Case Study: Aircraft Repair Procedure

Spotlight Business Consulting pioneered an approach, called Spotlight Technical Project Management (SpotlightTPM), to improve outcomes and cut costs, sometimes dramatically, by short circuiting the discovery process in cases involving technical issues. We also offer unique consulting services to adopt and implement it to those paying the litigation bill, insurers and self-insured companies. The largest portion of costs in litigation is in the discovery phase, but short-circuiting the discovery phase presents a critical challenge because settling a case requires establishing a reasonable basis for understanding the key issues involved, who is likely to prevail, and what it will take and cost to prevail. Our approach does this and also cuts costs and improves outcomes if a case proceeds through discovery to trial by focusing the expensive hands-on studies. The following case study demonstrates these outcomes.

We were involved in an aircraft crash involving fatalities, which was alleged to have occurred because of a repair procedure that was claimed to have degraded an advanced material, leading to the failure of a critical component of craft. This repair procedure had been used over time on many aircraft, and was alleged to have been responsible for more than one fatal accident. A technical investigation of this type involves numerous issues: materials, mechanical engineering, design, chemistry, and certification and standards. This type of case strains the resources of any one expert, but having an expert in each technical area is not attractive and would not address integrating each aspect of the investigation into a single message that a judge or jury of non-technical people could easily follow.

We successfully addressed this challenge by the SpotlightTPM technical project management approach. The other side had hired a chemist and a professor of mechanical engineering as experts as would typically be done. Their work was uncoordinated, being conducted as two distinct silos that did not address all of the issues of the case.

Using our innovative approach, we conducted a broad, but thorough review of the incident and all relevant information that was accessible in the literature as part of a multidisciplinary analysis of what could have contributed to the failure. Our goal was to learn everything that was potentially relevant to the performance of the materials and the repair procedure. The other side used the conventional approach and based their case on

complex Finite Element Analysis (FEA) of stresses and failure modes of advanced materials without first establishing what were the key issues. Once you take this approach, everything you do has to fit your focus, in this case FEA analysis of failure modes.

Our approach in contrast was brutally objective and established which aspects of the materials and repair procedure could have contributed and importantly which could not have contributed. This insight allows identification of the key underlying issues, so it ensures that you go down the right path and it dramatically focuses the investigation. We were able to estimate that the repair procedure was not capable of producing high enough temperatures to degrade the materials. This allowed us to conduct very focused testing that simulated the repair procedure and provided data to prove that the temperatures could not reach levels required to degrade the materials. The insight we had from the information searching and analysis phase showed us exactly how to setup the needed test to validate our hypothesis, unlike the conventional approach where testing is unfocused and conducted with generic approaches. Our approach cut cost and time dramatically, and provided easier to understand, authoritative, and compelling expert witness testimony. It also identified critical flaws in the analysis and testing conducted by experts for the other side.

For example, an expert for the other side conducted a test that showed a high temperature increase if a torch was placed on one side of thin foil and the temperature was measured on the other side. They purported this test to demonstrate that the repair caused excessively high temperatures that degraded the advanced material. Our analysis of what could have happened had estimated that heating during the repair could not have raised the temperature of the advanced material to the point at which it would degrade because the thermal mass of the component was so large that the torch could not provide heat quickly enough. Knowing what to expect, we performed our testing with a realistic sized part that was instrumented with temperature sensors, and this clearly showed that the repair did not cause a sufficient temperature increase to degrade the material in a way that was credible, authoritative, compelling, and easily understood by people not familiar with aircraft and who lacked a technical background.

Another example was that an expert for the other side, a mechanical engineering professor of some stature, produced a 36-page presentation of finite element analysis results to

backup their theory of how the component failed due to failure of the advanced material. Again, our analysis of what could have happened had established that the advanced material was not a failure critical component, and this provided the insight we needed to find the flaws in the boundary conditions that were used in the other side's complex finite element analysis. We were able to show that the boundary conditions had no relationship to reality, so that the finite element analysis and 36 pages of equations were irrelevant.

Our approach required the key issues in several different disciplines to be identified and a number of tasks and people to be effectively coordinated to conduct the needed tests and simulations. Our SpotlightTPM approach avoided a complex and possibly unsuccessful defense that without the SpotlightTPM insight would have had to be based on highly mathematical issues of stress analysis, a generic assessment of whether or not heat during the repair was appropriate, and an ambiguous analysis of how aircraft performance might be related to failure of this advanced material, all of which our approach avoided. A favorable settlement resulted, costs were reduced, and the best outcome was achieved in a case where that seemed uncertain if the conventional approach was used as it was by the other side.

Spotlight Business Consulting

Spotlight Business Consulting (SpotlightBC) was formed with a mission to provide businesses with consulting that is informed by a focus on execution. What distinguishes businesses with superior performance is the way they execute and overcome ambiguity and insufficient information and insight. Rather than simply apply our extensive experience, we are unique in offering you a contemporary, information-driven consulting process, every aspect of which is informed by a focus on execution.