WHITE PAPER

The real value of Digital Transformation in the Oil and Gas sector

EXECUTIVE SUMMARY

The digital transformation in the Oil and Gas industry is increasingly providing greater assertiveness in decision making by managers based on the best and most efficient data analysis of the operation.

In this sense, we can understand how true applications of Vidya's software can solve problems such as inefficient fabric maintenance process, low operational safety and high maintenance costs due to low predictability of failures in the Oil and Gas industries.

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SUMMARY

In this document, we have organized the main challenges present in the Oil & Gas industry from the analyses performed by our engineers, as well as the solutions proposed for each of the disciplines. This way, you can read the whole document or, if you identify more with one of the problems presented, direct your focus to the specific section using the buttons below!

INTRODUCTION

Some of the greatest challenges faced by managers in the Oil & Gas industry are ensuring the integrity of the operation as well as the safety of the workers. But performing this task in an undigitized and bureaucratic environment amplifies even more the difficulty.

For this reason, the technological advances made possible by Industry 4.0 have begun to take into account the difficulties in managing asset performance and ensuring the safety of workers in the field. However, even with the emerging need to apply these technologies, the digital transformation process in these industries is still very slow.

The McKinsey Global Institute's research shows that almost every company has been running digitization projects across various parts of its operations.

However

70% *of such efforts have not moved beyond the pilot phase.*

In other words, ***not only the problems remain, but the operation costs increase more and more and the workers continue to be subjected to constant risks.*** This is further confirmed by one of our surveys conducted with industries in the sector, in which it was possible to list the three problems most present in their operation:

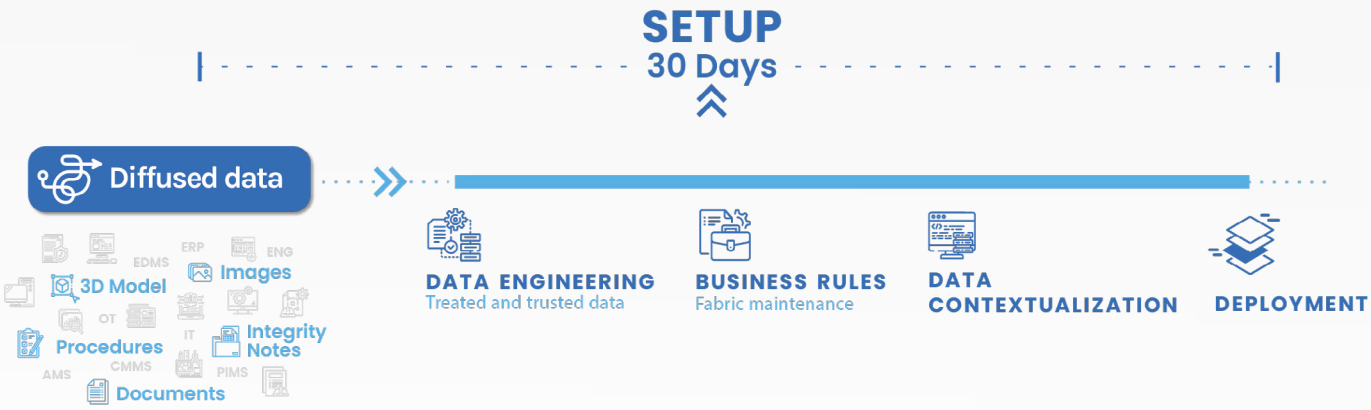
1. ***INEFFICIENT INSPECTION OF STRUCTURAL INTEGRITY.***
2. ***HIGH MAINTENANCE COSTS AND LITTLE PREDICTABILITY OF FAILURES.***
3. ***LOW OPERATOR AND OPERATIONAL SAFETY.***

In this way, ***we seek to delve deeper into the needs of these industries*** and generate even more value for the digital transformation process that is gradually becoming more urgent for the sector.

Vidya Technology and Digital Twin

According to a research on digital transformation in the Oil and Gas market conducted by EY, almost 66% of people believe that ***the lack of ability to make rapid changes is the biggest challenge*** in adopting new technologies in their operation.

