

# Saddles and Sabers: Reducing World War II Underground Facilities: Failures and Successes Against Japanese Defenses on Okinawa with Tank-Infantry Teams, 1945

by MAJ James Villanueva

*“The XXIV Corps was confronted with the job of reducing a heavily defended [Japanese] line across the island which had numerous caves, wire, mines, [anti-tank] and machineguns. ... The action became [a] small-unit action, with our artillery, air and naval support ships trying to soften up the [Japanese] defenses by continuous shelling and bombardment.”<sup>1</sup>*

As the U.S. Army prepares to potentially confront adversaries such as North Korea, who occupy extensive underground facilities (UGFs), a look at historical cave complexes and how the U.S. military dealt with them during large-scale combat operations is particularly instructive.

Similar to the U.S. Marines operating on Okinawa, the operations of the U.S. Army XXIV Corps during the Battle of Okinawa in World War II, fought between April and June 1945 (code-named Operation Iceberg by the Allies) and the war’s last major battle, offer a number of insights to the American warriors who may have to reduce cave structures in the future.

There was overwhelming Allied superiority in firepower during the Battle of Okinawa, which was in many cases negated by creative Japanese methods of fortifying and camouflaging caves and UGFs. Ultimately, Allied success in overcoming Japanese defenses on Okinawa, won at great cost, can best be attributed to the ability of American ground units to adapt to enemy defenses at the small-unit level through effective use of combined-arms operations.

By Spring 1945, Allied forces had wrested control of many strategic island groups from the forces of Imperial Japan, including the Solomon, Mariana, Gilbert and Marshall Islands. Allied forces were also in the process of liberating the Philippines from Japanese control. By October 1944, Allied military leaders decided to invade the island of Okinawa to provide a staging base for the anticipated invasion of Japan.<sup>2</sup>

Only 500 miles southwest of Japan, Okinawa would provide the Allies air bases, a fleet anchorage and logistical infrastructure. Its seizure would help sever the Japanese home islands from their possessions to the south. At the tactical and operational levels, invading Okinawa would provide the Allies the opportunity to implement the tactics, techniques and procedures developed during previous campaigns to reduce Japanese defensive positions.

## Japanese dig in

Anticipating the Allied invasion, the Japanese constructed defenses on Okinawa, which consisted of a large number of fortifications, using or building upon existing natural caves. Because of their previous experiences with the crushing weight of Allied naval gunfire, artillery and air strikes in the campaigns on the Marshall and Mariana islands, Japanese military leaders opted to abandon pillboxes made of logs above ground in favor of more protected defenses in underground structures.<sup>3</sup>

Japanese troops on Okinawa constructed small-scale cave defenses beginning in August and September, with full-scale construction of larger complexes beginning in December and continuing to the Allied invasion in April. Beyond strengthening caves, the Japanese dug about 60 miles of tunnels to protect the 100,000 troops of the 32<sup>nd</sup> Army responsible for defending Okinawa.<sup>4</sup>

Many of these defenses had strongpoints based inside hills with multiple levels underground. One example, Hill 130 (nicknamed Chocolate Drop Hill) – in what became the U.S. 77<sup>th</sup> Infantry Division’s sector as it attacked from north to south – had four subterranean levels and embrasures all around the hill that provided the defenders three

47mm anti-tank guns and four heavy machineguns in locations designed to engage American troops in any direction.<sup>5</sup> Foxholes and trenches provided cover for infantrymen defending the firing ports and entrances.

Significantly, the defenses of Chocolate Drop were concentrated on the reverse (southern) slope and were all but invulnerable to American artillery and mortars firing from the north. Supporting Japanese positions on nearby hills and ridges to the east and southwest made envelopment of the position difficult.

So formidable were the defenses on Chocolate Drop that 77<sup>th</sup> Infantry Division took from May 11-17 to capture it, and then only after the loss of 10 tanks and the reduction of the attacking 306<sup>th</sup> Infantry Regiment to a battalion-sized element after it suffered extensive casualties.<sup>6</sup>



**Figure 1. Tanks and armored flamethrowers attack Chocolate Drop Hill May 13, 1945, from the west.** (Source: <https://history.army.mil/books/wwii/okinawa/chapter13.htm>)

While the Japanese decided to allow the Americans to land unopposed on the beaches of the middle section of Okinawa, assuming the reefs there too much of an obstacle for the Americans to cross, the defenders did construct formidable beach fortifications on the beaches of the island's southern coasts, with caves carved out of the natural coral, often reinforced with concrete.<sup>7</sup> These defenses were practically invulnerable to air and naval bombardment and would have likely cost many Allied casualties to reduce had amphibious landings been attempted. Nevertheless, although they were not used to oppose any landings, the Japanese defenses provided ample protection from Allied firepower during the American forces' advance south.

