



**CCS Rule Change Notice For:
RULES FOR CLASSIFICATION OF SEA-GOING
STEEL SHIPS**

Version: 2022. RCN No.2

Effective date: July.1, 2022

Beijing

CCS Rule Change Notice For:
RULES FOR CLASSIFICATION OF SEA-GOING
STEEL SHIPS

PART NINE COMMON STRUCTURAL RULES FOR BULK
CARRIERS AND OIL TANKERS

CONTENTS

PART 9-1 GENERAL HULL REQUIREMENTS.....	2
<i>CCS Appendix D THE REQUIREMENT FOR ASSESSING ALTERNATIVE METHODS USED IN HULL STRUCTURAL DESIGN OF SHIPS.....</i>	2

PART 9-1 GENERAL HULL REQUIREMENTS

CCS Appendix D RECOMMENDATION FOR ASSESSING DESIGN INSTANCES BASED ON APPLICATION OF ALTERNATIVE METHODS IN THE HULL STRUCTURAL DESIGN OF CSR SHIPSTHE REQUIREMENT FOR ASSESSING ALTERNATIVE METHODS USED IN HULL STRUCTURAL DESIGN OF SHIPS

1—GENERAL

1.1

This Appendix is applied to assessing alternative methods used in the hull structural design as permitted in the applicable resolutions of this PART. The methodology applied in this Appendix is consistent with the CCS Circular No.498 “The Notice on the approval of IMO MSC.1/Circ.1455”⁽¹⁾, while allowing for the use of simplified approaches.

1.2

The basic approach for considering equivalency in this Appendix involves comparing proposed alternative methods to the IACS technical provisions and CCS Rules, Guidelines, such as CCS Rules for Classification of Sea-going Steel Ships, Guidelines for Implementation of Statutory Surveys, etc.

1.3

The responsibility for generating the equivalency request and supporting information required rests with the owner/shipyard/designer.

1.4

Review/approval of any equivalency request as well as the resulting scantlings, materials, etc. should be undertaken by CCS.

2—SCOPE OF AN EQUIVALENCY ASSESSMENT

2.1

The scope of simplified equivalency assessments is expected to be limited to materials selection and structural strength of the hull structure.

2.2

If there is not full and direct compliance to this PART due to innovative designs that are not capable of being directly evaluated with the existing CCS Rules and/or IACS resolutions, then an equivalent safety level can be accepted in accordance with the applicable guidance provided by the CCS Circular No.498.

2.3

More detailed criteria and/or procedure for assessing alternative methods used in the hull structural design may be considered by CCS on case-by-case basis, when more experience and information gained from the evaluation of alternative methods and/or novel designs are provided by owner/shipyard/designer.

2.4

When conducting simplified equivalency assessments, the guidance contained in CCS Circular No.498 should be applied to the extent possible and reported in the documentation associated with the application of alternative methods.

3—DOCUMENTATION

3.1

Documentation provided with an application for alternative methods used in the hull structural design as equivalency should identify the detail of the methods that have been undertaken, the equivalent safety level and the sufficient supporting information to validate assessments as well as the resulting scantlings, materials, etc.

3.2

In case of a ship where alternative methods are applied and an equivalency for the technical resolutions is considered by CCS, this should be noted in the relevant structural drawings and/or appropriate approval documents as required by CCS's procedures. The documentation on the application of alternative methods should be included in the Ship Construction Files (SCF) in accordance with the requirement in CCS Rules for Classification of Sea-going Steel Ships Part 1, Chapter 4, Appendix 1, Annex 2, [3.1.1], (3)⁽²⁾.

Note (1): CCS Circular No.498 is the transformation of the International Maritime Organization "the Guidelines for the approval of alternatives and equivalents as provided for in various IMO instruments" (refer to IMO MSC.1/Circ.1455).

Note (2): The requirement is incorporation of IACS Unified Requirement (UR) Z23.

1 GENERAL

1.1

This Appendix is applied to this PART of CCS Rules for Classification of Sea-going Steel Ship and gives recommendations for assessing alternative (novel) design instance and alternative (novel) design method (technology).

