



Survivable Systems Development and Design

MPR's Smart Valve Technology is Installed in DDG 51 Class Ships and in the Advanced DDG 1000 to Improve Survivability

CHALLENGE

Several key factors are driving the Navy's need to apply new technology to make ship systems more survivable:

1. Weapons are more lethal.
2. Modern mission systems are more dependent on support from integrated ship systems to provide power, cooling and other vital support.
3. Ship manpower must be reduced to make future operations affordable; this requires moving from manual to automated recovery from damage.

Meeting the challenge of creating more survivable systems requires innovative approaches to ship systems survivability.

SOLUTION

Fifteen years ago, the Navy came to MPR, because they needed a new approach to determining the damage control capabilities needed for new ship designs. MPR developed the first quantitative objectives for shipboard firefighting performance, and these objectives are being applied to new ship designs today. Our analysis of damage control performance demonstrated the need for significant improvements in fluid systems recovery from damage, particularly the ship's firemain and chilled water systems. The Navy started the Damage Control Automation for Reduced Manning (DC-ARM) program to develop technology to improve fluid systems recoverability, and MPR won the competitive solicitation for this work. MPR developed "smart valve" technology for the DC-ARM program to automatically isolate damage in fluid systems without the need to obtain data from any source other than the valve itself. MPR's patented "hydraulic resistance" logic enables a highly survivable capability to isolate fluid system damage.

RESULTS

Numerous tests, including full-scale, live-fire, weapon effects tests, have demonstrated the consistently successful performance of MPR's smart valve technology for isolating fluid system ruptures. Based on this very successful development work, the Navy now is installing smart valves in the chilled water systems aboard new construction DDG 51 Class ships and in the chilled water and fire suppression systems for the new DDG 1000 destroyer. The improved fluid systems recoverability will enable these new ships to maintain critical mission capabilities when the chilled water system is damaged, and to prevent fire spread with little or no manned intervention. MPR's technology is key to enabling the DDG 1000 to achieve effective damage control performance with a substantially smaller crew.