While the Japanese prepared their defenses, the Allied forces charged with seizing Okinawa underwent varying levels of preparation for the coming battle. Commanding the ground troops, named Task Force 56, was the commander of U.S. Tenth Army, LTG Simon B. Buckner Jr.<sup>8</sup> The task force included the U.S. Army's XXIV Corps (7<sup>th</sup> and 96<sup>th</sup> Infantry Divisions), the III Amphibious Corps (1<sup>st</sup> and 6<sup>th</sup> Marine Divisions) and 27<sup>th</sup> Infantry Division as a floating reserve.

Two other divisions would ultimately become involved in the campaign: the 2<sup>nd</sup> Marine Division served as a demonstration landing force, while 77<sup>th</sup> Infantry Division served as the landing force for the Western Ryukyu Islands before joining the rest of Tenth Army on Okinawa.<sup>9</sup>

All of the Army divisions involved in Operation Iceberg were veterans of previous Pacific campaigns, but in many cases they conducted little training prior to landing on Okinawa because they were recovering from previous operations.<sup>10</sup>

## **Armor, infantry cooperation**

Regardless of the amount of training they were able to conduct prior to Operation Iceberg, the importance of tank-infantry cooperation was not lost on American forces before the invasion. Anticipating the need for synchronization, 7<sup>th</sup> Infantry Division trained with its attached 711<sup>th</sup> Tank Battalion while on Leyte.<sup>11</sup> Training exercises focused on tank-infantry coordination, communication between tanks and infantry, target designation and familiarization.

Furthermore, all tank commanders received training on acting as forward observers for artillery. The 711<sup>th</sup> Tank Battalion even formed tank liaison teams for each of its platoons using repurposed mortar men from the battalion's headquarters company, equipping them with radios and jeeps to allow smoother communication with infantry units.

However, the Americans' training prior to Operation Iceberg would prove rather inadequate initially, and the Japanese would present a number of major challenges – both with their fixed defenses and their tactics – that would hamper American efforts at combined-arms integration. Realizing the importance of tanks in particular to the Americans' operations, the Japanese tried to destroy them in a variety of ways, and American tanks took heavy losses during the fighting on Okinawa.<sup>12</sup> Early in the campaign, the American 711<sup>th</sup> Tank Battalion would see its company bivouac areas come under nighttime assaults by Japanese troops “armed only with hand grenades, knives and bundles and cylinders of picric acid (a type of explosive).”<sup>13</sup>

Although American defensive fire normally prevented the Japanese from throwing the explosives under the tanks as they had intended, American troops had to be vigilant lest the Japanese succeed in entering company perimeters. Observers noted that “infantry must be trained to work with the tank, so that the [Japanese soldier] is killed before he reaches the tank. If he is killed after getting to a halted tank, the damage to the tank is usually assured.”<sup>14</sup>

Another Japanese weapon that proved effective against American tanks was the 47mm anti-tank gun, which was generally capable of penetrating American Sherman medium tanks at ranges up to 800 yards.<sup>15</sup> Japanese gunners, well hidden in caves, would hold their fire until the Shermans were very close and then engage them with effective enfilade fire to the sides or rear.<sup>16</sup> This delayed engagement prevented discovery and destruction of the guns and their crews before they could engage American armor.

