

AVEVA

How digitalization
improves pipeline
safety management



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Pipeline safety challenges

Pipeline safety challenges

An effective Digital Safety Management system

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Pipeline safety and regulatory compliance challenges

Oil & Gas Pipeline Operator's utmost priority is achieving operational safety excellence above all else. Failing to do so can result in consequences ranging from fines to loss of human life. Pipeline Operators are challenged every minute of the day to maintain a safe track record ensuring a Company's reputation remains positive, customer and public confidence, and maintaining a license to operate.

Most pipeline incidents can be attributed to disconnects within a plant or pipeline network. The more complexity, risk, and consequence associated, the more important it is that every inspection, maintenance and repair task is carried out correctly, consistently, in full knowledge of the relevant information and in accordance with industry regulations and best practices. Managing the safety of a process, no matter how complex, requires coordinated actions in order to address multiple, dynamic activities and circumstances.

Key challenges are:

- Data management issues or disparate information systems makes it difficult to perform safety work activities
- Lack of digitized comprehensive standardized procedures (Who, What, When, Where, How)
- Lack of awareness, training and accountability with key personnel



An effective Digital Safety Management system for pipelines

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An effective Digital Safety Management system for pipelines

Safe and effective pipeline operation requires awareness and management of many linked activities. Such activities can then become complex processes that must be performed consistently and effectively. Examples of such activities include design, construction, operations, maintenance and integrity management.

A Digital Safety Management system is the key to closing safety gaps which can lead to infrequent yet catastrophic accidents.

An effective Digital Safety Management system:

- Provides a clear, current overview of all planned and in-progress work on a facility
- Enables operators to plan more effectively and to complete both routine and ad-hoc maintenance tasks more efficiently
- Reduces risks both to personnel and to the facility itself
- Minimizes incidents and costly downtime



What is Digital Safety Management?

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Introducing Digital Safety Management

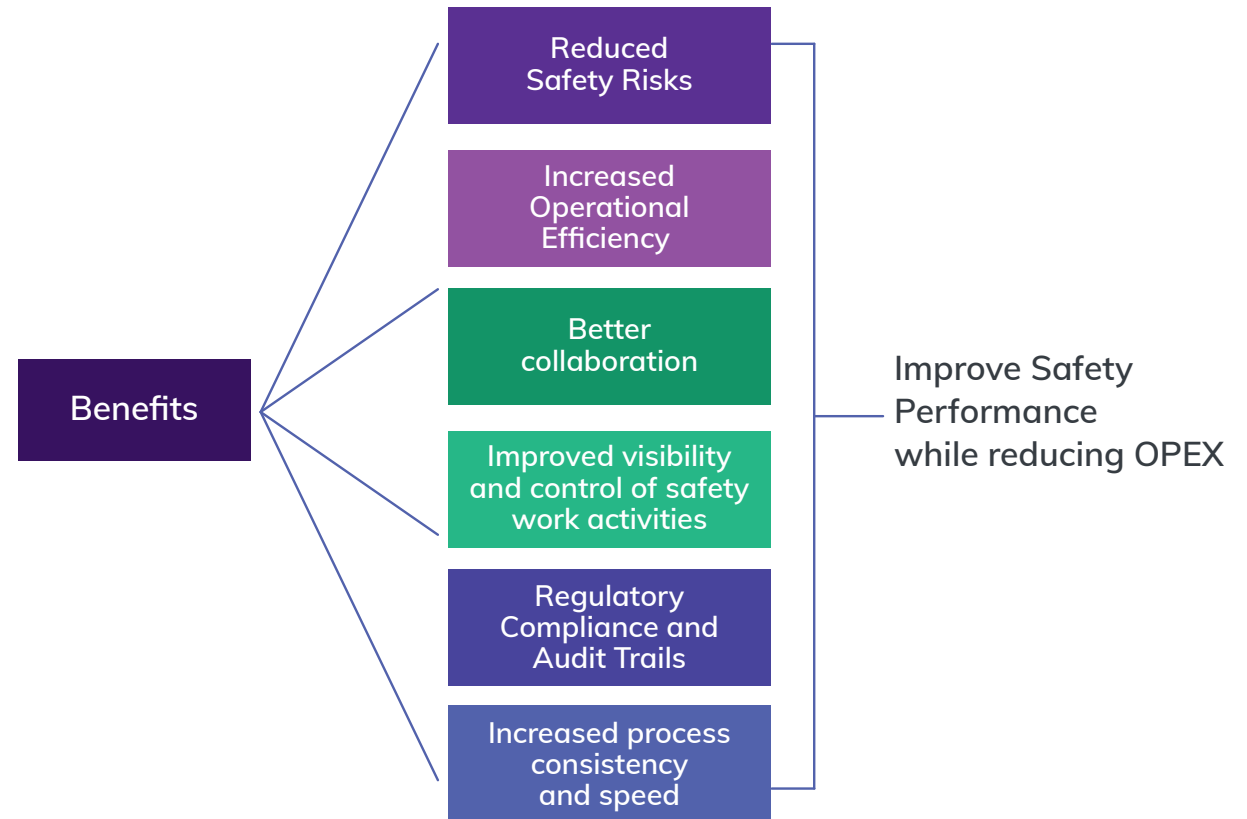
AVEVA's Digital Safety Management solution is a comprehensive, data-centric Work Permit solution designed to minimize and mitigate operational risks for each work order activity by ensuring every new construction project, maintenance or repair task in addition to regulatory O&M inspection are performed safely and consistently.

