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INDEPENDENT REVIEW/REASSESSMENT  
OF  
ANOMALOUS DATA

VOLUME I

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## INTRODUCTION

By terms of Contract Number MDA903-86-C-0386 (see Appendix E for the Statement of Work), the LFW Team has conducted an independent review/reassessment of 61 battles in eight campaigns of World War II and the Arab-Israeli Wars of 1967 and 1973 which were a part of a broader study conducted by the Historical Research and Evaluation Organization [HERO], a study known as the U.S. Army Concepts Analysis Agency [CAA] Study Report CAA-SR-84-6, "Analysis of Factors That Have Influenced Outcomes of Battles and Engagements," September 1984, in six volumes with Defense Technical Information Center [DTIC] numbers as follows:

<u>Volume</u>	<u>DTIC Number</u>
1	AD-B086 797L
2	AD-B087 718L
3	AD-B087 719L
4	AD-B087 720L
5	AD-B087 721L
6	AD-B087 722L

The CAA Study Report is the original version of the HERO data base, to which, at CAA's direction, HERO has made several changes under two contracts: CHASE Data Enhancement Study [CDES] Contract No. MDA903-85-C-0252, completed in February, 1986, and Data Base Error Correction [DBEC], Purchase Order MDA903-86-M-8560, completed in January, 1987. As instructed by the Contracting Officer's Technical Representative [COTR], the LFW Team, in order to insure maximum independence between HERO and LFW, had access only to the original HERO data base report.

### Objective

As determined by CAA, the 61 battles assigned for review are considered to be anomalous. They are in fact the "most anomalous" 61 battles of the 601 battles in the HERO data base, measured by the smallness of their loglikelihood values as explained in CAA Technical Paper CAA-TP-86-2, "Combat History Analysis Study Effort (CHASE): Progress Report for the Period August 1984 - June 1985," August 1986 (AD-F860 122). Since the inclusion of "non-bloody" losses

(i.e., prisoners of war and missing in action) in the HERO data base's loss figures might contribute to these anomalies, LFW was asked to provide estimates of the numbers actually killed or wounded in action, wherever the available information was judged sufficient to make reasonably reliable estimates of those "bloody" losses. The objective of the LFW Team's independent review/reassessment was to provide CAA with a factual basis for determining the extent to which the anomalies are attributable to flaws in HERO's data base or the extent to which they are attributable to actual changes in combat dynamics.

### Independent Review and Basic Assumption

None of the five historians constituting the LFW Team [see Appendix A] had any connection with the previous HERO study and no prior accumulated data existed and in no case were HERO's prior findings to influence the findings of the LFW Team, either before or after the LFW Team arrived at its conclusions.

Although every effort was made to consult all sources listed in HERO's bibliographies [such exceptions as there were are noted in the introduction to the appropriate group of battles], the emphasis was on primary sources consisting in the main of the official records of both sides: for whatever the flaws of official records, the LFW Team is convinced that they are the basic source for any reliable combat data.

Unable to use official records for the battles of the Arab-Israeli Wars, the LFW Team sought secondary sources in addition to those cited by HERO. For the battles on the Eastern Front, only a few official German records were applicable, but the LFW Team developed a completely new set of secondary sources considered to be far more reliable than those cited in the HERO study.

Detailed bibliographies and general evaluation of the value of the secondary sources are provided for each of the eight groups of battles. For the official records, the dates of the records conform to the dates of the battles studied.

### Definition of a Battle

As a first step in the review, the LFW Team sought to arrive at a workable definition of battle in order to assess

whether the 61 battles so designated in the HERO study are in fact battles. The Dictionary of Joint Military Terms of the Joint Chiefs of Staff has no entry for battle, and the definition in Webster's Dictionary is vague: "a general encounter between armies, ships of war, or airplanes" and "an extended contest, struggle, or controversy."

Although most of the battles designated in the HERO study were of one to three days' duration, some were longer and one on the Eastern Front lasted 65 days. On the other hand, battles throughout history have varied in length: the Battle of Marathon, for example, lasted less than a full day; Crecy, a day; Gettysburg, 3 days; Normandy, about 6 weeks; First Somme, close to 6 months. Yet the longer battles can be broken down into battles of lesser length: D-day in Normandy, for example, a day; GOODWOOD in Normandy, 3 days; St Vith in the Bulge, 8 days.

Since the length thus fails to provide a reliable criterion, one is left to look for something that sets a particular combat action apart from other aspects of the campaign to which it belongs, which would mean a distinct change in the nature of the action, either by the introduction of a new force, by the achievement of a specified objective by one side or the other, by a break in the action, or by one side or the other leaving the field. By that criterion, a distinct change in the nature of the action, all the battles designated by the HERO study qualify as battles.

The LFW Team thus accepted for the purpose of the study that a battle is an action or engagement that can be differentiated from other aspects of the campaign by a distinct change in the action either from a single factor or from a combination of factors.

#### Search for Additional Sources

While aware that the official records of the U.S. units and microfilms of captured German records are in the National Archives in Washington, the LFW Team in early stages of the review conducted a search for additional primary sources. Members of the team went to the U.S. Army War College, the Command and General Staff College, the Infantry school, and the Armor School; but the visits were with a few exceptions unproductive in turning up the kind of battlefield statistics required.

Because British, German, and Israeli units were involved in many of the battles, a representative of the LFW

Team visited the Public Records Office in London, the Military History Office of the Federal Republic of Germany in Freiburg-im-Breisgau, and Israel. Only the visit to London proved to be remunerative: there the operations reports of British Army units are readily available. Those proved of particular value on order of battle but were notably lacking in casualty statistics. Consultation with historians of the Cabinet Office Historical Section failed to turn up additional sources where those statistics might be found.

In Freiburg, the LFW representative found that German historians have completed only three volumes of value to the study, two on the Eastern Front, and one on Normandy; the LFW Team subsequently made use of those volumes. Although the Germans now have the originals of German Army records captured by the U.S. Army, they have thus far done little work on them.

The visit to Israel proved to be totally unproductive. The representative was able to establish only telephone contacts with the Israeli Army and the Israeli Army Archives and was discouraged from proceeding further. The Israeli Army records are in Hebrew and are still classified, closed to any foreign researcher.

Since the HERO study for the battles on the Eastern Front cited numerous sources in Russian, in which the LFW Team lacked a capability. LFW Management Associates, Inc. engaged two specialists on the Eastern Front with facility in Russian for an evaluation of the sources cited in the HERO study and the possibility of obtaining meaningful statistics from them. Their findings are covered in the introduction to the battles on the Eastern Front.

### Methodology

For each group of battles, members of the LFW Team began with a broad orientation by means of a major secondary source, usually the official U.S. or British histories. The project director then assigned specific battles to individual members. On the assumption that the official records, whatever their flaws, are the basic source for any meaningful battlefield statistics, the members concentrated their research primarily in the official records in the military branch of the National Archives in Suitland, Maryland, a process in which the project director and assistant project director also participated. [An exception was the German specialist who handled all research in microfilms of German records in the National Archives in Washington.]

The U.S. records consist in general of monthly after-action reports of regiments, divisions, and corps; divisional and corps G-1 and G-3 journal files, which include either daily situation reports or daily periodic reports; regimental S-1/S-3 journal files; an occasional statistical summary or special historical report; and for the battles in Italy, similar records of the Fifth Army.

After turning next to try to fill gaps from secondary sources, all members of the team met for a panel review during which each historian presented appropriate data for his specific project. Where gaps existed, the panel drew on its many collective years of military and historical experience and its knowledge of Tables of Organization and Equipment to extrapolate and arrive at data considered to be meaningful.

The final figures, the LFW Team is convinced, represent the closest possible approximation of the actual strengths in personnel and armament. The LFW Team nevertheless labels the figures "estimates" but only in that the team recognizes that no figure based on incomplete sources, however valuable and reliable, and extrapolation, however knowledgeable, can ever be considered to be exactly precise.

In determining personnel strengths, the LFW Team conformed to the contract requirement of counting those personnel on the field of battle subject of enemy fire, which resulted for division-sized battles in counting all members of the division and attached combat units and for corps-sized battles in counting all components of the divisions and attached combat units plus all general support corps combat units.

To meet the contract requirement for dispersion and subsequent guidance from the Contracting Officer's Technical Representative to the effect that this consist of "low," "high," and "nominal" figures (see Appendix F), the LFW Team began with the personnel strength as determined by the team [see above] as the nominal figure. Drawing again on the collective military and historical experience of the members of the team, the LFW Team determined the reliability of its nominal figure primarily on the reliability of its sources and then determined the most likely percentage of variation from the nominal figure that could prevail under the circumstances existing during the particular battle.

Reflecting the differing reliability and completeness of the sources, that percentage varied among the eight groups of battles and even within a group of battles. For the battles of Okinawa Campaign, for example, the LFW Team considered the official records to be as reliable as any

battle records are ever likely to be and thus settled upon a variation figure of only 5 percent.

For the most part, the "nominal" figure lies equi-distant between the "low" and "high" figures, but in some cases, reflecting again the LFW Team's studied opinion of the reliability of the particular records or statistics, the LFW Team weighted the nominal toward either the low or the high, which indicates the LFW Team's opinion that if the nominal figure is in error, it is more likely to be closer to either the low figure or the high.

The LFW Team employed the same process for determining dispersion of casualties, both "bloody" [those inflicted by the enemy] and "non-bloody" [non-battle, disease, missing in action, and prisoners of war]. The "non-bloody" casualties, in particular, were sometimes difficult or impossible to determine; but for battles in which U.S., British, and German forces were involved, two published official medical volumes proved to be of assistance:

Col. John Lada, ed., Medical Statistics World War II  
[Office of the Surgeon General, Department of the  
Army, Washington, D.C., 1975].

W. Franklin Mellor, ed., Casualties and Medical  
Statistics [London: Her Majesty's Stationery  
Office, 1972].

The LFW Team used either non-enemy-induced and disease-induced casualty figures per thousand troops per month for the month in which the battle occurred from Mellor [i.e., pp. 238 and 241] or general non-battle casualty figures per thousand per year by theater from Lada [i.e., p. 27]. The Team multiplied that casualty figure by the strength of the engaged force in thousands, divided the result by the number of days in the month or in the year [365], and then multiplied that result by the number of days in the particular battle. To that figure, the LFW Team added any available figures on missing in action or prisoners of war to produce a final nominal "non-bloody" casualty figure.

Where no German non-battle casualty figures were available, the LFW Team, on the assumption that the German culture and environment is more similar to the British than to the U.S. environment and culture, utilized the British statistics from Mellor to arrive at an estimated German casualty figure.

In all cases where one or the other of these two sources was used, that is noted on the appropriate chart.

### German Sources and Methodology

German statistics were developed from the following sources, listed in sequence of reliability and importance:

(1) Original contemporary documents and other primary sources in the microfilm holdings of captured German Army records in the National Archives.

(2) From published contemporary records, such as the Kriegstagebuch der Oberkommando der Wehrmacht [War Diary of the Armed Forces Supreme Command], a multi-volume history of the war containing daily entries [text] as well as numerous appendices covering key events, reproduced directives, and other documentary evidence.

(3) The official histories. In this category are the historical series of the U.S. Army in World War II, which benefited vastly from the availability and use of captured German records to complement U.S. and British records; the official German history with its main series, Das Deutsch Reich und der Zweite Weltkrieg [The German Empire and the Second World War] and volumes concerned with specific battles, such as Kursk and Normandy. These histories contain appendices with statistics and key documents that amplify the texts.

(4) Order of Battle information in such works as the U.S. War Department's Order of Battle of the German Army, 1945, and the Kriegsqliederungen [Order of Battle Charts] of the OKH [the German Army High Command], some of which are reproduced in the OKW War Diary.

(5) Special Research ["R"] studies and monographs, based on original documents and written by historians of the U.S. Army. These were produced with the objective of providing the German side of military operations for use by the authors of the official histories. These studies, too, usually contain copies of important documents as appendices.

(6) Manuscripts written after the war by German generals while in captivity and frequently based not only on memory but on documents or personal papers. Sponsored by the European Theater Historical Section of the U.S. Army, these monographs are available in the National Archives.

(7) Published histories and memoirs, some of particular value, such as Graham and Bidwell, Tug of War.

(8) Research materials and expertise developed by the researcher himself during a career of working with German Army records.

The basic goal was to obtain the data from primary sources. Where that failed, secondary sources. Finally, for any remaining gaps, extrapolation from Tables of Organization and Equipment. Those extrapolations, which are knowledgeable estimates drawing upon the researcher's long experience in the field, were in some cases the only possible approach, particularly for later periods of the war.

### Comparative Review Charts

\* A stands for the attacker, D for the defender.

\* The personnel strength figure is the nominal figure from the separate personnel strength chart reflecting strength at the start of the battle as of 0001 hours on the first day. Any returned to duty, replacements, and attachments or detachments during the battle are reflected on the personnel strength chart.

\* The first figure for armor [T] is the total, followed by a breakdown into light [Lt.] and medium [MBT]. [These strengths, too, are for the start of the battle; any reinforcements are reflected by unit attachment on the strength charts.] Light tanks are armored, track-laying vehicles up to 25 tons in weight, to include self-propelled antitank guns (on the U.S. side, tank destroyers) and assault guns. Medium tanks are armored fighting vehicles over 25 tons in weight.

\* Artillery pieces are those weapons normally classified as field artillery but on the U.S. side also include the 105mm. cannon of the organic infantry regimental cannon company and 4.2-incl chemical mortars. [Mortars of lesser caliber are not included.] The strength provided is again for the start of the battle.

\* Air sorties are those in direct support of the engaged force, which the LFW Team found in most cases to be impossible to determine since most air sorties were in general support of the entire front and in few cases could be pinned down to direct support of a specific unit.

\* Losses in personnel, armor, artillery, and aircraft are for the entire battle.

\* The personnel casualty figure is the nominal figure from the casualty chart, which reflects only "bloody" losses.

\* The percentage figure following battle losses is the percent of loss per day.

