

SERVICE AT ITS BEST

THE CHALLENGE

In an American engine casting plant, the furnace draft ID fans were regularly coated with sticky dust from the application and had to be sandblasted weekly to clean the wheels and restore the balance of the rotor assembly. After several years of operation, the plant began to experience rotor cracking resulting in frequent repair and maintenance. It was evident the cracking was related to metal fatigue and there was concern that the wheels would have to be rebuilt. The plant engineer requested a more economical solution to mitigate the cracking problem.

Industry:

Automotive

Application:

Engine Casting Plant

Problem:

Weekly maintenance requirements resulting in impeller erosion and cracking.

Solution:

Field testing and evaluation to identify natural frequency and installation of blade stiffeners to increase durability.

OVERVIEW



THE PROCESS

An nyb service technician performed onsite inspections including dimensional analysis, a review of the cracking pattern, and a “bump test” to identify natural frequencies within the wheel. These tests helped nyb’s engineering team identify a resonance near the blade pass frequency which can result in rotor cracking and metal fatigue. This field testing process also identified that the wheel blades had been significantly thinned from $\frac{1}{2}$ ” to $\frac{3}{8}$ ” (12.7mm to 9.525mm) by the sandblasting which left the rotor more flexible, lowering its natural frequency. When the original data is compared to the field data, it confirmed the results.



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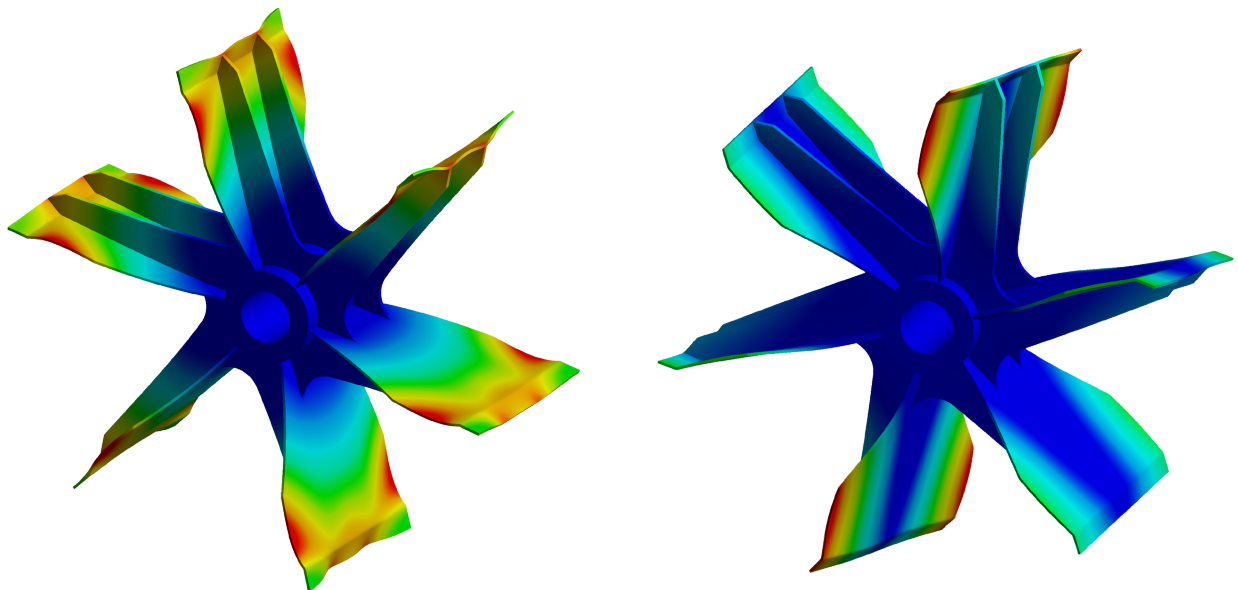
THE SOLUTION

After nyb's engineering team reviewed all the data collected in the field it was determined that blade stiffeners should be added to the back side of the blades to raise its natural frequency. Additionally, several blade doublers were added slightly off-center to each blade in order to change the blade's modal shape. After the modification, the fans were re-tested to check that the resulting wheel natural frequency was high enough to avoid co-incidence with the blade pass frequency.

Thanks to the partnership between the plant engineer and nyb's field service technician, engineering department, and manufacturing team, the initial problem was clearly identified, possible causes were determined, and testing procedures were established. This process ultimately resulted in a long-term solution to the customer's fatigue cracking problem offering a less frequent maintenance schedule and more reliable equipment, saving time and money.

Learn more about how New York Blower's aftermarket team can find solutions for any problem across all industries and applications.

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