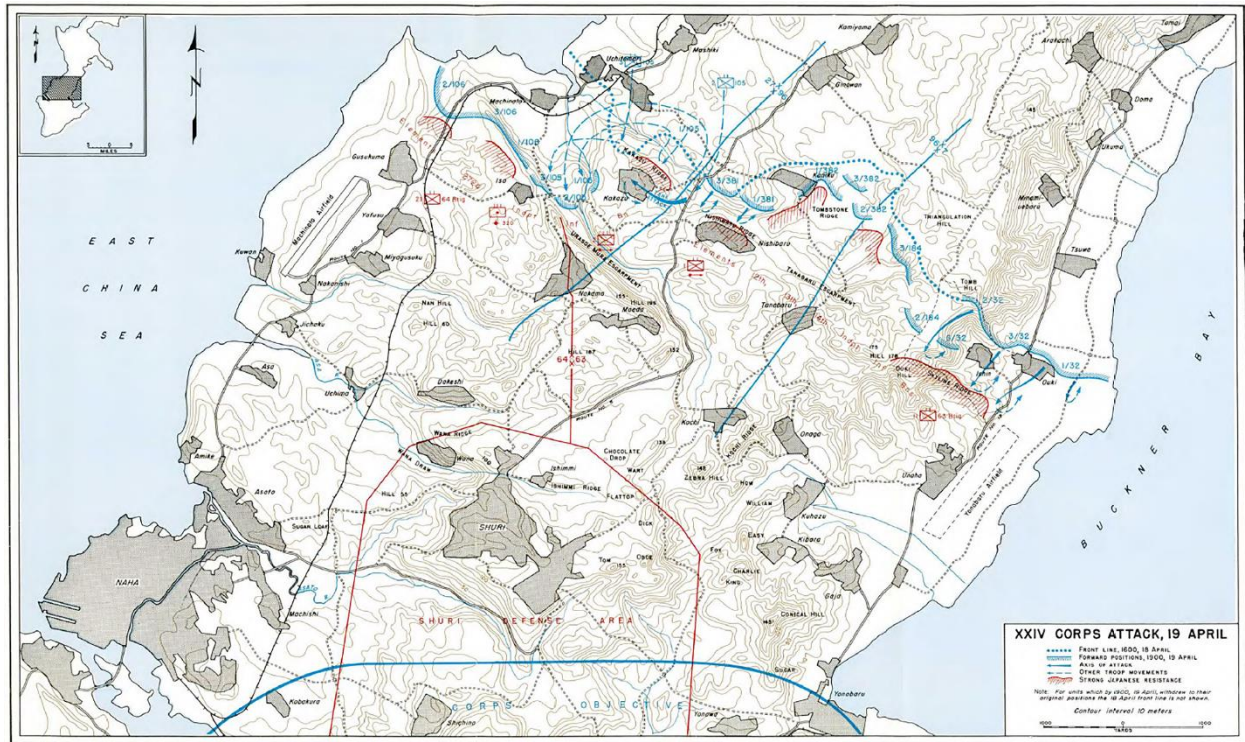
Besides combatting tanks, the Japanese proved adept at negating American firepower generally. The extensive Japanese underground fortifications made conventional linear or massed artillery preparations conducted by Allied forces largely ineffective, wasting ammunition and, in some cases, only serving to forewarn the Japanese of a coming attack. The 7<sup>th</sup> Infantry Division Artillery's report later listed its best practice as shooting “a sudden concentration of fire at odd intervals of time on the enemy so that he had no way of telling if the [artillery] had lifted and the [infantry] had begun to advance.”<sup>17</sup>

In addition to such irregular barrages, in some cases artillery did succeed in destroying camouflage which concealed Japanese bunkers, even if the artillery had little effect on the defenses themselves.<sup>18</sup>

## **Largest artillery use in Pacific**

Nevertheless, Allied artillery units, even when massed, were often ineffective in supporting the advance of forward units. On April 19, 27 battalions of corps and division artillery – 324 pieces all told from 75mm to eight-inch howitzers – fired a massive barrage in support of the three attacking divisions of the XXIV Corps. This was the largest concentration of artillery in the Pacific war.<sup>19</sup> Added to this bombardment was naval-gunfire support from six battleships, six cruisers and six destroyers, as well as the largest single air strike of the campaign conducted by 650 Navy and Marine Corps aircraft.

Despite such an awesome display of firepower, the 7<sup>th</sup>, 96<sup>th</sup>, and 27<sup>th</sup> Infantry divisions, attacking abreast, found Japanese defenses largely intact and failed to secure their objectives. They were unable to employ their combined-arms teams to full effect.



**Figure 2. The XXIV Corps attacks southern Okinawa, April 19, 1945.** (Source: Roy E. Appleman et al, *Okinawa: The Last Battle*, Washington, DC: U.S. Army Center of Military History, 1993.)

Particularly instructive, the failed assault on Kakazu Ridge during the XXIV Corps attack April 19 is one example of a breakdown in the use of the combined-arms team. The 27<sup>th</sup> Infantry Division committed 1<sup>st</sup> Battalion, 105<sup>th</sup> Infantry Regiment, and 30 medium tanks and assault guns – mostly from 193<sup>rd</sup> Tank Battalion – to seize Kakazu Ridge and continue the division’s advance to the south. While 1-105 Infantry conducted a frontal assault, the armored force was to conduct an envelopment to their west and link up with the infantry on the ridge.

Withering Japanese machinegun fire effectively kept the infantry from supporting the tanks. One Japanese 47mm anti-tank gun destroyed four tanks without receiving any return fire, and other vehicles were destroyed or disabled by mines and indirect fire.<sup>20</sup>

The Japanese in this sector – consisting of 272<sup>nd</sup> Independent Infantry Battalion, reinforced with mortar and anti-tank units – also employed suicide squads, which blinded tank crews with smoke candles before approaching with 22-pound satchel charges. These squads accounted for six vehicles destroyed. With their vehicles disabled and unable to count on infantry support for close-in protection, several American tanks crews were killed when Japanese infantryman swarmed their vehicles, forced open the hatches and dropped grenades inside. Those crews who did survive often dug in underneath their vehicles.

