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Overview

In testimony presented to the National Commission on the Future of the Army (NCFA), the Honorable John M. McHugh (SECARMY) and General Raymond Odierno (CSA) make several curious remarks regarding the cost of the Reserve Component. Coming from such senior level officials, these remarks bear much weight and deserve additional review and analysis. Specifically, we wish to comment on the following quotes from their testimony:

> *"The Reserve Component is cheaper but with significant caveats. It is only true in units where collective training and combined arms integration requirements are minimal."*[1]

> *"There is a long standing myth that the Reserve Component is cheaper. This is only true where collective training and combined arms integration requirements are minimal."*[2]

These statements reflect a rare view that is counter to the more common conclusion that the Reserve Component is, in fact, cheaper than the Active Component without qualification. The Department of Defense (DOD) reported to Congress that

> ***"When not in use, RC personnel are about 15 percent the cost of AC. When used, RC personnel costs range from 80 to 85 percent the cost of AC personnel."***[3]

Similarly, the National Commission on the Structure of the Air Force (NCSAF) stated that

> ***"Part-time force structure—that capability delivered by traditional Reservists and Guardsmen who do not serve continuously on active duty—costs less than the force structure provided by 'full-time' personnel."***[4]

Nowhere do either of these credible, unbiased reports suggest the RC's affordability is limited to "units where collective training and combined arms integration requirements are minimal."[5] If DOD and the NCSAF—among many others—agree on the clear affordability advantage of the Reserve Component, on what do SECARMY/CSA base their claims?

It is evident from their written testimony that they rely upon a 2014 RAND study titled, "*Assessing the Army's Active-Reserve Component Force Mix.*"[6] However, the RAND study's comparison of relative costs between the Active Component and Reserve Component analyzes specifically the *cost of output during sustained rotational operations,*[7] or "boots on the ground,"—and absolutely nothing else. This critical caveat is repeated multiple times throughout the study,[8] but is absent from the SECARMY/CSA testimony.[9] Without this stipulation SECARMY/CSA comments are an inaccurate summation of RAND's findings.

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Not only does SECARMY/CSA misinterpret RAND, the study's conclusions with regard to output cost are inaccurate because of a change in future ARNG rotation rates and due to RAND's decision to include annual equipment costs in their calculations. Both of these issues are addressed below.

Rotation rates—The RAND Study uses a comparison of AC/RC rotation rates to determine the number of RC units needed to equal the output of 1 AC unit. We will refer to that number as the "Rotational Factor." RAND lists three Rotational Factors based on historically preferred rotation rates and OSD policy.

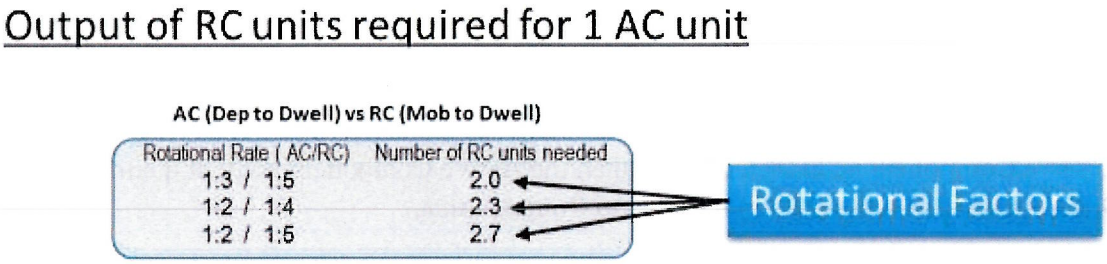


Fig. 1 – Rotational Factors from page 7 of RAND study

However, the ARNG rotation rates that RAND used to determine their Rotational Factors are no longer valid. General Grass and the Adjutants General have committed to a 1:4 *deploy to dwell* (vice 1:5 *mobilization to dwell)* for steady-state operations and 1:2 deploy to dwell for unplanned contingency operations.[10] The increased rates along with a change from mobilization to dwell based timelines to deploy to dwell timelines reduce the Rotational Factors dramatically.[11]

