Method for establishing fuel savings

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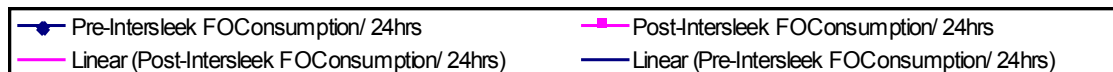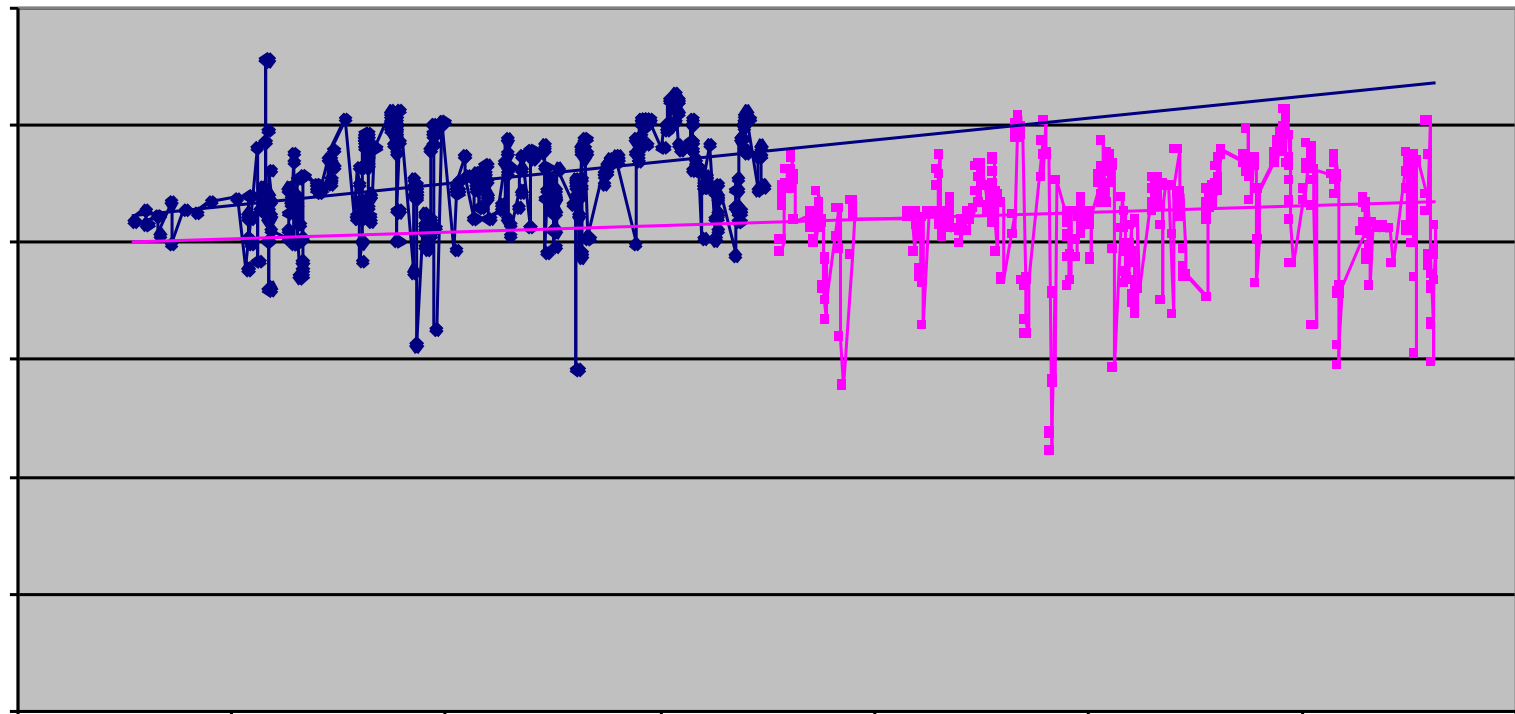UCL Energy Institute

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Contents

- Measuring fuel consumption
- How to use those measurements to establish fuel savings