Incorporating regulatory requirements, company and industry best practices, Digital Safety Management supports a company's O&M initiatives and drives improvement within each of the company's pipeline safety programs. It enables digitalization and streamlining of safety work processes that allows better control of the inspection, maintenance and modification work, leading to improved operational safety and efficiency of its plants and pipeline operations.

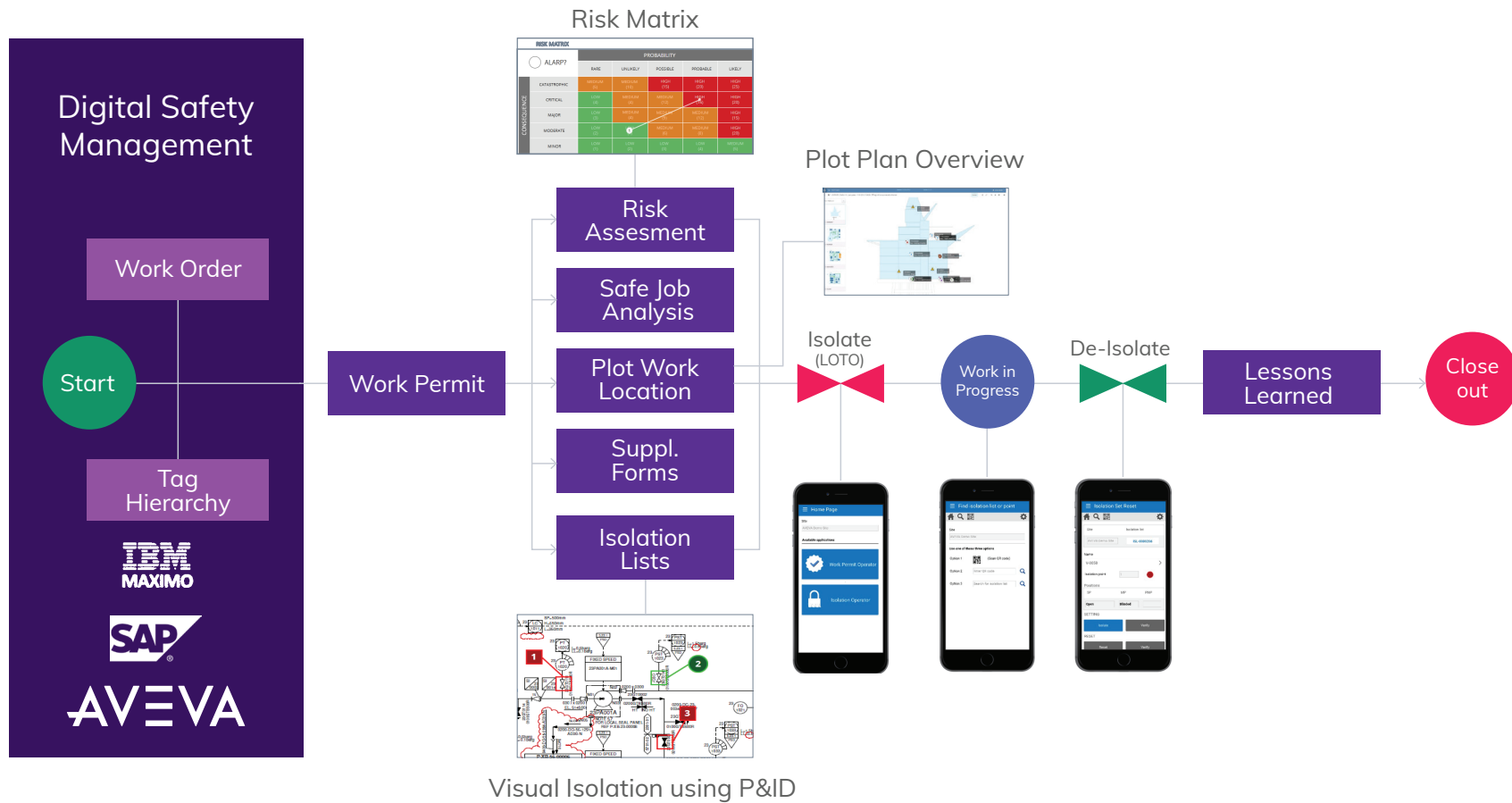


Benefits of Digital Safety Management

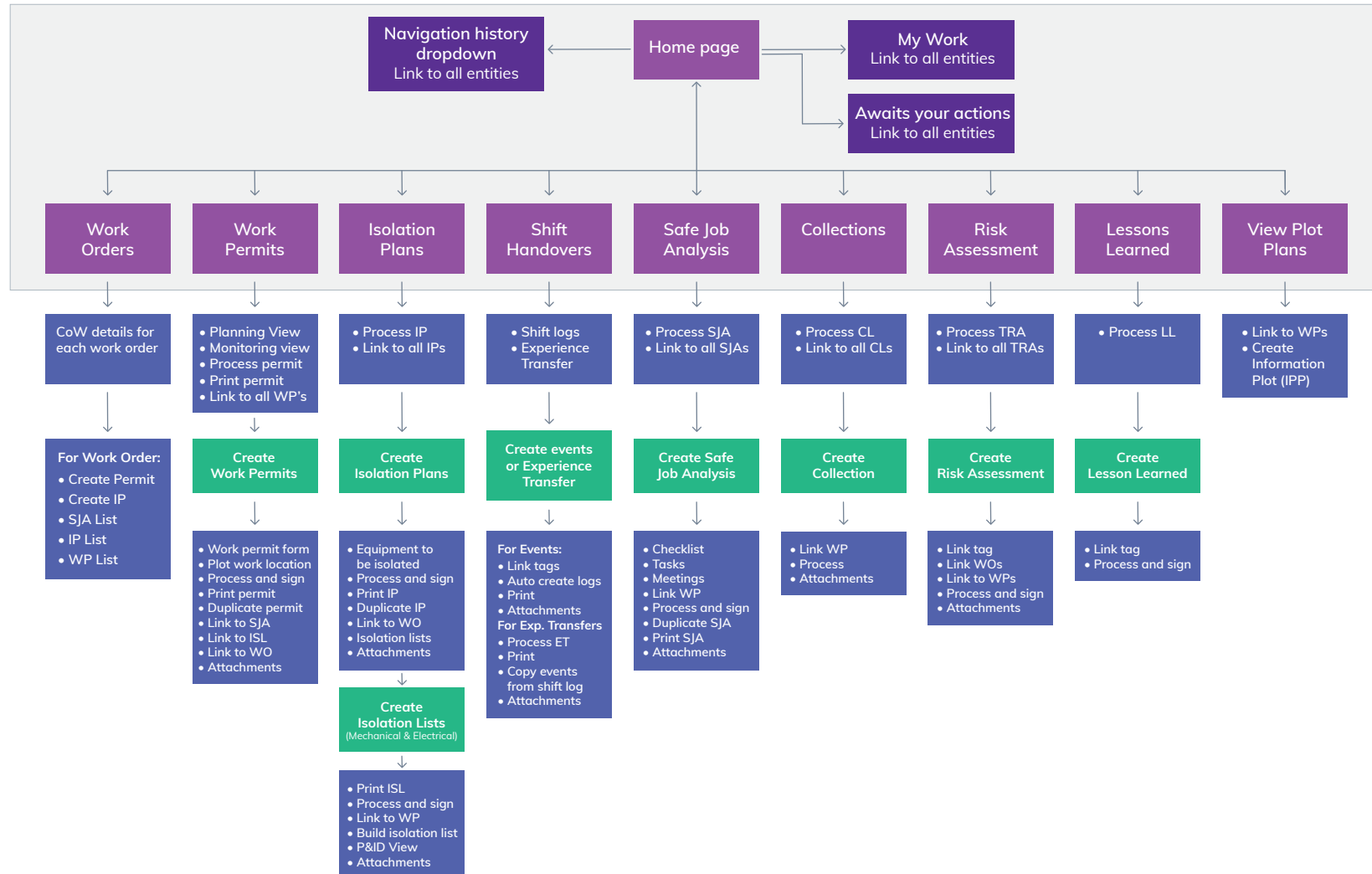
Among the many benefits of a strong Digital Safety Management program are reduced safety risks, increased standardized processes across multiple assets, reduced operating costs through saved labor, and audit trails that adhere to regulatory requirements.



