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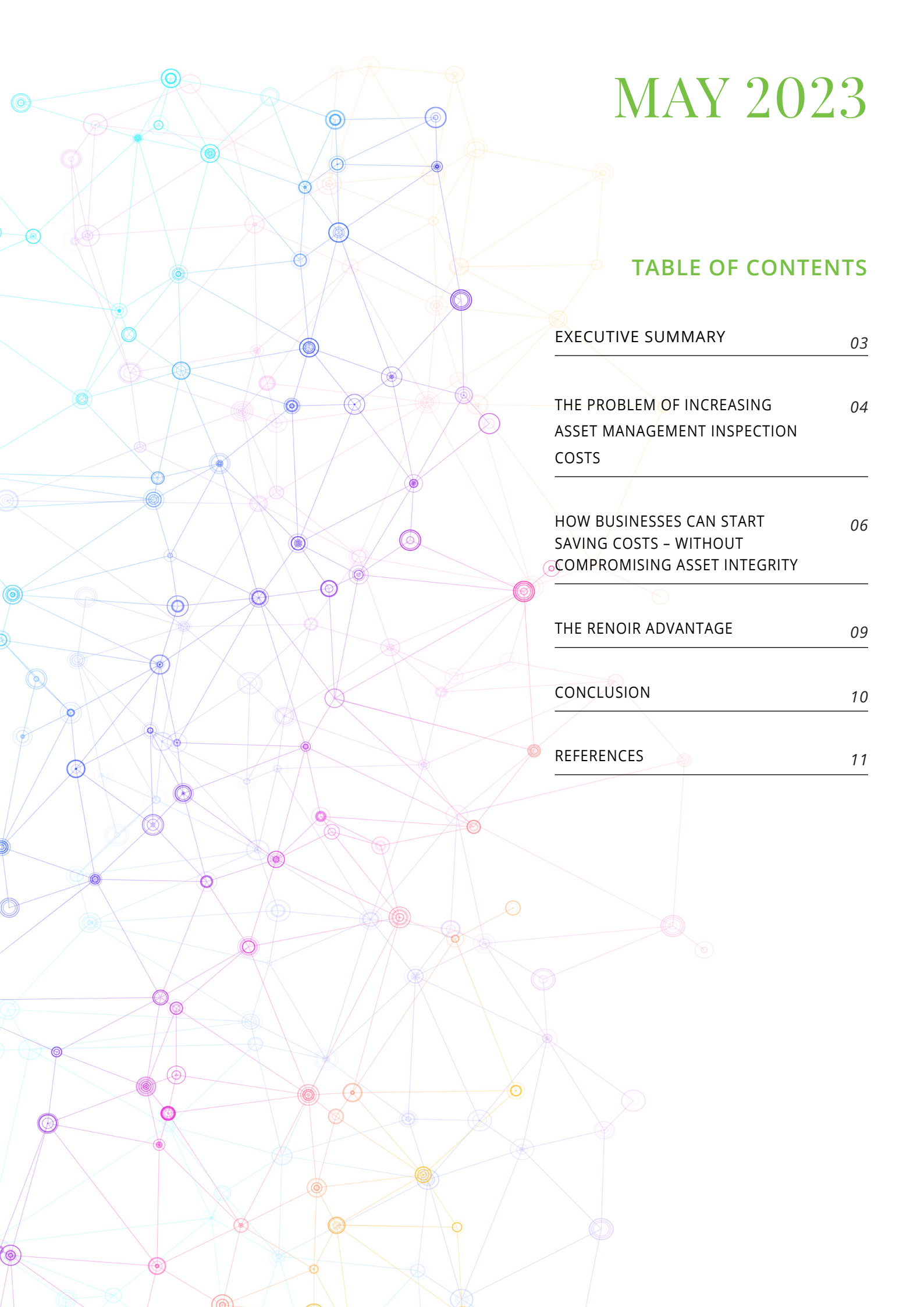
SAVING ASSET MANAGEMENT INSPECTION COSTS SAFELY

