

# KEEL EAM SERVICES OVERVIEW

## Keel Solution

Keel offers technological solutions and tailored services to leading companies within the field of **asset data management** and asset data governance. We help systemize, structure, quality assure, verify, and enhance **assets' technical and operational data integrity**.



ASSET DATA MANAGEMENT

### Master Data Management

- Asset Register
- Asset Structuring
- Asset Data Collection
- Materials Management

### Maintenance Analysis & Optimization

- Plant Maintenance Implementation
- Maintenance Program Optimization
- Maintenance Program Cleansing

### CMMS & ERP Support

- Virtual Support Services

ISO 55001

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# Master Data Management

# Asset Data Collection

- **Master Data** collection;
- **Outdated and defective tag plates** detection and re-installation. Drawing tag vs installed tag verification;
- **RFID** installation;
- **General view and nameplate** pictures collection;
- **Safety Critical Equipment list** (PSVs, ESD equipment, F&G detection, and alarm equipment, Fire Fighting equipment, etc.) check and tags installation;
- **Update of SAP equipment database** with new equipment, Master Data, pictures, etc.

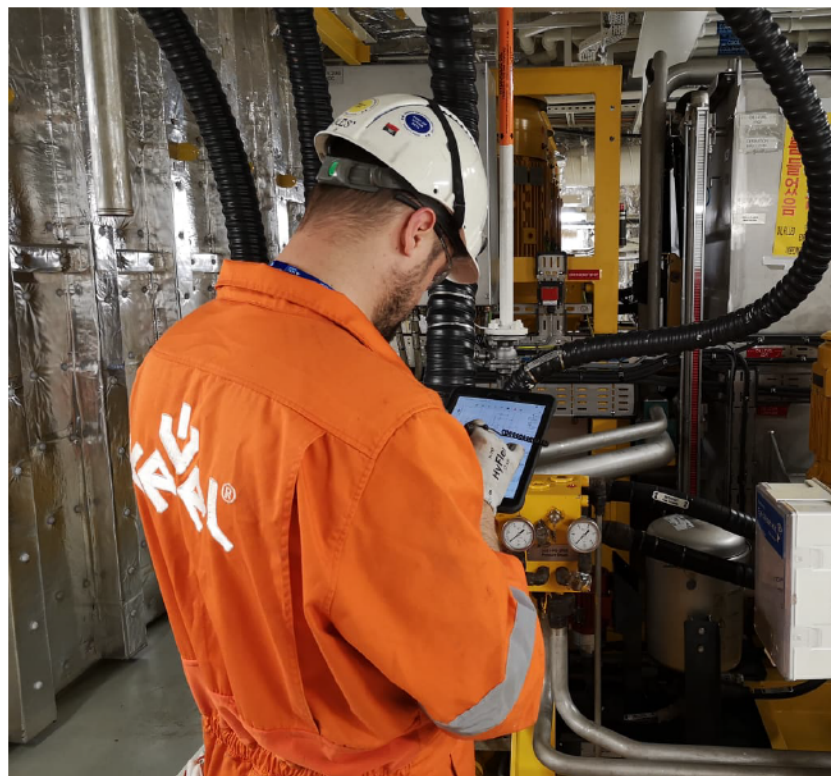
## SAP MOBILE APPLICATION FOR ASSET DATA COLLECTION

### Optimization of data synchronization with CMMS

Our SAP Mobile Application for Tag Verification has been created to assist engineers during **Asset Data collection / Verification projects**.

Usage of SAPUI5 library technologies makes this application **easily customizable** to any client's needs subsequently simplifying data collection and analysis.

The employment of hybrid cloud scenarios enables **fast data synchronization** and the ability to **work offline** which, in turn, eliminates paperwork and saves a substantial amount of time.



# Asset Structuring

## Equipment

registered as serialized and maintainable components and attached to appropriate function.

## Components in BOM

should correspond to "what is in the box" principle when a particular "header" material is ordered / purchased.

## Functional location structure

reflects asset's design, i.e., its main functional elements. This structure shall not be changed unless the asset's design is changed.

## BOM

reflects the structure of the objects in the way how the asset / component is built and maintained.

## Standards Implementation

Keel has experience and expertise in implementation of Industry adopted standards:

■ ISO 15925

■ IEC 81346

■ ISO 142224

■ RDS-PP

Functional Location Structure: Structure List

Levels above

Expand whole

Mat. classes

Functional loc.

