



CASE STUDY

Implementing a Digital Bolted Joint Management System for Quality Assurance During a Refurbishment Project

How Cumulus Smart Torque System technology was used on a major refurbishment project to maximize productivity and ensure a leak-free start-up

The Challenge

A large downstream operator in Southeast Asia turned to Cumulus for help refurbishing their Hydrofluoric Acid Alkylation (HFA) unit. The unit had previously been shut down due to issues with containment. Because hydrofluoric acid is a highly toxic and dangerous chemical, the operator had to ensure that the unit would start-up with zero leaks once the refurbishment work was completed.

The project took about one year to complete and required that approximately 5,500 flanged joints were repaired/refurbered, tightened, and inspected.

The Solution

The customer chose Cumulus's Smart Torque System (STS) to ensure the quality of this critical activity. An integrated bolted joint management system, STS provides real-time quality assurance and progress tracking for bolted joint assembly and maintenance.

STS was used to track and document the entire flange management process for each joint in this project, delivering quality results plus a robust dataset to be used for further improvement in future projects.

3,261

Flanges Tightened Once

1,881

Flanges Tightened Multiple Times

7,887

Unique Tighten Completions (joints tightened)

2,745

Tightens That Were Rework*

180

Flanges Completed Manually

198

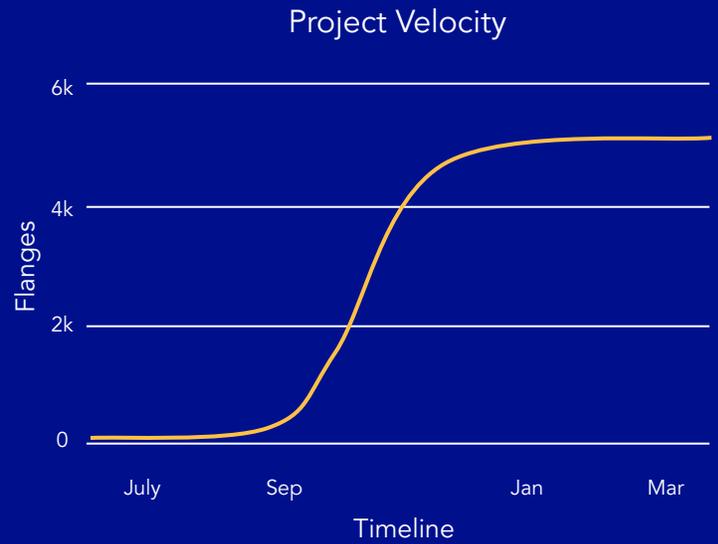
Flanges Decommissioned

*Rework: Any flange tightened more than once (includes planned and unplanned tightening)



Insights

Through the use of our Smart Torque System, the customer was able to collect a robust data set that revealed numerous actionable insights to streamline and improve this refurbishment project, as well as any and all future projects.



User and Joint Identification.

Each individual and flanged joint were assigned a unique identification number to facilitate accountability, tracking and analysis. This empowered the repair team to understand the size and quantity of each joint type, plus the customer was able to calculate a daily productivity report for each worker.



Tightening Time and Project Productivity.

Using STS, the customer was able to track tightening time and, by extension, project productivity. They were also able to ensure that workers were proficient at the beginning of a work scope, significantly decreasing the average tightening time over the course of the project.



Work Completion Measurements.

By measuring the number of "work completions", the customer was able to see the actual work activity that took place during the project. This helped to minimize rework, which can increase project costs by as much as 5-10%, and unplanned work, which can cost three times as much as planned activities.

The Results

0

The HFA Unit was restarted with zero leaks.

Typically, 5-10% of bolted joints develop leaks following major unit refurbishment.

40%

40% of the fitters completed 80% of the work.

This indicates a cost savings opportunity for future projects by employing top tier fitters.

50%

Average tightening time decreased 50% during project.

This shows the value in ensuring workers are fully proficient at the beginning of a work scope.

Implementing a robust digital system for bolted joint management proved effective and achieved the desired end result for this facility. Being restarted with zero leaks represents a major win for worker safety, environmental performance, and cost savings.