PETRONAS Project Management Transformation Initiatives

PDE Project delivery Digital Eco-system

Lean improvement of processes & AI ecosystem towards prescriptive project management solutions

CBE Construction-Based Engineering

Engineering interface & process improvements towards cost optimisation via AWP and PPM

DFG Disruptive For Growth

Engine for step change in project delivery eco-system through R&D of project delivery practices

JIP Joint Industry Programme

Collaboration across industry for standardisation of specification

SPS Smart Project Site

Adoption of robotics & smart devices to deliver insights & optimisation at project site

D1BM Design One Build Many

Maximizing value through design replication and standardisation

HSE 6.X

Delivering HSE effectively using technology & digitalisation with greater pace and value creation

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Lean improvement of processes & AI ecosystem towards prescriptive project management solutions

P6 Enterprise

Web-based Enterprise P6 with 3rd party access for open collaboration and integrated with PCS

PETRONAS Completion Management System (PCMS)

Tracking of construction, pre-commissioning & commissioning completion & handover

HUC Smart Dashboard

Online tools with analytics and AI capability in providing e-DPR, e-CMS, and e-Project Database

Quality Card Phase 2

Online tools to manage, monitor and perform analysis on Q-Cards submitted by Project Team

Welding Mgmt. System

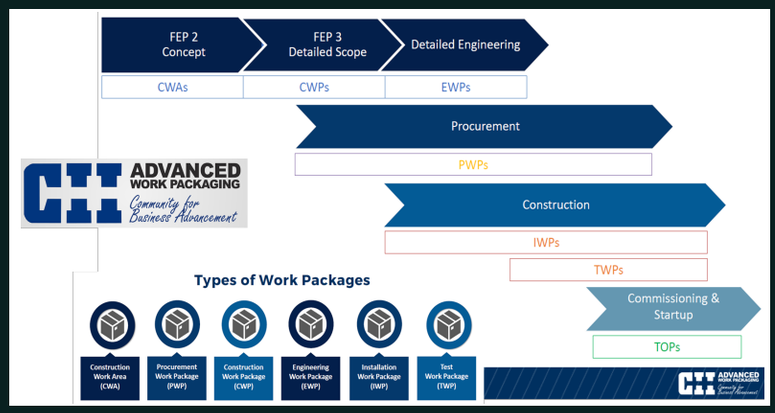
Platform for storage of data regarding welding for GPD with required data on real time basis

ProTrack

Digital platform with analytics and AI capability for construction productivity measurement

With 18 internal process improvement & more

Advanced Work Packaging (AWP)



Process of AWP guides the dissection of project scope to support execution of workface planning.

It starts with the processes upstream of the construction work packages and aligns engineering work packages with procurement packages.

This populates the construction work packages with all the drawing and materials and gets them ready to be carved into Installation Work Packages.

Project Production Management (PPM)

PPM views project as production system. Use of a production system framework allows application of Operations Science as the technical basis to map, model, analyse, optimise, control and improved project production system performance.

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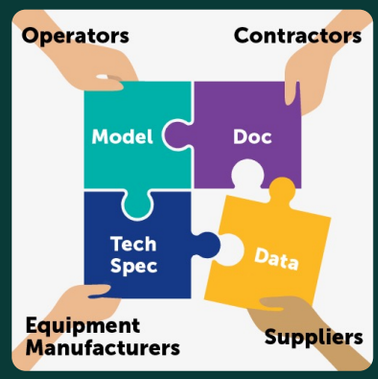

Capital Facilities Information Handover Specification (CFIHOS) – JIP36

Standardise specification of project information handover requirements for operators, contractors and equipment manufacturers and suppliers.

Improves interoperability
Easier information consolidation at each step in supply chain

Increase productivity
Accelerated handover process

Faster managing modification
Easier document/data retrieval

Reduce operational risk
Minimum standard assures asset information quality

Better advantage
Lower cost of implementing International Standards

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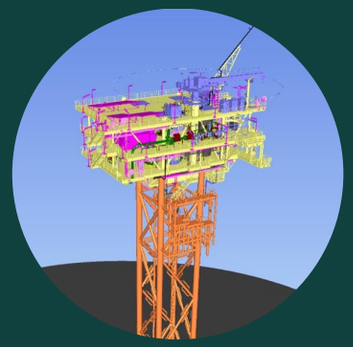
PETRONAS Station Prestige

GTR Metering Station



Light Weight Structure (LWS)

StanD - Utility System & OSBL

BIKE Inspection

Remote controlled inspection robot designed for hard-to-access and confined spaces areas

Drones + Visualisation Platform

UAV designed for accessibility of remote and at-height working areas. Data capture for project visualisation & analysis platform

Smart Helmet

Wearable Helmet Mounted Computer which enables connectivity and data capture

Robotics: ANYmal

Autonomous / Remote controlled walker robot designed for surveillance and data capture

SPOT & AISC (HSE6.X)

Wearable GPS positioning for real time location data and PPE compliance AI system

and more technology evolution to come...

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Delivering HSE effectively using technology & digitalisation with greater pace and value creation

IDEAS transformed into CONCEPT

- ✓ Virtual Reality (VR) Training

TECHNOLOGY enabled PROCESS

- ✓ Drone (AI Based Human Tracking using IR Camera).
- ✓ Artificial Intelligence Surveillance Camera (AISC).
- ✓ Personnel Tracker using Secure Positioning Online Tracking (SPOT).
- ✓ Tag Device Technology and Headgear.
- ✓ Wearable Wrist Band to manage fatigue.