All told, the attacking Americans lost 22 of 30 vehicles, and the attack stalled.<sup>21</sup> Four of those destroyed vehicles were flamethrower tanks of 713<sup>th</sup> Tank Battalion. The unit’s after-action report bluntly recorded, “The tanks must receive support by infantry on a mission of this type.”<sup>22</sup>

### Japan’s tactical success

In addition to using defensive positions that were largely invulnerable to artillery and aerial bombardment, the Japanese also employed their own artillery to effectively hamper American combined-arms integration throughout April and into May. Under the leadership of renowned Japanese artillery officer LTG Wada Kojo, Japanese forces employed artillery more efficiently and in greater quantity than they had in any other ground engagement in the Pacific Theater. As one example, the American XXIV Corps received some 14,000 rounds of artillery fire in one 24-hour period.<sup>23</sup>

While American artillery units tried to conduct counterbattery fire missions against Japanese artillery, locating Japanese artillery positions on the reverse slopes of hills or hidden underground often proved difficult; success in destroying Japanese artillery was mixed.

In many cases, Japanese employment of mortars and artillery successfully isolated attacking tanks from their infantry support, making them vulnerable to close-in attacks by anti-tank guns or dismounted suicide teams with satchel charges and grenades.<sup>24</sup> Regarding initial efforts to advance against the Japanese in the south, a tank-company commander of 711<sup>th</sup> Tank Battalion later related, "Emphasis was not placed [by American forces] on the close coordinated infantry-tank team. ... The most important factor was the quantity of artillery fire attracted by the tank. The artillery fire made it impossible for the infantry to remain in close vicinity of the tank."<sup>25</sup>

Besides separating American infantry and tanks from each other, Japanese artillery in a number of cases forced the withdrawal of American armor on its own, disabling vehicles by destroying their tracks and forcing the crews to button up. Japanese artillery also forced American troops to withdraw from positions they had seized, in part explaining the multiday efforts to seize positions like Kakazu Ridge and Chocolate Drop Hill. For example, after seizing hills codenamed "Dick Baker" and "Dick Able" May 13, Companies A and C of 96<sup>th</sup> Infantry Division's 382<sup>nd</sup> Infantry Regiment received a heavy concentration of Japanese 90mm and 150mm artillery as well as mortar fire, causing heavy casualties in both companies.

Japanese fires also forced the withdrawal of Company B. One of the platoons in Company A only had one or two survivors – the rest were killed by the bombardment.<sup>26</sup> Units of 7<sup>th</sup> Infantry Division had similar experiences with the deadly Japanese artillery.<sup>27</sup>

## **Tank variants important**

Despite initial Japanese success in combatting U.S. combined-arms teams, the Americans were able to make slow and steady progress through effective integration of tanks and infantry at the lowest levels. Tanks in particular were important to American success.

While standard American tank battalions saw extensive use on Okinawa, more specialized tank variants also made important contributions. With its 54 flamethrower tanks, 713<sup>th</sup> Tank Battalion (Armored Flamethrower Provisional) landed on Okinawa early in the operation, but found that the prevalence of Japanese anti-tank minefields hampered many of their efforts.<sup>28</sup>

Despite difficulties with their delayed employment, in many cases flamethrower tanks were crucial to American success, reducing Japanese defenses in hard-to-reach areas. In the words of one tank-company commander, "The more elaborate [Japanese] positions ... were most effectively reduced by the flamethrower tank. The infantry came to 'love' the flamethrower tank. In fact, they would not move until the forward slope of their objective was completely burned from end to end."<sup>29</sup>

Even when they didn't destroy Japanese defenses or kill enemy soldiers directly, flamethrower tanks would often drive Japanese defenders out of their defensive positions, making them vulnerable to American infantry and artillery fire.<sup>30</sup>



**Figure 3. Members of the U.S. 1<sup>st</sup> Marine Division advance behind a flame-throwing tank during the Battle of Okinawa, May 11, 1945. (U.S. Marine Corps photo)**

Beyond flamethrower tanks, tanks with bulldozer blades were also important to create hasty crossings over irrigation ditches or other impassable terrain or to seal cave entrances used by the Japanese defenders.<sup>31</sup> In attacking the Shuri Line, 7<sup>th</sup> Infantry Division found tank dozers useful for creating firing points for tanks to engage Japanese defenses.<sup>32</sup> Armor of various types was important for successful operations, as infantry often had trouble reducing cave defenses on its own. A post-battle report noted, "Without the armor, it is most difficult to reduce most caves."<sup>33</sup>

Therefore, during the fighting on Okinawa, small tank-infantry teams in many cases provided the primary units to reduce defended caves. While tanks suppressed any defending Japanese forces, the infantry would work its way to the cave's mouth. Using flamethrowers and grenades, the infantry would eliminate any Japanese defenders or seal the cave's entrance with demolition charges. By using bangalore torpedoes to destroy minefields, the infantry and attached engineers could also allow the tanks to get into position to place effective fire on Japanese defenses.

