

Training Mishaps Analysis

Introduction

Currently there is not enough analysis on training mishaps to lead to specific training courses or causes that could be used to target problem areas. This report attempts to target particular areas associated with mishaps of varying severity.

- Is there an increasing trend of training mishaps?
- Has there been any significant change in training mishaps?
- What training courses have the most training mishaps?
- What are the causal factors of training mishaps?

Data

Navy Training data from FY98-FY08 as of 17 June 2008 populates the graphs in this report. The mishaps include Class A, B and C event severities and are distinguished in charts as appropriate. The casual factors were determined using the narratives for each mishap with assistance from Mr. Blackwell from Code 41.

Team

Code 63 – OR Team

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Code 62 – Team provided requested data.

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Methodology

After obtaining data during the ten year timeframe, the training mishap data were rearranged to produce answers to the questions in the Introduction section. Overall statistical significance of training mishaps trend were determined using confidence intervals with 90% significance levels. The narratives for each mishap event provided enough information to determine a casual factor. The categories for the casual factors were created based on common words from the mishap narratives.

Discussion

Using the training mishaps from FY98-FY08 this study focuses on the trends, significant changes and top mishap causes. The snapshot of training mishaps during this time period, shown in Figure 1, shows the total mishaps by FY and mishap class. According to the chart, after FY03 there was only one Class A training mishap in FY06. Before FY04 the chart shows at least one Class A mishap each year from FY98 to FY03. Between FY00 and FY03 the chart also illustrates these years with much lower counts than the other years appearing on the chart. The first increase shown on the chart, in FY04, is consistent with the introduction of WESS. Each completed FY following FY04 is greater than the year before. During this select time period (FY04-FY07), the Class B mishaps show fairly constant numbers and only one Class A

mishap occurs. The force behind the increasing trend starting in FY04 is the Class C mishaps.

