



The Shortcomings of Cost Estimating Templates

Meagan Gadreault, Faye Kim
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Purpose

Estimates are created inefficiently, and Lean Six Sigma techniques can be used to:

- Identify the causes of inefficient cost estimate modeling;
- Propose a method to improve efficiency;
- Discuss future efforts incorporating the recommendations outlined in this paper.



Introduction

Standardization

DoD



The cost estimating process can take a long time and has many steps???





The DMAIC process can be used to improve the cost estimating process.

DEFINE

Define the problem you would like to fix and create the goal.



MEASURE

Determine how the process is currently performing and a plan to collect data.



ANALYZE

Identify the cause of the problem and examine the process.



IMPROVE

Brainstorm possible solutions and implement the best solution.



CONTROL

Maintain the solution and continuously improve the process.



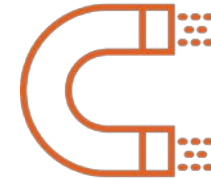
The cost estimating process is inefficient.



Poorly defined assumptions



No supporting documentation



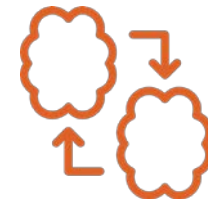
Poor data collection



Inadequate or irrelevant data



Bad Excel techniques



Loss of institutional knowledge with changes

There is a high degree of variation in the cost estimating process.



Number of requirements



Complexity of program



Type of estimate



Ideally, the data collection process would measure performance.

1

What kind of data will be captured?

- Feedback
- Qualitative metrics

2

From who will this data be captured?

Cost estimators

3

How will the data be captured?

Surveys

4

How can we ensure the data is reliable?

- Increase sample size
- Gather comments

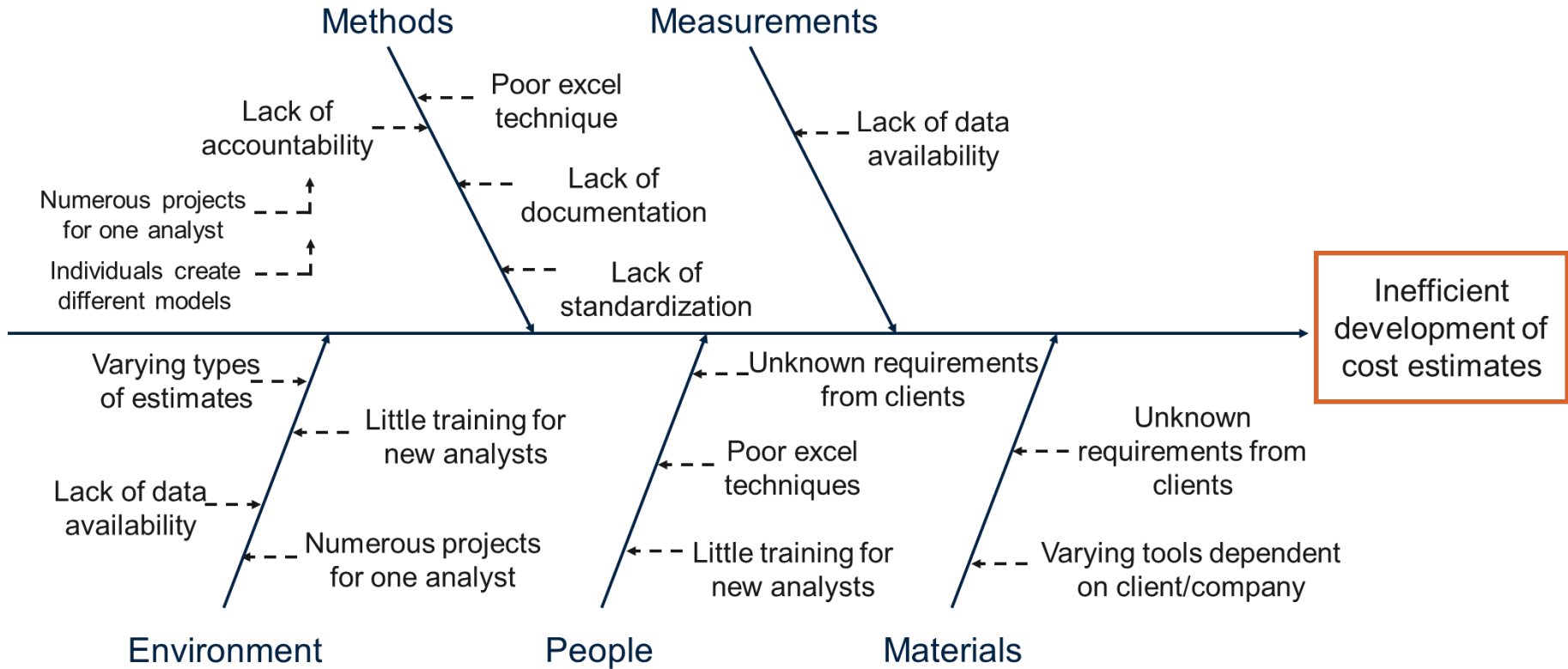
5

What would the data show us?