In mid-May, 96<sup>th</sup> Infantry Division's 2<sup>nd</sup> Battalion, 382<sup>nd</sup> Infantry, used about seven tons of bangalore torpedoes to clear paths through a minefield for supporting tanks, and the "tank-infantry team tactics enabled 2<sup>nd</sup> Battalion to completely clear the southern slopes" of their objectives.<sup>34</sup> However, less-conventional methods were often used to root out stubborn defenders. In some cases, troops would pour gasoline directly into caves before igniting the gasoline with explosives, but this could be dangerous work. For instance, after chasing some Japanese troops into a cave, a LT Brandino of 713<sup>th</sup> Tank Battalion suffered second-degree burns to his head and hands when there was an explosion in a cave into which he was pumping gasoline to burn out the inhabitants.<sup>35</sup>

### **Slow, hard work**

However, even when American forces were able to successfully reduce Japanese defenses, the work was slow and laborious, especially for the engineers accompanying the advancing infantry and tanks. Typical for many engineer units, 77<sup>th</sup> Infantry Division's 302<sup>nd</sup> Engineer Battalion demolished 1,000 Japanese defensive positions in a one-month period, allowing other units to bypass them.<sup>36</sup> However, when bypassing or isolating Japanese positions, American forces had to take care to properly demolish their entrances to prevent future use.

One Japanese prisoner noted that American forces would often fail to completely destroy the entrances to cave positions, in some cases inadvertently widening rather than closing the caves' mouths when they demolished them with explosives.<sup>37</sup> This allowed the Japanese troops within the cave to continue resisting or move on to other positions.

Ultimately, as discussed previously, American troops were able to successfully reduce Japanese defenses by infiltrating small units of infantrymen, armed with automatic weapons, flamethrowers and demolition charges to destroy cave defenses at close range. Where possible, these attacks had to be supported by artillery and tanks, especially flamethrower tanks, to force the Japanese underground. Unfortunately for the Americans, these tactics took time to master, but once they were implemented, American casualties dropped by 40 or more percent.<sup>38</sup>

Once it concluded, the Okinawa campaign proved the costliest of any that American forces fought against the Japanese, with 12,520 killed in action – including LTG Buckner – and 36,631 wounded among Allied ground, air and naval forces.<sup>39</sup> The Japanese lost 110,000 troops killed. Despite having overwhelming firepower, the Americans initially struggled to overcome Japanese defenses, and in the end, it came down to synchronized teams of tanks, infantry, engineers and artillery to defeat Japanese forces on the ground.

While Buckner has, perhaps rightly, been criticized for being unimaginative and not considering one or more amphibious envelopments to get around Japanese defenses, the Japanese defenses were so strong that heavy Allied casualties may have been all but assured.<sup>40</sup>

## Takeaway from Okinawa

For American forces who may have to reduce underground complexes during large-scale combat in the future, training in combined-arms integration and synchronization down to the lowest level squads is crucial to success when operating in this environment. Also, as clearing every complex would be prohibitively costly in terms of lives, equipment and time, bypassing, isolating or suppressing UGFs and merely destroying their entrances to prevent their use may be considerations as commanders weigh risks to their forces and missions.

Finally, extensive use of intelligence, surveillance, reconnaissance assets and sensors, both manned and unmanned, should provide current American forces greater information regarding enemy defenses than was available to their World War II counterparts. This could be particularly true for artillery firing points, machinegun and anti-tank weapon positions. The nature of UGFs, which are largely hidden from view, specifically makes intelligence-gathering more difficult than other types of terrain where U.S. forces have fought in recent decades. Although they do so for every operation, commanders should put particular emphasis on gathering information on the disposition of enemy UGFs as they contemplate operations in this challenging environment, drawing some important conclusions from the Army's experience on Okinawa.

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## Notes

<sup>1</sup> Quote from Headquarters Army Ground Forces, "Report on the Okinawa Operation," May 1, 1945, Army War College, Washington, DC, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a438628.pdf>.

<sup>2</sup> Roy E. Appleman *et al*, *Okinawa: The Last Battle*, Washington, DC: U.S. Army Center of Military History, 1993.

<sup>3</sup> 6<sup>th</sup> Division, U.S. Marine Corps, *Sixth Marine Division on Okinawa Shima: G-2 Summary*, Aug. 1, 1945.

<sup>4</sup> Thomas M. Huber, *Japan's Battle of Okinawa, April-June 1945*, Leavenworth Papers No. 18, Fort Leavenworth, KS: Combat Studies Institute, U.S. Army Command and General Staff College, 1990.

<sup>5</sup> Gordon L. Rottman, *Japanese Pacific Island Defenses 1941-1945*, Oxford, UK: Osprey Publishing Ltd., 2003.

<sup>6</sup> Appleman *et al*.

<sup>7</sup> ***Sixth Marine Division on Okinawa Shima: G-2 Summary.***

<sup>8</sup> Buckner was the son of the Confederate general who surrendered Fort Donelson, TN, to Union GEN Ulysses S. Grant during the American Civil War. Previously assigned to command the Alaska Defense Force, he had no combat experience prior to commanding Tenth Army. Stephen R. Taffe, ***Marshall and His Generals: U.S. Army Commanders in World War II***, Lawrence, KS: The University Press of Kansas.

