

A close-up, low-angle shot of a ship's propeller, showing the curved blades and the central hub. The image is in a cool blue color palette.

The Marine Industry Today and Goal Based Rules

E-Lass 2015 – Southampton, UK
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Lloyd's Register
Marine

Working together
for a safer world

Introduction

- Scene setting
- Fundamentals of Goal Based design
- Lloyd's Register's current & future rule development



Scene Setting – Goal Based Standards / Rules



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MSC.1/Circ.1394
14 June 2011

**GENERIC GUIDELINES FOR DEVELOPING IMO
GOAL-BASED STANDARDS**

MSC.1/Circ.1394
Annex, page 1

ANNEX

GENERIC GUIDELINES FOR DEVELOPING IMO GOAL-BASED STANDARDS

Purpose

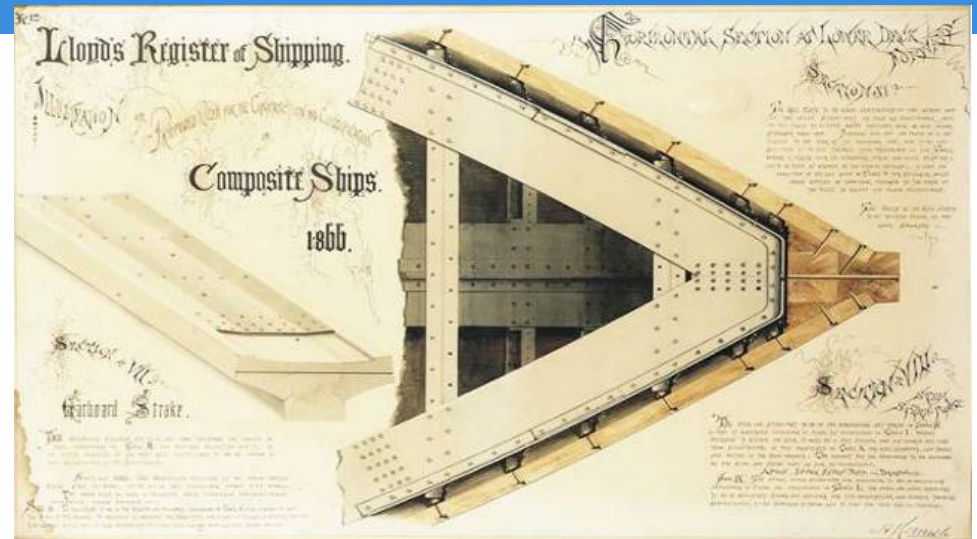
- 1 These Guidelines describe the process for the development, verification, implementation and monitoring of goal-based standards (GBS) to support regulatory development within IMO. GBS establish **“rules for rules”**.
- 2 It should be noted that these Guidelines are generic and where they use phrases such as "required level of safety", this does not imply any preference for a specific technical approach.

The goals of *Classification Rules*

- What are the objectives and limitations of prescriptive rules?

Scene Setting - Classification Rule Evolution

- 255 years old!
- Relatively 'simple' designs ~ 1750
- Masters competence
- Increasing complexity



The title page from Rules for Composite Ships, 1868.

- Rules driven by
 - Need for prescription
 - Engineering judgement 'cautious' > understanding > modelling capability
 - Experience
- Historically considerable safety margin 'fat' in Classification Society Rules



***“What is the difference between
a prescriptive and a
goal based standard ?”***

Example Prescriptive Standard

'All motor vehicle exhausts are to be fitted with a filtration unit of 120 mesh size or less'

- This specifies the technical measure to be used
- Compliance is easily checked
- It may not be task or cost effective
- No ownership of the objective by the car manufacturer



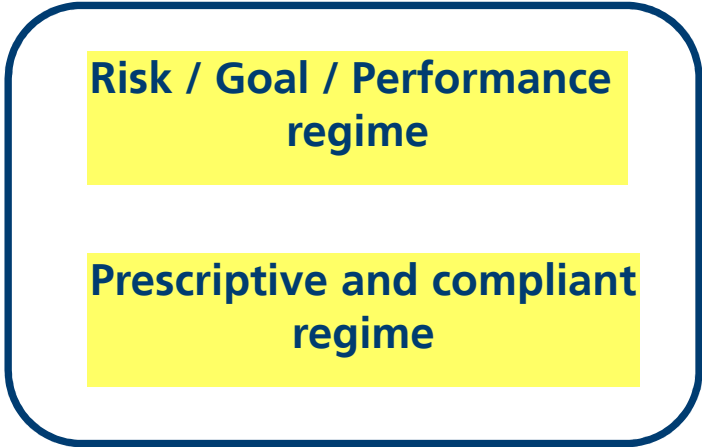
Example Goal Based Standard

‘The level of particulates emitted from a motor vehicle engine should not exceed 1 ppm’

