The 14th International Workshop on Electric Power Control Centers
Wiesloch, Germany, May 14-17, 2017

GoalArt Root Cause Analysis at HOPS, Croatia

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Abstract

The Croatian Transmission System Operator (HOPS) has installed a GoalArt system for intelligent alarm processing. The system uses online root cause analysis and was evaluated by HOPS during 2015. The system displays less than 1 % of the number of alarms displayed in the SCADA system. All evaluated outages are correctly analyzed, and the algorithm displays the minimal set of root alarms, that is, "the real faults." In this way, it is possible to reach the Engineering Equipment and Materials User Association's (EEMUA) alarm rate criteria [1] at all times, both during normal operation, and during incidents.

During November 2015, there were a total of 81 802 alarms in the four area control centers and 1889 GoalArt alarms (root causes of disturbances). The result is that in the normal operation there is an average alarm load of 4-10 alarms per ten minutes in the day time, for which the EEMUA classification is "over-demanding." The GoalArt alarm rate is significantly lower (98 %) than the SCADA alarm rate, and represents a great improvement for the dispatchers. One of the four selected cascading events ranks as "over-demanding" while the other three are "unacceptable." In the intelligent alarm processing tool, the alarm load is consistently "acceptable." Again, there are around 98 % fewer alarms.

All grid knowledge used in the system is derived automatically from the CIM model. Whenever the CIM model is updated, it is automatically imported to the system and compiled, which means that the system needs no manual maintenance.

The conclusion is that intelligent alarm processing with on-line root cause analysis provides a way of fulfilling the EEMUA criteria, and thus is an ideal tool for supporting the operators and dispatchers in maintaining situational awareness.

Reference

[1] EEMUA, "Alarm Systems: a Guide to Design, Management, and Procurement," Publication 191, Third Edition, EEMUA, London, 2014.