

## Rebuilding a Cooling Tower Fan Section

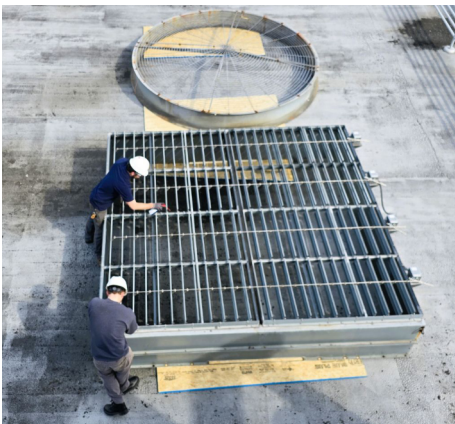


MSC recently completed a full fan section rebuild on a cooling tower in Jersey City. The project involved replacing nearly every component of the fan assembly, including the motor mounting cross structure and tensioner, fan motor, motor and fan drive sheaves and belts, fan drive shaft and bearings, and the fan blades with their mounting hardware.

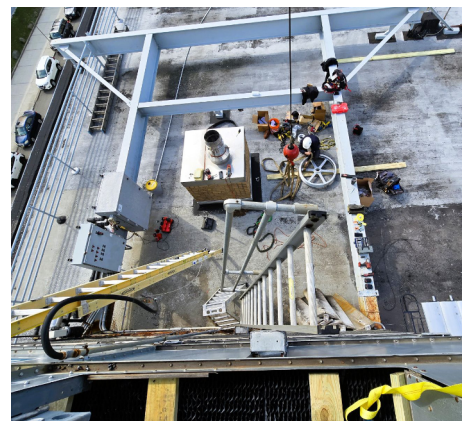
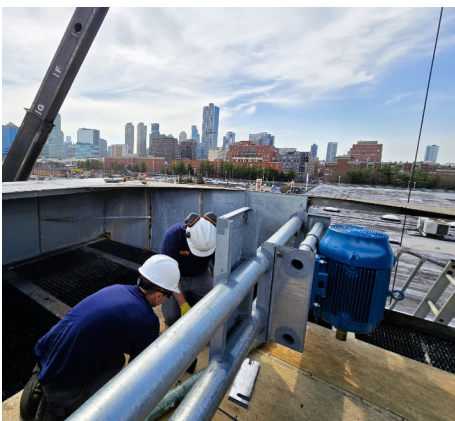
To gain access, our crew disconnected the tower's discharge damper assembly and rigged it off the tower. A lumber work platform was built inside the tower to protect the fill media while the old driveline was removed. A crane handled the heavy lifts, taking out the existing motor bracket and cross member and setting the new components in place.

With the new structure installed, the team mounted the motor, sheaves, belts, shaft, bearings and blades, checking bearing alignment, pulley location, blade clearance and pitch, and torquing the blade hardware to the manufacturer's specifications for that blade type.

The tower's sump and recirculation pump stayed online throughout the work, so the building kept partial cooling capacity while the fan was down. Once everything was reinstalled, the crew started up the fan and confirmed proper operation of the discharge damper.

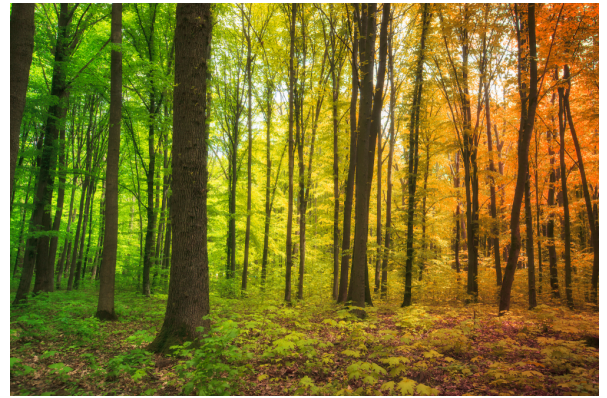


*Counterclockwise from top: The new fan motor is rigged to the tower; Apprentices Chris Struble and Nick DePascale lubricate damper louvers; Project Manager Glenn Daniel and Journeyman Alec Radovanovic review fan blade assembly clearance and pitch; The new pulley lands; Glenn and Alec verify pulley placement and the location of bearings on the fan shaft*



# Before the First Cold Snap: HVAC System Readiness

As crisp autumn air moves in, it's time to shift focus to preparing your facility for the upcoming heating season. Here's a practical guide to help ensure your HVAC systems perform properly throughout the winter months.



