



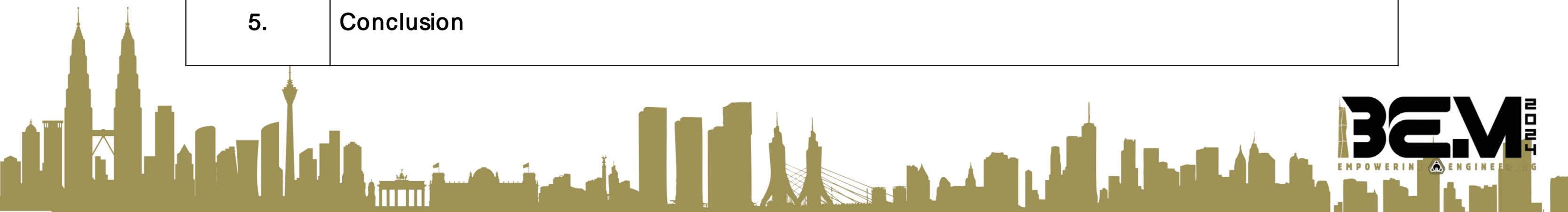
1 & 2 October 2024
Menara Felda, Platinum Park KLCC

Driving Innovation:
Technological Advancement in
Civil & Structural Asset Integrity
at PETRONAS

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PETRONAS

An Overview

Petroleum Nasional Berhad (PETRONAS) established in **1974** as Malaysia's national oil and gas company.

Today its operation is worldwide with presence over 100 countries.



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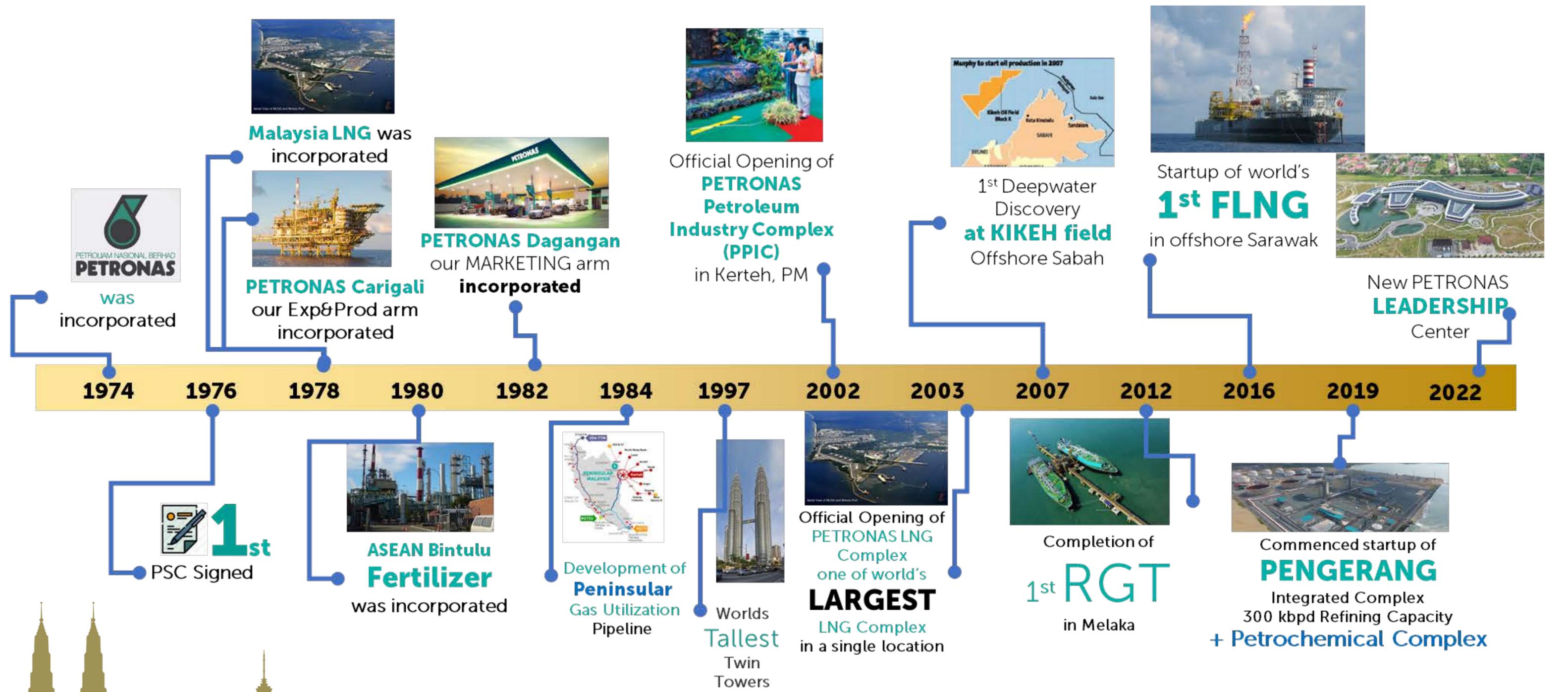


