

Successful turnaround planning

Discussion of five key components in planning and executing a successful turnaround

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Refineries around the globe undergo periodic turnarounds to accomplish strategic direction with respect to the unit's up time and reliability. For many in this industry, it is a way of life. Gone are the days that the plant can thrive or even survive with a 'run to failure' philosophy. Top organisations have invested in the reliability of equipment to avoid unplanned stops caused by equipment failure. A turnaround typically encompasses the repair and refurbishment of critical process equipment, piping, valves and electrical components every three to five years. Regulatory compliance is maintained through inspections and testing. If there are any capital projects, or equipment upgrades, this period of ramped-down production is when that normally occurs.

This major undertaking is very costly, but necessary to achieve the organisation's long-term financial stability. Even though the occurrence of turnarounds is common to refineries, each event has to be properly planned and executed safely within the established timeline and at or below budget. Avoiding high costs must be at the forefront for all key stakeholders in the organisation. If the turnaround is well planned and executed, the company can gain a competitive advantage and operate successfully for a long period with minimal interruptions caused by equipment failure. On the other hand, a poorly planned and executed turnaround can yield negative financial and productivity results. When turnarounds exceed budget and last longer than scheduled, companies have to rely on reduced operating costs in order to recoup their

losses. With the aim of avoiding turnaround catastrophes, this article will outline five key components that are essential to successful turnaround planning:

1. Strategic planning
2. Detailed planning
3. Organising
4. Execution planning
5. Reflection

Strategic planning

This involves a high level overview of what needs to be done and why. It includes the business orientated parameters that are collectively required to execute a turnaround properly during a time period that is feasible without disrupting or compromising the supply of product to customers. A team of key executives create a vision of the organisation's future and the strategies needed to get there. However, many fail to deliver the desired results because of lack of engagement. If the lack of engagement is persistent, the cycle of failure will repeat until the dilemma is identified and resolved. For this reason, strategic planning should be considered a process rather than an event. This process is crucial in developing the guidelines of the turnaround by engaging key staff throughout the organisation. A turnaround steering committee should be formed and comprise directors, the site manager, the operations manager of the unit undergoing the turnaround, marketing, cost analysts, inspection, engineering, the turnaround manager, and the turnaround event leader. All key participants will communicate to the senior management team by providing insight into issues, challenges and opportuni-

ties that may not have been known or fully understood. The senior managers will not execute the strategy – the turnaround group along with operations, inspections and engineers will. Engage these key participants and the success rate of strategy execution will increase dramatically.

Risk management plays a big role in strategic planning. Risk management includes identification, quantification, mitigation, and control of inherited risks. The risks that are likely to affect the project are identified and validated. The characteristics of each are documented in a risk register. Once identified, the risks are quantified and evaluated to assess their possible impact on the event. Those risks that are detrimental to the turnaround will need a plan of mitigation to avoid or reduce an outcome that compromises safety, equipment damage or delays. Risk response control will enable the team to respond to changes in risk over the length of the entire turnaround. During the strategic planning process, the risks identified will typically be more associated with ensuring that disruption to the product supply chain does not go beyond what is expected. Several considerations go into planning when a turnaround will take place. Periods of low demand, weather, resource availability, and regulatory requirements are all considerable factors that determine when an asset's turnaround occurs. Shutdown and start-up schedules must be reliable enough to predict when a unit will be available for the mechanical window to begin and end. The major focus at this level of planning is when the asset is back