DIGITISED DATA translated into ANALYTICS

- ✓ Paperless Application
- ✓ Translate manual process & HSE data into digital with centralised database – e.g., Artificial Intelligent Risk Analytics (AiRA) and MarSIS (Marine Safety Intelligent System)

INFRASTRUCTURE revolutionised backbone

- ✓ Enhance network infrastructure.
- ✓ Upgrade data center (facilities) for better data storage and network services.
- ✓ Enhance cloud computing.
- ✓ Centralised dashboard.

JIP33 Procurement

Standardisation of procurement spec for efficient supply chain

JIP33 specifications build on existing industry standards to provide a full set of requirements with which to purchase equipment & packages.

Over 40 specifications have been published and more are planned or in development..

Standard Design

Core set of standard design meet majority of user needs

Inventory

Smaller Inventory, shorter lead times, standard items

Procedures

Common and well-developed procedures and documentation cate to majority of customers

JIP35 provide "minimum specifications" which may be used by any operator to replace or supplement their own specifications. These "minimum specifications" were developed according to the following rules:

Standards

Based on international or industry standards with (minimum) additional requirements

Assessment

Any additional requirement must be assessed, and the value justified

Risk Mitigation

Less focus on 'technical excellence' and more focus on risk mitigation

Safety

Safety cannot be compromised

Covers 11 subdisciplines with future expansion, each associated with one industry and/or international standard

Standardisation of offshore structures specification

JIP35 Offshore Structures

JIP39 Normally Unattended Facilities (NUF)

Positioning NUF as safe, cost-effective, widely accepted design and operation method for O&G facilities

HSE

Risk reduction from elimination of personnel during normal operation

CAPEX Reduction

20% - 30% potential reduction in facility cost

OPEX Reduction

20% - 30% potential reduction in operating and logistic expenses

Reliability

Better than of equal to attended facilities

GHG Footprint

Improvement due to transportation, logistics, equipment selection and design reliability

All elements in Project Transformation Initiative are moving at the right direction in delivering **Project Digital Twin**

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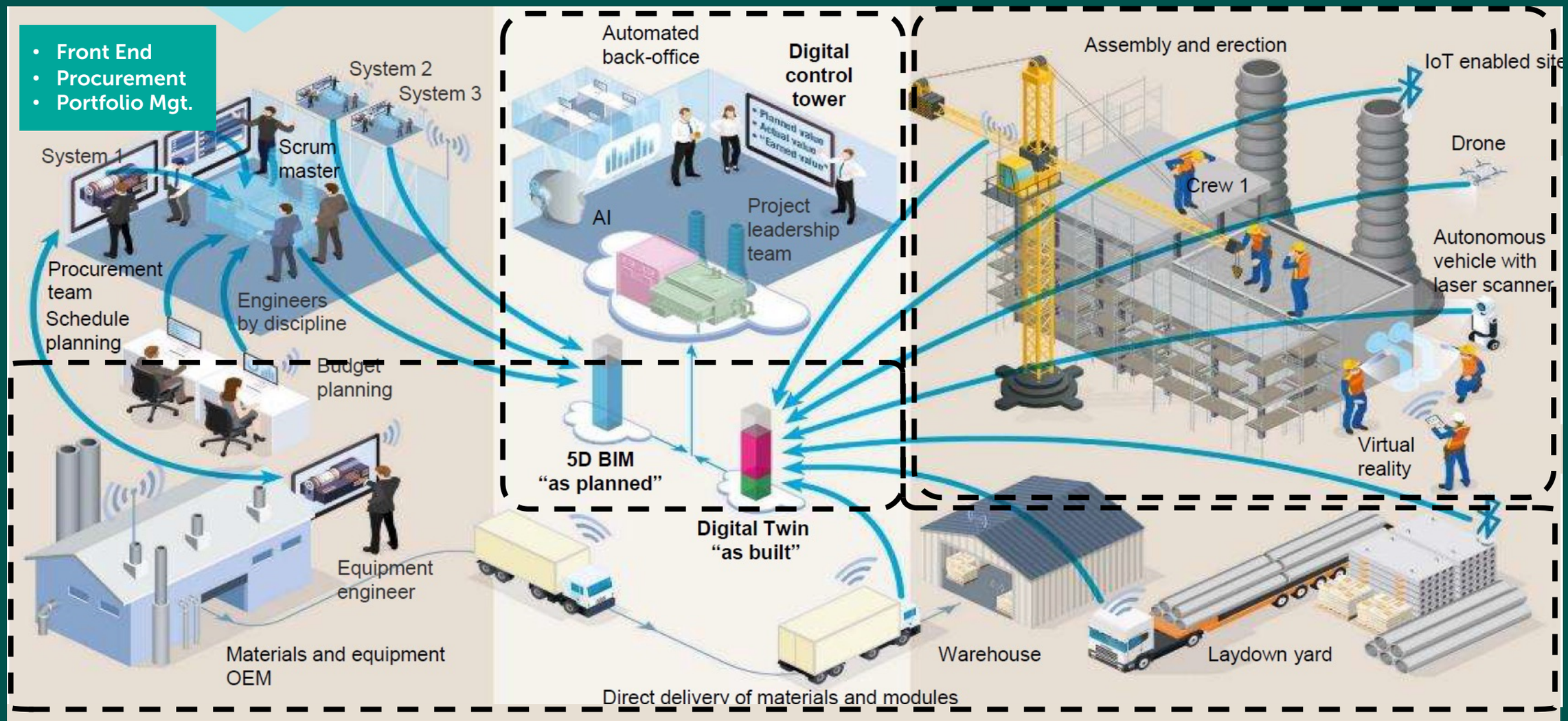

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Smart Contract · Blockchain · Leasing Model · Generative Design