\* Use of the figure 0 indicates that the LFW Team found reliable evidence of none. A question mark [?] indicates that the LFW Team was unable to find sufficient evidence to arrive at a figure. A double dash [--] in the percent of loss column means that no percentage figure could be established because some preceding entry was a question mark [?].

In reviewing and reassessing what may be considered "subjective" findings in the HERO study on such matters as forces involved, mission accomplishment, victor, intelligence, leadership, etc., the LFW Team has provided charts only where the Team's findings differ from those of the HERO study. Each such chart carries an explanation of the change in the finding.

\* In designating the victor, the LFW Team named the force which accomplished its assigned mission, which was not necessarily always the side which at the conclusion of the battle held the contested ground. A force charged with delay, for example, could still be labeled a victor even if the attacker penetrated the delaying position or captured it, in which case the battle would end in a draw. Where a force was the victor, the LFW Team also considered that that was the force that achieved success.

\* The LFW Team's figure under mission accomplishment reflects the team's studied evaluation of the degree of success achieved by each side in accomplishing or attempting to accomplish its mission.

\* Abbreviations or keys on the subjective charts are explained in the HERO glossary found in appendix B.

### Summation

In conducting this study, the LFW Team has attempted to provide the most accurate statistical data possible on the 61 assigned battles and to make allowance for possible error through dispersion statistics on both personnel strengths and casualties. From the first, the basic assumption has been that official records are the primary source for any viable battlefield statistic, and except for the battles in the

Arab-Israeli Wars, for which official records were unavailable, detailed research in the official records has provided the bulk of the figures.

Where reliable statistics could not be obtained from the records, the LFW Team utilized its many collective years of military and historical experience to extrapolate strength from Tables of Organization and Equipment with allowance made for prior unreplaced losses. For non-battle casualties, for the most part, a similar process of extrapolation was employed, using statistics from the two medical volumes edited by Mellor and Lada as explained in the main body of this introduction. While recognizing the possible weaknesses in this process, the LFW Team saw no alternative if casualty figures were to be obtained.

In virtually every case, the LFW Team's findings differ substantially from those determined by the authors of the HERO study. Not knowing the detailed processes employed in the HERO study, not having access to the final HERO study, and unaware of the reasons for the 61 battles being termed anomalous, the LFW Team can only reiterate that the members are convinced that the figures the team has presented represent the closest possible approximation of the actual strengths in personnel, armament, casualties, and materiel losses.

## INTRODUCTION AND BIBLIOGRAPHY: OKINAWA

As per contract, the LFW Team reviewed/reassessed the following battles:

- Kochi Ridge-Onaga I, 25-27 Apr 1945
- Kochi Ridge-Onaga II, 28-29 Apr 1985
- Kochi Ridge-Onaga III, 30 Apr-3 May 1945
- Shuri Envelopment, Phase II, 26-27 May 1945
- Shuri Envelopment, Phase III, 29-31 May 1945
- Advance to Shuri Line Outposts, 5-8 Apr 1945
- Kakazu and Tombstone Ridges, 9-12 Apr 1945
- Attach on the Shuri Line's Eastern Flank II,  
14-18 May 1945
- Attach on the Shuri Line's Eastern Flank II,  
14-18 May 1945

As noted in the general introduction, the LFW Team considers the official records of U.S. Army units in the Okinawa campaign to be the most complete of any to be found on battles of World War II. The team thus has imposed a variance figure for dispersion of only 5 percent.

The official records, as listed below, are the primary source of data. Of particular importance are three sources not cited in the HERO study: the after-action report, periodic reports, and operations orders of the XXIV Corps. The after-action report provided figures on replacements and returned to duty [RTD]; the periodic reports statistics on American casualties; and the operations orders information on attachments and detachments and data on initial strengths as found in loading tables.

Of particular importance also is a monograph prepared by the U.S. Army historians present on Okinawa [which is cited in the HERO study], "The XXIV Corps in the Conquest of Okinawa," which provides data on Japanese casualties as reported by American units and strengths as found in captured documents. Lacking official Japanese records, the LFW Team of necessity relied on these reports; yet at the same time the Team recognized a discrepancy between the reported figures, Japanese strength as of 31 March 1945 as determined from captured documents, and estimates of Okinawans drafted subsequent to the report of 31 March 1945. To compensate for the discrepancy, the LFW Team arrived at three possible percentages of error, which are explained in Appendix D and reflected on the charts dealing with Japanese strengths and "bloody" casualties.

For "non-bloody" Japanese losses, the LFW Team used only prisoners of war and made no attempt to estimate Japanese non-battle casualties, both because of the virtual impossibility of doing so and because in basically hopeless situations such as that on Okinawa, Japanese units usually disregarded illnesses.

Artillery strengths were determined primarily from the XXIV Corps Artillery After-Action Report and from division artillery after-action reports, and tank strengths and losses are from records of attached tank battalions. Tanks of amphibian tank battalions are not counted because in the wake of the initial assaults on the beaches, the amphibian tanks were used only for flank protection on the beaches. One tank battalion attached to the XXIV Corps [the 713th] was never committed to combat as a unit; its tanks, which had been equipped with flame throwers, were parcelled out to the tank battalions attached to the two divisions, and the LFW Team counts them with the strength of the units to which they were attached.

To provide a ready reference, American strengths and casualties are reproduced as Appendix C to this report and reported Japanese casualties in Appendix D.

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### Official Records

Tenth Army: After-Action Report.

XXIV Corps: After-Action Report, Artillery After-Action Report, Periodic Reports, Operations Orders, G-1 and G-3 Journals and files; monograph, "The XXIV Corps in the Conquest of Okinawa."

7th Infantry Division: After-Action Report, Artillery After-Action Report, Division Artillery Journal, G-1 and G-3 Journals and files, and Periodic Reports; After-Action Reports, S-1 and S-3 Journals and files, and Periodic Reports of the three organic regiments: 17th Infantry, 32d Infantry, and 184th Infantry; After-Action Reports of attached units: 711th Tank Battalion and 776th Amphibian Tank Battalion.

96th Infantry Division: After-Action Report, Division Artillery After-Action Report, Division Artillery Journal, G-1 and G-3 Journals and files, and Periodic Reports; After-Action Reports, S-1 and S-3 Journals and files, and Periodic Reports of the three organic regiments: 381st Infantry, 382d Infantry,

and 383d Infantry; After-Action Reports of attached units: 763d Tank Battalion and 780th Amphibian Tank Battalion.

Miscellaneous: Daily Air Support Summary, Amphibgroup 12; Naval Air Gunfire Liaison Detachment Log.

Monographs: Capt. Dennis W. Neill, "A Tank Company on Okinawa," The Armor School, Apr 1948; Maj. Joseph F. Yering, "The Operations of the 382d Infantry [96th Infantry Division] in the Penetration of the Japanese Naha-Shuri-Yonabaru Line on Okinawa, 10 May to 31 May 1945," The Infantry School, course of 1947-48; 1st Lt. Albert H. Conyne, "The Operation of the 96th Infantry Division, XXIV Corps [Tenth Army] in the vicinity of Kakazu Ridge, Okinawa, 5 April-12 April 1945," The Infantry School, course of 1949-50,

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**US ARMY**

**LFW MANAGEMENT ASSOCIATES, INC. REVIEW**

**OF**

**CAA TASK 1 REQUIREMENTS**

**LFW'S INDEPENDENT REVIEW/REASSESSMENT OF NINE ANOMALOUS BATTLES**

**FROM THE OKINAWA CAMPAIGN**



US ARMY

U.S. STRENGTH: KOCHI RIDGE-ONAGA I

	Low	High	Nominal
7th Inf Div (+) strength .....	18,915		
7th Inf Div (+) strength .....		20,905	
LFW Team's estimate .....			19,910
Replacements received during battle .....			800
RTD (27 April) .....			400
Attachments/Detachments during battle .....			<u>0</u>
Total			21,110

BASIC SOURCE: Appendix C.



**US ARMY**

**U.S. CASUALTIES: KOCHI RIDGE-ONAGA I**

Estimated casualties	"Bloody" Low	250
Estimated casualties	High	276
Estimated Casualties	Nominal	263
Casualties	"Non-Bloody" Low	119
Casualties	High	131
Casualties	Nominal	125

BASIC SOURCE: Appendix C.



US ARMY

JAPANESE STRENGTH: KOCHI RIDGE-ONAGA I

Low

22d Regt at estimated organizational strength ..... 4,787

High

22d Regt (4,787) plus estimated 32d Army attachments (3,212)\* 7,999

Nominal

LFW Team's estimate ..... 7,196  
 Replacements received during battle ..... 0  
 RTD ..... 0  
 Attachments/Detachments during battle ..... 0

Total 7,196

\*Artillery LN and FO parties ..... 25  
 Light mortar battalion ..... 633  
 AT battalion ..... 338  
 MG battalion ..... 333  
 Engineer company ..... 216  
Boeital and Labor Service troops ... 1,667  
 Total 3,212

BASIC SOURCES: Appendix D and Appelman et al., Okinawa: The Last Battle. No source makes any mention of RTDs, replacements, or attachments/detachments.



US ARMY

JAPANESE CASUALTIES: KOCHI RIDGE-ONAGA I

"Bloody"

KIAs reported by 7th US Inf Div ..... 582 (high)  
Reported KIAs minus LFW 29% over reporting factor  
per Appendix D ..... 413 (low)  
Reported KIAs minus LFW 18% over reporting factor  
per Appendix D ..... 477  
Reported KIAs minus LFW 6.7% over reporting factor  
per Appendix D ..... 543  
LFW Nominal estimate ..... 543

"Non-Bloody"

POWs reported captured by 7th US Inf Div ..... 4  
Total 547

BASIC SOURCES: Appendix D and Appleman, et al., Okinawa:  
The Last Battle.



US ARMY

KOCHI RIDGE-ONAGA I

HERO

A/D	Strength					Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs			Pers %/D	Armor %/D	Arty %/D	A/C	%/D	
		T	Lt.	MBT	Pcs							
A	14,594	126	56	70	203	269	0.6	3	0.8	?	?	?
D	5,000	0	0	0	40	1,324	8.8	0	?	?	?	?

LFW

A/D	Strength					Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs			Pers %/D	Armor %/D	Arty %/D	A/C	%/D	
		T	Lt.	MBT	Pcs							
A	19,510	76	15	61	126	263	0.4	1	0.4	?	?	?
D	7,196	0	0	0	40	543	2.5	0	?	?	?	?



US ARMY

U.S. STRENGTH: KOCHI RIDGE-ONAGA IJ

Low

7th Inf Div (+) strength ..... 19,686

High

7th Inf Div (+) strength ..... 21,758

Nominal

LFW Team's estimate ..... 20,722  
Replacements received during battle ..... 0  
RTD ..... 0  
Attachments/Detachments luring battle ..... 0

Total 20,722

BASIC SOURCE: Appendix C.



US ARMY

U.S. CASUALTIES: KOCHI RIDGE-ONAGA II

Estimated casualties	"Bloody" Low	172
Estimated casualties	High	190
Estimated Casualties	Nominal	181
Casualties	"Non-Bloody" Low	103
Casualties	High	113
Estimate	Nominal	108

BASIC SOURCE: Appendix C.



US ARMY

JAPANESE STRENGTH: KOCHI RIDGE-ONAGA II

Low

Known low strengths of preceding battle, Kochi-Ridge Onaga I.....	4,787
Replacements during Kochi Ridge-Onaga II .....	0
RTD during Kochi Ridge-Onaga II .....	0
Attachments/detachments during Kochi Ridge-Onaga II .....	0
Kochi Ridge-Onaga I nominal "bloody" and "non-bloody" losses .....	- 547
Kochi Ridge-Onaga II low estimated strength .....	<u>4,240</u>

High

High strengths of preceding battle, Kochi Ridge-Onaga I unit and detachments .....	7,999
Replacements during Kochi Ridge-Onaga II .....	0
RTD during Kochi Ridge-Onaga II .....	0
Attachments/detachments during Kochi Ridge-Onaga II .....	0
Kochi Ridge-Onaga I nominal "bloody" and "non-bloody" losses .....	- 547
Kochi Ridge-Onaga II nominal estimated strength .....	<u>7,452</u>

Nominal

Nominal strength of preceding battle Kochi Ridge-Onaga I .....	7,196
Replacements during Kochi Ridge-Onaga II .....	0
RTD during Kochi Ridge-Onaga II .....	0
Attachments/detachments during Kochi Ridge-Onaga II .....	0
Kochi Ridge-Onaga II nominal "bloody" and "non-bloody" losses .....	- 547
Kochi Ridge-Onaga II nominal estimated strength .....	<u>6,649</u>

BASIC SOURCES: Appendix D and Appelman, et al., Okinawa: The Last Battle. No source makes any mention of RTD, replacements, or attachment/detachments.



US ARMY

JAPANESE CASUALTIES: KOCHI RIDGE-ONAGA II

"Bloody"

KIAs reported by 7th US Inf Div .....	415 (high)
Reported KIAs minus LFW 29% over reporting factor per Appendix D .....	295 (low)
Reported KIAs minus LFW 18% over reporting factor per Appendix D .....	340
Reported KIAs minus LFW 6.7% over reporting factor per Appendix D .....	387
LFW Nominal estimate .....	387

"Non-Bloody"

POWs reported captured by 7th US Inf Div .....	<u>0</u>
Total	387

BASIC SOURCES: Appendix D and Appleman, et al.,  
Okinaawa: The Last Battle.



US ARMY

KOCHI RIDGE-ONAGA II

HERO

A/D	Strength					Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs			Pers %/D	Armor %/D	Arty %/D	A/C	%/D	
		T	Lt.	MBT	Pcs							
A	15,986	123	56	67	226	182	0.7	11	4.5	?	?	?
D	4,500	0	0	0	40	814	9.0	0	0	?	?	?

LFW

A/D	Strength					Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs			Pers %/D	Armor %/D	Arty %/D	A/C	%/D	
		T	Lt.	MBT	Pcs							
A	20,722	75	15	60	126	181	0.4	7	4.6	?	?	?
D	6,649	0	0	0	40	387	2.9	0	0	?	?	?