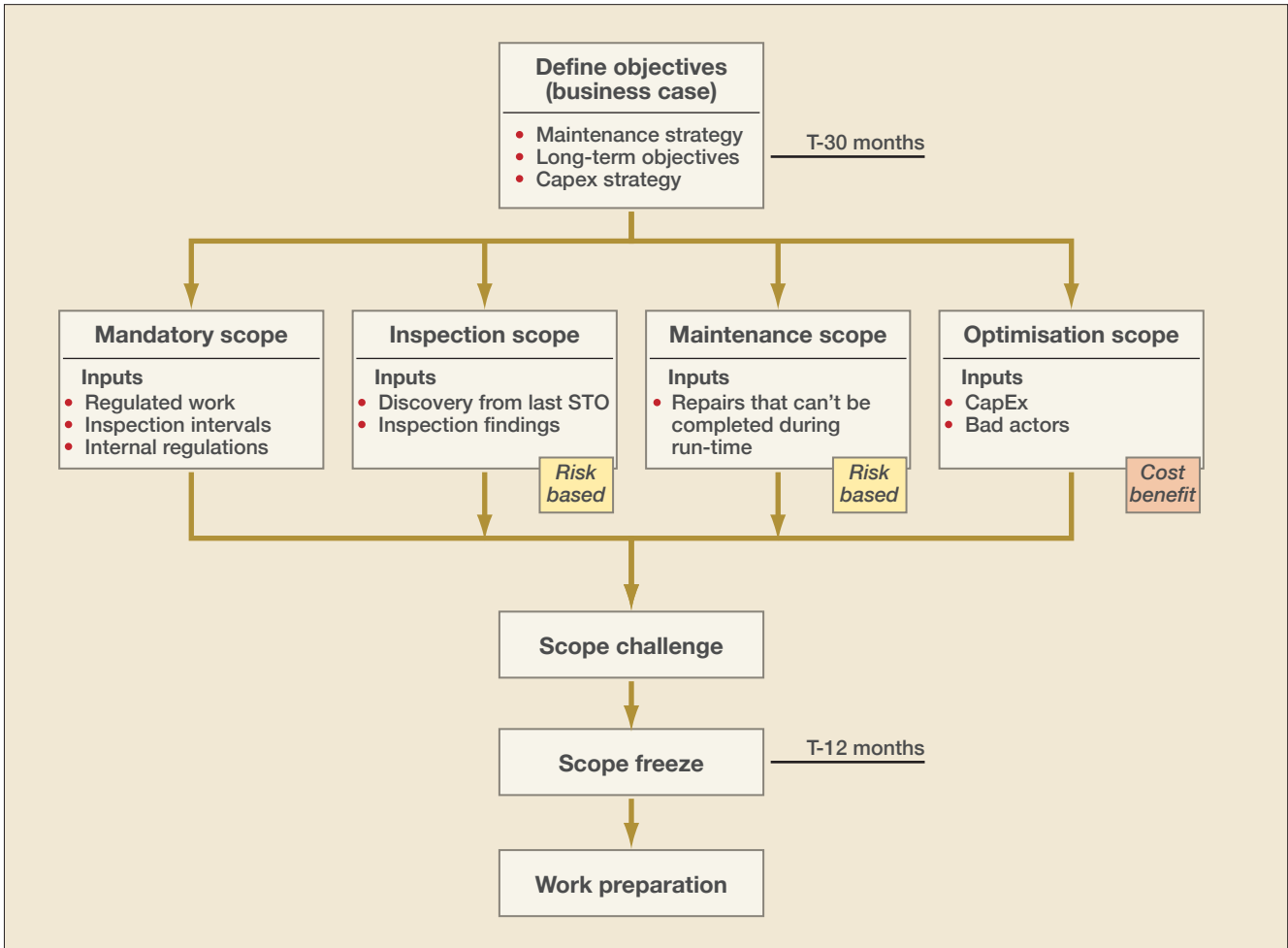


Figure 1 Scope management planning

online, producing product to fulfill commitments.

Detailed planning

Detailed planning is a component of a turnaround that gets more into the weeds compared to strategic planning. I am reminded of the ‘five Ps’: proper planning prevents poor performance. To take this a step further, the more planning done before the turnaround starts, the greater the success achieved. This stage is known as front end loading.

