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Shutdowns, turnarounds, and outages (popularly known as STOs) are a critical part of maintenance strategies for most manufacturing and production facilities. These activities help to ensure the continuous and reliable operation of assets so that there are no unplanned stoppages in production. A production facility ceases normal operations for significant periods during these activities so efforts can be focused on preventive maintenance and repair of assets.It is common to use the terms shutdown, turnaround, and outage interchangeably, but there are subtle differences between them.Generally, shutdowns and turnarounds can mean the same thing: planned maintenance work with a clearly defined objective and work scope, start date, and significantly longer durations than day-to-day preventive maintenance work. Often, however, shutdown is a broader term used to describe any asset downtime, including unplanned or break-in work. Outages, while aligned with the turnaround use case, typically refer to the power and distribution industry. An outage may occur for a nuclear refueling effort or impact a section of downstream customers dependent on the energy produced at the affected site. Shutdowns and turnarounds differ from routine maintenance in several ways, often including lengthy production stoppages and a much larger scope of work.STO Success Requires Months of PlanningShutdowns and turnarounds are very different in nature from other types of maintenance in that they require extensive planning many months in advance of the actual event. Its true that planning and prioritization of work are keys to the success of any maintenance program and if done properly will lead to greater efficiency. However, planning is even more essential when it comes to shutdowns and turnarounds. This is simply because its required to ensure that the project is delivered safely, on time, and within budget.Effective planning and scheduling are essential parts of a successful STO project. The shutdown turnaround process will cost the company money, both in terms of the cost of the project itself and in terms of lost production. Its up to the STO project leader and their team to make sure it costs as little as possible while still achieving the goals that have been set out.Shutdown and turnaround at a large facility, such as an oil refinery, could easily add up to a total of 100,000 work hours. To be clear, thats just the execution of the work itself. Preparing for a shutdown takes much longer. For example, if the shutdown will take between two and four weeks, then you can count on needing at least 18 months of planning. This is part of why its important to have a project team thats focused primarily on planning and leading the shutdown operation. What Makes STOs Unique?STO projects are inherently different from regular maintenance and other projects. This is largely due to the impact they have on the organization and their method of delivery. Outlined below are some of the factors that make shutdowns, turnarounds, and outages unique: 1. Lengthy StoppageSTO projects vary in duration, from a few days of outage to several weeks for the major shutdown. In any case, the impact on production is much greater than regular weekly maintenance.2. Extensive Work ScopeSTO projects are a great opportunity to carry out work which cannot be done under normal working conditions.3. Significant Scope CreepScope creep is a common problem for many projects, but for STO projects it is significantly higher, as some of the inspection work undertaken will throw up some emergent work which may have to be addressed before the plant can be returned to service.4. A Reduction/ Loss in Revenue and Significant ExpenditureInevitably, shutdown and turnaround projects mean that production has to stop to allow work to be carried out. Unfortunately, the sheer volume of work and the complexity of the project means that a lot of money is also being spent to ensure that the project is a success. As Kevin Duffy noted in an article for Reliable Plant, STOs can command significant capital and operating budgets. They attract the attention of shareholders and boards of directors, and impact inventory supply chains and customer relationships. They are, therefore, whole business events, not simple function-specific ones.Plan and Manage Your Shutdowns, Turnarounds, and Outages EffectivelyA successful STO project relies on successful planning. If you do not plan ahead, your STO can easily go over budget, take longer than expected, and interfere with bringing equipment back online. To ensure your STOs go smoothly, Prometheus Group offers a solution that can help: Prometheus STO Suite. With the suite, you will be able to plan and execute your STO to manage its scope, budget, and timeline. To learn more about how the Prometheus STO Suite can improve your companys STO management, reach out to us today. Prometheus Group November 23, 2022 What is involved in executing shutdowns and turnarounds? A turnaround which is sometimes referred to as a TAR is a highly-expensive planned period of regeneration in a plant or refinery. During this time, an entire part of the operation is offlined whilst plants are inspected and revamped. Not only are the tools and labour required for executing a turnaround extremely expensive, but the revenue lost through shutting down elements of production can amount to a significant portion of an annual budget. Turnarounds often throw up more issues than anticipated, making them difficult to keep on track, and requiring very experienced managers. Refinery turnaround activities With the world now completely reliant on oil and gas, planned cessations are a necessary part of the refining process. These turnarounds can be due to a need for maintaining, renovating, or refitting facilities usually every four years or so. Turnaround activities require well-organised labour and equipment for a few weeks at a time the duration of which are usually measured in shifts. Most facilities will be inspected during shutdowns and turnarounds, and so may have their turnaround extended if additional issues are flagged. Source: Pixabay Extending turnaround activities may result in fuel shortages, price increases, or both. Strain is increased on other suppliers to meet demands, and turnarounds which become shutdowns can be catastrophic for supply at a regional level. Turnaround activities may include preventative care of equipment, general corrective repair of faults, strip-downs, complete replacement and overhaul, or maintenance. Refinery shutdown activities Unlike turnarounds, shutdowns are not always planned. Often, if supplies of natural gas