Measuring fuel

- Noon reports
- Continuous Monitoring system
  - Can provide greater detail on performance of different components (hull, propeller etc)
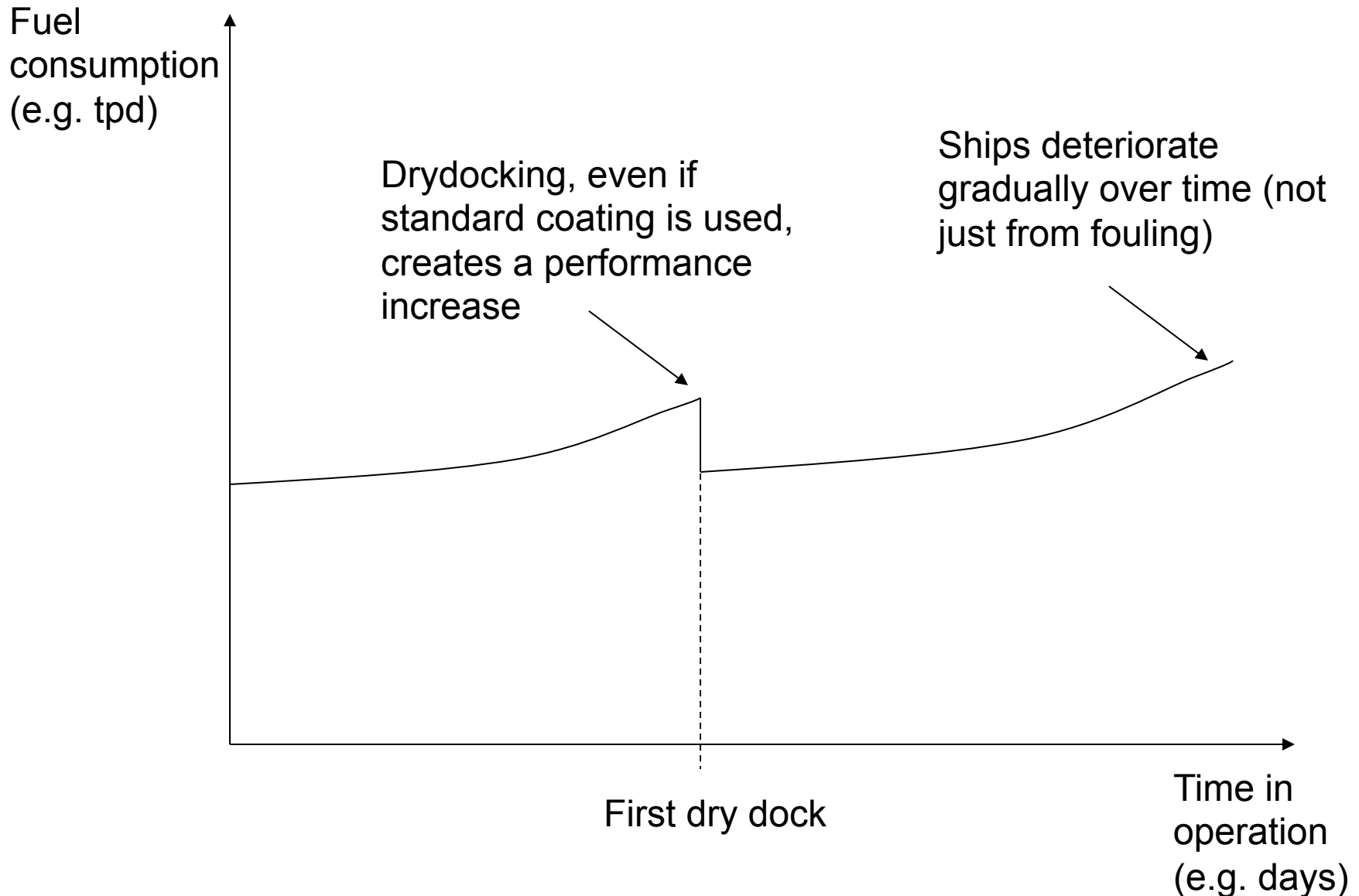
Raw data (noon reports)