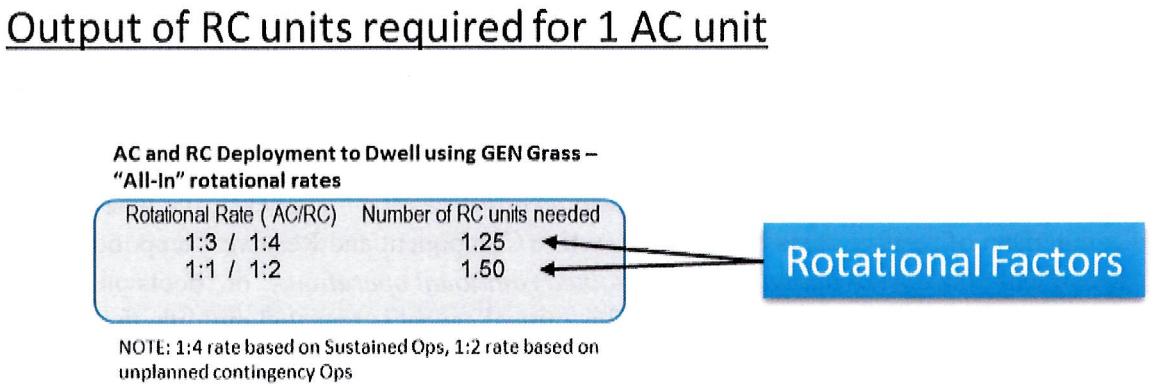
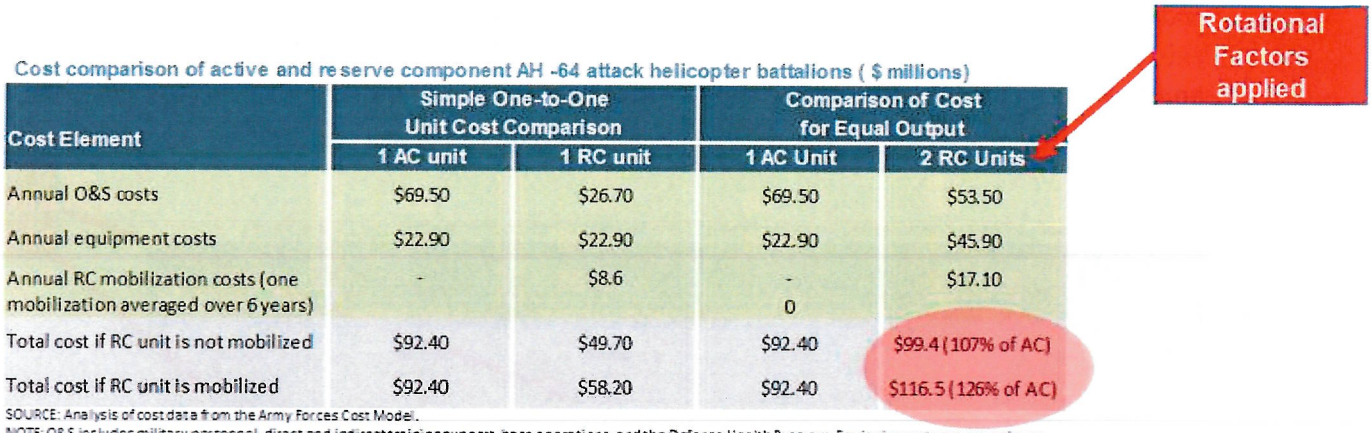


Fig. 2 – Rotational Factors based on GEN Grass's All-In Memo

In turn, these Rotational Factors are used in RAND's cost comparison tables to determine output cost for a given Rotational Factor. The table below taken from the RAND study is based off of rotation rates of 1:3 Deploy to Dwell (AC) and 1:5 Mobilization to Dwell (RC). This yields a Rotational Factor of 2.0 (See Figure 1) which is entered into the far right column of their table.



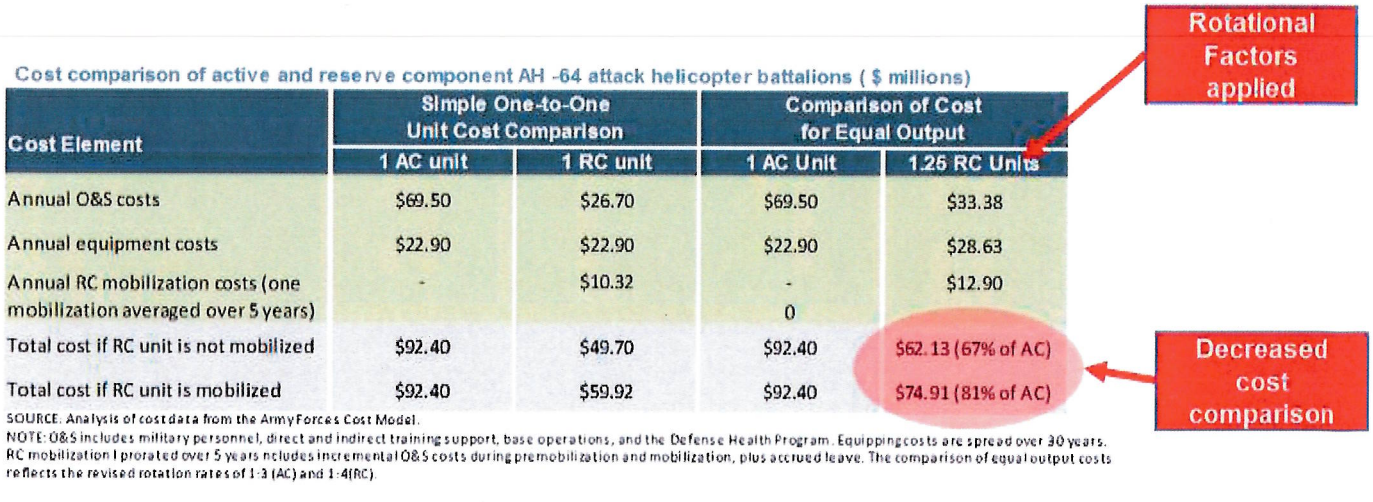
Cost comparison of active and reserve component AH -64 attack helicopter battalions ($ millions)

