Are You Ready for Your Next Turnaround?

mobideo

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About Turnarounds

Defining Turnarounds

In this eBook, a turnaround relates to a scheduled event in which an entire process unit of an industrial plant – from oil & gas and chemicals to power plants, utilities and manufacturing - is decommissioned for a period of time for revamp and/or renewal purposes. It's a blanket term that covers a range of more specific maintenance events such as inspection & testing (I&T), revamps and catalyst regeneration projects.

Turnarounds are also known as outages (in the power industry) and shutdowns, and are consequently often referred to as STOs. However, shutdowns are disruptions in normal operations and less planned than turnarounds, e.g., a shutdown can occur at any given time, without warning, as a result of failure, while a turnaround is a scheduled, planned break in operations that involves an overall shutdown of main production units.

Turnaround Goals and Complexity

Every turnaround is driven by different reasons, goals and objectives. Some are for the integration of a capital project that requires the shutdown of some or all production units. Others are driven by the need to optimize production performance, improve safety or comply with regulation requirements.

While some small outages are relatively easy to plan and execute, in general, turnarounds are completely different to any capital or normal project. They are complex and expensive, in terms of lost production while a plant is offline and in terms of direct costs for the labor, tools, heavy equipment and materials required for execution of the turnaround.

In most cases, turnarounds represent the most significant portion of any plant's annual maintenance budget. However, due to the high cost of lost production for each hour that units are down, mismanagement of a turnaround can very quickly affect a company's bottom line. Furthermore, turnarounds have unique project management characteristics which make them volatile, unpredictable and challenging. Often requiring decision-making under uncertainty, they're about assets, people and data; about understanding the risks and battling against the clock; about predicting the unpredictable; about planning, more planning and planning again, in order to achieve success. It's almost like going to battle.

"In preparing for battle I have always found that plans are useless, but planning is indispensable."

General Dwight D. Eisenhower

Turnarounds are Challenging

Never underestimate turnarounds. While their starting point is always known, the process involved to reach completion can often be complicated, full of surprises that easily lead to both delays and cost overruns. That's because turnarounds are complex, high-pressure, high-intensity events with many variables and challenges which can significantly impact the level of success.

"A large turnaround can include up to 150,000 individual activities. With this level of complexity, approximately half of all shutdown projects are delayed by more than 20% and 80% go over budget by more than 10%. Frequently, the work scope increases unexpectedly by up to 50%."

"Achieving Turnaround Success", Digital Refining

Furthermore, turnarounds have to be continuously and constantly managed. That's no mean feat for projects that can consist of hundreds/thousands/tens of thousands of activities that need constant coordination to ensure successful on-time/on-budget delivery.

The list of factors that can impact turnarounds is extensive. Just consider some of the following key issues.

Challenge: Level of Complexity

Industrial turnarounds are neither simple or complicated; they are complex. They have multiple variables and unknown dependencies, many of which are only discovered after the actual start of the turnaround. The level of complexity directly correlates with meeting cost and schedule targets and consequently, the more complex the turnaround, the higher the risk of overspend and overrun.

"If you manage complex things as if they are merely complicated, you're likely to be setting your company up for failure."

"It's Not Complicated: The Art and Science of Complexity in Business", Rick Nason

Turnarounds can be likened to the VUCA world – the world of volatility, uncertainty, complexity and ambiguity - the combination of qualities that taken together typically characterize the nature of some of the difficult conditions and situations involved in turnarounds. **Volatility** because turnarounds often present unexpected problems during execution (even though the problems may not be difficult to understand and solve). **Uncertainty** because turnarounds lack real-time data and information required to analyze the situation and make appropriate decisions. **Complexity** because turnarounds involve a critical mass of activities and moving parts. And **ambiguity** because cause and effect relationships are often unclear and lack precedents.

Challenge: The Human Factor

In industrial workforces, people still tend to be managed by documents, forms and walkie-talkies. And that's why people - both industrial workers and managers - tend to be the biggest cause of inefficiency and risk in the workplace. It's the result of multiple factors, such as human error, lack of communication, insufficient/incorrect reporting, and decision-making based on assumptions and "gut feelings" rather than actual on-the-ground facts and data. Additionally, knowledge transfer and communication are two key human elements that continue to challenge the ability to deliver successful turnarounds.

Challenge: Management of Contractors

Third-party contractors are essential in turnarounds in order to meet the demands for specialized expertise and also to get the job done quicker. However, almost by definition, the motivation and drivers of these contractors are very different to those of owner-operators. Insufficiently familiar with the facility and often lacking the big picture, their productivity rate is very low.

Furthermore, the use of contractors can raise other issues, such as workforce competency, conflicts of interest, and awareness of work culture based on valuable hands-on knowledge and experience.

"Some industry experts suggest that over 70% of all turnarounds are failures and that 40% can be classified as "train wrecks".