START SAVING COSTS WITHOUT
COMPROMISING ASSET INTEGRITY



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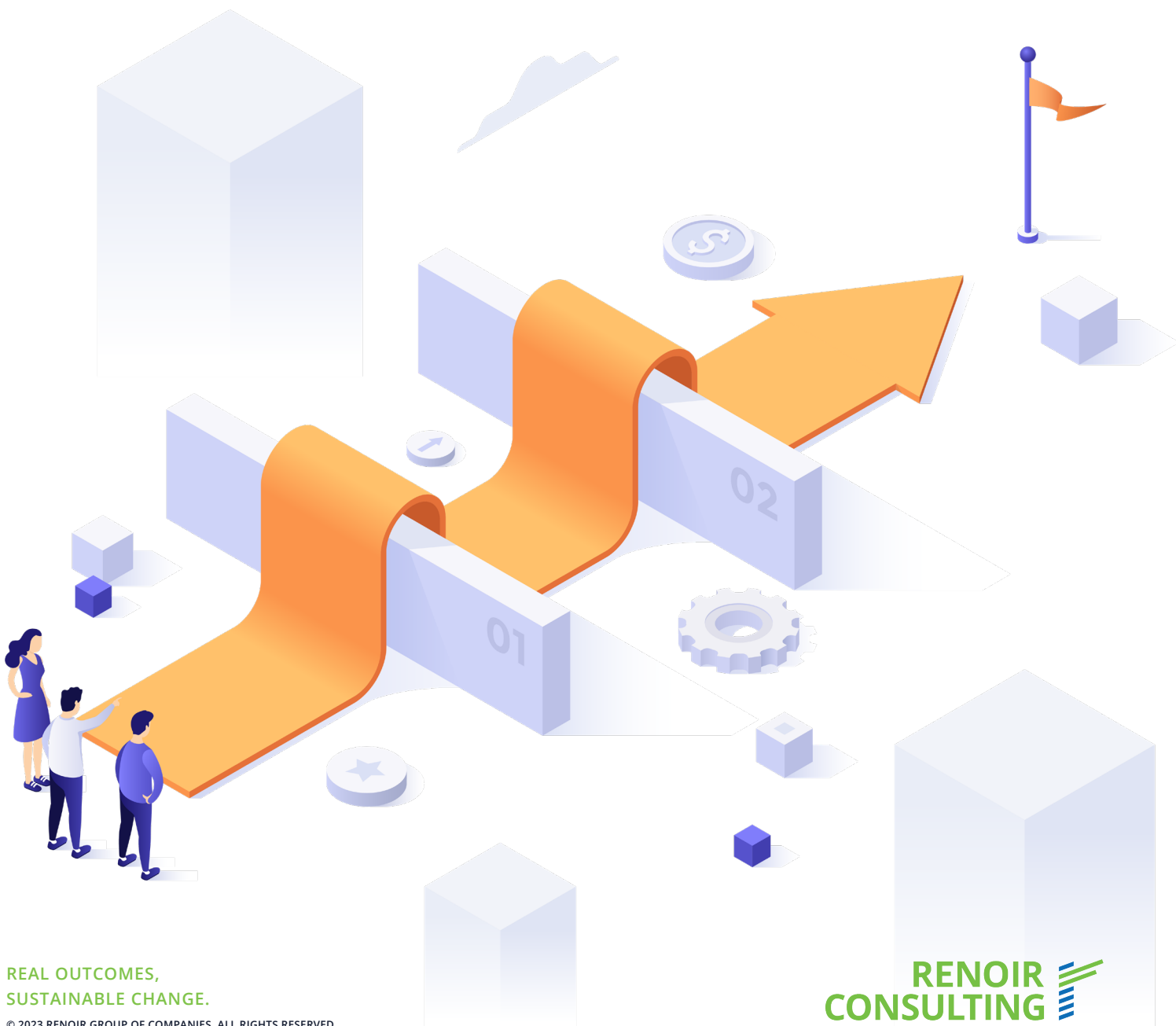
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EXECUTIVE SUMMARY

The COVID-19 pandemic has forced organisations to rethink and reprioritise their inspection and maintenance regimes. Most companies are struggling to liquidate backlogs caused by the pandemic-related movement restrictions.

In this paper we will look into the current challenges, available solutions, and best practices that can assist with bringing facility inspection expenses within budget — without compromising on safety.



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THE PROBLEM WITH ASSET MANAGEMENT INSPECTION COSTS

ISO 55000:2014 defines Asset Management as the coordinated activities of an organisation to realise value from assets. Inspection plays a crucial role in realising this value by flagging potential **Loss of Primary Containment** (LOPC) events as well as possible structural integrity issues.