High level overview of the workflow – Digital Safety Management



Detailed sitemap of the workflow



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1. Permit management

Permit management is the glue that holds together all parts necessary to support for an effective Change Management program. A work permit is created for each activity requiring Change Management protocols. Within the Digital Safety Management system, the supporting tasks are then routed to the necessary stakeholders responsible for ensuring the work activity. Elements connected to each work permit typically encompass isolation planning, safe job analysis, collections, risk assessments, lessons learned, visual plot plans, and shift handover when a work permit carries over consecutive shifts through completion. After the work is completed, the work permit is archived for future reference purposes and meeting regulatory auditing requirements.



2. Risk assessment

Each activity associated with a work permit carries a degree of complexity, level of severity, and a consequence should the activity fail to be performed properly. The risk assessment module is a configurable risk matrix that provides insight into the complexity of the task being performed and the level of experience, qualifications, and management approvals necessary to be involved in the work permit planning, approval, and work execution process.

Consequence	Catastrophic (5)	5	10	15	20	25
	Critical (4)	4	2 8	3 4 12	1 16	20
	Major (3)	3	6	5 9	12	15
	Minor (2)	2	4	6	8	10
	Negligible (1)	1	2	3	4	5
	Description	Rare (1)	Unlikely (2)	Possible (3)	Probable (4)	Likely (5)
Probability						

3. Isolation management

The isolation planning module in the Digital Safety Management system allows the responsible stakeholder to create the isolation list directly from the P&ID, then submit to other stakeholders for review and approval in advance of the work being performed. Through mobile extensions, the isolation list can be accessed by the maintenance personnel. As the isolation is performed, the Digital Safety Management system can digitally timestamp and track the isolation as each step is performed with workflow management mobile extensions.

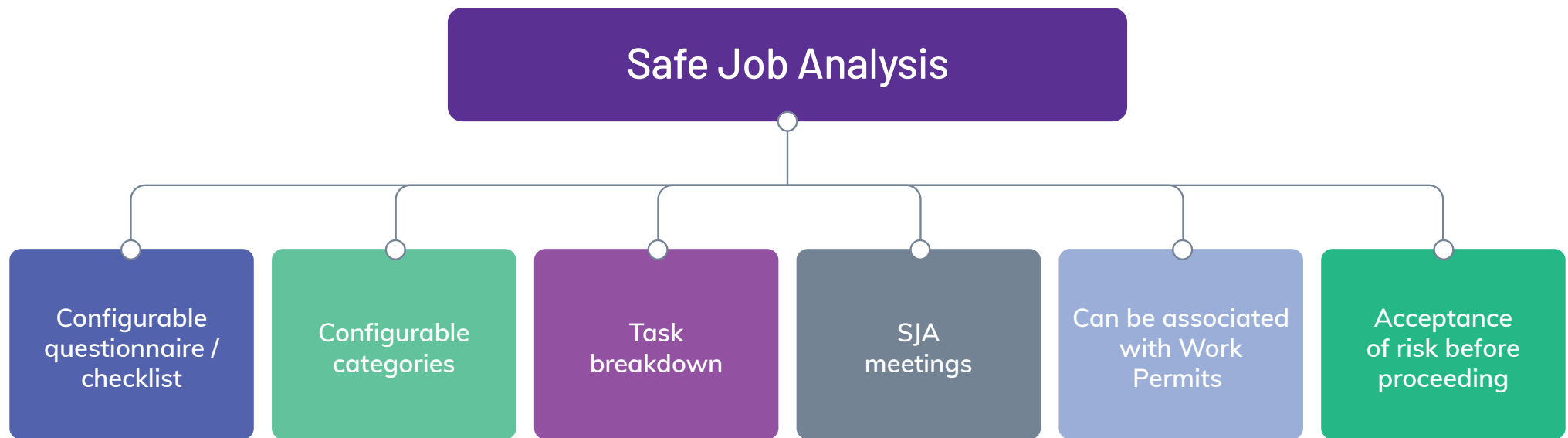
Mechanical Isolation List - built directly from the P&ID