"Paying Attention to the Leading Indicators of Turnaround Outcomes", Pete Shirley, Asset Performance Networks

Challenge: Scope

Scope is a constantly changing factor before and during any turnaround (unlike capital projects where it is clear and well-defined). It all revolves around scope creep – the project management changes that represent continuous or uncontrolled growth in a project's scope, at any point after the project begins. While this can occur when the scope of a turnaround project is not properly defined, documented or controlled, it is primarily because the actual status of any equipment involved in a turnaround is unclear until it is actually inspected. Consequently, turnarounds almost always involve the discovery of additional, unplanned work. Management of this unplanned work without impacting agreed timelines and budgets is a constant challenge, involving the creation and execution of post-discovery action plans, which is particularly difficult for non-critical items.

About 50% of turnaround overruns are related to scope creep and unplanned work during execution of the turnaround.

"Why Turnarounds Fail to Meet Management Expectations", TGE Industrial Services

Challenge: Scheduling

Every day that units are down and not producing, the plant is losing money. Consequently, management always pushes for the duration of the turnaround to be as short as possible, leaving little room for contingency plans and buffers. Since scope creep and unplanned work are an integral part of any turnaround, are delays inevitable?

In turnarounds, scheduling is a constant, ongoing challenge in any attempt to prevent delays. It requires the capture and sequencing of all activities; the assignment of resources and determination of duration of each activity; the horizontal and vertical integration of schedule activities; the establishment of critical paths for all activities; the identification of floats between activities; conducting schedule reviews and risk analyses; and updating the schedule. Furthermore, scheduling can be affected by a range of other issues, such as:

- Inaccurate quantities of resources - both manpower and equipment
- Unanticipated lead times for the procurement of previously-unknown unique parts
- Scheduling issues for personnel and equipment, e.g., reorganization and coordination of specialist workers and equipment according to the order of execution in the updated plan for the turnaround

Challenge: Safety

The protection of both personnel and equipment at all times is of paramount importance. But turnarounds pose enormous challenges for organizations whose ultimate goal is an on-time/on-budget, safe event. These challenges revolve around constantly growing inspection cycles, working with highly-complex technologies and ever-increasing demands for safety. The very definition of a shutdown – namely the plant has been taken apart and is not making money, the situation is constantly changing, tasks are unfamiliar, many contractors are involved and hazards are unknown – represents a high-hazard profile that directly impacts and challenges safety.

Are You Ready for Your Next Turnaround?

The common denominator of all these challenges is losing control of your turnaround. Losing control of the turnaround scope, scheduling, workers, contractors, bottlenecks and safety, ultimately leading to inevitable delays and overruns in timetables and budget.

Is there a more efficient alternative? All these issues can be improved by better management of industrial workforces. By being connected in real-time to what's going on in the field. By learning from past experiences to predict possible challenges. By raising the motivation, productivity and performance of workers and contractors through better communication. By reducing human inefficiencies and risks in the workplace. By sharing knowledge, knowhow and experience to generate more efficient and quicker solutions. By supporting decision-making based on actual facts and insights from the field.

It's time to gain control of your turnaround.

Digitalizing Industrial Workforces

It's All About Digital Transformation

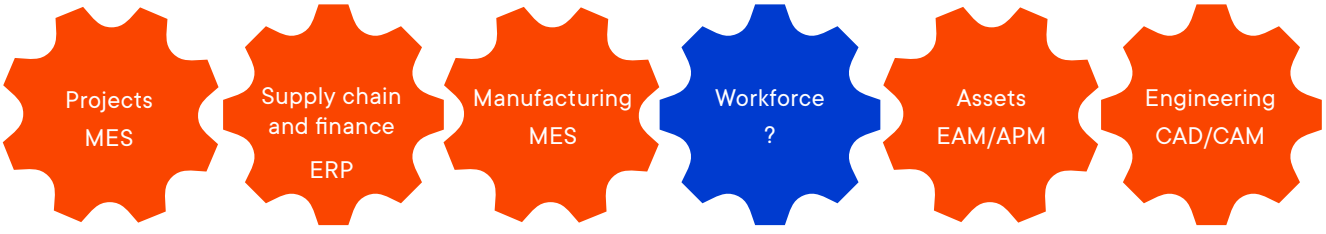
Digital transformation offers the opportunity to move away from manual processes and automate key areas of activity. Involving the integration of digital technologies - electronic tools, systems, devices and resources that generate, store or process data - in all areas of a business, it offers improved customer experience, increased employee productivity, reduction in overheads and improved compliance and security.

Consequently, companies across the globe are digitally transforming in order to improve business processes and develop new capabilities and business models. Entire industries are being disrupted, with actionable intelligence the key to success.

However, while owner-operators are investing heavily in computerizing all aspects of their businesses, they are still tending to ignore their most precious asset – their workforces – who continue to perform their tasks in ways that are essentially unchanged for over 100 years. Industrial workforces are still operating with a minimal toolset of documents and forms, with team collaboration based on meetings, mobile phones and walkie-talkies. This introduces extensive inefficiencies, mistakes and safety exposure while reducing revenue and increasing costs.

"20% to 30% of oil and gas companies have begun developing more aggressive ambitions based on disruptive business models."