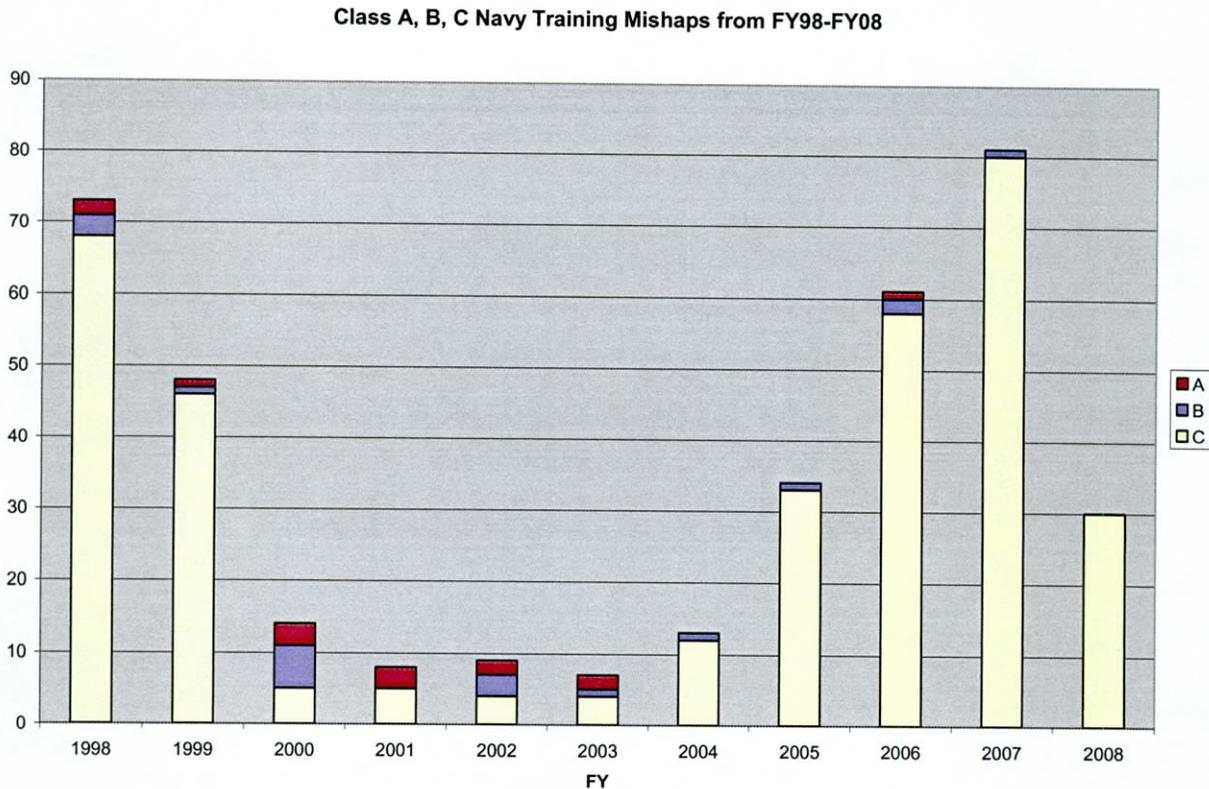


Figure 1

In terms of averages as opposed to trends, Figure 2 shows a five year average from FY03-FY07 for training mishaps. The average is shown with its 90% confidence interval above and below the 39.2 on the chart. The current FY as of 17 June 2008 has a total of 30 mishaps. Using Figure 1, each of these training mishaps for FY08 are Class C mishaps. The current total for FY08 training mishaps is within the 90% confidence interval of the five year average, thus FY08 is currently statistically significantly no different than the average from FY03-FY07 for training mishaps. This chart provides a quick look for determining whether or not the current year total differs significantly from a baseline such as the aforementioned five year average.

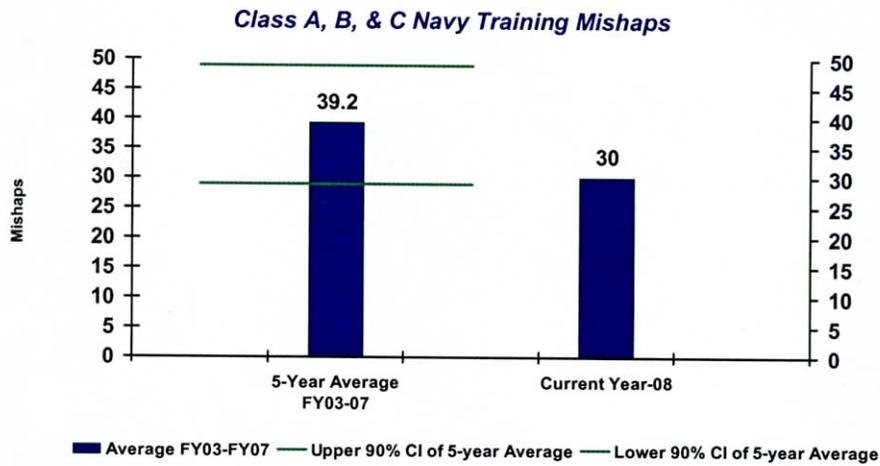


Figure 2

The charts shown in Figures 3-5 are similar to Figure 2, varying by the mishap class. While Figure 2 combined for an overall total of Class A, B and C mishaps, Figures 3-5 show the individual mishap classes.