1974

Our first office with only 15 personnel at the Prime Minister's Department at Jalan Dato' Onn, Kuala Lumpur



Malaysia has come a long way since the inception of **PETRONAS** in 1974, from a producer of crude & petroleum products to a world-class hub for petroleum, petrochemical, and LNG industries it is today



PETRONAS MAJOR STRUCTURES

Background

To date, the quantum of major structures have grown and expanded, consisting of the following.



ONSHORE
77 PLANTS



OFFSHORE
>220 PLATFORMS



FLOATER
34 FPSO



GEOTECH
3000 KM PIPELINE

These assets have been **built and acquired**, and as a **responsible operator**, we maintain them **to ensure the safety and reliability of all operations**. Therefore, significant emphasis is placed on **asset integrity**. Consequently, a proactive structural integrity management system has been **developed and is being implemented**.



CURRENT CHALLENGES

Despite having an integrity management system in place, the following challenges persist.

Growing Aging Assets

Time Consuming Manual Inspection

Resource Optimization

Backlog of Inspection & Repair

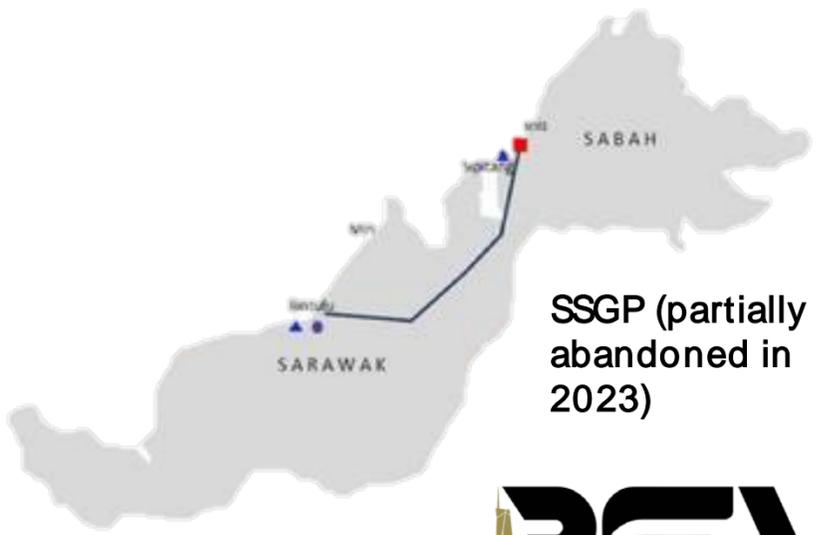
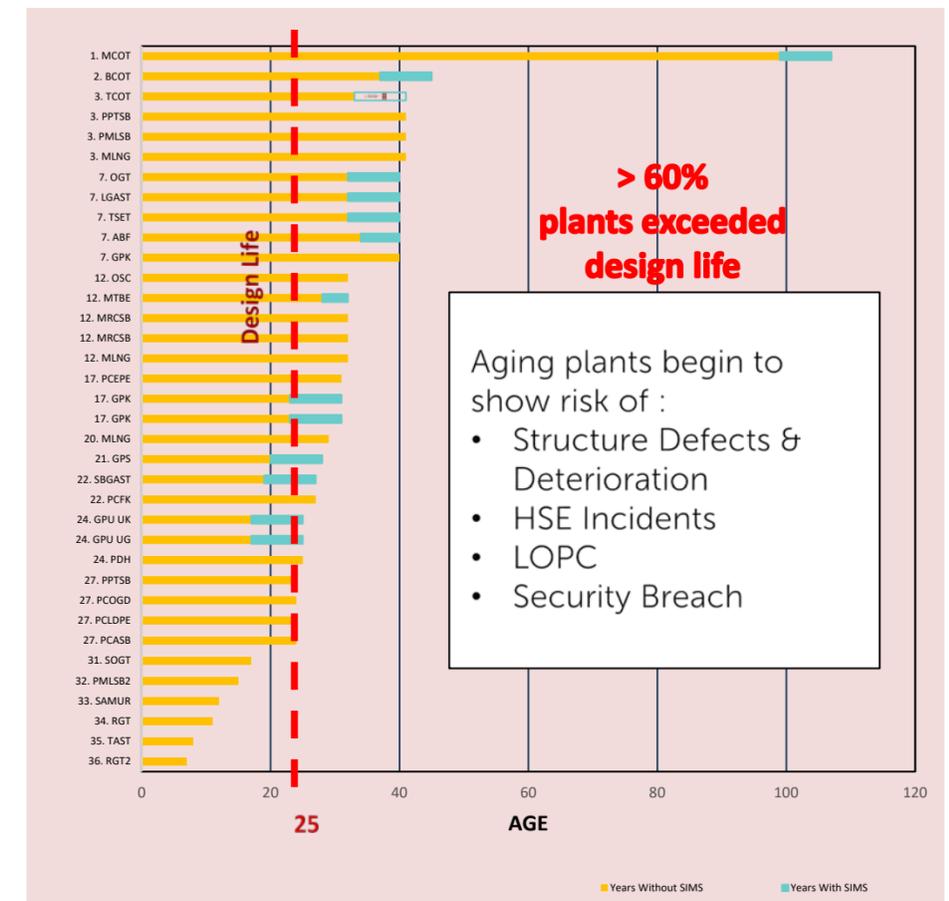
Severely Corroded Structure Supporting Flare Line