#	NAME	SP	MP
1	JK001	Open	Closed
2	PG-609	Closed	Open
3	TAG-123	Open	Blinded
4	LG-607C	Open	Closed
5	JK0003	Closed	Open
6	XT-602	Closed	Open
7	LG-607A	Closed	Open
8	13ESV5002	Closed	Open
9	63L9003	Open	Closed
10	FV-006	Closed	Open
11	RV-90042	Open	Closed

Equipment to be isolated: Z0VA001 PRIMARY INLET SEPARATOR

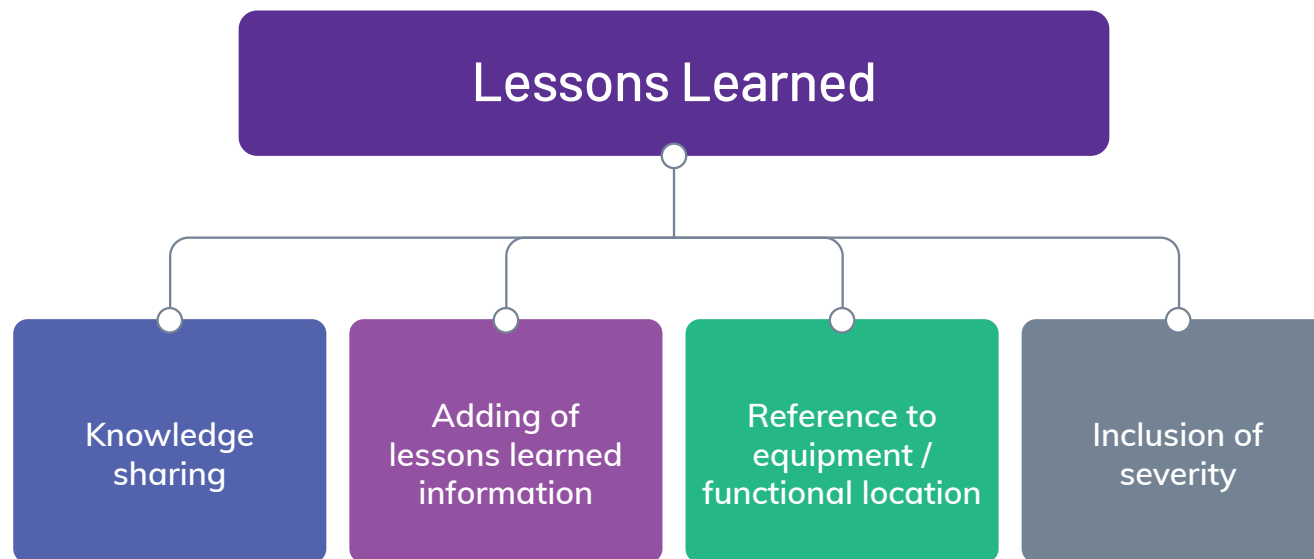
4. Safety job analysis

A safe job analysis is essential for each work permit within a Digital Safety Management system. The Safe Job Analysis connects operational procedures to the work permit to address safe work practices to assure safe conduct of operating, maintenance, and emergency response activities that impact pipeline safety.



