



V CONGRESO INTERNACIONAL DE **DISEÑO E INGENIERÍA NAVAL**

Marzo 15 - 17 de 2017

**An Introduction to NATO
Standard ANEP 77 and Its
Application to Naval Ships**

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ABS

Objectives

- Goal Based Standards (GBS) philosophy
- Overview of NATO ANEP 77 (Naval Ship Code)
- A suggested process for applying the Naval Ship Code to a naval combatant

What are Goal Based Regulations?

- Prescriptive regulations tend to be a representation of past experience
 - Could become less relevant over time
 - May hold back designers from being able to properly address future design challenges
- Increasing computing capability
 - More sophisticated designs
 - Safety regulations need to be frequently updated to keep pace with lessons learned and latest technologies

What are Goal Based Regulations?

- Organizations (such as IMO) have started approaching safety from a completely new perspective
 - Goal and performance oriented
 - Not the traditional prescriptive-based approach

What are Goal Based Standards?

- A goal based standard (GBS) differs from a prescriptive standard in its approach to compliance
- Describes what must be achieved, rather than what must specifically be done to successfully achieve it

Why Goal Based Standards?

- Does not specify the means of achieving compliance
- Tiered layers of goals
- Allow alternative and creative means
- A 'standard of standards'

Goal Based Standards

- Typically comprised of
 - At least one goal
 - Functional requirements associated with that goal
 - Verification of conformity to meet requirements and goal
 - Recognized Organizations (ROs) chosen by Naval Administrations

The Naval Ship Code

- A Code addressing naval surface ship safety
- Based on IMO conventions, resolutions and other sources that are applicable for the majority of government ships
- Published by the North Atlantic Treaty Organization (NATO)
- Designation: ANEP (Allied Naval Engineering Publication) 77