- The goal to be achieved is clear
- The manufacturer may use any solution in achieving the goal
- The manufacturer has to own / understand the goal
- Compliance with the goal is easily achieved by air sampling



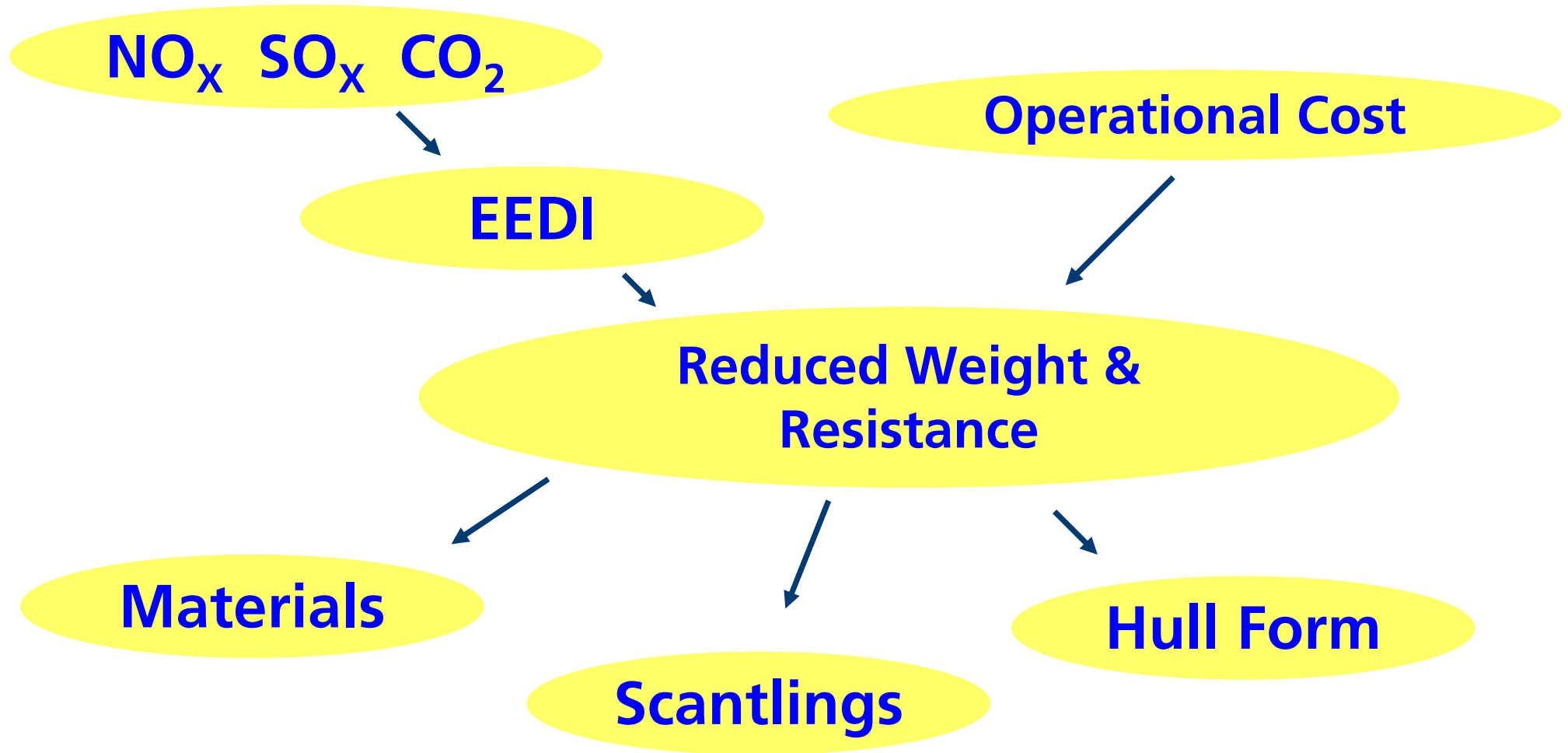
Not one or the other approach – they are complementary!



