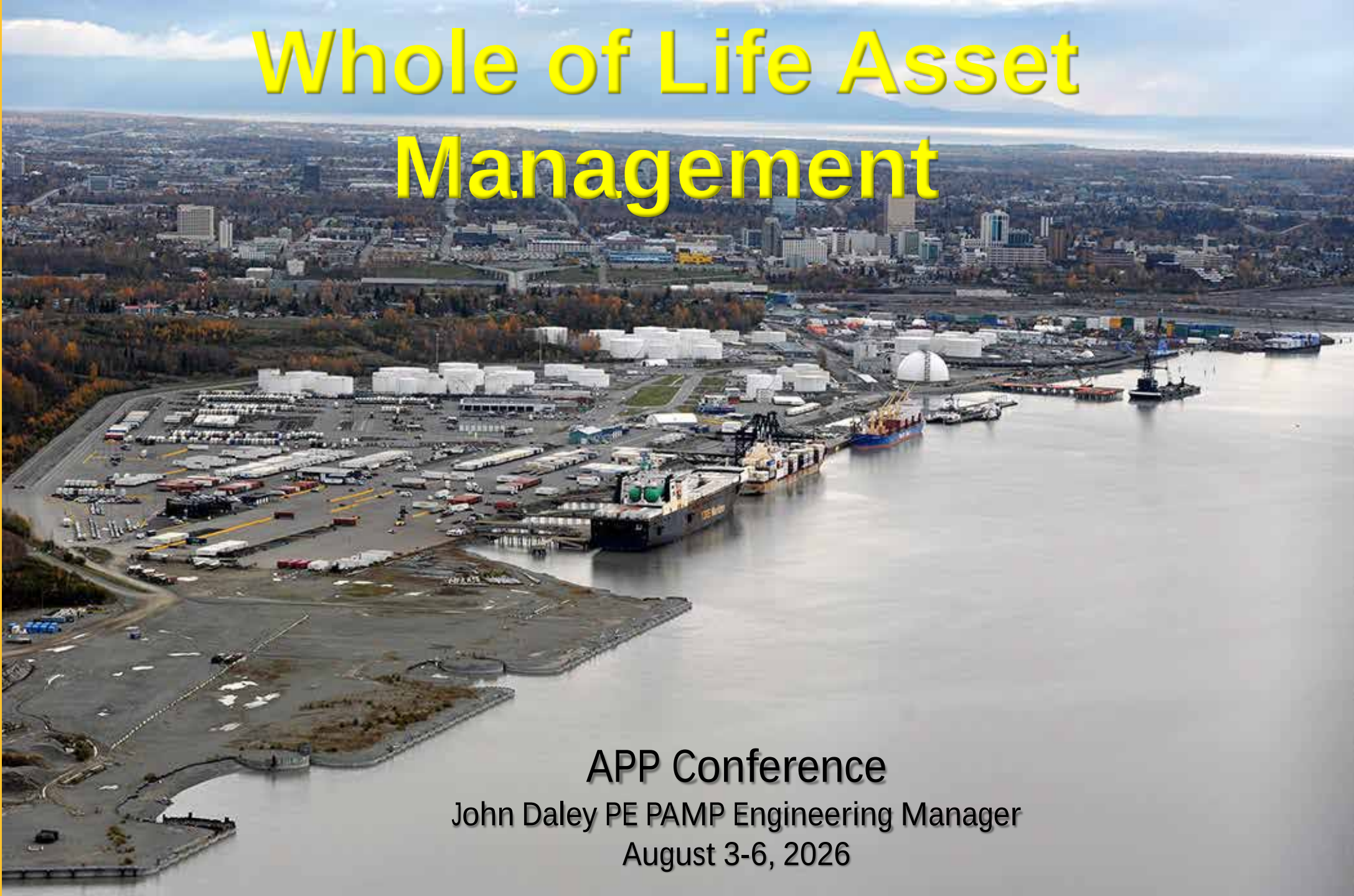


Whole of Life Asset Management

An aerial photograph of a large industrial port facility, likely a refinery or chemical plant, situated along a river or coastline. The facility features numerous large white storage tanks, a complex network of pipes and roads, and several large industrial buildings. In the background, a city skyline is visible under a cloudy sky. The water in the foreground is calm, reflecting the sky and the industrial structures.