- Ease of use
- Traceability
- Dynamic capability



A fishbone diagram can identify “many possible causes for an effect or a problem.”





To improve cost estimating, we will identify current waste and define potential solutions.

1
Results of the
fishbone diagram

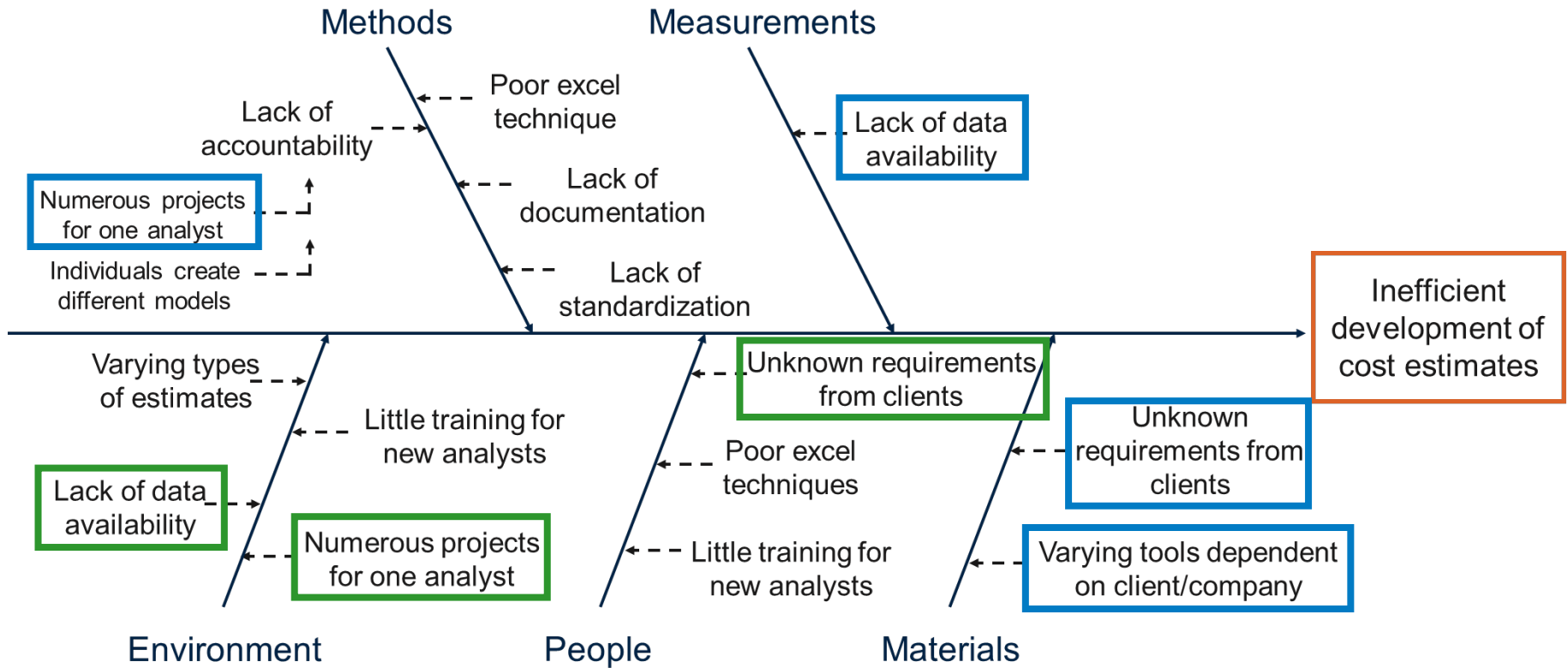
2
Analysis of
current template
implementation