<sup>9</sup> Rottman.

<sup>10</sup> Several units spent the time before Operation Iceberg recovering from the Leyte Campaign and providing manpower for a variety of loading and unloading details prior to the embarkation for Okinawa. Robert C. Williams, "Subject: Report on the Okinawa Operation; To Commanding General, Army Ground Forces, Army War College," May 1, 1945, Washington, DC; James B. Hewette, "Operations of Company K and 3<sup>rd</sup> Battalion, 184<sup>th</sup> Infantry, 7<sup>th</sup> Infantry Division, on Okinawa, April 1 - June 22, 1945 (Ryukyus Campaign) (personal experience of a company commander and battalion S-3," Fort Benning, GA: the Infantry School, 1946; <https://mcoepublic.blob.core.usgovcloudapi.net/library/DonovanPapers/wwii/STUP2/G-L/HewetteJames%20B.%20CPT.pdf>.

<sup>11</sup> Dennis W. Neill, "A Tank Company on Okinawa – Company A, 711<sup>th</sup> Tank Battalion in the Okinawa Campaign," Fort Knox, KY: the Armor School, 1949; <https://mcoepublic.blob.core.usgovcloudapi.net/library/Armorpapers/ASTUP/M-R/NeillDennisW.%20CPT.pdf>.

<sup>12</sup> American forces suffered 221 tank casualties on Okinawa, including 94 vehicles destroyed. This constituted about 57 percent of the tanks committed to the fighting on Okinawa. See Gene Eric Salecker, ***Rolling Thunder against the Rising Sun: The Combat History of U.S. Army Tank Battalions in the Pacific in World War II***, Mechanicsburg, PA: Stackpole Books, 2008.

<sup>13</sup> Neill.

<sup>14</sup> Williams.

<sup>15</sup> Huber.

<sup>16</sup> Headquarters Army Ground Forces, "Information on Japanese Defensive Installations and Tactics," Carlisle, PA: Army War College, 1945; <https://apps.dtic.mil/sti/citations/ADA438611>.

<sup>17</sup> Headquarters 7<sup>th</sup> Infantry Division artillery, "Report of Ryukyus Campaign (Iceberg Operation) April 1-June 30, 1945," San Francisco, CA; <https://apps.dtic.mil/sti/citations/ADA438197>.

<sup>18</sup> Ibid.

<sup>19</sup> Edwin W. Emerson, "Operations of B Company, 32<sup>nd</sup> Infantry, 7<sup>th</sup> Infantry Division, in the Conquest of Okinawa, April 10-20, 1945 (Ryukyus Campaign) (personal experience of a rifle-platoon leader," Fort Benning, GA: the Infantry School, 1948; <https://mcoepublic.blob.core.usgovcloudapi.net/library/DonovanPapers/wwii/STUP2/A-F/EmersonEdwin%20W.%201LT.pdf>; Appleman *et al.*

<sup>20</sup> Appleman.

<sup>21</sup> Rottman.

<sup>22</sup> Headquarters 713<sup>th</sup> Tank Battalion, "After-Action Report, 713<sup>th</sup> Tank Battalion, Armd [sic] Flame Thrower Provisional, Nov. 19, 1944, thru June 30, 1945, Chapter VI: Assault Phase";

<https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/3519/rec/>. Along the same lines, the seizure of Kadena Airfield did witness an incident which somewhat hampered tank-infantry cooperation. When used to reduce Japanese installations around the airfield in support of infantry units, tank fire detonated Japanese aerial bombs, injuring nearby infantrymen. Understandably, this made infantrymen hesitant to use tanks for the rest of the day. Also see Neill.

<sup>23</sup> Headquarters Army Ground Forces, "Subject: Information on Japanese Defensive Installations and Tactics," Aug. 3, 1945, Washington, DC.

<sup>24</sup> Salecker.

<sup>25</sup> Neill.

<sup>26</sup> Joseph F. Vering, "Operations of 382<sup>nd</sup> Infantry, 96<sup>th</sup> Infantry Division, in the penetration of the Japanese Naha-Shuri-Yonabaru Line on Okinawa, May 10-31, 1945 (Ryukyus Campaign) (personal experience of a company commander)," Fort Benning, GA: the Infantry School, 1948;

<https://mcoepublic.blob.core.usgovcloudapi.net/library/DonovanPapers/wwii/STUP2/S-Z/VeringJosephF%20MAJ.pdf>.

<sup>27</sup> Hewette.

<sup>28</sup> Office, Director of Intelligence, Army Special Forces, "Special Technical Intelligence Bulletin No. 9- FLAME!", June 2, 1945, Washington, DC; <https://archive.org/details/FlameSpecialBulletinNo9>.