KOCHI RIDGE: ONAGA II

HERO

A/D	CE	Leader- ship	Trng Exp.	Morale	Log	Momen- tum	In- tell	Tech- nology	Init- iative	Vic- tor	Adv	Mis AC
A	C	C	C	C	N	N	N	N	C		0	3
D										x		7

LFW

A/D	CE	Leader- ship	Trng Exp.	Morale	Log	Momen- tum	In- tell	Tech- nology	Init- iative	Vic- tor	Adv	Mis AC
A	C	C	C	C	N	N		N	C		0	3
D							x			x		7

The LFW Team considered that Japanese knowledge of the terrain afforded an intelligence advantage.



**US ARMY**

**U.S STRENGTH: KOCHI RIDGE-ONAGA III**

	<b>Low</b>	
7th Inf Div (+) strength .....	19,411	
		<b>High</b>
7th Inf Div (+) strength .....	21,455	
		<b>Nominal</b>
LFW Team's estimate .....	20,433	
Replacements received during battle .....	550	
RTD (as of 2 May) .....	200	
Detachments .....	-1,706	
	<hr/>	
<b>Total</b>	<b>19,477</b>	

BASIC SOURCE: Appendix C.



U.S. CASUALTIES: KOCHI RIDGE-ONAGA III

Estimated casualties	"Bloody" Low	369
Estimated casualties	High	407
Estimated Casualties	Nominal	388
Casualties	"Non-Bloody" Low	244
Casualties	High	270
Estimate	Nominal	257

BASIC SOURCE: Appendix C.



US ARMY

JAPANESE STRENGTH: KOCHI RIDGE-ONAGA III

Low

Low strengths of preceding battle, Kochi Ridge-Onaga II.....	4,240
Replacements during Kochi Ridge-Onaga III .....	0
RTD during Kochi Ridge-Onaga III .....	0
Attachments/detachments during Kochi Ridge-Onaga III .....	0
Kochi Ridge-Onaga II nominal "bloody" loss .....	- 387
Kochi Ridge-Onaga II nominal "non-bloody" loss .....	<u>0</u>
Kochi Ridge-Onaga III low estimated strength .....	3,853

High

High strengths of preceding battle, Kochi Ridge-Onaga II .....	7,452
Replacements during Kochi Ridge-Onaga III .....	0
RTD during Kochi Ridge-Onaga III .....	0
Attachments/detachments during Kochi Ridge-Onaga III .....	0
Kochi Ridge-Onaga II nominal "bloody" and "non-bloody" losses .....	<u>- 387</u>
Kochi Ridge-Onaga III high estimated strength .....	7,065

Nominal

Kochi Ridge-Onaga II LFW nominal estimated strength .....	6,649
Replacements during Kochi Ridge-Onaga III .....	0
RTD during Kochi Ridge-Onaga III .....	0
Attachments/detachments during Kochi Ridge-Onaga III .....	0
Kochi Ridge-Onaga II nominal "bloody" and "non-bloody" losses .....	<u>- 387</u>
Kochi Ridge-Onaga III nominal estimated strength .....	6,262

BASIC SOURCE: Appendix D.



US ARMY

JAPANESE CASUALTIES: KOCHI RIDGE-ONAGA III

"Bloody"

KIAs reported by 7th US Inf Div .....	1,831 (high)
Reported KIAs minus LFW 29% (531) over reporting factor per Appendix D .....	1,300 (low)
Reported KIAs minus LFW 18% (330) over reporting factor per Appendix D .....	1,501
Reported KIAs minus LFW 6.7% (125) over reporting factor per Appendix D .....	1,708
LFW Nominal estimate .....	1,708

"Non-Bloody"

PONs reported captured by 7th US Inf Div .....	<u>2</u>
Total	1,710

BASIC SOURCES: Appendix D and Appleman, et al., Okinaawa:  
The Last Battle.



US ARMY

KOCHI RIDGE-ONAGA III

HERO

A/D	Strength				Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor %/D	Arty %/D	A/C %/D		
		T	Lt. MBT								
A	15,764	126	26	56	329	398	0.5	4	0.8	?	?
D	4,050	0	0	0	40	2,276	4.0	0	0	?	?

LFW

A/D	Strength				Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor %/D	Arty %/D	A/C %/D		
		T	Lt. MBT								
A	20,433	67	13	55	114	388	0.5	3	1.1	?	?
D	6,262	0	0	0	40	710	6.8	0	0	?	?



KOCHI RIDGE: OMAGA III

HERO

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-tell	Tech-nology	Init-iative	Vic-tor	Adv	Mis AC
A	C	C	C	C	N	X	N	N	C	X	0.1	6
D												7

LFW

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-tell	Tech-nology	Init-iative	Vic-tor	Adv	Mis AC
A	C	C	C	C	N	N	X	N	C	X	0	6
D												7

The LFW Team considered that knowledge of the terrain afforded the Japanese an intelligence advantage, and because of stalemate, there was no momentum advantage for either side.



US ARMY

U.S. STRENGTH: SHOEI ENVELOPMENT, PHASE II

	Low	High	Nominal
7th Inf Div (+) strength .....	19,933		
7th Inf Div (+) strength .....		22,031	
LFW Team's estimate .....			20,982
Replacements received during battle .....			0
RTD (as of 2 May) .....			0
Detachments .....			0
Total			20,982

BASIC SOURCE: Appendix C.



U.S. CASUALTIES: SHURI ENVELOPMENT, PHASE II

Estimated casualties	"Bloody" Low	118
Estimated casualties	High	130
Estimated Casualties	Nominal	124
Casualties	"Non-Bloody" Low	130
Casualties	High	144
Estimate	Nominal	137

BASIC SOURCE: Appendix C.



US ARMY

JAPANESE STRENGTH: SHURI ENVELOPMENT, PHASE II

Low

Est. strengths <sup>1</sup> of known Japanese units <sup>2</sup> 26 May .....	6,659
Replacements during Shuri Envelopment, Phase II .....	0
RTD during Shuri Envelopment, Phase II .....	0
Attachments/detachments during Shuri Envelopment, Phase II .....	- 4,741
Est. strengths of known Japanese units 27 May .....	<u>1,918</u>

High

Est. strengths <sup>4</sup> of known Japanese units .....	11,299
Replacements during Shuri Envelopment, Phase II .....	0
RTD during Shuri Envelopment, Phase II .....	0
Attachments/detachments during Shuri Envelopment, Phase II .....	- 4,741
Est. strengths of known Japanese units 27 May .....	<u>6,558</u>

Nominal

Est. strengths <sup>5</sup> of known Japanese units with est. attachments, 26 May .....	9,332
Replacements during Shuri Envelopment, Phase II .....	0
RTD during Shuri Envelopment, Phase II .....	0
Attachments/detachments during Shuri Envelopment Phase II .....	- 4,741
Est. strengths of known Japanese units 27 May .....	<u>4,591</u>

Footnotes and BASIC SOURCE shown on following page.



## US ARMY

- 1 45.7% of original Japanese unit strengths x .64 for US 7th Inf Div portion of the line.
- 2 62d Div, 44th Ind Bde, 3d AT Bn, 2d Bn 22d Regt, 17th MG Bn, and 32d Inf Regt.
- 3 62d Div and 44th Ind Bde at reduced strengths computed per footnote<sup>5</sup> below.
- 4 45.7% of 62d Div and 44th Ind Bde original strengths + 100% of 3d AT Bn, 2d Bn 22d Regt, 17th MG Bn, and 32d Inf Regt (all prior duties were rear guard) x .64 for US 7th Inf Div portion of the line.
- 5 45.7% of 62d Div and 44th Ind Bde original strengths + 70% of 3d AT Bn, 2d Bn 22d Regt, 17th MG Bn, and 32d Inf Regt (all prior duties were rear guard) strengths x .64 for US 7th Inf Div portion of the line.

BASIC SOURCE: Appendix D. No replacements or RTDs were found in any source.



US ARMY

JAPANESE CASUALTIES: SHURI ENVELOPMENT, PHASE II

<b>"Bloody"</b>	
KIAs reported by 7th US Inf Div .....	349 (high)
Reported KIAs minus LFW 29% (101) over reporting factor per Appendix D .....	248 (low)
Reported KIAs minus LFW 18% (53) over reporting factor per Appendix D .....	286
Reported KIAs minus LFW 6.7% (23) over reporting factor per Appendix D .....	326
LFW Nominal estimate .....	326
<b>"Non-Bloody"</b>	
POWs reported captured by 7th US Inf Div .....	<u>1</u>
Total	327

BASIC SOURCE: Appendix D.



SHURI ENVELOPMENT, PHASE II

HERO

A/D	Strength				Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor %/D	Arty %/D	%/D	A/C	%/D
		T	Lt.								
A	15,840	0	0	171	0	0	0	0	0	0	0
D	3,000	0	0	24	0	0	0	0	0	0	0

LFW

A/D	Strength				Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor %/D	Arty %/D	%/D	A/C	%/D
		T	Lt.								
A	20,982	0	0	102	0	0	0	0	0	0	0
D	4,591	0	0	40	0	0	0	0	0	0	0



SHURI ENVELOPMENT, PHASE II

HERO

A/D CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-telli	Tech-nology	Init-iative	Vic-tor	Adv	Mis AC
A	C	C	x	N	C	N	N	C		0.5	6
D									x		9

LFW

A/D CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-telli	Tech-nology	Init-iative	Vic-tor	Adv	Mis AC
A	C	C	x	N	C		N	C		0.5	6
D						x			x		9

The LFW Team considered that knowledge of the terrain afforded the Japanese an intelligence advantage.



**US ARMY**

**U. S STRENGTH: SHURI ENVELOPMENT, PHASE III**

	<b>Low</b>	
7th Inf Div (+) strength .....	20,247	
		<b>High</b>
7th Inf Div (+) strength .....	22,379	
		<b>Nominal</b>
I.F.W Team's estimate .....	21,313	
Replacements received during battle .....	0	
RTD (as of 2 May) .....	0	
Detachments .....	0	
		<b>Total</b>
	21,313	

**BASIC SOURCE: Appendix C.**



US ARMY

U.S. CASUALTIES: SHURI ENVELOPMENT, PHASE III

Estimated casualties	"Bloody" Low	171
Estimated casualties	High	189
Estimated Casualties	Nominal	180
Casualties	"Non-Bloody" Low	169
Casualties	High	187
Estimate	Nominal	178

BASIC SOURCE: Appendix C.



**US ARMY**

**JAPANESE STRENGTH: SHURI ENVELOPMENT, PHASE III**

**Low**

Est. preceding battle, Shuri Envelopment, Phase II low strengths as of 27 May .....	1,918
Replacements .....	0
RTD .....	0
Attachments/detachments <sup>1</sup> 29 May .....	1,400
Shuri Envelopment, Phase III strength 30 May .....	518
Shuri Envelopment, Phase II casualties .....	<u>327</u>
Shuri Envelopment, Phase III strength 31 May .....	191

**High**

Est. preceding battle, Shuri Envelopment, Phase II high strengths as of 27 May .....	6,558
Replacements .....	0
RTD .....	0
Attachments/detachments <sup>2</sup> during Shuri Envelopment, Phase II .....	3,064
Shuri Envelopment, Phase III strength 30 May .....	3,494
Shuri Envelopment, Phase II casualties .....	<u>327</u>
Shuri Envelopment, Phase III strength 31 May .....	3,167

**Nominal**

Est. preceding battle, Shuri Envelopment, Phase II nominal strengths as of 27 May .....	4,591
Replacements .....	0
RTD .....	0
Attachments/detachments <sup>3</sup> during Shuri Envelopment, Phase II .....	2,145
Shuri Envelopment, Phase II casualties .....	<u>327</u>
Shuri Envelopment, Phase III strength 31 May .....	2,119

Footnotes and Basic Source shown on following vugraph.



**US ARMY**

- 1 64% of 32d Inf Regt at 45.7% of original strength.
- 2 64% of 32d Inf Regt at 100% of original strength.
- 3 64% of 32d Inf Regt at 70% of original strength.

BASIC SOURCE; Appendix D.



US ARMY

JAPANESE CASUALTIES: SHURI ENVELOPMENT, PHASE III

	<b>"Bloody"</b>	
KIAs reported by 7th US Inf Div .....		1,113 (high)
Reported KIAs minus LFW 29% (323) over reporting factor per Appendix D .....		790 (low)
Reported KIAs minus LFW 18% (200) over reporting factor per Appendix D .....		913
Reported KIAs minus LFW 6.7% (75) over reporting factor per Appendix D .....		1,038
LFW Nominal estimate .....		1,038
	<b>"Non-Bloody"</b>	
POMs reported captured by 7th US Inf Div .....	2	

BASIC SOURCE: Appendix D.

Total

1,040



SHURI ENVELOPMENT, PHASE III

HERO

A/D	Strength				Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor %/D	Arty %/D	A/C %/D		
		T	Lt. MBT								
A	15,205	79	17	62	150	182	0.4	0	?	?	--
D	2,600	0	0	0	5	2,564	34.2	0	0	?	--

LFW

A/D	Strength				Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor %/D	Arty %/D	A/C %/D		
		T	Lt. MBT								
A	21,313	79	17	62	102	180	0.3	0	?	?	--
D	2,119	0	0	0	3	1,040	16.4	0	0	?	--



SHURI ENVELOPMENT, PHASE III

HERO

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Monen-tum	In-tell	Tech-nology	Init-iative	Vic-tor	Adv	Mis AC
A	x	C	N	x	N	N	N	N	C	x	0.3	7
D												7

LFW

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Monen-tum	In-tell	Tech-nology	Init-iative	Vic-tor	Adv	Mis AC
A	x	C	N	x	N	N	N	N	C	x	0	8
D										x		2

Because both sides accomplished their missions, the LFW Team considers the battle a draw. Because Japanese forces were already withdrawing, which reflected pressure by U.S. forces, the LFW Team awarded a higher performance rating to the attackers.