or other reagents needed for the manufacture of gasoline are lacking, refineries will simply grind to a halt. These supplies can be found wanting if the natural resources are scarce, or prices are simply too high often, one as a result of the other. Shutdowns and turnarounds can also occur when accidents, natural disasters, terror threats, or political upheavals occur. READ: Prioritizing Connected Worker Safety in Remote and Hazardous Environments Shutdowns and turnarounds (and outages) Outages are the third and most-often overlooked type of shutdown activity. Unlike shutdowns, outages dont occur in an effort to protect equipment or personnel. They happen when power supplies are interrupted, equipment breaks down, or deliveries fail to arrive. They are also (usually) much shorter in duration. The goal for all types of interruption should be to achieve a return to normal process within time (difficult in outages), on budget, with no harm to staff, and with as little unplanned work as possible. Additional goals often include a forward plan which should aim to extend the period between shutdowns, and set out how to implement short, targeted periods of maintenance. Source: Pixabay Shutdown and turnaround managers are few and far between, and a smooth cessation and resumption of business is a difficult thing to achieve. Planning successful shutdowns and turnarounds Good planning is often the key to success, and with shutdowns and turnarounds, it is no less true. With an average duration of between three and six years, major shutdowns are dependent upon research into other similar events within the company and similar operators, cooperation across divisions and teams, and the very best industry knowledge. All major oil and gas companies are committed to developing both their scientific and service knowledge, ensuring that shutdowns prioritize what is best from a technical and customer point of view. Equipment in need of maintenance, repair, or replacement should all be identified in advance, and the necessary resources, equipment, and personnel prepared on the back of this. A base analysis of a refinery will give an overview of the scope and duration of any shutdowns and turnaround needed. Last-minute changes and alterations may still occur, but with strong planning, deviations can be accommodated safely. Evaluating shutdown and turnaround activities Often, the best way to plan ahead for a shutdown or turnaround is to evaluate as soon as one has been completed. This will allow a company to learn from any mistakes, and to have a plan laid out years in advance. Not only are these events engineering- and maintenance-led, but they have significant impacts on all parts of the business from the shareholders to the suppliers. As entire business events, they can make or break teams, KPIs, budgets, performances, and entire companies. Because they are cyclical, these outages should be dealt with as holistically as possible, and not treated simply as a break in normal proceedings. Risks: how not to proceed There are a few key areas to focus on when proceeding with an STO. Ensuring all STO personnel are safe this includes everyone from management to sub-contractors, Keeping the project to an appropriate timescale and extent including the risk of misallocating resources or overworking on unnecessary tasks, Staying within budget including the need to account for everyones time and energies: a sloppy budget will cause a sloppy TAR, Coordination of logistics including the monitoring of external workers who may be unfamiliar with processes and the STO site, and Evaluation including the collection of data metrics and the ultimate goal of improving business performance. Crucially, all shutdowns and turnarounds should be well-defined, planned realistically, and executed efficiently. Failure to fully realise any one stage of the STO process could result in delays, costs, and potential damage to the business. READ:Harnessing Gen AI for Workflow and Maintenance Optimization Understanding your turnaround activities Before planning or implementing a shutdown or turnaround, all interested parties should be contacted and involved opening communication across the business and beginning the process of identifying the scope of the project. All elements of the process should be planned and assessed, and the key decision makers should then be able to make a call on whether or not this clear set of objectives are attainable. Planning your shutdown or turnaround Once defined, the STO activities need to be organised. Tasks should be prioritised and scheduled, before the viability of the project can be assessed. It is at this point that materials and personnel can begin to be sourced and budgeted-for, and the normal operations of the company can be prepared for change. Risk assessments should be completed and any flagged issues resolved. Any changes to the plan should be made here, and the system for measuring the progress and success of the STO activity put in place. Executing the STO process As you would imagine, this phase of the turnaround covers the deployment of the planned activity. Keeping schedules updated and maintaining standards are vital to smooth operation, and management teams should ensure they have consistent monitoring capabilities. This part of the process also includes a return to function, and reporting on that restart. Learn more about predictive and preventative maintenance, repairs, overhauls, and equipment replacement, as well as how to address safety challenges at our upcoming events. Connected Worker: Energy SummitMarch 18-20, 2025| Houston, TX AI in Energy SummitFebruary 24-25, 2025| Houston, TX Tags: shutdowns shutdowns and turnarounds turnarounds turnarounds & outages Shutdown and turnaround are essential aspects of maintaining and optimizing industrial facilities, whether they are in the petrochemical, manufacturing, or energy sectors. These planned outages provide organizations with the opportunity to inspect, repair, and upgrade equipment, ensuring the continued safe and efficient operation of their plants. However, the process can be complex, costly, and time-consuming if not well-managed. In this article, well demystify shutdowns and turnarounds to help your organization effectively plan and execute these critical events. Well also tell you why using FAT FINGERs shutdown checklist is the best way to manage this maintenance process. To understand shutdowns and turnarounds, lets start with the fundamentals. A shutdown, also known as a planned outage, is a temporary suspension of plant operations in specific units or even entire industrial plants. These outages are typically done for routine maintenance, inspections, and