There are international engineering standards and practices that relate to such inspections, such as the American Petroleum Institute (API) and the American Society of Mechanical Engineers (ASME)¹, as well as national regulations and company own guidelines.

However, inaccurate interpretation and poor implementation of these regulations can lead to inefficiencies.

In addition to ageing infrastructure and corrosion damage (with an estimated economic impact around 3.4% of global GDP² and many oil and gas pipelines older than 40 years³), the two largest drivers of cost increases are:



INTERPRETATION OF REGULATIONS AND GUIDELINES

Regulatory bodies and operators are aware of the risks from improper inspections. However, facility owners are often unaware of provisions in the regulations to extend inspection periods if they can demonstrate equipment integrity. Additionally, there are usually opportunities at the equipment level to reduce the absolute number of testing points required.



COST OF WORK

One of the side effects of outsourcing inspections has been the creation of new administrative burdens and planning complexities. In the act of outsourcing, very few companies have been able to adequately adjust their administrative processes and supervision regimes to ensure work takes advantage of the latest technologies, is executed efficiently, and is billed as per expected rates.

It's also worth considering the underlying human factors at play:



RISK AVERSION

There are multiple human cognitive biases in play here; it is psychologically easier to keep existing inspection activities than give them up.



KNOWLEDGE MANAGEMENT AND TRANSFER

Over half of all experienced engineers in oil and gas will be eligible for retirement within the next 10 years⁴. With tens of thousands of inspection and maintenance activities, understanding what to optimize is complex, often involving tacit knowledge, extensive analysis and ultimately many expert manhours of work. For a young and inexperienced workforce, this could prove to be overwhelming.



INTEGRITY

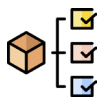
There is an assumption that procedures will be followed, and work completed as intended. More than 50% of asset integrity professionals surveyed said they had had budget cuts, and that current job loads were not sustainable⁵. So, it's not uncommon to discover backlogs of work, skipped activities, or other shortcuts have been taken.





HOW BUSINESSES CAN START SAVING COSTS – WITHOUT COMPROMISING ASSET INTEGRITY

The reality is that most asset integrity functions globally are feeling more pressure than ever to just keep their heads above the water. Finding avenues for saving costs without compromising on service quality and asset integrity has now become a business imperative. Organisations can start by looking at these aspects of their business:



OPTIMISING INSPECTION PLANS

Risk-based inspection (RBI) offers cost savings by better targeting finite resources. RBI programmes that are implemented correctly categorize individual pieces of equipment by their risks, and prioritize inspection efforts based on this categorization. However, inappropriate or incorrect application of RBI can dilute safety standards and result in dangerous plant failures.



BENCHMARKING WITH PEER FACILITIES

It's always advisable to benchmark current inspection plans with a similar facility. This comparison gives either reassurance or raises the alarm to revisit the inspection program. Asset management consulting firms can give insights by leveraging their exposure to having worked with various companies worldwide.



CONTRACT DESIGN

Competitive tendering should be used to establish the appropriate unit rates and adjustment factors (such as confined space entry allowances), without compromising the competency of contractors. Rates and factors need to be routinely benchmarked to ensure that what is agreed is indeed competitive. Contracts should also be structured with KPIs to incentivise safety and productivity.



PLANNED UTILISATION OF RESOURCES

It's not unusual for one job to involve multiple contractors across multiple tasks. For example, a simple inspection can involve at least 3 contractors (scaffolding, insulation, and inspection) across 5 different tasks (erect scaffold, remove insulation, inspection, replace insulation, and remove scaffold).

Multiply these tasks by the dozens of different tests required within a single week, and it's not unusual to discover that a weekly plan has fallen apart before it has even begun. A combination of appropriate planning software and planning process discipline can improve site productivity significantly.



SCAFFOLDING AND ALTERNATIVE ACCESS METHODS

There are new, more productive scaffolding solutions (such as magnetic scaffolding anchors) that have not yet gained widespread adoption. In offshore environments, arranging scaffolds and/or standby vessels for inspectors/divers is expensive and time-consuming. Robotic solutions can be adopted where accessibility is a challenge.



