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Shaft Alignment Procedure

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Shaft alignment should be an organized and simple process. It is important to establish a set procedure to perform alignments. This procedure should be followed for every alignment from beginning to end. After you perform alignments over a period of time using the same procedure, you will find yourself spending less time per alignment and doing a much better job.

Our objective is to identify a simple shaft alignment procedure that can be followed for every alignment. The following six steps form a comprehensive outline to follow for every shaft alignment.

1. Safety
2. Clean up
3. Rough Soft Foot Correction
4. Rough Alignment
5. Final Soft Foot Correction
6. Final Alignment

Safety is our first and foremost concern when working around machinery. All equipment should be locked and tagged out before any work is performed on it. The machine should be given ample time to cool. The surrounding area should be free of obstructions and debris. All established safety procedures in place at the facility should be followed. Make sure that there is ample time allotted for the task at hand. Nothing reduces safety like the effects of rushing to finish a job.

It saves time to clean up before you start the alignment. The time that is spent to clean up before the alignment begins, will pay dividends when final adjustments are being made. You should clean as much as you can. Any rusty or dirty shims should either be cleaned or replaced. The base should be cleaned with wire brushes and solvents. These two steps alone will reduce many soft foot issues. Any foreign objects underneath the machine should be removed. All dirt and grease in any of the contact areas should be removed, at the very least.

The rough soft correction is performed with all of the hold down bolts still loose. Any obvious gaps between the machine feet and base should be filled with shim. Only put a shim in if it can easily be placed in the gap. Do not force it; you will only create a much worse soft foot problem. After the all of the gaps are filled and the machine is stable, tighten the hold down bolts.

A machine is rough aligned when steps five and six can easily be performed. Determining when a machine is sufficiently rough aligned is more a matter of technique than standard. In order to have a valid soft check the machine must be in about the same

position as it will be in after final alignment. This will be even more critical if the machine is mounted on a poor base. This is because the soft foot condition can change as the machine is moved across the base. If the base is concave or convex to the machine, it will greatly affect the soft foot condition. The rough alignment's purpose is also to allow all of the remaining misalignment to be displayed in the coupling. If this is achieved when it comes time for the final alignment, it will be accomplished with one vertical and one horizontal move.

The final soft foot correction should reduce the measured deflection at each foot to no more than 0.002". By eliminating the soft foot condition, you are actually removing all internal misalignment from the machine. This is misalignment that occurs between the bearings, if it is not removed it will affect the bearings and seals much like misalignment at the coupling. A soft foot creates this internal misalignment because it is actually distorting the machine frame. It is extremely important to remove the soft foot condition.

If all of the previous steps were performed correctly the final alignment should be a breeze. The final alignment should position the machines so that the measured misalignment at the coupling is within the allowable tolerance. This tolerance will either come from the coupling manufacturer, machine manufacturer, an in-house specification or some generally accepted standard. The tolerance provides for a certain amount of misalignment to exist. As long as the machine is aligned to within this tolerance the alignment is done. Make sure that all of the bolts are tight and take one last set of measurements to confirm your move and for documentation purposes.

These six steps should be followed for every shaft alignment. Put this procedure into practice and you will do a better job, it will take you less time to perform an alignment, and you will be performing alignments less often.

About the Author

Damian Josefsberg is an applications Engineer for Acquip, Inc. He currently performs service work and teaches training classes. He has performed numerous laser shaft alignments, bore alignments, diaphragm alignments, machine train alignments, and thermal growth monitoring studies. He has performed internal and shaft alignments on compressors, gearboxes, motors, pumps, and turbines. Damian has provided plant maintenance support for the power, oil and gas, pulp and paper, food processing, automotive manufacturing, pipeline, and marine industries.

Damian has a degree in Mechanical Engineering from Florida Tech. He is also certified in vibration analysis and on several laser alignment systems.