C1 Tank Foundation damage due to degrading asphalt



Failing Fireproofing (SCE Element)

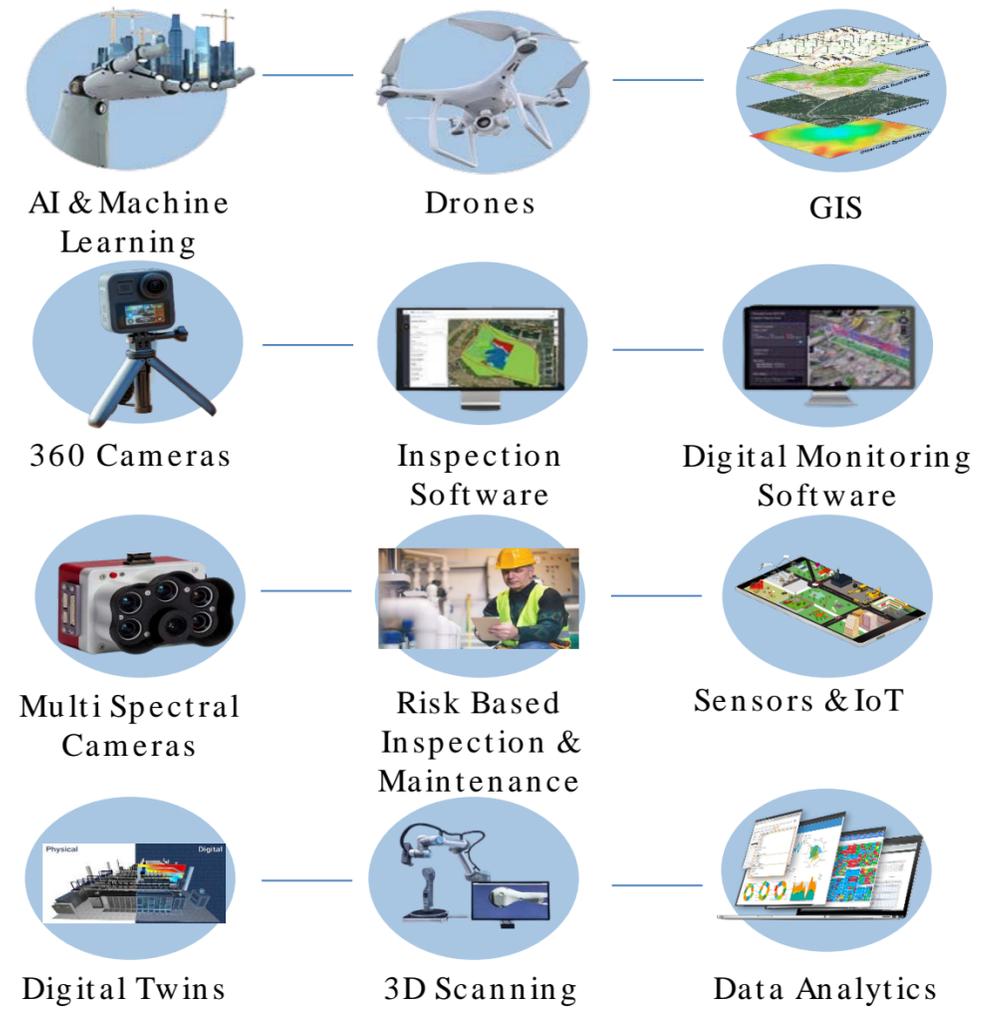




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TECHNOLOGIES

To address these challenges, we are actively pursuing **new technologies** and have initiated various **in-house C&S solutions**.



PISARES	INSPECTION & INTEGRITY SOFTWARE	INTEGRITY MANAGEMENT
i-SHM	REAL TIME ANALYTICS STRUCTURAL CONDITION	
FSIMS	FLOATERS INTEGRITY MANAGEMENT SYSTEM	
iMGESA – Multispectral	INTEGRATED METEOCEAN-GEOTECHNICAL SYSTEM ADVISORY	GEOTECHNICAL
PRSM	GEOTECHNICAL REGIONAL MAPPING	
RTMOS	REAL TIME METEOCEAN OBSERVATION SYSTEM	METEOCEAN
P-MET	METEOROLOGY & OCEANOGRAPY ONE STOP PLATFORM	
SISFOLDS	SMART INTELLIGENT SCAFFOLDING SYSTEM	WORK MGMT SYSTEM



PISARES – AI Defect Detection & Classification

PISARES

❑ PISARES provides line of sight to business on overall Health Check for C&S asset through delivery of cost effective, predictive and fit for purpose solutions.

❑ Utilizing affordable and COMMON TOOLS for plant general visual inspection.



