RELMAR

# MARINE ASSET DEPENDABILITY from RELMAR

Maximising Uptime that improves compliance with fully managed costs and risks



# How can you make your operations safer and more reliable, whilst balancing costs, risks, performance?

#### Challenges

- What can we do now to drive further operational efficiencies?
- What can we do to optimise asset and fleet performance?
- What can we do to improve reliability, availability and performance without compromising on safety?
- What can we do with exponential growth in data with interconnectivity?
- How do we defend against additional complexity and potential failures in a connected world?
- How do we overcome resistance to change with the cultural barriers?

#### Purpose

To assess and analyse marine asset strategy, operations and maintenance to optimise performance through a cost-effective asset dependability strategy.

#### Goal

To improve dependability through the fleet wide management of reliability, availability and safety whilst exercising sound economic judgement.



## Marine Asset Dependability from RELMAR

Marine Asset Dependability (MAD) from RELMAR helps assetintensive industries, in particular Oil and Gas and Maritime organisations, achieve safer and more reliable operations whilst facilitating optimal performance at the lowest costs possible.

MAD's smart asset strategy takes an holistic approach to responsible asset management by balancing commercial, technical and contextual aspects to your organisation.



With MAD, you get an enterprise wide solution that is risk-based by considering consequences of failure rather than failure alone. Some failures are more impactful than others.

Relmar specialises in the application of reliability-centred techniques in the marine and offshore sectors. Our focus is on maritime safety, environmental integrity and return on investment with our turbocharged Marine Reliability-centred Maintenance (MRCM) platform.



<sup>66</sup> The adoption of a data-driven philosophy for asset operations, such as reliability-centred maintenance, will therefore become even more important in the maritime industry.

DNVGL https://to2025.dnvgl.com/shipping/safety-enhancement,

#### Reliability-centred Maintenance (RCM)

RCM was developed by the civil aviation industry in response to changes in the equipment that it operates and the results of research into how the equipment fails. Over the past three decades, asset-intensive industries around the world have applied the same techniques to their own equipment. Experience has consistently shown the same results as in civil aviation: RCM maintenance schedules are safe, cost-effective, and they ensure maximum uptime at optimum cost.

Greater complexity	Equipment has become more complex; in turn, this has led to more maintenance and more complex maintenance requirements
Maintenance is often ineffective	Research has consistently found that many maintenance interventions are ineffective and do nothing to improve reliability; in some cases maintenance can be positively harmful
"Old" does not always mean "more likely to fail"	Studies conclusively show that most component failures do not become more likely as equipment gets older, so traditional fixed-interval maintenance tasks cannot be used to manage them
Overhaul and replacement are not the only maintenance policies	Replacing or overhauling components is not the only option: it is often possible to detect physical changes that occur when they are starting to fail, and to schedule replacement before the failure occurs
Hidden failures need special treatment	No one is aware of the failure of critical protective devices such as alarms, trips and standby equipment unless something else fails. The maintenance of these devices needs to be considered carefully to ensure that they operate correctly when they are needed.

### Marine Reliability-centred Maintenance (MRCM)

Marine Reliability-centred Maintenance delivers all the benefits of RCM and is carefully adapted to marine operations and maintenance.

MRCM is fully compliant with SAE Standard JA-1011 for Reliability-centred Maintenance.

Unique environment	MRCM recognises unique marine operating practices and challenges.
Classification	Takes into account the role and requirements of classification rules and Flag State regulations.
Maintenance organisation	Maintenance tasks take into account the changing availability of on-board, dockyard and OEM staff.
Failure consequences	Equipment failures at sea can result in massive economic loss or place the crew in imminent danger
Common equipment	MRCM uses a library of common equipment analyses that turbo-charge the MRCM process, reducing analysis time and ensuring the production of high quality maintenance schedules.

# What MRCM Achieves

Applying MRCM achieves a range of both short- and long-term benefits.

Higher availability	Equipment achieves higher availability and better overall performance.
Lower cost	MRCM schedules are typically more cost-effective than traditional maintenance.
Safety and the environment	By explicitly considering safety and the environment, MRCM limits risk and delivers performance that meets safety and environmental requirements.
Fewer surprises	Costly unplanned breakdown maintenance can be reduced or eliminated.
Lower backlog	MRCM removes ineffective maintenance tasks leaving only those that need to be carried out, so maintenance backlog is reduced or eliminated.
Longer equipment life	MRCM applies condition-based and online monitoring techniques that increase the useful life of assets and components.
Auditable maintenance	Maintenance is safe, consistent and fully auditable by classification authorities.
Better management of protective systems	Alarms, trips, standby equipment and other protective systems are consistently maintained and deliver the right level of protection for your equipment and crew.
Better understanding	Maintainers/operators have a clearer understanding of how equipment works and how it fails, leading to improved confidence in maintenance tasks.

#### **Reliability Management**

We provide reliability planning, analysis and management. It is essential to understand what 'failure' you could be dealing with and what 'symptoms' would arise in the presence of that failure – this is often forgotten about when implementing health monitoring equipment.

Much of the prognostics side of things is looking into the physics of failure, Proactively anticipating what could go wrong and reactively capturing what has gone wrong enables us to **effectively** manage failure using appropriate techniques.

There are many tools/techniques/methodologies that can then be used for Diagnostics and Prognostics, depending on:

- The nature of the failure (i.e. wearout, degradation, random)
- The root cause of the failure
- The symptoms that can be measured
- The availability of data (presence and timeliness)
- The time frames involved (i.e. P-F intervals)

To apply this **effectively** though, we must have a clear understanding of what we are trying to prognose – in the case of humans the best tool that we have is a Doctor, In our industrial world, we have RELMAR.



Courtesy of Exida®

#### Let's Talk?

Are you ready to take you asset management to the next level – to ensure your operations are safer, more reliable.

# Innovate UK

**RELMAR** Official Partner - DiMOS Project Artificial Intelligence based Prescriptive Maintenance for Ships

DiMOS is co-funded by Innovate UK and is part of UK Research and Innovation, a non-departmental public body funded by a grant-in-aid from the UK government.

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