



THE 21<sup>ST</sup> INTERNATIONAL  
OPERATIONS & MAINTENANCE  
CONFERENCE IN THE ARAB COUNTRIES

# HOW DIGITAL TRANSFORMATION AFFECTED MANAGEMENT OF MAINTENANCE RISKS

    #OmaintecConf

An Initiative by



Organized by





# Introduction

Maintenance operations and activities have been affected by the accelerating digital transformation that the world is witnessing right now, and despite the positives that came with this transformation, it has also been accompanied by a number of challenges that must be understood and dealt with.

And in this presentation we will discuss the positive effects of the digital transformation on maintenance, and also the challenges came with it, along with real applications by Namaa and other companies around the world.



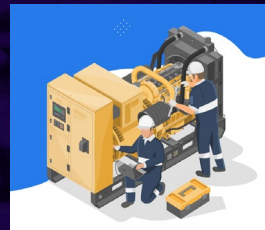


# Maintenance risks

Maintenance risks are potential hazards or threats that may arise during maintenance activities. These risks can include:



Safety risks



Equipment failure



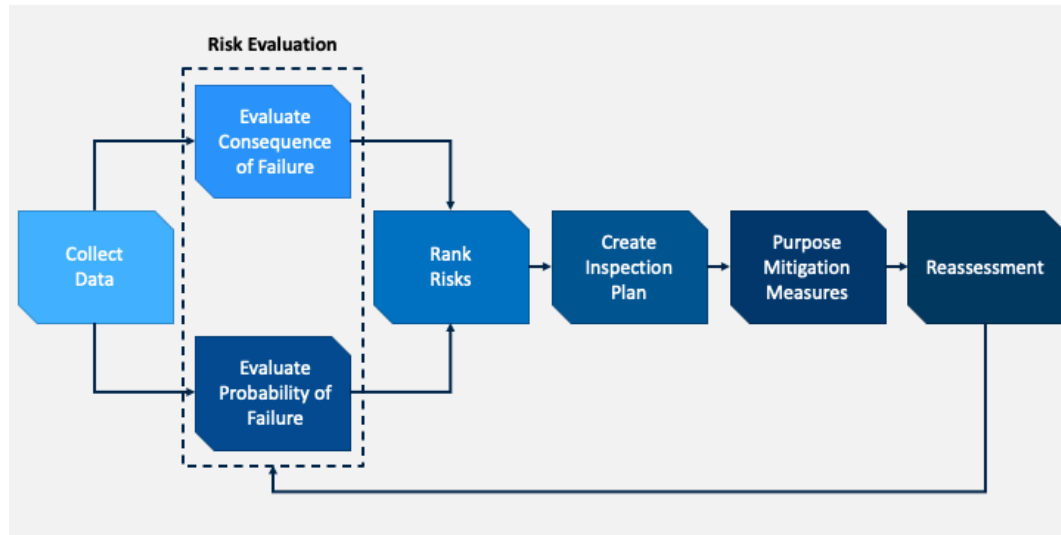
Environmental risks



Operational risks

# Management of maintenance risks

What is management of maintenance risks?



Risk based maintenance framework (RBM)





# Management of maintenance risks

The management of maintenance risks typically involves the following steps:

1

Identification of Risks

4

Monitoring of Risks

2

Assessment of Risks

5

Continuous Improvement

3

Mitigation of Risks



## Effect of digital transformation on management of maintenance risks

Digital transformation has made a significant impact on the management of maintenance risks in various industries. And here are some positive effects of digital transformation on the management of maintenance risks:

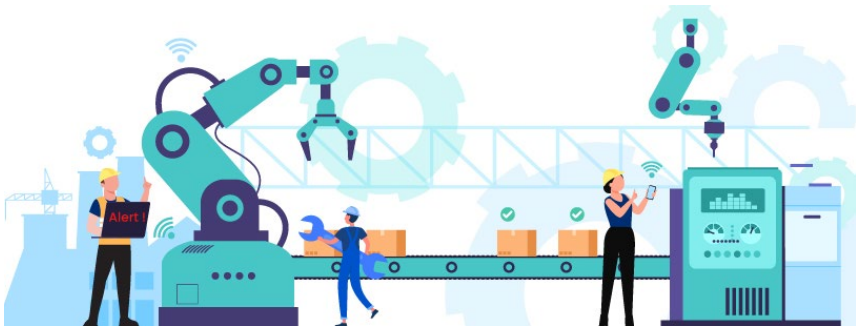


- Real-time monitoring
- predictive maintenance
- Condition Monitoring
- Providing remote maintenance capabilities
- Improving risk assessment and prioritization
- Enhancing safety and compliance management
- Increasing data-driven decision-making
- Enhancing collaboration and communication