Legend: Pre-Intersleek FOConsumption/ 24hrs; Post-Intersleek FOConsumption/ 24hrs; Linear (Post-Intersleek FOConsumption/ 24hrs); Linear (Pre-Intersleek FOConsumption/ 24hrs)
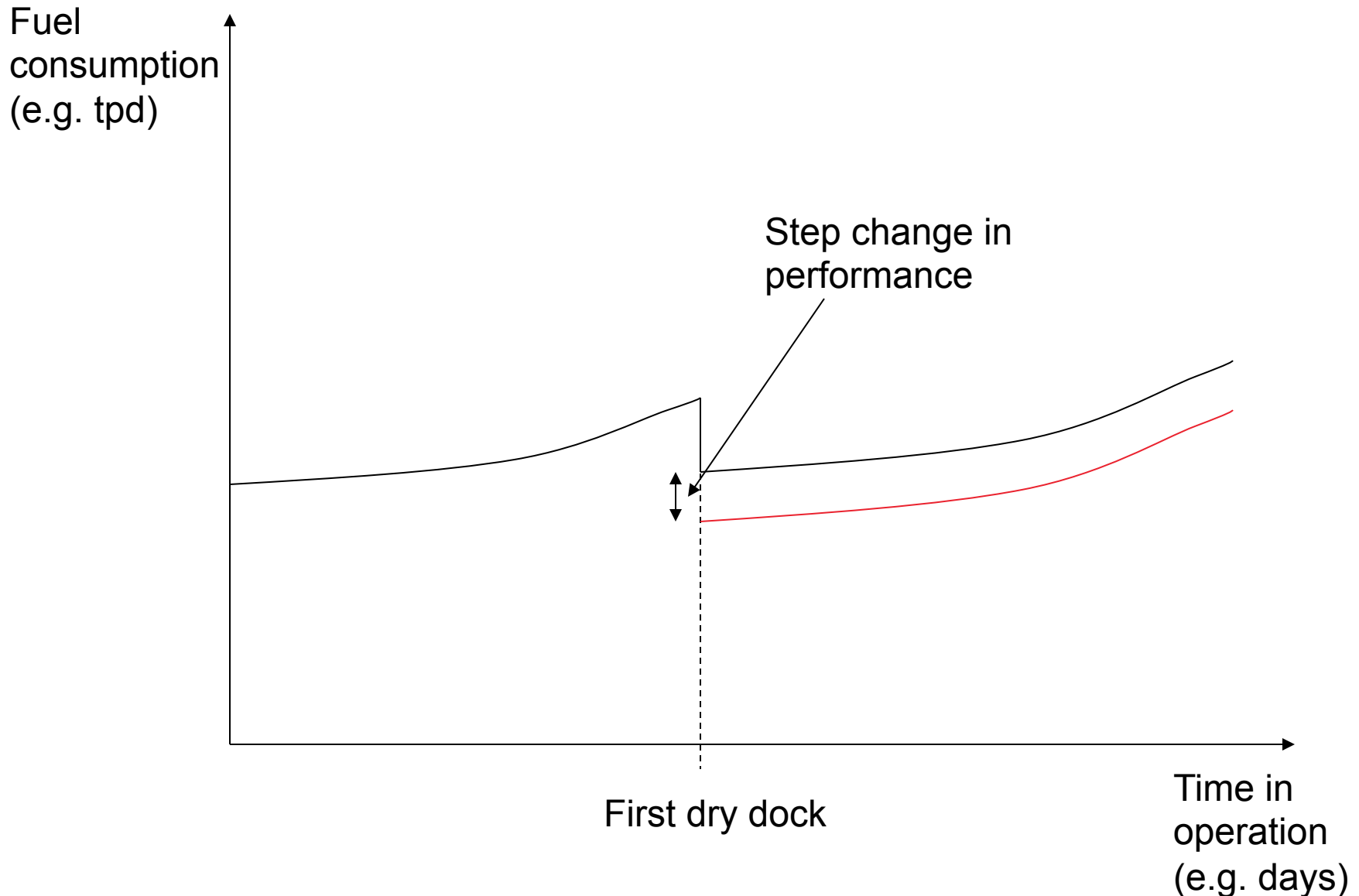
Processing

- Raw data needs filtering for:
  - Operating speed, trim, loaded/ballast voyages
  - Weather/metocean

A baseline (unmodified) ship

Fuel consumption (e.g. tpd)

Drydocking, even if standard coating is used, creates a performance increase

Ships deteriorate gradually over time (not just from fouling)

First dry dock

Time in operation (e.g. days)

