

NACE GB – Corrosion and asset management

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Coatings through life

- ✦ In his book, *La Tour de 300 Mètres* Eiffel noted that the first consideration for construction was that every single part be accessible so that each time the tower is inspected for rust, it can be treated.
- ✦ Eiffel, G., '*La Tour de 300 Mètres*' (Paris, France: Lemer cier Publications, 1900).

Eiffel, G

- ✦ *“We will most likely never realize the full importance of painting the Tower, that it is the essential element in the conservation of metal works and the more meticulous the paint job, the longer the Tower shall endure”.*

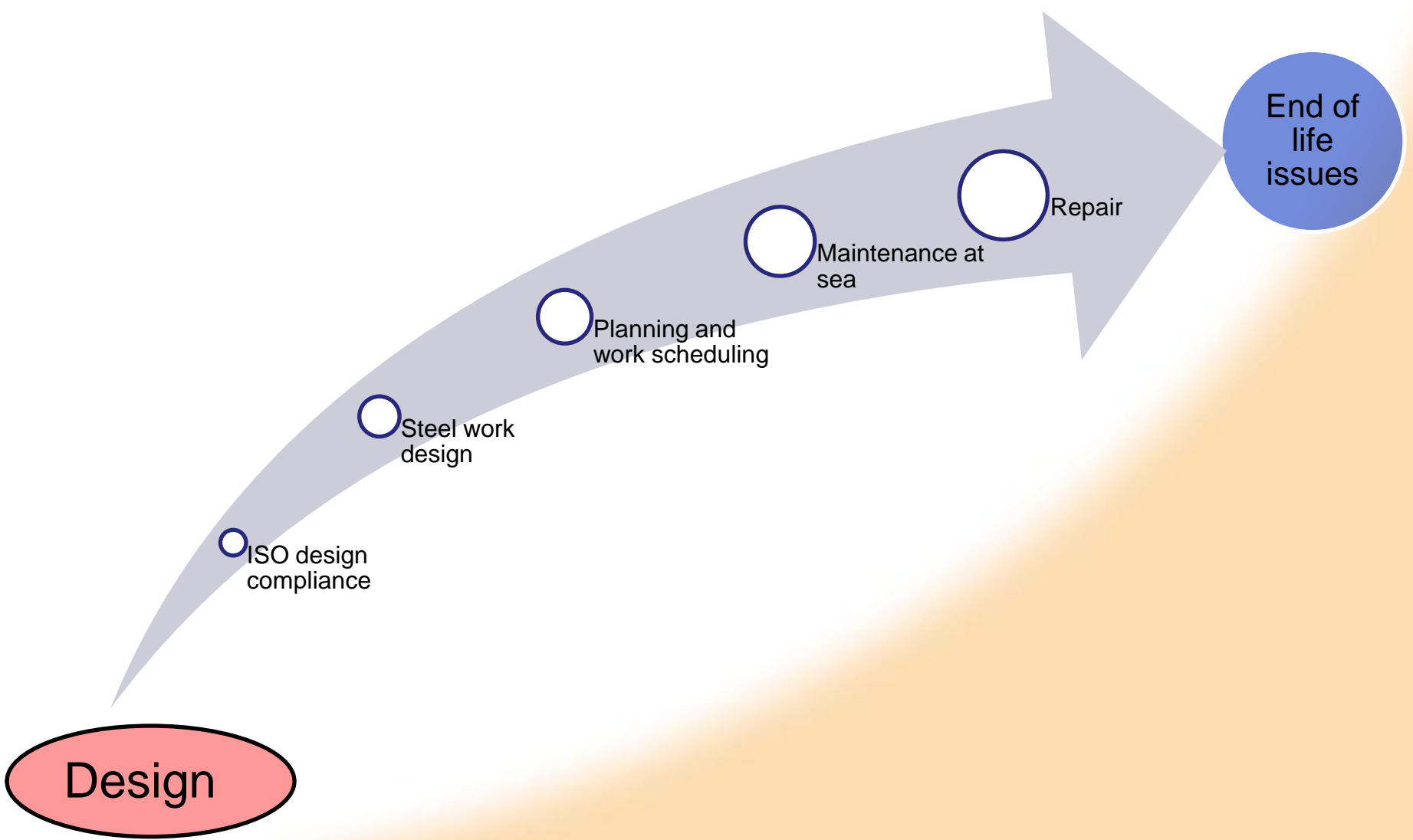
Why do paints fail?

