The power of zero (as in, zero defects) – part I

Zero – Some think of it as a placeholder. Nothing. No value. But what's the value of zero defects? Zero down-time? Zero errors? It can be worth a lot.

While there is no single solution for every problem, the numerous choices we make to achieve Sulzer Quality are called our Building Blocks of Quality. This is the story of how we found a lasting solution to an electrical challenge.

Motor coils can generally be classified as formed-coil or random-wound. Formed-coil windings are found in virtually all motors rated 2'300 volts or higher. They are made with wire having a rectangular cross-section, and the wire is layer-wound so that each turn is in physical contact with only adjacent turns. This reduces the "turn-to-turn" voltage stress to a minimum possible value. In fact, many years ago, we manufactured even low voltage motors (as small as 50 horsepower) with formed coils, because the film coated wire wasn't perfected yet.

The history

However, formed coils are costly to make and the process to install and connect the coils inside the motor is more labor-intensive than random-wound coils. Hence, when advances in chemistry permitted more durable film coatings on copper wire, manufacturers could make larger and larger low voltage machines with random windings.

Today manufacturers use random coils in motors or generators up to about 1'000 kilowatts (or about 1'300 horsepower).

The problem

Some years ago, however, we questioned why we had occasional early winding failures in random-wound three-phase stators, but never had them on smaller sizes. Motors are subjected to voltage spikes, contamination, scratched wire, etc., but for some reason, the larger ones seemed more vulnerable than the smaller ones. And because large motors and generators are costly to remove and reinstall, the discussions over the winding failures and possible causes was always unpleasant.

All about motors

Each year more motor horsepower is repaired than is sold new. For every new motor sold, approximately 2.5 motors are repaired. It is estimated that motors are repaired every five to seven years. Since motors frequently operate for 20 to 30 years, a motor may be repaired three to five times in its service life.

Sulzer specializes in remanufacturing industrial electric motors and wind generators. The company produces custom motor control centers for clients throughout the western United States.

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