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Fire & Safety



RESEARCH VESSEL - NEW ORLEANS

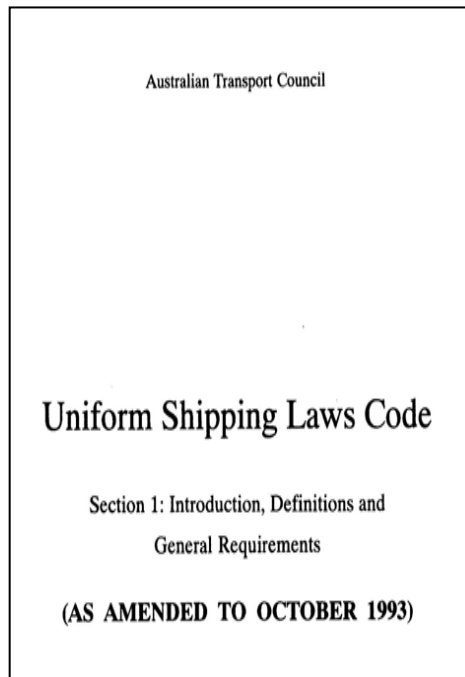
Fire suppression options for
machinery spaces in USL
survey vessels under the
new National Standard for
Commercial Vessels



by
Rick Foster M.SFPE, NFPA
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Current Legislation - USL

- Prescriptive - Appendix E
- All Class 1 A
- Class 1 B C D E > 25m
- Class 2 A B C D > 25m
- Class 2 E > 35m
- Class 3 A B C > 25m

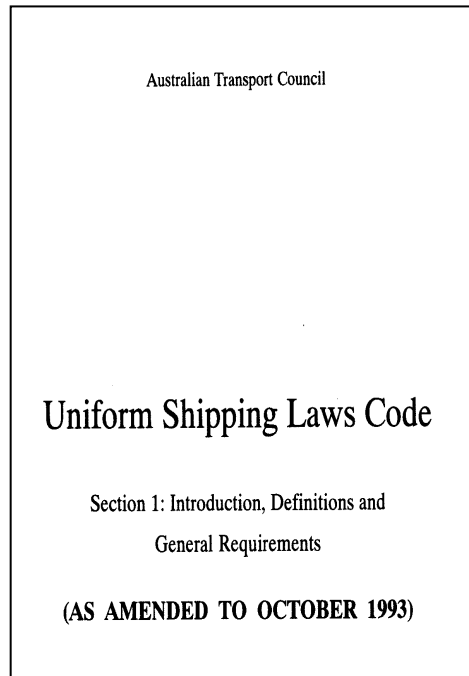
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APPENDIX E

Fixed manually operated

- CO₂
- Halon 1301 or 1211
- Steam
- Inert Gas
- Foam
- Water spray



Current Legislation

- Prescriptive - Appendix F
- Class 1 B C D E > 12.5 < 25m
- Class 2 A B C > 12.5 < 25m
- Class 3 A B C > 12.5 < 25m
- Class 3 D > 25m

APPENDIX F



Fixed manual or automatic

- CO₂
- Halon 1301 or 1211

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APPENDIX F

- Alternative water spray system with hand pump

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1980's WORMALD HALON 1301 PROMOTION



INTERNATIONAL MARITIME ORGANIZATION

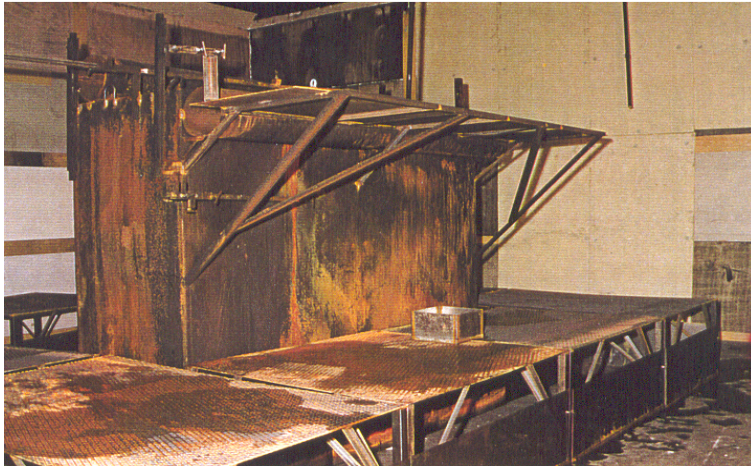
IMO Resolution A.719(17) Prevention of Air Pollution from Ships