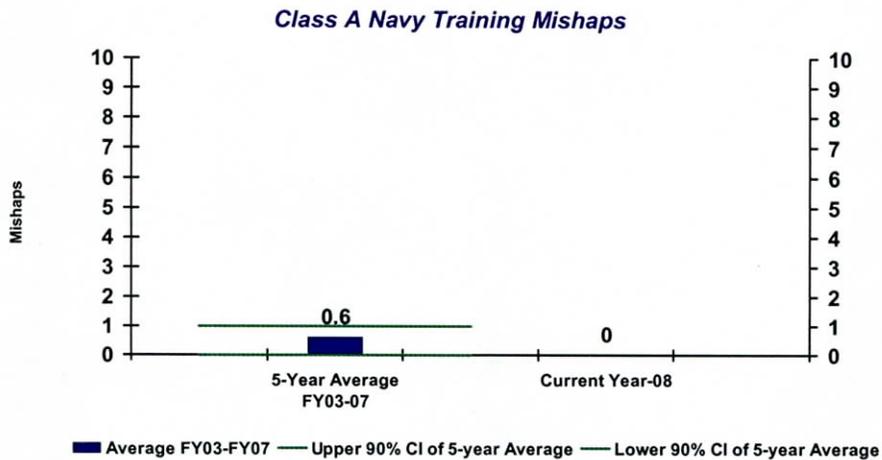


Figure 3

Class A training mishaps rarely occurred during FY04-FY07 and while the five year average covers the Class A mishaps in FY03, Figure 3 captures the frequency by its relatively low average. Historically, the time between Class A training mishaps is in years, therefore having zero or one training mishap in a given year is not significant. The 90% confidence interval of the average shown in Figure 3 supports the lack of statistical significance. Currently FY08 as of 17 June 2008 has zero Class A training mishaps and is not statistically significantly different than the five year average for respective training mishaps.

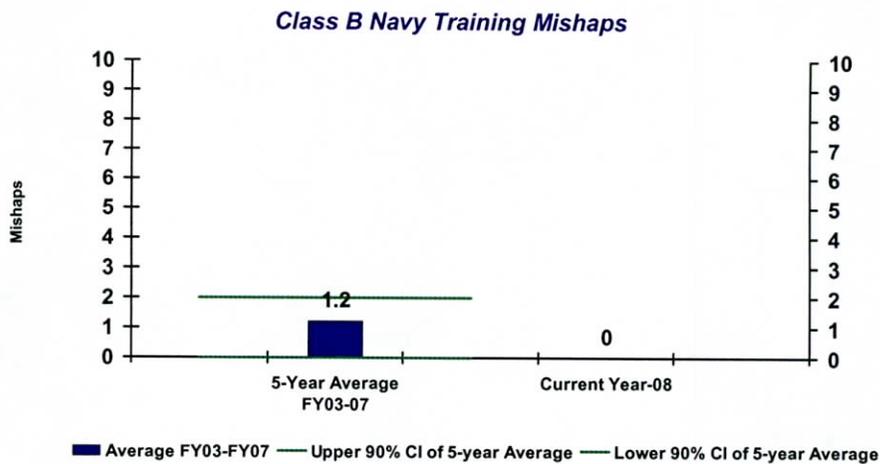


Figure 4

According to Figure 1 Class B training mishaps occur more often than Class A training mishaps; however, the five year average for Class B training mishaps shown in Figure 4 is also relatively low. Currently there are zero Class B training mishaps for FY08 but still the FY08 total is not statistically significantly different than the five year average with 90% confidence.

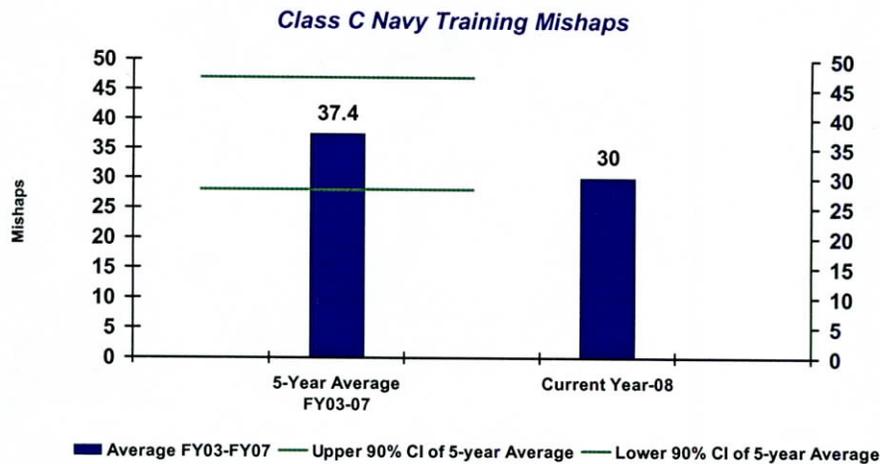


Figure 5

From the time WESS was introduced in FY04, the number of Class C training mishaps have increased. The average for Class C training mishaps greatly exceeds the average of both Class A and Class B training mishaps. Currently there are 30 Class C training mishaps for FY08 and compared to the five year average of 37.4, the current year is statistically significantly no different than this average with 90% confidence. The increase of Class C training mishaps provides evidence to the effect of WESS on reporting. For training mishaps, using WESS appears to be more convenient than past reporting procedures. More reports are being submitted for Class C mishaps, as shown in Figure 1.