INSULATION AND COATING MANAGEMENT

There is considerable technological advancement in the non-destructive testing (NDT) for corrosion under insulation (CUI). The initial cost of deploying these inspection tools might be higher, but it will turn out to be more cost-effective in the long run.



REMOTE INSPECTION

Movement restrictions caused by COVID-19 has helped drive the adoption of so-called 'remote inspectors,' specialised apps and remote connectivity that allow inspections to be carried out remotely by a qualified inspector, without being present on site. Not only does this save costs, but it also reduces the occupational hazards faced by inspectors.



FIELD METHODS AND TOOLS

There are numerous emerging tools to assist in inspection activities. Solutions such as machine vision and learning systems can spot and prescribe automated mitigation actions. 'Digital twins' are also used to visualise risks. Essential tools such as wirelessly connected data loggers can speed up the transfer of inspection information and risk appraisal.



FIELD SUPERVISION

The monitoring of work in the field and the management of site productivity has been greatly diminished because inspectors are tied up with new administrative burdens. Although the emergence of new labour laws mean that the productivity of contractors cannot be directly challenged, it's incorrect to assume that it can't be addressed. If a contractor supplies too many workers or workers that are unqualified, such issues can be monitored and tackled through the appropriate chain-of-command.



REDUCING PRODUCTION DISRUPTION

Many conventional inspection techniques require shutdown of equipment to gain access and get correct readings. However, numerous advanced inspection techniques allow online inspection with the required accuracy. The need and frequency of intrusive inspection that require shutdowns can be reviewed by applying these new principles of non-intrusive inspection (NII)⁶.



ANALYSING AND VALIDATING INSPECTION RESULTS

The competency of inspectors and engineers in evaluating inspection results is vital to the success of the inspection program. For engineers, individual certification such as API and ASME establish a minimum standard of knowledge for assessing results. However, exposure to best practices adopted by other companies can greatly help in effectively optimising inspection regimes.



OPTIMISING TESTING REGIMES

Conventional preventive maintenance (PM) only works for a small percentage of components, and only when there is solid information on their life statistics. However, with predictive maintenance (PdM), condition monitoring and corrective maintenance are optimised depending on the actual condition of the equipment rather than expected life statistics⁷.

Advanced predictive analytics such as Active Risk Based Inspection (ARBI) software solutions are available to automatically optimises inspection regimes based on remaining life statistics.



ADMINISTRATION OF ACCOUNTS PAYABLE

It's not uncommon to find that testing results, hours worked, and contractor invoices exist in separate systems — making the reconciliation of accounts payable almost impossible. Digital solutions such as Robotic Process Automation (RPA) can bridge these systems to close this transparency gap, ensuring that what's paid is what should be paid.



UPGRADING LEGACY SOFTWARE SYSTEMS

It's not surprising to companies using legacy versions of Inspection Databases Management Systems (IDMS), with some being in place for more than 20 years. Modern Asset Integrity Management Systems (AIMS) have increased in capability a great deal, improving connectivity in the field, providing more productive workflows and ARBI features as interfaces to financial applications for accounts reconciliation.



THE RENOIR ADVANTAGE

GOING BEYOND DIGITAL TOOLS TO IMPROVE PERFORMANCE

Augmenting existing inspection and maintenance systems with data mining and business intelligence solutions is a common starting point to driving performance and reducing costs.

Working together with one of the top ten international oil companies (in both upstream and downstream sectors), Renoir Consulting was instrumental in setting up and implementing a purpose-built control management system (CMS) to identify opportunities to simplify processes, eliminate workarounds, and drive appropriate behaviours.

One of the early findings of the project was discovering that over 40% of people were not following the standard planning processes. However, the purpose-built CMS — like any digital solution — couldn't explain why this was

happening. To understand why, the Renoir team dived into what individual people were doing. This uncovered a multitude of problems, from inappropriate usage of work prioritization levels to a lack of formal hand-off communications.

Through a combination of planning process improvements, as well as coaching all concerned parties in the appropriate routines and behaviours, labour spend was reduced by \$30 million for the assets in the initial program. Additionally, Renoir is still engaged with this client globally to pursue \$200 million in savings.