minor repairs. Shutdowns are often shorter, usually from a few hours to a few days. Shutdowns are what equipment and systems require to remain in optimal working condition. Turnarounds, sometimes called outages, are more encompassing than regular shutdowns. They occur periodically, often every few years, and go beyond maintenance. Turnarounds involve substantial overhauls and modifications intended to elevate the overall performance and reliability of the facility. Setting your goals and objectives is the first step in executing a successful shutdown or turnaround. What precisely do you want to accomplish during this planned break? Are you focusing on maintenance, replacing equipment, or optimizing performance? Clear objectives pave the way for a seamless process. Constitute a team of individuals well-versed in the intricacies of shutdowns and turnarounds. Your team should ideally include planners, engineers, safety experts, and skilled technicians. Effective teamwork is key to a trouble-free operation. Keep everyone on the same page with FAT FINGER workflows. Every team member will know their specific objectives, and you can monitor all activities in real-time. Scope of Work Create a meticulous scope of work. This document should outline every task that needs to be performed, from inspections and repairs to equipment replacements and potential upgrades. The scope of work acts as your roadmap during the event. Budgeting Establish a realistic budget, considering labor, materials, and any unforeseen costs that might surface. A carefully crafted budget safeguards the financial integrity of the project. Develop a comprehensive timeline that dictates when the shutdown or turnaround commences and concludes. This timeline is paramount in coordinating all the work, ensuring minimal downtime, and keeping the project on track. Identify the critical path of activities. These are the tasks that must be completed before others can commence. Recognizing the critical path ensures a logical sequence of work that avoids bottlenecks and delays. Risk Assessment Conduct a thorough risk assessment to identify potential hazards and perils. Implement stringent safety measures to safeguard your team and the environment from harm. Regulatory Compliance Compliance with industry regulations and standards is non-negotiable. Non-compliance can lead to costly penalties and legal complications. As the scheduled date for the shutdown or turnaround approaches, mobilize the necessary resources, equipment, and personnel to the site. Proper preparation is the key to a smooth launch. Execute the plan in well-defined phases, commencing with the most critical tasks. Regular progress monitoring allows for adjustments, ensuring the project stays on course. Regular and rigorous inspections are imperative to ensure all work meets the required standards. Any deviations from the plan should be addressed promptly. Before restarting operations, thorough testing is a must. This verifies that all systems function correctly, minimizing the risk of unexpected issues post-execution. Maintain detailed records of all work performed. Document changes made and any unforeseen issues that arose. This comprehensive record is invaluable for future reference. Gather your team for a post-project review. This is the moment to reflect on the entire process, discussing successes and areas for improvement. A candid post-mortem is the path to continuous enhancement. 1. Why are shutdowns and turnarounds necessary? Shutdowns and turnarounds are necessary to ensure industrial facilities ongoing efficiency and safety. They allow for maintenance, repairs, and performance enhancements. 2. How often should a turnaround be conducted? The frequency of turnarounds depends on the facility and its specific needs. However, they are typically conducted every few years to address accumulated wear and tear. 3. What are the key challenges during shutdowns and turnarounds? Challenges include efficient resource and time management, safety measures, and adherence to regulatory requirements. 4. Can shutdowns and turnarounds be completed by anyone? A skilled and experienced team is optional for the success of these operations. The collaboration and expertise of team members are essential for a smooth process. 5. What is the role of risk assessment in shutdowns and turnarounds? Risk assessment is pivotal in identifying potential hazards and threats during the process. It helps implement safety measures to protect personnel and the environment. Shutdowns and Turnarounds are crucial but they can be difficult to run without the right tools. Running these processes without digital workflows, will likely result in the following: Inefficient shutdowns and turnarounds, leading to long delays in production hence increased costs Increased asset risk as you have no workflows to guide you No data means youre operating blind, leading to running equipment to the point of failure FAT FINGER is the answer to running seamless, smooth, effortless transitions. Our intuitive digital procedure gives you control over scheduling, scope management and budgeting. Take control today with FAT FINGERs comprehensive shutdown checklist or customize your own with the drag and drop editor. TRY FAT FINGER FOR FREE TODAY! A shutdown in the oil and gas industry is a temporary cessation of production or operations for a specific reason. Shutdowns can be planned or unplanned.Planned shutdowns are typically scheduled for maintenance or inspection purposes. They may also be necessary to make changes to equipment or facilities. Unplanned shutdowns can be caused by a variety of factors, such as equipment failure, power outages, or natural disasters.TurnaroundA turnaround in the oil and gas industry is a planned, periodic shutdown of a refinery or petrochemical plant for the purpose of maintenance, inspection, and repair. Turnarounds are typically scheduled every few years and can last for several weeks or even months.During a turnaround, all equipment and facilities are inspected and repaired, or replaced if necessary. Turnarounds are also an opportunity to make changes to equipment or processes to improve efficiency or safety.Differences between shutdowns and turnaroundsThe main difference between a shutdown and a turnaround is that shutdowns can be planned or unplanned, while turnarounds are always planned. Turnarounds are also typically more complex and time-consuming than shutdowns.Another difference is that shutdowns are typically carried out by the plants own maintenance staff, while turnarounds may involve contractors from outside the company (Read more) In many industrial sectorssuch as manufacturing, oil and gas, power