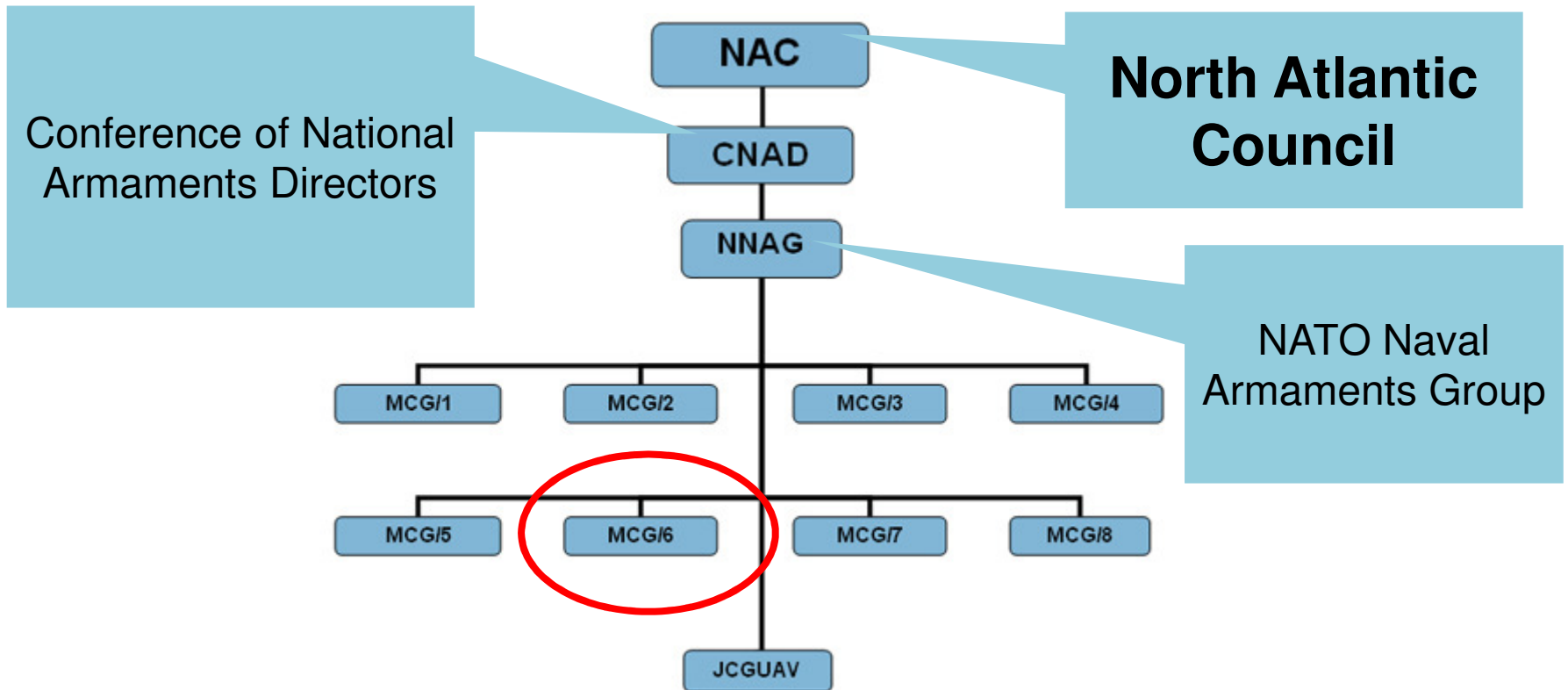


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Who Wrote the Naval Ship Code?

- Naval Ship Classification Association
 - 8 class societies
- International Naval Safety Association
 - Mission:
 - Continue developing the Naval Ship Code and track its application to designs around the world
 - Participating Navies:
 - Royal Australian, Royal Canadian, Danish, French, Italian, Netherlands, Norwegian, Singapore, South African, Swedish, UK (Royal) Navy

NATO Framework for NSC



The Naval Ship Code

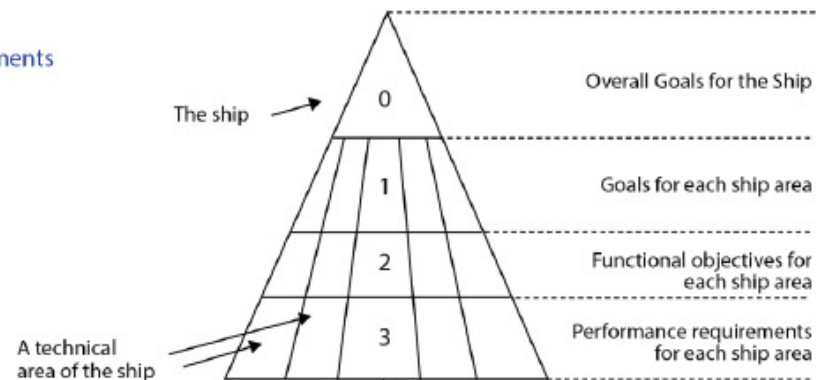
- 3 Distinct Parts:
 - Part 1: NSC Requirements
 - Part 2: Solutions
 - Part 3: Justification and Guidance



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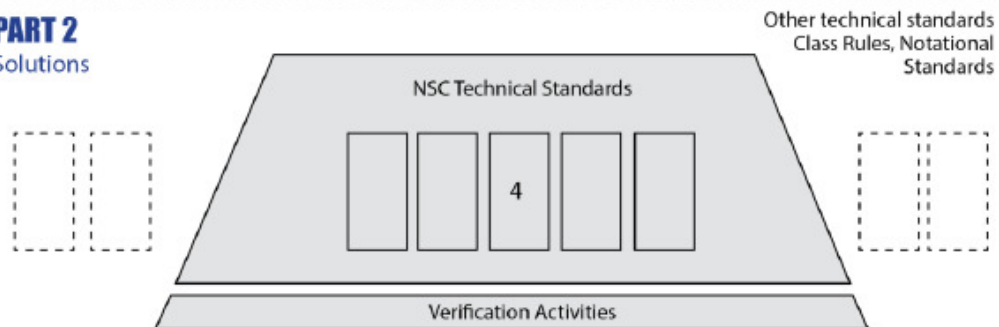
PART 1
NSC Requirements