APP Conference

John Daley PE PAMP Engineering Manager

August 3-6, 2026

The Politics of Maintenance

The Infrastructure Invisibility Principle

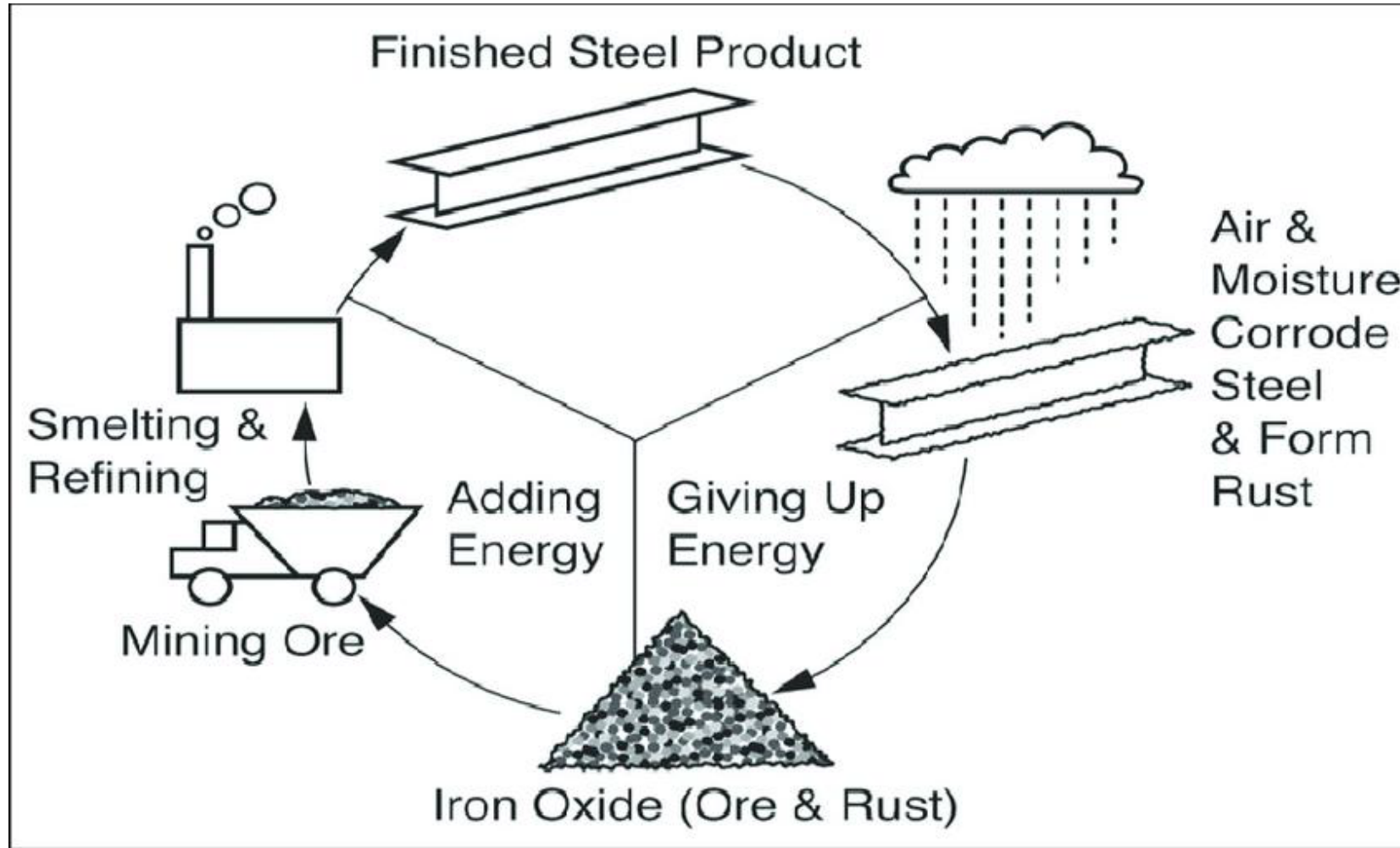
Every dock is politically invisible until it collapses.
(No one knows you exist until there is a problem)

The Maintenance Paradox

If maintenance succeeds, it appears unnecessary.
If maintenance fails, it appears incompetent.
(No one cares until there is a problem)