Up to this point the charts only show totals and averages of training mishaps, not where they occur or why. Figure 6 graphs the mishaps by course number, denoting the mishap class by color. The chart does not include the mishaps that had no course number associated with the event. Including the number of events with missing course numbers would conceal the distribution of the number of mishaps with course numbers.

Navy Training Mishaps by Course Number from FY98-FY08

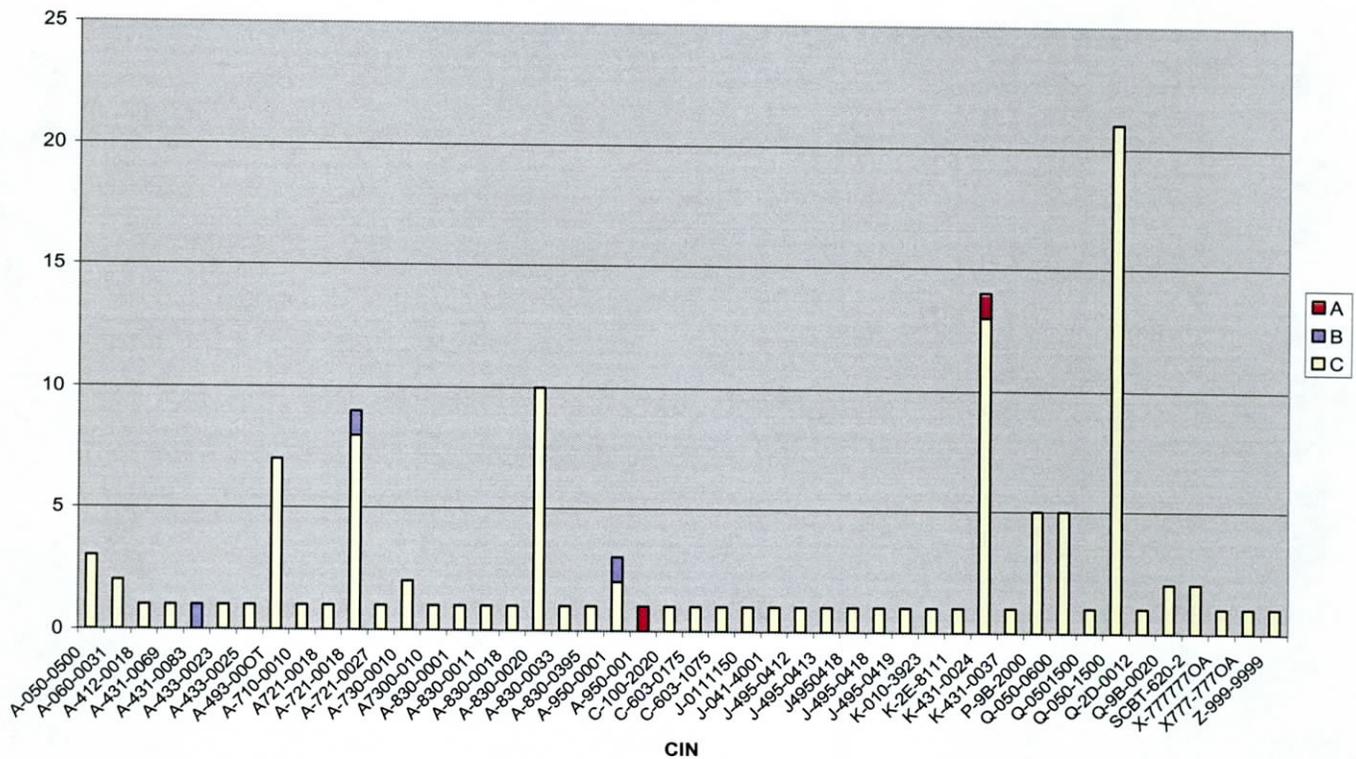


Figure 6

The course numbers of events are ranked in Table 1 by the total number of mishaps. The leader of the table includes the course numbers not listed with its respective event, noted as blank in the table. Table 1 shows the number of course numbers marked blank as 260 total. The totals ranking among events actually showing course numbers places the course number Q-050-1500 or the Naval Aircrew Candidate School as the course with the most mishaps. While this course number leads the other courses with numbers in mishaps, the number of blanks hides the underlying distribution of mishaps per course. The blanks consist of a mixture of courses with numbers not recorded, and non-formal training with no course numbers required. Not knowing more about the origins of the events without course numbers clouds the meaning of the events that have associated course numbers.

Table 1

CIN	Total Mishaps
(blank)	260
Q-050-1500	22
K-431-0024	14
A-830-0020	10
A-721-0018	9
A-493-000T	7
P-9B-2000	5
Q-050-0600	5
A-050-0500	3
A-950-0001	3

Although the course numbers provide minimal insight into training course where mishaps occur the most, Figure 7 focuses on the mishap cause. The categories and data shown in Figure 7 were derived from reading each training narrative. The descriptions of the categories follow in Appendix A. The top two causes of training mishaps according to Figure 7 are Situational Awareness and Technique Error. These top mishap causes have several Class C mishaps but not as many Class A or B mishaps as other categories such as Exceed Limitations or Procedure Error.

