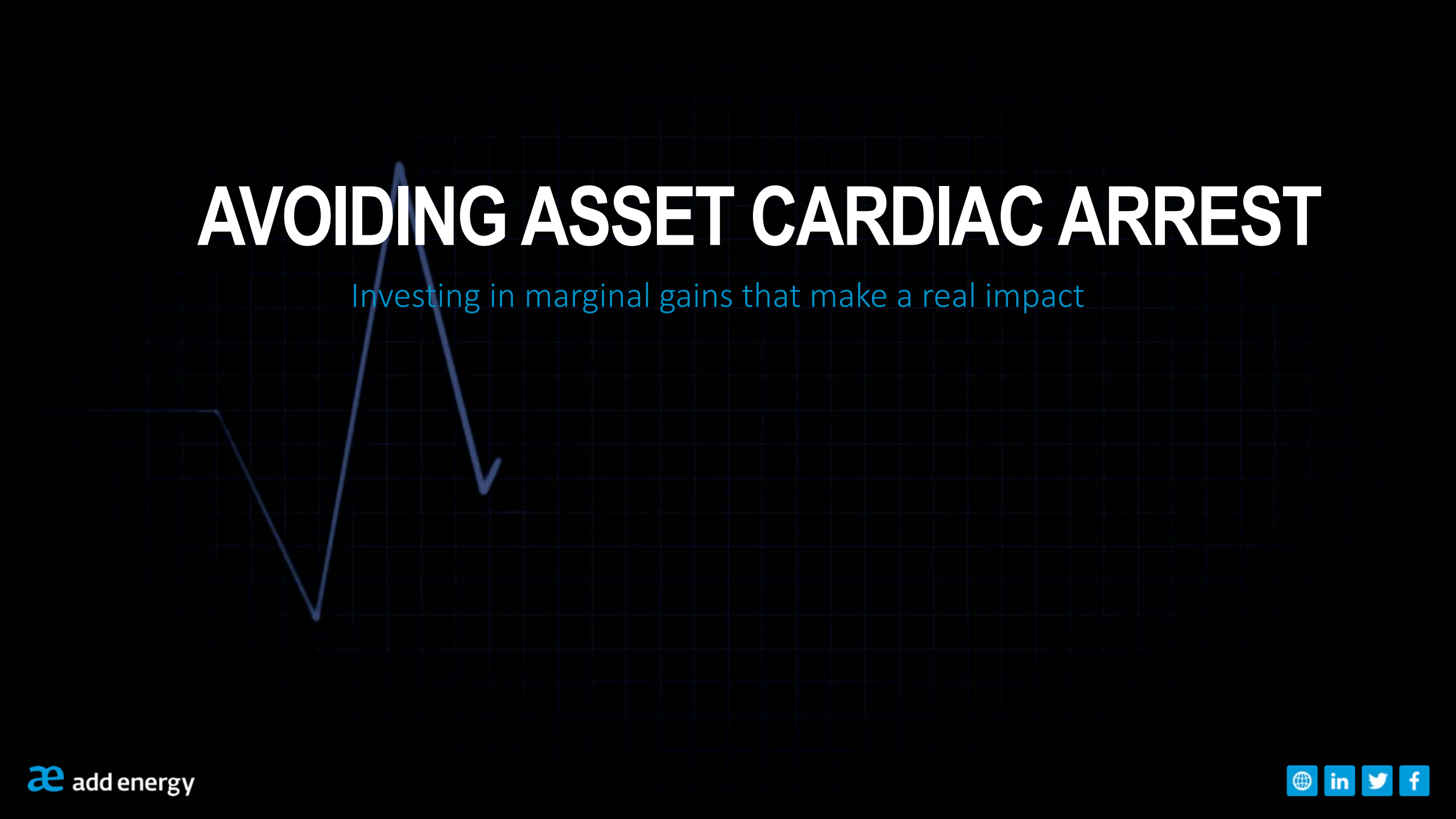
AVOIDING ASSET CARDIAC ARREST

Investing in marginal gains that make a real impact