Steel Lifecycle



Steel Lifecycle

More Order



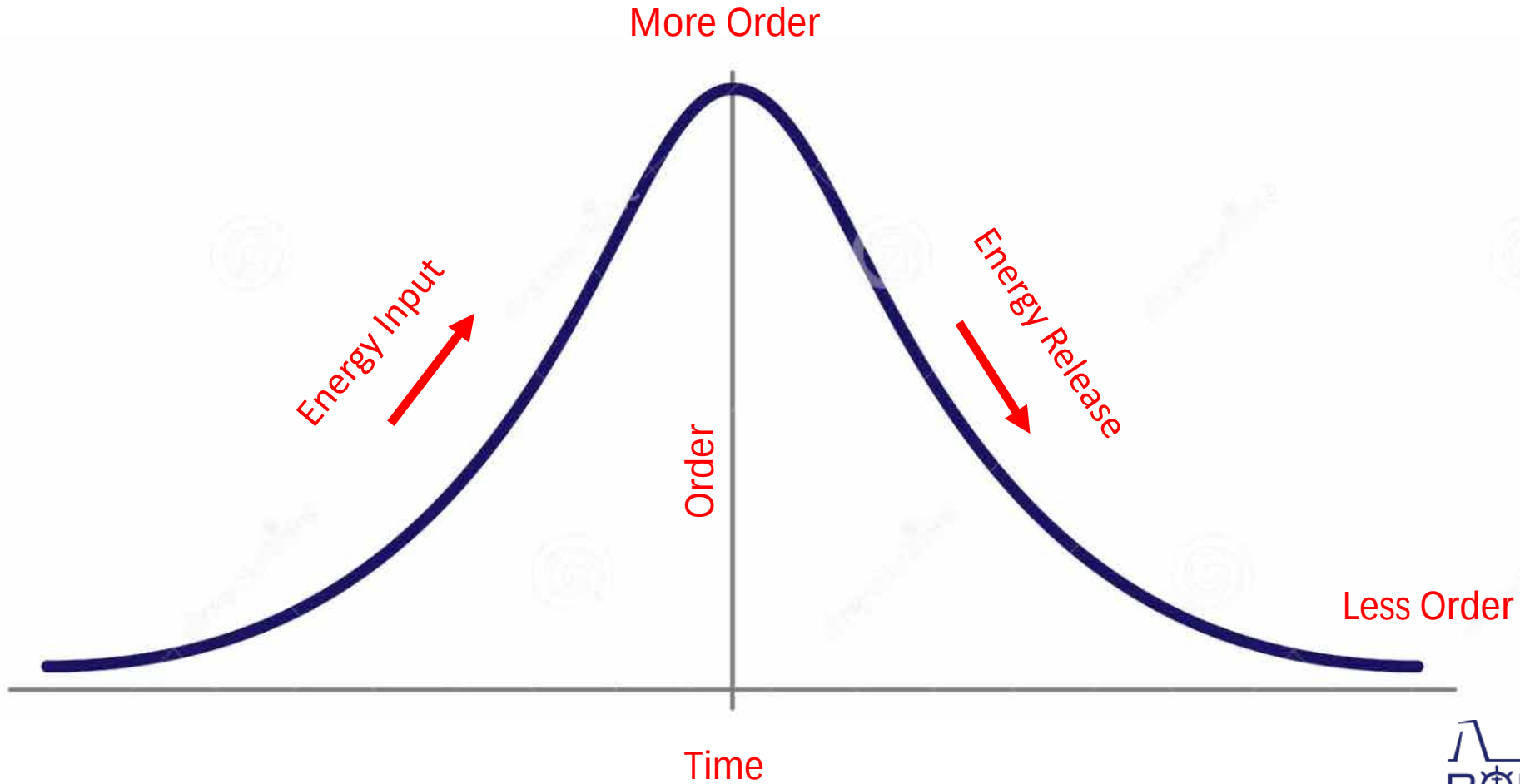
Energy Input



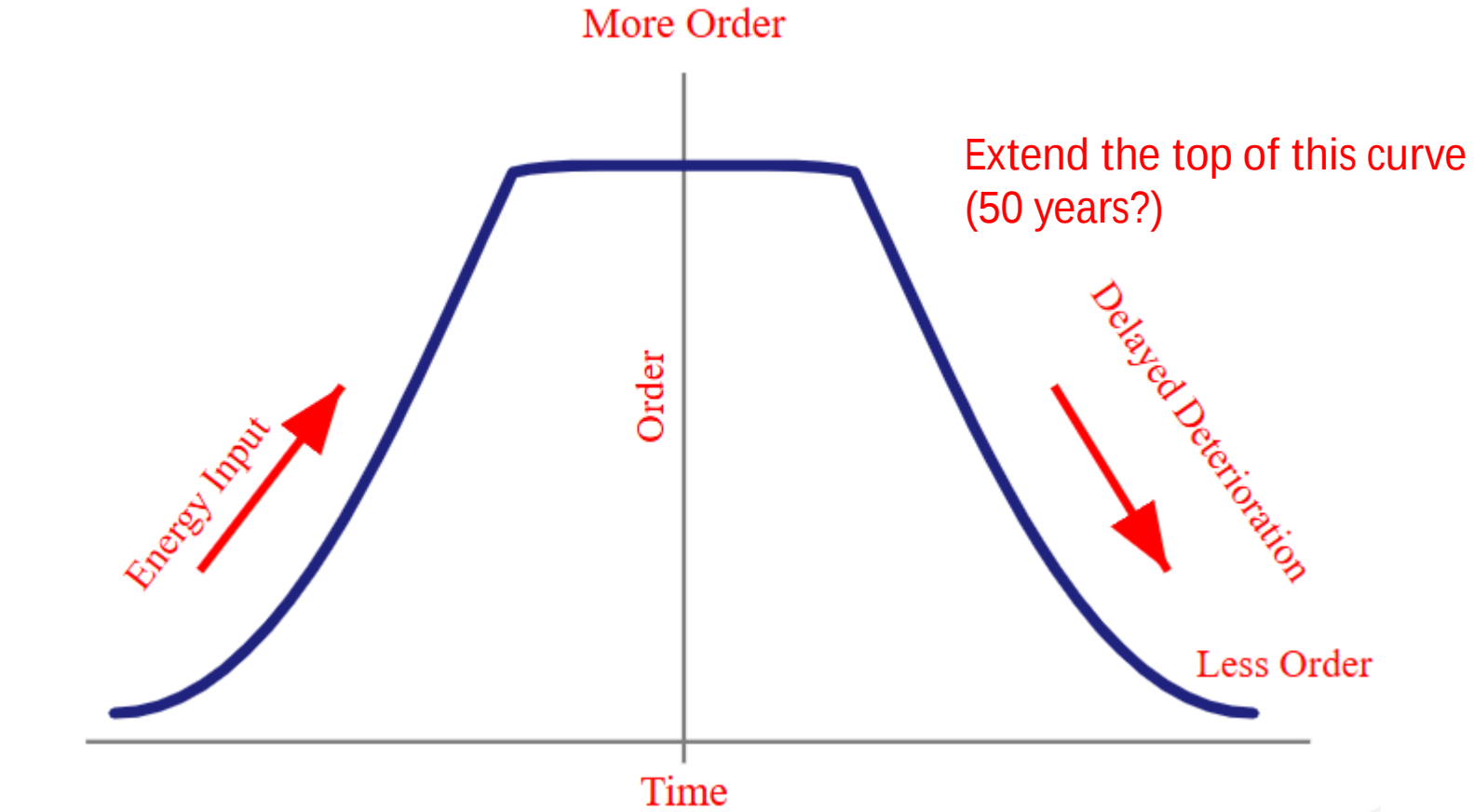
Energy Release - Less Order



Steel Lifecycle



Ideal Facility Lifecycle



Second Law of Thermodynamics Entropy

Heat flows from Hot to Cold

Natural processes tend toward greater disorder.