- ✦ Design
- ✦ Specification
- ✦ Facilities
- ✦ Production tools/techniques/processes
- ✦ Management systems
- ✦ Maintenance/Repair
- ✦ Service use
- ✦ Climate
- ✦ Human failings

Through Life

- ✦ What does it mean?
- ✦ From design to scrapping (not just in service)
- ✦ Best chance of success is to get it right first time
- ✦ After that it is an uphill battle

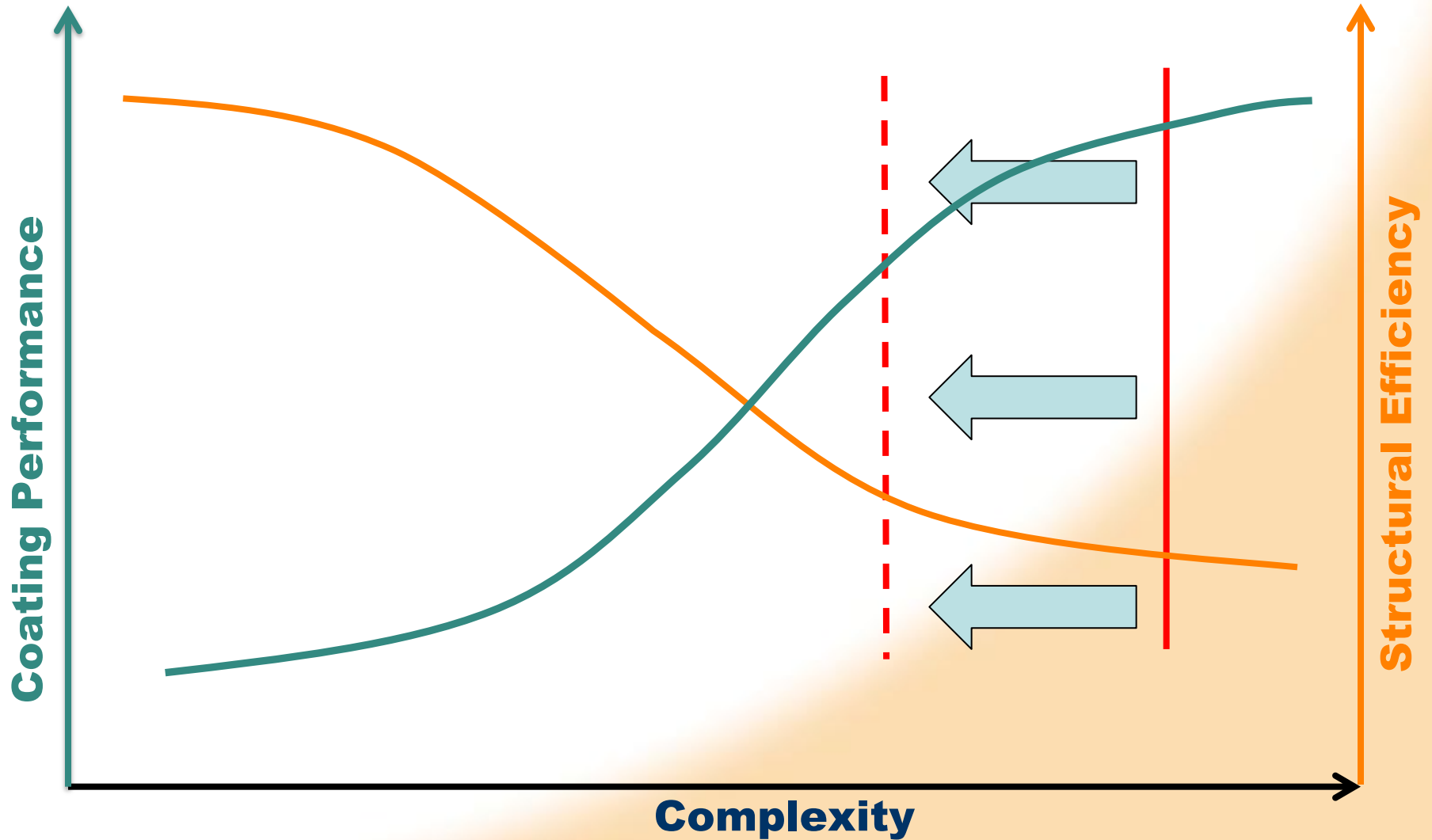
Coating reliability through life



In addition

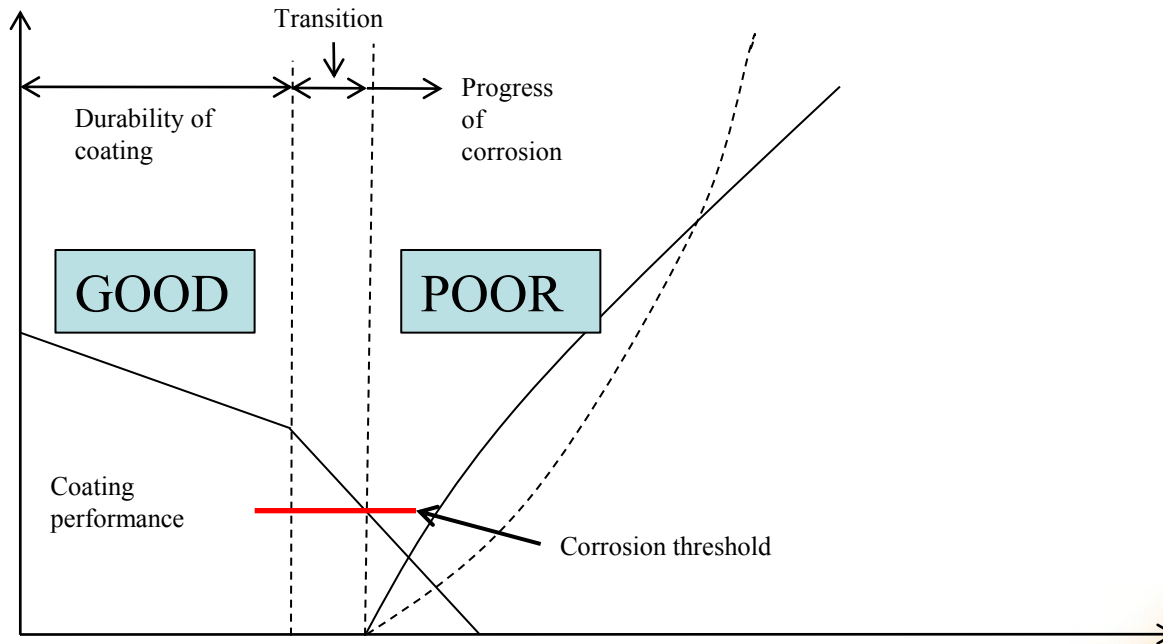
- ▶ Coating specification
- ▶ Tools and techniques for surface preparation and application
- ▶ Record keeping

Design life targets



Corrosion model

Corrosion model (Paik 2003)



- Can we measure performance – predict failure time?
- Preventative maintenance plan – ‘coatings engineering’
- Manage transition from Good to Fair to Poor.

Cost of work

- ✦ European yard can deliver a coated ship for about \$18 per sqm. First time application
- ✦ Spot damage repair can cost \$120 per spot. Repair work
- ✦ In service can be \$20 – 70 per sqm

Through life penalty

- ✦ Get design wrong
- ✦ Specify incorrectly at new build
- ✦ Considerable impact through life.
- ✦ Do not underestimate the impact of design on through life costs.

What is needed

- ▶ As painted documentation – Coating technical file
- ▶ Maintenance strategy to keep structure in “good” condition
- ▶ Repair procedures to restore “good” condition
- ▶ Record keeping and review

Coating is an engineering system

- ✦ Consider the steps taken to specify any other engineering system.
- ✦ Apply those to coatings
- ✦ At present the mode of specification is incorrect, often resulting in failure in service or not delivering the required life time.
- ✦ In simple terms the “specifier” is often “too lazy”.

Maintenance strategy – starts at the beginning