Interface Document

Standards Plan

PART 2
Solutions



PART 3 Justification and Guidance

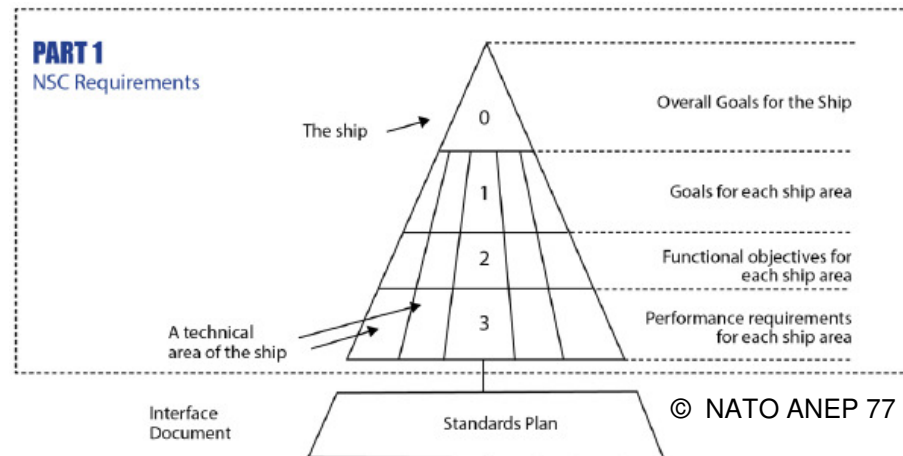


The Naval Ship Code

- Chapter 0 – Using the Naval Ship Code
- Chapter I – Naval Ship Safety Certification
- Chapter II – Structure
- Chapter III – Buoyancy, Stability and Controllability
- Chapter IV – Engineering Systems
- Chapter V – Seamanship Systems
- Chapter VI – Fire Safety
- Chapter VII – Escape, Evacuation and Rescue
- Chapter VIII – Communications
- Chapter IX – Navigation
- Chapter X – Dangerous Goods

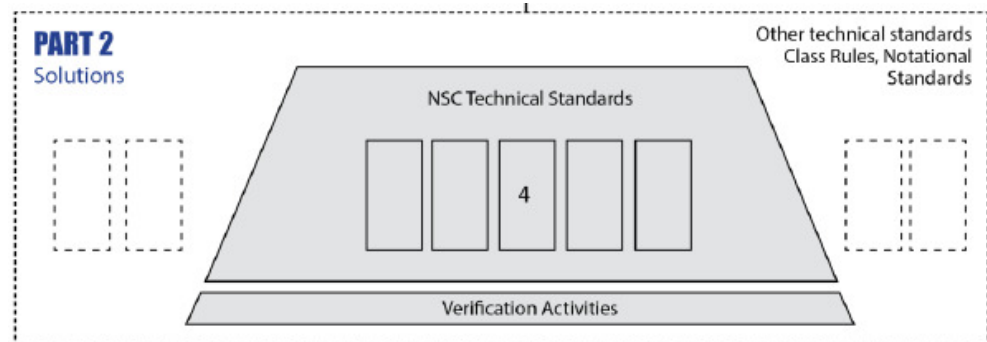
NSC Part 1

- Overall goals for the ship
- Functional objectives
- Performance requirements for each ship technical area
- Flexibility to achieve certification
- Standards plan



NSC Part 2

- Suggested solutions for the functional objectives and performance requirements
- Options are also provided for verification
 - Class society rules
 - International convention
 - Suitable alternative or additional standard



NSC Part 3

- Justification and guidance to support the performance requirements and solutions
- Provides the history and reference data
- Discusses the derivation of many of the sections