SHURI ENVELOPMENT, PHASE III

HERO

A/D	Plan and Maneuver		Success	Resolution
	Main Attack and Scheme of Defense	Secondary Attack		
A	F	F	X	P, S
D	D	-		

LFW

A/D	Plan and Maneuver		Success	Resolution
	Main Attack and Scheme of Defense	Secondary Attack		
A	F	F	X	P
D	D	-		

Because the LFW Team considered the battle a draw, both sides share success. Since Japanese forces were already withdrawing, the situation can hardly be considered a stalemate. So, too, the resolution should reflect the withdrawal.



ADVANCE TO SHURI LINE OUTPOSTS

HERO

A/D	Dates	Campaign	Forces	Commanders	Days	Width of Front (Km)
A D	5-8 Apr 45	Okinawa	US 96th Div+ Jap 12th Ind Inf Bnt	MG Bradley LTC Fujioka	4	4.0

LFM

A/D	Dates	Campaign	Forces	Commanders	Days	Width of Front (Km)
A D	5-8 Apr 45	Okinawa	US 96th Div+ Jap 12th Ind Inf Bnt	MG Bradley LTC Yoshida	4	4.0

The local commander was LTC Yoshida instead of LTC Fujioka.



US ARMY

U.S. STRENGTH: ADVANCE TO SHURI LINE OUTPOSTS

	Low	High	Nominal
96th Inf Div (+) strength .....	20,770		
96th Inf Div (+) strength .....		22,956	
LFW Team's estimate .....			21,863
Replacements received during battle .....			0
RTP .....			0
Attachments/Detachments during battle .....			0
Total			21,863

BASIC SOURCE: Appendix C.



US ARMY

U.S. CASUALTIES: ADVANCE TO THE SHURI LINE OUTPOSTS

Estimated casualties .....	"Bloody" Low	506
Estimated casualties .....	High	560
Estimated casualties .....	Nominal	533
Casualties .....	"Non-Bloody" Low	203
Casualties .....	High	225
Estimate .....	Nominal	214*

\*Four times daily average NBCs over a 22-day period plus 19 MIAs as NBCs were not reported separately to XXIV Corps by 96th Infantry Division for the four-day period of the advance to the Shuri Line outposts. The NBCs for this period, however, were included in the report submitted for the 22-day period, and this period of time included the four days of this battle.

BASIC SOURCE: Appendix C.



US ARMY

JAPANESE STRENGTH: ADVANCE TO THE SHURI LINE OUTPOSTS

Low

Known units <sup>1</sup> at estimated organizational strengths.....	1,408
Replacements.....	0
RTD.....	0
Attachments/detachments.....	0
Known strengths at start of battle.....	<u>1,408</u>

High

Known units (1,408) plus estimated 32d Army attachments (1,329) <sup>2</sup> ..	2,737
Replacements.....	0
RTD.....	0
Attachments/detachments.....	<u>0</u>
Known strengths plus estimated 32d Army attachments at start of battle.....	2,737

Nominal

LFW estimated strength of known units and estimated attachments...	2,405
Replacements.....	0
RTD.....	0
Attachments/detachments.....	<u>0</u>
LFW nominal estimated strength.....	2,405

- <sup>1</sup> 1 Boeital Company plus 13th Ind Inf Bn at organizational strengths\*
- <sup>2</sup> 2 Artillery LN and FO parties: 25, 1 Light Mortar Bn: 633, 1 MG Bn: 333, and 1 AT Bn: 338.

\*Source: Appleman, et al., Okinawa: The Last Battle.

BASIC SOURCE: Appendix D.



21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

US ARMY

JAPANESE CASUALTIES: ADVANCE TO THE SHURI LINE OUTPOSTS

"Bloody"	
KIAs reported by 96th US Inf Div .....	867 (high)
Reported KIAs minus LFW 29% (251) over reporting factor per Appendix D .....	616 (low)
Reported KIAs minus LFW 18% (156) over reporting factor per Appendix D .....	711
Reported KIAs minus LFW 6.7% (58) over reporting factor per Appendix D .....	809
LFW Nominal estimate .....	809
"Non-Bloody"	
POWs reported captured by 96th US Inf Div .....	<u>3</u>
Total	812

BASIC SOURCE: Appendix D.



ADVANCE TO THE SHURI LINE OUTPOSTS

HERO

A/D	Strength				Air Sorties	Battle Casualties						
	Pers (Total)	Armor		Arty Pcs		Pers	Armor		Arty	A/C	S/D	
		T	Lt.				MBT	S/D				%
A	18,388	74	18	56	174	555	0.8	9	3.0	1	1	--
D	2,900	0	0	0	32	2,470	21.3	0	0	1	1	--

LFW

A/D	Strength				Air Sorties	Battle Casualties						
	Pers (Total)	Armor		Arty Pcs		Pers	Armor		Arty	A/C	S/D	
		T	Lt.				MBT	S/D				%
A	21,863	80	17	63	114	533	0.6	6	1.9	0	1	0.2
D	2,405	0	0	0	40	812	8.4	1	8.3	2	1.6	0



ADVANCE TO SHURI LINE OUTPOSTS

HERO

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-tell	Tech-nology	Init-iative	Vic-tor	Adv	Mis Ac
A	C	C	C	N	N	N	N	N	C		0.4	5
D										x		7

LFW

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-tell	Tech-nology	Init-iative	Vic-tor	Adv	Mis Ac
A	C	C	C	N	N	N		N	C	x	0.4	8
D							x					7

The LFW Team considered that knowledge of the terrain, plus positions with decided observation advantage, afforded the Japanese an intelligence advantage. Since the U.S. forces accomplished their mission, the LFW Team considers they were the victor and affords a small advantage in performance rating.



ADVANCE TO SHURI LINE OUTPOSTS

HERO

A/D	Plan and Maneuver		
	Main Attack and Scheme of Defense	Secondary Attack	Success Resolution
A	F	-	
D	D	-	X

LFM

A/D	Plan and Maneuver		
	Main Attack and Scheme of Defense	Secondary Attack	Success Resolution
A	F	-	
D	D	-	X P WD

Although the Japanese forces did withdraw, U.S. forces penetrated the position and thus accomplished their mission. P represents penetration, WD represents withdrawal.



US ARMY

U.S. STRENGTH: KAKAZU AND TOMBSTONE RIDGE

	Low	High	Nominal
96th Inf Div (+) strength .....	21,885		
96th Inf Div (+) strength .....		24,189	
LFW Team's estimate .....			23,037
Replacements received during battle .....			0
RTD .....			0
Attachments/Detachments during battle .....			0
Total			23,037

BASIC SOURCE: Appendix C.



**US ARMY**

**U.S. CASUALTIES: KAKAZU AND TOMBSTONE RIDGE**

Estimated casualties .....	824
<b>"Bloody"</b>	
Low .....	
Estimated casualties .....	910
High .....	
Estimated casualties .....	867
Nominal .....	
Casualties .....	368
<b>"Non-Bloody"</b>	
Low .....	
Casualties .....	406
High .....	
Nominal .....	387*

\*Four times daily average NBCs over a 22-day period plus 19 MIAs as NBCs were not reported separately to XXIV Corps by 96th Infantry Division for the four-day period of Kakazu and Tombstone Ridge. The daily NBCs for this period, however, were included in the report submitted for the 22-day period, and this period of time included the four days of this battle.

BASIC SOURCE: Appendix C.



US ARMY

JAPANESE STRENGTH: KAKAZU AND TOMBSTONE RIDGE

Low

Low strength in preceding battle Advance to Shuri Line Outposts plus 50% of 63d Bde .....	5,336
Replacements .....	0
RTD .....	0
Attachments/detachments .....	0
Japanese casualties Advance to the Shuri Line Outposts .....	- 812
Japanese strength at start of battle .....	<u>4,524</u>

High

4,524 plus estimated 32d Army attachments (2,658) <sup>1</sup> .....	7,182
--	-------

Nominal

LFW estimated strength .....	6,518*
------------------------------	--------

- <sup>1</sup> Artillery LN and FO parties: 50, 2 Light Mortar Bns: 1,266,  
2 MG Bns: 666, and 2 AT Bns: 676.

\*Because attachments and units of the 63d Bde were fresh and thus had incurred few losses, the LFW Team weighted toward the high estimate.

BASIC SOURCE: Appendix D. No replacements, RTD, or attachments/detachments were found in any source, and a captured Japanese colonel later said no attachments/detachments were made. Source: XXIV Corps After Action Report.



US ARMY

JAPANESE CASUALTIES: KAKAZU AND TOMBSTONE RIDGE

"Bloody"

KIAs reported by 96th US Inf Div .....	1,550 (high)
Reported KIAs minus LFW 29% (450) over reporting factor per Appendix D .....	1,101 (low)
Reported KIAs minus LFW 18% (279) over reporting factor per Appendix D .....	1,271
Reported KIAs minus LFW 6.7% (104) over reporting factor per Appendix D .....	1,446
LFW Nominal estimate .....	1,446

"Non-Bloody"

POWs reported captured by 96th US Inf Div .....	<u>0</u>
Total	1,446

BASIC SOURCE Appendix D.



KAKAZU AND TOMBSTONE RIDGE

HERO

A/D	Strength				Air Sorties	Battle Casualties						
	Pers (Total)	Armor		Arty Pcs		Pers	Casualties					
		T	Lt.				MBT	%/D	Arty %/D	A/C	%/D	
A	18,388	74	18	56	246	1,079	1.3	0	?	?	?	?
D	3,000	0	0	0	32	2,468	20.6	0	0	?	?	?

LFM

A/D	Strength				Air Sorties	Battle Casualties						
	Pers (Total)	Armor		Arty Pcs		Pers	Casualties					
		T	Lt.				MBT	%/D	Arty %/D	A/C	%/D	
A	23,037	80	17	63	114	867	0.9	1	0.3	0	0	?
D	6,518	0	0	0	30	1,446	5.5	0	0	1	0.8	0



KAKAZU AND TOMBSTONE RIDGE

HERO

A/D	CE	Leader-ship	Trng Exp.	Morate	Log	Monen-tum	In-tell	Tech-nology	Init-iative	Vic-for	Adv	Mis AC
A	C	C	C	N	N	N	N	N	C	x	0.1	28
D												

LFW

A/D	CE	Leader-ship	Trng Exp.	Morate	Log	Monen-tum	In-tell	Tech-nology	Init-iative	Vic-for	Adv	Mis AC
A	C	C	C	N	N	N	x	N	C	x	0.1	28
D												

The LFW Team considered that knowledge of the terrain afforded the Japanese an intelligence advantage.



ATTACK ON THE SHURI LINE'S EASTERN FLANK I

HERO

A/D	Dates	Campaign	Forces	Commanders	Days	Width of Front (Km)
A	11-13 May 45	Oklnawa	US 96th Divt Jap 24th Inf Div	MG Bradley LTG Amamiya	3	2.3
D						

LFW

A/D	Dates	Campaign	Forces	Commanders	Days	Width of Front (Km)
A	11-13 May 45	Oklnawa	US 96th Divt Jap 89 Bde+2 Bns (28 & 29 Ind Inf)	MG Bradley LTG Amamiya	3	2.3
D						

The LFW Team has provided a more specific breakdown of Japanese forces.



**US ARMY**

**U.S. STRENGTH: ATTACK ON THE SHURI LINE'S EASTERN FLANK I**

	<b>Low</b>	
96th Inf Div plus strength .....	21,149	
		<b>High</b>
96th Inf Div plus strength .....	23,375	
		<b>Nominal</b>
LFW team's estimate .....	22,262	
Replacements received during battle .....	0	
RTD (as of 2 May) .....	0	
Detachments .....	0	
		<b>Total</b>
		22,262

**BASIC SOURCE: Appendix C.**



US ARMY

U.S. CASUALTIES: ATTACK ON THE SHURI LINE'S EASTERN PLANK I

Estimated casualties	"Bloody" Low	308
Estimated casualties	High	340
Estimated Casualties	Nominal	324
Casualties	"Non-Bloody" Low	132
Casualties	High	146
Estimate	Nominal	139

BASIC SOURCE: Appendix C.



**US ARMY**

**JAPANESE STRENGTH: ATTACK ON THE SHURI LINE'S EASTERN FLANK I**

	<b>Low</b>	
Known units <sup>1</sup> (previously not committed) with estimated strengths...	6,570	
Replacements.....	0	
RTD .....	0	
Attachments/detachments .....	0	
Low Japanese strength .....	<u>6,570</u>	
	<b>High</b>	
Known units (6,570) plus estimated 32d Army attachments (5,265) <sup>2</sup> ..	11,835	
Replacements .....	0	
RTD .....	0	
Attachments/detachments .....	0	
High Japanese strength .....	<u>11,835</u>	
	<b>Nominal</b>	
LFW estimated strength at start of the battle .....	10,519	
Replacements .....	0	
RTD .....	0	
Attachments/detachments .....	0	
Japanese LFW nominal estimated strength .....	<u>10,519</u>	

- <sup>1</sup> 89th Bde: 4,787 and 2 Ind Inf Bns: 1,783.
- <sup>2</sup> Artillery Ln and FO parties: 50, 2 Light Mortar Bns: 1,266, 2 MG Bns: 666, 2 AT Bns: 676, 1 Engineer Company, and 2,000 labor service troops.

BASIC SOURCE: Appendix D. No replacements, RTD, or attachments/detachments were to be found in any source, and a captured Japanese colonel later said no attachments/detachments were made. Source: XXIV Corps After Action Report.



**US ARMY**

**JAPANESE CASUALTIES: ATTACK ON THE SHURI LINE'S EASTERN FLANK I**

**"Bloody"**

KIAs reported by 96th US Inf Div .....	2,101 (high)
Reported KIAs minus LFW 29% (609) over reporting factor per Appendix D .....	1,492 (low)
Reported KIAs minus LFW 18% (378) over reporting factor per Appendix D .....	1,723
Reported KIAs minus LFW 6.7% (141) over reporting factor per Appendix D .....	1,960
LFW Nominal estimate .....	1,960

**"Non-Bloody"**

POWs reported captured by 96th US Inf Div .....	<u>4</u>
Total	1,964

BASIC SOURCE:- Appendix D.