6 November 1991

- Halons banned

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TYCO AQUAMIST TEST BY U S COAST GUARD

IMO

- 500m³ Real fire test regime
- Gaseous systems ok > 500m³
- Water mist limited to 500m³

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AUTHOR DEMONSTRATING DRY CHEMICAL POWDER FIRE EXTINGUISHER AT WORMALD FIRE TRAINING SCHOOL

Extinguishing Principles

- Remove fuel
- Remove oxygen
- Remove heat
- Break chain reaction

Let's examine how the various agents achieve extinguishment

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RAN HYDROGRAPHIC SURVEY SHIP
FM200 SYSTEM

HaloCarbons

- Remove fuel - no
- Remove oxygen - minor
- Remove heat - minor
- Break chain reaction - major
- NAF S-III, FM200 & CEA308
IMO tested
- Triiodide & FE13 not tested

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CO₂ SYSTEM CYLINDER BANK

CO₂ & Inert Gas

- Remove fuel - no
- Remove oxygen - yes
- Remove heat - no
- Break chain reaction - no
- CO₂ IMO approved by default

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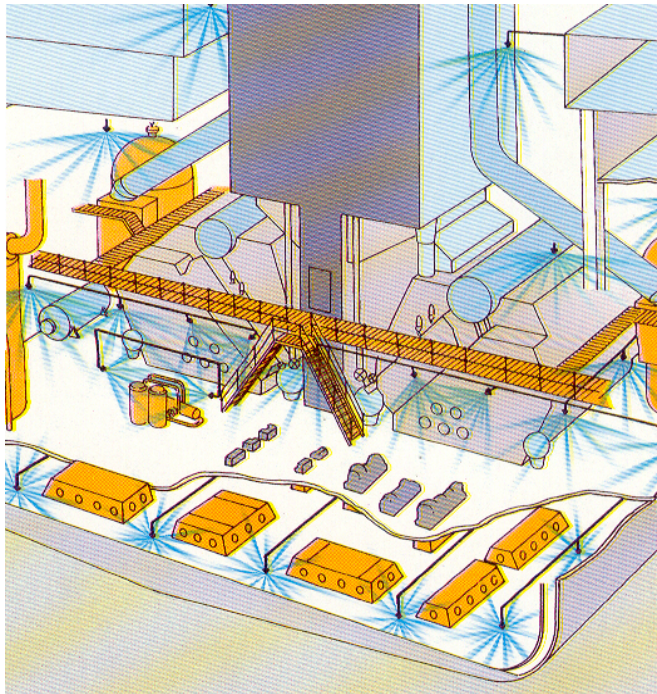
TYCO STAFF IN INERGEN DISCHARGE

Inergen

- Remove fuel - no
- Remove oxygen - yes*
- Remove heat - no
- Break chain reaction - no
- * 13.7% residual O₂ and 2.5% residual CO₂ allows normal respiratory functions.
- IMO tested

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TRADITIONAL WATERSPRAY SYSTEM SCHEMATIC

Water Spray

- Remove fuel - no
- Remove oxygen - no
- Remove heat - yes
- Break chain reaction - no
- Not IMO tested

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Water Mist



LOW PRESSURE WATERMIST IN MACHINERY SPACE

- Remove fuel - no
- Remove oxygen - some
- Remove heat - yes
- Break chain reaction - no
- IMO tested

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TYCO "MICRO-K" SYSTEM

Dry Powder &
Particulate Aerosols

- Remove fuel - no
- Remove oxygen - minor
- Remove heat - some
- Break chain reaction - yes
- Not IMO tested

