ABB on-site service can cut downtime for transformer repair

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By Steve Muller

A damaged transformer can be an expensive problem for a utility. Not only does the utility have to pay for the repair, but it may also lose revenue if it cannot transmit electricity or needs to procure replacement power.

Furthermore, the biggest transformers are so large and heavy that it is very expensive and often impractical to ship them back to the factory for repair.

ABB Inc., a major global manufacturer of transformers with facilities in the U.S. and Canada, offers a solution to this problem by taking the repair to the transformer rather than bringing the transformer to the factory.

The service, which ABB calls “TrafoSiteRepair,” can handle alternating-current transformers as large as 800 kV and direct-current transformers up to 600 kV.

Craig Stiegemeier, business development and technology director for the ABB TRES (Transformer Remanufacturing and Engineering Services) North America division of ABB in St. Louis, said the on-site repair service has completed more than 300 projects globally.

He explained that the two main drivers of a utility’s decision to use TrafoSiteRepair are speed and logistics.

In the case of a transformer that been diagnosed as trending toward failure, ABB can order replacement parts and start the new windings even before the transformer is taken out of service.

Stiegemeier pointed out that through acquisitions over the years, ABB has access to the original design files and documentation for about 70% of the transformers installed on the U.S. and Canadian grid.

Besides ABB’s current line of TrafoStar transformers, these designs include transformers from ABB predecessor companies including ASEA, Brown Boveri Electric, Westinghouse Electric, Kuhlman Electric Corp., National Industri and Stromberg.

If a suitable building is not present on site, ABB will build a temporary controlled environment for working on the transformer and provide cranes capable of lifting up to 400 tons.

Stiegemeier said an on-site repair can usually be done in eight to 12 weeks. “Compared to actually shipping the transformer to a factory, on-site repair is almost always the faster option,” he said.

And that assumes that the transformer can even be transported. Stiegemeier recalled that one of the factors initially leading ABB to develop the on-site repair service was a situation a number of years ago when a state highway department derated a bridge critical for the delivery of a heavy new transformer to a utility customer.

In addition, the rail infrastructure in many places has deteriorated, leaving many generators and major substations inaccessible by rail. Furthermore, loading, shipping and unloading the transformer exposes it to the risk of damage.

Stiegemeier related that one U.S. utility customer estimated it would cost more than $1 million just to ship a large transformer to the factory and back again.

However, despite complaints about the transportation infrastructure in the U.S., it is still relatively good and much better than in many other countries. Consequently, logistical problems are not as severe in the U.S., making shipping still feasible. As a result, only a small number of TrafoSiteRepair projects have been done in the U.S.

Stiegemeier said one of the U.S. projects was for a utility that needed to get a major transformer back in service prior to the summer peak season.

“We haven’t encountered [a transformer repair] that we can’t do [on site] because it’s too big,” Stiegemeier said. “The biggest ones lend themselves better to the process.”

However, he noted that for smaller transformers, the transportation costs may not be significant, and it makes more sense to ship these transformers to the factory unless there are a large number of them at a single site.

After the repair is completed, ABB offers its “TrafoSiteService” to test the transformer before it is energized. The company calls this “the transformer test floor that comes to your site.”

The system is transportable in a standard 53-foot trailer and can perform all required testing.

As a result, Stiegemeier said, “The quality of the work in the field is the same as in the factory, and gets an as-new [ABB] warranty.”

TrafoSiteService would be used after a repair, but it could also be used to test a new transformer, the status of a spare transformer or a transformer that has been subject to a field incident.

ABB Inc. is a subsidiary of ABB Group.