

## Pre-Owned Blower Rerate Restores Production to Normal Capacity at Canadian Refinery

### Customer

Oil refinery and chemicals facility  
Alberta, Canada

### Equipment

Blower

### Challenge

Repair a damaged blower to minimize unexpected downtime and increased production costs.

### Solution

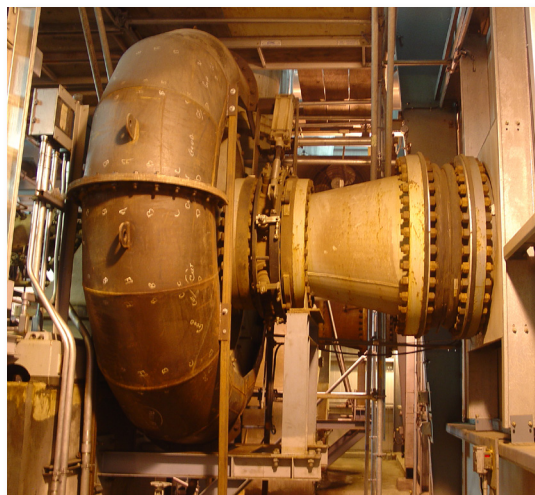
Elliott rerated a pre-owned blower, using a combination of repaired components from the failed unit and newly manufactured parts, to expedite the production schedule and meet the refinery's aggressive deadline.

One of the largest integrated refineries in Canada suffered an unexpected outage in July 2011 when a blower failed. The blower string provided air to the boiler feed. The refinery was forced to use an out-of-service blower as a temporary substitute. Because the replacement blower was designed for a different process, it was not as efficient as the original, resulting in increased production costs.

The damaged blower was built 40 years earlier by Elliott. The refinery operator turned to Elliott's Engineered Solutions team to assess the damage and provide a cost-effective solution. Elliott Field Service technicians inspected the failed unit onsite. The rotor shaft and impeller blades were severely damaged, and the compressor's casing was damaged beyond repair. As an alternative to manufacturing a new blower, Elliott proposed a rerate of a pre-owned machine to replace the failed unit.

Elliott located a pre-owned blower and shipped it to the Elliott service center in Edmonton, Alberta, Canada. Concurrently, the refinery shipped the failed unit to the service center for additional inspection. Elliott engineers determined that the bearing housing and seal housing could be salvaged from the damaged machine and used for the pre-owned blower rerate. New rotating and stationary components required for the rerate were manufactured at Elliott's Jeannette, PA manufacturing facility and the Edmonton service center.

Elliott was authorized to proceed with the rerate project in December 2011. Working closely together and using components from the failed unit as well as newly manufactured components, the Edmonton and Jeannette teams delivered the refurbished, pre-owned blower to the refinery in only six months. The lead time for an entirely new unit would have been significantly longer, requiring the refinery to use the replacement blower for an extended time.



*Failed blower at the refinery.*



*Damaged coupling spacer and coupling guard.*



*Damaged seal housing.*

## Casing

At the start of the project, the refinery specified new operating conditions for the replacement blower. Elliott engineers worked with the customer to determine what was possible based on the inherent limitations of the pre-owned compressor that was being used to rebuild the blower.

The Edmonton service center inspected and tested the casing of the pre-owned unit to validate the integrity of the metal, using a combination of non-destructive tests and a hydrotest performed to American Petroleum Institute (API) standards.

Elliott created adapters for the piping, and modified the existing bearing housing and the refinery's installed inlet and discharge piping to fit the casing. A new backing plate was also manufactured for the casing.



*Refurbished casing after hydrotest and blast cleaning.*

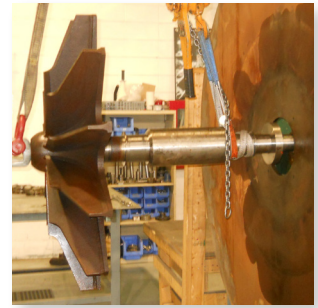


*Painted casing ready for final assembly.*

## Rotor Assembly

Elliott engineers evaluated the pre-owned compressor at the Edmonton service center and determined that the rotor assembly, consisting of a two-piece impeller design, could not operate at the refinery's desired speed.

