A MATTER OF TIME AND QUALITY

How our automatic testing solution sets the bar for testing protection systems

In order to ensure that power assets in a substation are protected whenever faults occur, it is necessary to thoroughly test the protection systems during commissioning and maintenance. When it comes to protection testing, manual tasks like preparation, configuration, and rewiring during the test runs are still a major part of a protection testing engineer's daily routine. Not only are these tasks very time consuming, but all these manual interventions have another implication that both utilities and service providers strive to avoid: low quality testing. One mistake during those manual testing procedures can lead to an entirely false assessment. Even if the protection engineers notice the error they have to repeat the test steps in question, which in turn can put them under pressure and decrease efficiency.

Automatic testing procedures can reduce manual intervention significantly and they standardize the testing process itself, resulting in less testing time, one-to-one repeatability and a much higher level of overall quality. But how much time can actually be saved with automatic testing procedures? How can that be measured? And is it really impacting the quality of the tests?

More than three years ago, in January 2017, we decided to increase the awareness and knowledge of our protection testing solution in Saudi Arabia. Based on automatic testing procedures and the Protection Testing Library (PTL), our solution clearly differentiates us from our competitors. Our approach offers tremendous potential in terms of time and cost savings as well as high-quality testing through automated test steps – a huge benefit for our customers. Especially since testing protection relays is one of the most time-consuming testing activities. Hence, our main objective was demonstrating the advantages of our solution to the Saudi Electricity Company (SEC) by offering them the opportunity to gain hands-on experience with our solution.

Thanks to the efforts of OMICRON Engineering Services, SEC's Commissioning Service Department (CSD) became interested in our automatic testing solutions and gave us an opportunity to prove the claims we had made: high-quality testing, professional reporting and a considerable reduction in testing time.

The pilot project was assigned to the well-known, local service provider Al-Babtain and took place near Riyadh at a 132 kV substation called Dhurma. Above all, the CSD wanted to reduce the time needed for commissioning, while at the same time increasing the quality of their tests. For this project the commissioning schedule consisted of three different voltage levels each protected by various multifunctional protection relays from different manufacturers. Part of CSD's schedule was a detailed standard commissioning activity list (SCAL) which summarized the efforts that were needed for setting up the protection of the substation, based on the previous testing equipment. Since the SCAL not only included all the activities that had to be completed before commissioning, but also listed the duration of each one of them, the commissioning-time that had to be beaten was perfectly clear. According to this information, the overall testing time for commissioning the ▸

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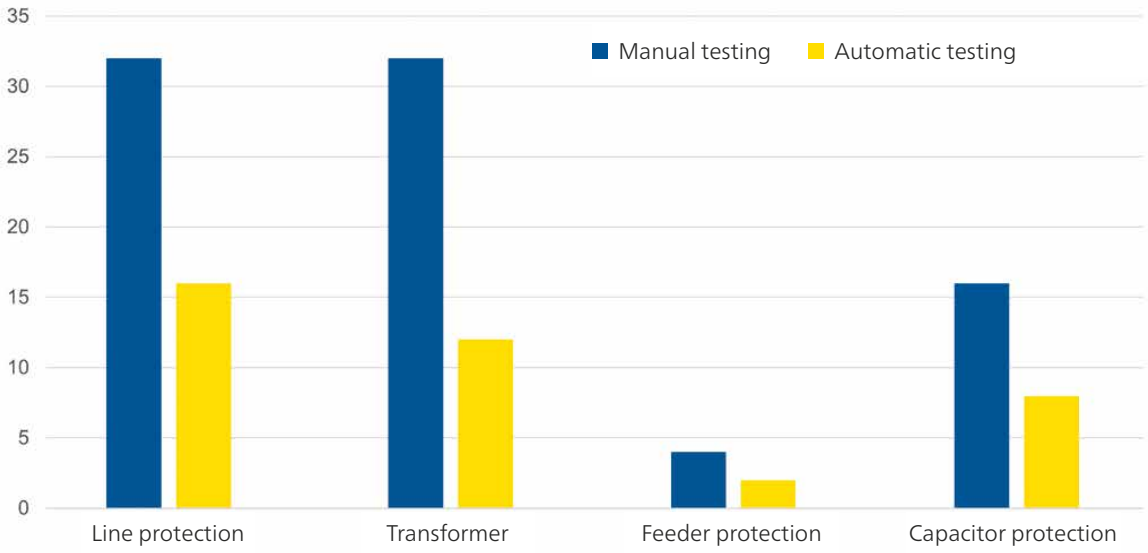
protection elements was an estimated 58 working days. This was the standard that Al-Babtain achieved with their previous testing solution and it was also the one that we would now be measured against.

At this point, it was time to provide each of Al-Babtain's six testing teams with a CMC and familiarize them with the devices.

In February 2019, OMICRON Engineering Services commenced the pilot project with a one-week kick-off seminar on-site. During this introduction workshop, Al-Babtain's testing team received extensive training and quickly gained a very good understanding of our devices (CMCs) and solutions (PTL, Test Universe, extension of automatic templates). Despite having no prior experience with our products, they were able to independently develop and adapt the templates to their own needs after just a week of training. In the weeks that followed, OMICRON Engineering Services gave immediate answers to all of their questions via a WhatsApp support group – 20 hours a day, even on weekends. From time to time and upon request we visited the substation, offered on-site support, passed on knowledge and above all, made sure Al-Babtain's testing team had all the information they needed in order to use our testing solution to its full potential.

Throughout all the testing activities the necessary efforts were documented thoroughly. Every test run was recorded with a stopwatch and subsequently logged in an Excel-file. For example, the automatic test for main feeder protection relays, including the full range of its functions, was completed in less than 3 hours. Based on this data, the overall time that was saved was calculated and it was already clear that it was more than satisfactory.

The protection testing was completed in 24 instead of 58 days with an exceptional level of quality. This included 7 days for a one-time effort of creating reusable automatic templates, which amounted to saving 70 percent of the overall time that it took to conduct the test. A total of eleven automatic testing templates were created by the teams, all of which can be used again for future tests, thus guaranteeing that the results will maintain a consistent level of quality. The pilot was assessed as Excellent by the CSD, a rating that we are very proud of, as it confirms the quality of our products and services as well as the benefits that they create for our customers.



Testing efforts in hours