Cost Element	Simple One-to-One Unit Cost Comparison		Comparison of Cost for Equal Output	
	1 AC unit	1 RC unit	1 AC Unit	2 RC Units
Annual O&S costs	$69.50	$26.70	$69.50	$53.50
Annual equipment costs	$22.90	$22.90	$22.90	$45.90
Annual RC mobilization costs (one mobilization averaged over 6 years)	-	$8.6	- 0	$17.10
Total cost if RC unit is not mobilized	$92.40	$49.70	$92.40	$99.4 (107% of AC)
Total cost if RC unit is mobilized	$92.40	$58.20	$92.40	$116.5 (126% of AC)

SOURCE: Analysis of cost data from the Army Forces Cost Model.
NOTE: O&S includes military personnel, direct and indirect training support, base operations, and the Defense Health Program. Equipping costs are spread over 30 years. RC mobilization includes incremental O& S costs during premobilization and mobilization, plus accrued leave. The comparison of equal output costs reflects the Army's preferred rotation rates of 1:3 (AC) and 1:5 (RC).

Fig. 3 – Rotational Factors applied to cost comparison. Table from RAND Study page 9.

The table below is a cost comparison based on deploy to dwell rotation rates of 1:3 (AC) and 1:4 (RC). This yields a Rotational Factor of 1.25 (See Figure 2) which when entered into the calculations completely negates any claims of output cost advantage for the Active Component.[12]



Cost comparison of active and reserve component AH -64 attack helicopter battalions ($ millions)

Cost Element	Simple One-to-One Unit Cost Comparison		Comparison of Cost for Equal Output	
	1 AC unit	1 RC unit	1 AC Unit	1.25 RC Units
Annual O&S costs	$69.50	$26.70	$69.50	$33.38
Annual equipment costs	$22.90	$22.90	$22.90	$28.63
Annual RC mobilization costs (one mobilization averaged over 5 years)	-	$10.32	- 0	$12.90
Total cost if RC unit is not mobilized	$92.40	$49.70	$92.40	$62.13 (67% of AC)
Total cost if RC unit is mobilized	$92.40	$59.92	$92.40	$74.91 (81% of AC)

SOURCE. Analysis of cost data from the Army Forces Cost Model.
NOTE: O&S includes military personnel, direct and indirect training support, base operations, and the Defense Health Program. Equipping costs are spread over 30 years. RC mobilization I prorated over 5 years ncludes incremental O&S costs during premobilization and mobilization, plus accrued leave. The comparison of equal output costs reflects the revised rotation rates of 1:3 (AC) and 1:4(RC).

Fig. 4 – Revised Rotational Factors applied to cost comparison.

Invalid assumptions—Rotational Factors that are now invalid due to increased ARNG rotation rates are just one of the problems with RAND's cost comparison tables. The issue that most distorts the true cost of output is RAND's decision to use "Annual Equipment Costs" in their output cost analysis. In the table below, the Annual Equipment Costs include the price of the Apache helicopters, spread over 30 years. Annual budgets do not include accrued costs for major end items. Procurement costs are borne in the year(s) in which the items are actually purchased, and even then they do not affect the cost of a given unit. When discussing how to distribute existing equipment, **equipment acquisition costs have absolutely no bearing on the analysis**.[13] Equipment costs are particularly irrelevant in light of the Army's plans to *reduce* the total number of existing Apaches.

Cost comparison of active and reserve component AH -64 attack helicopter battalions ($ millions)

Cost Element	Simple One-to-One Unit Cost Comparison		Comparison of Cost for Equal Output	
	1 AC unit	1 RC unit	1 AC Unit	2 RC Units
Annual O&S costs	$69.50	$26.70	$69.50	$53.50
Annual equipment costs	$22.90	$22.90	$22.90	$45.90
Annual RC mobilization costs (one mobilization averaged over 6 years)	-	$8.6	- 0	$17.10
Total cost if RC unit is not mobilized	$92.40	$49.70	$92.40	$99.4 (107% of AC)
Total cost if RC unit is mobilized	$92.40	$58.20	$92.40	$116.5 (126% of AC)

SOURCE: Analysis of cost data from the Army Forces Cost Model.
NOTE: O&S includes military personnel, direct and indirect training support, base operations, and the Defense Health Program. Equipping costs are spread over 30 years. RC mobilization includes incremental O& S costs during premobilization and mobilization, plus accrued leave. The comparison of equal output costs reflects the Army's preferred rotation rates of 1:3 (AC) and 1:5 (RC).