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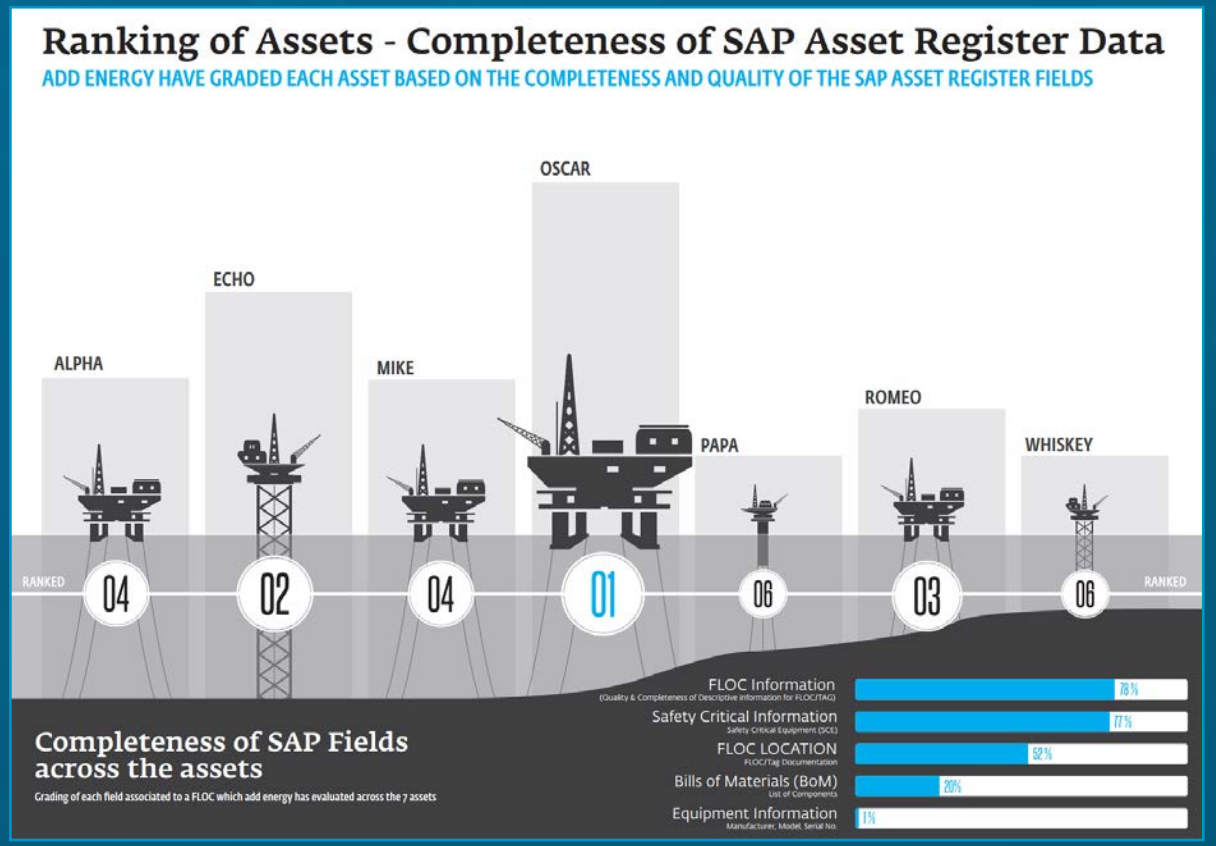
WHY DO I HAVE POOR FOUNDATION DATA?