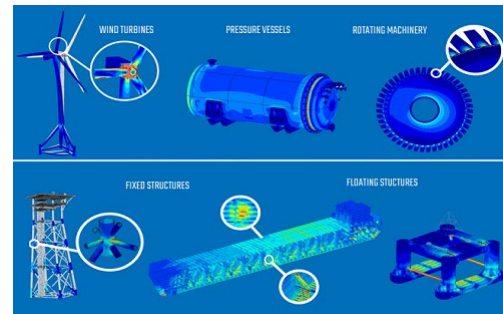
# Effect of digital transformation on management of maintenance risks

The effects of digital transformation on the management of maintenance risks have occurred through introducing and using digital technologies and tools, And here are some of these technologies and tools :

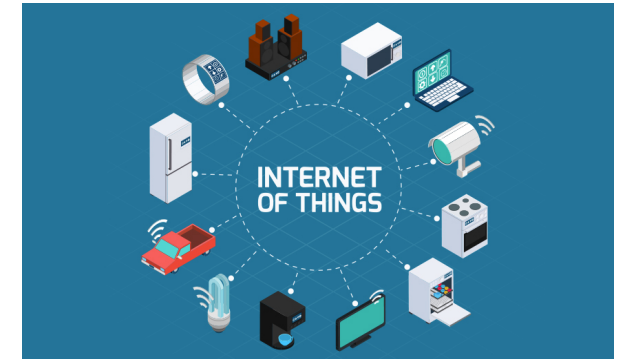
First: The technologies



**Artificial intelligence (AI), Machine learning and data analytics**



**Digital Twins & BIM**



**The Internet of Things (IoT)**

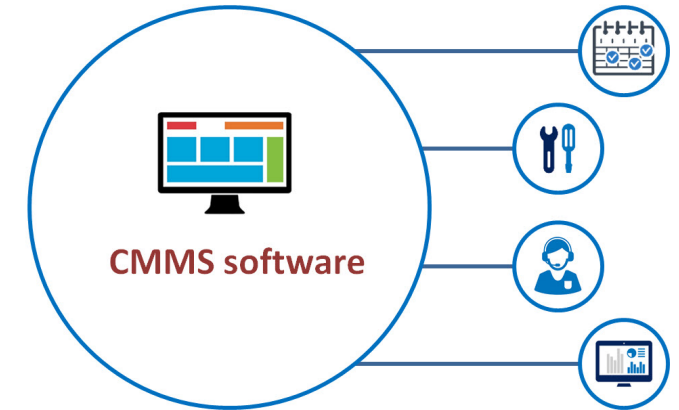




**Augmented Reality (AR)**



**Virtual Reality (VR)**



**Computerized Maintenance Management System (CMMS)**



Second: The tools (devices)



**Sensors**



**Robotics and Drones**



**Smart glasses**



**Neckband camera**



**360-degree Rotary Camera Mobile Phone**



# Challenges of digital transformation in management of maintenance risks

Organizations face several challenges in managing maintenance risks in the digital transformation era. Some specific challenges include:

1

Cybersecurity risks

4

Integration challenges

2

Data management

5

Cost

3

Skills gap

6

Regulatory compliance





## Applications of digital transformation on management of maintenance risks

Here are some of real applications of digital transformation on management of maintenance risks by Namaa and other companies:



**Namaa PMMS**  
(Pavement Maintenance  
Management System)



**Namaa VDED**  
(Visual Distortion  
Elements Detection)



**Maintenance 4.0**



**EcoStruxure Maintenance  
Advisor**



## Applications of digital transformation on management of maintenance risks



### Namaa PMMS (Pavement Maintenance Management System)



نظام إدارة صيانة الرصف  
لشركة نماء

Namaa PMMS



## Applications of digital transformation on management of maintenance risks



Multi- Function Vehicle (MFV)



Fast Falling Weight Deflectometer (FFWD)



Fast Falling Weight Deflectometer (FFWD)



Ground Penetrating Radar (GPR)





# Applications of digital transformation on management of maintenance risks

**MAIN STREETS**

Area:

Street:

ZOOM TO

---

Geographical Information Data(GIS)

Al Dhahran

Fifth Street Playground

**Pavement Management**

- Dashboard
- Network Definition and Identification
- Data Upload and Analysis
- Performance Indicators
- Maintenance Decisions
- Maintenance Plans
- Reports