5. Lessons learned

Lessons learned are essential to an operator's continuous improvement program. The lessons learned module can link every lesson learned to a work permit, tag name, or any other object ID to be reviewed by the operator based on their frequency of review. Capturing Lessons Learned in a work permit and associating them with a tag name or object ID, enables future work permits linked with the same tags or object IDs to view past lessons learned for awareness and to avoid repeat occurrences.



Digital Safety Management



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Digitalize permit-to-work system

Challenges

A leading oil company in Asia Pacific was facing challenges with its existing manual permit-to-work system. The manual process resulted in a lot of communication and collaboration issues between the maintenance workers, area owners, and HSE officers. This resulted in increased operational risks and costs due to inefficiency and poor documentation.

Solution

AVEVA's Operational Safety Management solution was deployed to digitalize and automate the permit-to-work system. Through the unified system, the company created an online permit-to-work system that streamlines and standardizes the safety work processes in all facilities across multiple sites.

Benefits:

- Facilitates the remote monitoring of the maintenance activities at a central location
- Improves control of the execution of inspection, maintenance and modification works at plants
- Improves the safety of its plants' operations and compliance with relevant safety regulations
- Reduces insurance premium due to lower operational risks



Digitalize inspection process

Challenges

A global oil major was facing challenges with its inspection and maintenance process for Corrosion Under Insulation (CUI). Planning the inspections required a high level of skill in interpreting 2D drawings in order to identify high risk areas and then validating these in the field before passing this information to the risk-based inspection team. This process caused further delay in assessment, resulting in costly downtime.

Solution

AVEVA's Information and Operational Safety Management combined with AVEVA Mobile Operator were deployed to digitalize and streamline these inspection activities, eliminating the need for multiple visits to the field to carry out corrective maintenance. The improved digital inspection process reduces the risk of further deterioration or failure leading to production outages.

Benefits:

- Overall improvement in the effectiveness of CUI programs
- Reduce inspection costs by up to 20%.
- Time spent in the planning process reduced by up to 60%
- Reduce field trips by up to 70% leading to lower Health, Safety, Security and Environmental (HSSE) exposure



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Why partner with AVEVA?

AVEVA's portfolio of software solutions for the Oil & Gas industry is uniquely positioned to drive digital transformation initiatives in the engineering, procurement, construction, operation and maintenance of pipeline assets. With more than 50 years of industrial software innovation and 23 years of experience in Digital Transformation, AVEVA has an unmatched ability to understand the challenges faced by the Oil & Gas industry, offer advanced technologies to empower more efficient and unified business environments, and provide the best execution approach to implement a digital roadmap that aligns with each customers' individual objectives.

Our Differentiators

1

Where we add value

- Help customers save \$90M-\$320M/yr implementing asset performance, planning & scheduling and optimization
- A vast industrial software portfolio that enables optimization of the integrated value chain
- Higher digital maturity and combined value across the asset and operations lifecycles

3

Our understanding of your challenges and needs

- Guarantee environmental and public safety
- Adhere to changing industry regulations
- Environmental sustainability
- Stay competitive in the digital age
- Make better decisions faster

2

Our credentials

- World leader for Pipeline monitoring and control software
- 23+ years in Digital Transformation
- 70% of the America's pipeline mileage
- More than 900K miles of pipeline

4


Our approach to digital transformation


- People, Process & Technology-in that order
- A holistic approach which empowers all personnel with the right enabling technologies and training to transform work


AVEVA

We'll take you there™

For more information on how Digitalization improves pipeline safety management please visit:
sw.aveva.com/asset-performance/asset-maintenance/control-of-work

 [aveva.com](https://www.aveva.com)

 [linkedin.com/company/aveva](https://www.linkedin.com/company/aveva)

 [@avevagroup](https://twitter.com/avevagroup)

About AVEVA

AVEVA is a global leader in engineering and industrial software driving digital transformation across the entire asset and operational life cycle of capital-intensive industries. The company's engineering, planning and operations, asset performance, and monitoring and control solutions deliver proven results to over 16,000 customers across the globe. Its customers are supported by the largest industrial software ecosystem, including 4,200 partners and 5,700 certified developers. AVEVA is headquartered in Cambridge, UK, with over 4,400 employees at 80 locations in over 40 countries.

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