Turnaround preparation starts many months in advance of the execution date. At the beginning, this is an opportunity to look at everything involved in the turnaround. This requires a team of key stakeholders in cooperation with the turnaround group. There is a definite advantage to gathering information from employees who know the equipment and are experienced with logistics, safety, isolations, risks as well as decommissioning and commissioning process equipment.

The owners, operations, play a key role in the front end loading process. Successful turnaround managers get them involved with planning very early in the game. Experienced operators have the knowledge to avoid delays regarding work sequencing and equipment coordination. Other critical aspects of front end loading include scope, cost and schedule. In this phase, establishing scope is key to accomplishing favourable cost results and adherence to the schedule. As the primary owners of the process, operations managers must provide input into the scope of work for the turnaround. Participation in scope meetings during the beginning of the front end loading process is crucial. In order to avoid costly expenditures, every item in the scope registry must be challenged. Needs must take priority over wants. Operations personnel have the working knowledge, experience and expertise to play an integral part in what goes into defining the scope.

Best practice dictates that only work that has a specific business purpose should be integrated into the scope of a turnaround. In order to bring about this result, you will need to remove any ambiguity when building a work list. Basically, there are two types of work list items: mandatory and non-mandatory. Mandatory items should include all inspections that are required for the plant to remain in compliance with local, state or federal regulatory requirements and relevant company policies during the premised frequency cycle. Mandatory work will be reviewed to determine if other options for mitigation exist that may allow this work to be done while the unit is still operational. Likewise, if the inspection due date can be extended until the next turnaround, the item should not be included in the current turnaround scope. However, once validated as turnaround activity only, these work list items will be included in the scope.

Non-mandatory scope will be vetted more thoroughly during the review or optimisation process. These items must be 'challenged into' the turnaround scope. This challenge in methodology is a time saving measure that will scrutinise every work list item based upon established criteria and risk ranking.

Before risk ranking begins, some work may be excluded from the turnaround scope if the worklist item does not satisfy certain criteria. Does the item have a spare? Can the item be safely bypassed? If the answer to either of these questions is "yes", the items should be excluded from the scope for the turnaround. The objective of a turnaround is sometimes viewed as the ideal time to fix everything in the plant. This is a mindset that contributes to enormous worklists that continue to grow after the scope is frozen. Avoid this by strict adherence to not allowing work that can be done while the unit is running to take place during the turnaround. This is accomplished by training all key stakeholders in the purpose and objective of scope development and scope optimisation. All it takes is an understanding of how excluding non-mandatory work list items from the scope helps to reduce the overall turnaround cost (see **Figure 1**).

Another factor that will help is to show how much repairs during a turnaround cost compared to making the repairs during routine maintenance. In the latter case, the amount will be much lower because in-house maintenance teams are more familiar with the equipment and the duration of repair should be less.

Planners begin their detailed work once a worklist has been developed and agreed upon. What is really key at this stage is regularly scheduled turnaround update meetings. The turnaround event leader facilitates each update meeting and gathers information on the progress of preparation for front end loading. The update meeting is used for gathering information on progress, but primarily establishes accountability. If progress is not where it should be, the key participant is responsible for providing an explanation and a

mitigation plan that will improve progress before the next update meeting. In some cases, this may involve a communication to highlight an issue that is causing delays in work getting done. Bringing the issue to the forefront during the update meeting can help to resolve the issue or escalate the issue to the steering committee. Increasing communication and establishing accountability will prove to be successful during the planning stage.

Organising

This provides the necessary resources to execute the turnaround. The turnaround manager must ensure that the turnaround group is capable of accomplishing all jobs effectively, efficiently and in a timely manner to stay within budget and schedule. The turnaround group and contractors must have the appropriate training to ensure that they are capable of adhering to the requirements of the event. The magnitude of all activities is immense and takes months to plan before any work has been started.