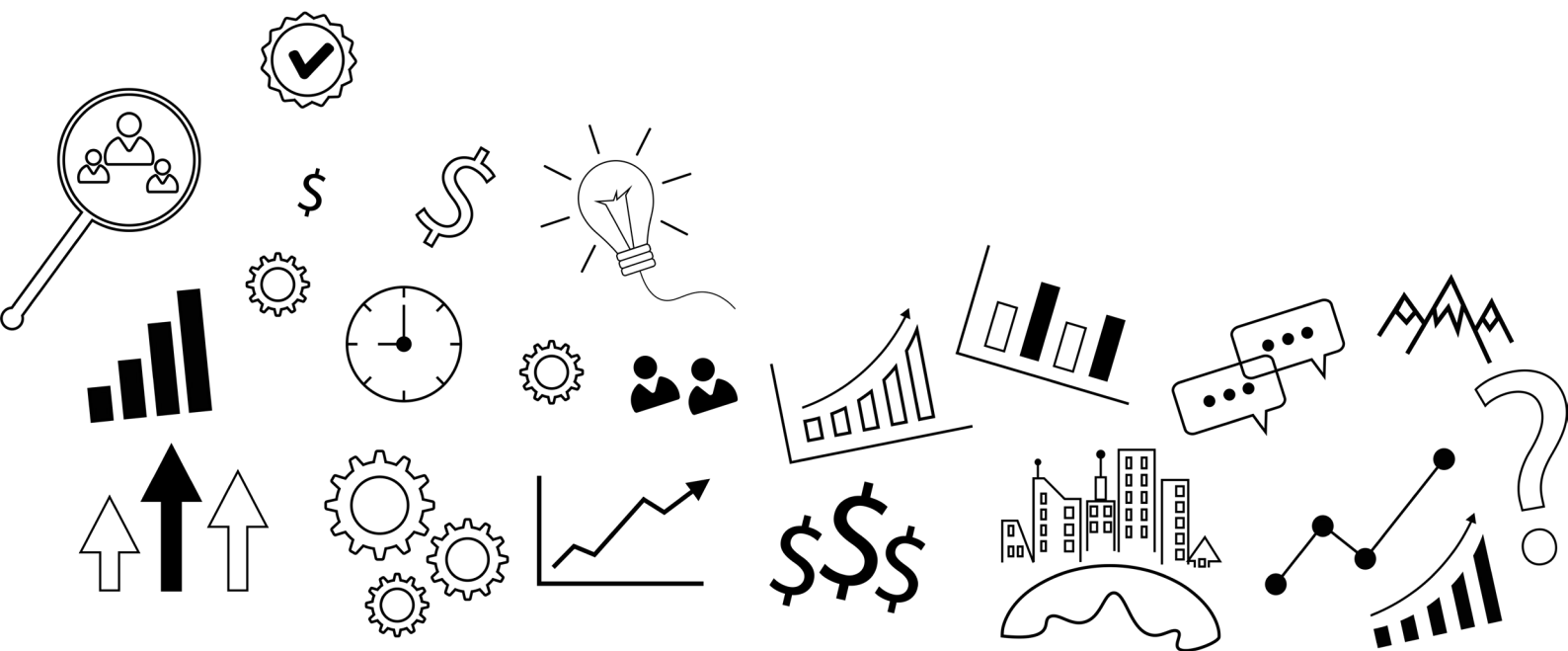
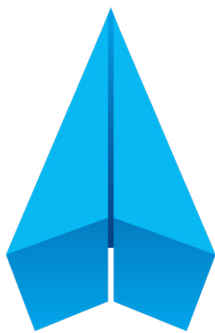




CONCLUSION

We have explored more than a dozen avenues for saving asset inspection costs safely. However, the unfortunate reality for most inspection teams is that they are swamped in fire-fighting mode with little time to pursue innovations.

This is when external parties can help, bringing not only their expertise to the forefront, but also project management support to ensure that changes are introduced and adopted across the organisation.





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ABOUT PRISM

PRISM Technical Advisors is an established, independent third-party consultancy with a highly qualified team, specialized in process risk integrity and safety management. We provide services for clients in many sectors, including oil and gas, marines, and even food and beverages industries.

ABOUT RENOIR

For 25 years, Renoir Consulting has been the trusted business transformation partner for companies globally. We have partnered with client from diverse industries in more than 50 countries to co-create bespoke solutions that produce real outcomes and sustainable change. Our boutique approach means that our clients receive the highest levels of professionalism, expertise and leadership ownership.

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