



AMC

# ARDEC



## Concepts and Practices in Finding and Applying Lessons Learned



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Ammunition - Missiles -  
Rockets Conference &  
Exhibition***

U.S. Army Armament Research,  
Development and Engineering Center  
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# Acknowledgements

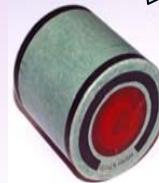
- As will most efforts, the difference between a successful and an unsuccessful program is the people involved in the project.
- Applying “Lessons Learned” to a project certainly depends on more than the efforts of one or two people.
- This project was a success only because of the dedication of the Modular Artillery Charge System (MACS) team and their commitment to applying “Lessons Learned” to the MACS program.

# Background

## Modular Artillery Charge System

- Two charge additive system Crusader
- Compatible with automated loading
- Maintain backward compatibility
- Environmentally compliant
- Meet insensitive munition goals

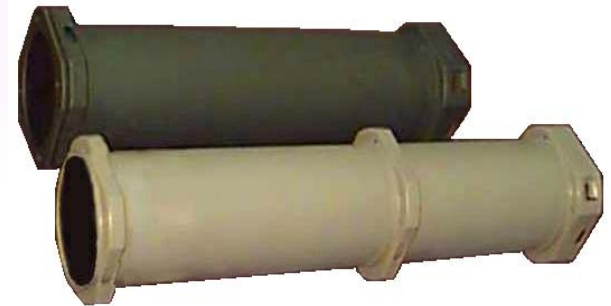
New PM wanted a review of Lessons learned



M231



M232

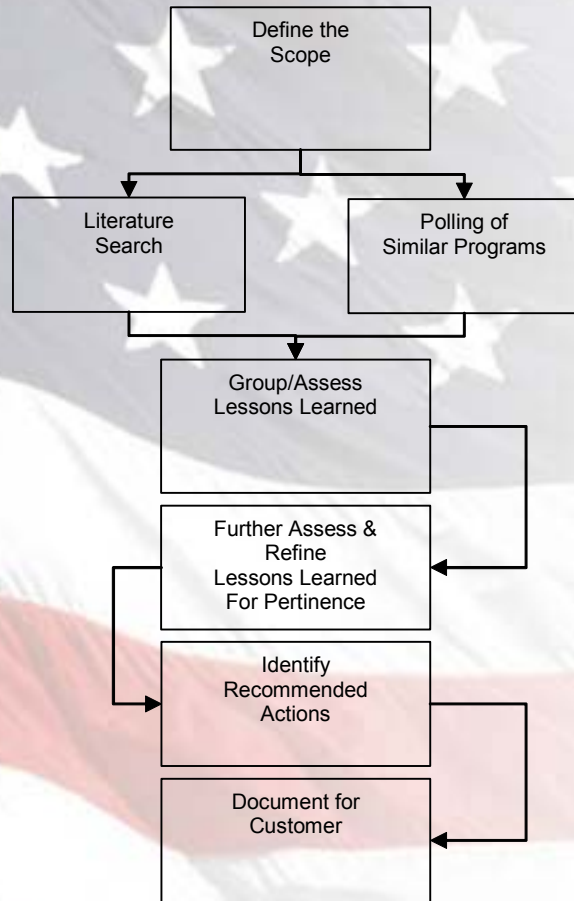


Packaging Canisters

# Little Guidance on Using Lessons Learned

- At the time of the initial study guidance on the use of lessons learned was not well established
  - Used by PM Production Base Modernization to review and update operation manuals
  - Collected and stored in libraries and databases
- Current DoDD 5000.1 guidance, paragraph 4.5.9.3
  - Ideally, a program manager **searches lessons learned databases for analogous systems**, enabling the program manager to be better prepared to defuse potential problems before they become real problems or to see what solutions to similar problems worked well in the past. However, **because lessons learned databases are currently highly decentralized, it is often difficult to efficiently and effectively find applicable lessons learned in a form that is useful.**

# The Approach



Define the Scope

Literature Search and Polling Similar Programs

Grouping the Information

Assessing and Refining

Identification of Recommended Actions

Documenting

# Defining the Scope

- Taylor the scope to the problem
  - We opened the MACS study up to the entire life cycle
    - Looking for unknown unknowns
    - Looking for solutions to known unknowns
  - Broader scopes translate into more lessons learned to review
  - Narrow scopes facilitate computer searches
    - But you may over look some pertinent areas

