



Asset Performance Canada

The Importance of Turnarounds to Business Success for the Oil Sands

By

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Most attention is focused on investment for new capital projects in Oil Sands. Often overlooked are the large sums and business impacts of facility turnarounds. In 2009, the Oil Sands spent \$11.7 billion on operating costs. A large portion of these expenditures were related to turnarounds. By comparison, \$11.2 billion was devoted to capital expenditures. This marked the culmination of decade long trend of an increasing share of expenditure devoted to operating costs and the first time in over a decade that operating costs were higher than capital costs. (Source: Canadian Association of Petroleum Producers, January 2011)

This article discusses the importance of turnarounds to the bottom line, the special challenges associated with Oil Sands turnarounds, and the practices that can lead to superior performance. The data presented are based on an industry dataset of recent (past 5 years) turnarounds in the industry. The dataset contains more than 500 refining and chemical turnarounds from across the world. More than 25 of these turnarounds are from Alberta, including Oil Sands.

What is the Stake?

Turnarounds are critical to the bottom line of oil and gas companies with operating facilities. Turnarounds are sometimes referred to as shutdowns or outages and are the periodic planned shutdown of a facility to perform maintenance work and install new capital projects. These can be major events and impact a company's profitability through the cost of the event, the lost revenue due to the plant being offline, and potential harm to plant reliability if the turnaround is performed poorly. Turnarounds also entail significant safety and environmental risks.

The business impact refers to the lost opportunity costs of taking an outage or turnaround. At Oil Sands mining and upgrading operations these costs can run into the tens of million dollars per day spread over a 30-60 day maintenance window. The negative business impact to these operations is quite visible. Some of the largest and most complex turnarounds in industry occur with Oil Sands Upgrader facilities.

Less visible is the business impact of annual outages for cokers or smaller turnarounds at SAGD and other smaller petrochemical facilities that would be rated as a lower complexity event. Due to the low number of direct field labor hours, lower budgets and scheduled days (typically between 7-14 days feed-out to feed-in) planning is usually conducted less than six months out from the shutdown date and with less rigor than that used in higher complexity turnarounds. In many cases a single extra day of lost opportunity in the schedule exceeds the project budget for the work.

The Industry Challenge

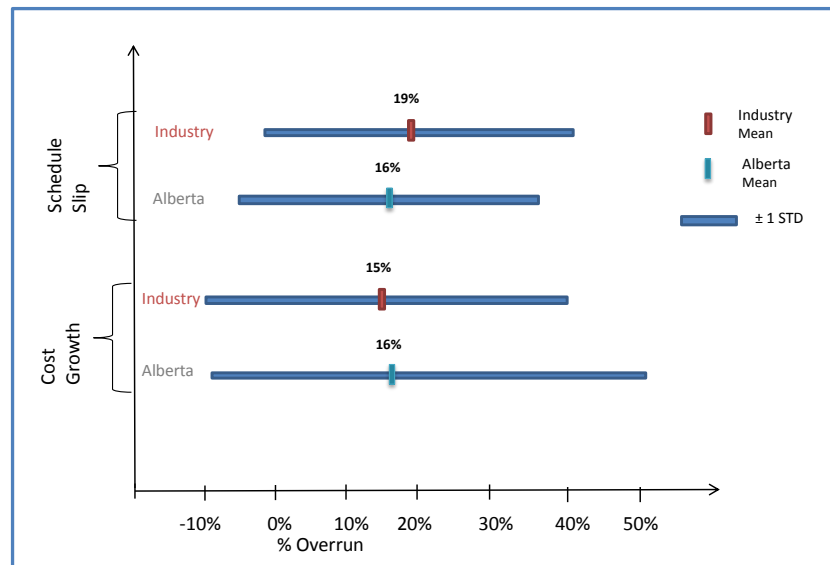
The refining industry has struggled to execute large, highly complex turnarounds on budget and on schedule. We have developed a "turnaround complexity" factor that takes into account the size of the turnaround, the amount of capital work include in the scope, and the turnaround interval. Higher levels of complexity are associated with higher cost and schedule overruns. Figure 1 shows the industry performance on meeting cost and schedule estimate for High and Medium complexity turnarounds across Industry and Alberta. Both the global industry and Alberta show a similar pattern in terms of

predictability. Similar to the industry at large, Alberta turnarounds (both Oil Sands and non-Oil Sands) show high average cost and schedule overruns.

The causes of these overruns are numerous but generally fall into the following categories:

- Poor scope control prior to the shutdown as significant work is added after the budget is developed.
- High rates of added scope or “discovery” during the shutdown.
- Poor planning and preparation prior to the shutdown.
- Unrealistic cost and schedule targets: Planned turnaround duration and cost targets are often established by the business far in advance of the turnaround and not related to the scope that has to be actually implemented. Turnaround teams have no choice but to live with these targets realizing that there is little chance of success.

