

[Maintenance Tips: April 2004](#)

Alignment Tip

Cardin shaft

There is more than meets the eye when performing a Cardin shaft alignment. First of all some misalignment must exist for the Cardin shaft to function properly. At least one half a degree of angle at each knuckle is needed to lubricate the splines. There can only be misalignment in either the vertical or horizontal direction, not both. The intentional misalignment between the driver and the driven should be pure offset. There should not be any angular misalignment between the output and input shaft. The angle at each knuckle should be the same; this will ensure that there is no angular misalignment present. The maximum angle at each knuckle should be no more than three and one half degrees. If the three and one half degrees is exceeded it will cause an unacceptable axial vibration.

Tip provided by Acquip, Inc.

www.acquip.com

Tel: 305-538-7101

[More Alignment Resources](#)

Motor Testing Tip

When a three-phase motor power output suddenly drops, especially if accompanied by a dramatic increase in the audible noise level -it is useful to start checking the basics first:

For example: Are one or more of the fuses blown? Test fuses with a properly rated VOLT-Meter while in their holders. One fuse with line voltage across it indicates an open circuit. This leads to an unacceptable operating condition called "Single Phasing". Only part of the motor windings will be able to carry the load requirement. If the load requirement is high the motor will overheat, and eventually burn out. Three phase motors will not re-start with a blown fuse.

Motor current signature analysis can identify this problem while the motor is still running.

Motors that have tripped offline due to single phasing should be fully tested with Kelvin resistance, Meg-ohm, Polarization Index, Stepped DC, and Surge Test, to determine the service life left in the motor.

Tip provided by Baker Instrument

Tel: (800) 752-8272

<http://www.bakerinst.com/>

[More Motor Testing Resources](#)

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Infrared Tip

Spots on the LCD Screen

If you have inactive spots on the LCD screen in your infrared camera's monocular viewfinder, they are probably caused by sun damage.

When working outdoors, sunlight can easily enter an upturned viewfinder eyepiece. When this happens, sunlight can be magnified by the viewfinder optics permanently damaging or destroying your LCD screen.

To prevent such damage, always cover your imagers eyepiece to prevent sunlight from entering the viewfinder. Temporarily placing a cover such as a baby sock over the eyepiece until you are ready to image can help to avoid a ruining an expensive viewfinder.

Submitted by James Henry,
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[Test Your Infrared IQ](#)

Electrical Safety Tip - READ IT!

Electrical safety is very important, so I feel I need to pass this on. I have already submitted a tip with lockout procedure, on testing the line side of disconnects then the load side and the line side again and the load side again. Last week in my plant I went on a routine service call to test a motor for a fellow electrician. I locked out the panel and preceded to test the line side, it read 480 volts phase to phase and 277 volts from phase to ground. On the load side of the disconnect it read 0 volts phase to phase and 277 volts from phase to ground. Red flag went off in my head that said there should be 0 volts phase to phase and 0 volts phase to ground. I said to myself I cannot go any further until the phase to ground voltage is 0 volts. I discovered that the disconnect did not open on all 3 phases, one phase was still energized and going through a transformer and back feeding the de energized phases. I hit the disconnect handle with my fist, and I heard a snap and the remaining phase that was energized opened up (it was out of adjustment). Reading from phase to phase was 0 volts and phase to ground now was 0 volts on the load side. Now I can safely test the motor, the motor was tested and determined to be fine. A drive problem was the root cause of the problem. I always test for lockout phase to phase and phase to ground both line and load side of what is being locked out. A repair safety work order was issued and the faulty disconnect repaired.

The safety committee at our plant had a review of what happened and are going to put out a communication on testing phase to phase and phase to ground. Our slogan at our plant is TAKE 2 , take 2 minutes to look over the job and plan it and do a complete lockout to confirm all is safe to proceed.

Reader tip provided by Dave Humphrey
Allison Transmission
Indianapolis In

Thanks Dave - you never know what kind of impact this information can have on some one. You may have just made a very big difference in someones's life.

[More Links](#)

Plant Turnaround Tip

Are you ready for your plant shutdown?

Many hours of planning and preparation are completed prior to the execution stage of a plant shutdown. One of the important steps is to review the preparedness of moving the planning phase into the organization phase in preparation for the execution of the work. To do this the turnaround team supervision should include a Turnaround Readiness Review Audit in the master execution schedule.

The turnaround readiness review audit is a review process of both documentation and field preparation. The documentation review should include such items as an audit on the work packages to ensure that all of the documentation is available to complete the required scope of work. This portion of the review will also include an audit of the support systems that are required to support the work scope such as the facilities management and procurement plans. In the field, the review should audit that the materials and machinery required have been procured, separated and distributed. Also included in the field review is the state of prefabrication of assets that will be replacing components during the plant shutdown. As each plant is different in layout and size the turnaround team should develop their own checklist and keep a copy of this in the technical archives, review and update it after every plant shutdown in order to enhance its effectiveness for future plant shutdowns.

Depending on the size of the plant and the expected work scope the audit can take a couple of hours or a couple of days and does not have to be done all at one time. However the review usually takes place one to three weeks prior to operations bringing the plant down. The audit team should include turnaround supervision, key contractor representatives and a person specializing in the review process.

A key example is to have the blind and lockout lists developed, approved and distributed so that isolation point tags can be hung by operations prior to mobilizing the key contractors. Once the key contractors are mobilized they can organize blinding and lockout materials to be located at the isolation points which should be included as part of the pre-plant shutdown activities. This will allow any shortages of isolating materials to be identified and also increase the momentum for work to be done at the start of the plant outage.

This is an excerpt from the manual "Practical Management for Plant Turnarounds." Over 200 examples can found in Appendix 'B' that will increase the effectiveness and reduce the cost of the overall plant shutdown.

Tip provided by John McLay, P. Eng, R.E.T., PE
<http://www.pmpt.org>

[Practical Management for Plant Turnarounds](#)

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