# Searching and Polling for Information

## Existing Databases

- Up Side
  - Outside the box
  - Computer searches
  - Claimed validity of results
  - Avoids vested interests
- Down Side
  - Large numbers
    - 1000
  - Translating to your application
  - Focuses on success stories

## Polling Analogous Systems

- Up Side
  - Small number (24)
  - Focused to your effort
  - Teaming with peers
    - Things done incorrectly
- Down Side
  - Effect of group thinking
  - Some NIH
  - Exposure to premature criticism

***Use both approaches and practice people skills  
Some lessons learned will conflict, accept it and adjust  
Throw out lessons learned that do not apply***

# Grouping

- Sort out those that do not apply
- Combine lessons learned into themes
  - Facilitates comparing Lessons Learned
  - Sorting out duplicates
  - Division of work load

Communications (2)

Technical Data Package (6)

Initial Production Facilities (3)

Inspection and Testing (4)

Producibility (28)

Transition to Production & ECPs (7)

Facility Planning (8)

Item Design (4)

Others (30)



# Assessing and Refining

- Identify the source program
  - Big differences between programs ammunition, weapon systems, etc.
- Concise statement of lessons learned
  - Abstract of the lessons learned
- Define the application
  - Describe the application to MACS
- List the source and contact

# Recommended Action

- Provide a recommended action
  - Evolves from the description of application
  - Concise positive statement
    - Reinforcing - Continue a current activity
    - Investigative
      - Reevaluate something currently being done
      - Look into doing something new
- Identify appropriate action officer by position
- Provide recommended timing

# Documenting for the Customer (Reporting to the PM)

- Document the study
  - Subjective in nature
  - Recommendations of a single person or small group
  - Moving target nature of item development
    - Changing information base
    - Changing requirements
    - Product changes and refinements
- Not a published report
  - Needs to be done quickly
  - Needs to be understood by all that it is a study

# Study Outline

1.0 Introduction

2.0 Methodology

3.0 Summary of Lessons Learned

App A Directly Applicable Lessons Learned (62)

App B Contributed Lessons Learned

App C Other Lessons Learned (30)

# Concluding Observations

- Presentation describes a methodology and process
  - Little documentation on “how to use lessons learned”
  - Each situation is unique
  - Avoid cookie cutter approaches
- Only guidance found “Best Practices Methodology, A New Approach for Improving Government Operations” (GAO/NSIAD-95-154), dated May 1995.

# Concluding Observations

- Take a study approach
  - A study provides alternatives to assist the PM
  - Do not publishing as a final report
    - Do not imply that findings are definitive and directive
  - Should facilitate team building
    - If done properly findings will be coordinated with action officers before going to the PM

# Concluding Observations

- The process can be applied to other programs
  - Careful scoping at the outset
  - Team approach
  - Avoid short cuts
    - Solicited lessons learned have a higher payback
    - Do not over look the data bases
    - Be prepare to explain why lessons learned apply or do not apply
  - Commitment to open-mindedness throughout the entire process.

The image features a large, semi-transparent American flag on the left side, with its stars and stripes clearly visible. The right side of the image shows a bright, hazy background with silhouettes of military personnel and equipment, including what appears to be a helicopter, suggesting a military or emergency response scene. The overall tone is patriotic and serious.

# Backup



## Propellant Charge Weight Assessment of Combustible Cased Tank Ammunition

Program: Cartridge, 120mm, APFSDS-T, M829A1

Lesson Learned: Propellant charge assess of any combustible cased ammunition should contain all the components expected to be utilized in the final cartridge or ammunition lot. Differences in minor components will then be normalized in final ballistic results.

Application: A thorough analysis of mixing combustible components from different lots was performed during the product improvement testing of the M203A1 propelling charge. After significant testing, it was determined that under the current beater additive process the mixing of the combustible case lots during production will have no impact on uniformity. The charge specification currently allows mixing of the case lots for the same interfix number.

