



**VIBES Corp®**



**V**ibration **I**ndustrial **B**alancing & **E**quipment **S**ervices, Corporation

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# Agricultural Rotating Machinery Vibration Identification and Solutions

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# Introduction to **VIBES Corp**®

## Why work with us? Serving Canadian Industry for over 50 Years.

VIBES Corp's reputation was built and established on thousands of promises fulfilled over 50 years in business across Canada. Superior quality service, sales and training courses provided on the intelligent specialist level has been the standard and always will be since our vibration and balancing business was formed in Calgary, AB, in 1982. (Formerly Industrial Balancing Ltd. Est. 1967) In the final real-time analysis VIBES Corp will deliver more value and peace of mind.

## What do we do? Expert technical services and preventative maintenance programs using advanced instruments and tools to solve various vibration, balance and mechanical noise related problems.

Factory trained and repair specialists on HVAC, fans, blowers, cooling towers, pumps, motors, industrial rotors. FlaktWoods Varofoils and Aerofoils, Sheldons Axico, Aerovent, Novenco, New York Blower, Chicago Blower, Canadian/Bufalo Blower, CML Northern Blower, Joy Axivane, Twin City, Alphair, Allied Blower, Markhot Varivane, Loren Cook, BAC, Evapco, Marley, Hoffman, Spencer, Baldor, Reliance, Trane, Carrier, Eng.Air, Haakon, WEG, Leeson, GEC, GE, Emerson, Westinghouse, Toshiba, Siemens, US Electric, Delhi, PennBarry, Armstrong, Westcan, Bell & Gossett, and most types of rotating, diesel engines & reciprocating machinery.

## What do we sell, supply, install & service?

- WEG Electric Motors
- Canada Support - Symphony Industrial AI - Engineered Vibration Solutions & Client Training
- COOLBLUE - Inductive Absorbers & Chokes = VFD any motor shaft current bearing damage protection
- DRIVE SYSTEM PARTS: Fans, Bearings, Sheaves, Couplings, Belts, Shafts, Misc.
- VIBRATION CONTROL, Isolation & thrust spring mounts, monitoring, trending, alarm/trip switch 24/7 machine protection

The machinery under our professional health care program = **VIBES-GUARD PdM Program**® are treated as if our own. We use proven technologies and methodologies along with our multi-technical and electro-mechanical (VIV, ASD, VPM, CPM, VFD, EIBD, EDM, Shaft Currents, etc.) training, skills, and experiences for total overall analysis and evaluations. When the total analyzed facts about a machine, motor or engine are known we formulate an accurate condition report and recommend the best possible solutions. We work with clients to organize necessary actions in order of urgency or budgets.

## Where do we work? (Commercial Towers, Infrastructure Facilities, Industrial Plants, Lumber Processing & Marine Ports, etc.)

Our service area is mainly BC Lower Mainland and Vancouver Island. If requested we can service other areas.

## Who have we worked with?

VIBES Corp service capabilities have been used and accepted by high-ranking officials in:

- |                                |  |                              |                                |
|--------------------------------|--|------------------------------|--------------------------------|
| • other service companies      | • power plants and dams                | • commercial towers          | • saw mills                    |
| • manufacturing and processing | • sewage and water treatment plants    | • agricultural               | • pulp and paper               |
| • engineering firms            | • government infrastructure facilities | • mining                     | • research and development     |
| • universities                 | • oil and gas                          | • ski hills                  | • machining / fabrication      |
| • colleges                     | • biogas energy systems                | • marine-terminals and ships | • chemical plants              |
| • hospitals                    | • transportation and construction      | • asphalt and cement         | • restaurants                  |
| • cold storage                 |  |                              | • skytrain and railway tunnels |



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**We take due diligence to the highest level on all projects regardless of size or budget.**

## Learn About Articles

You can download educational articles from our home page at [www.vibescorp.ca](http://www.vibescorp.ca). Here are five:

1. Learn About Vibration Volume 1: Basic Understanding Of Machinery Vibration
2. Learn About Vibration Volume 2: Advanced Vibration Analysis
3. Learn About Electrically Induced Bearing Damage & Shaft Currents
4. Failure Prevention Of Variable Pitch in Motion Axial Fans and Controllable Pitch In Motion Axial Fans
5. Learn About Agricultural Machinery Vibration Solutions

The photos below show typical projects that we have completed.

Fig 1. The failure was due to defective bearing.

Fig 2. The stainless steel guard helps prevent moisture contamination in cooling tower fan bearings (a very common problem).

Fig 3. A new fan was installed due to a complete failure of the original.

Fig 4. Shows a 200HP motor and fan repair/replacement.



Fig. 1

**Solution to Fig. 1** Replaced both Fan Bearings & New Motor Required.

**Solution to Fig. 2** The Guard has prolonged the Life Span of the Fan Bearings from 3 years to over 14 years.



Fig. 2



Fig. 3

**Solution to Fig. 3** Installed Brand New Controllable Pitch Fan & Repaired Motor.

**Solution to Fig. 4** Replaced the Old Motor based on 20 years of running time and Completed Variable Pitch in Motion Fan Maintenance.