**Risk / Goal / Performance
regime**

**Prescriptive and compliant
regime**

Scene Setting – The Challenges of Today



Classification Rules and Standards



European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

BS EN 13445-6:2002

Unfired pressure vessels. Requirements for the design and fabrication of pressure vessels and pressure parts constructed from spheroidal graphite cast iron

BS EN 13445-6 specifies requirements for the design, materials, manufacturing and testing of pressure vessels with a maximum allowable pressure exceeding 60 mm, the

ISBN 0 580 39859 5

BS ISO 4126-9:2008

Safety devices for protection against excessive pressure. Application and installation of safety devices excluding stand-alone bursting disc safety devices

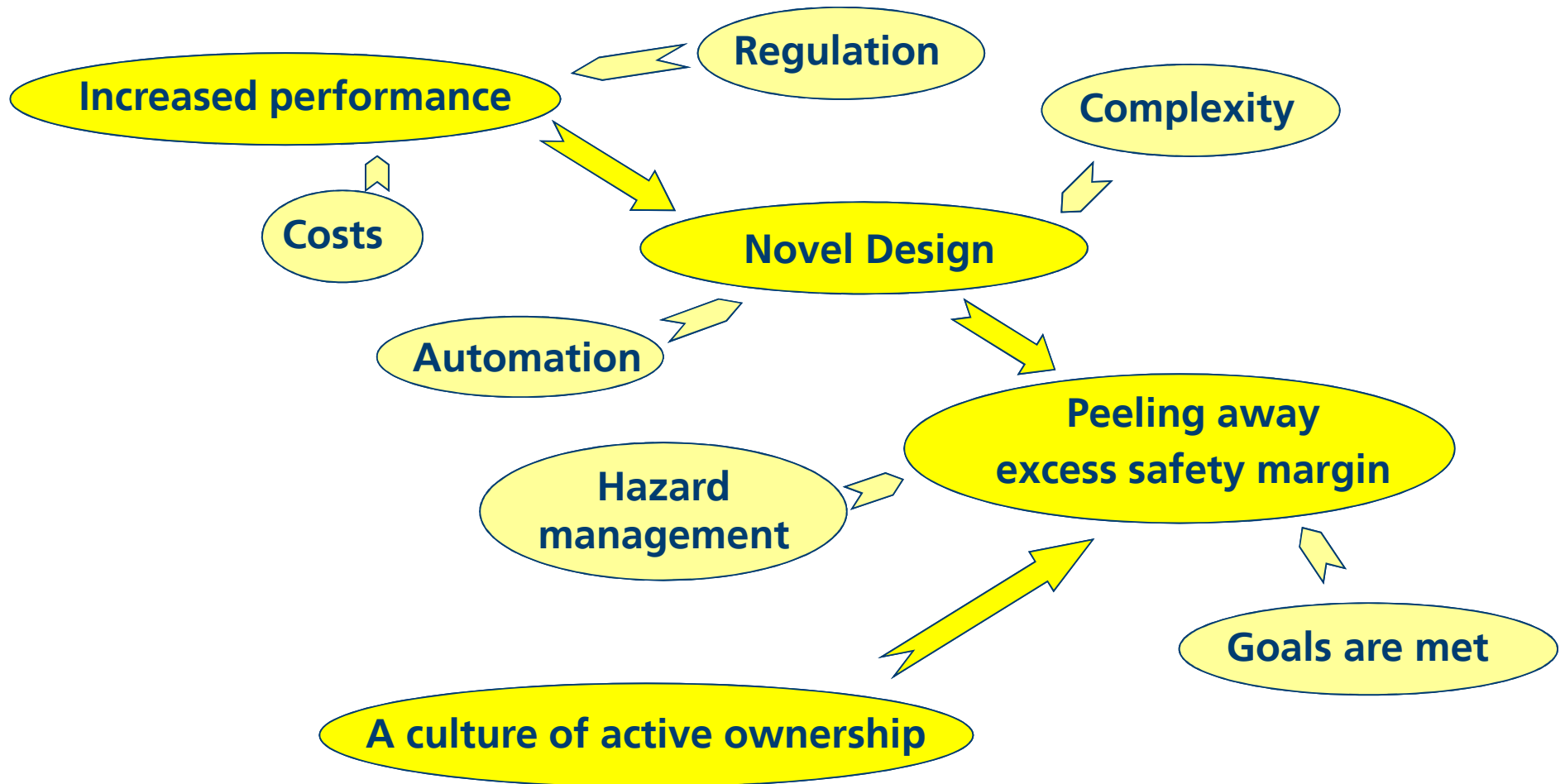
Standards and rules typically manage hazards & immediate consequences

