



The 23rd International Asset Facility and Maintenance Management Conference



DIGITAL TWINS IN ENGINEERING INSURANCES

Data in risk evaluation and claims adjustment

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Riyadh, KSA

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Digital Twin and Data-Based Risk Evaluation in Engineering Insurance

Transforming Risk Evaluation and Claims Adjustment from Month to Day Tasks



Battery fire
One year recovery
25M\$ claim



Boiler fire
10 month recovery
40M\$ claim



Turbine failure
12 month recovery
15M\$ claim

The Billion Dollar Problem



Up to 60% of industrial assets are legacy equipment

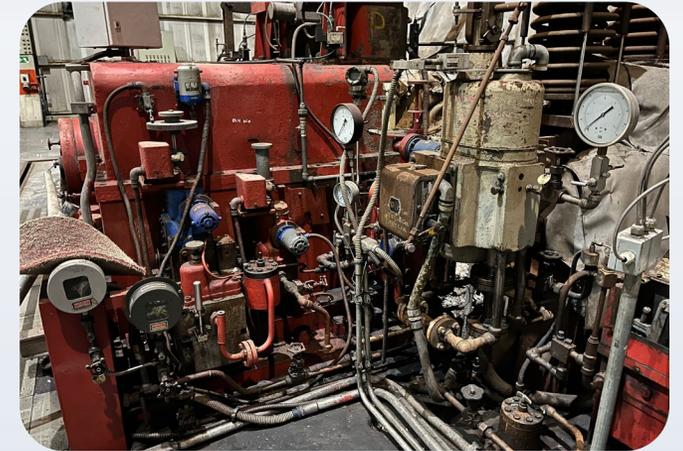
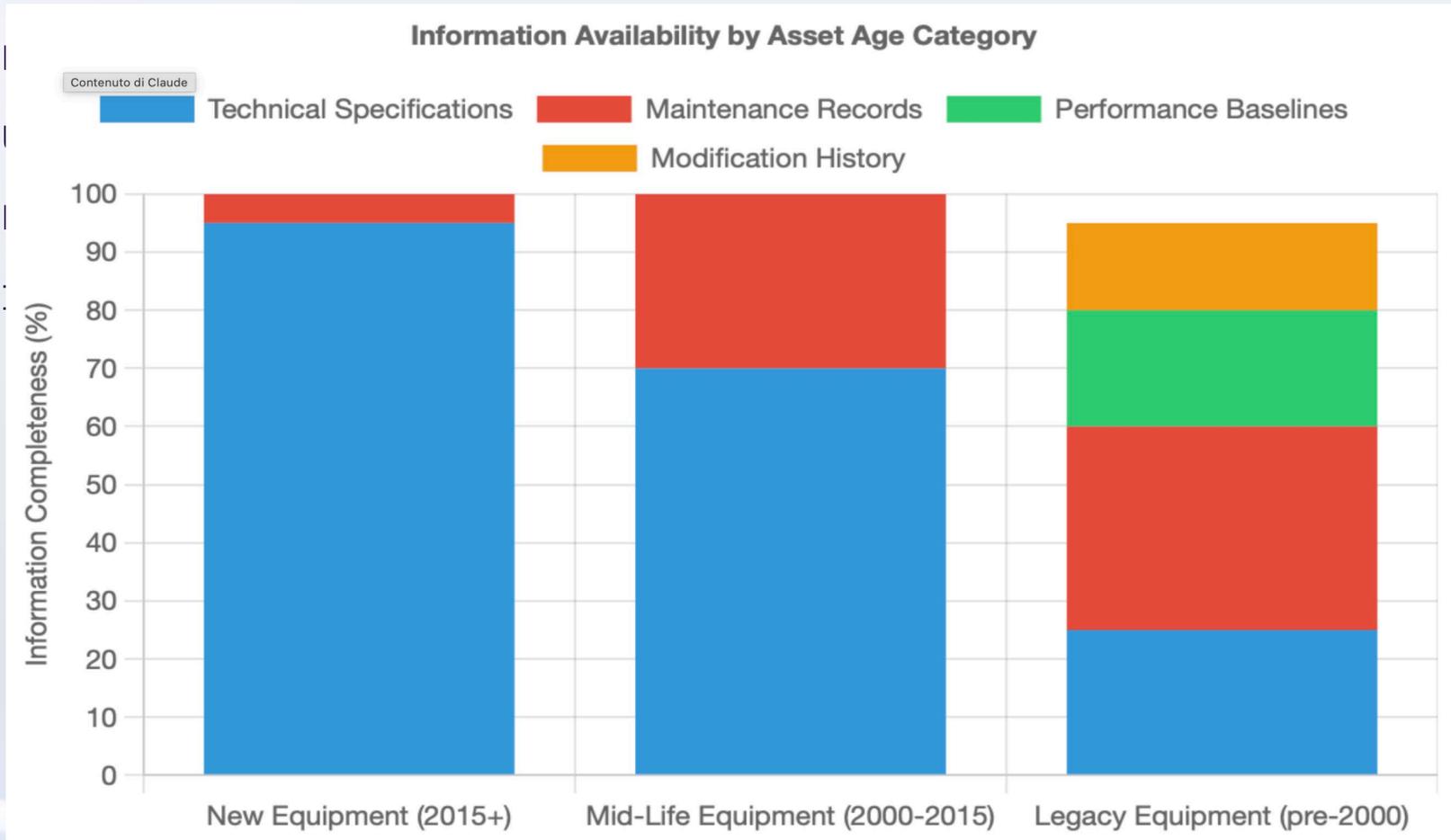
Average claim investigation: 3-6 months