2 SCOPE

2.1

The scope of this Appendix is to provide guidance for the assessment of alternative (novel) design instances and designs in compliance with requirements of this PART of CCS Rules for Classification of Sea-going Steel Ship, based on the application of alternative (novel) design method (technology) or alternative design and calculation methods within the context of Goal Based Standards and this PART of CCS Rules for Classification of Sea-going Steel Ship.

3 DEFINITIONS

3.1

Alternative (novel) design instance

An alternative or a novel design instance is defined via CCS Rules for Classification of Sea-going Steel Ship, Part 9-1 Ch 1 Sec 3 [6.2.1] i.e. ship design of unusual form, proportions, speed and structural arrangements outside those specified in Part 9-1 Ch 1, Sec 2, [3.2].

Design instances covered by additional class notations or additional class requirements (e.g. strengthening for operation in ice) are not considered alternative or novel design instances.

For ships not complying with CCS Rules for Classification of Sea-going Steel Ship, Part 9-1 Ch1 Sec 2 [3.2], Part 9-1 Ch1 Sec 2 [CCS 3.2.1a] and CCS Appendix A of Part 9-1 are to be applied.

3.2

Alternative (novel) design method (technology)

An alternative design method or alternative design technology is a method or technology applied in the design process that has no/limited documented track record for application in this field. This means that there is no documentation that can be arranged by the designers to prove with confidence that the outcome or result of the method (or technology) e.g. scantlings of hull structural elements or fatigue assessment of structural details, will be equivalent to a design based on the requirements of this Part of CCS Rules for Classification of Sea-going Steel Ship.

4 APPLICATION

4.1

The scantlings determined by the prescriptive requirements are not to be reduced by any form of alternative calculations such as FE analysis, unless explicitly stated. (CCS Rules for Classification of Sea-going Steel Ship, Part 9-1 Ch 1 Sec 2 [5.5.4])

4.2

Where indicated in specific sections of the Rules, alternative calculation methods to those shown in the

Rules may be accepted provided it is demonstrated that the scantling and arrangements are of at least equivalent strength to those derived using the Rules.

5 EQUIVALENCE PRINCIPLE

5.1

For the application of alternative methods in the design, the main principle is to get sufficient evidence, and verify such evidence, that the resulting alternative design instance is equivalent (i.e. has at least the same structural safety level) to a design instance compliant to this Part.

6 ASSESSMENT OF ALTERNATIVE(NOVEL) DESIGN INSTANCES

6.1 General

The handling of alternative(novel) design instances should follow as far as practicable the procedures given in CCS Circular No.498 “The Notice on the approval of IMO MSC.1/Circ.1455”⁽¹⁾.

Deviations from this PART of CCS Rules for Classification of Sea-going Steel Ship and/or other requirements that are proven to be in compliance with IMO Goal Based Standards may have impact on the compliance of the design with SOLAS Reg II-1/3-10. Therefore, a flag Administration need to consider the statutory approval of an alternative (novel) design instance in this case.

6.2 Role of the Classification Society

CCS reviews the delivered documentation; states further requirements for documentation if necessary, can request verification of achieved results and eventually grants approval.

This means that CCS is to assess whether the design has been sufficiently examined and whether any risks have been reduced acceptably and to evaluate the adequacy of the delivered information and the assumptions made. CCS is to make the final decision for applying CCS Circular No.498 to approve equivalency to this Part of CCS Rules for Classification of Sea-going Steel Ship of the alternative (novel) design instance, and the final responsibility of class approval for the design instance rests with CCS.

The task and role of CCS is to verify that - based on submitted information from the designer / shipyard - the design instance is in compliance with this Part of CCS Rules for Classification of Sea-going Steel Ship or its structural safety level is at least equivalent to that ensured by the requirements given in this Part of CCS Rules for Classification of Sea-going Steel Ship.

7 DESCRIPTION OF ALTERNATIVE DESIGN AND CALCULATION METHODS USED IN THE HULL STRUCTURAL DESIGN

7.1 General

Alternative design and calculation methods may be applied to the extent specified in this Part of CCS Rules for Classification of Sea-going Steel Ship for:

.1 Improvement of the design process

.2 Optimization of the hull structure (weight of the structure, improvements in fabrication, etc.)

