



*These two photos show the aftermath of the fan that exploded. On the far right you can see where the 1700 lb. motor was torn right off its mountings! Definitely validates stories of fan blades slicing through cinder block walls.*

# The deconstruction of a 125 hp motor and a 4 foot exhaust fan in seconds...

This is the aftermath of a fan that ate itself along with the motor that drove it. The motor is missing in these photos because it was ripped right off its mounting bolts! We have had a few of these over the years, but this one was particularly violent. It was a 48" supply air fan (5500CFM) driven by a 125hp motor controlled by a VFD. Originally the fan was an adjustable blade setup, It was converted and the blades were locked. ONE PROBLEM: All the linkage and bearings were left in place!! It has been in position for almost 20 years.

This type of disaster is a long time coming, but if you don't look for it...it sneaks up on you really fast. Little or no maintenance or Protective/Preventive Maintenance meant no one was keeping an eye on it. Or more correctly, maybe someone was keeping an eye on it ...and that was all they did.

Fans pick up dust, dirt and other stuff in many ways and it collects on many surfaces of the motor and the fan, most significantly the blades. It would seem logical that a spinning fan would collect this stuff on its blades in a symmetrical pattern. Since we don't live in a logical world all the time, individual blades can pick up their surface crap in a haphazard manner. Add to this any loosening or change in the blade's position or a loose sensor tube, and the imbalance reaches a critical point; then destruction happens quickly. A day or two earlier and this fan may have been humming right along and then the straw moment occurs. In a second, a blade flexes, touches a guard, breaks and the others follow suit in a manic blade jail break.

When converting a pneumatic variable pitch fan to VFD operation it is always recommended that the fan be replaced with a fixed pitch

style. This eliminates potential failure points in the linkage which is the probable cause of this destruction.

This type of problem is sooooo preventable. Regular maintenance and a PM survey will let you know all you need to know about the health of your fan/motor setup. The run to failure concept, that started in the 90's and grew substantially in 2008-2010, may have been seen as a temporary thing. Unfortunately, once the habit of little or no maintenance took hold, it was here to stay. This set of fans had not been tested in 15 years. Regular vibration testing to determine the fans condition is just good insurance. By trending this data we can make an assessment on how quickly the fan's performance is deteriorating.



*The rental ventilation equipment needed to substitute for the ruined fan and motor.*

The idea of accepting the cost of a new fan is one thing, but if it requires emergency response, additional repairs, rush freight charges on a replacement motor, etc., that rationale begins to fall apart. The replacement fan, motor and installation will reach \$50,000.00 alone. Add to that the rental for the auxiliary ventilation system and the initial service call and clean up...it gets very expensive to save a few dollars.

Maintenance programs are income for us, of course. But, a nice big emergency fan and motor replacement, well there is just no comparison, if you get the point...However, I am sure several of you who are reading this right now figure you can still

beat the odds by running your equipment until it taps out. All we can say is **"Good luck with that."**