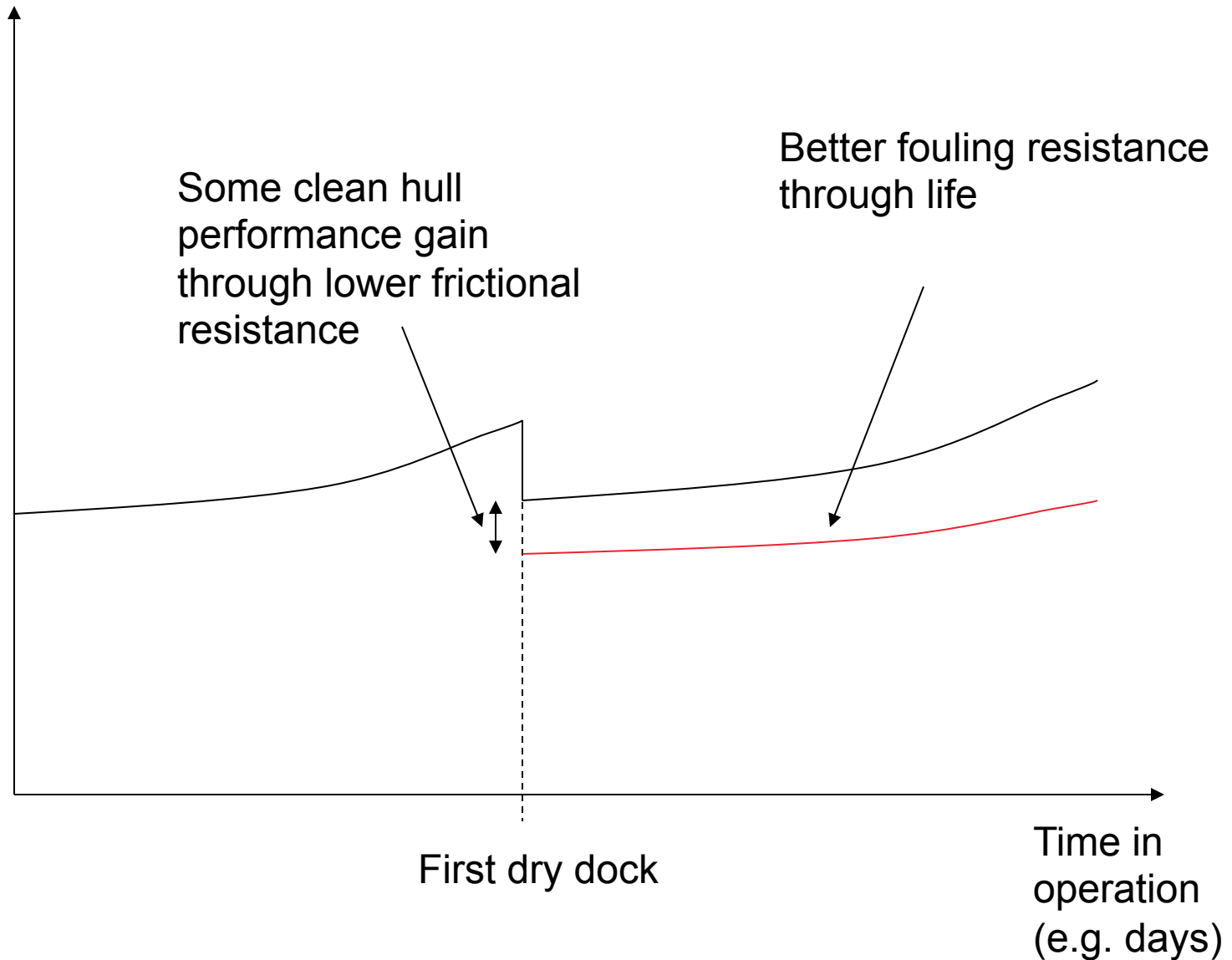# Consequence of technology (e.g. boss cap fin)

