

DEVELOPING AN ARMY STOCKPILE RELIABILITY PROGRAM ENGINEER

Four Critical Knowledge Elements and Traits

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DEVELOPING AN ARMY STOCKPILE RELIABILITY PROGRAM ENGINEER

Outline

- I. Introduction
- II. The SRP Engineer
- III. The Traditional Method of Making an SRP Engineer
- IV. Four Essential Knowledge Elements for an SRP Engineer
- V. Key Traits that Promote Success for an SRP Engineer

DEVELOPING AN ARMY STOCKPILE RELIABILITY PROGRAM ENGINEER



Dedication

Leave no One behind.

Here's to you, Tom Spain.



... Sometimes the light's all shinin' on me
Other times I can barely see
Lately it occurs to me
What a long, strange trip it's been

-Grateful Dead - Truckin'

The Army Missile Stockpile Reliability Program (SRP)

- Assesses aging missile systems throughout their lifecycle to determine if they continue to be safe, continue to be reliable, and continue to perform the mission required to provide Combatant Commander's the greatest probability for successful combat operations.
- Extends shelf life on billions of dollars of Army missiles annually to allow their continued use beyond the design shelf life and avoid procuring new.
- There are less than 20 government Army Engineers working SRP to support all Army missile systems.

**What does it take to be one of these
“SRP Engineers”?**

The Stockpile Reliability Program (SRP) Engineer:

- There is no such thing.



- No college of engineering provides a degree in “SRP Engineering”
- No government recognized core curriculum
- No Army regulatory guidance or certification process
- Each Army SRP engineer is built from scratch
- It is an on-the-job process with guidance from supervisors and peers, and customized depending on the incoming engineer’s education and experience.

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- ✓ The SRP Engineer must become a **Consummate Expert** on all aspects of the missile system(s) they are assigned to.
- ✓ They cannot be a warhead expert, or a motor expert. They need to be an expert on **all components of the system.**
- ✓ They need to:
 - Design Tests
 - Create Test Plans
 - Write Test Procedures
 - Determine Sample Selection
 - Perform Extensive Data Analyses
 - Publish Detailed Reports
 - Make and Support Recommendations having Inventory-wide Impacts on Army Missile Systems

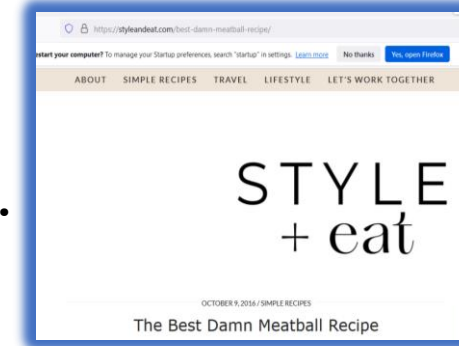
I was introduced in a meeting once with,
“He is the subject matter expert. You name the subject.”

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Best Damn Recipe for a Stockpile Reliability Engineer

1. Take one enthusiastic new college graduate and assign them to a specific weapon system.
2. Fold the engineer into every one of that missile system's description documents, test plans, test procedures, military specifications, previous SRP reports, photographs, and whatever else you can find. Note: No particular order is required for folding in the ingredients.
3. Allow the engineer to marinate for at least one month, intermittently folding in new documents until it appears that they have become completely saturated. If they seem too moist with enthusiasm, add more documents.
4. Once fully incorporated in the mixture, tell the engineer that they are "doing great!", then whisk them into :
 - a. Reviewing all component and flight test procedures for the missile system.
 - b. Overseeing and managing one test for the system.
5. Knead a previous SRP report into the SRP Engineer, then leave them to rise in a warm cubicle to analyze the results of current testing on that one component, combined with all previous years of testing.
6. Flour the rising SRP Engineer with report format guidelines and set oven for a due date for them to provide the new write-up for that component's section of the report.
7. Test for doneness, and when complete layer in more components or flight tests, repeating steps 4-6 until the engineer has assumed full responsibility for the system, then remove fully formed SRP engineer from oven.





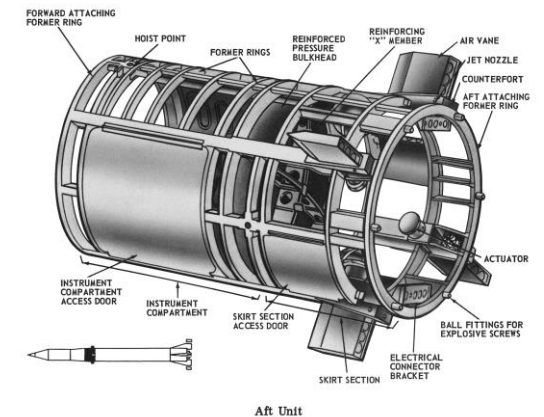
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FOUR ESSENTIAL KNOWLEDGE ELEMENTS FOR AN SRP ENGINEER

ELEMENT #1:

**Know the missile system - Down to the
screws that hold it together**



Aft Unit

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STEP 1:

“Remove the warhead.”



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- The SRP engineer is the overseer, billpayer, approver... they have the authority to be onsite during all tests.
 - This is NOT a burden. It should be one of the most exciting parts of the job!
- The new SRP engineer should make watching disassembly the highest priority, but go to whatever procedures come up first.
- Even if they don't know the test item being tested, they should go, but whenever possible they should review the test procedure beforehand and walk through the written procedure with the testers while observing the test.
 - Note, this usually requires a printing and bringing it on paper!

ELEMENT #2:

**Know all the people involved in
testing the system.**

ARE YOU TRYING TO KILL US?