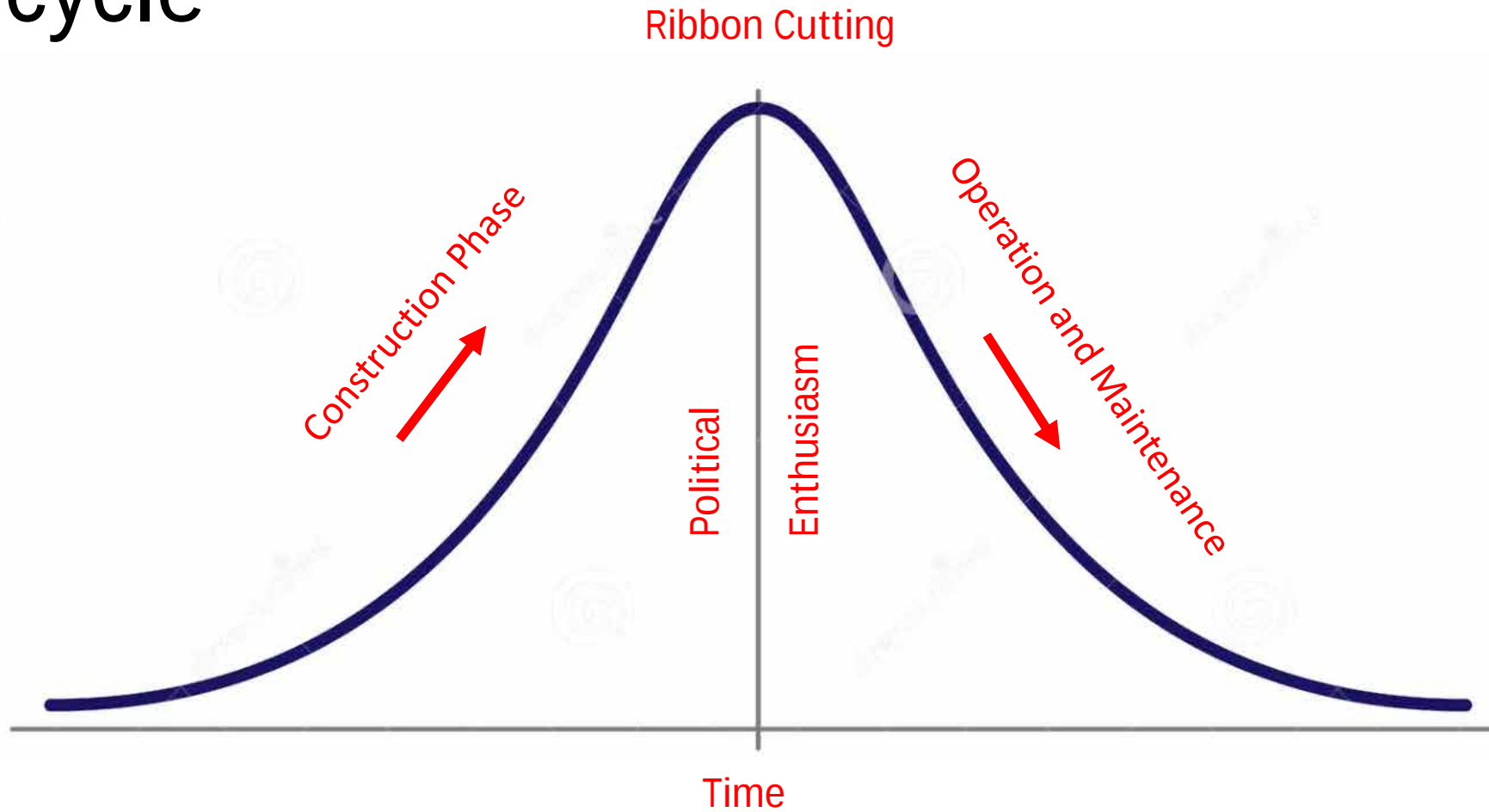
Lifecycle is ultimately governed by physics

Corrosion and degradation are natural processes

You must either add energy or retain existing energy to increase lifecycle.



Facility Political Lifecycle



Facility Political Lifecycle

Great Enthusiasm



Energy Input



Boredom and Drudgery



First Law of Thermodynamics (conservation of energy) Restated

Political energy can neither be created nor destroyed; it can only be transferred from maintenance budgets to projects with ribbon-cutting ceremonies.

(There Must be Ribbon-Cutting, Pomp, and Ceremony)



Fourth Law of Thermodynamics

Every waterfront facility tends toward neglect unless renewed by crisis, scandal, or an upcoming election.

(Preventing disasters generates no stories; causing and then fixing disasters generates promotions.)