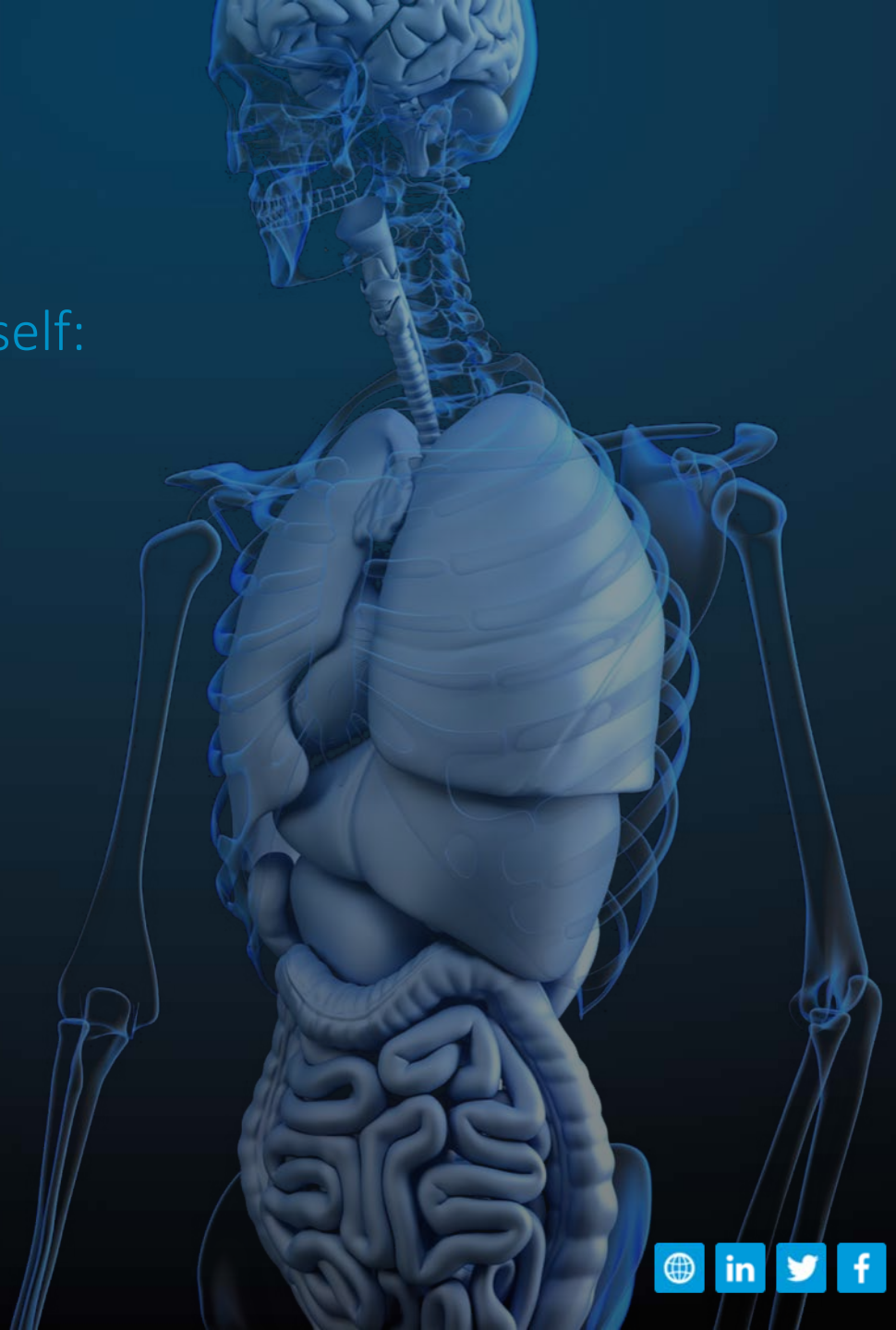
- Poor quality data handover from operations due to ambiguous contractual obligations
- Lack of rigorously enforced central data standard across all assets
- No continuous quality control of data gaps and changes
- Belief from team that nothing useful is done with the data resulting in poor data entry



3 QUESTIONS TO ASK YOURSELF

For every piece of maintainable equipment, ask yourself:

- What is it?
- How important is it?
- Where does it fit into the overall process?