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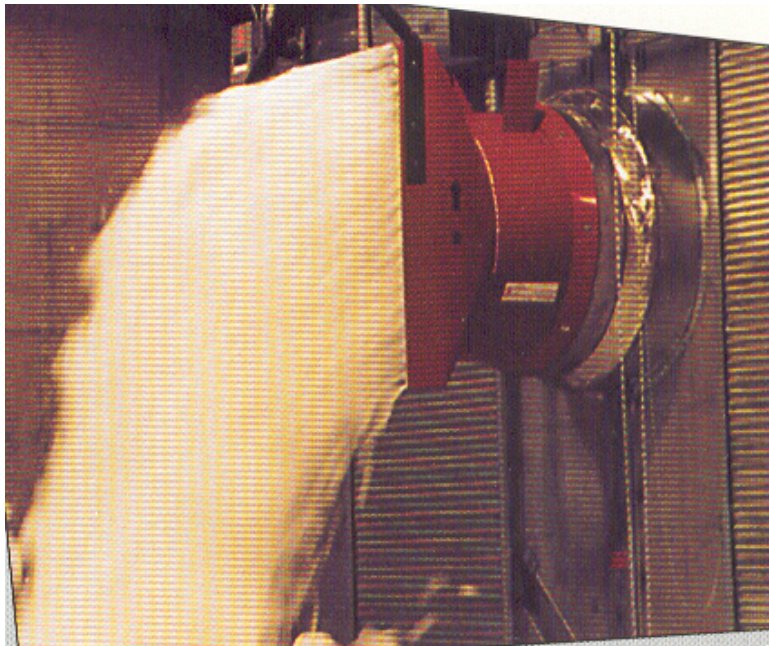
ANL BASS TRADER FOAM SYSTEM

Low Expansion Foam

- Remove fuel - no
- Remove oxygen - yes
- Remove heat - some
- Break chain reaction - no
- Not IMO tested

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HIGH EXPANSION FOAM IN MACHINERY SPACE

High Expansion Foam

- Remove fuel - no
- Remove oxygen - yes
- Remove heat - some
- Break chain reaction - no
- Not IMO tested

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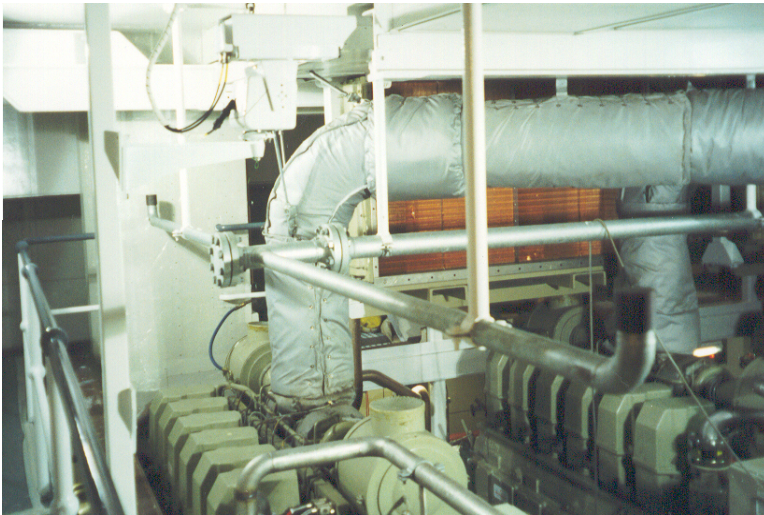
STEAM OUT AFTER DEMISE OF FIRETUBE BOILERS

Steam

- Remove fuel - no
- Remove oxygen - yes
- Remove heat - some
- Break chain reaction - no
- Not IMO tested