Forensic engineering costs: \$100,000-\$500,000 per claim

Information asymmetry drives up to 30% premium overpricing



The Legacy Equipment Information Gap



Enter the Digital Twin Revolution

At the Beginning:

- Measurements fed to control systems

The Evolution:

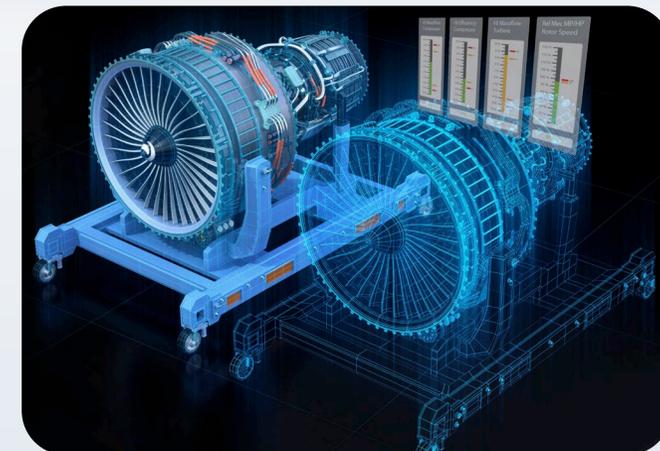
- Data visualization and recording
- First monitoring systems

The step forward:

- Generation of KPI
- Storage of large quantities of data

The Revolution:

