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Fan Blading or Blade Pass Vibration Issues

To whom it may concern,

This issue may be present in one form or another on many vertical shaft cooling tower or axial fans.

Fan blading or blade pass frequency vibrations can be due to one or more blades are not at the same pitch angle which causes higher (aerodynamic noise) and vibration peaks at blades x fan speed. Another issue might be the blade tip gap is very uneven or too large around the cowling.

You could check blade pitch angles by tracing a line along the curve of one blade tip inside the cowling.

Then rotate each blade to that curve line to see how close to the same angle they all are as the original

(mark each blade 1, 2, 3, 4, etc.).

If necessary corrections to change pitch angles would be done by loosening the hub bolts to allow blade shaft/blade rotational adjustments so they’re all the same.

Try to get a fan blade angle chart from manufacturer literature for a specific model and then confirm blade pitch angle versus motor HP and FLA or performance for that fan. Also check blade hub bolt/nut torque values.

Reducing blade tip gap inside the cowling requires more work.

In some cases I've added steel rings (welded in sections depending on diameter or single ring) around aluminum axial fans inside the wheel track to reduce the gap to improve performance. Blade gap may not be as critical on vertical shaft cooling towers.

If blade tip gap tolerances dimensions on an axial fan required reduction to fix a perceived fan blading problem check with manufacturers for info and how best to correct it to maintain proper tolerances for best performance and/or reduction of vibration peaks at blades x speed frequency.

I'm sure all fan manufacturers will have info which can be useful to solve this issue. If you’re stuck send me an email (info@vibescorp.ca) and I’ll forward a typical fan blade chart for left or right hand rotating axial fans.

Cheers

Garrett Sandwell,

CEO.

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