To mitigate the problems of the operation and the slow process of applying new technologies, Vidya's platform seeks to solve the lack of digitalization in the Oil and Gas industries by improving data collection and processing, optimizing the efficiency and safety of these companies and increasing the predictability of operation failures, ***with a deployment of only 30 days.***



Our software is a true Digital Twin, which creates a constant flow of data between the real and virtual environment, creating a truly data-driven and transparent context, ***optimizing the decision making of industry managers.***

Proving this, we will relate the most present problems in the industrial operation of the Oil and Gas sector with real applications of our software, showing how it can ***drive the digital transformation*** of the operation and maintenance of these industries.

Digital Fabric Maintenance

Dealing with structural integrity in the Oil and Gas sector reflects directly on the battle against corrosion, even more so in the case of offshore plants.

Because of the environment in which they need to be inserted to run their operations, the equipment and structures end up being subjected to a severe deterioration process, which requires monitoring and maintenance in order not to generate risks to the operation. In an environment that is not very digitalized, the inspection process of this problem is very susceptible to human error, time consuming, and still not very effective, since operators go to the field and outline the maintenance planning in a very analogical way, making it difficult to analyze components that are difficult to access, besides being subject to risks in the operation.

Finally, in the case of errors in maintenance planning, operational expenses due to rework or unplanned downtime of the operation still generate millions of dollars in losses, showing the need for digital transformation.

Virtual Corrosion Assessment on Oil & Gas FPSO

Based on the same challenges presented above, below is one of our software applications for the Oil & Gas industry with the objective of improving the structural integrity management process of an FPSO, reducing operational costs and the need for people on board.

APPLICATION EXAMPLE

SOLUTION

The proposed solution to the challenges faced at the FPSO involves virtualizing the corrosion assessment and data analysis process for optimized maintenance planning and reduced people on field.

The steps necessary for the deployment of the platform involved the ***processing and uploading of the 3D model*** of the assets involved in the project by our engineering team and the ***contextualization of all the already existing information and data*** from the industrial plant and the fabric maintenance process of this industry.

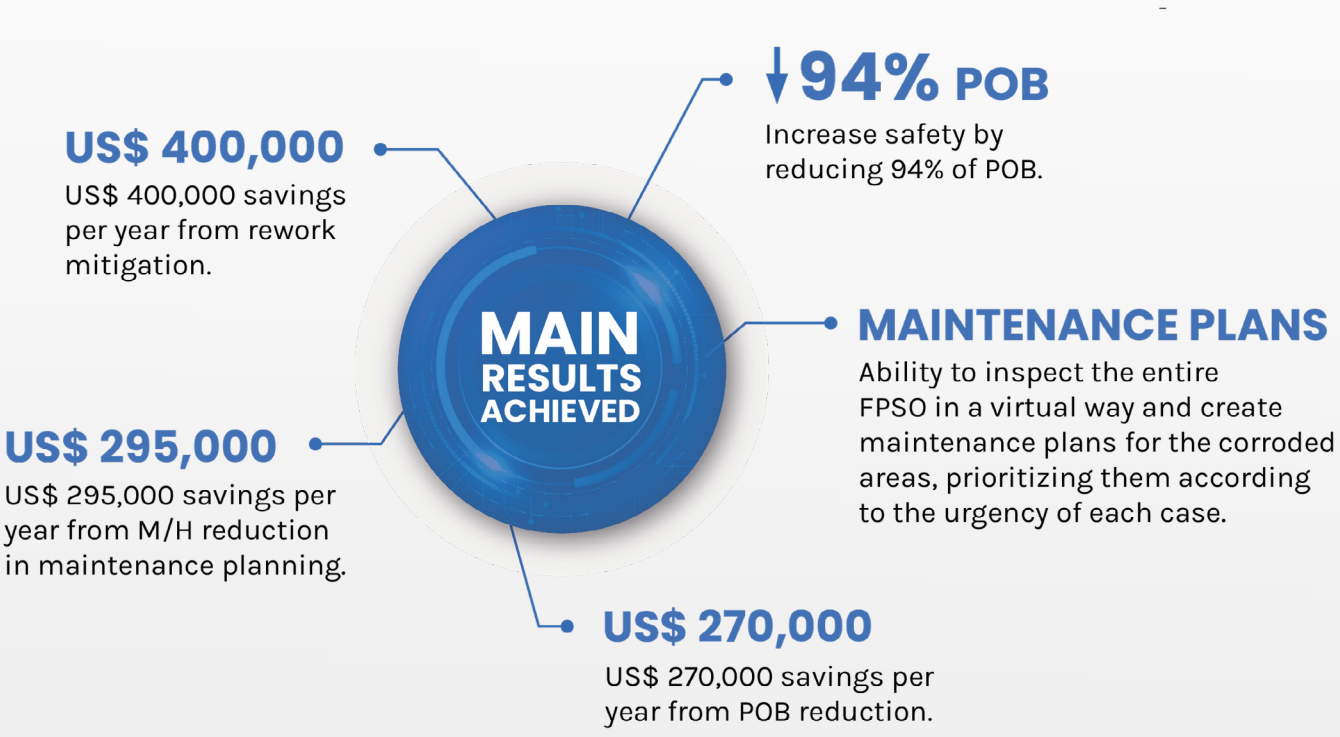
Then, one of our qualified inspectors went to the FPSO to ***collect images of the entire platform with 360° cameras and drones***, which were uploaded into the platform and synchronized with the respective components of the 3D model. With all the collected images, it was possible to ***process them with our Artificial Intelligence trained to detect corrosion points automatically.***