CLASSIFY AND ASSIGN CRITICALITY TO EQUIPMENT

Classification of Equipment Types

GROUPING OF EQUIPMENT TYPES IN LINE WITH
ISO 14224 OR **NORSOK Z008**

This acts as a good basis for collection of minimum standards of reliability and maintenance data

Allows for simple analysis of failure for future optimisation

Equipment Criticality Assignment

UPGRADE OF SMOKE DETECTORS
LOW SCE COUNT OF TAGS

BEFORE 1,689

AFTER 4,850

INCREASED BY

187%

Increasing the associated annual maintenance time for this equipment by

2263HRS

DOWNGRADE OF TRANSMITTERS
HIGH SCE COUNT OF TAGS

BEFORE 531

AFTER 356

DECREASED BY

32%

Decreasing the associated annual maintenance time for this equipment by

1140HRS

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DEVELOP ASSET HIERARCHY

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CONTRIBUTORS TO POOR ASSET HEALTH

Why is the right maintenance not done at the right time?

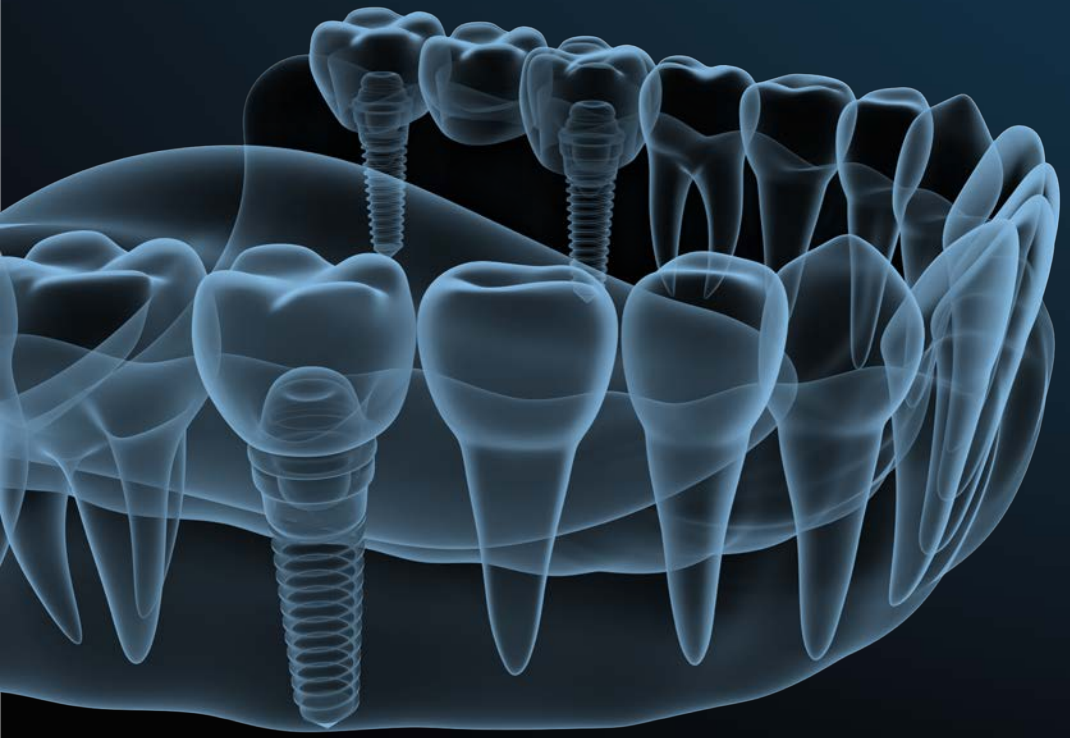
- Ineffective maintenance that's too generic or aligned to OEM
- Over allocation of high priority maintenance
- Poor PM planning leading to the spares and scaffolding not being in place
- Asset is in "Firefighting mode", where corrective maintenance overwhelms resources

Why is my health plan not working?