US ARMY

ATTACK ON THE SHURI LINE'S EASTERN FLANK I

HERO

A/D	Strength				Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor	%/D Arty	%/D A/C	%/D	
		T	Lt.								MBT
A	19,714	121	45	76	162	502	0.8	1.7	?	?	--
D	5,284	0	0	0	0	4,038	25.5	0	?	?	--

LFW

A/D	Strength				Air Sorties	Battle Casualties					
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor	%/D Arty	%/D A/C	%/D	
		T	Lt.								MBT
A	22,262	140	34	106	80	324	0.5	0.7	0	?	--
D	10,519	0	0	0	0	1,964	6.2	0	4	3.9	0



ATTACK ON THE SHURI LINE'S EASTERN FLANK I

HERC

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-tell	Tech-nology	Init-iative	Vic-tor	Adv	Mis AC
A	C	C	C	N	N	N	N	X	X	X	0.3	5
D												5

LFW

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-tell	Tech-nology	Init-iative	Vic-tor	Adv	Mis AC
A	C	C	X	N	N	N	X	X	X	X	0.3	5
D												6

The LFW Team considered that knowledge of the terrain afforded the Japanese an intelligence advantage.



**US ARMY**

**U.S. STRENGTH: ATTACK ON THE SHUR LINE'S EASTERN FLANK II**

	Low	High	Nominal
96th Inf Div plus strength .....	21,319		
96th Inf Div plus strength .....		23,563	
LFW Team's estimate .....			22,441
Replacements received during battle .....			0
RTD .....			0
Attachments/detachments during battle .....			0
Total			22,441

BASIC SOURCE: Appendix C.



US ARMY

U.S. CASUALTIES: ATTACK ON THE SHURI LINE'S EASTERN FLANK II

Estimated casualties .....	"Bloody" Low	524
Estimated casualties .....	High	580
Estimated Casualties .....	Nominal	552
Casualties .....	"Non-Bloody" Low	168
Casualties .....	High	186
Estimate .....	Nominal	177

BASIC SOURCE: Appendix C.





US ARMY

JAPANESE CASUALTIES: ATTACK ON THE SHURI LINE'S EASTERN FLANK II

<b>"Bloody"</b>	
KIAs reported by 96th US Inf Div .....	1,924 (high)
Reported KIAs minus LFW 29% (558) over reporting factor per Appendix D .....	1,366 (low)
Reported KIAs minus LFW 18% (346) over reporting factor per Appendix D .....	1,578
Reported KIAs minus LFW 6.7% (129) over reporting factor per Appendix D .....	1,795
LFW Nominal estimate .....	1,795
<b>"Non-Bloody"</b>	
POWs reported captured by 96th US Inf Div .....	<u>3</u>
Total	1,798

BASIC SOURCE: Appendix D.



ATTACK ON THE SHURI LINE'S EASTERN FLANK II

HERO

A/D	Strength				Air Sorties	Battle Casualties							
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor %/D	Arty %/D	A/C %/D				
		T	Lt. MBT										
A	20,273	129	59	70	240	590	0.6	4	0.3	?	?	?	?
D	4,757	0	0	0	0	4,328	18.2	0	0	?	?	?	0

LFW

A/D	Strength				Air Sorties	Battle Casualties							
	Pers (Total)	Armor		Arty Pcs		Pers %/D	Armor %/D	Arty %/D	A/C %/D				
		T	Lt. MBT										
A	22,441	144	34	110	180	552	0.5	2	0.3	?	?	?	?
D	8,555	16	?	?	0	7,98	4.2	16	20.0	6	4.0	0	0



ATTACK ON THE SHURI LINE'S EASTERN FLANK II

HERO

		Plan and Maneuver		
A/D	Main Attack and Scheme of Defense	Secondary Attack	Success	Resolution
A	F	F		P, S
D	D	-	X	

LFM

		Plan and Maneuver		
A/D	Main Attack and Scheme of Defense	Secondary Attack	Success	Resolution
A	F	F		P
D	D	-	X	

Since the Japanese issued an order to withdraw, the resolution can hardly be considered a stalemate.



US ARMY

ATTACK ON THE SHURI LINE'S EASTERN FLANK II

HERO

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-tell	Tech-nology	Inlt-ative	Vlc-tor	Adv	Mis AC
A	C	C	C	X	N	N	N	X	X	X	0.1	5
D												5

LFV

A/D	CE	Leader-ship	Trng Exp.	Morale	Log	Momen-tum	In-tell	Tech-nology	Inlt-ative	Vlc-tor	Adv	Mis AC
A	C	C	C	X	N	N	X	N	N	X	0.1	6
D												4

The LFV Team considered that knowledge of the terrain afforded the Japanese an intelligence advantage. Since the attackers achieved a penetration and prompted the Japanese to issue a withdrawal order, the LFV Team considers the attackers to be the victor and awarded a corresponding change in the figures on mission accomplishment.



one small  
correction  
made

## APPENDIX A

### THE LFW TEAM

Charles B. MacDonald (project director): 35 years with the U.S. Army Center of Military History as historian, Chief of the European Section, Deputy Chief Historian, and Deputy Chief Historian for Southeast Asia. Combat experience as an infantry rifle company commander in the European Theater and retired Colonel in the U.S. Army Reserve. Author of Company Commander; Three Battles: Arnaville, Altuzzo, and Schmidt [with Sidney T. Mathews]; The Battle of the Huertgen Forest; Airborne; The Siegfried Line Campaign; The Mighty Endeavor: The American War in Europe; and A Time for Trumpets: The Untold Story of the Battle of the Bulge. He holds a BA degree from Presbyterian College and honorary degrees from Presbyterian College and Francis Marion College.

William M. Glasgow, Jr. (assistant project director): retired from the U.S. Army as a colonel after 29 years of commissioned service that included combat experience in the Korean War and a tour of duty as historian with the U.S. Army Europe. He is a graduate of the U.S. Army Command and General Staff College and the author of a number of official monographs, numerous newspaper and magazine articles on military history subjects, and Northern Virginia's Own: A Military History of the 17th Virginia Infantry Regiment in the War Between the States. He has served as a consultant for various U.S. Army-sponsored research and analysis projects. He has a BGE degree from the University of Nebraska and has completed all graduate work requirements for an MA degree in International Relations from Boston University.

George H. Russell: retired from the U.S. Army as a colonel after 34 years of commissioned service, which included combat experience in the Pacific Theater during World War II as a platoon leader, company commander, and battalion staff officer, as a staff officer in Korea, and as a staff officer with the Military Assistance Command (MACV) in Vietnam. He is a graduate of both the Army and Navy War Colleges. He holds a BS degree from Washington State University and an MS degree from Boston University.

Graham M. Sibbles: a graduate of the U.S. Military Academy, he retired

from the U.S. Army as a colonel after 30 years of commissioned service. He is a graduate of both the U.S. Army Command and General Staff College and the Army War College. His last assignment was as Director, Battlefield Systems Integration, Headquarters U.S. Army Materiel and Readiness Command. Service also included duty as Chief, War Plans Division, Headquarters Allied Forces Central Europe, developing plans for mobilization, deployment and employment of Allied forces in Central Europe. Since retirement, he has served as a consultant to a number of defense oriented industries. He holds BS and MS degrees in Electrical Engineering from Mississippi State University.

Charles V.P. von Luttichau: a native of Germany, he served during World War II primarily on the Eastern Front as an intelligence officer. Becoming a naturalized American citizen, he received an MA degree in history from the University of Maryland. For 30 years he was an historian with the U.S. Army Center of Military History, working primarily with captured German Army records to write numerous monographs on German operations to support the official histories of the U.S. Army in Europe. He is the author of a manuscript which when published will provide the opening volume of a three-volume official U.S. Army series on the Russo-German War based primarily on official German records.

Consultants on Russian Sources:

Colonel David M. Glantz, Soviet Army Studies Office, Fort Leavenworth,  
Kansas

Colonel John E. Jessup, Jr., (USA, Ret.)

## APPENDIX B

### GLOSSARY

O = none  
? = no figure could be determined  
AAA = antiaircraft artillery  
Armd = armored  
AT = antitank  
Bde = brigade  
Bn = battalion  
CCA } Combat Command A  
CCB } " " B  
CCR } " " R (reserve)  
Det = detachment  
Div = division  
Engr = engineer  
FA = field artillery  
GS = general support  
Ind = independent  
Inf = infantry  
KG = kampfgruppe (task force)  
KIA = killed in action  
MG = machine gun  
MIA = missing in action  
NBC = non-battle casualty  
POW = prisoner of war  
Pz = panzer  
Regt = regiment  
RTD = returned to duty  
VG = volks-grenadier (an honorific for infantry)

## GLOSSARY FROM THE HERO STUDY

A system of abbreviations and symbols is used for matrix entries. These are shown below.

### Table 1: Identification

The symbols used in this table are as follows:

#### National or Other Forces, Units and Ranks

Am	American
Amph	Amphibious
Armd	Armored
Aus	Austrian
Bav	Bavarian
Bde	Brigade
Bn	Battalion
Boer	Boer
Boh	Bohemian
Br	British
Br Exped Force	British Expeditionary Force
Brig	Brigadier
Brig Gen	Brigadier General
Bul	Bulgarian
Cav	Cavalry
Col	Colonel
Cov	Scots Covenanter
CCA	Combat Command A
CCB	Combat Command B
CCR	Combat Command Reserve
C.,	Commanding General
Cc	Company
Cos	Companies
Cr Pr	Crown Prince
CS	Confederate States [of America]
Cumb'd	Cumberland
Dan	Danish
Det	Detachment
Dk	Duke
Du	Dutch
Eg	Egyptian
Elms	Elements
Eng	English
Eth	Ethiopian
Fld	Field
FM	Field Marshal
Ft Rgt	Foot Regiment
Fr	French
Ger	German

Gds	Guards
Gr	Grenadier
Han	Hanoverian
Imp	Imperialist
Ind Inf Bn	Independent Infantry Battalion [Japanese]
Is	Israeli
It	Italian
Jap	Japanese
Jgr	Jaeger
Jor	Jordanian
KG	Kampfgruppe [German combat team]
Mam	Mameluke
Mar	Marine
Mech	Mechanized
Mes	Mesopotamian
Mex	Mexican
MG	Majr General
Para	Paratroop
Parl	Parliament
PG	Panzer Grenadier
Pied	Piedmontese [Piedmont-Savoy or Piedmont-Sardinia]
PLA	Palestine Liberation Army
Pol	Polish
Port	Portuguese
Pr	Prussian
Prot	Protestant
Reb	Rebel
Res	Reserve
Rgt	Regiment
Rom	Romanian
Roy	Royalist
Sax	Saxon
Serb	Serbian
Sp	Spanish
Sp Rep	Spanish Republican
Spec Estab Rgt	Special Established Regiment [Japanese]
Sov	Soviet
Sw	Swedish
Syr	Syrian
TF	Task Force
Tk	Turk
U/I	Unidentified [unit]
US	United States
VG	Volks Grenadier
Vol	Volunteers
(+)	Reinforced
(-)	Elements, part, or a portion of a unit

Table 2. Operational and Environmental Variables

Defender Posture:

HD - Hasty defense  
PD - Prepared defense  
FD - Fortified defense  
WDL - Withdrawal  
Del - Delay

Terrain:

RD - Rolling, desert  
RgB - Rugged, bare  
RgM - Rugged, mixed  
RgW - Rugged, heavily wooded  
RB - Rolling, bare  
RM - Rolling, mixed  
RW - Rolling, heavily wooded  
FB - Flat, bare  
FM - Flat, mixed  
FW - Flat, heavily wooded  
R Dunes - Rolling dunes  
U - Urban or built-up area  
M - Marsh or swamp

Weather:

DSH - Dry, sunshine, hot  
DST - Dry, sunshine, temperate  
DSC - Dry, sunshine, cold  
DOH - Dry, overcast, hot  
DOT - Dry, overcast, temperate  
DOC - Dry, overcast, cold  
WLH - Wet, light, hot  
WLC - Wet, light, cold  
WHH - Wet, heavy, hot  
WHT - Wet, heavy, temperate  
WHC - Wet, heavy cold

Season:

Months

Northern Hemisphere

Southern Hemisphere

March, April, May  
June, July, August  
Sept, Oct, Nov  
Dec, Jan, Feb

Spring  
Summer  
Fall  
Winter

Fall  
Winter  
Spring  
Summer

Season Codes

SpT - Spring, temperate

ST	-	Summer, temperate
FT	-	Fall, temperate
WT	-	Winter, temperate
SpTr	-	Spring, tropical
STr	-	Summer, tropical
FTr	-	Fall, tropical
WTr	-	Winter, tropical
SpD	-	Spring, desert
SD	-	Summer, desert
FD	-	Fall, desert
WD	-	Winter, desert

#### Surprise

Y: Surprise achieved  
 N: Surprise did not influence outcome of battle.  
 x: Symbol showing which side achieved surprise.

