

Project 13-001 FFG Comparison Rate Analysis

Data: Data Range: FY2005 to FY2012

Data Source: Mishap data from Web Enabled Safety System (WESS), and USN population data as of September 30th of each fiscal year from Defense Manpower Data Center (DMDC) and Force Risk Reduction (FR2)

Methodology: Mishap data based on the reporting command and USN population data by Unit Identification Codes (UICs) were categorized into the following ship classifications:

AMPHIB WARFARE (LG)
AMPHIB WARFARE (MED)
CARRIER
CRUISER
DESTROYER
FRIGATE
MINE WARFARE
PATROL COMBATANTS
SUBMARINE

The on duty mishap rates per ship classification per 10,000 personnel were calculated and the Frigate average rates from FY 2005 to FY 2012 for each event severity classification were statistically compared to each of the other ship classifications average rates. In addition, the on duty mishap rates per ship classification per 100 ships were calculated and the Frigate average rates from FY 2005 to FY 2012 for each event severity classification were statistically compared to each of the other ship classifications average rates.

Mishaps for selected reserve personnel are only reported when the personnel are conducting military duties. To account for the limited exposure time for reportable mishaps for selected reserve personnel, a factor is applied to the selected reserve personnel population for each unit.

Bottom Line Up Front:

- Rates analysis based on ship population comparison does not show a statistical significant difference in the on duty mishap rates of frigates compared to other ship classifications.

Discussion:

The purpose of the study is to conduct a comparison analysis of the effect of changed frigate manning to mishap rates using other ship classifications as a baseline. This study begins by classifying the mishap into the above ship classifications and then

compares the FY 2005 to FY 2012 average frigate rates per 100 ships and rates per 100 personnel to the rates of the other ship classifications.

| On Duty Rates per 100 Ships | FY05 to FY12 Average | | | | P-Value | | |
|-----------------------------|----------------------|-------|--------|--------|---------|------|------|
| | A | B | C | A-C | A | C | A-C |
| FRIGATE | 3.75 | 2.92 | 63.70 | 70.37 | | | |
| AMPHIB WARFARE (LG) | 9.33 | 10.33 | 364.56 | 384.22 | 0.91 | 0.00 | 0.00 |
| AMPHIB WARFARE (MED) | 3.65 | 6.89 | 111.38 | 121.92 | 1.00 | 0.35 | 0.05 |
| CARRIER | 9.94 | 13.16 | 653.88 | 676.99 | 0.94 | 0.00 | 0.00 |
| CRUISER | 4.33 | 4.50 | 71.12 | 79.95 | 1.00 | 1.00 | 0.72 |
| DESTROYER | 0.69 | 3.83 | 95.55 | 100.07 | 0.71 | 0.53 | 0.17 |
| MINE WARFARE | 0.48 | 1.18 | 37.35 | 39.01 | 1.00 | 0.48 | 0.32 |
| PATROL COMBATANTS | 0.00 | 0.00 | 13.46 | 13.46 | 1.00 | 0.06 | 0.04 |
| SUBMARINE | 2.58 | 3.86 | 52.41 | 58.86 | 1.00 | 0.83 | 0.71 |

Table 1: FY2005 to FY2012 on duty average mishap rates per 100 ships

Table 1 above lists the FY 2005 to FY 2012 rates per 100 ships per ship classification along with the p-values comparing the frigate rates to the other rates per event severity classifications. A p-value of less than .05 ($p < .05$) indicates a statistically significant difference between the frigate rates and those of the ship classifications listed. There are too few class B events for frigates to conduct the analysis; however, the class B events are included in the class A through C analysis. There are no statistically significant differences in the average class A rates between frigates and the other ship classifications. The average class C rates for amphib (lg) and carriers are statistically significant higher ($p = .00$) than the average class C frigate rates. This holds true for the class A-C rates. Comparing the frigate rates to patrol combatant rates, the class C rates are not statistically significantly different; however, the rates including class A through class C events are statistically significantly different. The class A-C average rate for frigates is statistically significantly higher than the patrol combatant average class A-C rate.

| On Duty Rates per 100,000 personnel | FY05 to FY12 Average | | | | P-Value | | |
|-------------------------------------|----------------------|-------|--------|--------|---------|------|------|
| | A | B | C | A-C | A | C | A-C |
| FRIGATE | 16.94 | 13.21 | 299.86 | 330.01 | | | |
| AMPHIB WARFARE (LG) | 8.45 | 9.39 | 341.92 | 359.75 | 1.00 | 1.00 | 0.74 |
| AMPHIB WARFARE (MED) | 10.23 | 19.12 | 309.98 | 339.33 | 1.00 | 1.00 | 0.92 |
| CARRIER | 3.27 | 4.32 | 217.58 | 225.17 | 0.59 | 0.62 | 0.22 |
| CRUISER | 12.42 | 13.24 | 209.79 | 235.45 | 1.00 | 0.64 | 0.44 |
| DESTROYER | 2.33 | 12.85 | 325.21 | 340.40 | 0.58 | 1.00 | 0.91 |
| MINE WARFARE | 7.04 | 16.04 | 468.01 | 491.09 | 1.00 | 0.73 | 0.40 |
| PATROL COMBATANTS | 0.00 | 0.00 | 442.47 | 442.47 | 1.00 | 1.00 | 0.75 |
| SUBMARINE | 11.83 | 17.27 | 231.23 | 260.32 | 1.00 | 0.74 | 0.56 |

Table 2: FY2005 to FY2012 on duty average mishap rates per 100,000 personnel

This study also calculates and compares the FY 2005 to FY 2012 average rates per 100,000 personnel in the same manner as the rates per ship. Table 2 lists the FY2005

to FY2012 average on duty mishap rates per 100,000 personnel along with the comparison p-values. No p-value is less than .05 indicating no statistically significant differences amongst the average rates for frigates and the average rates of the other ship classifications.

Conclusion:

Comparing the frigate on duty class A-C mishap rates per ship count to the other ship classifications, there is a statistically significant difference in the mishap rates for amphib (lg), carriers and patrol combatant; however, there is no statistically significant difference between the frigate rates and the rates of other ship classifications when using the same comparison methodology for on duty mishap rates per ship population. Since the effect of a past manning change is the focus of the study, the rates using the ship population is a more effective indicator of different manning structures affecting on duty mishap rates. Frigate manning has not indicated an increase or decrease in on duty mishaps.

Appendix A

The below definition were directly extracted from DOD/ 6055.7, June 6, 2011, Glossary pages 45-46.

Class A mishap. The resulting total cost of damages to Government and other property is \$2 million or more, a DoD aircraft is destroyed (excluding UAS Groups 1, 2, or 3), or an injury or occupational illness results in a fatality or permanent total disability.

Class B mishap. The resulting total cost of damages to Government and other property is \$500,000 or more, but less than \$2 million. An injury or occupational illness results in permanent partial disability, or when three or more personnel are hospitalized for inpatient care (which, for mishap reporting purposes only, does not include just observation or diagnostic care) as a result of a single mishap.

Class C mishap. The resulting total cost of property damages to Government and other property is \$50,000 or more, but less than \$500,000; or a nonfatal injury or illness that results in 1 or more days away from work, not including the day of the injury.

Class D mishap. The resulting total cost of property damage is \$20,000 or more, but less than \$50,000; or a recordable injury or illness not otherwise classified as a Class A, B, or C mishap.