generation, and chemical processingmaintaining continuous operations while ensuring safety and efficiency is paramount. To achieve this balance, facilities periodically halt production for maintenance, repairs, and upgrades. Although the terms shutdown, turnaround, and outage are sometimes used interchangeably, each has its unique meaning and context. This article explores the distinctions between these concepts. Shutdown A shutdown refers broadly to the cessation of operations in a facility or specific unit. It can be either planned or unplanned: Planned Shutdowns Project: These are scheduled in advance to perform maintenance, upgrades, safety inspections, or comply with regulatory requirements. The planning process includes detailed schedules, resource allocation, and risk assessments. Unplanned Shutdowns: Sometimes unexpected issuessuch as equipment failures or safety incidentsforce a sudden halt in operations. These require immediate action and can lead to significant disruptions. Shutdowns are critical for ensuring that equipment operates safely and efficiently, even though they may temporarily reduce production capacity. Turnaround A turnaround is a specialized type of planned shutdown project, primarily associated with process industries like refineries and chemical plants. It is characterized by: Scheduled Maintenance and Overhaul: Turnarounds occur at predetermined intervals and involve comprehensive maintenance activities, including repairs, inspections, cleaning, and upgrades. Extended Duration: Given the complexity and scope of the tasks involved, turnarounds typically last for several days or even weeks. High-Level Coordination: They require meticulous planning and coordination among various teams to minimize downtime and ensure that all safety and operational standards are met. Budget and Resource Intensive: Due to the scale and complexity, turnarounds are significant events in an operational calendar, often involving substantial budgets and careful risk management. Turnarounds not only restore equipment to optimal conditions but can also provide opportunities for implementing improvements and extending the lifespan of assets. Outage The term outage is more generic and refers to any period when a system, facility, or service is not operational. Outages can be both planned and unplanned, and their usage extends beyond heavy industry to sectors like utilities and telecommunications: Planned Outages Project: These are scheduled events for routine maintenance or upgrades, similar to shutdowns, but the term "outage" is often used in broader contexts such as power supply interruptions. Unplanned Outages: Unexpected interruptions due to equipment failure, natural disasters, or other unforeseen events also fall under this term. Wide Applicability: Outages are not limited to industrial plantsthey can describe any stoppage in service, including IT system downtimes or utility power outages. Because of its broad applicability, "outage" serves as an umbrella term that can include both the highly structured nature of a turnaround and the more general concept of a shutdown. Comparative Overview Shutdown is a general term for any stoppage of operations, whether planned or unplanned. Turnaround specifically refers to a planned, extensive maintenance event within a shutdown period. Shutdown typically implies a deliberate halt in industrial production, often with a focus on maintenance and safety.Outage is a broader term that can refer to any cessation of service, including those in industries outside of manufacturing. Turnaround is a scheduled project based, comprehensive maintenance event, characterized by detailed planning and significant operational impact. Outage can describe both planned events (like turnarounds) and unplanned disruptions, making it a more versatile term. Conclusion Understanding the nuances between shutdowns, turnarounds, and outages is crucial for effective operational management. While a shutdown marks any stoppage in production, a turnaround is a carefully planned project, in-depth maintenance event, and an outage is a broader term encompassing any period of non-operation, whether planned or unexpected. Recognizing these differences helps organizations streamline maintenance schedules, manage risks, and maintain clear communication with stakeholders about the nature and impact of operational interruptions. A Shutdown, Turnaround, or Outage (STO) is a planned interruption of operations designed to conduct essential maintenance, inspections, or upgrades. Common in industries like oil and gas, petrochemicals, these events are crucial for ensuring operational efficiency, regulatory compliance, and safety. By halting production temporarily, in-detailed planned STO events provide the opportunity to prevent costly unplanned outages, extend equipment lifespan, and prioritize the safety of personnel working in and around the facility. A shutdown is a temporary stoppage of operations to perform maintenance, inspections, or repairs on specific assets or systems. Unlike a turnaround or outage, shutdowns typically target a portion of a facility, allowing partial operations to continue. Shutdowns are usually scheduled in advance and often last from a few days to a few weeks. These events are critical for addressing wear and tear on equipment, preventing minor issues from escalating, and ensuring compliance with operational and safety standardWhat is a turnaround?A turnaround is a scheduled maintenance event in which operations at an industrial plant are temporarily halted for inspections, repairs, and upgrades. Turnarounds are more complex than routine maintenance due to their extensive scope and the coordination required across multiple units, departments, contractors, and stakeholders.The key objectives of a turnaround include:Asset integrity: Inspecting and maintaining equipment to prevent failures.Production efficiency: Enhancing operational capacity and reliability.Safety compliance: Meeting industry safety standards and regulations.Minimizing risks: Reducing operational and financial risks by addressing potential issues before they escalate.Turnarounds are typically planned 18 to 24 months in advance and can last anywhere from 3 to 12 weeks. Delays in the process may result in significant revenue losses due to production downtime. Thus, effective turnaround management is essential to ensure these events are executed efficiently and within budget.What is an outage?An outage refers to a temporary stoppage of operations at an industrial plant, from which the nature can be both planned and unplanned. A planned outage is most often for a small amount of scope in a certain unit. However, outages can also