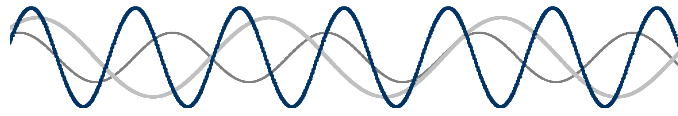


TRUCK VIBRATION TECHNOLOGY



Getting the Most Out of Your System

March 21, 2008

Here are some suggestions that will help you get to the 95% effectiveness in vibration reduction that we have seen the best users get out of the Eaton Vibration Tool. These are based on TVT's recent experience working with you and your systems.

1. Get the complaining driver behind the wheel. Make absolutely sure that he is duplicating the exact conditions that generate his complaint. Make measurements at those exact conditions. This includes all loads, speeds, gear ratios, and temperature conditions. If the complaint is generated only by pulling a loaded trailer, run a test with a loaded trailer. If the complaint is generated when the engine is at temperature, run a test under those conditions. Ask the driver questions about the frequency of the vibration and the location of vibration. Is it a buzz or a thump? Is it in the steering wheel, the lever, the floor or the seat? Describe to one another how it feels to you, so you reach a common understanding. This information can be a clue to reinforce findings of the tool. If you send the data to TVT, include those observations.
2. Don't run tests at any other conditions than those the driver is complaining about and assume that it is the same vibration.
3. If the problem is speed sensitive. Accelerate slowly from 5 mph below the peak to 5 mph above the peak and capture the data (F1). Then capture the data at constant speed at the peak (F1 and F3).
4. You can move the accelerometer to the location that the driver is focusing on (steering wheel, lever, or seat side frame) to get a better understanding of what is causing that vibration. The acceptance criteria might not be valid for that location, but the tool will identify the cause.
5. Usually the cause of a prop shaft balance issue is in the end yokes. Make sure the standard run-out measurement procedure is followed as a first step in diagnosing this problem.
6. Find a top notch drive shaft balancing facility. There are numerous instances of drive shaft balancing facilities not doing their job and costing a lot of lost time and confusion. If the tool identifies a prop shaft issue and you send the shafts out for balance and you reinstall without improvement, there is a good chance that the drive shafts are still out of balance. Find a facility that takes ownership on the vibration results on the truck.

7. Include an inspection of u-joints when a prop shaft balance issue is identified. We had an instance of a missing needle in the cross bearings cause a balance problem.

8. Find a wheel shop that has on-vehicle wheel balancing and tire shaving capability and that takes ownership in the vibration results on the truck. Tire shaving can be the least expensive approach to solving a wheel end vibration if tire out-of-round conditions are measured with the standard procedure, which should be the first step in diagnosing this problem.

9. Work with local engine supplier support to develop an understanding of the vibration data that you might send them and the implications of bad vibration signatures. We have had more success with local engine dealerships than getting centralized support from the big engine companies' central staffs. This lack of support may be the biggest issue in getting vibration problems solved quickly and efficiently.

10. Work with your OEM Service Manager when you see an engine problem (or send the data to TVT). Make sure that you understand the frequency content with advanced analysis. There are some tell-tale signs in the detailed vibration signature that may help us diagnose the problem, at least in a broad way. High cam harmonics indicate non-uniform firing, for instance. Certain engine resonances can be fixed by the engine companies.

11. There are many, many instances of incidental contact between engine and its parts and the hood, cab, and frame creating vibration problems. Be sure to inspect for this if you have an engine problem. We have had several instances of this happening only when under heavy throttle AND turning, or when driving with wind coming from the passenger side of the truck.

12. There are some neat features for non-standard data acquisition and real-time analysis when you use the advanced mode (even if you have the Basic data acquisition software): data acquisition with only the engine running, looking at orders when driving down the road etc.. Contact TVT to learn how to do this if you want or need this capability.

13. TVT has extra vibration sensors, cables, speed sensors, special brackets and all the support equipment you need for every engine and transmission. Call for help.

13. Please feel free to call TVT when you have any issues or questions. We are committed to help you get the best payback from your system. It is from your success that we hope to grow the use of the tool. If you have an unusual problem that you are wrestling with, we would like to hear about it. By attacking it and solving it, we all learn and get more effective, which is what investing in the tool is all about.

John Bair
Truck Vibration Technology
(269) 743-9372
johnjbair@truckvibration.com

