Design Review Based on Failure Modes (DRBFM) is a means to improve the targeting of validation testing and, along with the DB twin Design Review Based on Test Results (DRBTR). It can directly contribute to reducing costly field failures. More reliable products can clearly help with competitive advantage. But wait, there's more.

Those who ponder the concept of problem solving look across the population of organizations and see a maturity scale. At the immature end is first order, short cycle problem solving. Next is prevention of recurrence through deeper problem solving. At the mature end is prevention of potential problems, which is the goal of DRBFM, and a translation, at least a loose one, of the term Mizen Boushi.

**Short Cycle Problem Solving**

Most organization's work very hard at problem solving, sometimes derisively called fire fighting, but without it the world would surely grind to a halt. The problem has arrived, it's costing money, it must be solved now. There are many clever methods for doing this, but generally they all boil down to recognizing something is amiss, figuring out a cause, and implementing a fix. Most fixes, however, are focused on the immediate cause, and the solutions are obviously temporary, but the band aids are enough to hold things together for a little longer. Since this approach is both necessary and widespread there is a tendency to feel that improving this ability is a good long term policy. As more and more resources go into short cycle problem solving, less is available for longer term solutions. Even those who see the need for longer term solutions are pulled back into the fray, and eventually become resigned to living in a vicious cycle, waiting for the next alarm.

**Recurrence Prevention**

If the same problem surfaces repeatedly, the organization may look deeper into the cause and find a way to prevent the problem from happening again. This is a more effective strategy, but it takes resources from short cycle fire fighting, it requires more analysis and sometimes requires investment in equipment or training. Those who drive this process must be convinced, and able to convince others, that the inevitable and immediate dip in fire fighting capacity will be rewarded with greater long term benefits that offset the short term cost. Because this barrier exists there are fewer organizations that achieve a policy of routine recurrence prevention than those using the immediate problem solving policy.

There is a common issue with both of the above policies. They are both reactionary. The problem must surface before the solving process engages.

**Problem Prevention**

The third strategy is the problem prevention using the mizenboushi method. The significant difference from the previous two is that the problems are anticipated in order to keep it from happening in the first place. Few would argue that this isn't a good thing, but how to do it? And if it is such a good idea, why don't people do it routinely?

The method proposed to anticipate and prevent a problem is to focus the collective knowledge of those involved in the product design on the areas that are most likely to be the source of the problems. Who are those people? The design team. Where should they focus? On changes to the design. How to achieve the focus? Have a good discussion where the team works through the questions of the Design Review Based on Failure Mode process. Why focus on changes? The evidence, though anecdotal, is that a stable design with no problems can begin to have problems after a design change. The story of how a part that was reused because it worked well in a previous design subsequently became the source of surprise problems when it was put into a different environment has a familiar ring to many in the
DRBFM and Competitive Advantage

engineering design world. This could be substantiated (or disproved) with statistical studies on problems and causes during a design project, but it's as difficult to imagine a program manager eager to volunteer for such scrutiny as it is to conceive of a design organization backing such a study. Devising the appropriate experimental controls would also be difficult. Without such a study, we are left only with expert opinions and personal experience melded into stories, but they point toward the conclusion that many problems can be traced back to design changes.

Drawing out the team's expertise requires a forum and a process. Anticipating and preventing a problem for a change which has not yet actually been made requires informed imagination on the part of the group. We are asking the participants to engage in deep thinking about the future implications of the change to the design. This may sound difficult, but actually, people do it all the time when they worry about things, or express reservations, or feel uncomfortable about a given situation. In the hectic give and take of a design project, however, many of those ideas stay hidden, or are dismissed as being overly concerned (or trivial). The forum of DRBFM sessions, and the discussions which it seeks to promote are ways of recognizing that these concerns, worries and discomforts from the team as a whole are important and useful to anticipate and prevent problems.

The DRBFM process is a direct step toward breaking the vicious short problem solving or firefighting cycle, and it is also an improvement over a strategy of recurrence prevention. This frees up resources which were previously distracted by reacting to problems and allows them to be put to productive use. This leads to higher quality products, lower warranty costs and consequently, a competitive advantage.