#### Table 4. Intangible Factors

C: Comparable for both sides  
 N: Not a factor  
 x: Advantage  
 O: Disadvantage

#### Table 5. Outcome

x: Designates successful side  
 N: Negligible advance

#### Table 6. Factors affecting outcome

Same as for Table 4, with the following additions:

x: Advantage decisively affecting outcome  
O: Disadvantage decisively affecting outcome

#### Table 7. Combat Forms and Resolution

##### Main Attack Plan and Scheme of Defense:

F: Frontal attack  
 E: Single envelopment  
 EE: Double envelopment  
 FE: Feint, demonstration, or holding attack  
 D: Defensive plan  
 D/O: Defensive-offensive plan  
 (LF) Left flank  
 (RF) Right flank  
 (LR) Left flank and/or rear  
 (RR) Right flank and/or rear

P: Penetration  
RivC: River crossing  
--: No secondary attack

Success: Indicated by an "x"

Resolution:

S: Stalemate  
R: Repulse  
P: Penetration  
B: Breakthrough  
WD: Withdrew  
WDL: Withdrew with serious loss  
A: Annihilated  
Ps: Pursued

APPENDIX C

XXIX CORPS DAILY STRENGTHS AND CASUALTIES

OKINAWA CAMPAIGN

31 March-1 June 1945

**DIVISION REPORTED DAY-BY-DAY US STRENGTH AND CASUALTY FIGURES  
FOR THE OKINAWA CAMPAIGN PERIOD OF 31 MARCH THROUGH 1 JUNE 1945**

Date	Division	DOW KIA	WIA	MIA	NBC*	DAILY TOTAL CAS	RTD*	REP	ATCH DTCH	DAILY TOTAL SGTH
31 Mar	7th Inf									21,180
	96th Inf									22,175
1 Apr	7th Inf	?	?	?	?	?	?	0	0	21,180
	96th Inf	?	?	?	?	?	?	0	0	22,175
2 Apr	7th Inf	?	?	?	?	?	?	0	0	21,180
	96th Inf	?	?	?	?	?	?	0	0	22,175
3 Apr	7th Inf	?	?	?	?	?	?	0	0	21,180
	96th Inf	?	?	?	?	?	?	0	0	22,175
4 Apr	7th Inf	?	?	?	?	?	?	0	0	21,180
	96th Inf	?	?	?	?	?	?	0	0	22,175
5 Apr	7th Inf	35	172	3	?	210	?	0	0	20,970
	96th Inf	28	277	7	?	312	?	0	0	21,863
6 Apr	7th Inf	9	76	0	?	85	?	0	0	20,885
	96th Inf	36	95	0	?	131	?	0	0	21,732
7 Apr	7th Inf	10	31	0	?	41	?	0	0	20,844
	96th Inf	22	128	0	?	150	?	0	0	21,582
8 Apr	7th Inf	4	59	0	?	63	?	0	0	20,781
	96th Inf	30	104	19	?	153	?	0	0	21,429
9 Apr	7th Inf	17	142	6	?	165	?	0	0	20,616
	96th Inf	34	84	0	?	118	20**	0	1,706+	23,037
10 Apr	7th Inf	24	46	1	?	71	?	0	0	20,545
	96th Inf	51	207	86	?	344	?	0	0	22,693
11 Apr	7th Inf	30	122	3	?	155	?	0	0	20,390
	96th Inf	10	215	97	?	322	?	0	0	22,371
12 Apr	7th Inf	32	102	1	?	135	?	0	0	20,255
	96th Inf	43	256	9	?	308	?	0	0	22,063
13 Apr	7th Inf	9	30	0	?	39	?	0	0	20,216
	96th Inf	28	57	0	?	85	?	0	0	21,978
14 Apr	7th Inf	7	30	0	?	37	125	275	0	20,579
	27th Inf	13	38	0	?	51	?	?	?	?
	96th Inf	26	101	0	?	127	200	850	0	22,901
15 Apr	7th Inf	7	43	0	?	50	?	0	0	20,529
	27th Inf	1	3	0	?	4	?	?	?	?
	96th Inf	6	43	20	?	69	?	0	1,706-	21,126
16 Apr	7th Inf	10	115	0	?	125	10**	0	1,706+	22,120
	27th Inf	13	37	0	?	50	?	?	?	?
	96th Inf	34	179	0	?	213	?	0	0	20,913
17 Apr	7th Inf	11	34	0	?	45	?	0	0	22,075
	27th Inf	9	59	0	?	68	?	?	?	?
	96th Inf	3	15	0	?	18	?	0	0	20,895
18 Apr	7th Inf	3	13	0	?	16	?	0	0	22,059
	27th Inf	3	17	0	?	20	?	?	?	?
	96th Inf	1	15	1	?	17	?	0	0	20,878
19 Apr	7th Inf	1	11	0	?	12	?	0	0	22,047
	27th Inf	3	37	1	?	41	?	0	?	?
	96th Inf	0	29	2	?	31	?	0	0	20,847
20 Apr	7th Inf	46	188	2	?	236	?	0	0	21,811
	27th Inf	17	242	18	?	277	?	0	?	?
	96th Inf	32	175	0	?	207	?	0	0	20,640
21 Apr	7th Inf	27	136	8	?	171	?	0	0	21,640
	27th Inf	32	401	73	?	506	?	0	?	?
	96th Inf	38	204	10	?	252	?	0	0	20,388
22 Apr	7th Inf	22	169	2	1,072	1,265	?	0	0	20,375
	27th Inf	43	192	22	?	29	?	0	?	?
	96th Inf	18	146	3	879	1,046	?	0	0	19,342
23 Apr	7th Inf	25	131	1	111	268	?	0	0	20,107
	27th Inf	38	215	59	84	396	?	0	?	?
	96th Inf	19	71	3	21	114	?	0	0	19,228
24 Apr	7th Inf	2	48	1	71	122	?	0	0	19,985
	27th Inf	32	121	7	26	186	?	0	?	?
	96th Inf	13	69	4	32	118	?	0	0	19,110
25 Apr	7th Inf	5	24	0	46	75	?	0	0	19,910
	27th Inf	7	106	3	63	179	?	0	?	?
	96th Inf	3	32	0	25	60	?	0	0	19,050

US Strength and Casualty Figures (Cont'd.)

2

Date	Division	DOW			NBC*	DAILY TOTAL		RTD*	REP	ATCH DTCH	DAILY TOTAL SGTH
		KIA	WIA	MIA		CAS					
26 Apr	7th Inf	13	76	0	38	127	?	0	0	19,783	
	27th Inf	16	119	4	63	202	?	0	?	?	
	96th Inf	2	28	2	14	46	?	0	0	19,004	
27 Apr	7th Inf	4	61	0	26	91	400	800	0	20,892	
	27th Inf	29	164	5	23	221	?	?	?	?	
	96th Inf	9	71	0	13	93	300	1,100	0	20,311	
28 Apr	7th Inf	11	98	0	61	170	?	0	0	20,722	
	27th Inf	26	128	9	43	206	?	0	?	?	
	77th Inf	0	0	0	0	0	?	0	0	**15,000	
	96th Inf	29	161	0	11	201	?	0	0	20,110	
29 Apr	7th Inf	16	90	2	33	141	?	0	0	20,581	
	27th Inf	29	184	29	57	299	?	0	?	?	
	77th Inf	1	1	0	16	18	?	0	?	14,982	
	96th Inf	25	102	1	34	162	?	0	0	19,948	
30 Apr	7th Inf	16	59	0	73	148	?	0	0	20,433	
	27th Inf	27	164	10	38	239	?	0	?	?	
	77th Inf	4	28	0	28	60	?	0	?	14,922	
	96th Inf	25	56	0	20	101	?	0	0	19,847	
1 May	1st Mar	7	24	0	12	43	?	?	1,706+	?	
	7th Inf	33	125	8	63	229	?	0	1,706-	18,498	
	27th Inf	20	67	5	15	107	?	0	?	?	
	77th Inf	503**	1,177**	23**	312**	2,015**	1,500**	0	?	14,407	
	96th Inf	4	20	1	21	46	?	0	0	19,801	
2 May	1st Mar	0	0	0	0	0	?	?	?	?	
	7th Inf	12	79	0	51	142	200	550	0	19,106	
	27th Inf	27	5	0	1	33	?	0	?	?	
	77th Inf	32	114	1	5	152	250	450	?	14,955	
	96th Inf	1	1	0	18	20	200	1,625	0	21,606	
3 May	1st Mar	54	233	11	53	351	?	?	?	?	
	7th Inf	9	62	1	53	125	?	0	0	18,981	
	77th Inf	32	130	12	65	239	?	0	?	14,716	
	96th Inf	123	53	0	57	233	?	0	0	21,373	
4 May	1st Mar	27	227	1	45	300	?	?	?	?	
	7th Inf	10	58	1	80	149	?	0	0	18,832	
	77th Inf	-191**	102	0	72	-17	?	0	?	14,733	
	96th Inf	0	0	0	12	12	219**	0	0	21,580	
5 May	1st Mar	67	284	1	71	423	?	?	?	?	
	7th Inf	26	153	0	70	249	?	0	0	18,583	
	77th Inf	24	132	4	59	219	?	0	?	14,514	
	96th Inf	4	1	0	11	16	?	0	0	21,564	
6 May	1st Mar	18	178	1	33	230	?	?	?	?	
	7th Inf	28	132	0	60	220	?	0	0	18,363	
	77th Inf	40	179	2	37	258	?	0	?	14,256	
	96th Inf	1	1	0	19	21	?	0	0	21,543	
7 May	1st Mar	24	224	2	73	323	?	?	?	?	
	7th Inf	18	95	1	53	167	?	0	0	18,196	
	77th Inf	20	91	2	43	156	?	0	?	14,100	
	96th Inf	0	1	0	22	23	?	0	0	21,520	
8 May	7th Inf	9	60	2	44	115	400	1,350	0	19,831	
	77th Inf	34	80	1	29	144	345	875	?	15,185	
	96th Inf	1	1	0	21	23	150	550	0	22,197	
9 May	7th Inf	9	28	0	60	97	?	0	0	19,734	
	77th Inf	12	94	0	40	146	?	0	?	15,039	
	96th Inf	45**	0	0	32	77	305**	0	0	22,425	
10 May	7th Inf	86**	-81**	-26**	147**	46**	?	0	0	19,688	
	77th Inf	13	50	1	40	104	?	0	?	14,935	
	96th Inf	11	12	0	32	55	?	0	0	22,370	
11 May	7th Inf	5	13	0	19	37	?	0	0	19,651	
	77th Inf	13	61	0	31	105	?	0	?	14,830	
	96th Inf	9	66	7	26	108	?	0	0	22,262	
12 May	7th Inf	5	2	0	25	32	?	0	0	19,619	
	77th Inf	52	170	0	57	279	?	0	?	14,551	
	96th Inf	20	14	20	30	84	?	0	0	22,1	
13 May	7th Inf	6	1	-6**	37	38	?	0	0	19,581	
	77th Inf	15	104	8	47	174	?	0	?	14,377	
	96th Inf	18	118	20	29	185	?	0	0	21,993	
14 May	7th Inf	0	1	0	24	25	546	1,691	0	21,793	

## US Strength and Casualty Figures (Cont'd.)

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Date	Division	DOW			DAILY TOTAL				ATCH DTCH	DAILY TOTAL SGTH
		KIA	WIA	MIA	NBC*	CAS	RTD*	REP		
14 May	77th Inf	22	163	2	168	355	275	650	?	14,947
	96th Inf	28	126	8	32	194	133	180	0	22,112
15 May	77th Inf	0	0	0	0	0	?	0	0	21,793
	77th Inf	18	74	4	34	130	?	0	?	14,817
	96th Inf	21	108	10	29	168	?	0	0	21,944
16 May	77th Inf	3	5	0	19	27	?	0	0	21,766
	77th Inf	342**	1,671**	3**	577**	2,693**	?	1,500**	?	13,624
	96th Inf	11	95	5	28	139	?	0	0	21,805
17 May	77th Inf	0	4	0	28	32	?	0	0	21,734
	77th Inf	13	103	0	34	150	?	0	?	13,474
	96th Inf	13	109	0	34	156	?	0	0	21,649
18 May	77th Inf	0	4	0	0	4	?	0	0	21,730
	77th Inf	16	109	30	27	182	?	0	?	13,292
	96th Inf	16	91	22	26	155	?	0	0	21,494
19 May	77th Inf	0	0	0	44	44	?	0	0	21,686
	77th Inf	23	281	60	26	390	?	0	?	12,902
	96th Inf	21	67	1	22	111	?	0	0	21,383
20 May	77th Inf	0	0	0	35	35	?	0	0	21,651
	77th Inf	23	103	13	16	155	?	0	?	12,747
	96th Inf	3	55	2	26	86	?	0	0	21,297
21 May	77th Inf	0	1	0	46	47	?	0	0	21,604
	77th Inf	27	68	7	39	141	?	0	?	12,606
	96th Inf	8	133	10	38	189	?	0	0	21,108
22 May	77th Inf	0	1	0	33	34	?	0	0	21,570
	77th Inf	15	25	16	34	90	?	0	?	12,516
	96th Inf	10	143	9	38	200	?	0	0	20,908
23 May	77th Inf	5	54	0	28	87	?	0	0	21,483
	77th Inf	2	58	1	39	100	?	0	?	12,416
	96th Inf	17	113	6	41	177	?	0	0	20,731
24 May	77th Inf	24	87	0	49	160	?	0	0	21,323
	77th Inf	5	56	12	41	114	?	0	?	12,302
	96th Inf	12	93	24	36	165	?	0	0	20,566
25 May	77th Inf	28	98	0	41	167	?	0	0	21,156
	77th Inf	14	34	2	25	75	?	0	?	12,227
	96th Inf	6	71	6	32	115	?	0	0	20,451
26 May	77th Inf	14	115	0	55	184	?	0	0	20,982
	77th Inf	10	36	5	29	80	?	0	?	12,147
	96th Inf	15	53	1	20	89	?	0	0	20,362
27 May	77th Inf	5	44	0	58	107	?	0	0	20,865
	77th Inf	3	18	3	24	48	?	0	?	12,099
	96th Inf	3	23	0	19	45	?	0	0	20,317
28 May	77th Inf	18	57	0	79	154	525	150	0	21,386
	77th Inf	9	23	0	42	74	785	400	?	13,210
	96th Inf	7	40	4	33	84	450	100	0	20,783
29 May	77th Inf	0	12	0	61	73	?	0	0	21,313
	77th Inf	1	27	0	33	61	?	0	?	13,149
	96th Inf	2	17	3	39	61	?	0	0	20,722
30 May	77th Inf	15	48	2	65	130	?	0	0	21,183
	77th Inf	9	23	0	36	68	?	0	?	13,081
	96th Inf	6	19	0	50	75	?	0	0	20,647
31 May	77th Inf	4	35	0	56	95	?	0	0	21,088
	77th Inf	4	35	0	38	77	?	0	?	20,581
	96th Inf	3	30	0	33	66	?	0	0	19,685
1 June	77th Inf	13	65	0	55	133	?	0	0	20,955
	77th Inf	9	20	1	26	56	?	0	?	12,948
	96th Inf	3	22	0	30	55	?	0	0	20,526

\* Personnel undoubtedly were returned to duty (RTD), and non-battle casualties (NBC) also undoubtedly happened where question marks appear below. Initial NBC reports and all RTD reports with question marks therefore perhaps should be distributed throughout the period of prior question marks. However, sources only provided summary NBC and RTD data on dates indicated.