Equipment acquisition costs

Fig. 5 –Table 2 from page 9 of the RAND study, indicating included equipment acquisition costs

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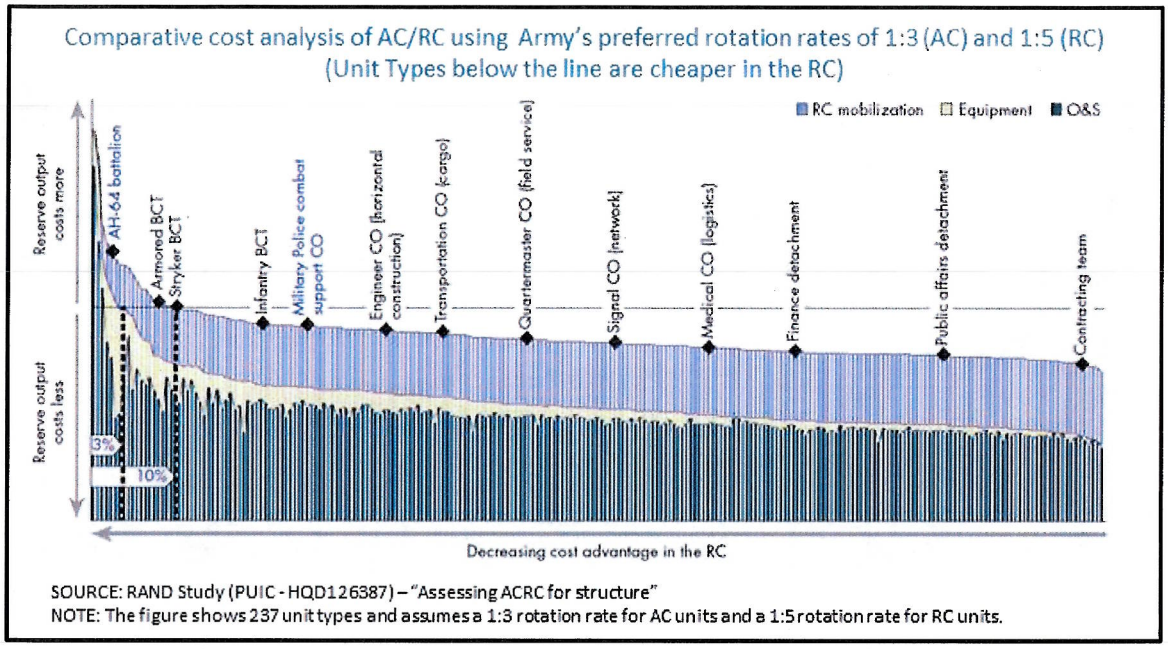
Inaccurate graphs—the net result of obsolete rotation rates and invalid assumptions regarding annual equipment costs is that the graphs on page 10-11 of the RAND study are rendered inaccurate. The horizontal line on each graph represents the point of equal RC and AC output cost for sustained operations (Figure 6). The line's position is determined by the Rotational Factor. Above this line, RC output is more expensive than AC output. Below this line, RC output is less expensive. The graph below taken from the RAND study shows a horizontal line based on a Rotational Factor of 2.0.



SOURCE: RAND Study (PUIC - HQD126387) – "Assessing ACRC for structure"
NOTE: The figure shows 237 unit types and assumes a 1:3 rotation rate for AC units and a 1:5 rotation rate for RC units.

Fig. 6 – Fig. 3 of Rand study

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As shown in Figure 2 of this paper, new rotation rate comparisons result in lower Rotational Factors. The lower the Rotational Factor, the higher the horizontal line. The higher the line, the greater the RC advantage in output cost. (See Figure 7) Since the Rotational Factors used by RAND are no longer valid, the position of the horizontal line on their graphs is no longer valid, and **in every plausible rotation rate comparison** the line moves higher thus showing an increase in RC cost advantage.