"10 Oil and Gas Trends to Watch in 2019", Smarter with Gartner



How Can Workforce Digitalization Help in Turnarounds?

Digitalization of industrial workforces offers a paradigm shift in industrial workforce management. Perfectly aligned with current digital transformation initiatives, it's an opportunity to transform workforce effectiveness and safety through digitalizing work processes, thereby increasing productivity and enabling financially efficient outcomes.

In industry in general, and in turnarounds in particular, this introduction of workforce digitalization tools offers a range of benefits. These include support of the planning, organization and management of projects; the delivery of tasks for execution and storage of results; the tracking of performance; the provision of alerts/predictions concerning failures to meet performance projections and planned timetables; and the delivery of insights to support managerial decision-making.

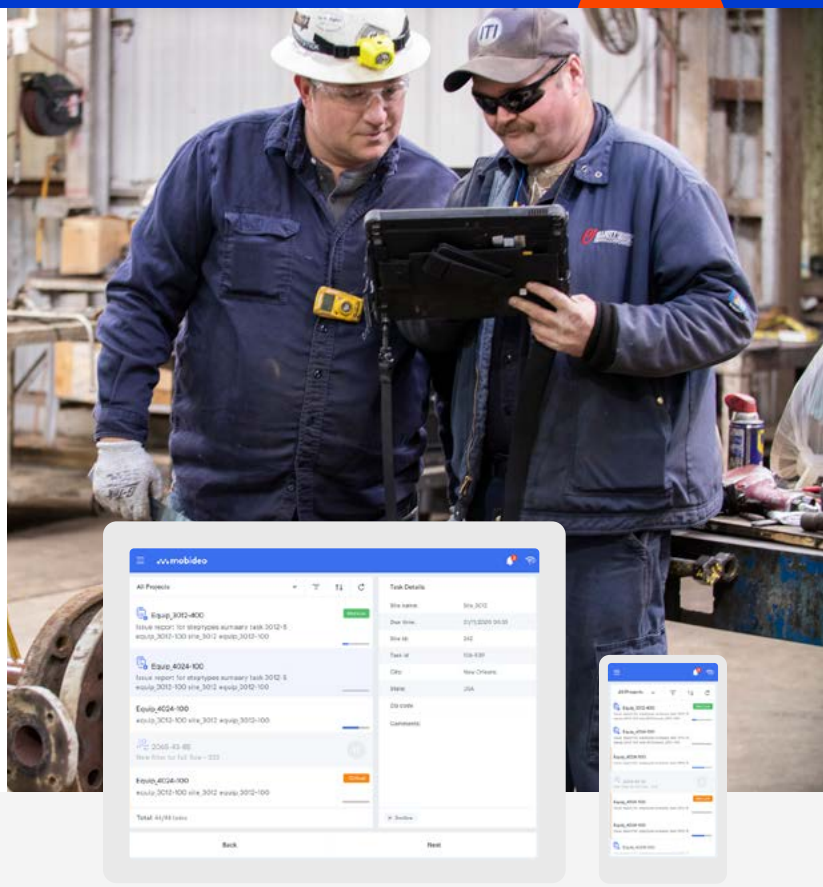
Mobideo's Solution: The Connected Workforce

Mobideo delivers the missing link in industrial digitalization with a platform that connects the workforce - workers, managers and all other stakeholders - optimizes complex work processes and empowers collaborative teamwork, contractor management and knowhow ingestion. This is achieved through the Mobideo App (connecting teams in the field), the Mobideo Contol Center (connecting managers to real-time information) and the Mobideo Optimizer (analytics delivering actionable insights for process optimization).

The Connected Worker (Mobideo App)

The Mobideo App enables workers to seamlessly access all the information they need to perform their work at the point-of-service. Based on existing SOPs and knowhow, it aggregates all essential data from multiple sources and presents it to workers in the context and order that tasks should be performed. Fully operational both online and offline on any mobile device (iOS, Android and Windows-based), the Mobideo App guides workers through the work process, reduces the likelihood of human error, validates that work is performed by-the-book, and enables communication and sharing of real-time work status with managers and peers.

In a turnaround, all this increases worker and team productivity; ensures compliance; improves accountability & traceability; reduces errors & re-work; and enhances workforce competence & safety.



Specific Features Relevant for Turnarounds

Complete data access

Access to required information in the field at the right time and location, delivering aggregation of all existing customer data resources contextualized around work packages – including documents and forms, enterprise application data and asset information - through a single point-of-entry.

Capture of field data

Step-by-step process execution allows granular visibility into task status, the capture of data input by the technician – including timestamps, location tags, signatures and images - and provision of a digital data trail.

Validation of adherence

Precise task execution with full adherence to processes and best practices.