This Part allows explicitly the application of alternative design and calculation methods in the following paragraphs:

<u>Rule reference</u>	<u>Details</u>	<u>Alternative design / calculation method</u>	<u>Detail procedure in this Part</u>
<u>Pt 9-1, Ch 5, Appendix 2</u>	<u>Hull girder ultimate capacity</u>	<u>Direct non-linear finite element analysis</u>	<u>Yes, Part 9-1, CCS Appendix C</u>
<u>Pt 9-1, Ch 6, Sec 6, [2.2.2]</u>	<u>Primary supporting members within cargo region for bulk carrier less than 150 m</u>	<u>FEA (Finite Element Analysis)</u>	<u>Yes, FEA procedure of this Rules can be applied.</u>
<u>Pt 9-1, Ch 9, Sec 1, [4.5]</u>	<u>Fatigue design standards for alternative design</u>	<u>FEA (Finite Element Analysis)</u>	<u>Yes, FEA procedure of this Rules can be applied.</u>
<u>Pt 9-1, Ch 9, Sec 4, [5.3]</u>	<u>Stress concentration factors for alternative</u>	<u>FEA (Finite Element Analysis)</u>	<u>Yes, detail FEA procedure in [5.3.1]</u>

¹ Note (1): CCS Circular No.498 is the transformation of the International Maritime Organization “the Guidelines for the approval of alternatives and equivalents as provided for in various IMO instruments” (refer to IMO MSC.1/Circ.1455).

	<i>design</i>		
<i>Pt 9-1, Ch 9, Sec 6, [2.2]</i>	<i>Equivalent design of stiffener-frame connections</i>	<i>FEA (Finite Element Analysis)</i>	<i>Yes, detail FEA procedure in [2.2]</i>
<i>Pt 9-1, Ch 10, Sec 1, [2.3.3]</i>	<i>The spacing of web frames and stringers iwo side shell</i>	<i>FEA (Finite Element Analysis)</i>	<i>Yes, FEA procedure of this Rules can be applied.</i>
<i>Pt 9-1, Ch 10, Sec 3, [2.1.4]</i>	<i>The spacing and arrangement requirements</i>	<i>FEA (Finite Element Analysis)</i>	<i>Yes, FEA procedure of this Rules can be applied.</i>
<i>Pt 9-1, Ch 11, Sec 1, [3.2.5]</i>	<i>Arrangements of deck girders and transverses</i>	<i>Grillage or FEA (Finite Element Analysis)</i>	<i>Yes, FEA procedure of this Rules can be applied.</i>
<i>Pt 9-2, Ch 1, Sec 4, [4.1.2]</i>	<i>Primary supporting members in cargo hold structures, subjected to lateral pressure for ships having a length L less than 150 m</i>	<i>Grillage or FEA (Finite Element Analysis)</i>	<i>Yes, FEA procedure of this Rules can be applied.</i>
<i>Pt 9-2, Ch 2, Sec 3, [1.5.4]</i>	<i>Deck transverses fitted above the upper deck</i>	<i>FEA (Finite Element Analysis)</i>	<i>Yes, FEA procedure of this Rules can be applied.</i>

The application of alternative design and calculation methods should result in a design instance compliant with this Part of CCS Rules for Classification of Sea-going Steel Ship.

CCS should assess the resulting design instance with respect to compliance with the rules. Assessment of the alternative design and calculation method used for the design is not necessary.

The requirements in Section 6 and Section 8 of this Appendix should be followed only in case the application of alternative design method results in alternative (novel) design instance.

8 DOCUMENTATION

8.1

Documentation provided with an application for alternative (novel) design method (technology) used in the hull structural design as equivalency should identify the detail of the methods that have been undertaken, the equivalent safety level and the sufficient supporting information to validate assessments as well as the resulting scantlings, materials, etc.

8.2

In case of a ship where alternative methods are applied and an equivalency for the alternative (novel) design instance is considered by CCS, this should be noted in the relevant structural drawings and/or appropriate approval documents as required by CCS's procedures. The documentation on the application of alternative methods should be included in the Ship Construction Files (SCF) in accordance with the requirement in CCS Rules for Classification of Sea-going Steel Ships Part 1, Chapter 4, Appendix 1, Annex 2, [3.1.1], (3)⁽²⁾.

² Note (2): The requirement is incorporation of IACS Unified Requirement (UR) Z23.