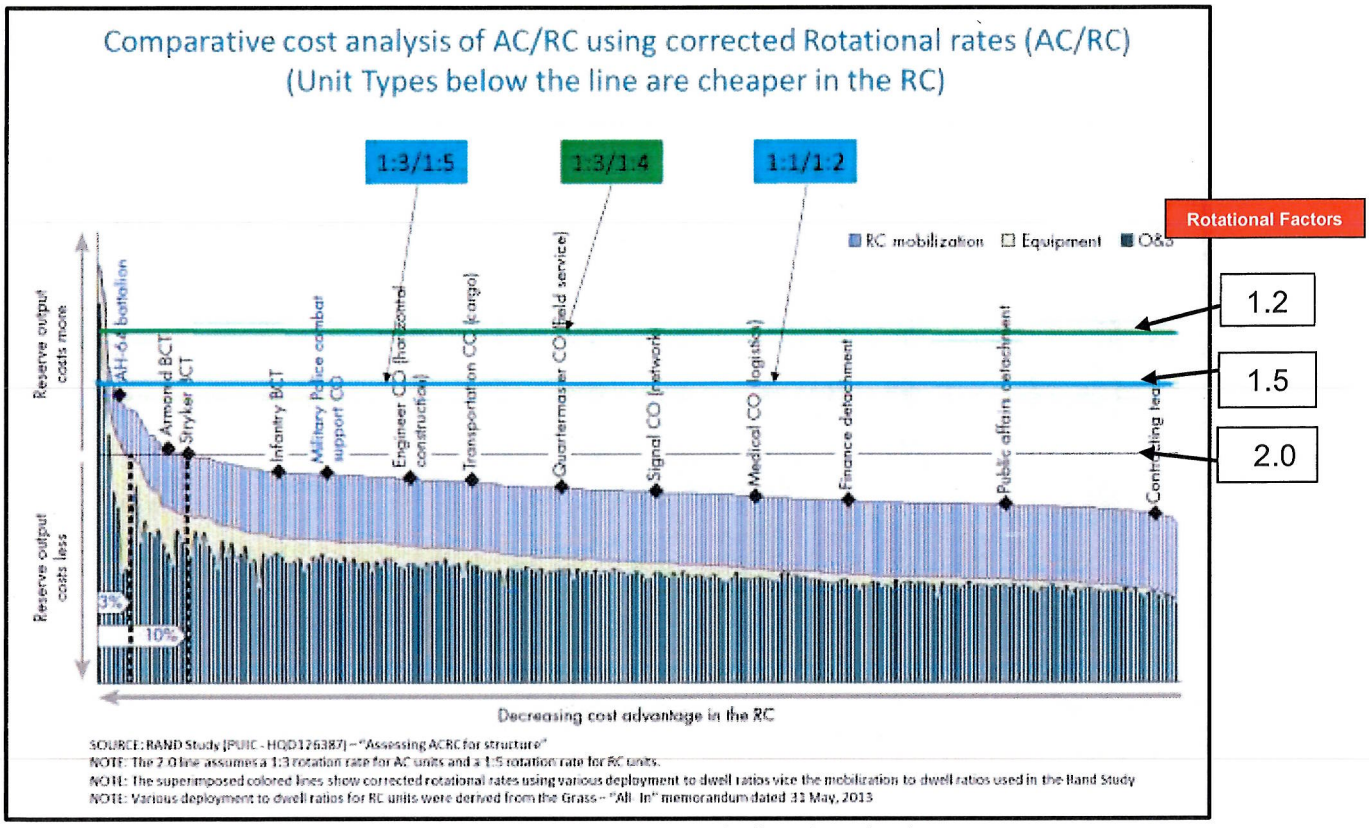

Fig. 7 – Cost analysis using corrected rotation rates and adjusted Rotational Factors
1:3/1:5 and 1:1/1:2 = 1.5 Rotational Factor
1:3/1:4 = 1.25 Rotational Factor

It is important to point out that the graph above includes annual equipment costs. When these costs—captured by the middle, or gold band on the graph—are eliminated, every RC unit to include Apache Battalions, Armored BCTs and Stryker BCTs provide sustained output less expensively than the Active Component in every rotation rate comparison.[14]

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Missing Emphasis

The title of the RAND Study cited in SECARMY/CSA testimony is "*Assessing the Army's Active-Reserve Component Force Mix*." This title insinuates an analysis of various factors influencing force mix decisions. Despite the broad scope suggested by the title, the study examines only two factors: 1) Time needed to ready AC/RC forces to deploy abroad, and 2) Cost to provide a sustained level of deployed forces on the ground for rotational missions.[15]

Figure 8 below demonstrates the narrow focus of the RAND study's cost analysis. Each block below represents one month of "boots on the ground." Therefore this graphic illustrates RAND's assertion that the Active Component can produce one year of output—in this case output of an Apache unit—for less cost than the Reserve Component can produce the same output. Again, they focus only on boots on the ground time.