TOW Missile Flight Testing 1990
Yakima Washington

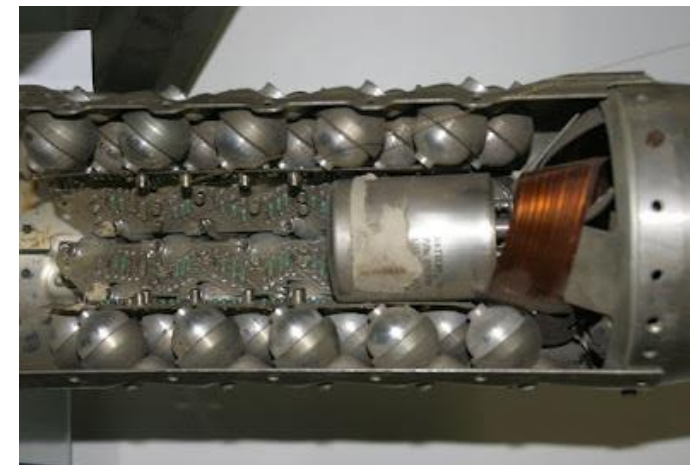
Benefits of a healthy relationship with the Testers:

- The SRP Engineer will learn things that cannot be found in the spec/procedure.
- The Tester will know who is the responsible agency for their funding.
- The Tester will know who to go to if there are questions/issues/failures.
- The Tester will be more likely to admit when something doesn't go right.
- The Tester will be more willing to accept recommendations/guidance for changes in procedure, and vice-versa, more likely to recommend changes to the SRP Engineer.

ELEMENT #3:

Know your Customer.

**WHEN THE BOSS SQUEEZES YOUR
THIGH UNDER THE TABLE YOU KNOW
YOU'VE GOT THIS ELEMENT.**



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The SRP Engineer's Customer is **NOT**:

- Supervisor
- Project Office
- AMCOM / AMC / HQDA
- Foreign Agency

The SRP Engineer's Customer **IS** a
Soldier / Marine / Sailor / Airman.

What the SRP Engineer does can often be so remote from the actual purpose of the weapon system that they can forget who the customer is.

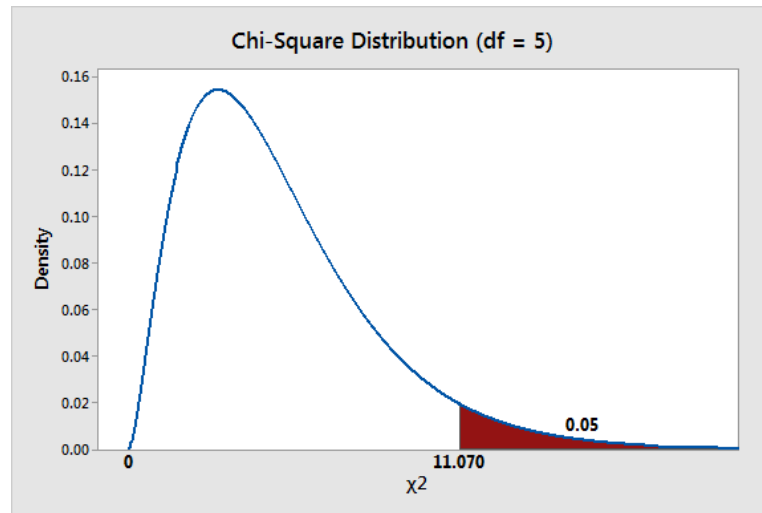
If the SRP Engineer always keeps this center in the back of their mind:

- It will make the job more fulfilling, with a greater ‘Purpose’
- The SRP engineer will be able make better disposition decisions with greater confidence.
- The value of the job becomes greater than just making the boss, higher headquarters, or the PM office ‘Happy’.

ELEMENT #4:

Know a broad-base of basic statistics.

Dick Nutt and the Fisher's Test



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- Engineering colleges require minimum or no courses in Statistics.
- Many standard RAM practices are rarely performed in SRP Engineer work.
- The SRP Engineer needs RAM knowledge, but as the ‘Consummate Expert’ they also need to be an independent critical-thinking statistical professional.
 - Analyst of broad datasets for relationships: to age, manufacturing strata, storage, handling, deployment, environmental exposure/operation, test set, test operator...
- This requires an additional set of statistical tools broader than a Reliability Engineer.
- If the SRP Engineer has not already received them, they should pursue college-quality basic statistics courses.
- Without that depth of understanding, the SRP Engineer is likely to:
 - Be unable to perceive or prove out unexpected relationships that often show up in SRP (test sets/operations, subpopulations, etc).
 - Make faulty conclusions by utilizing software to perform analyses without understanding the underlying assumptions of the statistical tool, or what the result from the tool actually represents.

Key Personality Traits that Promote Success for an SRP Engineer:

1. **Courage:** To admit when you don't know, ask for explanation, and pursue the knowledge.
2. **Critical Thinking:** Why...? Why...? Why...?
3. **Independent:** Prioritize, check-off, next...
4. **Collaborative:** Can never be the expert of all things.

CONCLUSION

Four Essential Knowledge Elements for an SRP Engineer

- #1. Know the missile system - Down to the screws that hold it together.
- #2. Know all the people involved in testing the system.
- #3. Know your customer - it is not your boss or the project office.
- #4. Know a broad-base of basic statistics.

Key Traits that Promote Success for an SRP Engineer

- #1. Courage: To admit when you don't know.
- #2. Critical Thinking: Why...?
- #3. Independent: Prioritize and tackle.
- #4. Collaborative: You can never be the expert of all things.



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QUESTIONS?