Class A,B,C Training Mishaps by Mishap Cause from FY98-FY08

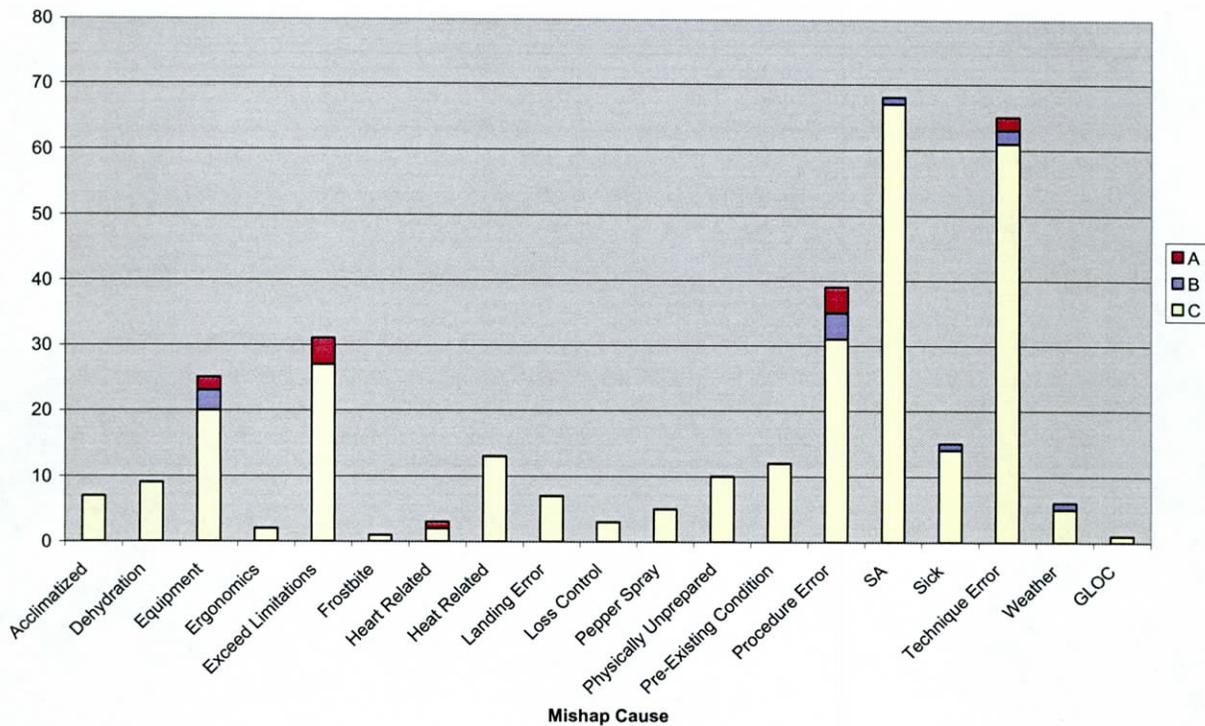


Figure 7

Conclusions / Recommendations -

While Figure 1 illustrated an increase in mishaps since FY03, the increase is more likely due to how the introduction of WESS in late FY04 affected the number of reports submitted. Although more Class C mishaps were reported, fewer Class A and B mishaps have occurred as opposed to the first half of the time period shown in Figure 1. The graphs in Figures 2 to 5 statistically compare the FY08 totals by varying mishap class to each mishap class' respective five year average to determine significant differences. At the 90% confidence level, the FY08 totals as of 17 June 2008 are statistically significantly no different than the respective average for each chart. This result infers that at this point, the FY08 totals are statistically no different than the yearly training mishap totals from FY03-FY07. Unlike analyzing the statistical comparisons, determining which course number owns the most of these mishaps using Figure 6 is no small feat. The number of events that occurred with no course number, regardless of reason, prohibits truly knowing what course to target as a problem area. This result could simply infer that most training mishaps occur during non-formal training, but the data is unclear. A recommendation for this issue is better distinguishing when a course number is and/or is not appropriate and more consistency with recording course numbers when required. With a consistent approach to course numbers follow-up action can be more specifically related to the cause. With specificity in mind Figure 7 graphically demonstrated the main causes of training mishaps. While the two categories, Situational Awareness and Technique Error, are leaders in quantity they are not necessarily leaders of the more fatal mishaps such as Procedure Errors and Exceed Limitations. Categories such as Technique Error are expected in a training environment where techniques are practiced and learned for the first time. The only way to reduce technique errors and lack of situational awareness is consistent reinforcement of both. The Procedure Errors graphed in Figure 7 include events such as an experienced member having proper technique but not following the right procedure. Given the fatal results of Procedure Errors, no matter the experience, procedures should be thoroughly reviewed during training events.

