

CASOM 19: STATISTICS OR UNDERSTANDING: WHICH ONE DO YOU BELIEVE?

Robert R. Richwine
Reliability Management Consultant

This month's case study is a little different. There are no derived or hypothetical equations or in depth general analysis. Rather, it is a story of how one young engineer with access to his company's power plant performance data undertook a study that changed the maintenance philosophy of his company, eventually helping to increase the plant's availability and saving millions of dollars.

BACKGROUND

Several years ago I led a consulting effort to create a Performance Improvement Programme at a large Northeast U.S. generating company. During the time I spent at their offices, a young reliability engineer asked me "Bob, where do you get your ideas from to perform the statistical analyses you've been showing us? I've been placed in charge of collecting our plant's reliability data and compiling summaries for top management but I think we could do more analysis and bring more value to the company."

I replied that I was sure he was right about bringing more value by studying the data (see all of our previous WEC case studies published in the last 18 months) and that the way I got most of my ideas was from spending time at my company's power plants talking with the plant staff about the issues that are of most concern to them. They generally have deep insight into those issues but often don't have the time to explore them in detail.

The next time I visited his company the reliability engineer told me that he had taken my advice and visited the plants and talked with the staff about their problems. He told me that a recurring issue identified at several of the plants was:

- During major planned overhauls no outside support was allowed (budget constraints);
- Even with overtime the local plant staff was insufficient for the increased workload;
- In order to meet the planned outage schedule routine maintenance at the other units at that plant was often skipped;
- These other units suffered from an increase in forced outages as a result.

He then told me that he had set up a study comparing the reliabilities of the units at each plant during times other units were on major planned outages to their reliabilities when no other units were on planned outages. He then told me that the results of his statistical analysis showed *no* correlation and asked me what he should do.

I asked him if he had more confidence in his statistical analysis or the understanding of the plant staff gained through years of actually living with the issue. He replied "Well, since you put it that way, I might question my analysis." We then discussed his assumptions and decided that he should modify his original hypothesis to compare the reliabilities with a

“lagging” effect of 1 – 3 months (this tests the idea that the units at the plant other than the one on a major overhaul would not begin to “feel” the effects of insufficient maintenance for some period of time).

When I returned he showed me the results of his revised analysis, which showed a substantial reduction in the reliabilities of the “other” units 2-3 months following the overhaul of another unit at the same plant. By combining the results of his analysis with the economic impact of the reduced reliabilities (see our Jan. and March 2003 WEC case studies for further discussion of how to calculate these economic impacts), he was able to demonstrate conclusively to his company’s executive management that forbidding external support during a major overall was “false economy”, costing them much more in plant unreliability than they were saving in maintenance costs. A new policy allowing increased external support during major overhauls was then implemented, helping to lead to a substantial increase in their power plant reliability.

CONCLUSIONS

The purpose of this month’s case study was to demonstrate how generating companies have studied their own unique issues using their internal plant performance data (no national databases were required in this case, although the company did collect their data in a standard format for national reporting requirements which made the analysis much easier). Furthermore, substantial cost savings have been realised stemming from changes in Operations and Maintenance policies as a result of these studies.

Another purpose is to encourage data analysts to get out to their power plants and talk to those plant staff members who have to live with their plants every day and find out what their issues are. They may not have the time to study the issues in detail or have the necessary statistical tools or expertise to use them or even the ability to express them in ways that the analyst can fully comprehend, but they *will* have a deep understanding that only comes from first hand knowledge accumulated over years of experience.

The final purpose is to warn data analysts that if your statistical results don’t conform with the understanding expressed by your plant staff, I’d take another look at the analysis before I would challenge their knowledge. As we found in the preceding story, their understanding was the one to believe.