Thus, the platform allowed operators to ***navigate through the 3D model synchronized with field photos*** and the AI corrosion markings to remotely and quickly assess the integrity of the FPSO. To do this, the inspector can fill in checklists with the client's inspection procedures, the degree of degradation and severity of corrosion in each component, and mark on the 3D model the corroded areas that need to be painted.

Based on the information inserted into the platform and the corrosion evaluation performed by the inspector, automatic coating plans were ***generated and customized dashboards*** were developed with main inspection and maintenance parameters.

RESULTS

With all this set, we had the delivery of a fast, hybrid and assertive corrosion assessment process through Vidya's Platform. The AI Image Analytics and the virtual inspection by operators of the corrosion spots on the FPSO allowed the creation of complete and optimized coating plans to the industry. In other words, since the implementation of Vidya's Digital Twin, the main results achieved are:



US$ 400,000

US$ 400,000 savings per year from rework mitigation.

94% POB

Increase safety by reducing 94% of POB.

MAINTENANCE PLANS

Ability to inspect the entire FPSO in a virtual way and create maintenance plans for the corroded areas, prioritizing them according to the urgency of each case.

US$ 295,000

US$ 295,000 savings per year from M/H reduction in maintenance planning.

US$ 270,000

US$ 270,000 savings per year from POB reduction.

Want to know more details about this case, from the application to the final results obtained?

Access the complete report by clicking the button below!

Study Case

PART 2

Process Efficiency

The second issue raised by our customers related the high maintenance costs with the low predictability of equipment failure. In this case, the same analog inspection process that affects structural integrity also interferes in equipment maintenance.

Due to the low collection of productivity data, or the lack of centralization and contextualization of this data obtained in the operation due to the various diffuse systems used, there is little real understanding of the situation of the assets. The consequence generated by this is the need to use corrective maintenance methods, dealing with the problems of the operation only when they have already happened.

Therefore, in the absence of failure predictability methods, there is a significant increase in the industry's operating costs, especially in the case of unplanned downtime in the operation due to these errors.

Failure Prediction of Iron Roughneck equipments on upstream Oil and Gas industry

To understand the real application of our software in this case, below is one example for the Oil & Gas industry with the objective of improving the understanding of operation data, enabling error prediction, and reducing unplanned downtime.