3
Proposed list of
best practices

4
Plan to measure
success

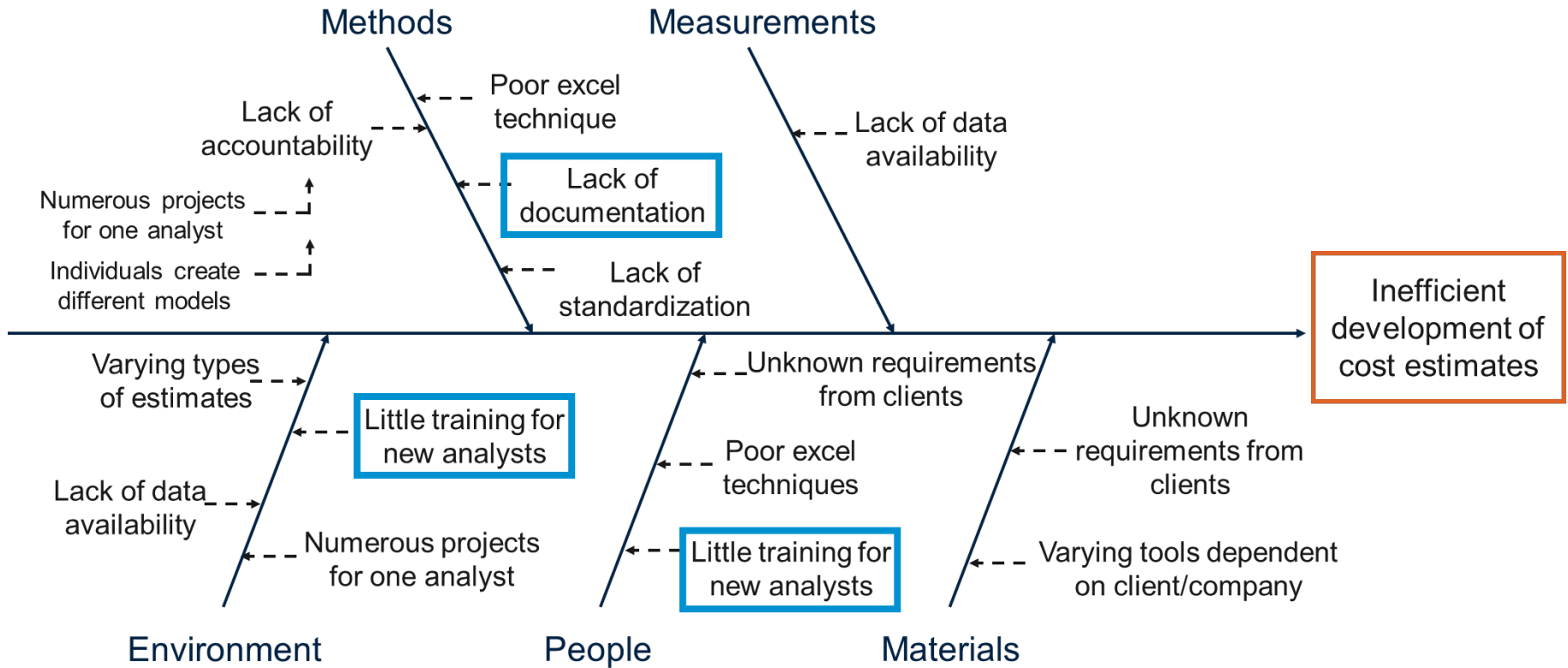


Some causes are uncontrollable, and we will not be addressing them.