Valid From

10.05.2017

Description

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# Materials Management

## MM in SAP

- Registration of **Materials and Master Data** update;
- Creation of **Vendor Master Data**;
- Analysis of **consumption data** and reporting;
- Creation of **Material BOMs**;
- Creation of **Purchase Info Records**;
- Processing of **Purchase Requisitions** and Orders;

## MM

- Duplicates & Manufacturer Part number** cleansing;
- Development and implementation of **proper material naming convention**;
- MRP** suggestions (Min/Max level) for the spare parts based on the historical consumption;
- Spare parts **criticality assessment**. Identification of Critical Spare Parts for Safe Operation;
- Analysis of original Manufacturer / Vendor **Documentation**, Required Compliance **Rules / Regulations**;
- Preparation of **Suggested Spare Parts Package** and Consumables Stock for 1 year of Safe Operation;
- Suggestion for Quantity** (Initial Stock);
- Future Demand Planning** (min / max levels).
- Analysis of **Transactional Data**;

## Compliance with Standards

Keel provides Material Classification and Data collection as per Industrial standards

- eCl@ss
- UNSPSC

RECOMMENDED							SUGGESTED						
MANUFACTURER	DESCRIPTION	RECOM Q-TY	TOTAL RECOMMENDED PRICE	PART NO	PRICE	LEAD TIME, MONTH	SUGGESTION Q-TY	TOTAL PRICE PER PACKAGE (SUGGESTION)	COMMENTS FOR SUGGESTION	EQUIPMENT	COMMENTS	PRICE ESTIMATION	
NOV, NATIONAL OILWELL VARCO	VLV, CHECK, SS, 1" TUBE EACH END, 5 PSI CRACKING PR	1	572,00	1552125	572,00	2	1	572,00	SUGGESTED TO PURCHASE FOR 1Y OF OPERATION / MD TO RE-EVALUATE	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL OILWELL VARCO	TRANSMTR, PRSSR, 0-7500 PSI, 4-20mA	1	879,45	6550175	879,45	1	1	879,45	SUGGESTED TO PURCHASE FOR 1Y OF OPERATION / MD TO RE-EVALUATE	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL OILWELL VARCO	GAUGE, SNUB, POROUS METAL, 1/4" MPTX 1/4" FPT, OIL, 31	10	377,00	1705101	37,70	1	10	377,00	SUGGESTED TO PURCHASE 10 EA FOR 1Y OF OPERATION / ACCORDING TO	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL OILWELL VARCO	VLV, 4-WAY 2-POS, AIR PILOT, SPG RETURN, 1/2" NPT,	1	224,90	1306019	224,90	1	1	224,90	SUGGESTED TO PURCHASE FOR 1Y OF OPERATION / MD TO RE-EVALUATE	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL OILWELL VARCO	VLV, SHUTTLE, 1/4" NPT, 3-200# AIR, 3-500# HYD, BR	1	49,40	1050610	49,40	1	1	49,40	SUGGESTED TO PURCHASE FOR 1Y OF OPERATION / MD TO RE-EVALUATE	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL OILWELL VARCO	VLV, CHK, FREE FLOW, 1" FPTX FPT 3000#, ZERO LEAKAGE	1	230,10	1500350	230,10	1	1	230,10	SUGGESTED TO PURCHASE FOR 1Y OF OPERATION / MD TO RE-EVALUATE	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL OILWELL VARCO	TRANSMTR, PRSSR, 0-3000 PSI, 4-20MA, 24VDC	1	1 127,10	4520255	1 127,10	1	1	1 127,10	SUGGESTED TO PURCHASE FOR 1Y OF OPERATION / MD TO RE-EVALUATE	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL OILWELL VARCO	VLV, RELIEF, HYD, SET @5500 PSI, SHR SEAL, 3/4" NPT	1	1 521,65	7404112	1 521,65	1	1	1 521,65	SUGGESTED TO PURCHASE FOR 1Y OF OPERATION / MD TO RE-EVALUATE	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL OILWELL VARCO	VLV, 1/4" NPT, 3-WAY NC, AIR PILOT, 1/8" NPT PILOT,	1	165,75	1306067	165,75	1	1	165,75	SUGGESTED TO PURCHASE FOR 1Y OF OPERATION / MD TO RE-EVALUATE	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL OILWELL VARCO	GAUGE, 4", 0-6000# BAR, PNL MT 1/4" SS, W/CERT	1	249,60	70000289	249,60	1	1	249,60	SUGGESTED TO PURCHASE FOR 1Y OF OPERATION / MD TO RE-EVALUATE	BOP DIVERTER CONTROL SYSTEM	RECOMMENDED BY MANUFACTURER FOR ONE YEAR OF OPERATION	NO	
NOV, NATIONAL	VLV BALL 2" SAE FIG. 5000# SS								SUGGESTED TO PURCHASE FOR 1Y OF	BOP DIVERTER CONTROL	RECOMMENDED BY MANUFACTURER		



# Maintenance Analysis & Optimization

# Plant Maintenance Implementation

## Management and Maintenance of Technical Objects in SAP

- Building of Functional Location and Equipment structure;
- Registration of Equipment, Master Data update, Measuring Points creation;
- Creation of Functional location and Equipment Bill of Materials (BOM);
- Preparation of list of critical spare parts and recommended stock items for 2 years in operation.