Interaction with peers

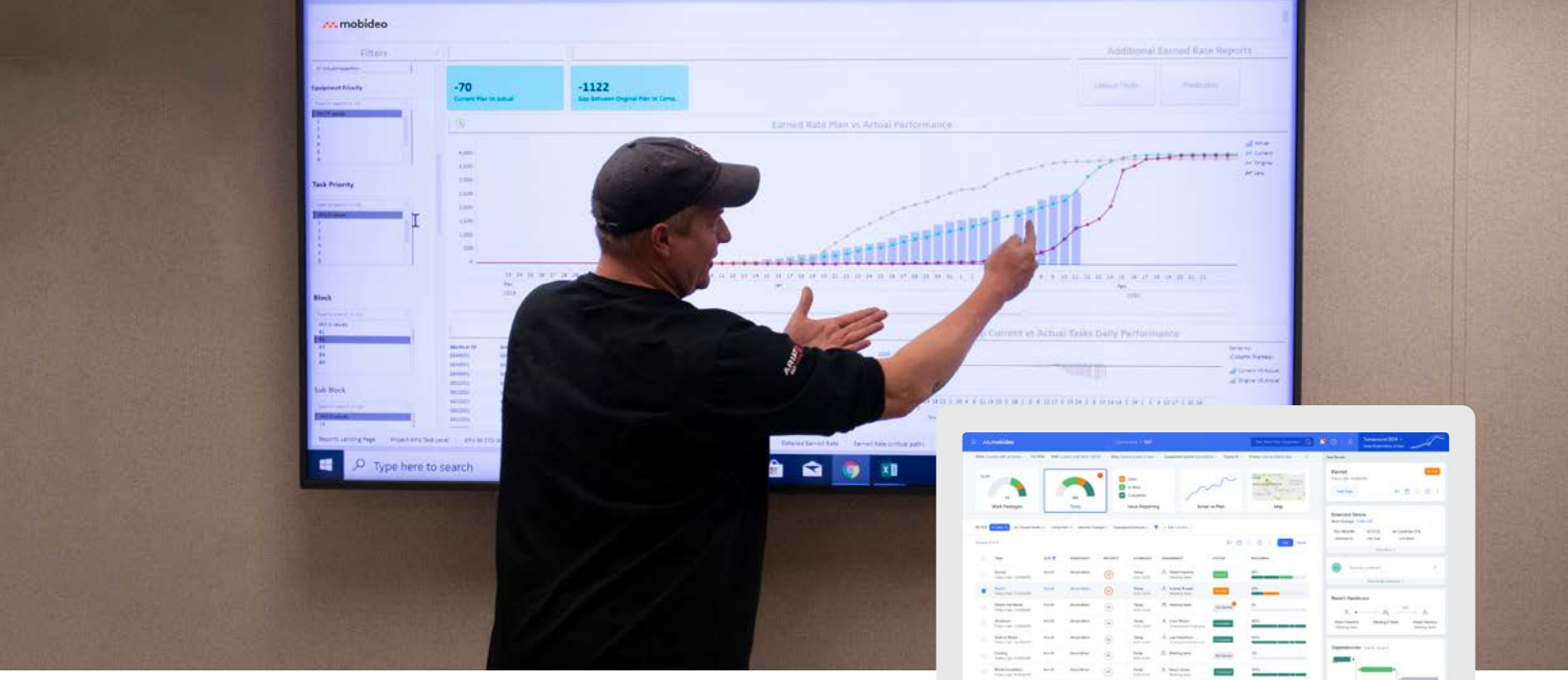
Contextual and automated communication with peers and supervisors.

Personalized interfaces

Customization of displays by language, role and skills.

Adaptive and agnostic

Online/offline operation on all mobile devices.



The Connected Manager (Mobideo Control Center)

The Mobideo Control Center connects managers at all levels, giving them real-time visibility and insights into the most detailed elements of all remote work activities. Empowering managers with situational awareness - by constantly monitoring activities and comparing them to predefined KPIs – it delivers alerts to deviations from plans, management by exceptions, and identification of critical risks to work processes. Furthermore, the Mobideo Control Center is easily customizable to specific business parameters and permits managers to formulate real-time decision adjustments - such as shifting priorities and optimizing resource allocations - based on instantaneous, granular data analysis, as well as enabling efficient coordination between different crafts and skills that are dependent on specific orders of execution.

In a turnaround, all this increases productivity; improves manager visibility; enhances decision-making; enables optimization of resource allocation; ensures compliance; and reduces risks.

Specific Features Relevant for Turnarounds

Workforce monitoring
Real-time, 360° view of field execution, dramatically improving situational awareness.