refer to unforeseen circumstances like equipment failures or malfunctions. Unplanned outages can affect a part of the facility or the entire plant, depending on the issues severity.Key aspects of outages include:Unplanned or planned: While outages are usually unplanned, they may also be scheduled for specific maintenance tasks.Duration: The duration of an outage can vary from hours to several months, depending on the nature of the problem.Risk and impact: Unplanned outages pose greater risks to production, safety, and revenue. Quick identification and resolution are essential to minimize downtime and operational disruptions.For the sake of simplicity, outages will be considered as a planned maintenance event for the rest of the blog. Please consider that the explanation about shutdowns, turnarounds, and outages varies across industries. Shutdowns, turnarounds, and outages (STOs) are essential maintenance events for sustaining operational excellence of industrial facilities and minimizing risks.Ensuring safety: STOs are critical for identifying and addressing potential hazards, safeguarding workers and the environment.Maintaining compliance: Regular STOs help facilities stay in line with legal and regulatory standards, avoiding costly penalties and operational halts.Enhancing reliability: Proactive maintenance during STOs reduces the likelihood of unexpected failures, ensuring continuous operations.Boosting efficiency: STOs improve equipment performance and overall operational processes, helping to reduce delays, streamline workflows, and lower operational costs.Boosting efficiency: STOs provide an opportunity to implement technological advancements and optimize processes (debottlenecking), improving operational efficiency, and driving long-term cost savings.Maximizing asset lifespan: Ongoing maintenance ensures that equipment remains functional for a longer time, increasing ROI and asset reliability.When executed effectively, STOs not only reduce risks but also enhance productivity and profitability in the long term. Managing STOs comes with unique challenges given their complexity:Time constraints: STOs often operate on tight schedules, with limited downtime to complete essential tasks. Delays can lead to extended outages and significant financial losses.Workforce coordination: Effective coordination between internal teams, contractors, and stakeholders is critical. Misalignment can result in miscommunication, delays, and safety risks.Resource allocation: Ensuring the availability of skilled labor, equipment, and materials when needed is vital. Shortages or last-minute adjustments can disrupt progress and extend timelines.Safety and compliance: Ensuring strict adherence to safety protocols and regulatory requirements is a top priority. Any lapse could lead to accidents or compliance violations, resulting in costly fines.CAPEX integration: Often capital expenditure project scope is added to the time window of a STO event. This leads to more complexity due to difference in the nature of preparation for a STO event versus CAPEX event.To overcome these challenges and ensure smooth execution of STO events, leveraging a shutdown, turnaround, and outage software like Cleopatra Enterprise can make all the difference. From conceptual strategic portfolio planning to real-time tracking, the right software empowers organizations to stay on schedule, improve safety, and minimize downtime. To navigate the complexities of shutdowns, turnarounds, and outages (STOs), organizations should implement the following best practices:Establish a clearly defined scopeEarly and precise scope definition aligns teams, reduces last-minute changes, and mitigates disruptions. Use historical data and advanced tools to assess the necessity of each task, ensuring efficient execution.Control progress and schedules proactivelyUtilize real-time tracking tools to monitor progress and timelines. Early detection of deviations enables quick corrective actions, preventing overruns and ensuring smooth progress.Foster transparent communicationEstablish open communication channels with centralized dashboards or collaboration tools. These ensure teams, contractors, and stakeholders are consistently informed about progress, safety updates, and any necessary adjustments.Prioritize safety at every stageEmbed safety into every phase with thorough risk assessments and strict protocols. Cultivate a safety-first culture through regular drills and shared responsibility among all stakeholders.Leverage technology for efficiencyEmploy advanced STO management software to optimize planning, resource allocation, and reporting. These tools enhance visibility and streamline decision-making for efficient execution.Conduct post-STO event reviewsEvaluate the STO event with detailed reviews to identify successes and areas for improvement. Document lessons learned in a centralized repository to refine STO future processes and avoid repeated mistakes. Cleopatra Enterprises STO management software offers a fully integrated platform designed to streamline every phase of shutdowns, turnarounds, and outages (STOs). From conceptual STO portfolio planning to scope definition to work pack creation, execution management, and cost control, Cleopatra optimizes each step to ensure seamless STO delivery and successful outcomes.A standout feature of Cleopatra Enterprise is its work pack management software capability. By consolidating all essential job planning and execution details into comprehensive work packages, the platform ensures centralized coordination of tasks, resources, and timelines, helping teams stay aligned throughout the process.Cleopatras platform integrates seamlessly with industry-standard scheduling tools (e.g. Primavera P6), ERP solutions (e.g. SAP) and even CMMS/EAM solutions. Having an integrated and centralized STO solution, which is able to communicate with existing software platforms by means of bi-directional integrations.In addition, Cleopatras TA controls provide valuable insights into project performance, enabling teams to spot deviations early and make informed decisions. Complete visibility into scope, resources, and costs ensures tight control over every aspect of the STO, helping organizations reduce downtime, stay within budget, and maximize productivity.With powerful data analytics capabilities, Cleopatra Enterprise empowers organizations to continuously refine their processes. From tracking costs and monitoring progress to mitigating risks, the turnaround management platform equips teams with actionable insights to enhance STO outcomes and drive continuous improvement. A plant turnaround is defined as a major plant maintenance shutdown, typically