- No effective exercise or nutrition plan, leading to random amounts of exercise and calorie intake
- Lack of basic care to drink a reasonable amount of water daily and to brush teeth
- Following generic health advice rather than working out what's right for you

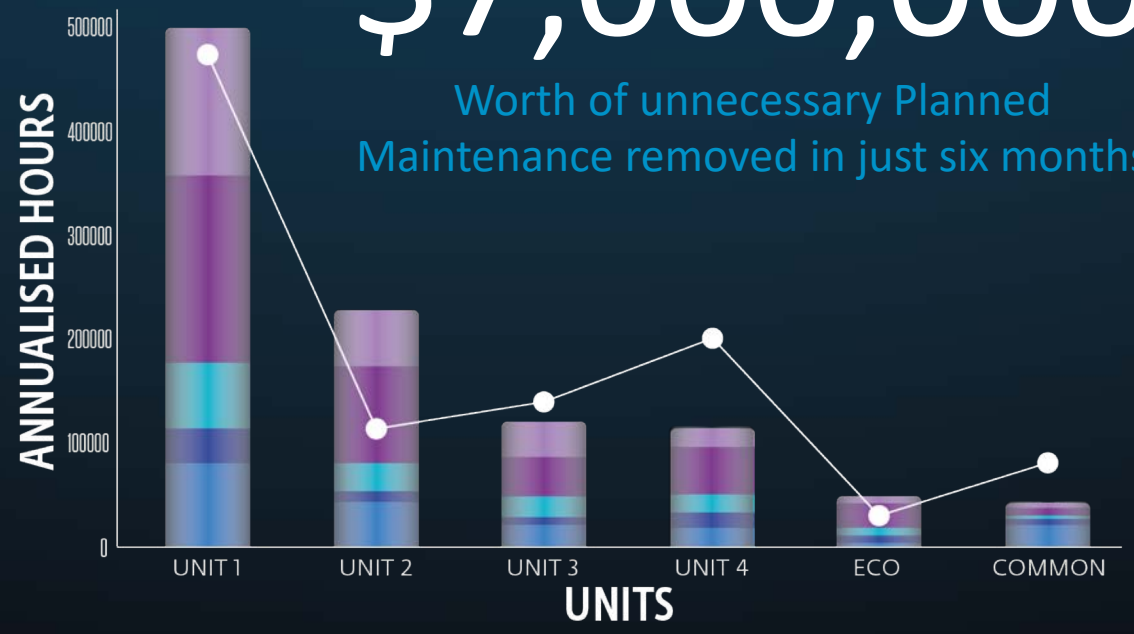
DOING THE RIGHT MAINTENANCE AT THE RIGHT TIME

To ensure you are in an sufficient state when you shutdown and to minimise downtime