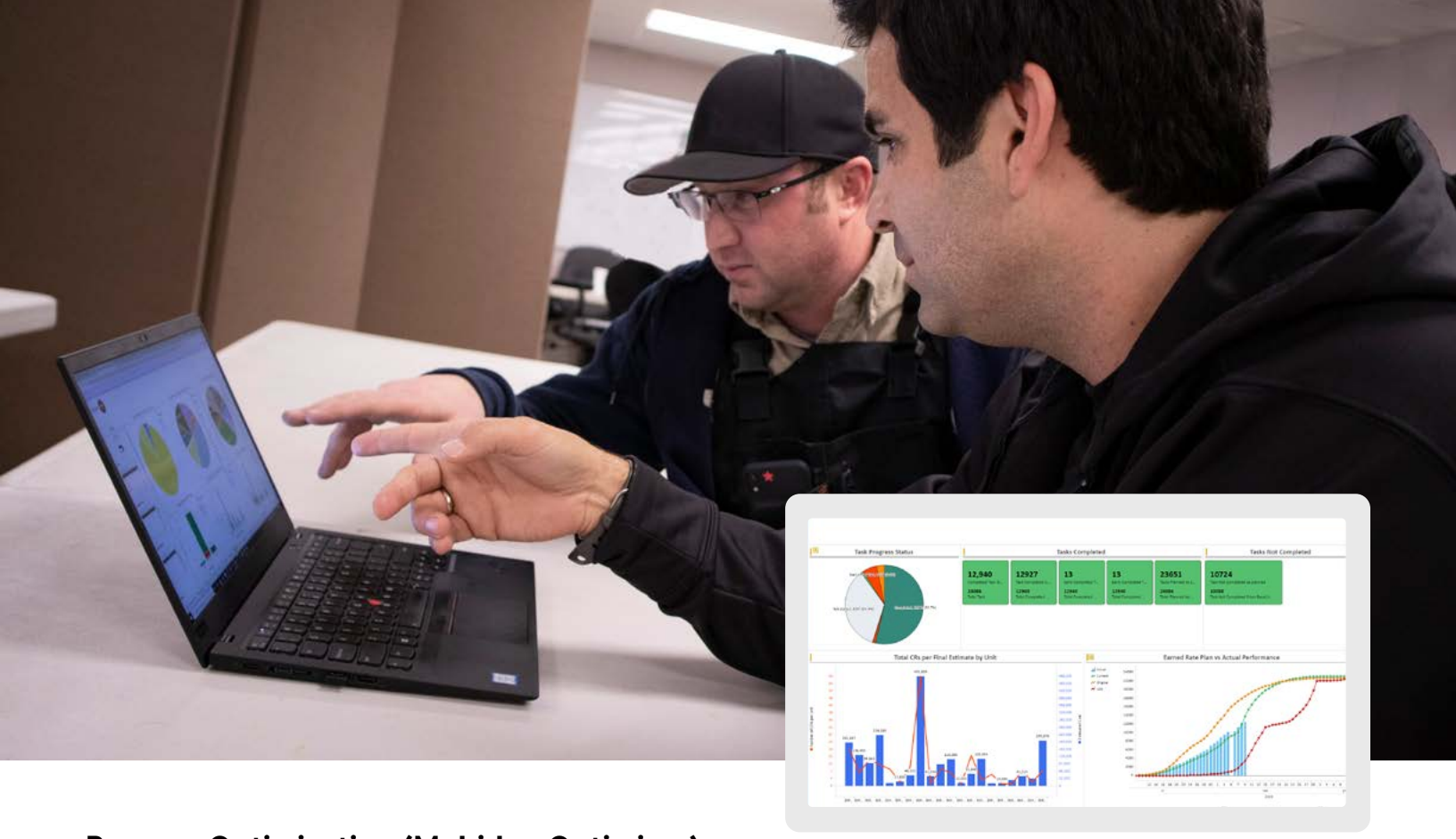
Personalized dashboards & data analytics
Customized analytics by application, role and responsibility, including personalized KPI monitoring and tracking.

Event-driven reporting
Alerts to critical path bottlenecks and attention to high-impact events, keeping managers focused and improving efficiency.

Deployment of corrective actions
Rapid response and resolution of events by fast deployment of the necessary corrective actions.

Decision support system
Aggregated, consolidated and analyzed data for data-centric decision-making.

Field execution optimization
Real-time events and work plans, modification of priorities and efficient resource allocation.



Process Optimization (Mobideo Optimizer)

The Mobideo Optimizer captures all data from the Mobideo App and the Mobideo Control Center , generating a rich data set that is available for immediate BI analysis. It enables owner-operators to evaluate how tasks are actually being executed; identify trends, work patterns and delays; drive continuous process improvement; and strengthen operational excellence.

In a turnaround, all this ensures the capture of best practices; enables organizational transformation; improves negotiation capabilities with contractors; strengthens change management; and supports digital transformation.

Specific Features Relevant for Turnarounds

Capture of performance data
Systematic feed of Six Sigma and lean manufacturing data programs and measurements.

Re-engineering of processes
Identification of opportunities for process improvements and on-the-fly, cross-organizational insights.

KPI measurement and analysis
Implementation of big data analytics to capture, measure and analyze real data and track KPIs.

Distribution of knowhow
Transfer, standardize and roll-out of knowhow across regions, roles and functions.

Recording and leveraging of best practices
Identification and capture of best processes and tribal knowledge.

Support of change management
Promotion of change management initiatives, after-the-fact analyses and performance management.