Contractors can be essential to the overall success of planning by getting involved and participating in turnaround update meetings early and often. Most contractors know that: time is of the essence; there is not much flexibility in the turnaround schedule; discovery work (unplanned work) has to be fixed quickly to prevent delays; and the current turnaround is not the only one. If the contractor's actions contribute to extending the schedule beyond the end date, its next project will not start on time. Contractors stand to make a lot more money by working a job longer than expected, but in the long run it hurts their business as it relates to future jobs. Most would rather start moving workers to a new project as the work on a current turnaround is winding down. It is in their best interest to stay on track with all work activities.

To take this a step further, having the contractors on site during the detailed planning stage will also help to validate the planning estimates. As work packages are completed, experienced crafts should

walk down each job to verify that the planning estimates are accurate, all materials have been identified, and the resources loading is correct. The objective here is to eliminate as much 'fluff', or inflated estimates, as possible. Eliminating fluff during planning will ultimately have a positive result on the turnaround schedule as well. The key here is to incorporate the contractors into the detailed planning as early as possible. Waiting until the last few weeks before the turnaround begins will not be beneficial to the overall success of the event. Some organisations will plan to validate planning estimates by using their own planners. This will work if planners review work packages developed by other planners. This can be successful if the entire effort is managed effectively by the lead planner and event leader. However, staffing issues and workload may contribute to validation of the planning estimate being placed on the back burner. A small group of experienced contractors reviewing the completed work packages will alleviate this dilemma and provide more accuracy for planning estimates.

Execution planning

Execution planning is key to accomplishing the tasks of the turnaround. While the majority of the work is being done by contractors and managed by the turnaround group, operations personnel must make sure that the equipment has been properly prepared, isolated and made safe. Daily permit meetings with the turnaround group and contractor's leadership are essential in preventing delays in the schedule. Ensuring that the equipment is available and prepared the shift before scheduled work is to be done goes a long way in maintaining adherence to schedule. Communication of any unavailability of equipment by operations is also important. Contractor foremen should identify several backup tasks that can be worked if their first job on the schedule falls through due to equipment shortages. With proper planning and management of tasks, success should be the

result. However, unplanned repairs will undercut the best of turnaround schedules.

The criticality of discovered work can slow the pace to a crawl if not properly prepared for. I left this out of the detailed planning section because there is no way to plan for unplanned work. Some organisations build in contingency and projected costs just in case discovery work is found. A good way to avoid the pitfalls of discovery work impacting cost and schedule negatively is to form a discovery work task team dedicated to working solely on repairing work that was not planned. Again, there is no way to plan for discovery work ahead of time, making it important to have a dedicated team made up of a planner, coordinator, crafts and operator to address these issues as they arise. Failure to address these repairs in a timely manner will result in them getting lost in the weeds and ending up on the very end of the schedule. Having a team in place to escalate this issue will definitely be a benefit.

Reflection

When the turnaround has ended and the unit has started up successfully, it is time to reflect on what went well and what needs to improve. Lessons learned provide the feedback organisations need in order to continuously improve. All key stakeholders involved in the turnaround should participate in this formal meeting. Contractor managers and superintendents should participate in this meeting too. It is important to have a meeting facilitator from outside of the organisation in order to control the flow of information and prevent finger pointing. The purpose of this meeting is to gather information that will enable the organisation to meet fully the strategic goals set forth. This meeting should focus on how could the organisation improve going forward, consequently securing operational turnaround readiness. Recommendations should be presented to the steering committee in order to implement improvements into future turnarounds.

Conclusion

Turnarounds are very costly events that can be properly controlled if planned in accordance with five key components. Strategic planning deals with a high level overview of the turnaround's objectives, constraints and risks. Detailed planning focuses on how well the scope is defined and optimised. This article also discussed how to organise key participants, trained and accountable in performing tasks in a timely manner. Execution planning is the development of a blueprint that will meet or beat expectations. Finally, reflection on what occurred during every stage of the turnaround will make the organisation successful for each future endeavour. Document what needs to improve or remain the same in order to be in total alignment with best practices.

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