❑ AUTOMATED INSPECTION OUTPUT Annotated photos and tabulated results for next stage of assessment.

GPS INFO
DEFECT DATE
DEFECT TYPE

ASSET

ID	ASSET	DEFECT DATE	DEFECT TYPE	GPS INFO
01	ASSET_001	2023-10-26	minor	10.1234567
02	ASSET_001	2023-10-26	minor	10.1234567
03	ASSET_001	2023-10-26	minor	10.1234567
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20	ASSET_001	2023-10-26	minor	10.1234567



iMGESA – Integrated Metocean-Geotechnical System Advisory

iMGESA - Multispectral

1. Drone equipped with **MULTISPECTRAL SENSORS** can rapidly capture high-resolution imagery of extensive areas, providing a comprehensive overview of terrain conditions. This efficiency **REDUCES TIME AND RESOURCES** required for data collection.



Why **MULTISPECTRAL SENSORS**?

1. Enhance productivity of **GEOHAZARDS DETECTION**
2. **MANHOURS OPTIMISATION** of field work activities.
3. Able to generate indices maps of geohazard detection within **SHORT PERIOD OF TIME**.
4. Able to **AUTOMATE THE PROCESS** and provides **EFFICIENCY** and **PRECISION**.
5. Effective **INSPECTION AND MONITORING**.