Workforce Digitalization Meets Turnaround Challenges

Digitalized industrial workforce management like Mobideo's connected workforce approach meet turnaround challenges by:

1. Improving cost and schedule predictability
2. Minimizing project risk
3. Enabling integrated planning
4. Aligning competencies and capabilities
5. Delivering effective cost management and tracking

This is possible because of the following range of benefits:

Real-time visibility & management of work activities
Replacement of manual, static, hard-to-maintain, paper-based wall charts containing out-of-date data with interactive dashboards and KPIs displaying real-time event status to all relevant users in any location and facilitating better decision-making based on accurate data.

Better & faster schedule updating
Replacement of painstaking and time-consuming manual scheduling with automated schedule updating, enabling better management of evolving timetables.

Improved handover process
Real-time view of actual task execution status and immediate understanding of the relevance to dependent tasks, enabling better and timely manpower and equipment coordination; and remote handovers that significantly increase efficiency, save time and reduce workforce downtime.

Automatic compilation of field data into final reports
Real-time report creation, eliminating the need to manually create reports after work is completed.

Identification & early resolution of delays
Early, real-time awareness of issues and delays allows for improved mitigation, as well as driving continuous improvement during the event and supporting improvement in future events.

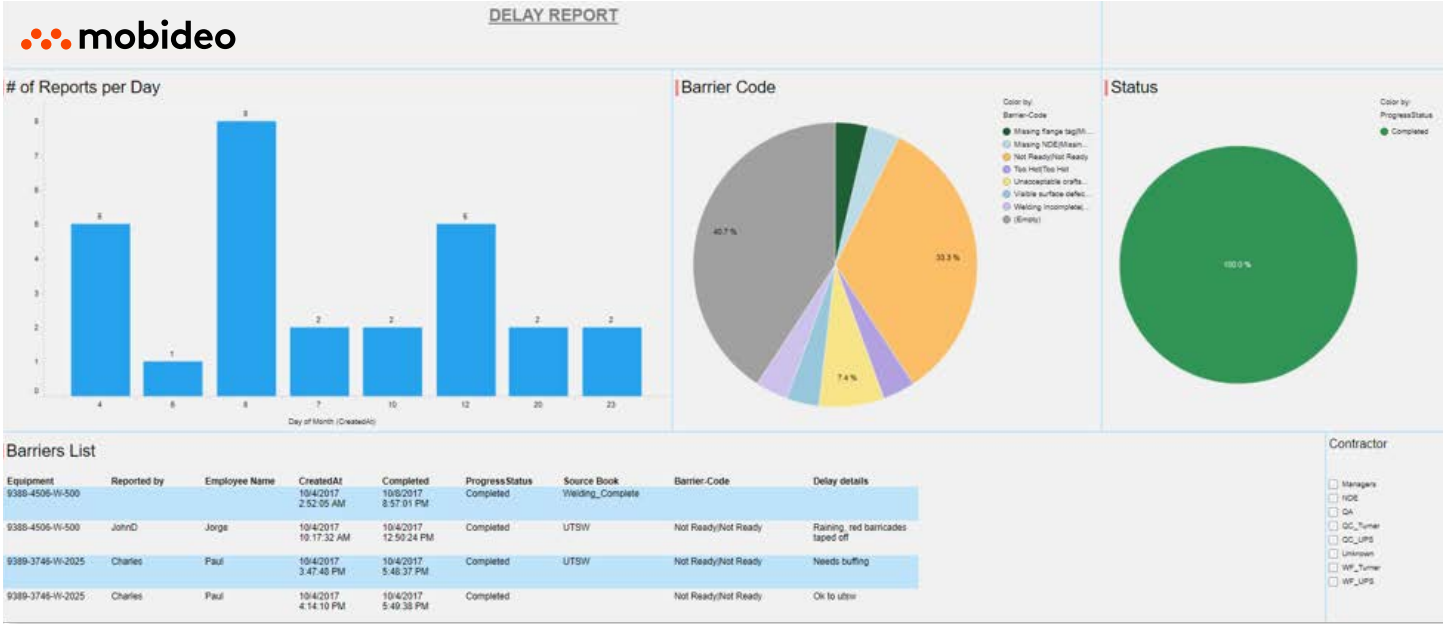
Improved discovery / scope change management
Automated review and approval process delivers a frictionless experience, eliminating the need for all stakeholders to be onsite for review and approval.

Better resource utilization, efficiency & productivity
Fieldworkers can quickly assign themselves appropriate tasks based on an agreed lookahead, while supervisors can see which tasks are available and allocate them accordingly. Such real-time management based on open lines of communication can eliminate work hours that are lost while waiting for instructions or searching for resolutions to problems, as well facilitate shorter, more forward-looking meetings with less participants.

Real-time traceability of equipment sign-off
Reduces the non-utilization of often expensive equipment by ensuring immediate awareness of availability for re-assignment.