Area: All Areas | Road: All Roads | Section: All Sections | Lane: All Lanes

PCI Average: 62 (0-100 scale)

IRI Average (m/km): 2.9 (0-11.4 scale)

Cracks (m<sup>2</sup>): 196.7k

Potholes (m<sup>2</sup>): 313

Streets with the highest Maintenance Cost (SAR)

Street	Cost (SAR)
OLD DHABO ROAD	1.6M
DHAHRAN BLVCA	1.2M
SOUTH STREET	923.4k
UHAMANI VALI WALS ROAD	644.7k
ABQAND BYPASS ROAD	638.4k
AL MOHIB ACCESS ROAD#4	553.6k
Uthmaniyah ROAD	480.9k
KHURSAN PLANE ACCESS ROAD	348.4k
SHEDDU AL WATER AL ROAD	332.0k
EASTERN AVENUE	264.8k

Maintenance Decisions Area (m<sup>2</sup>): Global MSB 78.1k, Localized MSB 159.8k, Major MSB 46k

Maintenance Decisions Cost (SAR): Global MSB 1.7M, Localized MSB 2.2M, Major MSB 3.3M

Roads Summary	MD Roads Details	MD Sections	MD Lanes
MD Samples	PCI Sections	PCI Lanes	PCI Samples
IRI Roads	IRI Sections	IRI Lanes	IRI Samples
Distresses Deduct	UDI Samples	UDI Lanes	UDI Sections

**International Roughness Index Tabular**

Area:

Roads:

Section Number	Lane Type	Sample Number	IRI Value (m/km)	IRI Rate	Survey Date
DHF01001	L	1	6.2	Failed	7/11/2023 12:00:00 AM
DHF01003	L	3	2.45	Fair	7/11/2023 12:00:00 AM
DHF01002	L	1	2.25	Fair	7/11/2023 12:00:00 AM
DHF01003	L	2	2.3	Fair	7/11/2023 12:00:00 AM
DHF01003	L	1	4.45	Failed	7/11/2023 12:00:00 AM
DHF01004	L	1	4	Failed	7/11/2023 12:00:00 AM
DHF01002	L	2	2.5	Fair	7/11/2023 12:00:00 AM









## Applications of digital transformation on management of maintenance risks

**SIEMENS**

Maintenance 4.0



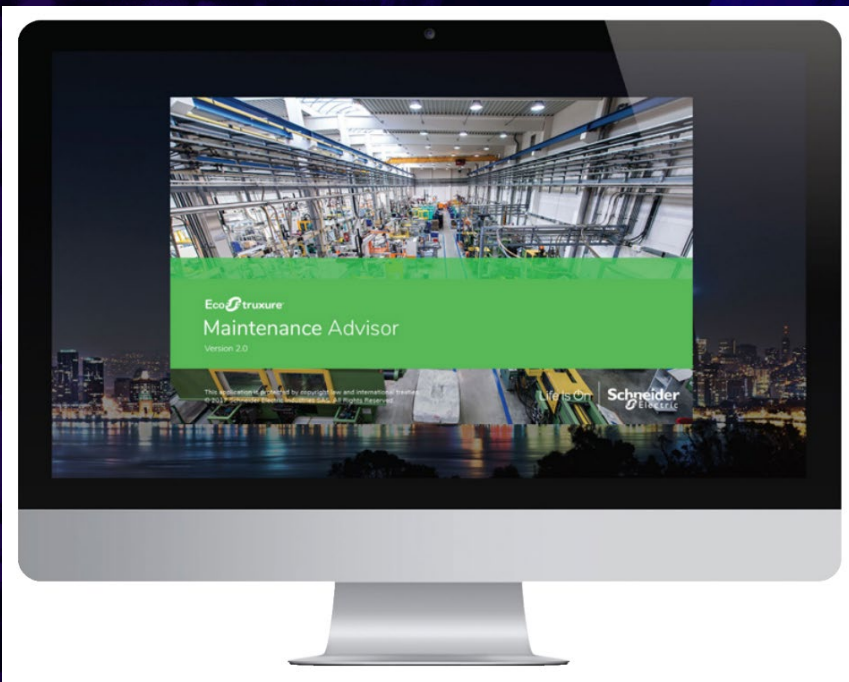




## Applications of digital transformation on management of maintenance risks

Schneider  
Electric

### EcoStruxure Maintenance Advisor







THE 21<sup>ST</sup> INTERNATIONAL  
OPERATIONS & MAINTENANCE  
CONFERENCE IN THE ARAB COUNTRIES

THANK  
YOU!

    #OmaintecConf

An Initiative by



Organized by