involving the entire plant or multiple areas and lasts for several days (or if not properly planned and scheduled can last longer than expected). Some organizations have both Major (more than 24 hours) and minor (24 hours or less). In many cases, minor shutdowns can have a bigger impact on lost production. When weve been at client sites, we often hear that Shutdown/Turnarounds arent managed well. Late start-ups make it impossible to complete work on time. Different departments having disparate objectives makes it impossible to work as a team. And most egregious, not having a set Shutdown/Turnaround process and schedule causes confusion and inefficiency throughout the plant, mill, or mine. At IDCON, we divide plant Shutdown and Turnaround management into 6 phases. The goal of the six phases is to drive unscheduled downtime to zero as well as increasing Overall Production Efficiency (OPE) to create the opportunity to increase output. Creating a process with common goals is vital to achieving world-class reliability and maintenance. This post will detail the four of the six phases. To learn more about all the Phases, you can either buy our Shutdown Turnaround Optimization Process Practical Guide or join us for our next training course. You can also watch our Shutdown/Turnaround playlist on YouTube. 6 phases of shutdown and turnaround management What is the purpose of the Strategic Phase? The Strategic Phase of Shutdown/Turnaround Optimization Process (S-TOP) focuses on the frequency/interval and duration of the shutdown, organization and management of the shutdown, the use of contractors, long-term strategy for shutdown, and a strategy for the current shutdown. At the end of the Strategic Phase (if the steps are followed), you will have increased run time, decreased frequency of shutdowns, optimized outage duration, and good coordination with the overall business plan. Not planning for or meeting market or seasonal demand Equipment deterioration and maintenance demands, i.e., Major Maintenance Process and operational demands unmet Not meeting regulatory requirements Capital project opportunities not identified Your organization must identify the business requirements and drivers. If there is no plan on how to meet market and seasonal demands on the products, production wont be able to meet demand and it will interrupt the high season and customers deliveries wont be made. If major maintenance items that need a shutdown arent done, such as boiler inspections and pressure valve testing, production losses will occur due to break-in and emergency work to fix problems. Failing to strategize Shutdown/Turnarounds properly can also cause missed capital project opportunities. A successful Shutdown/Turnaround organization requires identifying roles and their responsibilities. Organizations should have: A Turnaround Manager/coordinator to coordinate between different departments. A steering committee to set objectives, policies, monitor Key Performance Indicators (KPIs), and control the budget. Coordinator(s) for contractors If the turnaround is large enough, there will be many outside contractors involved and if there is a lack of organization, it is impossible for them to be efficient and beneficial to your organization. When contracting work, identify which work will be outsourced, consolidate the number of contractors, identify contractor coordination, decide on the selection criteria for contractors and verify qualifications, and evaluate the contract work at the end of the project. There must be quality control in terms of contractor work just like work done by team members in the plant, mill or mine or else hiring them will be a waste of time, capital, and resources. Lack of a detailed schedule showing all activities, deadlines, and responsibilities to prepare for the turnaround No 3-5-year schedule is in place The shutdown cycle and approximate downtime needed are not determined This example is from IDCONs Maintenance Planning and Scheduling Book. If the organization doesnt develop a 3-5-year long term schedule, the Shutdown/Turnaround process will continue to be inefficient and cause greater cost, lost time and production losses each time it is done. Creating the schedule properly allows the organization to determine approximate downtime based on business requirements that have been decided upon. Developing a countdown schedule is crucial because it gives the whole organization a direction on what to prepare and when. This should be detailed with activities, deadlines, responsibilities, how to prepare for the turnaround, and anything else needed to get the job done well and on time. It can also be a vehicle for holding people accountable. The purpose of the Work list Phase (or scope review) in the Shutdown -Turnaround Optimization Process (S-TOP) is to make sure that the correct work is selected. In this phase, your organization identifies the work that is critical to support production reliability. decide if work needs to be done at the next shutdown, deferred to another time, or moved to on the run reduce the shutdown work scope decide on tasks that should be done before or after the shutdown identify items that have long lead times identify and eliminate non-value adding jobs prioritize work accurately through selecting work based on risk review Fixed Time Maintenance (FTM) work. This phase is critical to the determining the time required for the plant production to be offline. In general, a worklist development team is led by the Operations Manager and the Maintenance Manager (there can be more), but all too often they may not take responsibility for setting up and attending meetings. Read more about Operations role in shutdown scheduling here. Those responsible for the meeting should prepare and distribute an agenda and have a process to clean and prepare the worklist before the meeting starts. It wastes time if this must be done during the meeting. These meetings should be included in the countdown schedule so that the date and time is designated for when a decision needs to be made about what to include in the shutdown. The work list determines the total shutdown scope. There needs to be a process in place to screen and evaluate risk or else work that doesnt need to be included in the shutdown may be added, wasting time. If the scope of work is not understood, it is very difficult to develop a budget and control the cost of the shutdown. Make sure only work that sustains or increases production is identified as part of the work to be done in the shutdown. To determine this, ask the questions below about each job using Risk Based Work Selection: Questions to ask about the suggested work for a shutdown and turnaround