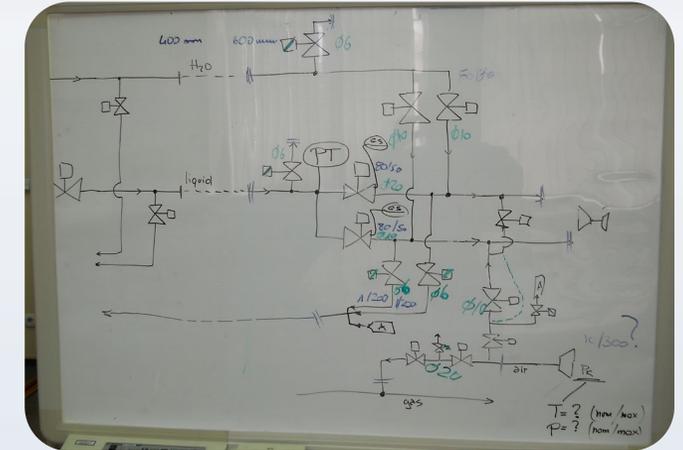
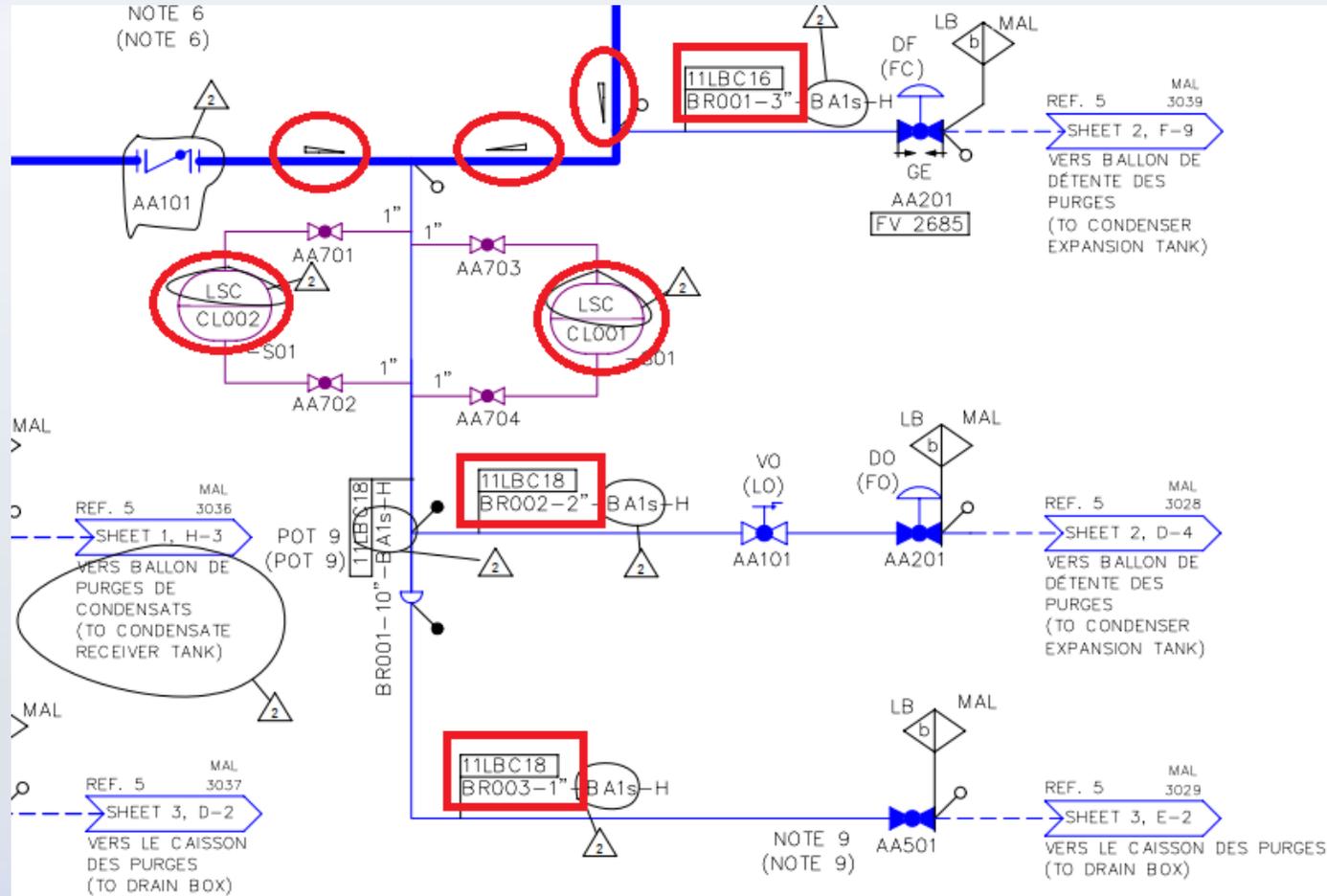
- Real-time performance monitoring
- AI-driven anomaly detection
- Predictive failure modeling
- Complete audit trails, SOP tracking and validation