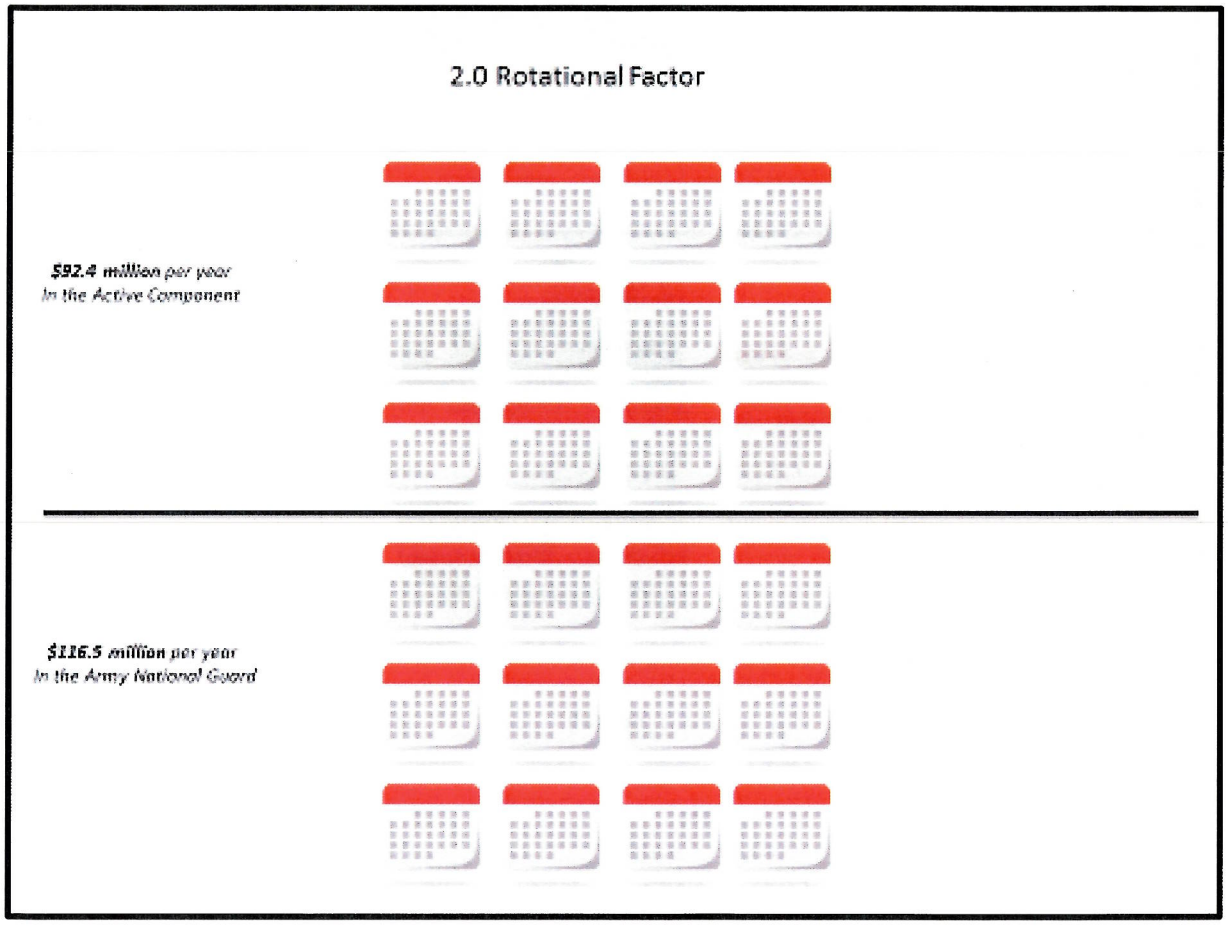

Figure 8
(The dollar amounts shown include equipment costs and assume a Rotational Factor of 2.0)

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By focusing the reader solely on the cost of output, RAND minimizes the strategic reality that **along with boots on ground time, comes the benefit of having two units instead of one**. A more accurate depiction of actual cost would include that additional RC force structure.