- ✦ Start with a good design
 - ISO compliant
 - Detail to reduce complexity factors such as free edges, shadow areas etc.
- ✦ Functional paint specification is required
- ✦ Facilities and processes are capable
- ✦ Manage properly
- ✦ Record data

Define “good”

- ▶ Define required standard over vessel life:
 - 0 – 10 years
 - 10 – 15 years
 - 15 – 20 years
 - 20 year plus
- ▶ Many systems take no account of ageing asset or expected useful life

In service

- ▶ Put in place a maintenance programme
 - Regular planned survey
 - Appropriate specifications
 - Approved procedures
 - Appropriate tools/techniques
 - Appropriate documentation
 - Appropriate feedback to future projects

In service

- ▶ Put in place an appropriate Repair programme
 - Appropriate specifications
 - Approved procedures
 - Appropriate tools/techniques
 - Appropriate documentation

The challenge

- ▶ New build and in service do not consider through life – run on two budgets – no longer acceptable for best results.
- ▶ The extra \$1 per sqm at new build could save \$50 per sqm in service.

Paint as an engineering system

- ✦ Develop the tools and techniques to do this
- ✦ Develop a new profession “ the coating engineer”
- ✦ Give coatings an equal footing to other engineering systems.

Asset integrity management

- ▶ It is not hard – so why is it not done?
 - Knowledge and education
 - Split between new and in service budgets
 - No documented follow through
 - No reviews
 - No lessons learned

Then and now – 10 years experience



Can we do better

- ▶ In short - yes much better
- ▶ We simply do not have enough information and what we have is not adequate for proper decision making
- ▶ Need to change this
- ▶ A history of missed opportunities
- ▶ EU Through life project a good start point

Thank you