

Inspecting Your Motor Repair Shops.

“TOOL BOX TRAINING”



Introduction:

1. Motor failures are often caused by “on-line” factors, such as production activities, poor maintenance, and the environment in which they operate. Other failures are due to “off-line” factors, including inadequate or substandard motor repair practices, improper motor shipping, storage, and installation.
2. Compared with “on-line” failures, those failures caused by “off-line” factors are much easier to eliminate and they represent an often overlooked opportunity to improve in motor reliability.
3. The first and most important step is to develop and **use** a motor repair specification that is customized to your needs. Best Practice companies have customized specifications to meet their needs and ensure their savings. IEEE 1068 is a great resource to help you get started if you do not already have one. You can obtain a copy of this specification by visiting: http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=4286299
4. Your company should evaluate and work with the electric motor rebuilders based on their adherence to high-quality repair standards and practices. A great practice is to certify your motor repair vendors through Advanced Energy’s Proven Efficiency Verification [PEV] program. You can learn more by visiting: http://www.advancedenergy.org/md/motor_repair_requirements.html
5. It is important to understand that expertise, professionalism, and overall quality offered by electric motor repair companies can vary significantly from shop to shop and also over time. Expert repair shops share many of the same outstanding characteristics.

When choosing a provider, look for the following characteristics:

1. *Maintains clean, orderly work areas and has a highly trained and qualified workforce.*
2. *Fully equipped shop with state-of-the-art equipment and instruments. Equipment and instrumentation will be calibrated annually according to NIST standards to ensure accuracy of repairs.*
3. *Adherence to a documented set of repair procedures. Tribal knowledge is not good enough! These providers have developed detailed procedures covering every step of electric motor repair. This type of detail ensures that regardless of when or who repaired/rebuilt your motor, it was accomplished to the same standards.*
4. *Use of high-quality replacement components procured through transparent supply channels. This addresses customer concerns about obsolete or imitation components that may result in poor motor performance.*
5. *How was the motor treated during shipping and installation? Was it dropped, even the slightest bit? Was it bumped, or nudged? Did it slide off a dolly at the installation site? The best repair shops understand the importance of properly handling a motor as even the slightest of any of the above mentioned could easily result in premature motor bearing failures.*

Repair Process:

- Most repair processes, if done improperly, can reduce motor efficiency. Conversely, doing them correctly will maintain and may even improve efficiency. It is vital to keep clear, concise written records throughout the repair process.

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- The main motor repair processes include:
 - Evaluation in-service motor test data
 - Preliminary inspection (include digital photos)
 - Dismantling the motor
 - Documenting and removing the old winding and cleaning the core
 - Rewinding the motor
 - Mechanical repairs
 - Reassembling the motor
 - Full motor circuit analysis testing prior to shipping.
- Each one of these steps of the processes should have detailed steps and procedures capturing a full slate of data and digital pictures that will remain with the motor throughout the repair/rebuild process.
- Another excellent resource for additional guidelines to good motor repair can be found here: http://www.advancedenergy.org/md/knowledge_library/resources/guidelines_to_a_good_motor_repair.pdf

KEY Point:

- **One of the most important things is to inspect work in process at all critical stages!** Having the equipment and standards is only one-third (1/3) of the requirements. The other two-thirds (2/3) is what they do with it and how they do it! Work in process should be available for inspection at all critical stages if not all the time. I have even seen at least one major motor repair facility provide online live webcams to view the entire process.

Example of tests that should be performed:

As Received Tests: Performed during Preliminary Inspection	Quality Control Tests: Performed after Motor has been repaired/rebuilt
De-Energized Testing	De-Energized Testing
MCA Offline standard test performed & results stored in Motor file	MCA Offline test performed & results stored in Motor file (to be shared with site PdM group)
Energized Testing (should be able to perform)	Energized Testing (should be able to perform)
MCA Online test performed & results stored in Motor file	MCA Online test performed & results stored in Motor file (to be shared with site PdM group)
Single phase rotor test performed & results stored in Motor file	Vibration analysis test performed & results stored in Motor file (to be shared with site PdM group)
Vibration analysis test performed & results stored in Motor file	Motor nameplate is up-to-date and legible

All details stored in Motor file provided to client

If you have questions send me an email at rsmith@gpallied.com or you can contact Chris Colson at colsonc@alliedreliability.com