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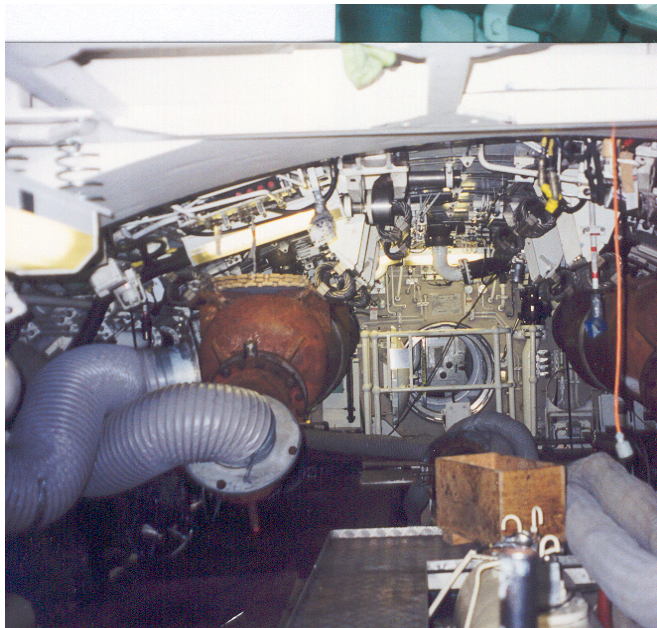
RAN HYDROGRAPHIC SURVEY SHIP
GENERATOR ROOM

Key factors for safety after
agent discharge in no fire
- cold compartment

- Raw agent toxicity
- Oxygen deficiency
- Visibility
- Agent scalding or frostbite
from direct contact

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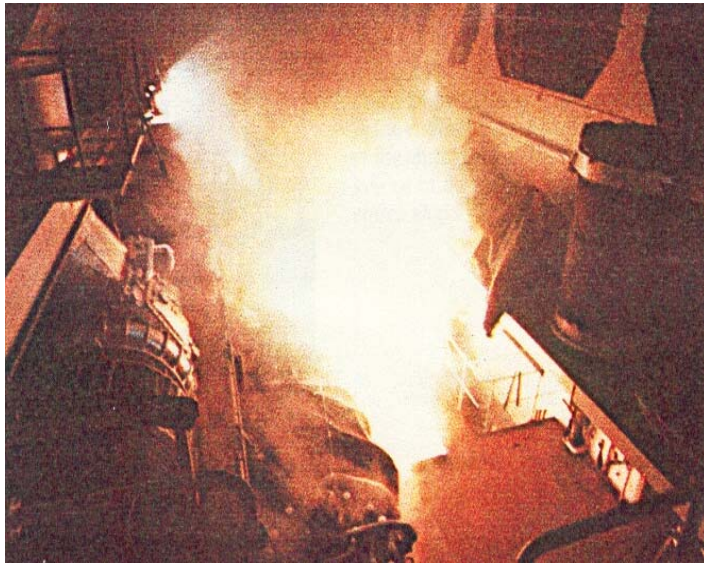
COLLINS CLASS SUBMARINE
MAIN GENERATOR ROOM

Key factors for safety after agent discharge in no fire - hot compartment

- Raw agent toxicity
- Decomposed agent toxicity
- Oxygen dilution
- Visibility / hot surfaces
- Agent scalding or frostbite from direct contact

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AMOCO WHITING MAIN ENGINE ROOM
1980 LIVE FIRE TESTS WITH HALON 1301

Key factors for safety after agent discharge in Fire Compartment

- Fire product toxicity
- Heat & flame impingement
- Agent decomposition toxicity
- Oxygen deficiency
- Visibility / hot surfaces
- Agent scalding or frostbite from direct contact
- Wayfinding & obstructions

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Key factors for safety after agent discharge in post fire compartment

- Fire product toxicity
- Agent decomposition toxicity
- Oxygen deficiency
- Visibility / hot surfaces
- Wayfinding & obstructions

Australian Transport Council

**National Standard for
Commercial Vessels**

Where to now?

- Implementation of the NSCV
- Fire Safety, Part C4, in 2002 ?
- Will undoubtedly rely on Australian Standards.
- Will undoubtedly require National Register Compliance.
- Performance, OH&S and Safety Obligations paramount.