Consequence of advanced paint (e.g. foul release coating)
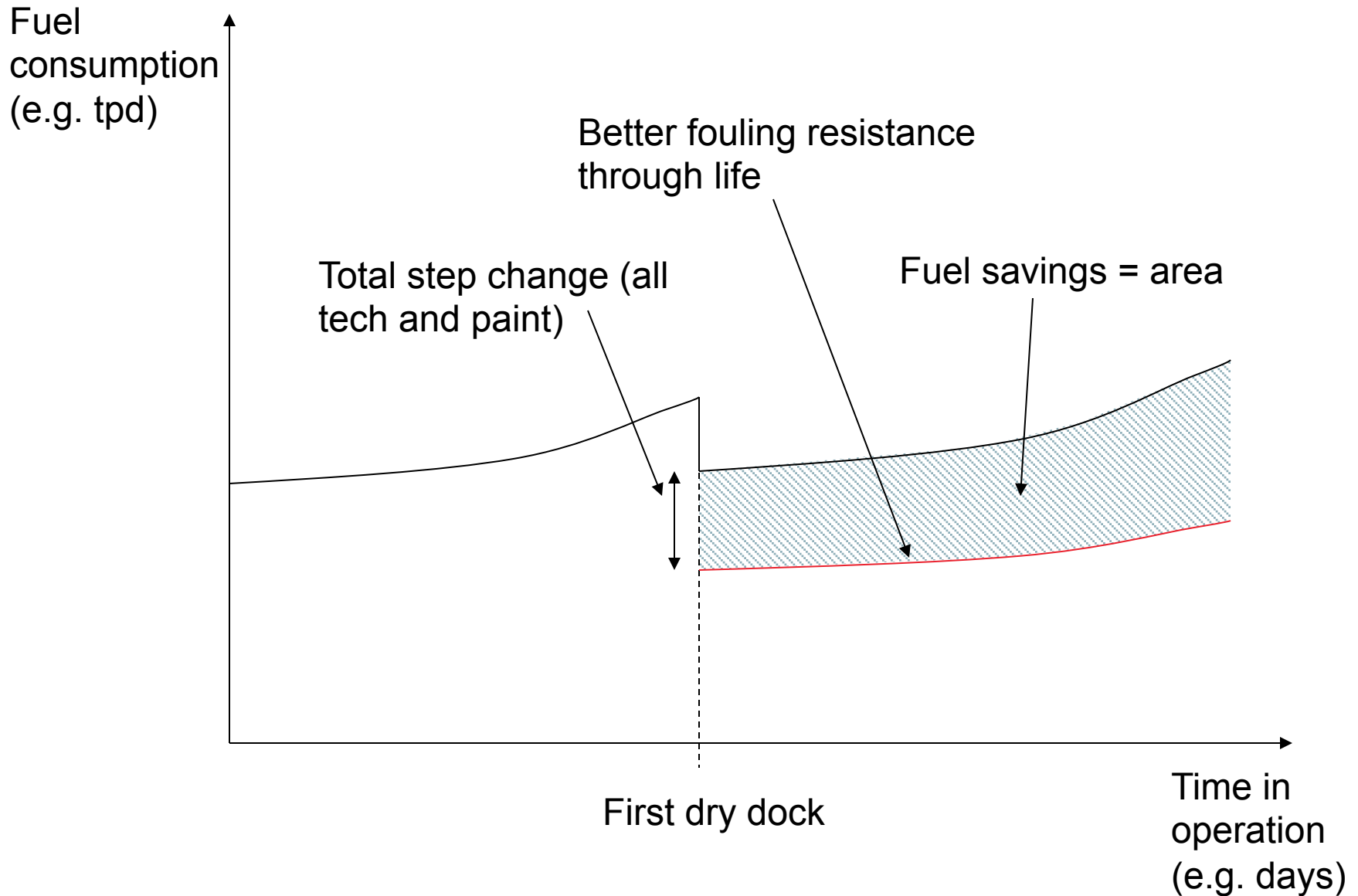

Fuel consumption (e.g. tpd)

Some clean hull performance gain through lower frictional resistance

Better fouling resistance through life

First dry dock

Time in operation (e.g. days)

In combination…

Fuel consumption (e.g. tpd)

Better fouling resistance through life

Total step change (all tech and paint)

Fuel savings = area

First dry dock

Time in operation (e.g. days)

Reality

Fuel consumption (e.g. tpd)

Monitoring begins

First dry dock

Monitoring ends?

Time in operation (e.g. days)

A proposal:

Fuel consumption (e.g. tpd)

Estimate post-dock baseline from pre-dock data, extrapolated if necessary

Apply an agreed long-term underlying deterioration trend

Estimate the fuel saved over guarantee time (e.g. 1 year post drydock)

Monitoring begins

First dry dock

Monitoring ends?

Time in operation (e.g. days)

A proposal:

Fuel consumption (e.g. tpd)

Additional saving from hull paint

Saving from propeller

Monitoring begins

First dry dock

Monitoring ends?

