

FRACAS

An Acronym For

Failure Recording, Analysis, and Corrective Action System

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For More Reliability Tools: See <http://www.barringer1.com/nov07prb.htm>

FRACAS: What Is It?

- **FRACAS** is an organized database for aiding in solving reliability problems using a common-sense approach data for systematically and permanently removing failure mechanisms.
- What goes into the database: equipment IDs, ages to failure, suspended (censored) ages for removals before death (PMs, Optimum Replacements, etc.), reasons for failure or removals (**broke and fixed are not sufficient details**) and a host of other common sense information.

What Data To Acquire?

- **Life data from equipment logs will contain**
 - True failures from breakdowns/predictive repairs—ages to failure
 - Suspended data for removals not yet failed—ages to removal
 - Suspended data for good maintenance replacements—removals
- **Ages to failure** are times/cycles/stops-starts/hot-cold cycles, or what motivates failures
- You need the “**birth date**” and “**death date**” just as the requirement for your own death certificate
the reason for failure must be identified

What Specific Data Is Needed?

- **Three requirements for precise failures:**
 - The time origin must be unambiguous
 - A scale for measuring passage must be set
 - The meaning of failure must be entirely clear
- **What failure data should you gather?**
 - First: Define what is a failure
 - Second: Acquire data motivating the failure
 - Third: Record exposure “time” to “insults” motivating failure
- Build a **Weibull library** for wise use of your data—it’s your history!

FRACAS: Why Is It Necessary?

- **Use data to solve problems.** Attack root causes to reduce/eliminate failures to make reliability grow and reduce costs.
- **Fixing failures requires facts**—not opinions.
- **Use the system closed loop to record**, analyze, correct, and verify improvements have occurred.
- Remember first data reported is usually a **SYMPTOM** and **NOT** the root cause for failures so the FRACAS system requires updates, corrections, and facts.

FRACAS: When to use it?

- The maintenance repair order system generates evidence of a failure—this is the starting point
- Failures with significant costs* must be investigated and evaluated to reduce future failures—little is gained investigating trivial cost items—**use the \$Pareto list, on the vital few \$items, add details to records, and make big \$improvements**

* (repair costs + collateral damage + lost gross margin from the failure + other appropriate business costs such as \$risk*POF)

FRACAS: Where to use it?

- This engineering tool **requires clerical effort** to input data and build the vital few details to **identify significant events** requiring **corrective action** in a timely manner along with **root causes**.
- Use the FRACAS tool to update management in terms of \$'s, time/place to take action, and improvements achieved for **controlling costs**.
- **FRACAS is not a clerical toy or bureaucratic tool!** It is a useful and practical tool for improvements and communicating practical details up and down the management chain.

FRACAS: In Summary

- Gather failure reports **What failed**
- Do a failure analysis with ages to failure **How it failed**
- Understand the failure modes **Why it failed**
- Mitigate failures including risk mitigation **No future failures**
- Demonstrate success by avoiding failures **Show successes**
- Include details in lessons learned library to train **Train**
- Communicate success/failures to management and the FRACAS teams **Communicate**
- Go to the next big item on the \$Pareto list & repeat corrective actions using data **Repeat over and over!**

FRACAS: Resource Lists

- **MIL-HDBK-2155** (formerly MIL-STD-2155)
- **AMSAA Design For Reliability Handbook**
- Reliability Program Requirements For Space And Lunch Vehicles, **MIL-STD-1543B**
- Electronic Reliability Design Handbook, **MIL-HDBK-338A**
- Weapon System Integrity Guide, **MIL-HDBK-515**
- Reliability Program For Systems And Equipment, **MIL-STD-785**

You can download these PDF's from <http://www.barringer1.com/mil.htm>