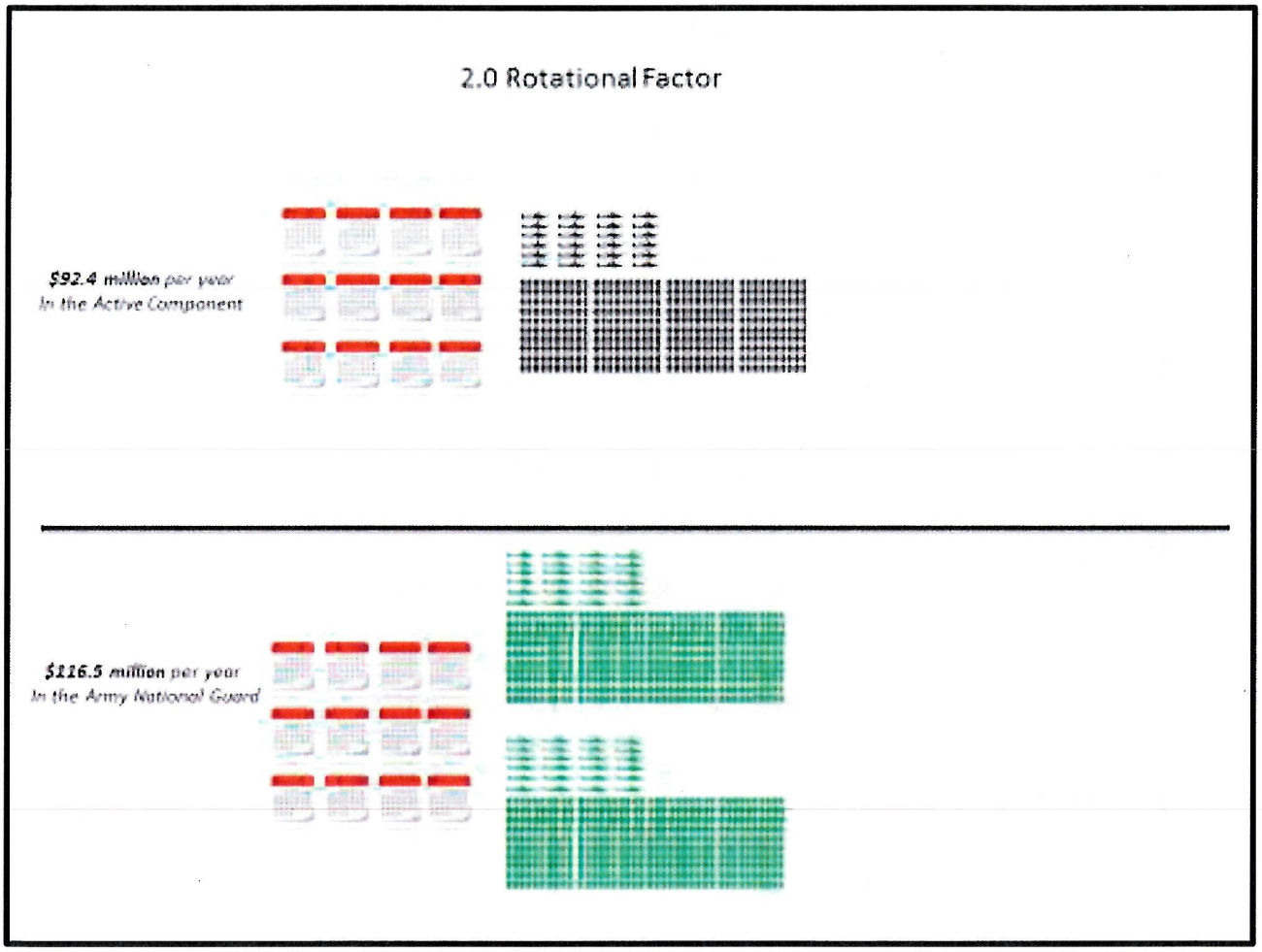

Figure 9

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The same scenario minus the annual equipment costs is shown in Figure 10. Notice that *even at a Rotational Factor of 2.0*—which is higher than any plausible Rotational Factor under the Army Guard's new rotation rates—the Guard provides the same output at practically the same cost, while providing twice the Apache force structure.

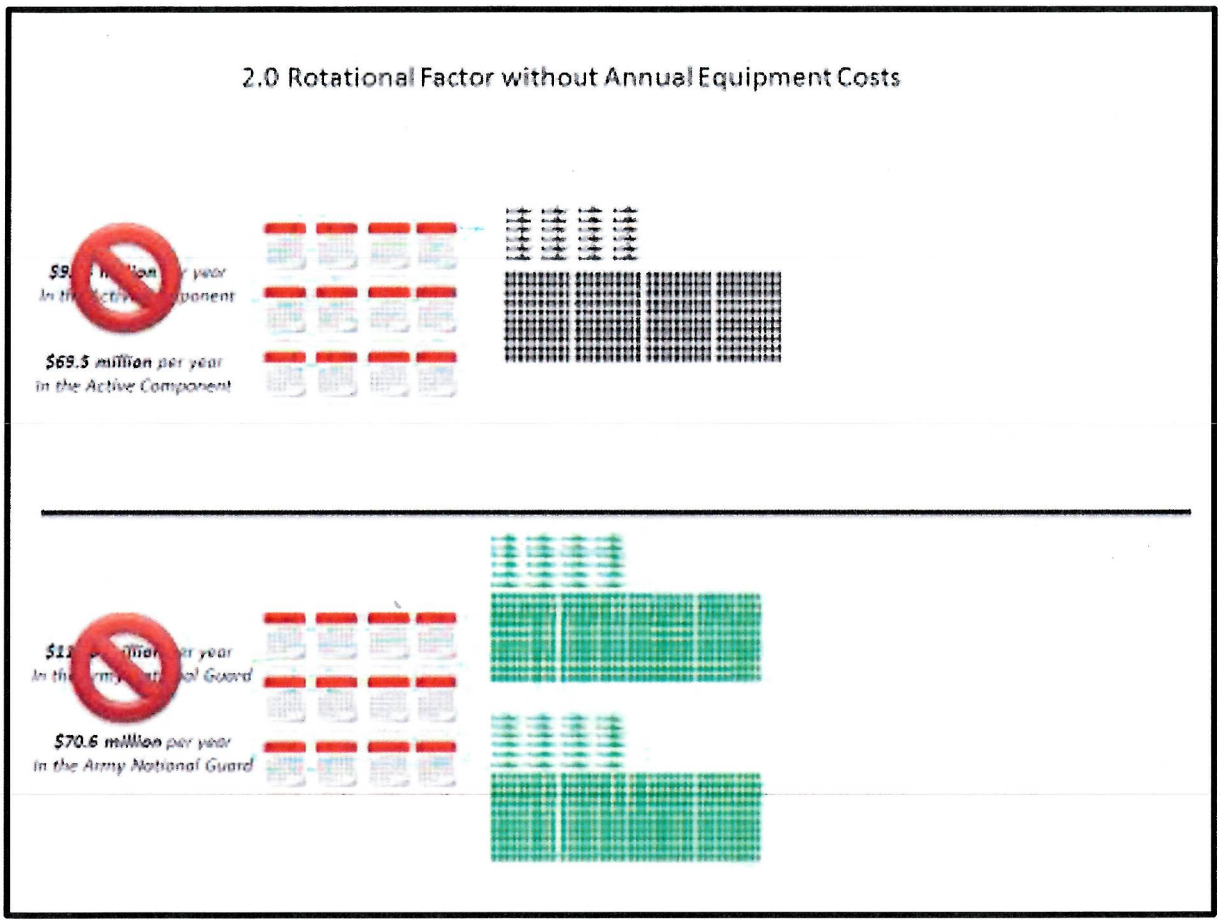

Figure 10

In an endnote that attempts to sweep this foundational truth under the rug, RAND states,

> ***"In some missions there may be an intrinsic operational or strategic value in having multiple RC units rather than one AC unit, but addressing this question was beyond the scope of this study."***[16]

This is a stunning admission for a study that claims to make an assessment of AC/RC force mix. Discounting the intrinsic value in having multiple RC units ignores the very reason the Reserve Component exists.