Fig. 4



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## Agricultural Rotating Machinery Vibration Identification and Solutions



Originally from Calgary, I established my business in 1982, mostly working at industrial and commercial locations. Thanks to one of my best business friends (Standen Springs) I was asked to visit a farm equipment dealership to solve a very serious vibration problem on a New Holland TR axial flow twin rotor combine. Talk about a challenge. That first (1986) combine vibration job scared the heck out of me but with the patience of the shop manager, we managed to reduce the overall extreme vibration levels by on site dynamic balancing both rotors. The trick was to balance one rotor at a time and start with the one that has the highest vibration levels. We added several steel plate weights and welded them to the rotor at both ends. The final result was a very smooth running combine that was ready to ship back to the owner.

After that I started servicing dealerships and farmers throughout Alberta and Saskatchewan from 1986 to 1999. Due to new business opportunities I re-located to Vancouver, BC where I've worked ever since.

You know the old saying you can take the boy away from the farm but you'll never take the farm out of the boy. As a small town boy from farming and ranching community (Grandpa was a self-employed master saddle, harness & bridle maker) my inner spirit will always be linked with the hard working men and women in the farming and ranching industry. Yes, I still miss you too.

Over those many years and thousands of miles a significant amount of knowledge was gained about a vast variety of mechanical vibration problems on rotating agricultural machinery such as:

Combines, Tractor PTO's, Crop Processing, Crop Planting, Baling, Moving, Pulverizing & Fertilizing, Fans, Blowers, and Misc.

I know all types of machinery have evolved since then but vibration problems are always going to be an issue on any rotating machinery where high levels of wear and abrasive particles wear down the rotor parts.

Here are a few tips that may help you solve some of the more common problems on your own. If you become frustrated trying to fix it you can send me some detailed information and photos in an email to:

[info@vibescorp.ca](mailto:info@vibescorp.ca) and I'll try to help you.



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## **This is a list of the most common vibration problems on farm machinery**

### **1. Straw Chopper = Vicious Beast – Beware and Always Think Safety.**

The Combine straw choppers are usually the most common vibration problem.

Due to the high volume of abrasive straw (including small rocks, misc.) going through the choppers and the high speeds (2300 rpm – 3600 rpm) it doesn't take a lot of wear or unbalance to cause serious vibrations throughout the combine up to the steering wheel.

Before trying to find the vibration problem in a chopper clean it out thoroughly. Do an intensive visual inspection of the entire chopper – drive, belts, shaft, bearings, rotor, knives, and mounting panels.

Several very common problems on choppers that cause rough vibration are: Bent Shaft (drive end), loose mounting brackets, and worn bearings.

Believe it or not looseness on the support slide ways and worn bearings are major causes for chopper vibrations.

If the shaft is worn under the bearings by  $-.002$ " expect problems.

Unbalance/rough vibration problems in the straw chopper would be from worn or bent rotors (with/without blades), worn bearing journals or bearings defects, looseness at mounting brackets and/or unevenly worn blades as an assembly.

When checking to isolate this issue clean the rotor and remove all old blades and run the rotor alone. If vibration is rough with blades removed the rotor needs to be balanced first which can be done on site and/or at a balance shop. If bearing journals are worn then the rotor should be repaired and balanced at a machine shop that specializes in this work.

After the chopper rotor is repaired and/or balanced you should test-run it without blades to confirm improved conditions.

Then install accurate weighed blades as sets. Test-run the assembly again to confirm smooth vibration.

Even brand new choppers can have rough vibration if not balanced properly at factory and/or loose at mounting brackets.

### **2. Rotors & Cylinders = Big Ugly Rotating Monsters – Use extreme caution and be very careful when the guards are removed.**

If the rotors or cylinders have rough vibrations inspect for external defects such as broken rotor bars or cutting edges, dents, worn or loose shafts and bearings. If there is minimal wear found and the shafts and bearings are in good shape then unbalance is the most likely issue.



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On site balancing will be required. Note: Shop static balancing can work in low speed rotors but not recommended for balance for high speed rotors. There are two ways to dynamic balance rotors and cylinders – a) Send parts to a balance shop b) balance the part inside the combine with only minimum dis-assembly. The b) method is usually the least costly and fastest, most convenient at the dealership shop, out in the fields or farm yards.

### **3. Chaff Savers, Augers, Air Fans & Blowers, Tractor PTO's, and Engine Drives.**

These parts require thorough visual inspections and often a trained heavy duty mechanical will be required. Chaff savers, augers, fans, blowers and most other rotating parts can be balanced on site. Vibration analysis data can pin point the source and cause of unusual issues.

**If you're interested in learning more about vibration and balancing technology see two other articles that are free downloads from [www.vibescorp.ca](http://www.vibescorp.ca):**

1. [Learn About Vibration, Volume 1: Basic Understanding of Machinery Vibration](http://www.vibescorp.ca/lav1) at [www.vibescorp.ca/lav1](http://www.vibescorp.ca/lav1)
2. [Learn About Vibration, Volume 2: Advanced Vibration Analysis](http://www.vibescorp.ca/lav2) at [www.vibescorp.ca/lav2](http://www.vibescorp.ca/lav2)

**Wishing all the agricultural industry a very good future.**



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