\*\* Adjusted by reporters or report receivers for the purpose of correcting errors. In case of 77th Infantry Division's 28 April total strength, figure is based on organizational authorization without deduction of previous casualties

## US Strength and Casualty Figures

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experienced outside of XXIV Corps. In case of 1 and 16 May 77th Division figures, the stated figures obviously are efforts to pick the division's casualties experienced in the Okinawa Campaign during prior engagements that did not take place on the main Island with the XXIV Corps.

### Headings:

DOW - Died of wounds received in action.  
KIA - Killed in action.  
WIA - Wounded in action.  
MIA - Missing in action.  
NBC - Non-battle casualty.  
RTD - Returned to duty.  
REP - Replacements.  
ATCH - Attached units' personnel.  
DTCH - Detached units' personnel.  
CAS - Casualties.  
SGTH - Strength.

**NOTE:** XXIV Corps Periodic Reports were compiled at 1600 hours daily, but the cutoff time for casualty reporting was 2400 hours of the previous day. The LFW Team therefore used XXIV Corps Periodic Report strength figures reported on the first day of an engagement and casualty figures from the second and subsequent days of an engagement plus one. XXIV Corps Periodic Reports proved to be the most comprehensive, complete, and accurate sources for both U.S. and Japanese strength data.

**SOURCES:** XXIV Corps Periodic Reports for April, May, and 1 June 1945; XXIV Corps Operation Orders for April, May, and June; and XXIV Corps After Action Report (Replacement Section) for REP and RTD data.

APPENDIX D

JAPANESE STRENGTHS AND DAILY CASUALTIES

OKINAWA CAMPAIGN

31 March-1 June 1945

**ACTUAL JAPANESE UNIT STRENGTHS AT START OF OKINAWA CAMPAIGN AND AN ANALYSIS OF THOSE STRENGTHS IN RELATIONSHIP TO JAPANESE CASUALTIES REPORTED BY U.S. UNITS**

Captured documents show the 31 March 1945 strength of Japanese units on Okinawa as follows:

<u>Unit</u>	<u>Strength</u>
32d Army Headquarters	1,070
74 Division	14,260
62d Division	11,225
44th Independent Brigade	2,269
15th Independent Regiment	1,585
Sea Raiders	7,012
27th Tank Regiment	800
5th Artillery	11,175
Engineers	4,959
Air Ground Troops	5,360
Service Troops	8,718
Naval Troops	9,000
Okinawa Labor Troops	<u>13,005</u>
Total	91,238

In addition to these actual 31 March 1945 strengths taken verbatim from the sources indicated below, the Japanese also were in the process of drafting 20,000 more Okinawa Labor Troops on that date. As U.S. forces invaded Okinawa on 1 April 1945, the Japanese probably did not fully implement their draft plans, but U.S. forces later found few Okinawa natives of military age in their civilian enclosures. This indicates that the Japanese draft program enjoyed some degree of success. Moreover, prisoners of war later reported two further successful drafts of Okinawa natives. Almost all of these so-called "labor service troops," along with all Japanese Navy and Air Force personnel on Okinawa, were later fully integrated into Japanese combat units as fighters. If the Japanese are given credit for drafting only 8,762 additional Okinawa Labor Troops in their 31 March program, this would have provided them with a force of 100,000 men. Later, however, the U.S. XXIV Corps G-2 estimated that the total enemy force slightly exceeded this figure.

During the period 1 April through 30 June 1945, U.S. forces reported that they killed 110,071 Japanese troops and captured an additional 7,830. Using the actual 31 March 1945 Japanese strength of 91,238, U.S. reports reflected an excess of 29 percent in the reporting of enemy casualties. However, if the more likely 100,000-man Japanese strength figure is used, U.S. forces only reported 18 percent more casualties than the actual number. The use of a most likely 110,000 Japanese strength figure would provide an excess of only 6.7 percent in the reports of U.S. units.

SOURCES: Monograph, The XXIV Corps in the Conquest of Okinawa. Appleman, Burns, Gugler and Stevens, Okinawa: The Last Battle.

DAILY JAPANESE CASUALTIES AS REPORTED BY US XXIV CORPS DIVISIONS

DATE	DIVISION	JAPANESE KIA	JAPANESE CAPTURED
2 Apr	7th Inf	125	0
	96th Inf	361	0
3 Apr	7th Inf	69	0
	96th Inf	278	0
4 Apr	7th Inf	120	0
	96th Inf	0	0
5 Apr	7th Inf	222	0
	96th Inf	512	0
6 Apr	7th Inf	171	2
	96th Inf	1,524**	3
7 Apr	7th Inf	306	6
	96th Inf	326**	2
8 Apr	7th Inf	306	0
	96th Inf	267**	0
9 Apr	7th Inf	453	0
	96th Inf	539**	-2*
10 Apr	7th Inf	420	0
	96th Inf	378	0
11 Apr	7th Inf	63	0
	96th Inf	195	0
12 Apr	7th Inf	80	0
	96th Inf	122	0
13 Apr	7th Inf	58	0
	96th Inf	355	0
14 Apr	7th Inf	69	4
	27th Inf	261	0
	96th Inf	252	0
15 Apr	7th Inf	127	1
	27th Inf	0	0
	96th Inf	156	1
16 Apr	7th Inf	59	0
	27th Inf	4	0
	96th Inf	19	0
17 Apr	7th Inf	59	2
	27th Inf	18	5
	96th Inf	-1,141*	1
18 Apr	7th Inf	71	9
	27th Inf	18	0
	96th Inf	16	0
19 Apr	7th Inf	0	0
	27th Inf	0	0
	96th Inf	0	0
20 Apr	7th Inf	393	1
	27th Inf	446	2
	96th Inf	247	0
21 Apr	7th Inf	275	0
	27th Inf	1,311	0
	96th Inf	464	0
22 Apr	7th Inf	578	1
	27th Inf	427	0
	96th Inf	200	1
23 Apr	7th Inf	157	0
	27th Inf	440	0
	96th Inf	164	0
24 Apr	7th Inf	99	0
	27th Inf	302	-1*
	96th Inf	125	0
25 Apr	7th Inf	290	0
	27th Inf	133	0
	96th Inf	169	0
26 Apr	7th Inf	252	1
	27th Inf	333	1
	96th Inf	267	0
27 Apr	7th Inf	110	1
	27th Inf	190	1
	96th Inf	341	0
28 Apr	7th Inf	270	1
	27th Inf	123	5

Daily Japanese Casualties as Reported by US XXIV Corps Divisions (Cont'd.) 2

DATE	DIVISION	JAPANESE KIA	JAPANESE CAPTURED
28 Apr	96th Inf	468	0
29 Apr	7th Inf	197	0
	27th Inf	714	-1*
	77th Inf	0	0
	96th Inf	629	0
30 Apr	7th Inf	218	0
	27th Inf	261	1
	77th Inf	116	0
	96th Inf	358	0
1 May	1st Mar	33	0
	7th Inf	452	0
	27th Inf	8	-1*
	77th Inf	155	0
	96th Inf	5	0
2 May	1st Mar	61	1
	7th Inf	96	11
	27th Inf	0	0
	77th Inf	449	0
	96th Inf	0	0
3 May	1st Mar	77	4
	7th Inf	232	-10*
	77th Inf	172	0
	96th Inf	0	0
4 May	1st Mar	915	2
	7th Inf	1,051	1
	77th Inf	1,155	0
	96th Inf	0	0
5 May	1st Mar	337	0
	7th Inf	800	0
	77th Inf	736	0
	96th Inf	7	0
6 May	1st Mar	163	1
	7th Inf	361	-14*
	77th Inf	634	0
	96th Inf	0	0
7 May	1st Mar	0	0
	7th Inf	376	0
	77th Inf	417	0
	96th Inf	0	0
8 May	7th Inf	117	1
	77th Inf	261	0
	96th Inf	1	-2*
9 May	7th Inf	56	1
	77th Inf	195	3
	96th Inf	0	-9*
10 May	7th Inf	38	0
	77th Inf	239	0
	96th Inf	199	5
11 May	7th Inf	3	1
	77th Inf	368	0
	96th Inf	391	0
12 May	7th Inf	0	0
	77th Inf	273	1
	96th Inf	593	0
13 May	7th Inf	3	0
	77th Inf	337	2
	96th Inf	955	3
14 May	7th Inf	0	0
	77th Inf	789	1
	96th Inf	553	1
15 May	7th Inf	0	15
	77th Inf	365	0
	96th Inf	372	0
16 May	7th Inf	0	0
	77th Inf	477	1
	96th Inf	479	1
17 May	7th Inf	0	0
	77th Inf	513	2

Daily Japanese Casualties as Reported by US XXIV Corps Divisions (Cont'd.) 3

DATE	DIVISION	JAPANESE KIA	JAPANESE CAPTURED
17 May	96th Inf	375	1
18 May	7th Inf	0	0
	77th Inf	603	2
	96th Inf	404	0
19 May	7th Inf	0	0
	77th Inf	237	0
	96th Inf	294	1
20 May	7th Inf	0	0
	77th Inf	758	-2*
	96th Inf	482	0
21 May	7th Inf	0	0
	77th Inf	427	0
	96th Inf	1,029	0
22 May	7th Inf	113	-13*
	77th Inf	353	0
	96th Inf	403	0
23 May	7th Inf	125	1
	77th Inf	381	0
	96th Inf	486	0
24 May	7th Inf	696	1
	77th Inf	269	0
	96th Inf	302	2
25 May	7th Inf	572	0
	77th Inf	124	0
	96th Inf	169	1
26 May	7th Inf	191	0
	77th Inf	143	0
	96th Inf	102	0
27 May	7th Inf	261	0
	77th Inf	134	0
	96th Inf	161	6
28 May	7th Inf	88	1
	77th Inf	389	1
	96th Inf	141	0
29 May	7th Inf	431	0
	77th Inf	131	0
	96th Inf	31	0
30 May	7th Inf	467	1
	77th Inf	633	0
	96th Inf	358	0
31 May	7th Inf	382	0
	77th Inf	865	0
	96th Inf	139	1
1 June	7th Inf	264	1
	77th Inf	5	2
	96th Inf	19	1
Totals		49,747	20

\* Adjustments made for changes on source documents. Reasons for changes unknown. They appear, however, to be Corps induced corrections to division reports, especially of running totals that were included on a daily basis with reports for that day.

\*\* These figures were not used by the LFW Team in its computations. 96th Division records showed a total of 867 Japanese killed in action during the period 5 - 3 April 1945, and all Japanese casualty report figures submitted by the 96th Division were adjusted on 17 April 1945 by a XXIV Corps subtraction of 1,141 Japanese killed in action, indicating that the 1,324 Japanese killed in action report of 6 April 1945 was an error.

NOTE: XXIV Corps Periodic Reports were compiled at 1600 hours daily, but cut off times for casualty reporting were 2400 hours of the previous day. The LFW Team therefore used strength and casualty figures from XXIV Corps Periodic Reports for the following day.

Daily Japanese Casualties as Reported by US XXIV Corps Divisions (Cont'd.) 4

Sources: XXIV Corps Periodic Reports for April, May, and 1 June 1945 and XXIV Corps After Action Report for the Okinawa Campaign.

c. The contractual effort described in this Statement of Work (SOW) will provide CAA with a factual basis for determining the extent to which the WWII anomaly is due to flaws in the HERO data base for the World War II and Arab-Israeli War battles, and the extent to which it is due to an actual change in combat dynamics.

d. Definitions of Terms. The following terms are defined for purposes of this SOW.

(1) An anomalous battle is one of those listed in paragraph E-5 of this SOW.

(2) An independent review or reassessment is one that is independent of the data and methods employed by HERO for preparing the HERO data base, and which is based to the maximum feasible extent on a new, original, and objective historical research involving a thorough examination and consideration of all relevant sources of information.

(3) Personnel losses are those personnel lost as the result of battle casualties as defined in the Department of Defense Dictionary of Military and Associated Terms, JCS Pub. 1, latest issue.

(4) The strength of a side is its personnel strength at the start of the battle (i.e., those combat troop personnel who at the start of the action are present on the battlefield and subject to enemy fire), plus those additional combat personnel who enter the battle while it is in progress as a result of maneuver, replacement, reinforcement, attachment, etc.

(5) Dispersion is a measure of the variability, uncertainty, or error in a numerical quantity. Various measures of dispersion are the standard deviation, interpercentile ranges, etc. See, for example, the article "Statistics, Descriptive: Location and Dispersion," in the International Encyclopedia of Statistics, edited by William H. Kruskal and Judith M. Tanur, The Free Press, New York, 1987, and the references cited therein.

#### E-4. TASKS

##### a. General

(1) For each anomalous battle, the Contractor shall independently and objectively review the information on it in the HERO data base, and for each anomalous battle shall make original and independent reassessments of the designation of the action as a battle, the identifications of the attacker and the defender, the values of the personnel strengths and losses for each side, and the identification of the victorious side. In making these independent reviews and reassessments, the Contractor shall consult both official and reliable unofficial sources of information. All data sources consulted shall be critiqued and evaluated for accuracy and reliability. Victory in battle shall, as far as possible, be reassessed based on the local battlefield results--and not on sequelae or ancillary factors less immediately related to the local action. The Contractor shall identify separately the numbers of personnel killed and wounded in action (the bloody losses), and those missing in action or captured (the nonbloody losses) in

all cases where the available data support such identification. The Contractor shall identify separately the initial forces on each side and the number of additional combat troops that enter the battle while it is in progress in all cases where the available data support such identification. The Contractor shall fix upon one particular method of expressing dispersion, as defined above, and shall then provide for each strength and loss figure an estimate or judgment of its dispersion, expressed according to the particular method chosen.

