



A CASE STUDY IN ENGINEERING, EXPERIENCE, AND EXPERTISE

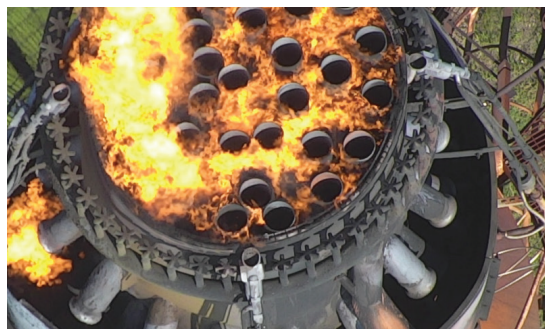
Record Breaking Delivery: Hurricane Harvey Relief

SITUATION

In August 2017, one of the costliest and most destructive hurricanes in American history, Hurricane Harvey, wreaked havoc on the Gulf Coast of the United States. Cedar Bayou, Texas received a record-high 51.88 inches of rainfall, causing devastating and deadly flash flooding. One large petrochemical facility in this area lost power because of the surging waters. Without power, the facility's large high-capacity steam assisted flare was incapable of producing steam, resulting in a critically damaged flare tip.

In a state of emergency, the facility went offline until power could be restored and vital equipment could be repaired or replaced. A flare tip of comparable size and complexity usually takes over 20 weeks to complete, and hundreds of jobs and millions of dollars in production were at stake while the facility was offline. Representatives from the facility considered many vendors in the area for this project, including the original equipment manufacturer, but only Zeeco had a proven history delivering equipment of this size and complexity in record time. At the time, Zeeco's fastest delivery on record, for a project of this magnitude, was eight weeks' time. However, this was a uniquely dire situation and the facility determined the replacement flare tip was critical path to get their facility back in operation. Consequently, they could not afford to keep the flare offline for eight weeks. On September 8, 2017, Zeeco's Aftermarket team committed to draft, design, manufacture, and deliver a direct replacement flare tip to the customer's facility located on the Gulf Coast of Texas by 10/12/2017 – within five weeks. One week later, the Aftermarket team unexpectedly received a flooded combustion control unit from the same facility that also needed to be replaced.

The following timeline demonstrates how Zeeco's Aftermarket applications, engineering, purchasing, drafting, design, manufacturing, and quality teams surpassed customer expectations in a record-breaking, expedited delivery project under immense deadline pressure.



ENGINEERING, EXPERIENCE, AND EXPERTISE

TIMELINE

► 8/25/2017

Category 4 Hurricane Harvey makes landfall along the Middle Texas Coast. Cedar Bayou in Houston, Texas receives a total of 51.88 inches of rainfall; a new North American record.

► 9/6/2017

Customer contacts Zeeco requesting a quote for the fastest possible delivery of a direct replacement flare tip.

► 9/7/2017

Zeeco's Aftermarket applications, engineering, drafting, design, and manufacturing teams meet to assess the project and plan its execution. Zeeco's Aftermarket purchasing department immediately begins identifying necessary material and negotiating critical procurement paths. Customer is informed that Zeeco will deliver the flare tip by 11/2/2017 (within eight weeks); the fastest delivery of a comparable flare tip to date.

► 9/8/2017

Given the extreme circumstances, the customer contacts Zeeco to request an even faster delivery. Zeeco's Aftermarket teams take all necessary steps, including implementing a night shift to expedite production, and commit to deliver the flare tip by 10/12/17 (within five weeks). Zeeco receives purchase order from the customer.

► 9/11/2017

All critical materials are delivered to Zeeco.

► 9/12/2017

Fabrication begins, utilizing both day and night crews.

► 9/13/2017

All flare tip drawings are finalized and a formal shop release is issued.

► 9/14/2017

Construction of the tip is underway. Customer sends photos of a control panel damaged by the floodwaters to Zeeco and notifies them that a direct replacement of the flare's control panel needs to be delivered on the same date as the flare tip. Zeeco begins procurement of materials based on photos and a control panel schematic provided by the customer. Zeeco sends a quote to the customer, committing to draft, design, manufacture, and deliver the replacement control panel on the same date as the flare tip.

► 9/18/2017

Zeeco receives purchase order from customer for new control panel. Control panel components begin to arrive.

► 9/19/2017

Zeeco's Houston area end-user support personnel visit the facility and are given the damaged control panel to bring to Zeeco for investigation. Zeeco personnel deliver the control panel from Houston to Broken Arrow headquarters via private jet. Zeeco completes control panel drawings.

ENGINEERING, EXPERIENCE, AND EXPERTISE

► 9/20/2017

In-house product instrumentation and controls engineers at Zeeco conduct a full evaluation of the damaged panel and update drawings to match. Final drawings completed and submitted to customer.

► 9/21/2017

Flare tip construction completed, and final assembly of components begins. Zeeco instrumentation and controls engineers discuss possible functional modifications to the control panel. Flare tip is ahead of schedule, which is now driving the controls delivery date because the flare tip and control panel must ship together. Control panel drawings are released to shop, and fabrication begins, along with procurement of all remaining materials.

► 9/25/2017

Shop receives all control panel items and Zeeco's controls assembly team expedites production.

Instrumentation and controls engineers keep constant line of communication open with customer to ensure shop captures and includes any design changes.

► 9/26/2017

Customer's upper management visits Zeeco to inspect the flare tip and express gratitude for a job well done.

► 9/28/2017

Zeeco's shop completes fabrication of control panel. Instrumentation and controls engineers conduct function tests and deem control panel complete.

► 10/2/2017

Crating of the flare tip and the control panel begins.

► 10/4/2017

Twenty-nine days ahead of the original date of delivery and eight days ahead of the requested expedited delivery date, the flare tip, control panel, and all associated items are loaded onto a truck and shipped to our customer.