The refinery was also interested in upgrading to modern technology and materials. A reworked rotor assembly, built from new and refurbished components, was required to improve performance and to operate at the specified operating conditions.



*Damaged rotor assembly from the failed blower.*

The Edmonton shop machined a new rotor shaft from AISI 4340 steel to meet the blower's temperature requirement of -40°C; Engineered Solutions designed a one-piece impeller that was fabricated in the Jeannette factory using the same material. Jeannette also supplied a new coupling and coupling guard for the unit.



*New one-piece impeller manufactured at the Elliott Jeannette, PA facility.*

The Edmonton service center's scope of work also included:

- Overhauling the inlet guide vanes from the failed unit
- Manufacturing an inlet adapter
- Modifying the thrust bearing housing from the failed unit
- Machining the thrust disc
- Modifying the existing bearing housing for tilt-pad style bearings
- Manufacturing an offset discharge adapter

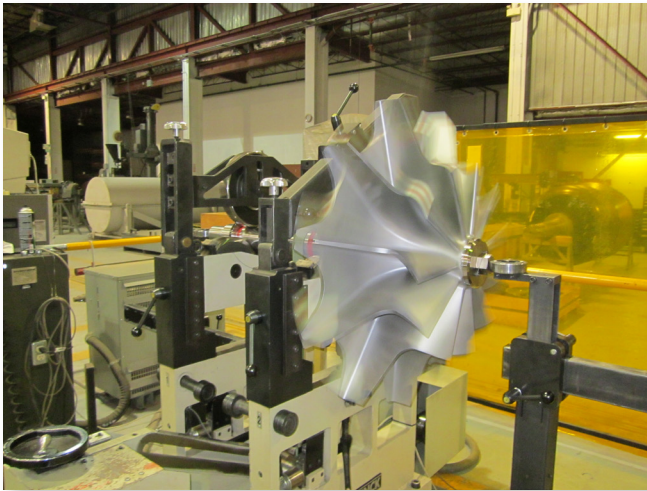


*Refurbished inlet guide vanes.*



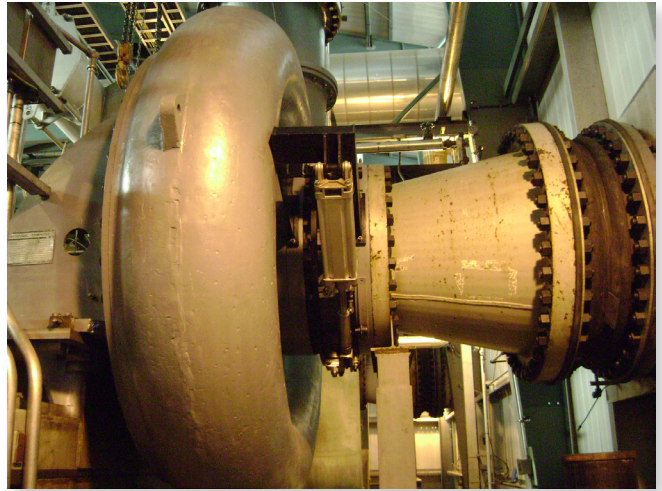
## Blower Assembly

The Edmonton service center fit the one-piece impeller from Jeannette onto the new shaft and balanced the final rotor assembly. Elliott engineers then assembled the bearing housing and seal housing from the failed blower, the new rotor assembly, the casing from the pre-owned compressor, and the new backing plate. Prior to installation, Elliott modified the baseplate from the failed unit onsite to improve structural rigidity and weight bearing capacity. The rebuilt blower was installed by Elliott Field Service in June 2012, on schedule with the refinery's startup date.



*Rotor assembly being balanced at Edmonton service center.*

The customer was extremely satisfied with Elliott's quick turnaround and flawless execution on this project. The combination of locating an appropriate pre-owned, single-stage compressor for modification, manufacturing new components, and refurbishing existing parts from the failed unit enabled Elliott to deliver a reliable blower to improve performance and meet the refinery's specific requirements.



*Repaired blower installed at refinery.*

With over 100 years of turbomachinery experience and engineering expertise, Elliott specializes in providing customers with cost-effective and unique solutions to their complex problems. Customers around the world turn to Elliott for new rotating equipment as well as repairs and overhauls to existing units for improved efficiency, reliability, and productivity.



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