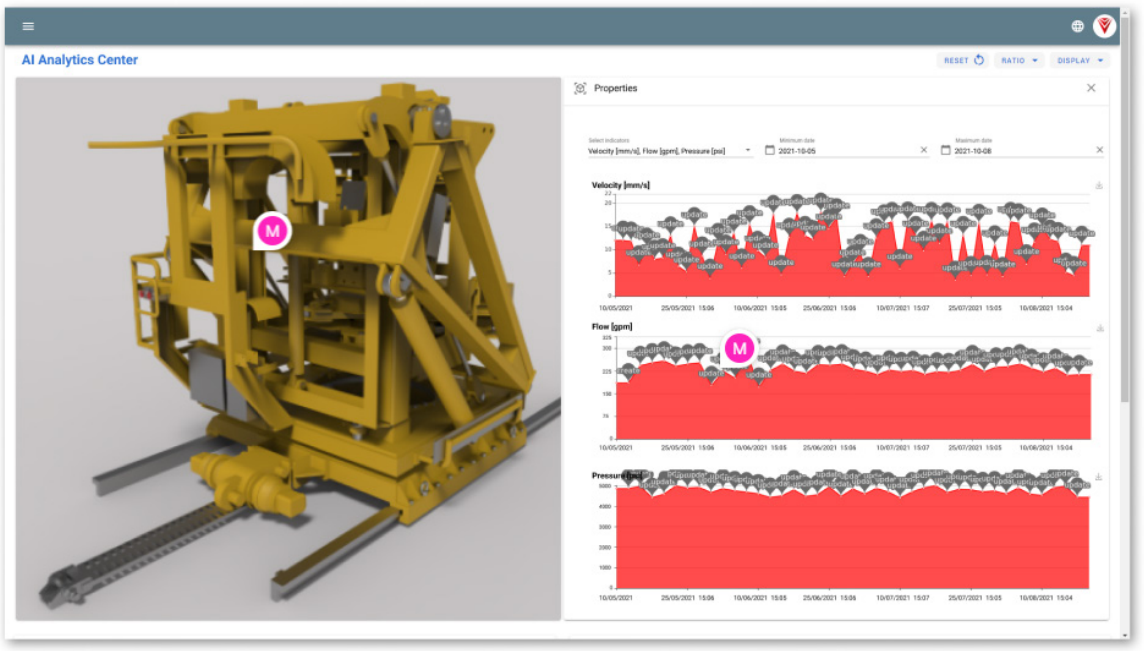
APPLICATION EXAMPLE

SOLUTION

The proposed solution involved the digitization of processes with the centralization and contextualization of the data generated by the equipment, aiming to create a data-driven environment in the industry and increase the efficiency of the process from an authentic Digital Twin.

For this, a 3D model of the Iron Roughneck was processed and inserted into Vidya's platform. In addition, our engineering team was responsible for processing, contextualizing and linking all the already existing data, just as attributes of each structural component, TAGs, workflows, inspection, with its respective component in the 3D model.

To complete the data collection structure, our team integrated the platform with the client's PIMS (Plant Information Management System) to process the data already collected by the sensors on board regarding the integrity and efficiency of the Iron Roughneck's operation. This allowed us to supply our AI algorithms with the available historical data to generate equipment failure predictions and display this data in custom dashboards for better analysis.



RESULTS

With all this set, we had the delivery of a fully remotely operable platform. Because of the constant exchange of information of the Digital Twin, the data collected by sensors can now be analyzed remotely and operated in just one place, allowing the reduction of workers in the field and error prediction in the industry. In other words, from the application of our Digital Twin in the Oil and Gas sector, the main milestones possible to achieve were:

REDUCE

Reduced time spent on maintenance planning, with the help of Analytics to cross-reference the wellhead and christmas tree efficiency projections and maintenance costs

DECREASED

Decreased OPEX spent on operation and maintenance, achieving 30% of savings in maintenance costs.

Want to know more details about this case, from the application to the final results obtained?

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Study Case

Operational Safety

Finally, the third challenge highlighted brought the issue of operational and field workers' safety, which are subject to constant risks due to the adverse environment of the Oil and Gas industries.

The processes of intervention in a problem in the operation are usually presented in extensive documents, such as HAZOP (Hazard and Operability Study), HAZID (Hazard Identification) and PRA (Preliminary Risk Analysis). To understand the sequencing of actions required to be taken in an emergency scenario, it is necessary to find among the many sources of non-integrated information which of the thousands of procedures that exist is relevant to that particular situation, in that particular component.

This evaluation is usually time-consuming and with prominent errors, and without any visual contextualization, it is difficult to associate TAGs and cross data to act as required.

Process Operational Safety Virtualization

Based on the same challenges presented above, it was possible to select one of our software applications for the Oil & Gas industry with the objective of digitalizing the risk analysis process and understanding the sequencing of actions needed to optimize decision making.