Turnarounds Are Unpredictable



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Source: Asset Performance Canada, Turnaround Industry Database

Figure 1

The Unique Challenges of Oil Sands Turnarounds

Turnarounds are difficult to execute successfully even in the best of circumstances, but they are even more difficult in Oil Sands due to some of the following factors:

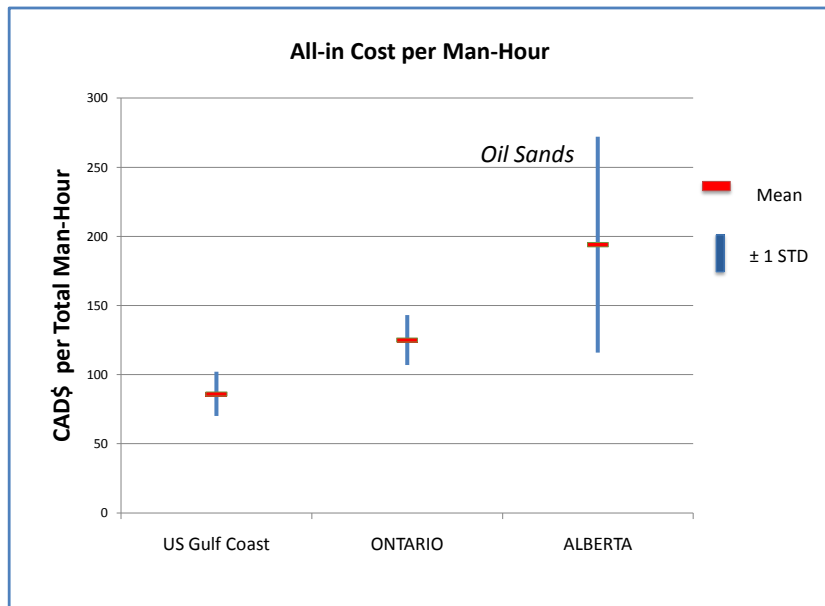
Size: Upgrader turnarounds can be very large by industry standards in terms of manpower and peak labor. Worker productivity declines as turnarounds get larger and it is difficult to efficiently manage larger workforces.

Logistics: These are remote locations and there is added cost for temporarily housing and transporting workers.

Skilled Labor: Attracting and retaining a quality workforce is difficult in this environment.

Taken together, these factors mean that the Oil Sands turnarounds are some of the most expensive in the industry. The figure below shows that average cost range (measured on a cost per total man-hour basis) for turnarounds executed in the US Gulf Coast, Ontario, and Alberta. The US Gulf Coast is generally perceived as a low-cost region due to its ample supply of skilled non-union labor and existing infrastructure in the region. The data indicate that turnarounds executed in Alberta are the most expensive and this holds true globally. The Oil Sands turnarounds are on the upper end of the Alberta Cost range.

Alberta Is a High Cost Environment for Turnarounds



Source: Asset Performance Canada, Turnaround Industry Database

Figure 2

Strategies for Improving Performance

After analyzing more than 800 turnarounds from across industry, we have identified some clear drivers of turnaround success. These include:

1. *Senior management recognizes the importance of turnarounds to the business*
Historically, the value behind improving turnaround performance has long been overlooked by the refining industry. The recent recession and drop and drop in margins have resulted in a

wake-up call for many companies on the importance of these events. Companies that have improved performance are those where senior management has become actively involved in driving change in their organizations.

2. *Planning for the turnaround starts early*

The goal posts for starting the turnaround planning process for these large events have been moved up. For high complexity turnarounds, planning needs to start at least 15 to 18 months prior to the shutdown start. Ten years ago, the expectation was 6 to 9 months.

3. *There is effective integration across all plant functions, and importantly, between the maintenance and capital projects departments.*

Poor alignment and communication across departments both prior to and during the turnaround is one of the primary drivers behind turnaround disasters.

4. *Scope is effectively managed*

Companies continually struggle with the process of identifying, defining, and freezing scope. Late scope additions de-rail the planning process, lead to re-work, and have major cost and schedule impacts.

Turnarounds that are characterized by the factors above have better readiness, which in turn, drives better outcomes. Figure 3 shows that improved readiness correlates with both better cost and schedule performance.

Readiness Drives Turnaround Performance

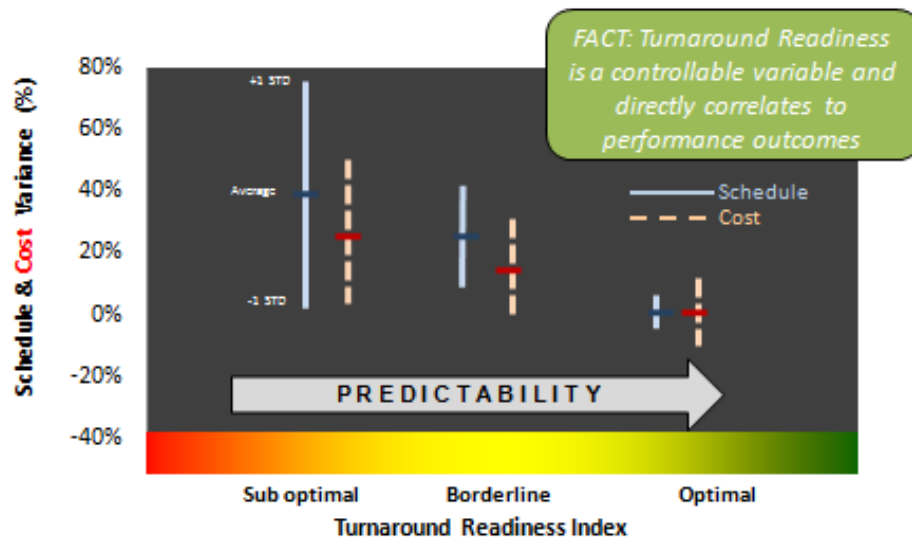


Figure 3

Conclusions

The business stake for improving turnaround performance is high. As new plants come on line in the Oil Sands an increasing share of expenditure will be devoted to operations and turnaround costs. Alberta, and particularly Oil Sands, is a high cost region with opportunity for improving performance. Executing turnarounds that are competitive not only in terms of schedule perspective, but also in terms of cost is possible through strategic decisions that results in a well defined scope with a comprehensive execution plans.

The authors

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