$7,000,000

Worth of unnecessary Planned Maintenance removed in just six months



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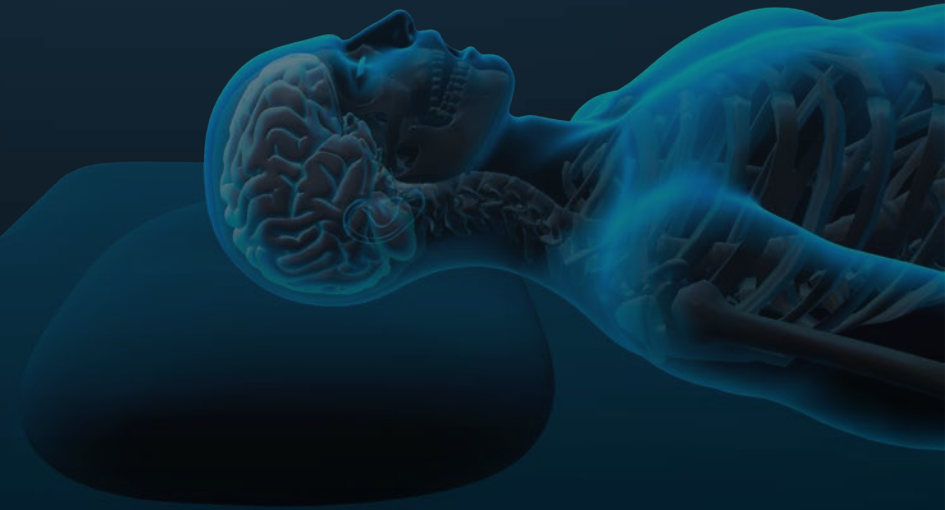
CONTRIBUTORS TO POOR ASSET HEALTH

Why do I have an inability to cope with maintenance backlog?

- Resources not right for amount of maintenance asset needs
- Maintenance is aligned to OEM recommendations in most cases and not optimized for the asset
- Maintenance is not level loaded to ensure it is evenly spread

Why do I have an inability to cope with sleep backlog?

- Continue to sleep less than recommended amount causing additional backlog
- Watching TV or checking phone an hour before sleep
- Eating dinner late



KEEPING ON TOP OF YOUR MAINTENANCE BACKLOG

- ✓ Remove “fake” backlog
- ✓ Cancel repeated overdue work orders
- ✓ Review work coming up between a month and a year in advance
- ✓ Plan work well with the right access requirements and spares in place

EXAMPLE OF BACKLOG ANALYSIS

Total of

1,200,000

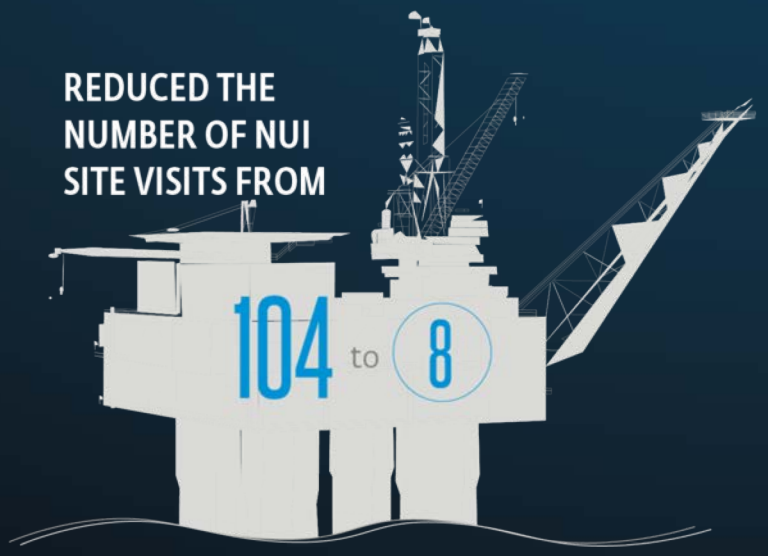
Man-hours of Maintenance Backlog

25.6%

of the Planned Maintenance backlog was for Process Containment Work Orders

OPTIMISE AND LEVEL LOAD MAINTENANCE

- ✓ Identify routing opportunities
- ✓ Nest work orders
- ✓ Remove redundant jobs
- ✓ Optimise frequencies based on failure history
- ✓ Level load mainteannce