What can we do? (after the party's over)

- Design with service life in mind
- Start a professional inspection and maintenance program (Asset Management)
- Budget for routine and major maintenance

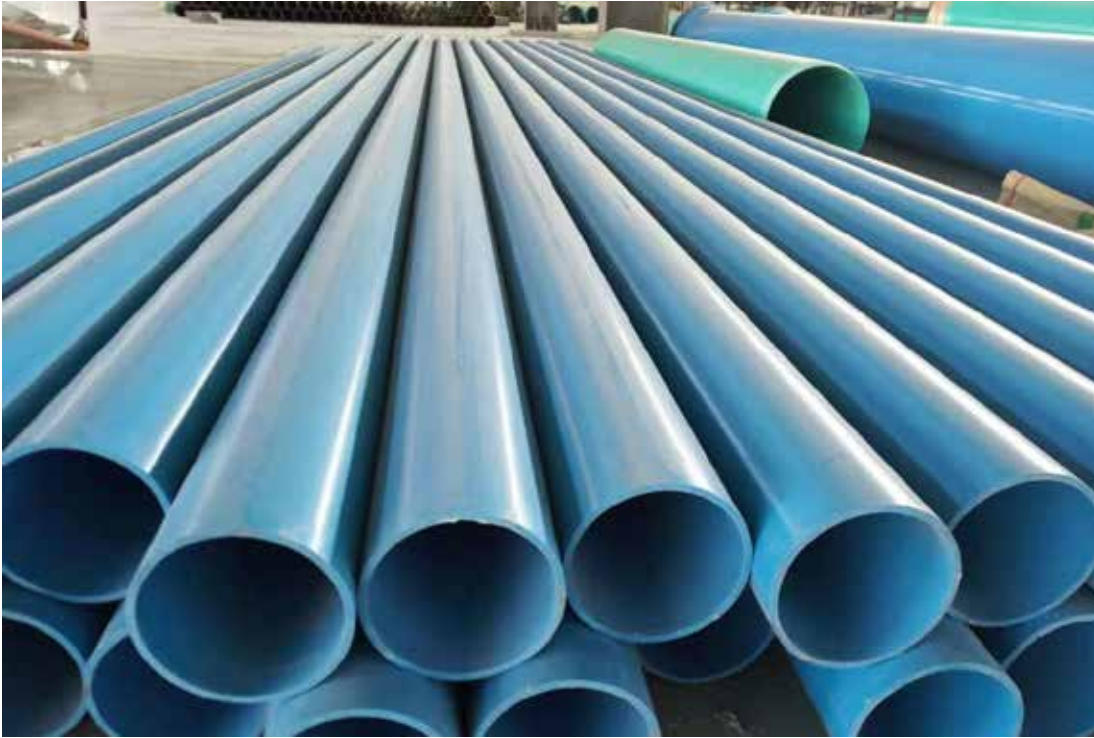


Design with Service Life in Mind

- Materials
- Coatings
- Cathodic Protection



Design with Service Life in Mind Materials



Plastic



Concrete



Design with Service Life in Mind - Coatings

Coatings are the first line of defense against corrosion.