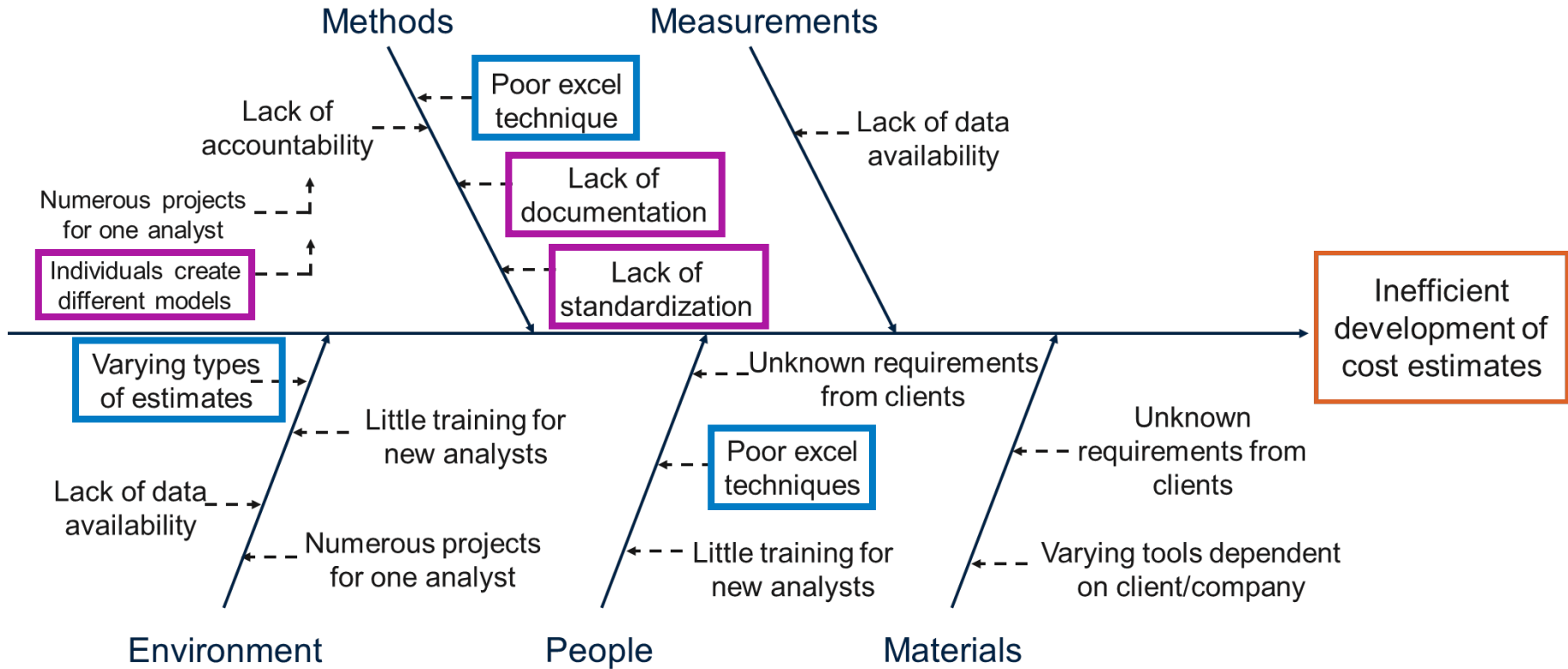


Some causes are critical in developing reliable estimates but not solved using templates.