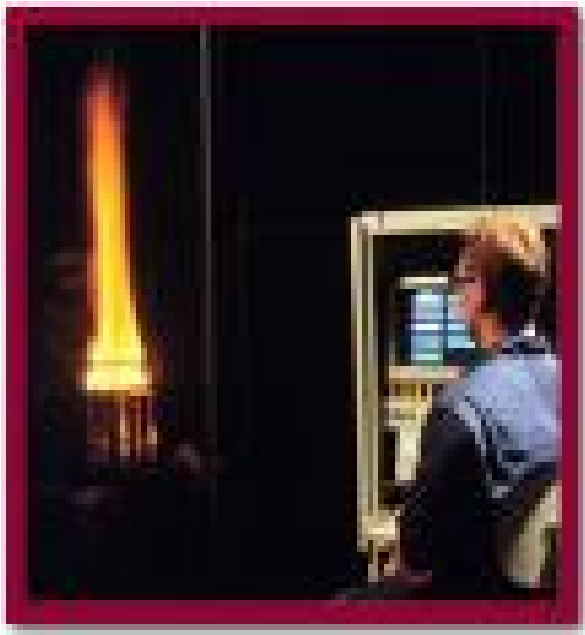
Australian Standard[®]

Gaseous fire extinguishing systems

Part 1: General requirements

Australian Standards

- AS 4214 - Gaseous
- DR 99552 - Gaseous
- AS4587 - Water Mist
- Compliant Systems and Equipment



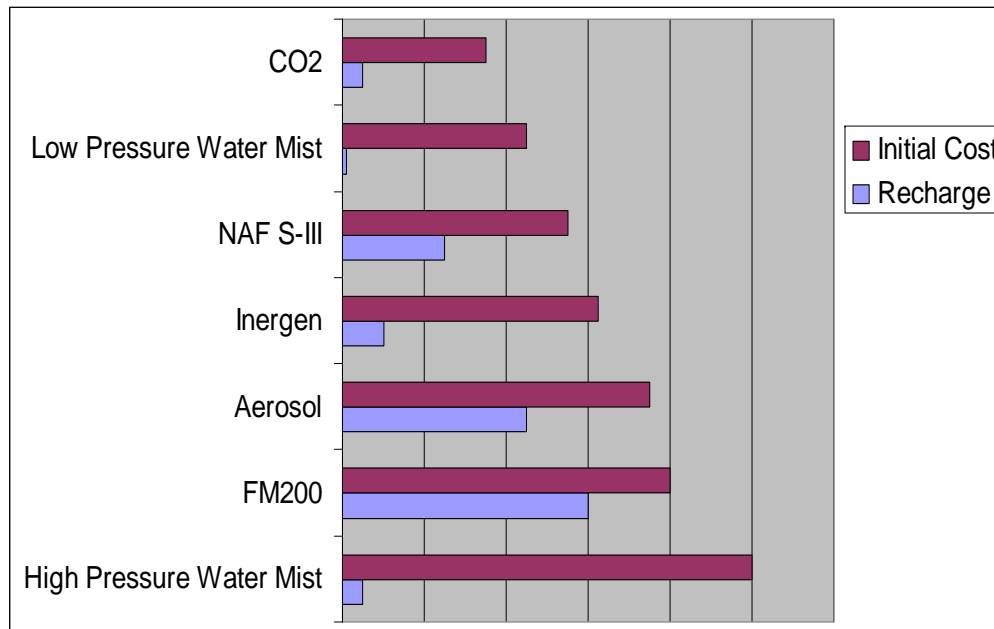
ANSUL FIRE RESEARCH LABORATORY

Candidate Systems and Agents

- CO₂ 📄
- NAF S-III 📄 - Interim Halon replacement
- FM200 📄
- Inergen 📄
- Foam 🏠
- Dry Powder 🏠
- Aerosol Particulates 📄
- Water Spray 🏠
- Steam 🏠
- Water Mist 📄

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Costs & Availability

- Installation cost
- Recharge cost
- Agent availability
- Environment



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Conclusion

- System must meet satisfactory performance for intended application
- System must pass IMO or other acceptable tests or be designed to Australian Standards
- Safety paramount under OH&S legislation
- Tested and supportable systems

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**THANK YOU FOR YOUR
GENEROUS ATTENTION**

Rick Foster
National Marine Coordinator

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www.tycotech.com.au/marine