<sup>29</sup> Neill.

<sup>30</sup> Steven J. Zaloga, ***U.S. Flamethrower Tanks of World War II***, Oxford, UK: Osprey Publishing Ltd., 2013.

<sup>31</sup> Neill.

<sup>32</sup> Headquarters 711<sup>th</sup> Tank Battalion, "After-Action Report, 711<sup>th</sup> Tank Battalion, April 1-June 30, 1945"; <https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/3515/rec/2>.

<sup>33</sup> Headquarters Army Ground Forces, "Subject: Information on Japanese Defensive Installations and Tactics."

<sup>34</sup> Vering.



<sup>35</sup> Headquarters 713<sup>th</sup> Tank Battalion, "After-Action Report, 713<sup>th</sup> Tank Battalion, Armd [sic] Flame Thrower Provisional, Nov. 19, 1944, thru June 30, 1945." The Americans had tried to flush the Japanese out of the cave with "gunfire, smoke and grenades," but this had proven ineffective.

<sup>36</sup> G.H. Lenox, "A Pictorial Review of Engineer Work Performed by Engineer Troops of XXIV Corps During the Okinawan Campaign," July 1, 1945; <https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/4636>.

<sup>37</sup> *Sixth Marine Division on Okinawa Shima: G-2 Summary*.

<sup>38</sup> Huber.

<sup>39</sup> Appleman *et al.*

<sup>40</sup> Buckner thought such operations were unworthy of the risks and could also overstretch his already taxed logistics. Ronald Spector, *Eagle Against the Sun: The American War with Japan*, New York: Vintage Books, 1985.