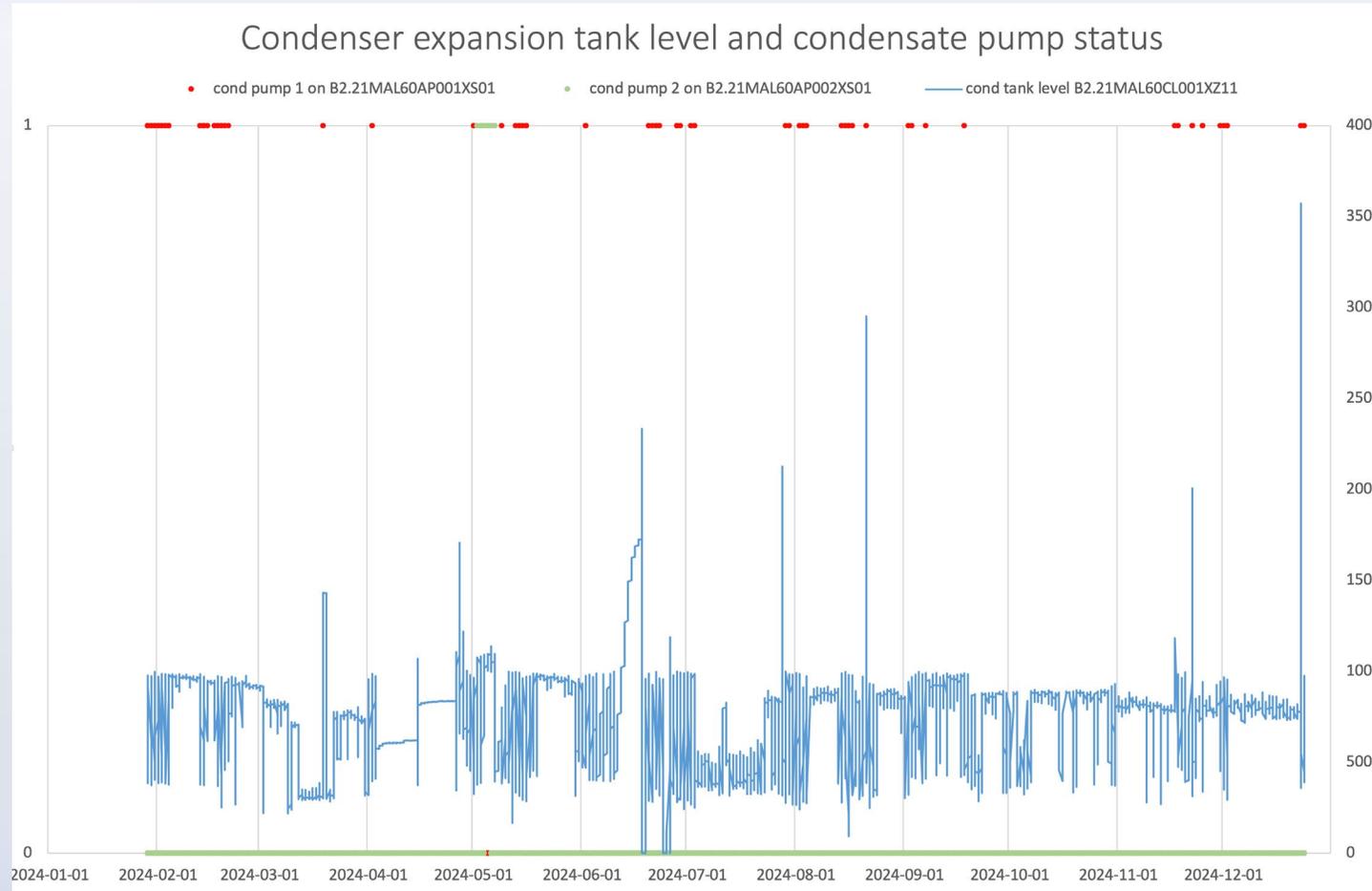
Case Study – 400MW ST shaft bending



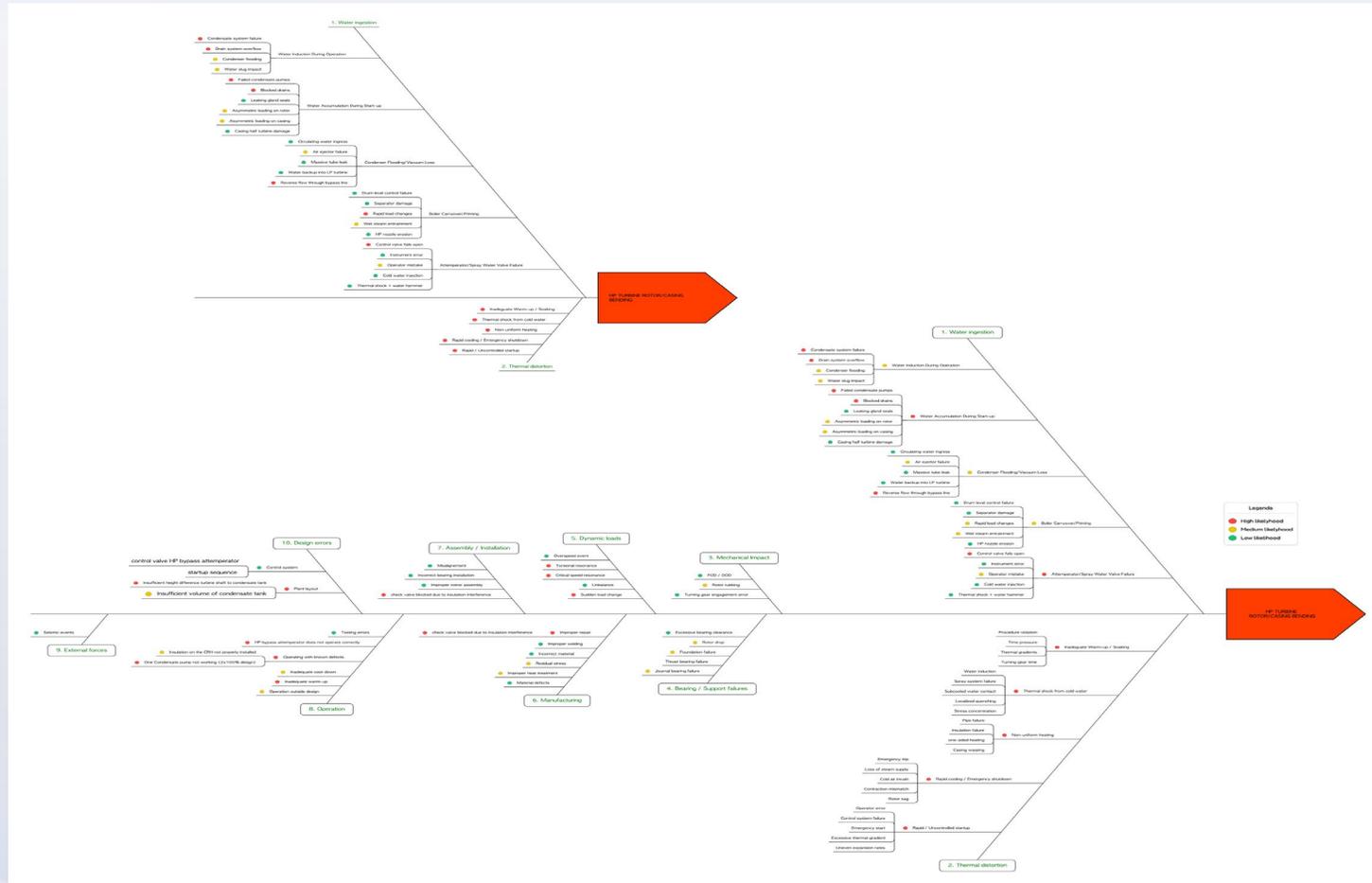
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Case Study – 400MW ST shaft bending