PART 3 Justification and Guidance

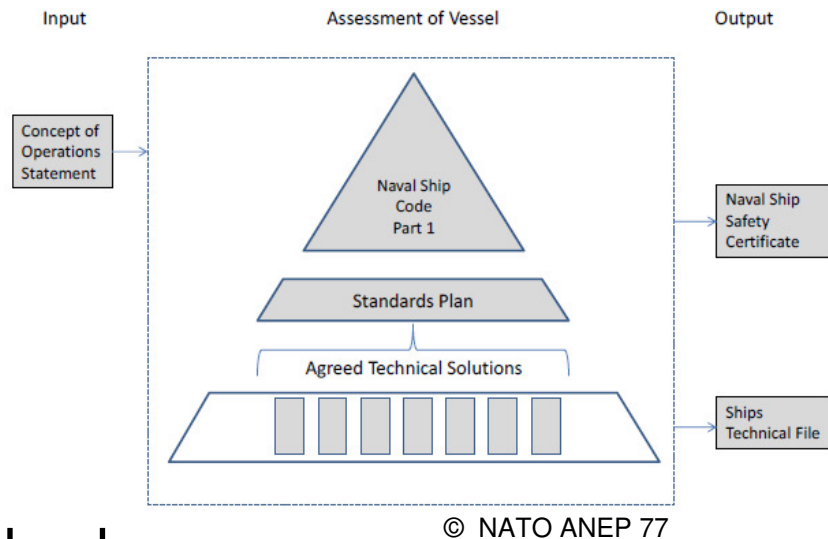
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NSC Limitations

- The Naval Ship Code is not intended to be viewed as a complete and entire safety management system for a ship or fleet.
 - A 'tool in the toolbox'
- The Code is NOT intended to apply to combat operations, or its associated threat conditions
- The Naval Ship Code need NOT be invoked in full
- It is not mandatory

The Process for NSC Certification

- **Concept of Operations Statement (ConOpS)**
 - Ship's function
 - Operational areas and characteristics
 - Basis for the certification
- **Standards Plan**
 - Listing of technical standards



The Process for NSC Certification

- Technical File
 - A copy of ConOpS;
 - Applicable NSC parts/chapters being invoked
 - Applicable NSC tier level being invoked
 - The complete standards plan
 - Interpretations/justifications made during the NSC certification process
 - Class society information (rulesets, notations, etc.)
 - Statutory certificates
 - Other information as needed
 - Living document

Naval Ship Safety Certification (NSSC)

- May be issued by the Naval Administration
- Jointly with the recognized organization
- NSSC shall refer to:
 - ConOpS
 - Standards plan
 - Ship construction files
 - Annex containing key design and verification information
 - Supporting data related to design information
 - Part of the technical file

ANEP 77 and the Acquisition Process

- Certification matrix
- Ships work breakdown structure format
- Example:
 - *SWBS code*: 555
 - *Description*: Fire Extinguishing Systems
 - *Subtopic*: Fire Pumps
 - *Standard*: ABS INSG, sections 4-6-1/3.7 and 4-7-3
 - *Certification*: Certified per ABS INSG 4-6-1/7.3.1
 - *Certifier*: ABS

ANEP 77 Application to Existing Ships

- Preferable to conduct the process for Naval Ship Safety Certification at new construction
- With adequate documentation and access to the ship, it may also be applied after the ship has begun operation

ANEP 77 Application to Existing Ships

- Class Society Approach:
 - Provide ConOpS to class society
 - Build a draft standards plan
 - Reference to the ruleset to which it was built
 - Compare the rules to the applicable performance requirements
 - Determine 'gaps'
 - Revisit standards plan to determine standards for gaps

ANEP 77 Application to Existing Ships

- Example (based on recent ABS experience):
 - Chapter II – Structure: Very few gaps
 - Chapter VIII – Communications – gaps:
 - Capability for sea-to-air 2-way radio communications
 - Some systems to be provided with facilities to inhibit transmission for Emissions Control (EMCON) and Electromagnetic Radiation Hazard (RADHAZ) purposes

Conclusions

- Goal based standards have enabled both commercial and government ships to maintain acceptable levels of safety for operators, Flag Administrations and Naval Administrations, while allowing for novel design innovation and technological advances related to ship design
- GBS are intended for developers of standards, not as the standard itself

Conclusions

- By applying this goal based philosophy for naval ship safety, NATO ANEP 77 (Naval Ship Code) provides a comprehensive safety standard for combatant and noncombatant military ships for both NATO and non-NATO warships around the world

Conclusions

- As the Naval Ship Code has only been in existence for a few years, it is too early to determine how effective it has been in adequately addressing safety on new naval ships
- The NSC remains a living document, and both NSCA and INSA continue to improve the document to increase its effectiveness as a worldwide naval safety standard

Acknowledgement

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Thank You

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