessel.

(4) If at any time the owner or operator decides that there are certain areas that should be removed from active monitoring, a letter request should be submitted, with the documentation contained in the vessel's CAIP supporting the change, to the Coast Guard authority that required the CAIP. The Coast Guard letter response must then be included in the CAIP for future reference.

e. CAIP Surveys.

(1) Surveys are an integral part of the CAIP. Therefore, the process by which these surveys are conducted is very important. The scope and frequency of the surveys will be tailored to each vessel or vessel class as deemed necessary by the cognizant OCMI, district commander, or Commandant. When appropriate, specific direction will be delineated via policy letter. Survey reports should include the basic information listed in enclosure (4).

(2) When relief from required critical area surveys is granted, the CAIP should still be used by the owner, operator, classification society, and Coast Guard to focus structural inspection efforts during subsequent internal exams, mid-periods, and biennial inspections.

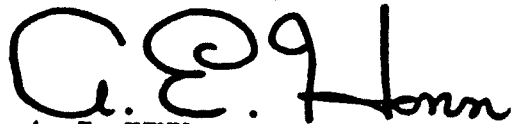
4. IMPLEMENTATION.

a. When an existing or potential structural deficiency is determined to exist, the following guidelines should be used to implement the provisions of this Circular:

(1) For vessels that operate entirely within one OCMI's zone, the cognizant OCMI will institute the provisions of this NVIC in a letter to the owner with copies to the district commander (m) and Commandant (G-MVI).

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4. a. (2) For a vessel that operates in more than one OCMI's zone, the OCMI that first identifies a requirement for which the application of this NVIC is appropriate, during the course of a special, routine or periodic inspection, will implement the requirements of this NVIC and issue the letter to the owner. If the implementing OCMI did not issue the vessel's currently valid certificate of inspection, a copy of the implementation letter shall be sent to the certifying OCMI and that OCMI's district commander (m). In all cases, a copy of the implementation letter shall be sent to the OCMI's district commander (m) and Commandant (G-MVI).
- (3) Commandant (G-MVI) will be the implementation authority for CAIP programs for specific classes of vessels. G-MVI may either take this action on its own initiative or upon approval of a request from an OCMI or district commander.
- b. OCMI's will consult with their district commander (m) and Commandant (G-MVI) prior to implementing the provisions of this Circular.
- c. For those vessels required to have a CAIP, OCMI's should verify that the CAIP is on board the vessel by the required deadline. This may be accomplished at the vessel's next scheduled examination after implementation. This includes inspections for certification as well as drydock examinations. OCMI's are encouraged to take a very restrictive position regarding whether to issue a Certificate of Inspection to a vessel that has not complied with a requirement for a CAIP.
- d. OCMI's should ensure this NVIC receives wide dissemination. CAIP's have applicability for use on all vessels as a means of tracking and recording structural history. Even when not required, all owners and operators should be advised to incorporate the principles of CAIP's into their management philosophy.



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Chief, Office of Marine Safety,
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- Encl: (1) Classification of Structural Failures
(2) CAIP Performance Elements
(3) Recommended Contents of CAIP Implementing Letter
(4) Survey Report Contents

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NOAA Fleet Inspection Officer (1).

DEFINITIONS

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- (1) outer shell: the side shell and bottom plating of a vessel including the bow and stern rakes of barges.
- (2) oiltight envelope: that portion of the outer shell in way of cargo oil tanks and the vessel's bunker, fuel, lube oil and slop tanks, exclusive of the clean ballast tanks.
- (3) main strength members: those structural members which provide primary longitudinal strength to the hull and those transverse structural members which directly contribute to support longitudinal strength members. Such members include the strength deck plating; side and bottom plating; tank top plating; the center vertical keel; underdeck, side and bottom longitudinal stiffeners; internal longitudinal bulkheads and stiffeners; deep web frames and girders; transverse bulkheads and girders; and associated bracketing connecting the aforementioned longitudinal and transverse structural members.
- (4) buckle: an, deformation in the outer shell and/or strength deck plating and the adjacent internal main strength members to the extent that structural strength has been lost.
- (5) action: the extent of response an operator must take, with concurrence by the OCMI, for a particular structural failure.

CLASSIFICATIONS

Class 1 Structural Failure: During normal operating conditions, either

- (1) a visible, through thickness fracture of any length in the oiltight envelope of the outer shell where threat of pollution is a factor or,
- (2) a fracture or buckle which has weakened a main strength member to the extent that the safety of the vessel to operate within its design parameters is compromised.

ACTION: Immediate corrective action must be initiated by the operator with approval of the cognizant OCMI. Temporary repairs may be permitted to allow the vessel to safely transit to a repair facility.

Class 2 Structural Failure: A fracture or buckle within a main strength member which does not compromise the safety of the vessel to operate within its design parameters and does not create a threat of pollution either by location or containment.

ACTION: Necessity for corrective action shall be evaluated and agreed upon between the vessel operator and OCMI when the failure is found. Temporary repairs until the next scheduled repair period may be authorized.