## Acronym Quick-Scan

HHC – headquarters and headquarters company

UGF – underground facility

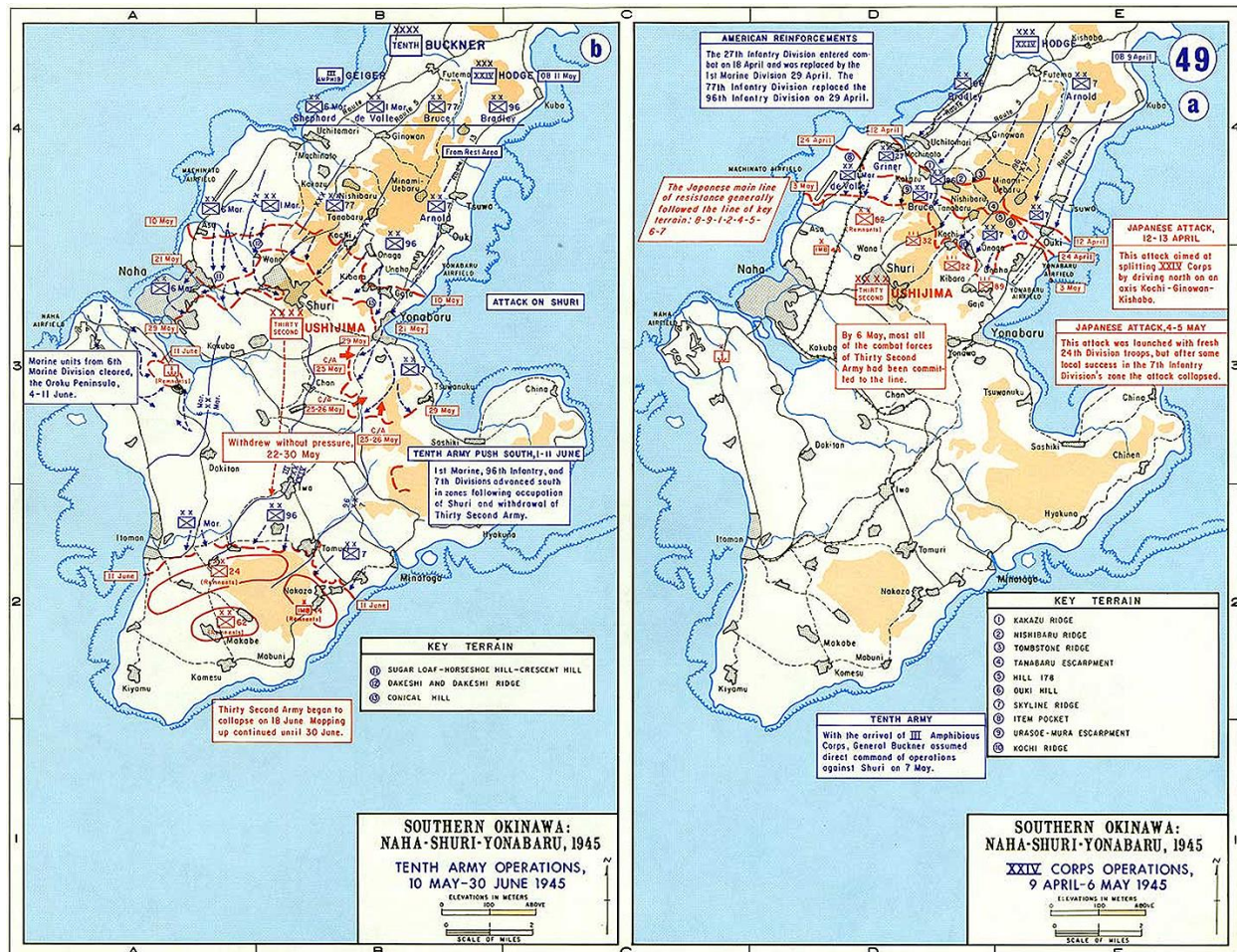


Figure 4. Operations on the island of Okinawa, April-June 1945. (Map courtesy of the U.S. Military Academy Department of History)

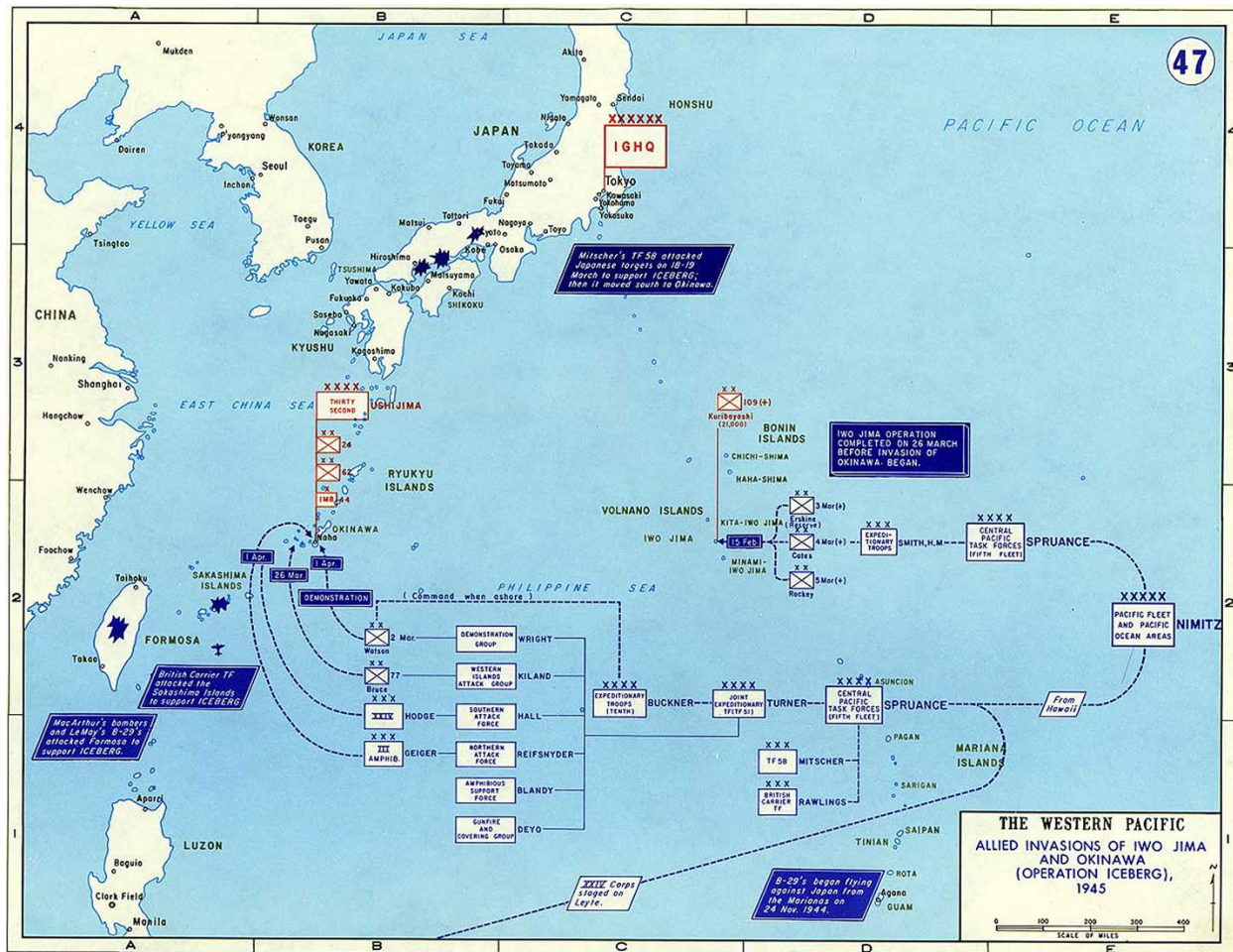


Figure 5. Operation Iceberg (Allied Invasion of Iwo Jima and Okinawa, 1945). (Map courtesy of the U.S. Military Academy Department of History)