Time in operation (e.g. days)
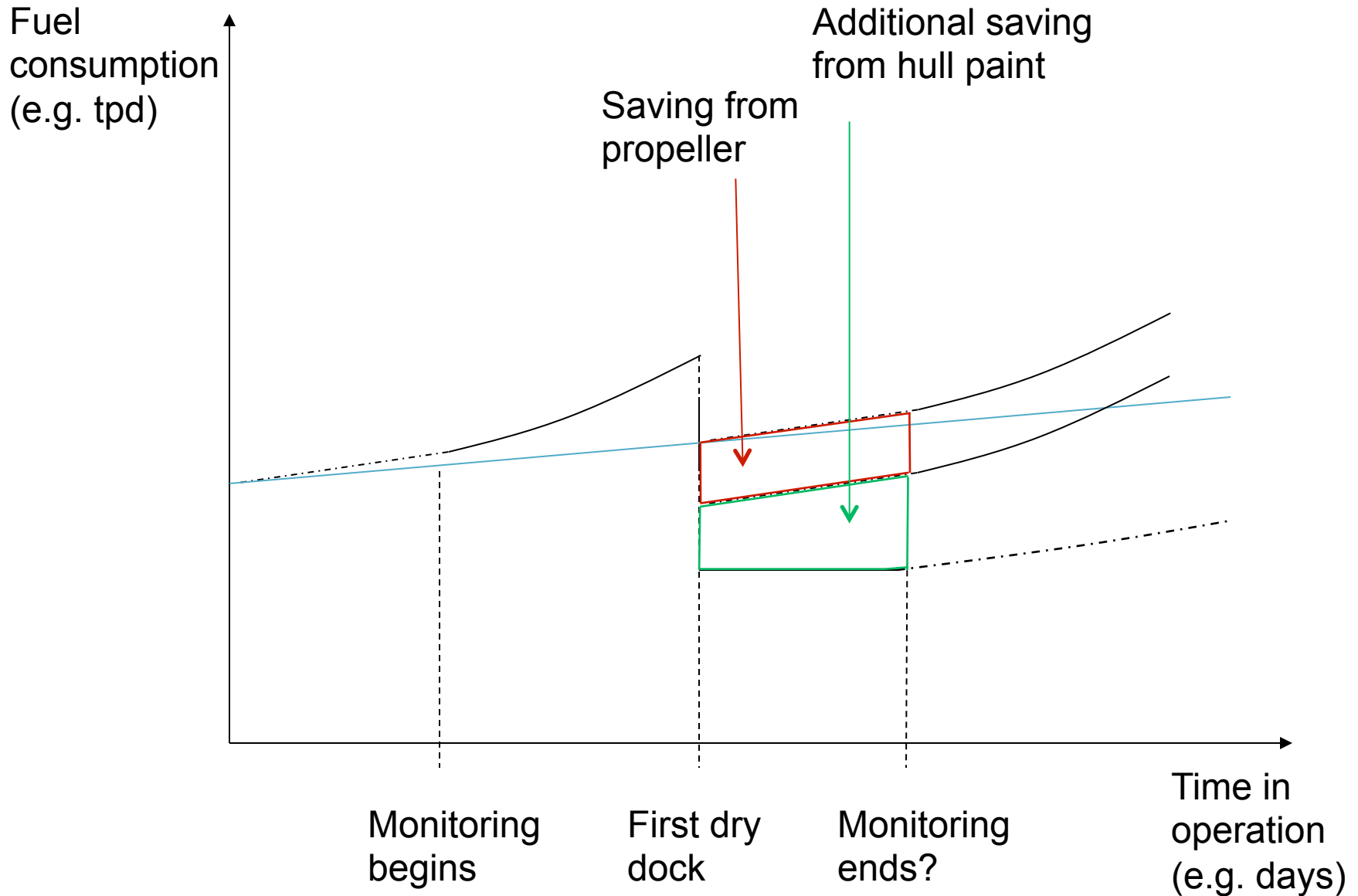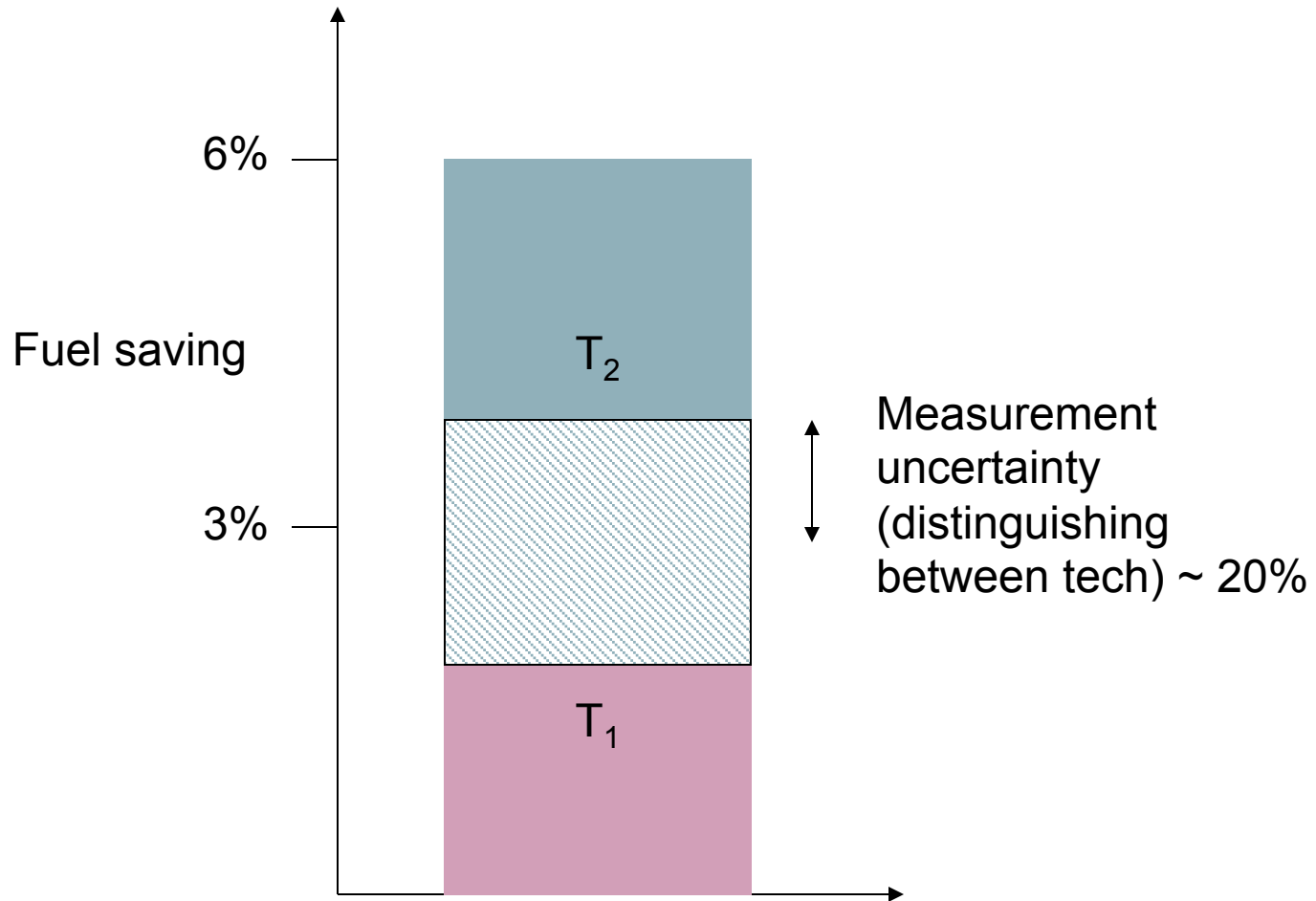
More than one tech, T:

Risks

- Consistency in measurement accuracy between noon reports and monitoring system

- Noise in the data increasing the uncertainty in the best-fit

- Insufficient pre-dock data to produce reliable extrapolation

Risk mitigation

- Good quality pre-drydock data!
  - Metocean data
  - Operational data (speed, loaded/ballast, trim)
- A ship with fairly standard operation (no long periods stationary pre or post docking, consistency in operating speeds)
- Long time-series (e.g. 10+ years) performance data for a number of similar ships to determine long-term deterioration trend
- Good quality energy monitoring equipment (flow meters etc)
- Time (money) for method refinement / data processing
- 3rd party quality control/data processing verification

Thank you for your attention.