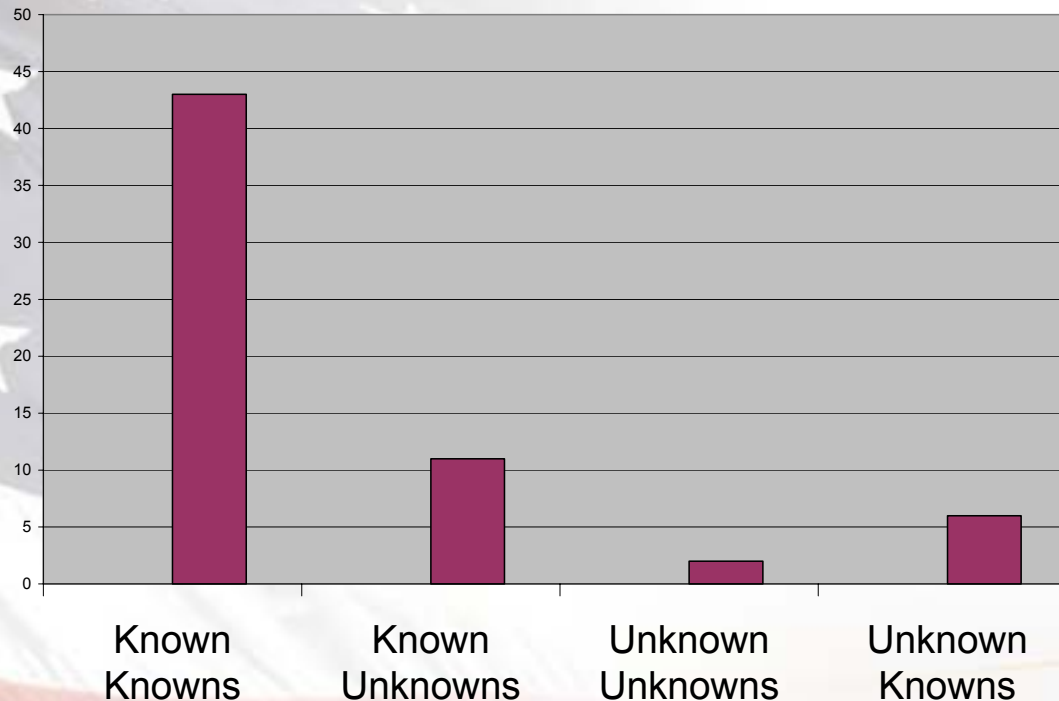
Action: This issue was already considered by the developer and no further action is required.

Timing: N/A

Reference: SFAE-AR-TMA-E, Memo dated 5 March 1992, Subject: Lessons Learned Applicable to the XM230

# Post Script

## You Never Know How Effective the Effort Was



Known Knows – Policy and practice in place at time of study

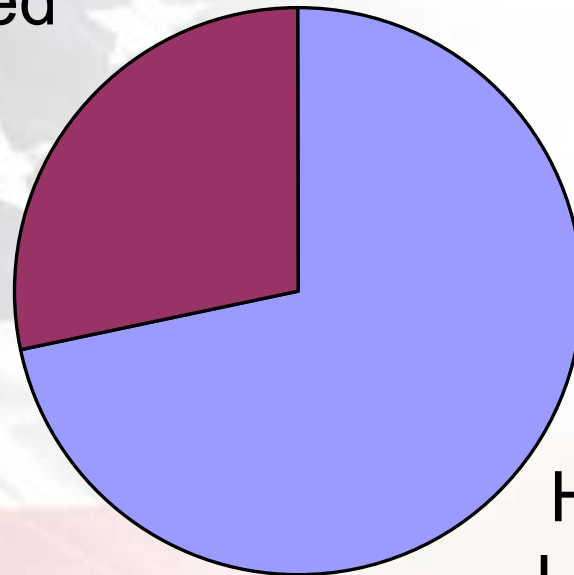
Known Unknowns – Planning to address in place at time of study

Unknown Unknowns – Did not plan for prior to study

Unknown Knowns – Did not work out as originally thought

# Historic vs. Solicited Lessons Learned Used

Solicited  
Lessons  
Learned  
28%



Historic  
Lessons  
Learned  
72%