Below are some examples of work that have been on work list review. See how well you do at answering the questions using the RBWS method. Work Order #1: 600-megawatt combined cycle power plant steam turbine The risk of not doing the work is too high based on the history of breakdowns of the steam turbine; it cannot be deferred to the next shutdown; the work can be executed economically and safely outside the outage (the spare pump is in place; approved ship is in place within region with two weeks turnaround); the work scope cannot be reduced; the work item does not remain in the outage scope. The pump should be repaired and put back in service without shutting down the entire steam turbine. Work Order #2: 600-megawatt combined cycle power plant steam turbine (same plant) In this case, the feedwater pump recirculation valve is pulsating, vibrating, and making a loud noise. This is a high priority. According to the Risk Based Work Selection process, the risk of not doing the work is too high so it must be done there is no history available on the failure. It cannot be deferred to the next shutdown. The work cannot be done economically and safely outside the outage because the recirculation valve is connected to both feedwater pump and cannot be isolated. The unit must be shut down to work on the control valve and there may also be a problem with the check valve. The work scope cannot be reduced. So, as you can see, the Work list Review Phase can improve the duration of your shutdown/turnarounds by ensuring the work is valid for the next shutdown. When was the last time you reviewed the work being done during your shutdown/turnarounds? I challenge you to review those standard shutdown jobs and see if they really must be done during a shutdown. What is the purpose of the Planning Phase in Shutdown/Turnarounds? The purpose of the Planning Phase in Shutdown/Turnaround Optimization is to plan the jobs from the worklist created in Phase 2, the start-up and shutdown activities, and the safety and environmental procedures. To read more about work safety, read this short series Part 1 and Part 2. If executed correctly, the Planning Phase will result in downtime reduction, mitigation plans, the most critical jobs being planned first, and contracted jobs being planned. Tradespeople will be able to complete work efficiently, knowledgably, and on time; downtime and shutdown duration will be optimized; and coordinated use of resources will be optimized. Pre-shutdown inspections provide us with valuable information before the shutdown. These inspections reveal corrective work or pre-fabrication that needs to be done before shutting down, where shops and pre-fabrication areas need to be set up, if part specifications are correct, if cranes or rigging devices are needed, if scaffolding is needed, any equipment modifications, quality control procedures before and after the job, which crafts are needed where, physical conditions and environmental protections needed, etc. Having this information ensures that the right work is being done during the shutdown and that the problem needing solving is understood. It is good practice to use a template when planning jobs, whether it is daily, weekly or shutdown work. It is easy to get stressed about making mistakes and become disorganized. Having a checklist while scoping out the job ensures that nothing will be missed and that the job description will be thorough. If you dont have a template, you can get one as part of our Maintenance Planning and Scheduling training, both our instructor led and self-paced courses give this resource to our students. There are specific items included in the planning checklist template for scoping out the job. The first is a clear and thorough job description including job steps so that crafts can perform the work safely and efficiently. There needs to be communication in terms of the production interface. This can help avoid delays such as forgetting to lock out a piece of equipment in time or missed opportunities for operations and maintenance to work together on the job. Job scope also includes cost estimates, parts needed for the work, kitting, any necessary PPE identified, utilities needed (air, water, electricity), chemicals and safety data sheets needed to regulate use of the chemicals, and any equipment and tools needed. An important part of this process is feedback sessions about the work to gather information for next time if it is a repetitive job (as many are). After planning, especially for a major outage and turnaround, it is best practice for the maintenance manager or department manager to review all job plans, specifically if they involve the critical path, and to give feedback to the planner. Having an extra set of eyes (management) provide feedback on job plans, making sure nothing is left out, and then approving the plans can only help with the quality of the shutdown plan. What is the purpose of the Scheduling Phase? The focus during the Scheduling Phase is on integrating schedules, the critical path, shutdown execution management, logistics, and organizing resources (including contract management). Executing the Scheduling Phase correctly will result in shutdown preparedness, efficient and high-quality work, better communication, developed contingency plans, and resource leveling and scheduling. Shutdown schedules are not integrated across the organization. Work is added into the schedule too late. In many plants, mills, and mines, the shutdown schedules are not integrated between different functions such as engineering, maintenance, and operations, and that work is often added to the schedule too late, causing delays and interruptions to work already scheduled. What is scheduling exactly? Maintenance scheduling covers who is doing the work and when they will do the work, and coordinates with materials, equipment, and other departments and functions involved in the job. To have a successful shutdown, all activities need to be integrated and coordinated into one master schedule to avoid any delays, inefficiency, and unsafe situations. This is usually done by the Shutdown Manager. Another important part of a successful shutdown is shutdown schedule compliance. Watch my video, Youre doing it wrong! Shutdown schedule compliance to learn more. It is a common mistake for different departments working on the same equipment at the same time because they are not operating under an integrated schedule. For example, on a paper machine during a Capex project, I saw engineers upgrading the headbox at the same time as maintenance was changing the breast roll. Both tasks were delayed because they cant be completed on the same machine at the