



CHINESE MARITIME SAFETY ADMINISTRATION

10 year Lightning Protection Achievement Report

On Coastal RBN/DGPS Stations

Before the year 2000, lightning was causing serious damage to the equipment in our coastal RBM/DGPS stations. Almost every year, we had lightning damaging incidents. Some stations would have repeating lightning damage every year or two.

In every station we tried many different brands of SPDs and various other solutions. None of them mitigated the damage. In those days our lightning protection focused on improving the grounding systems of the stations in hopes of reducing the damage. An example: in Qinhuangdao Station, we tried grounding directly into the ocean floor. Unfortunately, none of these solutions had any discernable result on the lightning damage. Lightning still regularly damaged our equipment.

At the end of year 2000, the MSA Scientific and Technology Center invited MCG Electronics, an American manufacturer, for a discussion on lightning protection issues. As a result, we did a power quality check in the above-mentioned Qinhuangdao Station which showed many transient surges. In 2001, MCG surge protectors were installed in that station. After one year, a second power quality check was done which showed a marked improvement in the station's power quality. Moreover, the equipment in the station was running smoothly without damage. In fact, up to this date, 10 years later, the station has continued to run with no further lightning damage whatsoever.

Meanwhile, the equipment in other stations continued to suffer from lightning damages. In 2002, lightning struck an Island station off the coast of Dalian. The lightning damaged much of our equipment and took the station off-line. We asked MCG representatives to investigate and give a comprehensive solution.

After checking and investigating the equipment damage at several stations, the MCG representative gave us recommendations including:

- a) Our grounding systems already met the requirements for effective surge protection and no further improvement to the stations' grounding was required;
- b) SPDs must be upgraded to ratings of 200kA (8/20us)
- c) SPDs must have internal multiple paths (backups) to guarantee the safety of the equipment, especially in the unattended stations.

For the past 10 years more than a dozen MSA stations on high coastal promontories, offshore islands and in tropical Hainan Island have been being protected with MCG surge protection. Since the installation of MCG surge protectors, all equipment in these stations has been working stably with no further lightning damage reported.

---CW, Senior Engineer, China MSA