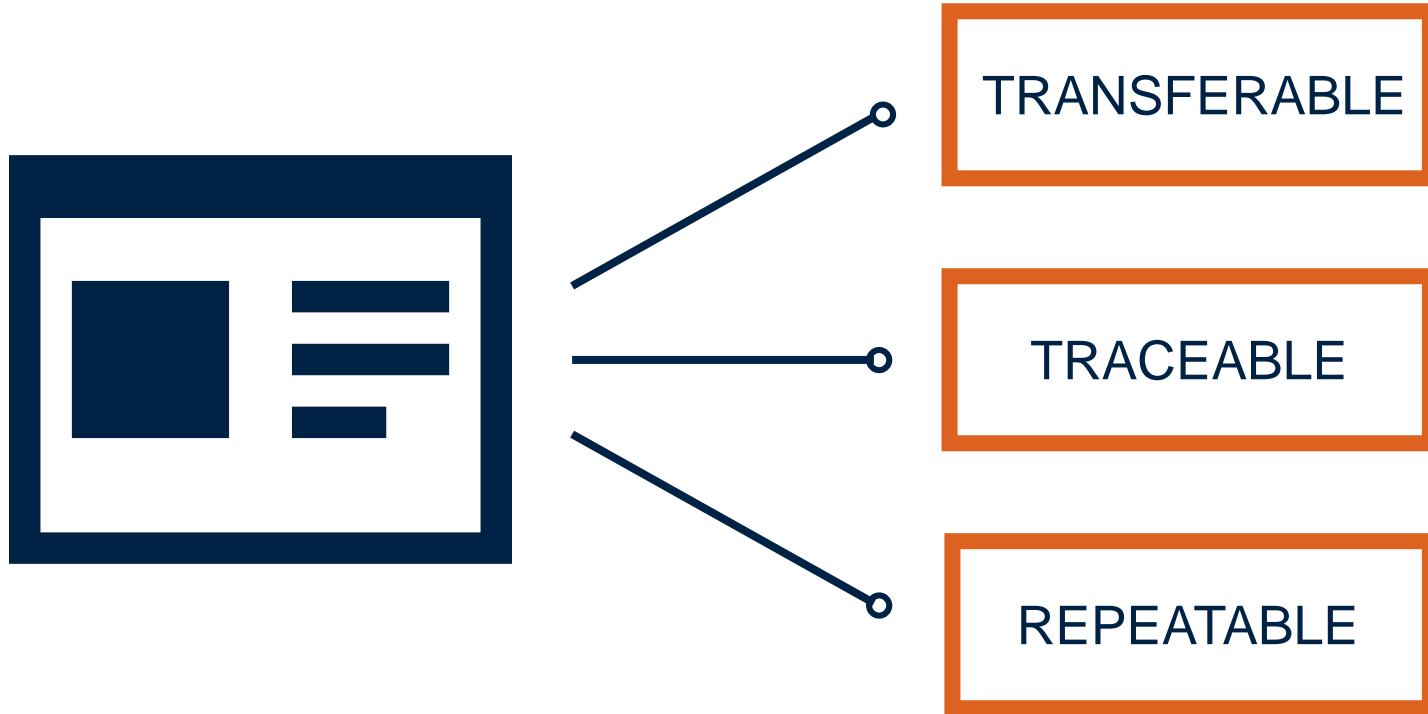


These causes directly lead estimators towards creating templates for cost estimating.





In theory, templates can be used to standardize the cost estimating process and improve efficiency.





A set of best practices is a solution that can be used for every cost estimate.

I

Use MIL-STDa 881C to finalize the first two levels of WBS elements. The third level of elements is program-specific.

MIL-STD-881C APPENDIX D				
D.3 WORK BREAKDOWN STRUCTURE LEVELS				
WBS #	Level 1	Level 2	Level 3	Level 4
1.0	Ordnance System			
1.1		Munition		
1.1.1			Airframe	
1.1.1.1				Airframe Integration, Assembly, Test and Checkout
1.1.1.2				Primary Structure
1.1.1.3				Secondary Structure
1.1.1.4				Aero-Structures
1.1.1.5				Other Airframe Components 1...n (Specify)
1.1.2			Propulsion	
1.1.2.1				Propulsion Integration, Assembly, Test and Checkout
1.1.2.2				Motor/Engine
1.1.2.3				Fuel Management



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2

Utilize database structure to organize cost elements in WBS.

#	CES Level 0	CES Level 1	CES Level 2	CES Level 3	CES Level 4	CES Level 5	Funding Source	APPN
1	1.0 Research & Development	1.1 Munition	1.1.1 Guidance and Control (G&C) Section				Internal	RDTEN Composite
2	1.0 Research & Development	1.1 Munition	1.1.2 Warhead Section				External	RDTEN Composite
3	1.0 Research & Development	1.1 Munition	1.1.3 Fuel Tank Section					RDTEN Composite
4	1.0 Research & Development	1.1 Munition	1.1.4 Afterbody/Tailcone Section					RDTEN Composite
5	1.0 Research & Development	1.1 Munition	1.1.5 On Board Test Equipment					RDTEN Composite
6	1.0 Research & Development	1.1 Munition	1.1.6 On Board Training Equipment					RDTEN Composite
7	1.0 Research & Development	1.1 Munition	1.1.7 Auxiliary Equipment					RDTEN Composite
8	1.0 Research & Development	1.1 Munition	1.1.8 Munition Software Release 1...n					RDTEN Composite
9	1.0 Research & Development	1.1 Munition	1.1.9 Munition Integration, Assembly, Test and Checkout					RDTEN Composite



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3

Need all cost inputs in the same units and cost elements labeled with appropriations

CES Level 3	APPN	QTY	CY15\$ PE	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
				CY15\$ PE FY18	CY15\$ PE FY19	CY15\$ PE FY20	CY15\$ PE FY21	CY15\$ PE FY22	CY15\$ PE FY23	CY15\$ PE FY24	CY15\$ PE FY25
	RD TEN Composite			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	O&MN Composite			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	OPN			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	WPN			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -



A set of best practices is a solution that can be used for every cost estimate.

4

Place all data into a single inputs page and link the rest of the model to this page.



A set of best practices is a solution that can be used for every cost estimate.

5

Cite the source of all assumptions and provide comments and documentation.



A set of best practices is a solution that can be used for every cost estimate.

6

Use multiple cells to break down formulas into easy parts.



A set of best practices is a solution that can be used for every cost estimate.



Build everything that is needed in the model in the single Excel spreadsheet.



A set of best practices is a solution that can be used for every cost estimate.



Use standardized template for certain aspects to cut time.



It is important to determine whether the cost estimating process changed.

Support from the industry and an updated control plan can facilitate continued improvement.





Conclusion

- Process improvement methods that are prevalent in other industries can be applied to the cost estimating industry.
- Lean Six Sigma techniques were used to find the root causes of inefficient cost estimates.
- Solutions to these causes were explored and areas of improvement were identified.
- Process improvement is most likely to be achieved by using a set of best practices as a learning tool.