WORK ORDER OPTIMISATION

SUPPRESSION AND REPLACEMENT OF PM WORK ORDERS FOR OVERLAPPING MAINTENANCE CAN REDUCE

4,435 Work Orders = 5,476 Hours

GIVING A TOTAL COST SAVING OF

$647,230.00

OVER 5 YEARS

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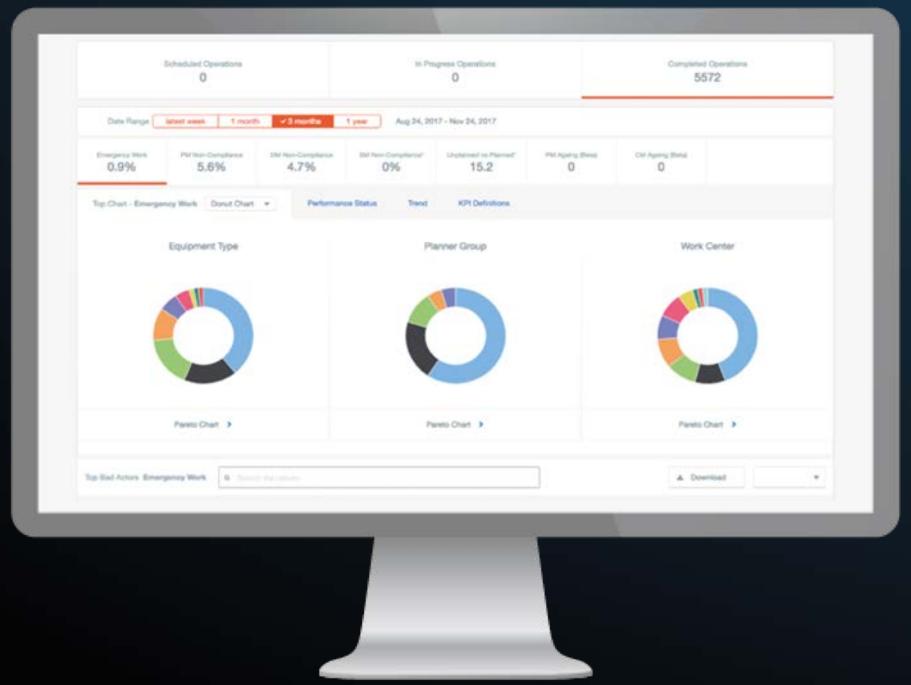
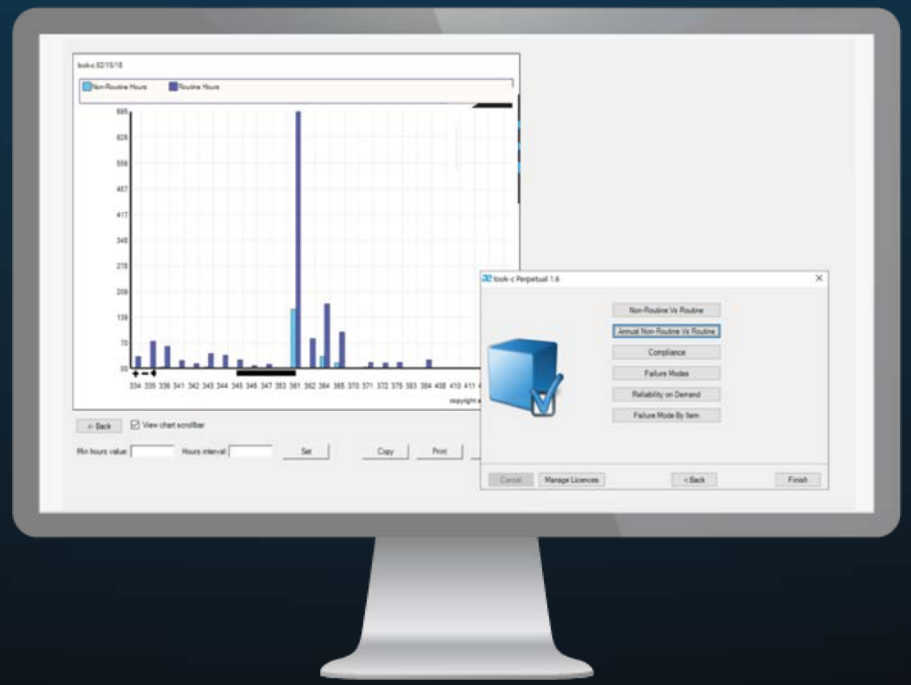
MONITORING COMPLIANCE WITH CHANGE