Class 3 Structural Failure: Any fracture or buckle which does not otherwise meet the definition of a Class 1 or 2 structural failure or a fracture which might normally be considered a Class 2 but is determined not to be detrimental to the strength or serviceability of the effected main hull structural member.

ACTION: Corrective action or notification to the OCMI is not required. Shall be noted for the record, monitored by the operator if deemed desirable and addressed at the next regularly scheduled repair period.

CRITICAL AREAS INSPECTION PLANS
PERFORMANCE ELEMENTS

1. Executive Summary - this overview should be easy to read and give an overall outlook on the vessel and the remainder of the plan. This summary should include a list of the designated critical inspection areas.

2. Vessel Particulars.

a. Name, Official Number

b. Vessel Design Class

All other vessel particular information can be found on the Certificate of Inspection (COI).

3. Historical Information.

a. Structural Failures

(1) Type

(2) Location

(3) Method of repair

b. Vessel Structural Modifications

(1) Major structural modifications

(2) Detail modifications

This section is intended to be for those areas where the repair has been successful with no recurrence.

4. Active Repair Areas.

a. Structural Failures

(1) Type

(2) Location

(3) Method of repair

(4) Number of occurrences

(5) Date of most recent repair

- 4. b. Vessel Structural Modifications
 - (1) Major structural modifications
 - (2) Detail modifications
- c. Structural Analyses Completed/Pending
 - (1) Results of completed analyses kept on board
 - (2) Implementation plan for recommended corrective action
- d. Trends
 - (1) Description of method used to determine trends, i.e., gaugings, renewals, coating and anode systems, etc.
 - (2) Results

Sections 3 and 4 above may be organized in many different ways depending on the volume of the information and the availability of other data management systems. It is important that the information be presented so it can be easily interpreted by company maintenance representatives, classification society surveyors, and Coast Guard inspectors.

- 5. Structural Inspections.
 - a. Critical Area Inspection Intervals
 - (1) Annual/semi-annual
 - b. Records of Inspections
 - (1) Internal
 - (a) Tank
 - (b) Date
 - (c) Method
 - (d) Inspected by (USCG, ABS, Company)
 - (e) Previous inspection date
 - (f) Problems noted

5. b. (2) A vessel log should be maintained indicating the person or persons who performed the inspection.
- (3) External surveys (hull, bilge keels, etc.)
 - (a) Date
 - (b) Inspection method, i.e., drydock, underwater survey
 - (c) Inspected by (USCG, ABS, Company)
 - (d) Previous inspection date
 - (e) Problems noted

6. Tank Coating Systems.

- a. Type
- b. Last Renewed
- c. Planned Renewal
- d. Present Condition and Percent Failure

7. Critical Areas Inspection Plan Update.

- a. Internal Company Review
 - (1) Frequency

The use of diagrams and vessel plans to illustrate fractures and problem areas is highly encouraged.

RECOMMENDED CONTENTS OF CAIP IMPLEMENTING LETTER

The letter to the owner/operator of a vessel(s) where a CAIP is being required should contain certain amplifying information. This letter will give the owner/operator all the specifics for the monitoring program being required.

1. Vessel particulars sufficient to identify the vessel, i.e.: name, official number, or design class.
2. The specific reasons CAIP's are being required, include:
 - a. The potential or perceived threat
 - b. Past history of particular problems
3. Specific areas to be surveyed.
 - a. Known active and critical repair areas
 - b. Any other area required to be inspected
4. Survey requirements.
 - a. Scope
 - b. Interval
 - c. Type or method of survey required
 - d. OCMI notification and participation requirements
 - e. Any specific requirements on who must conduct the survey
 - f. Accessibility/visibility of the critical areas
5. Reports required.
 - a. Timeliness
 - b. Where sent
 - c. Contents
6. Anticipated benefits of the CAIP.
7. Method for relief from requirements in this letter.

SURVEY REPORT CONTENTS

Survey reports should contain the following information:

1. Survey Particulars.
 - a. Vessel name
 - b. Scope of survey
 - (1) Yearly cargo block (entire or partial)
 - (2) Active repair area
 - (3) Any other area required to be inspected
 - c. Local OCMI notified
 - (1) MSO
 - (2) Date of letter
2. Survey Participants.
 - a. Names
 - b. Organizations
 - c. Qualifications
3. Survey Results.
 - a. Tanks entered (or critical area checked)
 - b. Tank cleanliness
 - c. Method of inspection
 - d. Comment on overall condition of the tanks
 - e. If coated, percent of coating breakdown (if applicable)
 - f. Fractures noted
 - (1) Location
 - (2) Dimensions
 - (3) Suspected cause
 - (4) Class/USCG notified

g. Other damage/conditions noted

(1) Deformations

(2) Wastage

For tank vessels the Guidance Manual for the Inspection and Condition Assessment of Tanker Structures contains sample forms that, if properly filled out, could constitute the survey report.