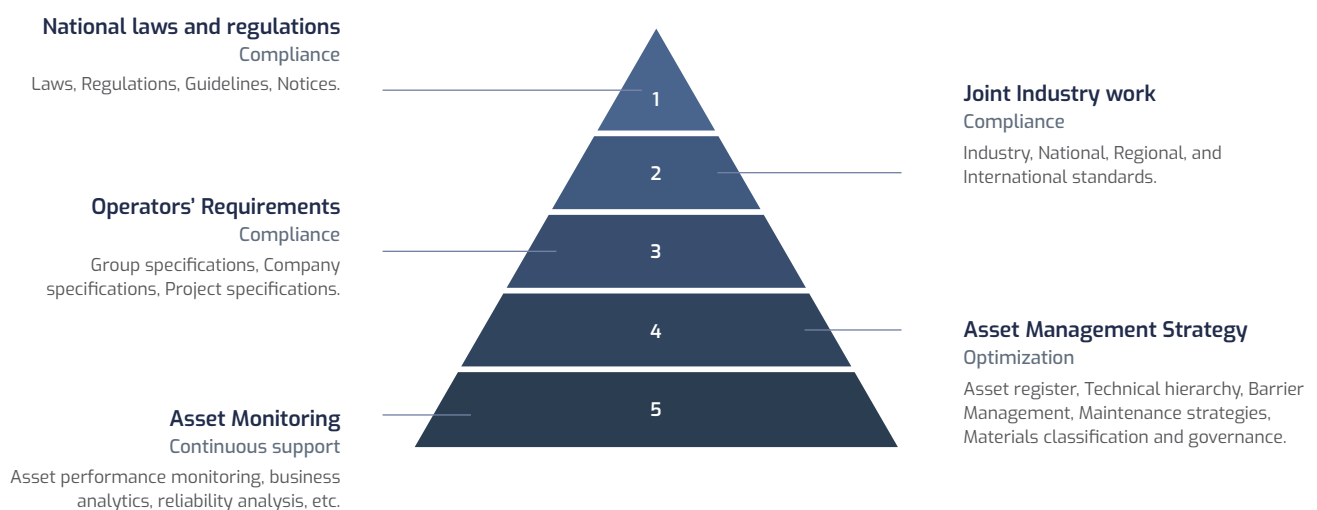
## Corrective Maintenance:

- Maintaining Notifications and Corrective Work Orders.

## Preventive Maintenance:

- Task Lists Creation;
- Maintenance Planning and Scheduling;
- Preventive Maintenance Program for all equipment aligned with OEM recommendations and relevant legislative requirements.

## KEEL ASSET MANAGEMENT & MAINTENANCE VISION



# Maintenance Program Optimization

## Scope of work

- **Development and implementation** of generic maintenance strategies;
- Asset **performance standards** review;
- Asset **maintenance compliance** review;
- Review of **recommended and best practice** maintenance;
- Review of **reliability centered maintenance**;
- Review of **resources and work duration** with a reduction to ALARP level;
- Optimization of **maintenance strategies** (migration to counter-based and vice-versa);
- **Workload analysis and smoothing**;
- **Maintenance rescheduling** and synchronization.





# Maintenance Program Cleansing

## Asset Register

- **Risk assessment** according to Norsok Z-008 Standard;
- **Performance standards** and **Barrier Management** implementation.



## Preventive Maintenance

- **Preventive maintenance program** alignment with relevant compliance - Classification societies (ABS, DNV and Lloyd);
- **National legislations** (Norway, Denmark, USA, UK );
- **Assignment of spare parts** required to accomplish maintenance requirements.



## CMMS

- Review and Optimization of **Preventive maintenance** program for the fleet in operation.