APPLICATION EXAMPLE

Process Operational Safety Virtualization

SOLUTION

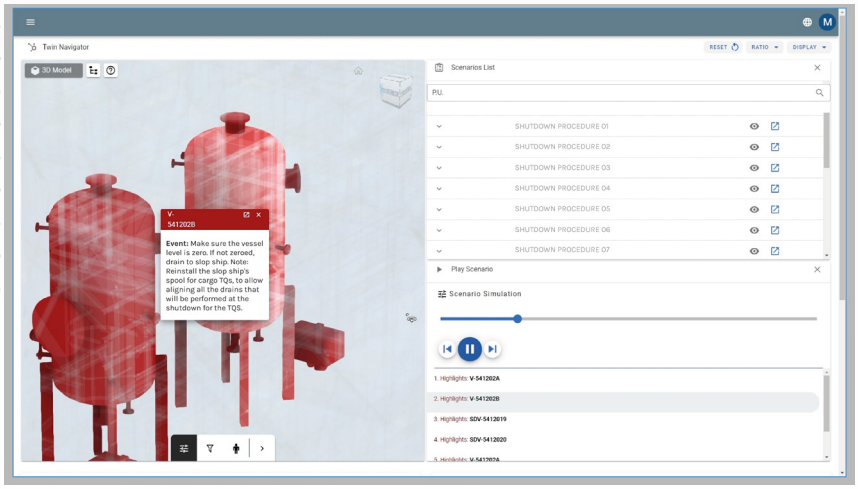
The proposed solution involved the digitalization of the risk analysis process in the industrial plant. For this, the related documents were centralized in Vidya's platform and visual simulations of the intervention process in the industry were created to understand the necessary sequencing of actions and optimize decision making.

The steps necessary for the deployment of the platform involved the processing and uploading of the 3D model of the assets involved in the project by our engineering team and the contextualization of all existing information related to safety procedures, such as HAZOP and PRA.

From this, it was possible to link the documents to the 3D modeling with VFiles technology and organize them in folders of their respective components, enabling the access and visualization of this information with a few clicks.

After contextualizing the data and separating the different procedures into their components, it was possible to feed the Scenarios feature into the Vidya system.

This feature consists in a visualization and animation tool capable of demonstrating events and their consequences, right in the 3D model. These events can be a risk, a sequence of actions, process triggers, sequence of physical processes, sequence of system processes, single operational stop procedures, anomalies or failures, that were previously mapped (in the engineering documents, HAZOP and PRA), and the actions needed to prevent or remediate these situations.



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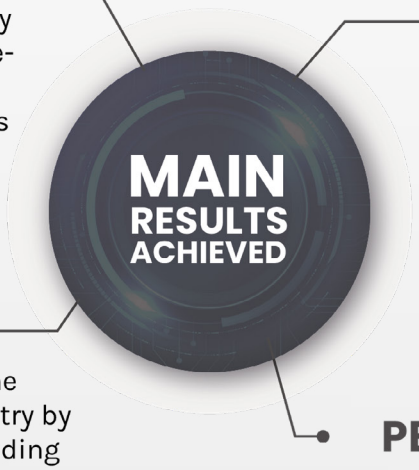

ANALYZE

Analyze in a visual way the intervention procedures in equipment and the consequences generated in the rest of the process.

REDUCE

Reduce workers in the field, with the possibility of remotely operating the system, and consequent reduction of their exposure to risks, leading to a drop in the number of incidents and injuries in the industry.

FACILITATE

Act more assertively on the risks present in the industry by facilitating the understanding and analysis of information such as HAZOP and PRA.

PERFORM

Perform shutdown planning in a more agile and visual way with the sequencing of actions shown in the Scenarios feature;

Want to know more details about this case, from the application to the final results obtained?

Access the complete report by clicking the button below!

Study Case

CONCLUSIONS

The implementation of new technologies in the Oil and Gas industries is increasingly becoming urgent and essential to deal with the management of integrity, efficiency and safety of assets in operation.

In this context, based on the analysis of the main problems present in these industries, we were also able to list some of the existing uses of Vidya's software for these cases.

Therefore, it is possible to understand the flexibility of our platform's applicability for the various objectives of the operation, such as reducing the number of people on board, equipment failures, accidents in the field and, mainly, operational costs.