Detection rate of **Sign of Distresses** is 93%



i-SHM – Intelligent Structural Health Monitoring

SHM

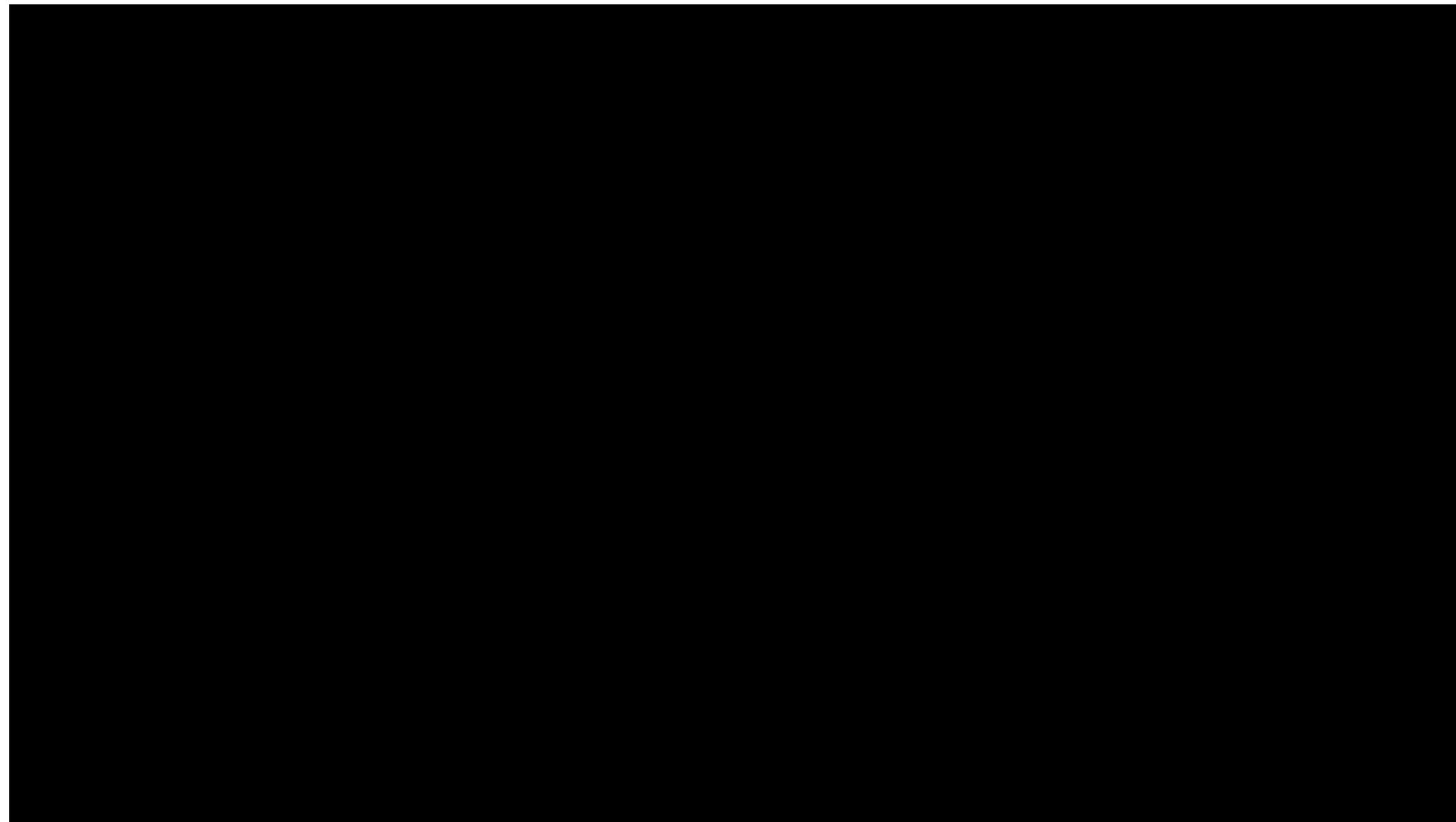
1. Using hardware that utilize the **ENTERPRISE-GRADE STRUCTURAL SENSORS** to monitor real-time conditions.



2. Physics Engine & Cloud Dashboard that **DELIVER REAL-TIME ANALYTICS OF STRUCTURAL CONDITION** through web-based digital twin of asset.

OUTCOME

1. Real time and automated update of our assets essential data e.g., weight, stiffness, natural period, fatigue sensitive joints etc.
2. To **CAPTURE THE DEGRADATION OF AGEING ASSETS** through **DIGITAL TWIN** utilizing **physics engine** and **real time in site assessment** which will optimize the required inspection & maintenance work.



SISFOLDS – Smart Intelligent Scaffolding System

SISFOLDS

1. What is **SISFOLDS**?

SISFOLDS is a techno-digital scaffolding management that produce real time monitoring dashboard at Enterprise level.

2. Why we need **SISFOLDS**?

- Managing **HUGE** volume of scaffold request.
- Improve scaffold **SAFETY** on green tag validity, material PPS, competent scaffolders tracking, design etc.
- Enhance **WORK EFFICIENCY** through **REAL-TIME** system & tracking incl. notification/reminder.
- Digital **BIG DATA** management and record.
- Address **LATE** dismantlement issues.
- Minimise **value leakage**.



CONCLUSION

- **PETRONAS** has empowered its engineers to develop solutions that significantly enhance time management, optimize resource allocation, and ensure continuous asset management, leading to increased operational efficiency.
- The solutions are versatile and suitable for a range of major industries, **requiring only minor modifications** for tailored applications.
- **PETRONAS** is committed to advancement and technology and open to collaborations with any industry.

Visit us at **PETRONAS** booth for further information of solutions.