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# ERP & CMMS Support

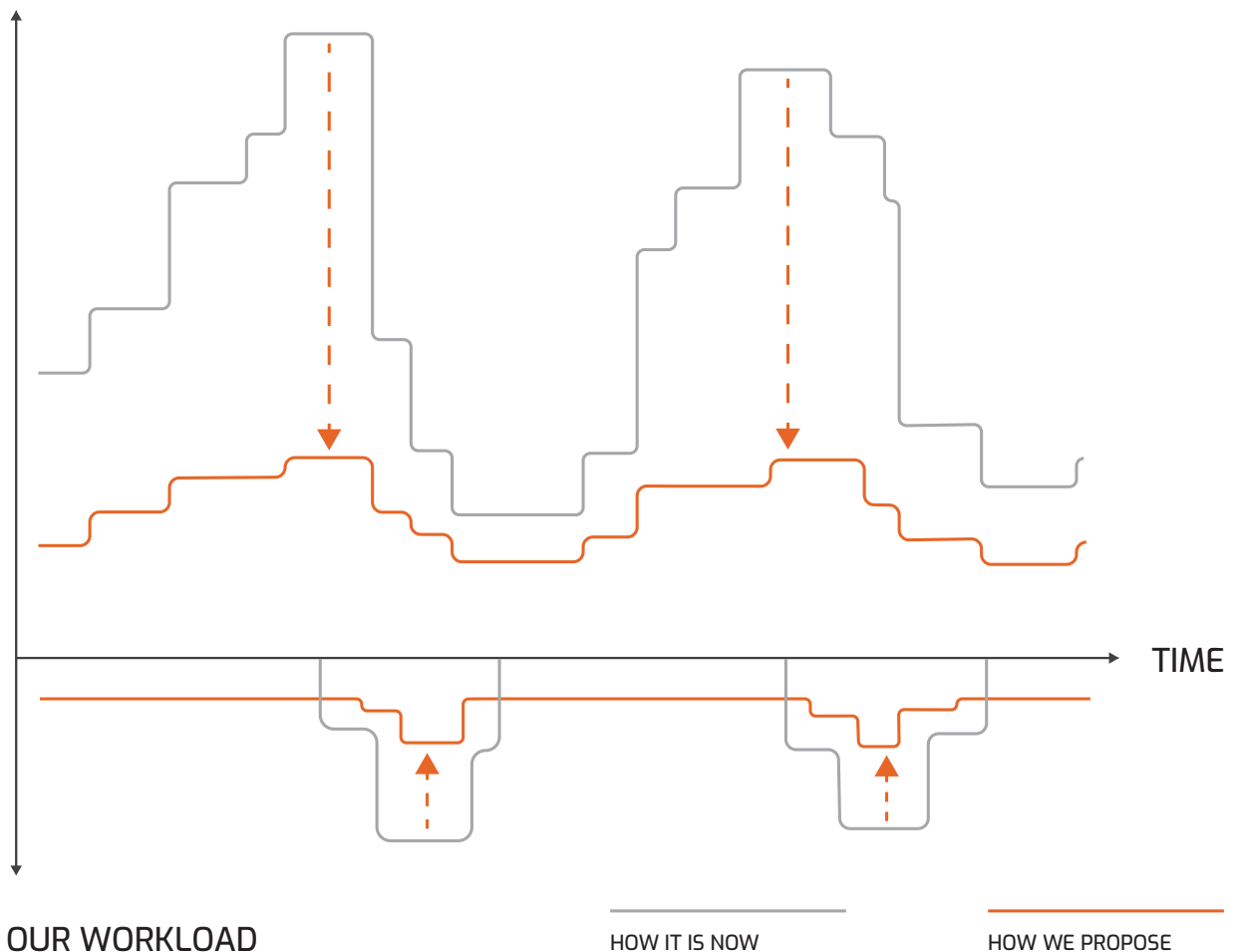
# Virtual Support Services

Keel updates CMMS according to Asset Operational Life Cycle changes:

- Installation of new or decommission of existing Equipment;
- Spare parts updates due to logistic needs;
- Drawing and Technical documentation update;
- Update of PM program due to legal requirements or RCM studies;
- Optimization of Work Load and Campaign Maintenance.

CLIENTS' WORKLOAD

■ KEEL SOLUTION STRATEGY



# Virtual Support Services

## Equipment and SP Governance



We help to keep track of the ERP data on daily basis by creating and updating **Asset Register** in a unified way across all installations.

We also help our customers run ERP for every asset with the same approach.

## Spare parts Duplication



We set up **spare parts cleansing** based on the Manufacturer Part numbers.

Our team also reviews the proper Serial / Spare Part classification.

## Comprehensive Risk Assessment



Using the **industry-recognized standards** (e.g. NORSOK Z-008), Keel performs criticality analysis of our customers' assets in order to identify critical components and spare parts for further Maintenance & Repair strategy and stock planning.

## Documents Duplication



If the Attachment function is not used, the same document is created multiple times as a new one, creating duplicates in the system. That is why we suggest performing document cleansing.

We create "heavy" **documents with hyperlinks** for the Offshore Tech doc. portal instead of attachments (MRBs).

# Virtual Support Services

## Administrative Overload



Section / team leads are regularly overloaded with CMMS tasks.

In order to cover the routine reporting in CMMS (in cooperation with TSL), **we suggest outsourcing 1 technical engineer for sister-rigs.**

## Redundant Maintenance



Over time and due to improper change of management processes, ERP may accumulate maintenance jobs that should be either made obsolete or be aligned with other activities. Keel analyzes all abnormalities and **optimizes the maintenance jobs** for efficient operation.

## Unclear Task Lists



In cooperation with experts and section / team leads, we review the standard job list and **make it more specific** and with **clear definitions**. Complicated job lists are to be divided / grouped by operation lines with relevant tasks.