Old Piling



New Piling

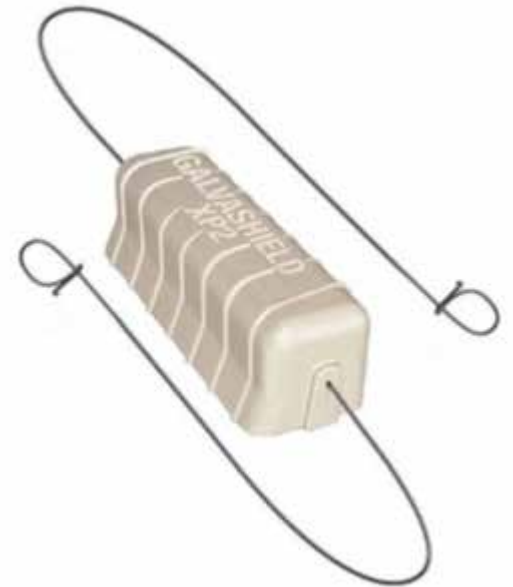


Design with Service Life in Mind – Cathodic Protection



Impressed current sled

Galvanic Anode



Concrete Anode



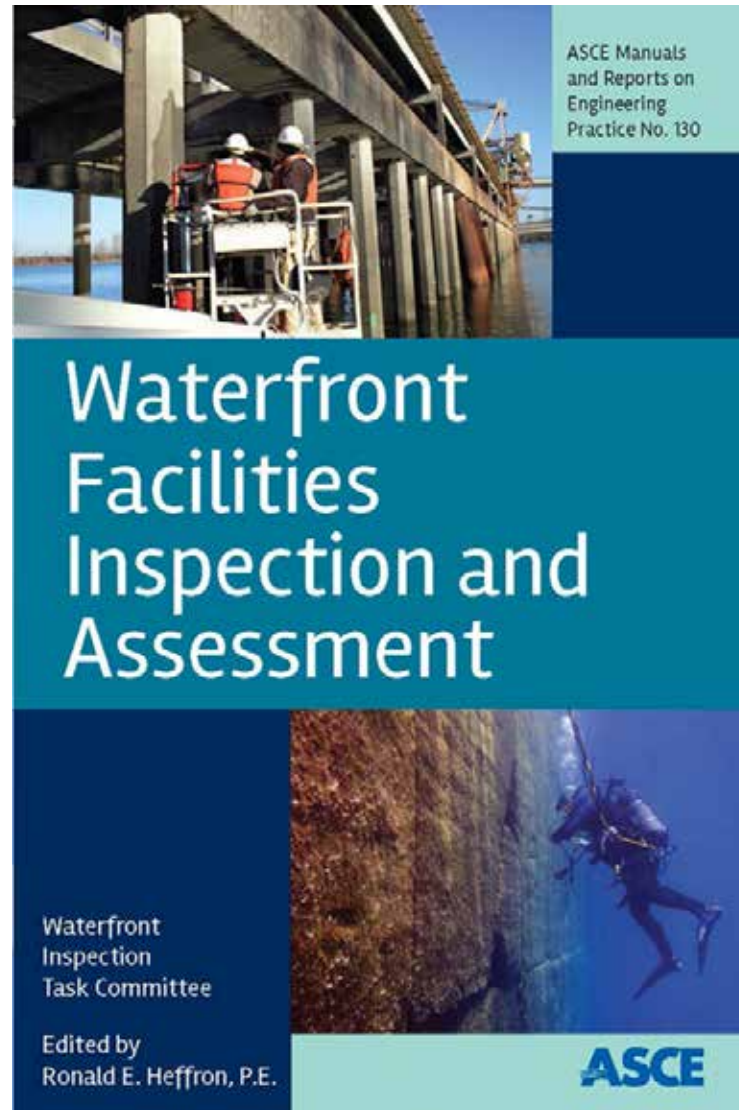
Asset Management

- Inspection
- Records
- Maintenance



Regular Professional Inspections and Maintenance

This manual is
your friend!



What Does This Manual Do For Me?

Asset Management:

- A system to monitor and maintain a valuable capital facility.
- The goal is to provide a high level of service for the life of the structure in a cost effective manner.
- Includes record keeping, programed inspections, and maintenance.
- This can also help to establish realistic maintenance budgets.



What Does This Manual Do For Me?

Maintenance and Repair:

- Provides uniform and repeatable rating system.
Example damage rating: Minor, Moderate, Major, and Severe.
- Maintenance can be prioritized based on rating.



What Does This Manual Do For Me?

C.Y.A. (Cover Your Assets)

- Many public infrastructure facilities are in disrepair nationwide. What happens when something important fails?
- Search for the guilty and punishment of the innocent.
- A condition report can help to save your “assets” in a crisis!



Budget for Routine and Major Maintenance

Typical Annual Maintenance Budget % of Facility Capital Cost

Facility Condition	Annual Maintenance Budget
New dock (0–10 years)	0.3–0.8%
Well-maintained dock	0.8–1.5%
Older dock (>30 years)	1.5–3.0%
Harsh marine environment or heavy industrial use	2–4%



Budget for Routine and Major Maintenance

Every year

Inspection, cleaning, coating touch-up, electrical testing

Every 5 years

Underwater inspection, pile survey, fender assessment

10–15 years

Replace lighting, repair coatings, concrete patching

20–30 years

Replace fenders, cathodic protection, electrical equipment

30–40 years

Significant deck rehabilitation, utility replacement

50–75 years

Major structural rehabilitation or deck replacement

75-100 years

Complete reconstruction



Budget for Routine and Major Maintenance

Routine Maintenance Typical Budget = 1% to 2% of Facility Capital Cost per year.

\$100 million dock = \$1 to \$2 million per year.

Major Maintenance Typical Budget = 1.5% of Facility Capital Cost per year.

Major Maintenance Cash Flow = 15% of capital cost every 10 years

\$100 million dock = \$15 million every 10 years.

At 3% per year the maintenance cost equal the initial capital cost in 33 years



Summary:

You can't win! Physics and political apathy are conspiring against you.

- **Design with durability in mind**
- **Start a cover your assets program**
- **Budget for routine and major maintenance**
- **Have a sense of humor**



Chill Dude!



Thank You