Appendix A: Mishap Cause Legend

Mishap Cause	Description
Acclimatized	Mishaps involving a member's lack to adapt, especially to environmental or climate changes.
Bad Weather	A mishap occurring due to excessive wind, wind change or larger than normal wave.
Dehydration	A mishap occurring due to excessive loss of water from the body.
Equipment	A mishap directly caused by anything dealing with equipment, such as: equipment failure, not wearing appropriate equipment, or improper stowage of equipment.
Ergonomics	A mishap occurring due to improper lifting procedures.
Exceed Limitations	A mishap occurring when a member pushes past physical limitations.
Frostbite	A mishap occurring due to frostbite even when appropriate equipment is worn.
GLOC	A mishap occurring due to G enforced loss of conscious
Heart Related	A mishap occurring due to a member's heart such as heart failure, or heart attack.
Heat Related	A mishap occurring due to member's adverse reaction to extreme heat, such as heat fatigue, heat stress, heat exhaustion or heat stroke.
Landing Error	A mishap occurring due to incorrect landing.
Loss Control	A mishap occurring due to a member losing control of situation or self while training.
Pepper Spray	A mishap occurring involving an adverse reaction to pepper spray.
Physically Unprepared	A mishap occurring from a member whose body is unprepared for the training such as bad diet, lack of rest or sleep, not stretched enough, or forgot to take medication.
Pre-Existing Condition	A mishap occurring where a member's previous condition
Procedure Error	A mishap occurring due to a member or members not following the correct rules for the respective situation.
Sick	A mishap occurring due to a member becoming unavoidably ill, such as having a stomach virus.
Situational Awareness (SA)	A mishap occurring due to a member's loss of focus, distracted, or unawareness of surroundings.
Technique Error	A mishap occurring due to an incorrect technique used, most often due to lack of experience.