**Optimize Your Economizer:** Start by fine-tuning your economizer settings and functionality. These systems can significantly reduce energy costs by leveraging cooler outside air for free cooling, so verify they're calibrated correctly to maximize efficiency during the transitional fall weather. Check outside air damper actuators, linkages, and minimum position settings, as well. A damper stuck open on a cold morning can freeze a coil.

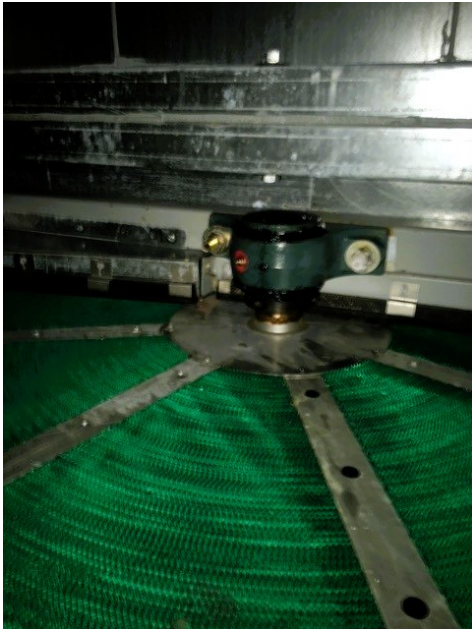
**Comprehensive Fall Maintenance:** Your fall preventive maintenance should be thorough, going beyond the basics of changing filters and belts. MSC recommends:

- Heat Exchanger Inspection: Check for cracks or corrosion to maintain optimal heat transfer and prevent potential safety hazards such as carbon monoxide and flue gases entering the air stream.
- Boiler Combustion Analysis: Test combustion efficiency and verify safety controls, flame sensors, and low water cutoffs before the boiler carries the full load.
- Heat Pump System Check: Verify both heating and cooling modes are functioning correctly for those unpredictable fall temperature swings.
- Hydronic System Operational Inspection: Confirm proper pump and valve operation and even heat distribution throughout the building, so the system is ready when cold weather arrives.
- Heating Control Tests: Ensure that all thermostats, sensors, and control systems are accurately reading and responding to temperature changes.
- Freeze Protection Tests: Verify that freeze stats and low limit controls trip and reset properly, and check glycol concentration in any systems that rely on it. A failed freeze stat can mean a burst coil and an expensive emergency call.
- Cooling Tower Winterization: Whether your tower stays in service or shuts down for the season, check basin heaters, drain or bypass piping as needed, and confirm damper and louver operation for low ambient conditions.
- Steam Trap Survey: Failed traps waste energy and can cause water hammer once the system is under load.

**Consider Retro-Commissioning:** Fall and winter are ideal times to conduct retro-commissioning on your HVAC system to resolve original construction flaws or issues that emerged over time. This process can reduce energy costs, minimize unexpected downtime and repairs, and extend the lifespan of your equipment. MSC is NEBB certified in building systems commissioning and can evaluate how your systems are actually performing against how they were designed to perform.

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## ERU Case Study: Getting to the Root of a Lab Airflow Problem



As part of a larger project, MSC assisted with the commissioning and turnover of two 60,000 CFM air handlers serving two floors of research laboratories. Each unit's energy recovery unit (ERU) used two 16-foot diameter wheels, one for sensible (temperature) recovery and one for latent (moisture) recovery, rather than the conventional single wheel. That unusual configuration turned out to be central to the problem.

Roughly 30 days after air balancing, supply and exhaust airflow in the labs dropped by more than 10%, and recovery efficiency declined right along with it.

### Finding the Root Cause

The supply and exhaust fan drives had crept up to 59 to 60 Hz, well above their original setpoints. The real answer came from diagnosing the ERUs while running rather than static. Once the slow-turning wheels were brought up to speed, the pie-shaped wheel sections were visibly uneven, with some protruding as much as an inch out of plane.

This misalignment, caused by faulty installation, accelerated mechanical wear between the wheels and their gasketing systems, prematurely degrading the seals and creating significant bypass between supply and exhaust airstreams. The longer the units ran, the worse it got.

### The Fix

Working one ERU at a time, technicians readjusted every section on all four wheels and retested at high RPM to confirm true rotation, a process that took several days per wheel. They then replaced all gaskets and brushes, verified seal performance against the manufacturer's tolerances, and installed and aligned new belts on the wheel drive motors.



### The Results

The VFDs dropped back to their intended operating speed almost immediately. Follow-up readings confirmed correct supply and exhaust volumes across the labs, including at the fume hoods, and the ERU manufacturer's representative verified the results with calibrated instruments.

Facing unexplained airflow or efficiency issues? MSC's commissioning team can find the root cause and get your equipment back to design intent. Contact MSC to schedule an assessment.