(2) The tasks to be addressed by the Contractor are described in paragraphs b through j below.

b. Task 1 - Independently review/reassess the nine anomalous battles from the Okinawa campaign conducted in the Pacific Theater during World War II and listed in paragraph 5a of this SOW.

c. Task 2 - Independently review/reassess the seven anomalous battles from the Salerno campaign conducted in the Italian Theater during World War II and listed in paragraph 5b of this SOW.

d. Task 3 - Independently review/reassess the nine anomalous battles from the Volturno campaign conducted in the Italian Theater during World War II and listed in paragraph 5c of this SOW.

e. Task 4 - Independently review/reassess the six anomalous battles from the Anzio campaign conducted in the Italian Theater during World War II and listed in paragraph 5d of this SOW.

f. Task 5 - Independently review/reassess the eight anomalous battles from the Rome campaign conducted in the Italian Theater during World War II and listed in paragraph 5e of this SOW.

g. Task 6 - Independently review/reassess the nine anomalous battles from the Arab-Israeli Wars of 1967, 1968, and 1973 and listed in paragraph 5f of this SOW.

h. Task 7 - Independently review/reassess the seven anomalous battles from the Northwest European Theater during World War II and listed in paragraph 5g of this SOW.

i. Task 8 - Independently review/reassess the six anomalous battles from the Eastern Front of the European Theater during World War II and listed in paragraph 5g of this SOW.

j. Task 9 - The Contractor shall prepare a final report that describes the results of each of the Tasks 1 through 8, to include the development track used to arrive at those results.

E-5. LIST OF ANOMALOUS BATTLES

a. Anomalous Battles From The Okinawa Campaign

HERO Data Base No.	Description	Start date
525	Kochi Ridge - Onaga I (7th Div sector)	1945 Apr 25
526	Kochi Ridge - Onaga II (7th Div sector)	1945 Apr 28
527	Kochi Ridge - Onaga III (7th Div sector)	1945 Apr 30
532	Shuri Envelopment (Phase II) (7th Div sector)	1945 May 26
533	Shuri Envelopment (Phase III) (7th Div sector)	1945 May 29
539	Advance to Shuri Line Outposts (96th Div sector)	1945 Apr 5
540	Kakazu & Tombstone Ridges (96th Div sector)	1945 Apr 9
543	Attack on Shuri Line Eastern Flank I (96th Div sector)	1945 May 11
544	Attack on Shuri Line Eastern Flank II (96th Div sector)	1945 May 14

b. Anomalous Battles From The Salerno Campaign

HERO Data Base No.	Description	Start date
394	Amphitheater	1943 Sep 9
395	Port of Salerno	1943 Sep 9
396	Sele-Calore Corridor	1943 Sep 11
397	Battipaglia I	1943 Sep 12
398	Vietri	1943 Sep 12
400	Battipaglia II	1943 Sep 17
401	Eboli	1943 Sep 17

c. Anomalous Battles From The Volturno Campaign

HERO Data Base No.	Description	Start date
403	Grazzanise	1943 Oct 12
406	Castel Volturno	1943 Oct 13
408	Triflisco	1943 Oct 13
409	Dragonì	1943 Oct 15
410	Canal I	1943 Oct 17
411	Monte Grande (Volturno)	1943 Oct 16
413	Francolise	1943 Oct 20
419	Monte Rotondo	1943 Nov 8
422	Monte Maggiore	1943 Dec 2

d. Anomalous Battles From The Anzio Campaign

HERO Data Base No.	Description	Start date
423	Aprilia I	1944 Jan 25
425	Campoleone	1944 Jan 29
427	Carrroceto	1944 Feb 7
428	Moletta River Defense	1944 Feb 7
430	Factory Counterattack	1944 Feb 11
433	Fiocchia	1944 Feb 21

e. Anomalous Battles From The Rome Campaign

HERO Data Base No.	Description	Start date
442	Moletta Offensive	1944 May 23
443	Anzio-Albano Road	1944 May 23
447	Velletri	1944 May 26
448	Campoleone	1944 May 26
449	Villa Crocetta	1944 May 27
451	Fosso di Campoleone	1944 May 29
452	Lanuvio	a944 May 29
454	Via Anziate	1944 Jun 1

f. Anomalous Battles From The Arab-Israeli Wars

HERO Data Base No.	Description	Start date
558	Jebel Libni (Sinai)	1967 Jun 6
568	Kerama (Jordan Valley)	1968 Mar 21
579	Ismailia (Suez)	1973 Oct 19
585	Kuneitra (Golan)	1973 Oct 6
586	Ahmadiyah (Golan)	1973 Oct 6
588	Yehuda - El Al (Golan)	1973 Oct 7
592	Mount Hermonit (Golan)	1973 Oct 8
593	Mount Hermon I (Golan)	1973 Oct 8
600	Mount Hermon II (Golan)	1973 Oct 21

g. Anomalous Battles From The Northwest European Theater

HERO Data Base No.	Description	Start date
459	Operation Goodwood (Normandy)	1944 Jul 18
462	Chartres (Le Mans to Metz)	1944 Aug 16
465	Moselle-Metz (Le Mans to Metz)	1944 Sep 6
472	Morhange (Saar-Lorraine)	1944 Nov 13
479	Durstel-Faerbersviller (Saar-Lorraine)	1944 Nov 28
482	Singling-Bining (Saar-Lorraine)	1944 Dec 6
483	Sauer River (Ardennes)	1944 Dec 16

h. Anomalous Battles From The Eastern Front

HERO Data Base No.	Description	Start date
489	Defense of Moscow (Typhoon)	1941 Sep 30
491	Pogoreloye Gorodische (Rzhev Operation)	1942 Aug 4
492	Leningrad	1943 Jan 12
496	Oboyan - Kursk (Phase III - Citadel)	1943 Jul 11
508	Vistula River (Phase DI - Poland)	1944 Jul 29
513	Ciechanow (Phase I)	1945 Jan 14

## APPENDIX F

### ASSESSING UNCERTAINTIES IN QUANTITATIVE VALUES

F-1. Military historians since at least the time of Herodotus and Thucydides have estimated the numbers of combatants and casualties associated with battles. These estimates are always more-or-less uncertain because the available evidence never is either absolutely exact or completely reliable. Instead, there always is some residual uncertainty, due (if nothing else) to the fact that no tallies are available of the PRECISE number of personnel present at the EXACT time the battle started. Other times there are considerable uncertainties in the numbers. In any event, all such numbers are estimates of their true values, and hence are associated with some "error tolerance," which may be large or small depending on the available data. For this reason, military historians often have deliberately reported their estimated numbers in vague form. For example, they might state that "The French occupied the outskirts with about 20,000 troops. The Allies held the town with some 15,000 men. By the end of the action, the French had lost approximately 3,600, while nearly 5,000 had fallen on the side of the Allies.

F-2. Unfortunately, such descriptions are much too vague to be useful in CAA's (or any other systematic) Combat History Analysis Study Effort (CHASE). Let us recognize at the outset that matters of definition are of course a problem, but let us further suppose that they can somehow be adequately dealt with. In particular, we suppose that in the above description we can confirm that "troops" and "men" both mean "combat effective troops under arms," and that "lost" and "fallen" both mean "battle casualties."

F-3. Presuming the definitional problems are satisfactorily resolved (a bold presumption, to be sure!), we can then take up the issue of what meaning can be placed on the words "about," "some," "approximately," and "nearly." Such language is so vague that it is impossible to decipher what the writer is trying to tell us about the strengths and losses in this battle. For example, did the writer believe that the French troops numbered between 19,500 and 20,500? Or between 17,500 and 22,500? Or between 15,000 and 25,000? Or between 10,000 and 30,000? And whatever your answer, how are you (or anyone else) to know for sure that it's the right answer? Unfortunately, it clearly is impossible to tell. Did the writer believe that 5,000 is the best estimate of Allied losses? Presumably not, since expressions such as "nearly" suggest that the true number is less than the one actually stated. This contrasts with the 3,600 figure for the branch losses, which seems to be intended as a "best" or "most likely" estimate.

F-4. CAA's CHASE project requires an unambiguous way of expressing estimated numbers and characterizing their accuracy. The modern notion of subjective or personal probability provides a way of doing this that is perhaps as reasonable as any other (and which is demonstrably more reasonable than some). Raiffa's book ("Decision Analysis Introductory Lectures on Choices Under Uncertainty," Howard Raiffa, Addison-Wesley, Reading Massachusetts, 1969, second printing 1970) gives a good explanation of these notions in relatively nontechnical form. The recommended application of the notions of subjective or personal probability to the DBEC contract is as explained in the paragraphs below.

F-5. The first step is to settle on a most likely value. This is the value that the military historian would pick if forced to bet on a single value at even odds. In the example used above, the value 21,600 might be settled on as the most likely value. It might be supported by a rationale somewhat like the following. In the official records, the reported strength of the French units at the start and end of the month was 22,311 and 17,532, respectively. Hence, they lost about 4,809 over the month from all causes. Since it is known that no official administrative gains or losses of personnel occurred during that period, the only gains or losses were due to combat, non-battle losses, and incidental accessions. The reported battle was the only major action this unit was involved in during the period. Hence we estimated that the net non-battle losses for the month amounted to 4,809 less the 3,600 battle casualties, or 1,209 non-battle losses. It seems more likely than not that slightly over half of these 1,209 non-battle losses occurred prior to the battle in question. Now 22,341 less 741 leaves 21,600, which is our stated best estimate of the French strength at the start of the battle. After further contemplation of all the factors that need to be considered, we conclude that this is the number we'd pick if we were forced to bet at even odds that it is indeed the true value. This completes step one.

F-6. In step two, we assess the 90 percent confidence band or bracket. Ostensibly, the computation in the foregoing paragraph would suggest that the true value should lie in the bracket 21,600 plus or minus six or seven hundred. That would be in fact the case if we were sure that all of the values used were exactly correct (neither inadvertently nor deliberately misstated), but, all relevant facts considered, we would not wish to bet at ten-to-one odds that the French actually had between 20,900 and 22,300 at the start of this battle. (Ten-to-one odds means that we put in \$100 in the pot, the other bettor puts in \$10, and the winner takes the pot). Suppose that after an initial consideration, we would feel comfortable betting at ten-to-one odds that they had between 19,000 and 25,000. Consequently, we tentatively adopt 19,000-25,000 as the 90 percent confidence bracket. Upon further contemplation and examination of the available sources, we decided that we would be willing to offer even longer odds in favor of any wider bracket, such as 18,500 to 25,500. However, we would not offer odds as long as ten-to-one in favor of any narrower bracket, such as 19,500 to 24,500. Furthermore, we feel that the chance that the French strength was actually less than 19,000 is about the same as the chance that it was greater than 25,000 (specifically, about 5 percent in either case). So, after further study and contemplation, we settle on the 90 percent confidence bracket 19,000 to 25,000.

F-7 We report the results by saying that, for the French strength, the most likely value is 21,600, with a 90 percent confidence bracket of 19,000 to 25,000.

F-8. To reiterate, the key question for the most likely value is "If we were forced to bet at even odds on a single value, what value would we pick, and why?" The key questions for the 90 percent confidence bracket are: Would we be willing to bet at ten-to-one odds that the true value is inside the bracket? Would we be more willing to bet at ten-to-one odds if the bracket were broadened slightly? Would we be less willing to bet at ten-to-one odds if the bracket were narrowed slightly? Do we really believe that the true

value is as likely to be wide of the bracket on the high side as on the low side? If all these questions are answered affirmatively, and we can support them by a convincing rationale, then we have arrived at a good 90 percent confidence bracket. To the extent possible, these answers should be supported by a rationale, but it is recognized that sometimes (perhaps more often than not) the only justification that can realistically be presented is that the answers were honestly and con arrived at by professionals in the field of military history, who in formulating the answers carefully reviewed all of the pertinent sources and made every effort to consider all of the relevant factors. This means that they weighed carefully all evidence provided by the sources, and before using them those sources were studied, evaluated and critiqued for accuracy and reliability, with an eye to the question "How could the author of this source have known the truth about the things he claims?" In addition, it means that professional experience (failures as well as successes) in accurately estimating numerical values in other historical contexts was applied con to the case in hand.

F-9. As a general observation, most people with little prior experience in making these tapes of judgments tend to make their confidence brackets too narrow. It is sobering to contemplate the sizable errors in other sociometric data, and to make realistic adjustments in judgments of the widths of confidence brackets. In this context, one might consult Morgenstern's famous book on errors in econometric data ("On the Accuracy of Economic Observations," Oscar Morgenstern, Princeton University Press, Princeton, New Jersey, Second Edition, 1963). The book "Judgement Under Uncertainty: Heuristics and Biases," Daniel Kahneman, Paul Slovic, and Amos Tversky (Eds.), Cambridge University Press, Cambridge, 1982, is also relevant. In addition, we observe that, 40 years after it ended, The Surgeon General's and the Adjutant General's Offices still cannot agree on the number of US Army casualties in WWII. (The book "Medical Statistics in World War II," prepared under the guidance of Frank A. Meister of the Office of The Surgeon General, US Army, published by the US Printing Office, 1975, gives on page 4 the following comparison of wounded and battle deaths for the US Army in World War II.

Observe that the statistics prepared by the Adjutant General often disagree with those prepared by The Surgeon General by more than 10 percent.

TYPE OF CASUALTY	ADJUTANT GENERAL	SURGEON GENERAL
Wounded in Action	592,170	723,550
Total Deaths	139,696	192,220
Died of Wounds	26,309	20,810
Other battle Deaths	13,869	16,793