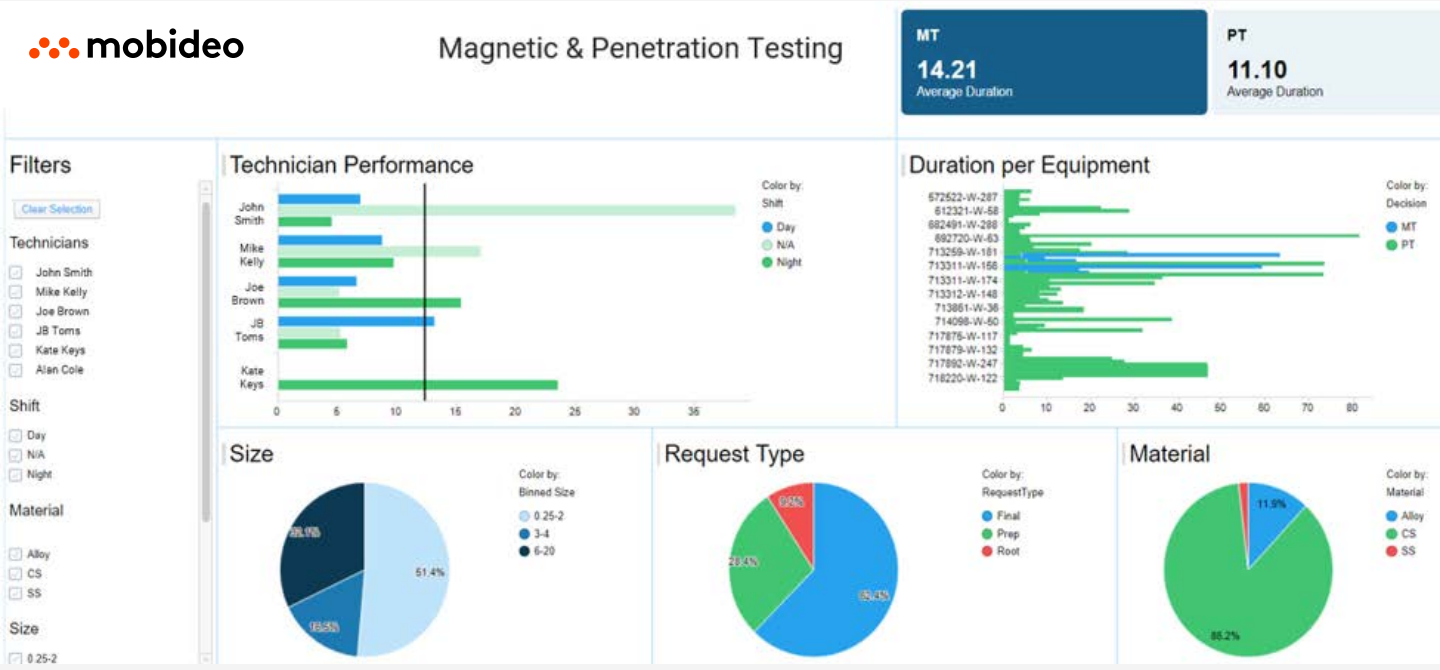
Improved future event planning
Ability to capture and track actual task execution times, enabling the creation of baselines/benchmarks – rather than estimations - required to perform specific types of tasks for use when planning a future event.

A move from reactive to proactive work culture
Ability to anticipate and resolve issues before they have an impact on the program, and the provision of KPIs to support informed decision-making and forward-looking/shorter shift handover meetings.



Delay Tracker Dashboard

Displays emerging trends and problems in the execution of the turnaround early on, as well as the reasons why there is going to be a delay, e.g., a welder didn't turn up, lack of permissions to work, extreme weather conditions, insufficient equipment to perform tasks and reworks required.



Contractor Performance Dashboard

Enables control of contractor operations, as well as comparisons between contractors performing the same activities, including a drilldown to determine exactly which specific workers are performing best and providing quality work, in comparison to workers performing poorly. This is also relevant for providing relevant data in contractor reviews at the end of a turnaround.