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Conclusion

In written remarks to the NCFA, SECARMY/CSA misinterpreted the conclusions of a RAND study and incorrectly stated that the Reserve Component is only cheaper in units where collective training and combined arms integration requirements are minimal. However, the RAND study cited to support this claim was narrowly focused on one specific aspect of value: cost of output during sustained rotational operations. RAND's output cost comparison is rendered invalid by changed ARNG rotation rates and the insertion of equipment acquisition costs into their analysis. As evidenced by a myriad of independent studies, the Reserve Component is cheaper than the Active Component regardless of training requirements or equipment type.

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[1] Statement by The Honorable John M. McHugh, Secretary of the Army and General Raymond T. Odierno, Chief of Staff, Army, before the Commission on the Future of the United States Army, May 19, 2015, page 9

[2] Ibid, 10.

[3] U.S. Department of Defense, *Unit Costs and Readiness for the AC and* RC (Washington, DC: Department of Defense, Report to Congress, December 20, 2013), 28.

[4] National Commission on the Structure of the Air Force, 8.

[5] McHugh, 10.

[6] Klimas, et al, "Assessing the Army's Active-Reserve Component Force Mix," RAND, February 2014.

[7] Klimas, 3 Output defined by RAND as "the same amount of deployed forces on the ground."

[8] Ibid pp 1-4, 6-14. The word output is used on every page of their study except for page 5.

[9] SECARMY/CSA testimony uses the word output only twice, both times in the same paragraph on page 10. Neither usage of the word clarifies or modifies the meaning of claims that the RC is cheaper "only in units where collective training and combined arms integration requirements are minimal."

[10] National Guard Bureau, "Authorities and Assumptions Related to Rotational Use of the National Guard," (Washington, DC: NGB, Memorandum from GEN Grass to the Chief of Staff of the Army, May 31, 2013).

[11] See Attachment 1 for rotation rate comparisons and resulting Rotational Factors.

[12] Higher Rotational Factors yield slightly less savings, but still show an output cost advantage for the RC.

[13] To further support the rationale for omitting annual equipment costs, see *"Fully Burdened Costs in Army Planning and Programming,"* delivered to the NCFA by the Active Component. This paper states "*when two alternatives are compared, costs which are different between the two must be considered; however costs which are fixed across the alternatives can be left out of the analysis*."

[14] The mobilization cost per year increases for the RC with increased rotation rates, and we adjusted for this in the cost comparison tables, but were not able to manipulate the RAND study graphs to illustrate this slight increase in RC costs.

[15] Klimas, 1.

[16] Klimas, 14.

Attachment 1 – Mob:Dwell calculations

9 MONTH DEPLOYMENT

MOBILIZATION : DWELL					
9 MONTH DEPLOYMENT / 1 YEAR MOB					
No RIP/TOA			RIP/TOA subtracted		
1:5	9/72	.125		8/72	.111
1:4	9/60	.150		8/60	.133
1:3	9/48	.187		8/48	.167
1:2	9/36	.250		8/36	.222

DEPLOY : DWELL					
9 MONTH DEPLOYMENT					
No RIP/TOA			RIP/TOA subtracted		
1:5	9/54	.167		8/54	.148
1:4	9/45	.200		8/45	.177
1:3	9/36	.250		8/36	.222
1:2	9/27	.333		8/27	.296

AC/RC = 9 MONTH DEPLOYMENT					
AC = DEPLOY TO DWELL					
RC = MOBILIZATION TO DWELL					
AC	RC			RC UNITS to = 1 AC	
1:3	1:5	.250	.125		2.0
1:2	1:4	.333	.150		2.22
1:2	1:5	.333	.125		2.66

AC/RC = 12 MONTH DEPLOYMENT				
AC = DEPLOY TO DWELL				
RC = DEPLOY TO DWELL				
AC	RC			RC UNITS to = 1 AC
1:3	1:5	.250	.167	1.50
1:2	1:4	.333	.200	1.66
1:2	1:5	.333	.167	1.99
1:2	1:3	.333	.250	1.33
1:1	1:2	.500	.333	1.50
1:3	1:4	.250	.200	1.25

12 MONTH DEPLOYMENT

MOBILIZATION : DWELL					
12 MONTH DEPLOYMENT / 15 MONTH MOB					
No RIP/TOA			RIP/TOA subtracted		
1:5	12/90	.133		11/90	.122
1:4	12/75	.160		11/75	.147
1:3	12/60	.200		11/60	.183
1:2	12/45	.267		11/45	.244

DEPLOY : DWELL					
12 MONTH DEPLOYMENT					
No RIP/TOA			RIP/TOA subtracted		
1:5	12/72	.167		11/72	.153
1:4	12/60	.200		11/60	.183
1:3	12/48	.250		11/48	.229
1:2	12/36	.333		11/36	.305

AC= 12 MONTH DEPLOYMENT RC= 9 MONTH DEPLOYMENT				
AC = DEPLOY TO DWELL (SUBTRACT I MO RIP/TOA)				
RC = MOBILIZATION TO DWELL				
AC	RC			RC UNITS to = 1 AC
1:3	1:5	.229	.111	2.06
1:2	1:4	.305	.133	2.29
1:2	1:5	.305	.111	2.75

= Calculations that informed RAND Study examples