Digital Twin Architecture for Insurance Tasks

Insurance Applications Layer

Risk Assessment

Parametric Triggers

Claims Processing

Premium Calculation

Digital Twin Processing Layer

AI/ML Analytics

Predictive Models

Anomaly Detection

Performance Trending

Data Collection Layer

IoT Sensors

SCADA Systems

Historians

CMMS Integration

Physical Asset Layer

Turbines

Compressors

Heat Exchangers

Control Systems

Traditional vs. Digital-Enabled Claims Timeline Comparison

Traditional RCA Process (8-16 weeks)

Site Visits → Forensic Analysis → Expert Consultation → Report Compilation

Digital-Enabled RCA Process (2-4 weeks)

Remote Assessment → AI
Diagnosis → Rapid

Time Savings: 65-75% reduction in RCA timeline
Cost Savings: 30-50% reduction in investigation expenses

Economic Impact for Digital Asset Management

Financial benefits breakdown showing comprehensive economic impact with ROI timeline and real facility example.

Annual Savings Breakdown (\$1.5M Premium Facility)



ROI Timeline



Break-even at 18-24 months | Positive ROI continues thereafter

Example: \$1.5M Premium Facility

PD Claims Savings (15%):	\$45,000
BI Claims Savings (12%):	\$65,000
RCA Cost Reduction (40%):	\$80,000
Premium Reduction (10%):	\$150,000
Parametric Admin Savings:	\$60,000
Total Annual Benefit:	\$400,000

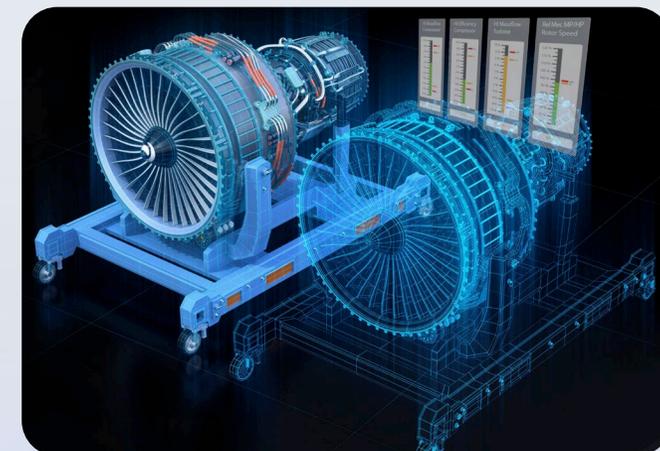
Implementation Roadmap

How to do it

- Phase 1 (Months 1-3): Critical equipment assessment & pilot
- Phase 2 (Months 4-6): Digital twin development & IoT deployment
- Phase 3 (Months 7-9): Integration & training
- Phase 4 (Months 10-12): Insurance product optimization

Security & Compliance

- ISO/IEC 27001 certified approach
- Air-gapped operational systems? New technologies?
- Blockchain immutability
- Full regulatory compliance (API, ATEX, SIL, FDA and may more)



The Digital Transformation Toolkit

- Digitalized P&ID, electrical schematics with live data integration
- Additional sensors or IoT-sensors for legacy equipment retrofit
- Monitoring and diagnosis tools implementation
- Tools training and tuning
- Insurance relevant triggers and patterns generation

The future developments:

- Augmented Reality for remote inspection and recording
- Blockchain-based maintenance records



Conclusions

- Digital twins in risk assessment and claim handling are beneficial both to the insurers and the insured in terms of:
 - Cost
 - Availability
- The challenges and efforts to implement digital twins are relevant
- Digital Twins and AI are tools supporting the experts, not replacing them





The 23rd International Asset Facility and Maintenance Management Conference

"Every minute of delay costs you money.
Every uninstrumented asset is a hidden liability.
Let's transform your risk into competitive advantage."

THANK YOU!



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