Classification Rules and Standards



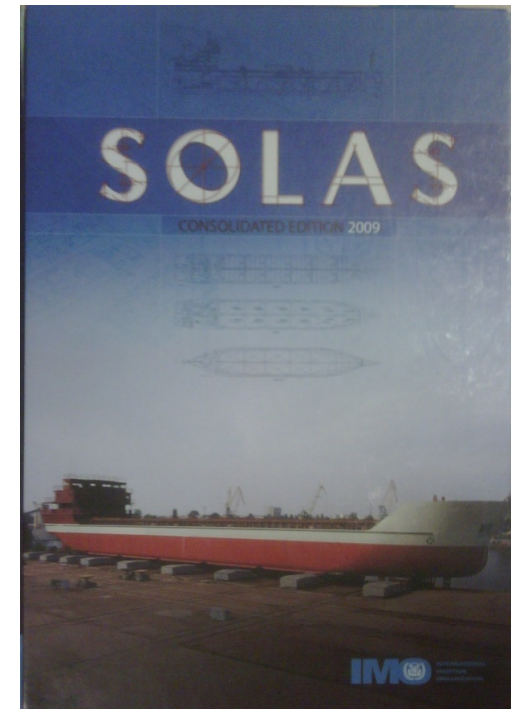
Standards and rules typically manage hazards & immediate consequences

Today's Situation is then one of



Alternative Design & Arrangements

- SOLAS Chp II-1 & III (effective 1/7/2010) joined Chp II-2
- Demonstrating equivalence
- Equivalence with what objective
- Performance based
 - Hazard, Consequence or Risk based
 - Etc



Lloyd's Register - Current & Future Rule Development

- Lloyd's Register has 2 Technical Committees (TC)
- **Main TC**
 - 79 external members, yards, operators, owners, institutions
 - Meets yearly in November
 - Various national / regional TC's which feed into the main TC (14 members).
 - Purpose is to provide independent oversight / approval of proposed rule changes
- **Naval TC** is similar, meeting May
- In 2011 both TC's were asked their view on how to incorporate increasing complexity and whether prescriptive rules were the answer.

**Lloyd's
Register**

NOT FOR PUBLICATION

TECHNICAL COMMITTEE

REPORT OF 180th MEETING 31st October & 1st November 2011

The Technical Committee (TC), duly convened by Notice to each member, met to consider various proposals submitted to them relating to Lloyd's Register Classification Rules and to discuss technical issues connected with Lloyd's Register's business.



Lloyd's Register - Current & Future Rule Development

Prescription needs to be maintained from a cost and ease of contracting perspective, however rules need to be flexible enough to allow for novel, new & complex design to be facilitated

- Historically Lloyd's Register has always addressed novelty on a case by case basis
- Volume, complexity and removal of the 'fat' means the rigor now required is quite different to that of 20 + years ago.
- What gives **confidence** to enable LR to independently classify a vessel is that the objective of the rules are met. So:-
 - The goals of Classification Rules need to be specified
 - Rule structure needs to develop - currently only the detail of the rule is specified.



Implications of Goal based *Classification Rules*

- If pursuing a prescriptive route:
 - Greater understanding of why the rule exists
- If pursuing a goal based approach:
 - It requires a very different culture, of all organisations involved, to realise the benefits
 - Initial cost & effort (design / build) is significant
 - Significant through life benefits



Conclusions

- Goal based Classification Rules are required to cope with today's new / novel designs
 - System complexity
 - Removal of traditional excess safety margin
 - Allow innovation
- In realising the benefits of using goal based design
 - Change in approach - passive compliance to active ownership
- Lloyd's Register future rules will be:
 - Goal based, *and* will also
 - Allow a purely prescriptive route to be followed



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