Continuous performance monitoring and improvement is key to good asset health

KPI Management



Maintenance Benchmarking and Business Performance Review



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SHUTDOWNS ARE A MAGNIFYING GLASS FOR YOUR ASSET

Shutdowns will expose weaknesses caused by missed maintenance and poor planning and cost you millions

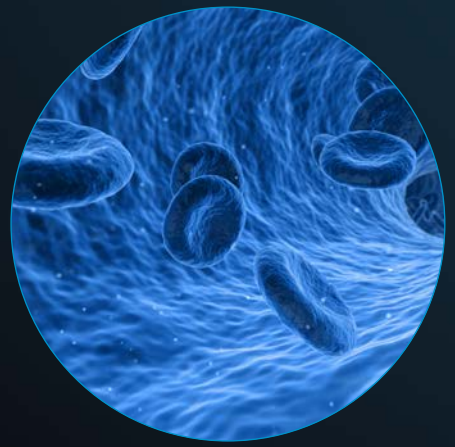
Top tips for shutdown planning

- Start planning 18 months before
- Create stage gates and action owners for shutdown planning
- Get buy in from all stakeholders into the plan
- Workshop work order estimates with team on the ground
- Carry out lessons learned after shutdown for continuous improvement

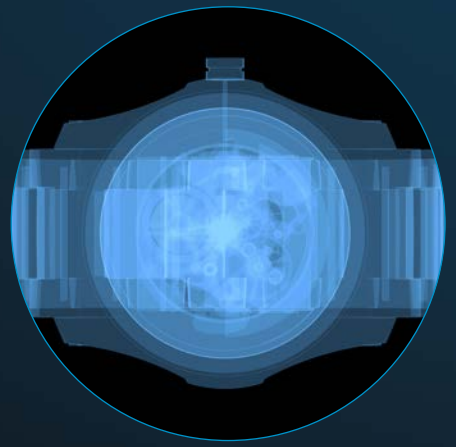
Top tips for making shutdowns easier

- Maintain your isolation valves correctly, you will rely on them during a shutdown
- Ensure vessel wall thickness tests are carried out to avoid nasty surprises during a shutdown
- Carry out thermography on vessels well in advance of shutdown, to help you plan major vessel inspection with real facts

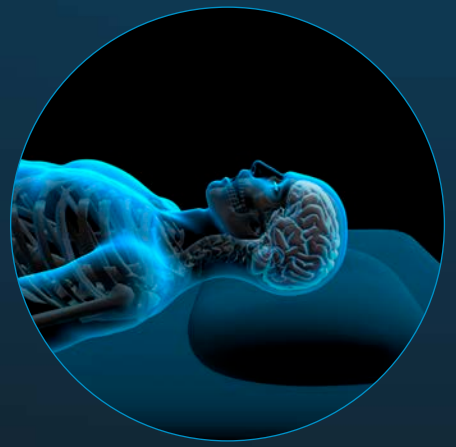
TO SUMMARIZE



Invest time and resource into data cleansing and enrichment



Review your current preventative maintenance frequencies and job plans



Prioritize your backlog

Develop a robust competency improvement plan

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A SNAPSHOT OF ADD ENERGY

Delivering benefits to clients in safety assurance, equipment reliability and performance

- **Performance Analysis**
  Quantifying and optimizing performance
- **Maintenance Optimization**
  Improving reliability and rationalizing cost
- **Asset Integrity**
  A framework for assurance in safety and integrity
- **Materials Management**
  Aligning materials with maintenance and risk
- **Operational Support**
  Optimizing processes and competency