same time. In the end, the startup was delayed because the engineering and maintenance schedules were not integrated. It is also common to see departments forget prep, lockout/tag-out, permitting, handover and hand back, startup checks, quality assurance, etc. Smaller tasks like these are usually what delays a job and possibly the overall shutdown/turnaround schedule. Turnaround Work Cutoff Date A cutoff date is defined as the last day that any new work can be added to the shutdown including projects, maintenance, installations, etc. As the schedule is integrated, a cutoff date must be determined. The reason to have a cutoff date for work added is to manage scope creep or avoid any late work that has not been planned and scheduled. It is hard to be efficient if work has not been planned or scheduled because the person responsible and the time to do the work hasnt been decided on, and parts or specific skills needed to do the work may not be available. There should be an add-on policy in place that requires written approval by both the operations manager and the maintenance manager to add jobs after this deadline. The cutoff policy exists to manage the shutdown scope so that adding unplanned and unscheduled work late is avoided. The cutoff time should provide a reasonable time to plan and schedule so everyone is prepared when the job starts. Best practice is to have at least two months cutoff time for an annual shutdown or turnaround. As mentioned, there are two more phases of shutdown turnaround management. Those are the Execution phase and the Critique phase, you can learn more about these two phases in our book Shutdown Turnaround Optimization Process A practical guide or by attending our training course either at your site or our HQ. If you want to check the health of your shutdown and turnaround management process, we have a free assessment you can download. Download the Free AssessmentA turnaround in the oil and gas industry refers to a scheduled event in the operational life of refineries, chemical plants, or gas processing facilities, where the entire unit or selected sections are temporarily shut down for maintenance, inspection, and repair activities. It typically occurs every few years and can last from several days to several weeks. It may involve activities such as equipment cleaning, repairing, or replacing; catalyst change-outs; internal inspections; and debottlenecking, which is the process of identifying and resolving production constraints. Due to the temporary loss of production, turnarounds are often strategically scheduled during periods of lower demand or when there is an availability of alternative production sources to minimize financial and market impacts. While these terms are sometimes used interchangeably, they have distinct meanings and serve different purposes. Turnaround is a planned, periodic stoppage of production, during which various maintenance, repair, inspection, and testing activities are performed on equipment and facilities to minimize unplanned downtime, assure operational efficiency, and maintain regulatory compliance. Shutdown, on the other hand, is the complete cessation of operations in a specific section or the entire plant due to an emergency situation, economic reasons, or other external factors. Shutdowns can be further categorized into two types: planned and unplanned. A planned shutdown is a scheduled event that occurs when a refinery or process unit needs to be taken offline for a predetermined period to perform essential maintenance, repairs, or modifications. An unplanned shutdown occurs when an unexpected event, such as equipment failure, natural disaster, or safety hazard, forces the immediate stoppage of production to ensure the safety of personnel and prevent environmental or asset damage. Such emergency shutdowns can result in significant financial and operational consequences for the plant, as they come without warning and may involve significant recovery efforts. Related: What is Pipeline Pigging? The primary objective of a turnaround is to ensure the safety of personnel, infrastructure, and the environment. Regular maintenance and inspection help identify and correct potential hazards or issues in the processing units, such as corrosion, leaks, and mechanical failures. Turnarounds are necessary to comply with regulations and standards governing the oil and gas industry. Periodic inspections are required to meet standards set by safety and environmental organizations, ensuring that the units operate within safe and acceptable limits. Turnarounds are crucial to maintaining the reliability and efficiency of oil and gas processing units. When distillation units or compressors, for example, operate continuously and deteriorate over time due to usage and environmental factors, they must be serviced to maintain productivity or improve process efficiency. Turnarounds help to prolong the life of the equipment and facilities. Scheduling regular turnarounds helps maintain the units in good working condition and minimize unscheduled downtime, which results in reduced costs and increased profitability. Related: Why Are Gas Prices So High? Thorough planning is a critical step for a successful turnaround. Developing a comprehensive plan that includes scope identification, tasks, schedule, budget, and execution strategy is essential. A detailed plan helps monitor the progress of activities, estimate costs, identify potential risks, and solve issues that may arise during the turnaround process. Effective communication is vital to ensure coordination between departments, vendors, contractors, and regulatory bodies. Sharing information on the schedules, budgets, and expectations helps maintain transparency and collaboration throughout the turnaround event. Selecting and allocating the right resources is essential to support a smooth turnaround process. A skilled workforce, including engineers, technicians, safety professionals, and suppliers, is necessary to perform maintenance, inspection, and repair tasks. It is vital to prioritize safety to prevent incidents that may jeopardize personnel or assets during a turnaround. Implementing robust safety measures, adhering to corporate safety policies and procedures, and providing safety orientations and briefings to workers will help maintain a safe working environment. After the turnaround, companies should assess the turnaround process and identify areas for improvement. Read next: Oil and Gas Industry Overview: Upstream, Midstream, and Downstream Share copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. 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What is shutdown and turnaround. Turnaround shutdown meaning.