Case Study

Company

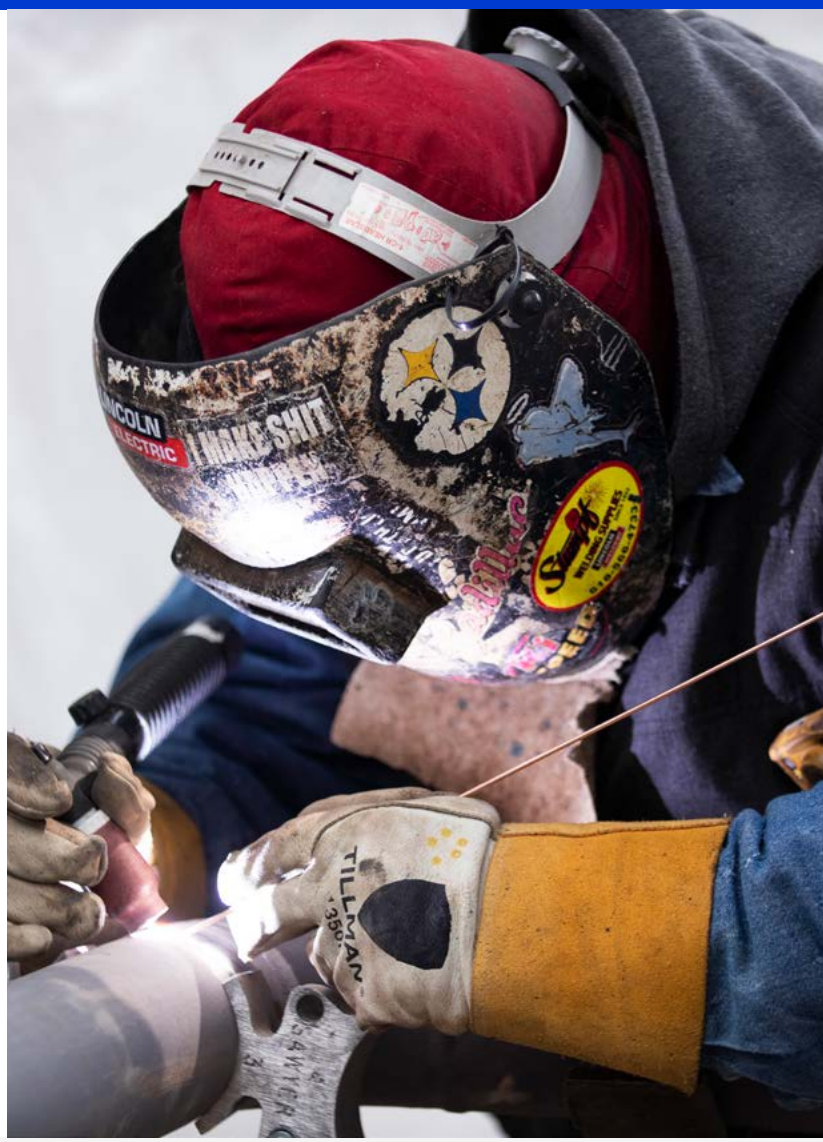
Independent refinery wholly-owned by one of the largest private companies in the U.S.

Challenge

Turnaround requiring more than 800 weld packages (after a previous identical turnaround lost control of the welding process resulting in a 7-day delay in completion). For effective management, the company sought real-time situational awareness and visibility of all work activities in order to increase the efficiency of handover processes between teams and improve their ability to identify and resolve delays.

Solution

Use of the Mobideo Platform to focus on the welding process and related treatments (heating, cooling, testing, etc.) in the turnaround. This covered tracking of the process from pre-weld inspection to mechanical completion of all welding; provision of visual management and tracking of all pipe welds; support of QA, QC, NDE and welding foremen teams/roles; and manual schedule updating using live status data.



Results

- 18 less inspectors required because of streamlined monitoring of work.
- No need for an administrator because status automatically displayed on dashboard.
- 10% increase in production performance of welders, since supervisors no longer had to stand watching welders and writing reports (all data available on dashboards).
- 290% return on investment + 3 days of production gains from early identification of problems which allowed critical time and resource-saving decisions to be made.

Are You Ready for Your Next Turnaround?

No matter how long you've got before your next turnaround or what your role and interests are in your next turnaround, you can benefit from digitalization. It will make your turnaround execution easier and more efficient. It will enable you to control your turnaround outcomes.

Here are some recommendations for a successful turnaround execution:

- Develop and train your managers to work with innovative systems and to make decisions under uncertain conditions
- Continually assess the situation of the turnaround from a central operations room equipped with all the necessary real-time dashboard displays and ensure effective execution of all activities and projects
- Inspect as early as possible and as much as possible
- Manage by milestones
- Try to maintain buffers in your turnaround plan to cover for unknown delays in manpower, parts and equipment
- Establish a team of experts who will always question the turnaround and constantly look for what can go wrong
- Assign a specific manager for each type of critical resource – manpower, equipment, subcontractors, parts procurement, etc.
- Prioritize every work task, e.g., mandatory/high/low/optional

But first and foremost, learn more about our turnaround proof-of-value program and how digitalization can transform performance in your next turnaround.

www.mobideo.com

About Mobideo

Mobideo is a global hi-tech company transforming the way industrial workforces operate and perform. By digitalizing work processes and leveraging cloud, big data analytics, mobility and machine learning technologies, it enables owner-operators in asset-intensive industries to achieve unprecedented levels of operational excellence and increased profitability.

The company's flagship product, MobideoSTO, is a Digital STO (Shutdown, Turnaround, Outage) Operating System that establishes a fundamentally different way for turnaround groups to manage the full STO lifecycle. Built on experience in over $3 billion of STO projects in the refining, chemical and power industries, it directly addresses the dynamic and complex nature of STOs and dramatically improves manageability of the key factors that determine STO success – scope, cost, schedule, quality, and EHS.

Founded in 2008, Mobideo meets the highest industry standards and is ISO 27001 cyber security certified. Employing a team of seasoned professionals worldwide, it supports customers in a range of asset-intensive industries, including oil & gas, chemicals, power, aviation and life sciences.

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